NOZALA COAL (PTY) LTD

PROPOSED GRUISFONTEIN PROJECT

FINAL ENVIRONMENTAL MANAGEMENT PROGRAMME OCTOBER 2019

Compiled by:

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mineral resources

Department:
Mineral Resources
REPUBLIC OF SOUTH AFRICA

FINAL ENVIRONMENTAL MANAGEMENT PROGRAMME

PROPOSED GRUISFONTEIN PROJECT

FOR LISTED ACTIVITIES ASSOCIATED WITH A MINING RIGHT APPLICATION

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).

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FILE REFERENCE NUMBER SAMRAD: LP30/5/1/2/2/10170MR

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

OBJECTIVES OF THE ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

The objective of the environmental impact assessment process is to, through a consultative process—

(a) determine the policy and legislative context within which the activity is located and document how the proposed activity complies with and responds to the policy and legislative context;
(b) describe the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the preferred location;
(c) identify the location of the development footprint within the preferred site based on an impact and risk assessment process inclusive of cumulative impacts and a ranking process of all the identified development footprint alternatives focusing on the geographical, biophysical, biological, social, economic, heritage and cultural aspects of the environment;
(d) determine the -
    a. nature, significance, consequence, extent, duration and probability of the impacts occurring to inform identified preferred alternatives; and
    b. degree to which these impacts -
        i. can be reversed;
        ii. may cause irreplaceable loss of resources; and
        iii. can be avoided, managed or mitigated;
(e) identify the most ideal location for the activity within the preferred site based on the lowest level of environmental sensitivity identified during the assessment;
(f) identify, assess, and rank the impacts the activity will impose on the preferred location through the life of the activity;
(g) identify suitable measures to manage, avoid or mitigate identified impacts; and
(h) identify residual risks that need to be managed and monitored.

In terms of the NEMA 2014 EIA Regulations contained in GN R982 of 04 December 2014 (as amended in 2017) the Environmental Management Programme (EMPr) must comply with Appendix 4 of the NEMA 2014 EIA Regulations (GN R982 of 04 December 2014).

Legal Requirement		**Relevant Section in EMPr**
(1)	An EMPr must comply with section 24N of the Act and include–	
(a)	details of- (i) the EAP who prepared the EMPr; and (ii) the expertise of that EAP to prepare an EMPr, including a curriculum vitae;	Section 1.2.2 Appendix 2
(b)	a detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description;	Section 2
(c)	a map at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that any areas that should be avoided, including buffers;	Figure 5 Appendix 19
(d)	a description of the impact management objectives outcomes, including management statements, identifying the impacts and risks that need to be avoided, managed and mitigated as identified through the environmental impact assessment process for all phases of the development including– (i) planning and design; (ii) pre-construction activities; (iii) construction activities; (iv) rehabilitation of the environment after construction and where applicable post closure; and (v) where relevant, operation activities;	Section 3
(e)	The description and identification of impact management outcome required for the aspects contemplated in paragraph (d);	Section 3
(f)	a description of proposed impact management actions, identifying the manner in which the impact management objectives and outcomes contemplated in paragraph (d) and (e) will be achieved, and must, where applicable, include actions to (i) avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation; (ii) comply with any prescribed environmental management standards or practices; (iii) comply with any applicable provisions of the Act regarding closure, where applicable; and (iv) comply with any provisions of the Act regarding financial provision for rehabilitation, where applicable;	Section 4 Table 9
(g)	the method of monitoring the implementation of the impact management actions contemplated in paragraph (f);	Section 5 Table 11
(h)	the frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f);	Section 4 Table 10
(i)	an indication of the persons who will be responsible for the implementation of the impact management actions;	Section 4 Table 10
(j)	the time periods within which the impact management actions contemplated in paragraph (f) must be implemented;	Section 4 Table 10
(k)	the mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f);	Section 5 Table 11
(l)	a program for reporting on compliance, taking into account the requirements as prescribed by the Regulations;	Section 5.2
(m)	an environmental awareness plan describing the manner in which—	Section 6

Legal Requirement		Relevant Section in EMPr
	(i) the applicant intends to inform his or her employees of any environmental risk which may result from their work; and (ii) risks must be dealt with in order to avoid pollution or the degradation of the environment; and	
(n)	any specific information that may be required by the competent authority.	Section 8

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GLOSSARY OF TERMS

Term / Abbreviation	Meaning
AIP	Alien and Invasive Plant
ARD	Acid Rock Drainage
AQA	National Environmental Management: Air Quality Act 39 of 2004, as amended
BID	Background Information Document
Biome	A broad ecological unit representing major life zones of large natural areas – defined mainly by vegetation structure and climate
CA	Competent Authority
CARA	Conservation of Agricultural Resources Act 43 of 1983
CBA	Critical Biodiversity Area
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CRR	Comments and Response Report
DAFF	Department of Agriculture, Forestry and Fisheries
dBA	Decibels
DAFF	Department of Agriculture, Forestry and Fisheries
DEA	Department of Environmental Affairs
DM	District Municipality
DMR	Department of Mineral Resources
DRDLR	Limpopo Department of Rural Development and Land Reform
DRT	Department of Roads and Transport
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EC	Electrical Conductivity
EDD	Expanded Durov Diagram
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
EMPr	Environmental Management Programme
ESA	Ecological Support Area
GDP	Gross Domestic Product
GPS	Global Positioning system
HIA	Heritage Impact Assessment

Term / Abbreviation	Meaning
IAPs	Interested and Affected Parties
IBA	Important Bird and Biodiversity Area
IDPs	Integrated Development Plans
IUCN	International Union for Conservation of Nature and Natural Resources
IWUL	Integrated Water Use Licence
IWWMP	Integrated Water and Waste Management Plan
LCC	Land Claims Commissioner
LDP	Limpopo Development Plan
LED	Local Economic Development
LEDET	Limpopo Department of Economic Development, Environment and Tourism
LEMA	Limpopo Environmental Management Act 7 of 2003
LIHRA	Limpopo Heritage Resources Agency
LM	Local Municipality
LOM	Life of Mine
LSU	Large Stock Unit
Mamsl	Meters above mean sea level
MAE	Mean Annual Evaporation
MAP	Mean Annual Precipitation
MAR	Mean Annual Run-off
mbs	Meters below surface
MCWAP	Mokolo and Crocodile (West) Water Augmentation Project
MPRDA	Mineral and Petroleum Resources Development Act 28 of 2002, as amended
MRA	Mining Right Application
MSA	Middle Stone Age
Mtpa	Million Tonnes Per Annum
MWP	Mining Work Programme
NBA	National Biodiversity Assessment, 2011
NDP	National Development Plan, 2030
NEMA	National Environmental Management Act 107 of 1998, as amended
NEMBA	National Environmental Management: Biodiversity Act 10 of 2004, as amended
NEMWA	National Environmental Management: Waste Act 59 of 2008, as amended
NFA	National Forest Act 84 of 1998
NFEPA	National Freshwater Ecosystem Priority Areas

Term / Abbreviation	Meaning
NGO	Non-Governmental Organisation
NHRA	National Heritage Resources Act 25 of 1999
NPAES	National Protected Areas Expansion Strategy, 2010
NPV	Net Present Value
NWA	National Water Act 36 of 2008, as amended
NWCS	National Wetland Classification System
PCD	Pollution Control Dam
PFD	Process Flow Diagram
PM	Particulate Matter
PRECIS	Pretoria Computer Information Systems
QDS	Quarter Degree Square
RDL	Red Data List
RE	Risk estimation
RoM	Run of Mine
SAHRA	South African Heritage Resources Agency
SANBI	South African National Biodiversity Institute
SANS	South African National Standards
S&EIR	Scoping and Environmental Impact Reporting
SDF	Spatial Development Framework
SEIA	Socio-Economic Impact Assessment
SIA	Social Impact Assessment
SCC	Species of Conservation Concern
SLP	Social and Labour Plan
SMME	Small, Medium and Micro Enterprise Businesses
SPLUMA	Spatial Planning and Land Use Management Act 16 of 2013
TDS	Total Dissolved Solids
TOPS	Threatened or Protected Species
TWQR	Target Water Quality Range
VIA	Visual Impact Assessment
WHO	World Health Organisation
WML	Waste Management Licence

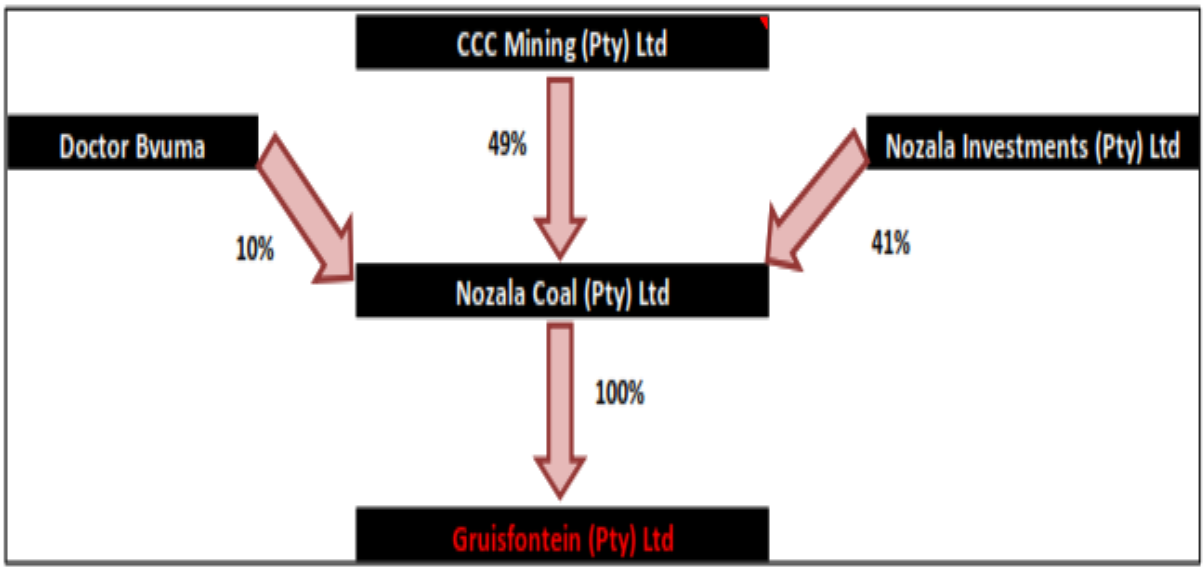
1 INTRODUCTION

1.1 BACKGROUND

Nozala Coal (Pty) Limited (Nozala Coal) holds a coal prospecting right (PR) over the farm Gruisfontein 230 LQ in the Waterberg Coalfield.

The PR was granted for the exploration of bituminous coal and was renewed in January 2017 for a further three years, expiring in January 2020. An application for a Mining Right was submitted to the Department of Mineral Resources (DMR) in terms of section 22 of the Mineral and Petroleum Resources Development Act (MPRDA), 2002 (Act 28 of 2002) on 25 April 2019 and duly accepted by the DMR on 28 May 2019.

The project is referred to as the **Gruisfontein Project**. The illustration below shows the shareholding structure of Nozala Coal.



Shareholding In Nozala Coal (Pty) Ltd

RSV Enco Consulting (Pty) Ltd (RSV Enco) completed a Concept Study in 2018 to determine the most suitable exploitation of the resource. Subsequent to the Concept Study, RSV Enco was appointed to project manage the application for the mining right on behalf of Nozala Coal and to ensure that all legal requirements are in place for the said applications. RSV Enco in turn appointed Jacana Environmentals cc (Jacana) to apply for Environmental Authorisation (EA) in terms of the National Environmental Management Act (NEMA), 1998 (Act 107 of 1998), as amended, and for the Waste Management Licence (WML) in terms of the National Environmental Management: Waste Act (NEMWA), 2008 (Act 59 of 2008), as amended.

The Integrated Water Use Licence (IWUL) in terms of the National Water Act (NWA), 1998 (Act 36 of 1998), as amended, will only be applied for once the EA and WML are granted.

The development of the project will take approximately 4 years during which period licences will be secured, agreements for offtake and services will be entered into, feasibility studies completed, and construction commenced.

The below diagram indicates that operations will only commence during Stage 4, estimated to be around 2023, mainly due to licencing and construction of infrastructure for the mine.

The project is divided into different stages:

STAGE 1 LICENCING	STAGE 2 WATER USES AND FEASIBILITY	STAGE 3 CONSTRUCTION	STAGE 4 RAMP-UP OPERATIONS	STAGE 5 FULL PRODUCTION	STAGE 6 DOWNSCALING & CLOSURE
2019 – 2020 (12 mnths)	2020 (12 mnths)	2021 – 2022 (18 mnths)	2023 (12 mnths)	2024 (16 years)	2037 (3 years)
Mining Right Application Environmental Authorisation Waste Management Licence	Water Use Licence Feasibility Study	Commence Construction	Commence Operations	Operations in Full Production	Rehabilitation Downscaling Portable Skilling Closure
		Construction employees 250 - 300	Start-up employees 300 - 350	Full Production employees 500	

The integrated application for EA and the WML was submitted to the DMR on 25 April 2019, the Competent Authority (CA) for mining and related activities. The application was acknowledged by the DMR on 6 May 2019.

The Final Scoping Report (FSR), following a 30-day commenting period by registered Interested and Affected Parties (IAPs) and commenting authorities on the draft Scoping Report (DSR), was submitted to the CA on 10 June 2019. The FSR and Plan of Study was accepted on 18 July 2019.

This document serves as the **Final Environmental Management Programme** (EMPr), following a 30-day commenting period by registered Interested and Affected Parties (IAPs) and Commenting Authorities on the draft EMPr from 17 September to 19 October 2019.

1.2 APPLICANT AND SPECIALIST DETAILS

1.2.1 Applicant

Project applicant	Nozala Coal (Pty) Ltd
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1.2.2 Environmental Assessment Practitioner

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Professional Affiliation	Pr.Sci.Nat. at SA Council for Natural Science Professions (SACNASP) Reg No 400090/02 Member of the Land Rehabilitation Society of Southern Africa (LaRRSA): Membership ID 30835

Marietjie Eksteen is the Managing Director of the consulting firm Jacana Environmentals cc, an environmental consulting firm based in Polokwane. She is an environmental scientist with 28 years' experience, her main fields of expertise being water quality management, mine water management, environmental legal compliance and project management. Ms Eksteen is a registered Professional Environmental Scientist (Pr.Sci.Nat.) at the South African Council for Natural Scientific Professions – Registration No. 400090/02.

Since establishing Jacana Environmentals in 2006, she has been involved in a variety of mine-related environmental projects serving clients such as Coal of Africa Limited, BHP Billiton Energy Coal SA, Xstrata Coal SA and Optimum Coal. Prior to 2006 she was employed by Pulles Howard & De Lange Inc as an environmental consultant for 2 years. Before consulting, Ms Eksteen was employed by BHP Billiton as a mine environmental manager at their operations in Mpumalanga, as well as the Department of Water Affairs where she was appointed as a water quality specialist for the mining industry. Her career started off as a geophysicist at Genmin in 1990. Ms Eksteen obtained a Masters' degree in Exploration Geophysics (MSc) from the University of Pretoria in 1993.

2 DESCRIPTION OF THE ASPECTS OF THE ACTIVITY

2.1 PROJECT LOCATION

The Gruisfontein Project is located in Ward 3 of the Lephalale Local Municipality within the Waterberg District Municipality of Limpopo Province. The proposed development lies within the Waterberg Coalfield.

The main settlement in the area is the Lephalale town that consist of Ellisras and Onverwacht, with a large settlement to the north-west called Marapong, approximately 40 km south-east from the Gruisfontein MRA area. The closest town to the proposed development is Steenbokpan, approximately 13 km to the south, with a relatively small settlement (± 400 households) called Lesedi located on the farms Steenbokpan and Vangpan.

The Matimba and Medupi Power Stations (Eskom) is situated strategically close to the proposed development, approximately 28 km south-east of the proposed Gruisfontein Project.

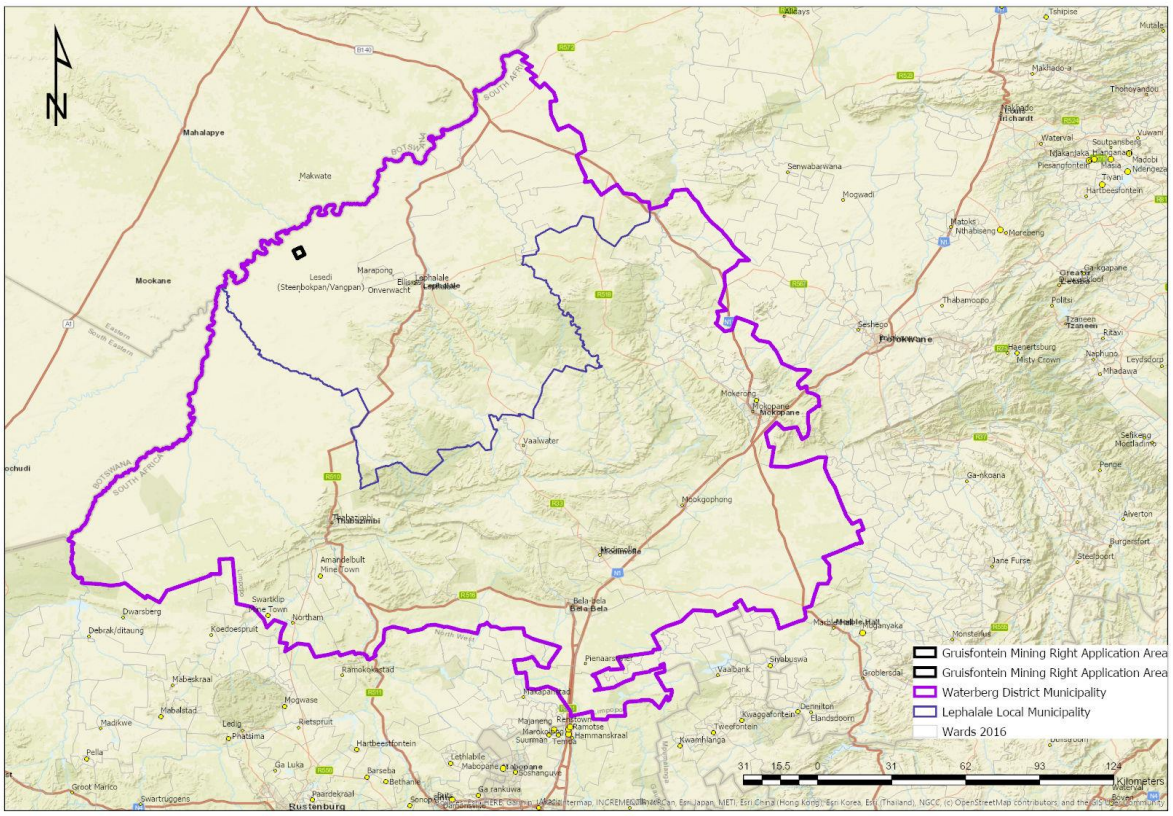


Figure 1: Project Locality and Institutional Map

2.2 PROPERTY DESCRIPTION

The registered description of the property involved is tabled below.

FARM NAME	GRUISFONTEIN 230 LQ
Application area (ha)	1 136.0655 (whole farm)
Magisterial district	Waterberg District
Registered owner	Prostart Traders 136 (Pty) Ltd
Title Deed number	T57802/2003 PTA
21-digit SG Code	T0LQ00000000023000000

Neighbouring landowners include private landowners (DH Steenkamp, GA Steenkamp, ME Swanepoel and SC Beukes) and commercial or mining companies (Kanivest 3067, Sasol Mafutha Mining, Anglo Operations, Eyesizwe Coal). Refer to Landownership Map (Figure 2) below.

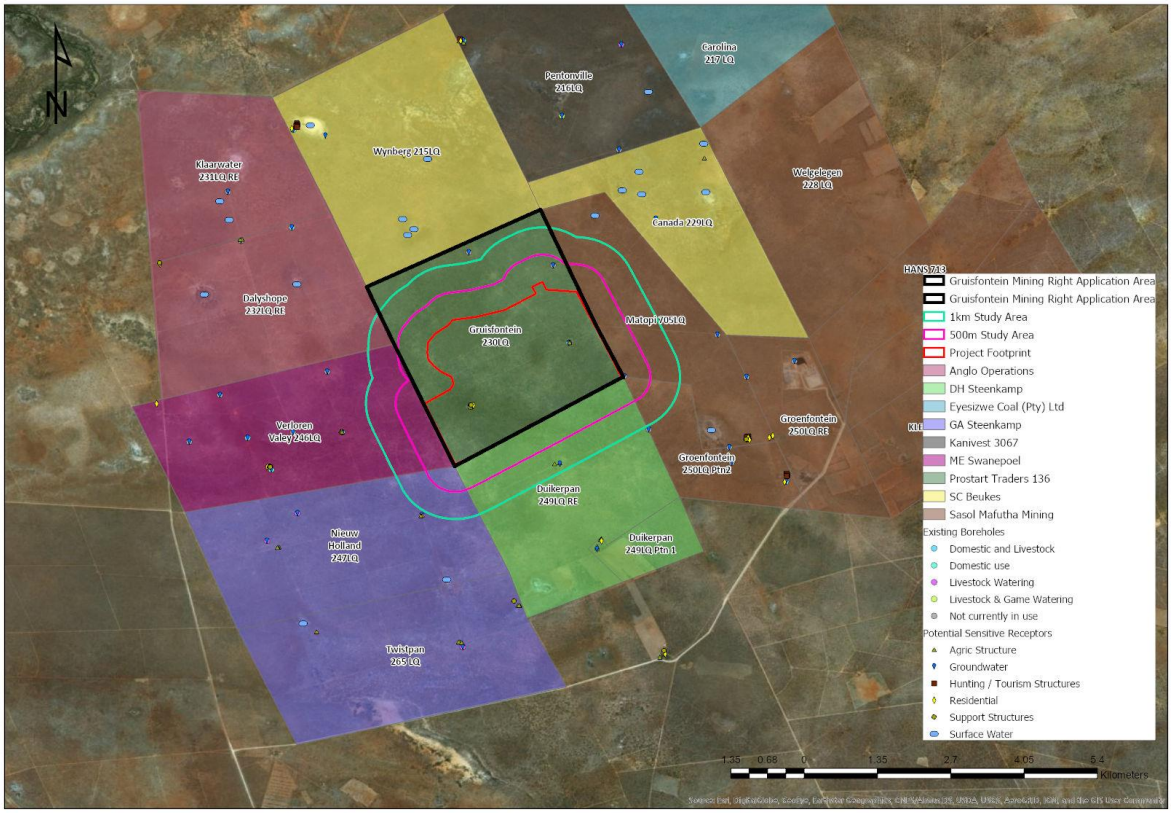


Figure 2: Landownership Map

No traditional authority is present in this area and none was identified in close proximity of the proposed development.

The office of the Limpopo Regional Land Claims Commission confirmed that there are no land claims on the farm Gruisfontein 230 LQ.

2.3 MINING AND INFRASTRUCTURE LAYOUT

The Gruisfontein Project will be an opencast coal mine with processing plant, ancillary infrastructure and temporary and permanent dumps and stockpiles. The project has a life-of-mine (LOM) of approximately 16 years and will be mined via open pit truck and shovel operations. Gruisfontein Project is designed to accommodate a run-of-mine (RoM) production of 6 million tonnes per annum (Mtpa), and at a practical product yield of approximately 50%, resulting in 3 Mtpa of Eskom product.

The footprint of the infrastructure and mining areas (disturbed areas) is in the order of 830 ha (70% of the farm extent). The infrastructure will be placed to the south of the open pit and include a processing plant, temporary discard dump (3 years), long-term discard dump, overburden and topsoil stockpiles and water management and other supporting infrastructure. Product will be transported via road to either Medupi or Matimba Power stations or both, with an option of an export product transported via rail to the market.

2.3.1 Mining Methodology and Schedule

The Gruisfontein resource will be mined using the opencast strip-mining method which is preferred because the initial box cut lies generally close to the surface with a low strip ratio. This mining system is considered standard for these types of barcode coals, is well understood in southern Africa, and is suitable for large near-surface coal deposits found in the Waterberg coal basin.

The selected mining system has been identified as standard truck and shovel with blasting below rockhead. The mining operation will follow the sequence outlined below:

- Initial scrubbing to clear the land.
- Topsoil will be stripped from the waste, discard dumps and initial box cut and stockpiled appropriately for use at a later stage for reclamation and rehabilitation.
- Appropriate ditching will be applied around the perimeter of the excavations and soil removal areas.
- Overburden from the initial box cut will be removed by a combination of hydraulic digging, ripping and drill and blast as required. The combined method of extraction will be dependent on the rock mass and strength properties which have in turn been determined by geotechnical domain classification. The overburden will initially be hauled to an above-ground waste dump and later returned to the mined-out void. Once the waste dump has reached maximum capacity and there is sufficient mined-out volume the waste will be hauled to an adjacent mined-out void. Whenever possible preference will be given to backfilling due to the cost and time implications of hauling to a dump site.
- Once the overburden has been stripped to expose the coal mining horizons, they will be liberated by digging, ripping or drill and blast and loaded onto haul trucks using excavators. The haul trucks will then transport the RoM coal to the RoM pad at the coal handling and preparation plant (CHPP) for washing / beneficiation.
- The CHPP waste will be removed by haul truck and either taken to the dedicated discard dump or placed in compartments constructed from soft and hard overburden to prevent spontaneous combustion.

Gruisfontein Project is designed to accommodate a RoM production of 6 Mtpa, and at a practical product yield of approximately 50%, resulting in a 3 Mtpa Eskom product. The production profile is indicated in Figure 3.

Figure 4 shows how the resources are planned to be depleted over the LOM.

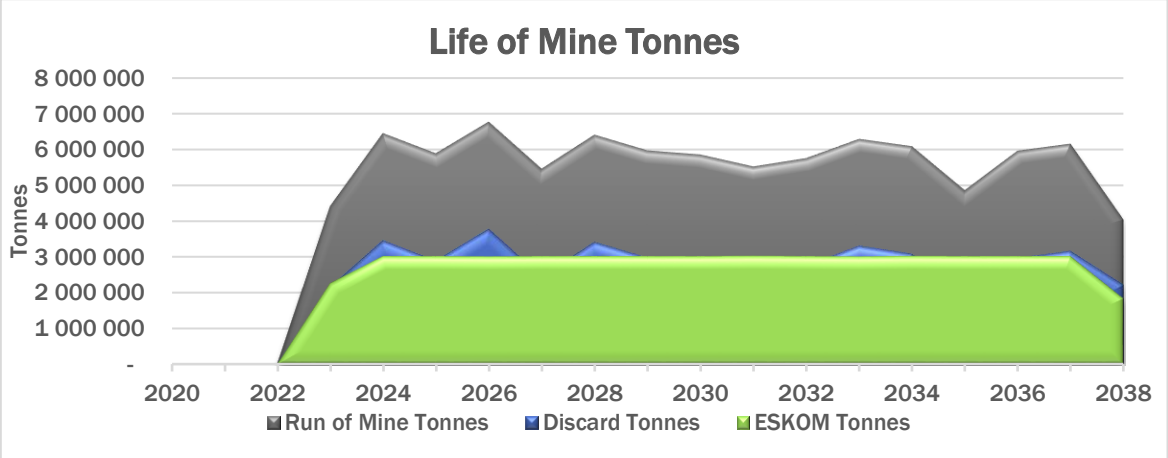
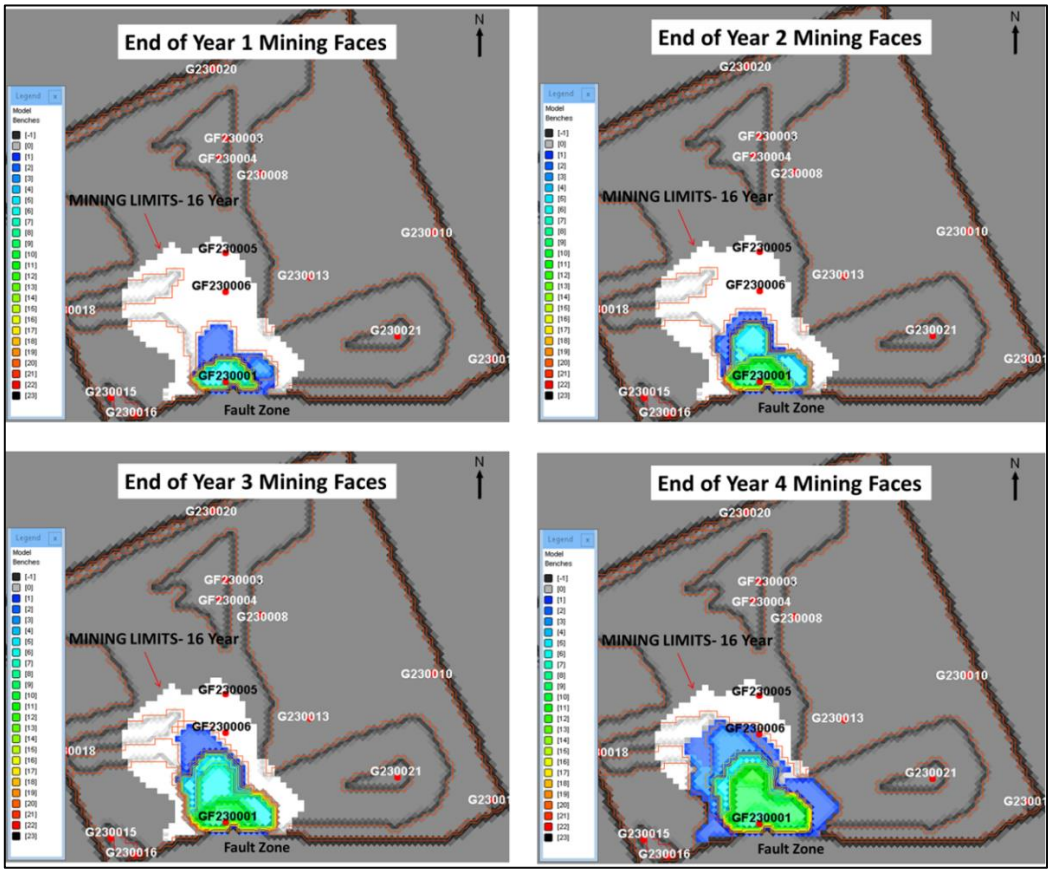
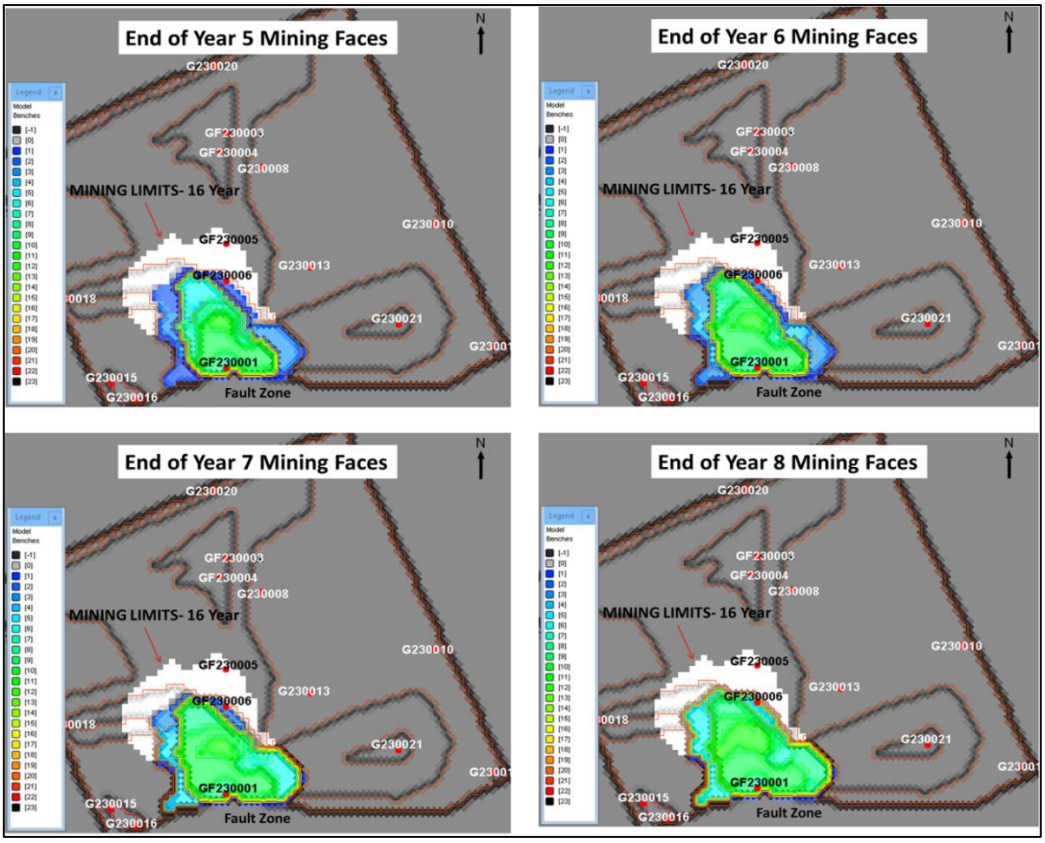
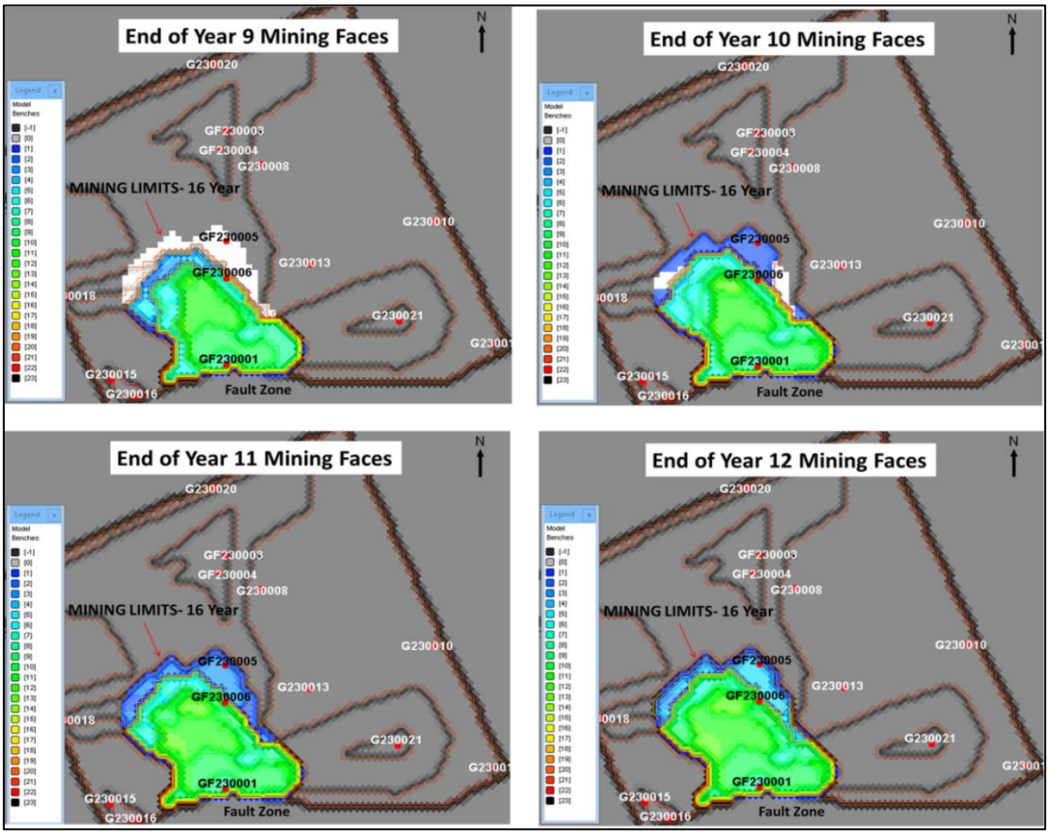


Figure 3: Production profile for the Gruisfontein Project




End of Year 5 Mining Faces
End of Year 6 Mining Faces
End of Year 7 Mining Faces
End of Year 8 Mining Faces
MINING LIMITS- 16 Year
Fault Zone
N


End of Year 9 Mining Faces
End of Year 10 Mining Faces
End of Year 11 Mining Faces
End of Year 12 Mining Faces
MINING LIMITS- 16 Year
Fault Zone
N

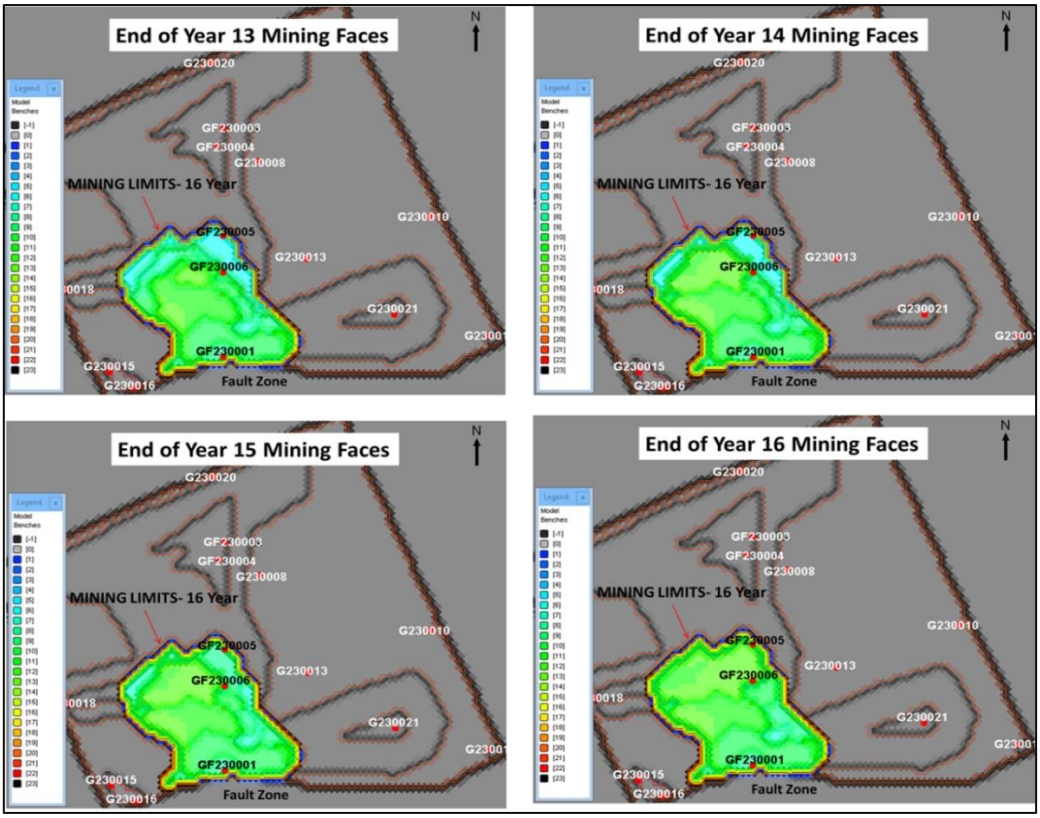


Figure 4: Mineable resource area

2.3.2 Surface Infrastructure Layout

The proposed infrastructure to be developed includes:

- Process plant and associated stockpile and load-out facilities;
- Buildings and structures (viz. offices, workshops, changes houses, stores, etc.);
- Roads (haul, service and access);
- Bulk services such as fuel, water, sewage and power;
- Water and power distribution facilities;
- Water management infrastructure, including clean and dirty water drains, pollution control dams, etc.; and
- Discard and carbonaceous material facilities.

The infrastructure components and layout are presented in Figure 5.

Discard, soft overburden, hard overburden and carbonaceous material will be stockpiled separately although the commencement of the construction of the long-term discard/carbonaceous dumps will take place in terms of the construction of the paddocks using hard and soft overburden. Topsoil and soft overburden that will not be used to construct the carbonaceous dumps will be used for the construction of water diversion berms. This material will be used at the end of LOM for final layer works after backfilling of the open pit.

During the first three years of operation the plant discard will be placed on a temporary discard dump that will be constructed to the west of the CHPP. A filter press at the plant has been provided in order to conserve water. This eliminates the need of a co-disposal system.

From YR4 onwards all the waste material from the open pit, including the plant discard will be stockpiled on the long-term dump. Topsoil will be stockpiled separately. The long-term discard dump will be compartmentalised with soft overburden to eliminate the risk of spontaneous combustion.

Two sewerage treatment plants will be established within the project area. The treatment works will be an activated sludge treatment plant. Sewerage from various ablution facilities located in the mine area will be channelled to the treatment plants. The treated effluent from the sewerage treatment works will be pumped to a PCD for reuse in the CHPP.

The daily bulk water requirements for the Gruisfontein Project is as follow:

- Plant water demand – 747 942 m^3/annum
- Office water demand – 104 875 m^3/annum
- Dust suppression – 482 130 m^3/annum.

The available water sources, as calculated with the available information, can be summarised as follow (Deltabec, 2019 – Appendix 17):

- Average annual rainfall – 4 644 m^3/annum.
- Recyclable plant water – It is estimated at this stage that 45% of the water used within the plant will be recycled for reuse and can, therefore, be seen as another source of water. This will amount to 568 631 m^3/annum.
- On-site STP – 182 625 m^3/annum (estimated at a sewage treatment rate of 0.5 Mℓ/day).

On-mine water treatment and storage facilities will be established to facilitate daily demands. Potable, raw water and service water will be stored in separate storage reservoirs.

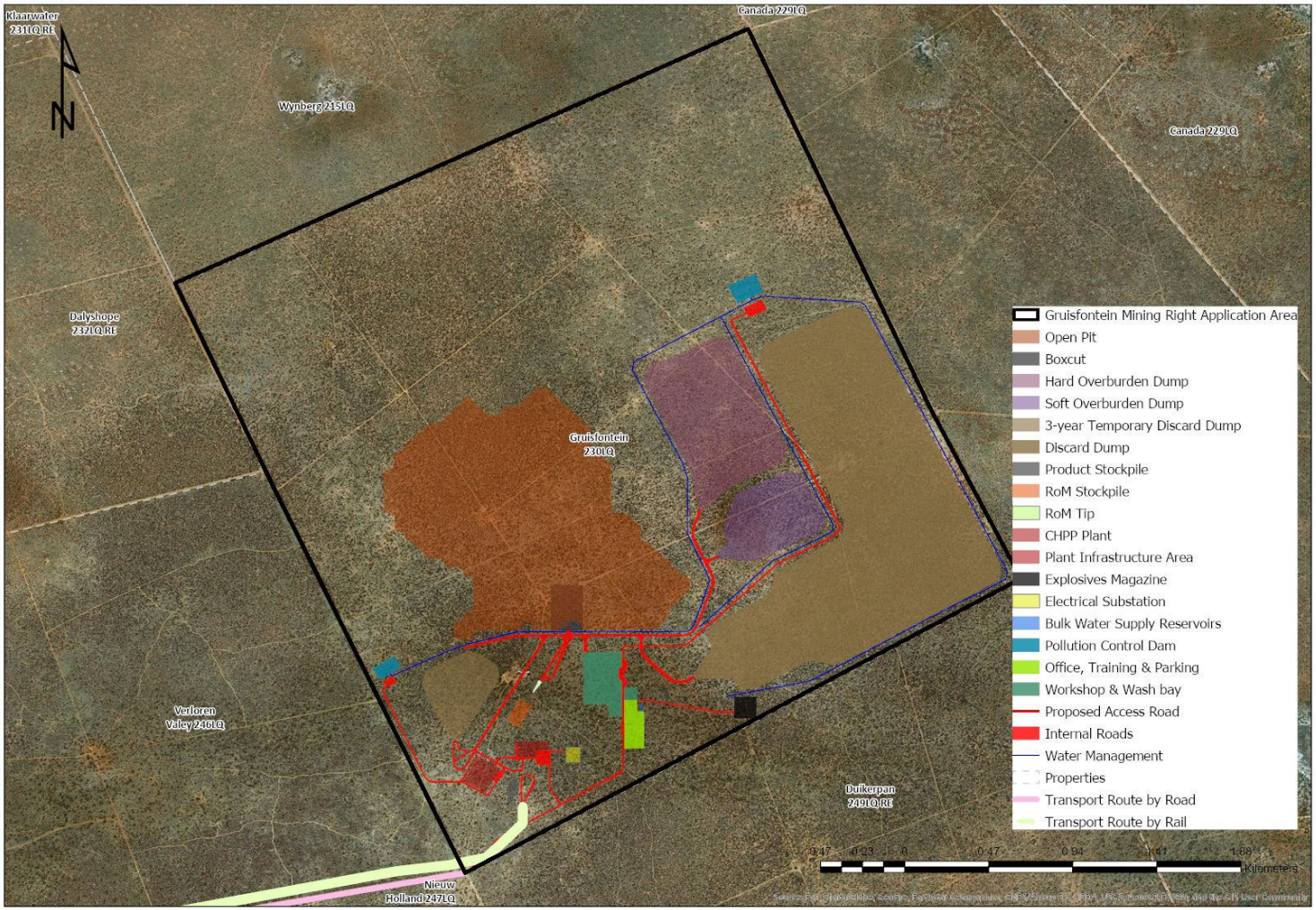


Figure 5: Gruisfontein Project Layout

The proposed Gruisfontein Coal Mine has an estimated forecast maximum demand of between 3 and 4 MVA, excluding the provision of the power factor correction. This estimated power requirement will be firmed up in the next study phase.

An Eskom sub-station, Theunispan, is in proximity to the town of Steenbokpan and it is assumed that Gruisfontein will be able to source power from this substation. It is assumed that Eskom will provide the following infrastructure to support the mine:

- A 22 kV overhead line from the sub-station to the mine.
- A 22 kV / 0.55 kV /10 MVA sub-station located on the mine.

A total of 607 m^3 of hydrocarbon storage facilities will be required for the operational phase, as indicated in Table 1.

Table 1: Hydrocarbon requirements for the Gruisfontein Project

Quantity	Volume	Location
6	82 000 litres	Bulk storage for diesel at the workshop area facility
4	23 000 litres	Bulk storage facilities for new oils and lubricants at the workshop area
1	23 000 litres	Bulk storage facilities for used oils at the workshop area

2.3.3 Roads and Transport

Access to the site will be gained via the Provincial Road D1675 from Lephalale towards Steenbokpan. From Steenbokpan, access to site will be via Provincial Road D175, a gravel secondary provincial road. This road will be upgraded to handle the additional traffic associated with the proposed mining project, as required. From the D175 the mine will be accessed via an existing service road running along the southern border of Verloren Valey 246 LQ. Similarly, this road will be upgraded to carry the additional traffic load. Formal access will be constructed to the pit and the infrastructure as the development progresses.

Product will be transported from Monday through to Sunday during daylight hours.

Product for the domestic market will be transported along a haul road from the product stockpiles to the south-eastern corner of Gruisfontein. From there is will be transported along an existing service road situated on the southern border of Verloren Valey 246 LQ, turning south on the secondary (gravel) Provincial Road D175 to Steenbokpan, and finally along the paved Provincial Road D1675 from Steenbokpan to Medupi Power station.

Alternatively, the product can be transported to the Temo Railloop Rapid Load-Out Facility planned approximately 400m south of the CHPP on farm Duikerpan 249 LQ (still to be confirmed and agreed).

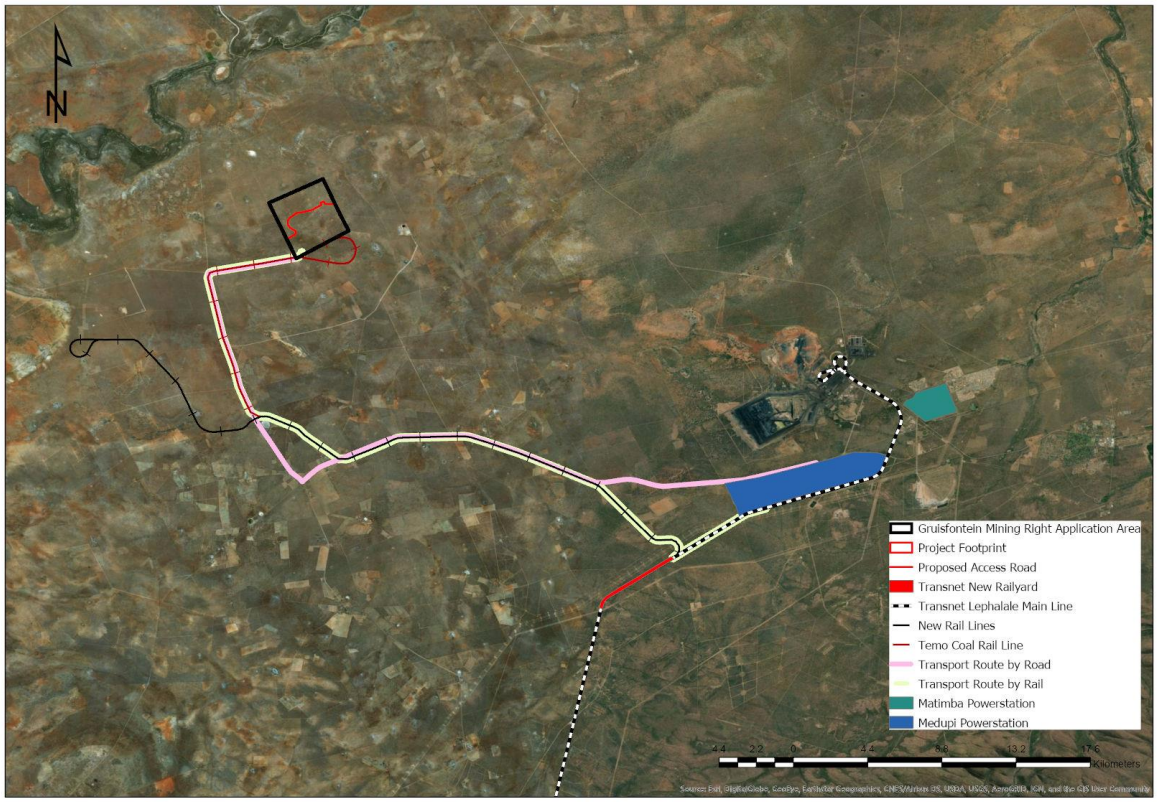


Figure 6: Product transport options

2.3.4 Listed Activities

The proposed Gruisfontein Project trigger several listed activities as contemplated in the 2014 EIA regulations (as amended in 2017), as well as a waste management activity as contemplated in NEMWA: GN No. R. 921 of 2013, for which Environmental Authorisation is required.

Table 2: Listed and waste management activities associated with the Gruisfontein Project

Activity	Aerial extent	Listed activity	Applicable notice
Open Pit Mining	134 ha	X	GNR 983 – A24 GNR 984 – A15 GNR 984 – A17
CHPP and related infrastructure (including water management infrastructure)	28.2 ha	X	GNR 983 – A9 GNR 983 – A10 GNR 983 – A13 GNR 983 – A24 GNR 984 – A6 GNR 984 – A15 GNR 984 – A16 GNR 984 – A17
Overburden and discard dumps	220 ha	X	GNR 983 – A24 GNR 984 – A15 GN No. 921 – Category B11
Access and haul roads	Access road: width 7.8m Haul road: width 30m (> 8m)	X	GNR 983 – A12 GNR 983 – A19 GNR 983 – A24
Bulk hydrocarbon facilities	607 m^3 (> 500 m^3)	X	GNR 984 – A4
Bulk power	22 kV	X	GNR 983 – A11

2.4 COMPOSITE SENSITIVE RECEPTOR MAP

The final preferred mining and layout infrastructure footprint are indicated in Figure 5. The motivation for the preferred development alternatives as detailed in the EIAR is summarised in Table 3.

Table 3: Motivation for preferred development alternatives

Aspect	Preferred Development Alternative	Motivation
Land use activity	Mining	Currently the economic activities within the MRA area are limited and the mine will be a definite economic improvement. Although the proposed mine could potentially impact negatively on the current land use activities in the surrounding area, the net result is a positive improvement in benefits for the area. The positive economic contribution to the Limpopo and National economies is an additional positive factor.
Mining methodology	Opencast mining	Underground mining is not considered feasible due to the thick laminated coal horizons prevalent in the Waterberg Coalfield which are conducive to open pit mining operations.
Mine residue disposal	Filter press for slurry	A filter press at the plant will conserve water and eliminates the need for a co-disposal system, which has the potential for significant groundwater contamination if not managed.
	Compartmentalised discard dump	By compartmentalising the discard with soft and hard blasted overburden, the risk of spontaneous combustion will be eliminated.
Surface infrastructure location	South-western corner of the farm	By placing the mine infrastructure in the southern portion of the development footprint, a portion of natural vegetation will be left intact adjacent to the CBA 1 and the private nature reserves that could buffer against edge effects.
Transport	Combination of road and rail transport	Although rail is the best option in respect of social considerations, this option still needs to be confirmed and agreed with Temo Coal.

3 DESCRIPTION OF IMPACT MANAGEMENT OUTCOMES

3.1 CLOSURE MANAGEMENT OUTCOMES

3.1.1 Closure guiding principles

The following closure-related guiding principles underpin the closure planning process for the Gruisfontein Project:

- To comply with relevant or applicable local legislative requirements;
- To ensure that stakeholders' needs, concerns and aspirations are considered when considering closure and the eventual closure vision;
- To ensure the health, safety and welfare of all humans and the environment are safeguarded from hazards resulting from mining operations that have been terminated;
- To limit or mitigate adverse environmental effects to an extent that it is acceptable by all parties;
- To mitigate socio-economic impacts following decommissioning and subsequent closure as far as reasonably possible;
- To avoid or minimise costs and long-term liabilities to the company and to the State and public; and
- To ensure investment decisions include appropriate consideration of closure, including both quantitative and qualitative impacts of closure.

3.1.2 Closure vision

The overall closure vision for the Gruisfontein Project is:

To achieve a post-mining landscape that is safe, stable and non-polluting, that will sustain rural agricultural activities after mining has ceased

3.1.3 Closure objectives and performance targets

Aspect	Closure Objective	Rehabilitation-Related Performance Target
Infrastructure	To remove and/or stabilise surface infrastructure to facilitate the implementation of post-mining land uses	• Identification and retainment of all infrastructure that has a beneficial post-mining use • Transfer of the retained infrastructure to a third party for long-term management and maintenance purposes • Demolish and dismantle all non-beneficial infrastructure and rehabilitate the area to facilitate the post-mining land use
Land capability	To re-instate suitable grazing capabilities	• Establishment of a self-sustaining, grazing land capability over the rehabilitated areas
Biodiversity	To re-establish an appropriate mix of grassland and other native flora	• Implementation of a low maintenance Alien and Invasive Plant (AIP) Control Plan

Aspect	Closure Objective	Rehabilitation-Related Performance Target
	species in the rehabilitated areas to enable the natural re-instatement of biodiversity over time	• Establishment of a sustainable vegetation cover to facilitate the final grazing land capability requirements
Post-mining land use	To establish a post-mining land use that will sustain rural agricultural activities once mining is concluded, whilst providing an acceptable overall aesthetic appearance aligned to the surrounding landscape	• All stockpiled material (overburden, discard) utilised to backfill and rehabilitate the opencast area • No surface dumps remaining post-closure • Establishment of a sustainable vegetation cover, including trees and shrubs • Restoring the site to a condition in which it is visually acceptable to the community
Water resources	Prevent erosion and downstream siltation	• Establishment of a sustainable vegetation cover to prevent erosion
	Limit the impact of the groundwater quality and yields	• Demonstrate that the surrounding groundwater users are not impacted in terms of quality or yield • Implementation of compensation strategy if the above cannot be demonstrated
Social	Limit the possible health and safety threats to humans and animals that will utilise the mining site post-closure	• Access to high-risk areas are safe-guarded and monitored • Eliminating unacceptable health hazards and ensuring public safety
	Identify and establish livelihood retention projects to create off-mine livelihoods during and post-mining	• Projects are in advanced stages of execution with specified timeframes on completion and desired outcomes
	Equip employees with portable skills that can be used in other sectors post-mining	• Successful implementation of Social and Labour Plan

The final closure objectives will be consulted through the Public Participation process. The recommendations proposed by the IAPs and authorities will be considered during the development of the final closure plan.

3.1.4 Proposed final post-mining land use

The objective is to rehabilitate the open pit and other disturbed areas to a post-mining grazing capability class. All surface structures where alternative use is not possible will be demolished and the areas rehabilitated. All stockpiled material (overburden, discard) will be utilised to backfill and rehabilitate the opencast area, no surface dumps will remain post-closure.

3.1.5 Rehabilitation methodology

At this stage it is envisaged that backfilling will only start after decommissioning of the mine. During the next study phase an optimised mine plan will be developed to create enough space for in-pit backfilling as soon as practically possible. This will be addressed in the Rehabilitation, Decommissioning and Closure Plan that will be developed in line with the requirements of

Government Notice No. R.1147 (GN R.1147): "*Regulations pertaining to the Financial Provision for Prospecting, Exploration, Mining or Production Operations*" promulgated in November 2015. Financial provision will be updated on an annual basis in line with the requirements of GN R.1147.

The open pit mining operations have been planned to stop at a depth where a thick impermeable sandstone band will be encountered. This sandstone band varies in thickness of between 20m to 27m.

The methodology of rehabilitation of the open pit will be as follows:

i) The discards from the short-term discard dump situated alongside the coal processing plant will be placed first on the impermeable sandstone layer across most of the open pit bottom.
ii) Thereafter, a 10m thick layer of hard overburden, retrieved from the hard overburden dump and the cladding of the discard/carbonaceous dump will be placed as a sealing layer to the underlying discard layer.
iii) Thereafter, an 11m thick layer of discards, retrieved from the large discard and carbonaceous dump, will be placed over the hard overburden layer.
iv) A second 10m thick layer of hard over burden, retrieved from the hard overburden dump, will be placed over the discard layer.
v) A 10.5m thick layer of carbonaceous material, retrieved from the large discard and carbonaceous dump, will be placed over the second layer of hard overburden.
vi) A 2.5m layer of soft overburden, retrieved from the soft overburden dump, will be placed over the carbonaceous layer.
vii) Each of the thick hard overburden, carbonaceous and discard layers will be compacted in 2.0m layers during the backfilling operations to prevent spontaneous combustion taking place and to minimise water infiltration into the underlying carbonaceous layers.
viii) Similarly, the soft overburden will be compacted to minimize water infiltration into the underlying carbonaceous layers.
ix) Finally, a 1.0m topsoil layer, retrieved from the various topsoil dumps, will be placed over the soft overburden layer.
x) This will be followed by soil amelioration and re-vegetation in accordance with the Reclamation Plan.

Other disturbed areas (infrastructure areas) will be ripped to a minimum depth of 1m, followed by levelling, sloping and landscaping. Finally, soil amelioration and re-vegetation will be conducted in accordance with the Reclamation Plan.

3.1.6 Final landform

As far as practically possible, the disturbed infrastructure areas will be designed to be free draining to allow clean surface runoff to be discharged into the natural environment.

The extraction of the economic coal seams within the pit and factoring in a bulking factor will result in a large post rehabilitation depression over the open pit area. The estimated depth of the depression will be between 30m to 40m. The cross sections of the rehabilitated open pit, using the methodology described above, are depicted in the rehabilitation design drawings (Appendix-19).

3.2 OPERATIONAL MANAGEMENT OUTCOMES

3.2.1 Management Objectives and Outcomes

The operational environmental and social management objectives and impact management outcomes are presented in Table 4.

Table 4: Proposed management objectives and outcomes for the Gruisfontein Project

Aspect	Management Objectives	Impact Management Outcomes (Performance Target)
Land capability	To re-instate suitable grazing capabilities over the reclaimed portions of the mine site	• Development of a Rehabilitation, Decommissioning and Closure Plan • Establishment of a self-sustaining, grazing land capability over the reclaimed areas
Ecology	Minimise impact on the biodiversity habitat in the area and protected species	• Limit the clearance of vegetation and topsoil to 830 ha (disturbed footprint) • Implementation of a Rescue and Relocation Plan • Implementation of a Biodiversity Action Plan (BAP) • Implementation of an AIP Control Plan
	To re-establish an appropriate mix of grassland and other native flora species in the reclaimed areas to enable the natural re-instatement of biodiversity over time	• Establish an indigenous nursery • Establishment of a sustainable vegetation cover to facilitate the final grazing land capability requirements
Water resources	Prevent erosion and downstream siltation	• Implement SWMP to separate clean & dirty water
	Limit the impact of the groundwater quality and yields	• Groundwater monitoring demonstrates that the surrounding groundwater users are not impacted in terms of quality or yield • Implementation of compensation strategy if the above cannot be demonstrated
Air quality	Limit the risk of dust exposure to the general public	• Dust fallout < 600 mg/m^2/day on MRA boundary • PM_{10} (24-hour) < 75 µg/m^3 on MRA boundary

Noise	Limit the noise impact on sensitive receptors	• Rural noise level
		  ○ Day: 45 dB
		  ○ Night: 35 dB
		• Increase in ambient noise levels (on MRA boundary) < 7 dB

Blasting	Limit the blasting impact on sensitive receptors Prevent any structural damage to infrastructure	• Air blast < 120 dB on MRA boundary • Maximum ground vibration levels < 2.54 mm/s when blasting within 3 500m from dwellings used for residential purposes • Maximum ground vibration levels < 25 mm/s when blasting within 1 600m from identified potential sensitive structures • Maintain exclusion zone of 428m

Aspect	Management Objectives	Impact Management Outcomes (Performance Target)
Heritage / Palaeontology	Prevent any impact on heritage and palaeontological material	• No damage to heritage and palaeontological material without the necessary investigations and permits
Post-mining land use	Establish a post-mining land use that will sustain rural agricultural activities once mining is concluded, whilst providing an acceptable overall aesthetic appearance aligned to the surrounding landscape	• Define, in consultation with all IAPs, the final (post-closure) land use for the mining area, including mining areas, surface and water management infrastructure, roads and powerlines • Development of a Rehabilitation, Decommissioning and Closure Plan
Local community / adjacent landowners	Prevent vehicle and pedestrian accidents due to increase in traffic	• Implementation of road upgrades as proposed in the TIA • No fatal accidents
	Maximise social benefits (employment, procurement, etc.) to local communities	• Percentage of local employment set at 70% (SLP)
	Identify and establish livelihood retention projects to create off-mine livelihoods during and post-mining	• Successful implementation of Social and Labour Plan
	Equip employees with portable skills that can be used in other sectors post-mining	• Successful implementation of Social and Labour Plan

Appropriate monitoring should be implemented to ensure compliance with the objectives and outcomes as proposed.

3.2.2 Ecological and Biodiversity Management

3.2.2.1 Biodiversity Action Plan

In order to ensure that impact mitigation takes place to an adequate level, a Biodiversity Action Plan (BAP) must be developed which contains details on all actions that need to be undertaken to manage impacts on the ecology of the region. In addition, the BAP and its implementation should be overseen by an Environmental Management Committee (EMC) which should include representatives from the mine, the local communities and the local farmers' association. The BAP should be a living document and must be continuously updated based on the findings of management and the ecological monitoring program.

3.2.2.2 Reclamation Plan

A detailed Reclamation Plan must be developed for the Gruisfontein Project, inclusive of the following aspects:

- Rescue and Relocation Strategy: Protected plants must be removed or transplanted before any mining or construction activities start. The necessary permits to remove and/or destroy protected transplantable and non-transplantable plants must be obtained.

- Collection of local seeds for reproduction in a nursery: Seed from as many of the species as possible will be collected for the re-vegetation programme.
- Establishment of an on-site nursery.
- Re-vegetation trials.
- Maintenance: The maintenance plan must address challenges experienced for both the soil and vegetation resource to achieve sustainable reclamation and improved agricultural potential and final land-use, which is important for mine closure planning.
- Monitoring: The following parameters can be used to establish the condition of the vegetation with other landscape function parameters: basal cover; biomass production; and botanical composition.

3.2.2.3 Ecological offset

Since effective mitigation through avoidance, impact minimisation and rehabilitation is unlikely to adequately limit the impact on the receiving ecology, an ecological offset initiative must be initiated to contribute to the conservation of the area. In particular, initiatives focused on the involvement of surrounding landowners and management of land to create the ecological corridors linking the various areas currently functioning as conservation areas.

In addition, Nozala Coal must contribute to Strategic Environmental tools, programmes and projects within the province.

3.2.2.4 Utilisation of natural resources

The relatively dense vegetation within the proposed mining and infrastructure areas will produce a large volume of biomass that has to be removed and stockpiled before mining commences. A large percentage of the removed plant material will be stored and used to protect newly established plants, prevent soil erosion and serve as seed catchers. A further portion will be chipped for compost, mulching and stabilising berms in the mine. This organic material will be mixed into the top 0.3 m of the rehabilitated topsoiled areas.

Excess wood will be stockpiled and distributed to the local communities, for building purpose or as firewood, as required. It may even offer entrepreneurs the opportunity to start a small business.

3.2.3 Water Management

The Stormwater Management Plan (SWMP) for the Gruisfontein Project is attached as Appendix 16 (Deltabec, 2019).

3.2.4 Mine Residue Management

Discard, soft overburden, hard overburden and carbonaceous material will be stockpiled separately although the commencement of the construction of the long-term discard/carbonaceous dumps will take place in terms of the construction of the paddocks using hard and soft overburden. Topsoil and soft overburden that will not be used to construct the carbonaceous dumps will be used for the

construction of water diversion berms. This material will be used at the end of LOM for final layer works after backfilling of the open pit.

During the first three years of operation the plant discard will be placed on a temporary discard dump that will be constructed to the west of the CHPP. A filter press at the plant has been provided in order to conserve water. This eliminates the need of a co-disposal system.

From YR4 onwards all the waste material from the open pit, including the plant discard will be stockpiled on the long-term dump. Topsoil will be stockpiled separately. The long-term discard dump will be compartmentalised with soft overburden to eliminate the risk of spontaneous combustion. A typical cross-section of the dump and its paddocks are shown in Figure 7.

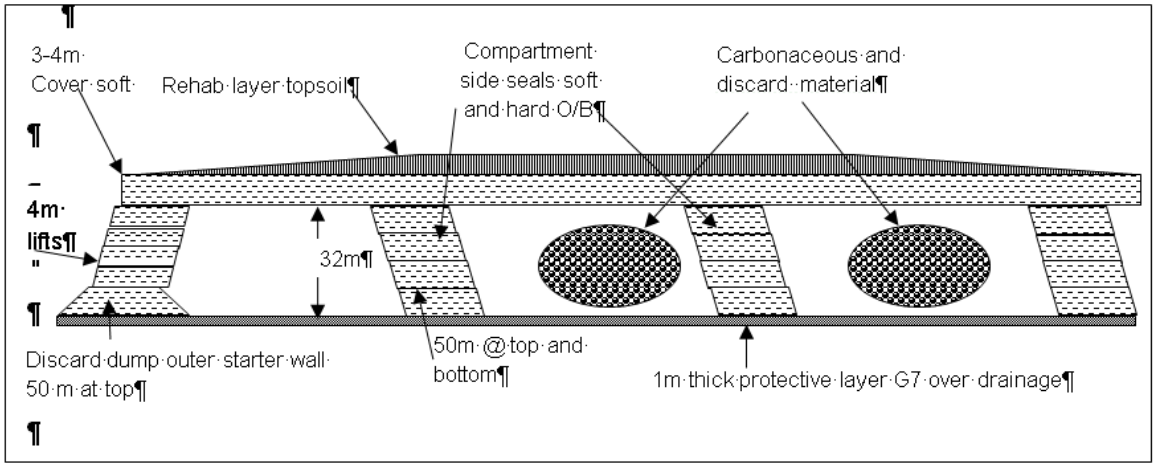


Figure 7: Carbonaceous dump cross-section

Once sufficient room has been established in the open pit, in-pit stockpiling of carbonaceous material and discard will take place. For the purpose of the impact assessment it will assumed that all material over the 16 LoM will be stockpiled on surface and that backfilling will only start after year 16.

During the next study phase an optimised mine plan will be developed to create sufficient space for in-pit back filling as soon as practically possible. The size of the current dumps should therefore reduce substantially in size.

The envisaged extent of the stockpiles and dumps at Gruisfontein is provided in Table 5. The mine residue design and lining specification report is attached as Appendix 18 (Deltabec, 2019).

Table 5: Extent of stockpiles and dumps at Gruisfontein Project

	Number	Height (m)	Extent (m^2)
Temporary discard	1	5	124,150
Long-term discard	1	90	1,487,197
Soft overburden	Included in long-term discard dump, 30% used for berm	5	161,968
Hard overburden	included as cladding for long-term discard dump	15	384,615
RoM stockpile	1	15	855,600
Product stockpiles	4	12	386,400

3.2.5 Archaeological and Heritage Management

3.2.5.1 Management and mitigation of identified heritage sites

The following management measures should be implemented during the construction and operational phases:

- A qualified archaeologist shall monitor the development phases (topsoil excavation) during construction and operations to identify any subterranean cultural and heritage resources.
- A qualified palaeontologist shall monitor the mining activities once the coal seams are exposed to identify any palaeontological material or fossils.
- Construction activities shall cease immediately upon any further discovery of cultural and heritage resources and the required assessment and reporting instituted – refer to Chance Find Protocol below.

3.2.5.2 Chance Find Protocol

Most archaeological and palaeotological remains are subterranean and there is always a chance that archaeological material (including burial sites) may be exposed during earthworks. The Chance Find Protocol below indicates the procedure that need to be followed in such an event.

3.2.5.2.1 Archaeological or historical material

If any unidentified archaeological or historical material are identified and/or exposed during any of the developmental phases of the project, the following steps must be implemented subsequent to those outlined above:

- All work at the affected area must cease and reported to the immediate supervisor and through their supervisor to the senior on-site manager.
- The area should be demarcated to prevent any further work there until an investigation has been completed.
- An archaeologist should be contacted immediately to provide advice on the matter.
- The archaeologist will decide on future action. Depending on the nature of the find, it may include a site visit.
- If needed, the necessary permit will be applied for with SAHRA. This will be done in conjunction with the appointed archaeologist.
- The appropriate action will be determined by the nature of the find and the possibilities given the restriction placed upon it by mining activities.
- Work on site will only continue after the archaeologist/ SAHRA has agreed to such a matter.

3.2.5.2.2 Human remains

If unidentified burial grounds, graves or human remains are identified and/or exposed during any of the developmental phases of the project, the following steps must be implemented subsequent to those outlined above:

- All work at the affected area must cease and reported to the immediate supervisor and through their supervisor to the senior on-site manager.

- The area should be demarcated to prevent any further work there until an investigation has been completed.
- An archaeologist should be contacted immediately to provide advice on the matter.
- The archaeologist must confirm the presence of burial grounds, graves or human remains.
- If this is the case, the archaeologist must inform the local South African Police Services (SAPS) and traditional authority (if applicable). SAHRA's BGG Unit should also be notified in the case of human remains.
- The archaeologist, in conjunction with the SAPS and traditional authority, will inspect the possible graves and make an informed decision whether the remains are of forensic, recent, cultural-historical or archaeological significance.
- Should it be concluded that the find is of heritage significance and therefore protected in terms of heritage legislation, the archaeologist will notify the relevant authorities and institute the grave relocation procedure.

3.2.5.2.3 Palaeontology

If any palaeontological material or fossils are exposed during any of the developmental phases of the project, the following steps must be implemented subsequent to those outlined above:

- All work at the affected area must cease and reported to the immediate supervisor and through their supervisor to the senior on-site manager.
- The area must be fenced-off with a 30 m barrier and the area declared as a no-go area.
- A palaeontologist should be contacted immediately to confirm the presence of palaeontological material and/or fossils.
- If this is the case, SAHRA must be contacted for further investigation and mitigation.
- Three types of permits are available: Mitigation, Destruction and Interpretation. The specialist will apply for the permit at the beginning of the process.
- Mitigation will involve recording, rescue and judicious sampling of the fossil material present and will include a Phase 2 Palaeontological Impact Assessment (PIA).

3.2.5.3 Grave Relocation Procedure

3.2.5.3.1 Graves older than 60 years

- Application for a permit from SAHRA in terms of Section 36 of the NHRA for graves older than 60 years or that of a victim of conflict.
- Known graves: Proof of thorough consultative process:
    - Locate next of kin and obtain letter of consent from next of kin.
    - Obtain a letter of consent or statement of no objection from the local traditional authority if in a rural area.
    - Determine a place for the re-burial of each grave in consultation with next of kin. In addition, also determine the arrangement of reburial, i.e. by the next of kin/community or a funeral undertaker.
    - Submit documentation of the above with the permit application to SAHRA.
    - Inform the SAPS of intent to relocate the grave/s and submit a copy of the permit to SAPS.

    - The graves are to be exhumed by a funeral undertaker under the supervision of an archaeologist. Undertaker would also arrange all the formalities for the reburial.
    - The specific requirements regarding ritual and ceremonial practices from next of kin and/or community for both the exhumation and reburial activity must be determined beforehand and facilitated by the developer.
- Unknown graves: Proof of thorough consultative process:
    - Place advertisement in a local and national newspaper with description and location of graves and full contact detail of consultant and developer. A waiting period of 60 days applies.
    - If no reaction to advertisement follows, then apply for permit from SAHRA after waiting period of 60 days with proof of advertisement and any other consultative process.
    - If in rural area obtain a letter of consent or statement of no objection from local traditional authority and submit with permit application.
    - If advertisement leads to a claim from next of kin or from a community who by tradition has an interest, then written consent from relevant party must be obtained.
    - Determine a place for the reburial of each grave.
    - Submit documentation of the above with the permit application to SAHRA.
    - Inform SAPS of intent and process of reburial and submit a copy of the permit to SAPS.
    - The graves are to be exhumed by a funeral undertaker under the supervision of an archaeologist. Undertaker would also arrange all the formalities for the reburial.
    - The specific requirements regarding ritual and ceremonial practices from next of kin and/or community for both the exhumation and reburial activity must be determined beforehand and facilitated by the developer.

3.2.5.3.2 Graves less than 60 years old

- Locate the next of kin of the buried persons and obtain consent from the next of kin for the relocation of the graves.
- Determine a place for the reburial of each grave.
- Obtain a letter of consent or statement of no objection from the local traditional authority if in a rural area.
- Submit above documentation to the Department of Health and obtain permission for the relocation of the graves, which process would most probably be regulated by the District Municipality.
- Inform the SAPS and provide above-mentioned documentation.
- The graves are to be exhumed by a funeral undertaker under the supervision of an archaeologist. Undertaker would also arrange all the formalities for the reburial.
- The specific requirements regarding ritual and ceremonial practices from next of kin and/or community for both the exhumation and reburial activity must be determined beforehand and facilitated by the developer.

3.2.6 Social Impact Management

The Socio-economic Impact Assessment has identified and developed several Social Management and Monitoring Strategies that would be implemented to ensure that all identified impacts are addressed and managed accordingly. The main aim of the strategies is to minimise negative impacts and maximize positive impacts by means of effective compensation and mitigation measures. Logical Framework Matrix methodology was used to develop the strategies listed below.

- **Communication, Consultation and Awareness Management Plan**: Ensuring continuous engagement with project affected parties and stakeholders.
- **Issue and Grievance Management Strategy**: To ensure the appropriate management of issues and grievances.
- **Social Monitoring and Evaluation Strategy:** to ensure that the project intervention process is monitored with the aim of implementing corrective measures if and when required.

In the following sections, the proposed strategies will be discussed in terms of a hierarchy of objectives, outputs and activities and targets.

- **Objectives –** objectives of strategy / policy which highlight the motivation behind each strategy.
- **Outputs –** the expected deliverables for the objectives to be achieved.
- **Activities –** actions that should be undertaken to get the expected deliverables. These activities are referenced against the timeframe within which they should be undertaken and the parties that would take responsibility for carrying out the activities.
- **Targets –** probable key success factors / performance indicators by which implementation success of strategy should be monitored. In a significant number of cases, specific targets would only be set in the process of implementing the strategies.

3.2.6.1 Communication, Consultation and Awareness Strategy

3.2.6.1.1 Objective

- To develop and maintain an ongoing process of public participation to ensure the continued involvement of IAPs in the project in a meaningful and responsible way.
- To establish an Environmental Management Committee (EMC) to inform and monitor the environmental and social planning and implementation processes.

3.2.6.1.2 Outputs

- An EMC comprising of representatives from local landowners, community stakeholder sectors, the mining company and relevant national, provincial and local authorities.
- A database of project IAPs, stakeholder groups and stakeholder sectors.

3.2.6.1.3 Activities

Table 6: Communication, Consultation and Awareness Strategy Action Plan

Activity	Timeframe	Responsible parties
Consult and constitute a local EMC	Pre-Construction	Mining Right Holder
Develop a constitution for the EMC to guide its operations	Pre-Construction	Mining Right Holder EMC
Annual EMC meetings	During construction and Operations	Mining Right Holder EMC

3.2.6.1.4 Targets

- Annual meetings
- Monitoring reports

3.2.6.2 Issue and Grievance Management Strategy

3.2.6.2.1 Objective

To define mechanisms and procedures to manage the land use and influx that may result due to the mine development during construction and operational phases.

3.2.6.2.2 Outputs

- Ensure communities and stakeholders are aware of the opportunity to express grievances and complaints.
- Ensure communities and stakeholders feel free to express their complaints / grievances.
- Encourage communities and stakeholders to use the procedure, but also warned not to abuse it with false grievances.
- Ensure sensitive grievances are dealt with privately, and confidentiality of information is maintained.

3.2.6.2.3 Activities

Table 7: Issue and Grievance Management Strategy Action Plan

Activity	Timeframe	Responsible parties
A Grievance is submitted in written form via fax or project email detailing the Party lodging the grievance, contact details, details of the grievance, location and proposed solution.	Pre-Construction Operational	Mining Right Holder Contractor Stakeholder Engagement Officer (SEO)
The existence and conditions of access to this procedure and avenue shall be widely disseminated within the stakeholder environment and affected parties as part of the consultation undertaken for the development in general.	Pre-Construction Operational	Mining Right Holder Contractor SEO
The staff member responsible for Stakeholder Engagement (SEO) at the mine which will receive the grievance (via fax or email) must ensure the Grievance Register has been correctly completed and the grievance is clearly understood.	Pre-Construction Operational	Mining Right Holder Contractor SEO
Grievances will be lodged (via email, fax or in person) with the SEO at the mine.	Pre-Construction Operational	Mining Right Holder Contractor SEO
The SEO will send a copy to Mining Right Holder / Management within 48 hours (2 working days).	Pre-Construction Operational	Mining Right Holder Contractor Engagement Officer
Within 7 days, management will submit a response to the stakeholder/community.	Pre-Construction Operational	Mining Right Holder Contractor

Activity	Timeframe	Responsible parties
		SEO
If the response to the grievance has not been accepted or resolved, the SEO will engage the Grieving Party to facilitate an acceptable solution, if acceptable this would be put in writing as the final response to Grieving Party.	Pre-Construction Operational	Mining Right Holder Contractor SEO
If the response to the grievance has not been accepted or resolved the mine management will enter a Mediation phase, where a meeting will be held with the party that submitted the Grievance in an attempt to resolve.	Pre-Construction Operational	Mining Right Holder Contractor SEO
If Grievance is not resolved through Mediation the Grieving Party are open to take up any of the formal avenues available in terms of South African Legislation.	Pre-Construction Operational	Mining Right Holder Contractor SEO

3.2.6.2.4 Targets

- Registration and Resolve of grievances
- Amicable mediation and settlement

3.2.6.3 Social Monitoring and Evaluation Strategy

3.2.6.3.1 Objectives

- To ensure that all the activities listed in the social strategies are implemented to support the achievement thereof.
- To monitor, review and adapt social implementation strategies if and when required.
- To ensure that the monitoring information is captured in structured and organised fashion, according to an agreed system by responsible parties, in order to ensure ex-post analysis of the data.
- Integration with monitoring functions of the bio-physical and construction environments.

3.2.6.3.2 Outputs

- Drafting of Monitoring and Evaluation Policy.
- Definition of a Conflict Resolution Procedure.
- Implementation of corrective measures.
- Compilation of monitoring reports to EMC and mining right holder.

3.2.6.3.3 Activities

Table 8: Social Monitoring and Evaluation Strategy Action Plan

Activities	Timeframe	Responsible Parties
Compile Monitoring and Evaluation Policy and Procedures. Definition of Conflict Resolution Procedure.	Pre-Construction	Mining Right Holder Social Scientist EMC Engineer, Contractor
Define monitoring role and functions of the EMC with regards to various project components, e.g. social aspects, bio-physical environmental aspects, construction issues etc.	Before and during construction	Mining Right Holder EMC
Design and implementation of monitoring and evaluation methodologies (e.g. checklists, PRA etc.).	Before and during construction	Mining Right Holder Social Scientist EMC
Design and implementation of a Complaint Register.	During construction	Mining Right Holder

Activities	Timeframe	Responsible Parties
		Social Scientist EMC
Drafting of regular process and compliance monitoring reports. Timeous implementation of corrective measures based on recommendations from process and compliance monitoring reports.	During and after construction	Mining Right Holder Social Scientist EMC

3.2.6.3.4 Targets

- Efficient and effective project management
- Timeous information flow to support decision-making processes
- Triangulation of monitoring data

4 IMPACT MANAGEMENT ACTIONS

Table 9 lists the impact management actions (mitigatory measures) identified for the Gruisfontein Project to reverse, reduce and mitigate the impacts. The management objectives and outcomes are presented in Table 4.

The persons responsible for mitigating measures at the Gruisfontein Project include:

- GM - General Manager
- Mine M - Mine Manager
- Eng M - Engineering Manager
- Rehab M - Rehabilitation and Closure Manager
- EO - Environmental Officer
- SEO - Stakeholder Engagement Officer
- ES - External Specialist
- HRD - Human Resources Department
- TD - Training Department
- EMC - Environmental Management Committee

Mechanisms and responsibilities for the implementation of the impact management actions is provided in Table 10.

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Table 9: Impact Management Actions for the Gruisfontein Project

ID	Activity	Potential Impact	Impact Management Actions (Mitigation Measures)
PRE-CONSTRUCTION PHASE			
	Open Pit Mining Infrastructure area	Extensive and unnecessary loss of favourable floral habitat, leading to a decline in floral diversity, including a decline in floral SCC numbers. Extensive loss of faunal habitat, leading to a decline in faunal diversity, including a decline of potential faunal SCC, including potential niche breeding areas (large trees for avifaunal SCC).	• Minimise loss of indigenous vegetation where possible through planning and suitable layouts. • The footprint area of all proposed infrastructure should be limited to what is necessary. • Disturbance to the surrounding natural habitat should be kept to a minimal. • Access roads should be kept to existing roads so to reduce fragmentation of existing natural habitat. • Prior to construction activities faunal and floral SCC / NFA-protected tree species that will be directly impacted upon need to be marked and removed to a suitable similar habitat or nursery as part of a rescue and relocation plan. • All relevant permits are to be obtained from LEDET and DAFF prior to the removal of floral SCC. • A pre-construction inspection (avifaunal walk-through) of the final mine layout, road and powerline routes must be conducted to identify Red List species that may be breeding within footprint of the mine and the road and powerline servitudes to ensure that the impacts to breeding species (if any) are adequately managed. This is particularly important in terms of nesting avifauna, where large trees with active nests are to be marked and recorded. • Where large nests are located within tall trees, if active, they are to not be disturbed and a suitably qualified avifaunal specialist is to be consulted as to the best way forward. • Every effort must be made to select a powerline route that poses the least risk to birds, avoiding key avifaunal habitat and where possible routing the proposed powerlines alongside other infrastructure to increase conductor visibility. • High risk sections of powerline must be identified by a qualified avifaunal specialist during the pre-construction inspection, once the alignment has been finalized. If powerline marking is required, bird flight diverters must be installed according to industry standard guidelines.
	Open Pit Mining Infrastructure area	Extensive and unnecessary loss of favourable floral habitat, leading to a decline in floral diversity, including a decline in floral SCC numbers. Proliferation of AIPs within the study area and the surrounding areas due to a failure to implement AIP Control Plan during the pre-construction phase. If AIPs are not managed before construction activities, dispersal propagules such as seeds will end up in topsoil stockpiles and reintroduced during the rehabilitation phase.	• Ensure that sound environmental management is in place during the planning phase. • It is recommended that prior to the commencement of construction activities that the entire construction servitude, including lay down areas and stockpile areas etc., be clearly demarcated. • A Biodiversity Action Plan (BAP) must be developed proactively and implemented throughout all development phases in order to manage indigenous vegetation within the project area and avoid unnecessary loss thereof. • Prior to the commencement of construction activities on site an AIP Control Plan should be compiled for implementation throughout the construction and operational phases. • Prior to the commencement of construction activities on site, a rehabilitation plan should be developed for implementation throughout the development phases.
	All activities	Physical and economic displacement of affected households and/or labour tenants through land acquisition	• Fair compensation negotiated and agreed with landowner based on valuation of land and economic value of the livelihood activities. • Implement a consultation programme with local stakeholders in the development of a closure plan and rehabilitation programme. • Determine the regional needs and characteristics to ensure post mining land use enhances the regional characteristics.
CONSTRUCTION PHASE			
	Open Pit Mining Infrastructure area	Soil erosion and dust generation during vegetation clearance activities	• The footprint of the proposed infrastructure area should be clearly demarcated to restrict vegetation clearing activities within the infrastructure footprint as far as practically possible.

ID	Activity	Potential Impact	Impact Management Actions (Mitigation Measures)
			• Vegetation clearance and commencement of construction activities should be scheduled (if practical) to coincide with low rainfall conditions when the erosive stormwater and wind are anticipated to be low. • Bare soils must be regularly dampened with water to suppress dust during the construction phase, especially when strong wind conditions are predicted according to the local weather forecast. • All disturbed areas adjacent to the infrastructural and opencast areas must be re-vegetated with an indigenous grass mix, if necessary, to re-establish a protective cover, in order to minimise soil erosion and dust emission. • Temporary erosion control measures may be used to protect the disturbed soils during the construction phase until adequate vegetation has established.
	Open Pit Mining Infrastructure area	Soil compaction resulting from vehicle movement during construction	• Vegetation clearance and commencement of construction activities should be scheduled (if practical) to coincide with low rainfall conditions when soil moisture is anticipated to be relatively low, such that the soils are less prone to compaction. • Compacted soils adjacent to the mining blocks and associated infrastructure footprint must be lightly ripped to at least 50 cm below ground surface to alleviate compaction prior to re-vegetation. • Special attention should be paid to AIP control within these areas.
	Open Pit Mining Infrastructure area	• Loss of the original spatial distribution of natural soil forms and horizon sequences which cannot be reconstructed similarly during rehabilitation. • Loss of natural topography and drainage pattern. • Loss of original soil depth and soil volume. • Loss of original fertility and organic carbon content. • Soil compaction from heavy machinery traffic during earthworks and rehabilitation will adversely affect effective soil depth, structure and density, thus influencing the pedohydrology and soil fertility of the area. • Exposure of soils to weathering, compaction, erosion, and chemical alteration of nutrients, particularly nitrogen. • Exposure of the soils to acidic, neutral or alkaline mine drainage that may be high in sulphates and heavy metals. • Permanent changes in the hydrological functioning of the soils and the landscape.	• Prevent mixing of high-quality topsoil [A (0 - 30 cm) and B (30cm – parent material) horizons] with low quality underlying material to ensure sufficient volumes of high quality soil for rehabilitation. • Separate stripping, stockpiling and replacing of soil horizons [A (0 - 30 cm) and B (30cm – parent material)] in the original natural sequence to combat hardsetting and compaction, and maintain soil fertility. • Stockpiles should be revegetated to establish a vegetation cover as an erosion control measure. These stockpiles should be kept free of AIP species to prevent loss of soil quality. • The soil fertility status should be determined by soil chemical analysis after levelling, before seeding/re-vegetation. • Soil amelioration should be done according soil analyses as recommended by a soil specialist, in order to correct the pH and nutrition status before revegetation. • Management of soil organic matter through organic amendments and the use of mulches should receive attention with the aim of improving functional microbial diversity, nutrient cycling and re-vegetation.
	Open Pit Mining Infrastructure area	Impact on low potential arable soils that comprise deep soils of the Ermelo and Hutton soil forms	• During the decommissioning phase the footprint should be thoroughly cleaned, and all building material should be removed to a suitable disposal facility. • The footprint should be ripped to alleviate compaction. • Stored topsoil should be replaced, and the footprint graded to a smooth surface. • The soil fertility status should be determined by soil chemical analysis after levelling, before seeding/re-vegetation. • Soil amelioration should be done according soil analyses as recommended by a soil specialist, in order to correct the pH and nutrition status before revegetation. • The footprint should be re-vegetated with a grass seed mixture as soon as possible, preferably in spring and early summer to stabilize the soil and prevent soil loss during the rainy season.

ID	Activity	Potential Impact	Impact Management Actions (Mitigation Measures)
			• A short-term fertilizer program should be implemented based on the findings of the soil chemical status after the first year in order to maintain the fertility status. Fertility treatment should take place for a maximum of 2 to 3 years after rehabilitation until the area can be declared self-sustaining.
	Open Pit Mining Infrastructure area	• Loss of floral habitat. • Loss of floral species diversity. • Potential loss of floral SCC species. • Proliferation of AIP species in the disturbed areas.	• All construction personnel will be educated in environmental awareness as part of the Induction Programme. • All floral SCC, with specific reference to species listed under LEMA and TOPS identified within the development footprint area, should be rescued and relocated to similar suitable habitat as part of a Rescue and Relocation Plan. • It is recommended that a thorough walkthrough of all footprint areas be completed to mark all protected tree species and that where feasible, infrastructure be placed around these trees (mostly applicable for linear developments and smaller infrastructure). • The construction footprint must be kept as small as possible in order to minimise the impact on the surrounding environment, and vegetation clearing should be limited to what is essential. • Clearing of vegetation should take place in a phased manner to keep bare soil areas as small as possible and to limit the erosion potential. • All areas of increased ecological sensitivity, or with high abundances of floral SCC, should be designated as No-Go areas and be off-limits to all unauthorised construction vehicles and personnel. • Planning of temporary roads and access routes should take the site sensitivity plan into consideration. If possible, such roads should be constructed along existing roads and planned in such a manner that the habitat does not unnecessarily get fragmented. • Vehicles should be restricted to travelling only on designated roadways to limit the ecological footprint of the proposed development activities. • Edge effects of all construction activities, such as erosion and AIP species proliferation, which may affect natural habitat within surrounding areas, need to be strictly managed adjacent to the proposed infrastructure footprint areas. • No collection of firewood, floral SCC or medicinal floral species must be allowed by construction or mining personnel. • An AIP Control Plan must be designed and implemented in order to monitor and control AIP recruitment in disturbed areas.
	Open Pit Mining Infrastructure area	• Loss of faunal habitat through vegetation clearance activities. • Loss of faunal species diversity. • Decreased faunal species habitat connectivity. • Loss of faunal food resources, artificial water points and potential breeding habitat.	• All construction personnel will be educated in environmental awareness as part of the Induction Programme, notably with regards to dangerous faunal species and faunal SCC. • Only vegetation within the footprint areas is to be cleared. • Planning of temporary roads and access routes should take the site sensitivity map into consideration. If possible, such roads should be constructed along existing roads and planned in such a manner that the habitat does not unnecessarily get fragmented. • Vehicles should be restricted to travelling only on designated roadways to limit the ecological footprint of the construction activities. • All areas of increased ecological sensitivity, outside of the mining footprint should be designated as No-Go areas and be off-limits to all unauthorised construction vehicles and personnel. • Edge effects stemming from construction activities, which may affect faunal habitat in the surrounding areas, are to be strictly managed, e.g. implement an AIP Control Plan, manage soil erosion, restrict personnel and vehicles movement to the footprint areas and ensure that sufficient dust suppress is taking place during the construction and operational phases.

ID	Activity	Potential Impact	Impact Management Actions (Mitigation Measures)
			• A rehabilitation plan must be in place and implemented in disturbed areas where work has been completed.
	Infrastructure area	• Potential loss of faunal SCC species. • Loss of faunal SCC breeding habitat.	• The construction footprint must be kept as small as possible in order to minimise impact on the surrounding environment and vegetation clearing should be limited to what is essential. • Prior to vegetation clearance activities a site inspection/walkdown of the footprint area is to be undertaken and the occurrence of SCC is to be marked. • Clearing of vegetation should take place in a phased manner to enable faunal species to move of on their own, whilst keeping bare soil areas at a minimum and to limit the erosion potential. • Where slow moving terrestrial species are located, if they are threatened by construction activities or vegetation clearance, they are to be carefully relocated to similar habitat in the study area by a suitably qualified specialist. Such location and removal activities are particularly important to slow moving reptile species and arachnids. • Suitably qualified and nominated personnel should undergo a snake handling course in order to safely remove any snakes that are encountered during construction activities.
		• Displacement of Red List avifaunal species as a result of habitat loss or transformation and disturbances. • Direct mortality of Red List avifaunal species.	• Construction activity should be restricted to the immediate footprint of the infrastructure. • Access to the remainder of the site must be strictly controlled to prevent unnecessary disturbance of RDL species. • Maximum use should be made of existing roads and the construction of new roads must be kept to a minimum. New roads are to be located in areas of existing high disturbance, and not encroach upon sensitive habitats. • The 22kV powerline must be constructed using a bird friendly structure (i.e. Inverted Delta-T Structure). • Additional mitigation in the form of insulating sleeves on jumpers present on strain poles, terminal poles and box transformers must also be considered. • Anti-nesting and roosting devices should be installed on all powerlines poles to avoid electrocution of avifauna. • Artificial nesting stations should be constructed in the northern portion of the study area to offset any nesting locations lost as a result of the removal of large trees in the mining footprint. A suitably qualified faunal specialist should be consulted with regards to their design and placement. • Bi-annual post construction monitoring to be conducted to assess actual impacts, determine diversity trends and assess mitigation efficacy, particularly with regards to vultures.
	All activities	Indiscriminate driving through the open veld leading to the loss of sensitive floral species and increased vehicle related mortalities of faunal species.	• No indiscriminate driving through the veld is allowed. As far as possible vehicles are to utilise the existing roads. Where this is not feasible, new roads are to be located in areas of existing high disturbance, and not encroach upon sensitive habitats. • Speed restrictions to be placed on all vehicles within the MRA area to limit faunal and vehicle collisions. • Drivers to be educated through the Environmental Awareness Programme about the presence and importance of faunal species and instructed to actively avoid collisions with faunal species, regardless of size.
	All activities	• Increased risk of veld fires leading to loss of faunal and floral species as well as alteration of plant diversity. • Trapping of faunal species through the use of snares. • Hunting/ collection of common faunal species and that of SCC.	• No illicit fires must be allowed during any phases of the proposed mining development. A Fire Management Plan (FMP) should be set in place to ensure that any fires that do originate can be managed and / or stopped before significant damage to the environment occurs. • No hunting or trapping of faunal species or SCC is to be allowed. Access control to the property must be implemented and perimeter fences are to be regularly inspected for signs of damage by poachers.

ID	Activity	Potential Impact	Impact Management Actions (Mitigation Measures)
			• Well used game paths, roadsides and if applicable burrows under fences used by fauna are to be inspected for snares, which if found are to be removed and destroyed.
	Open Pit Mining Infrastructure area	Clearing of topsoil from footprint areas can increase infiltration rates of water to the groundwater system, ultimately leading to an increase in groundwater levels. This potential impact is not necessarily a negative one.	• Mitigation not possible.
	All activities	• Dumping of construction material in open space areas other than those demarcated for such waste, leading to increased habitat and species loss. • Accidental spills and/or leakages of hazardous chemicals and hydrocarbons resulting in soil contamination. • Poor handling of waste and the transport of building material can cause various types of spills (especially hydrocarbons) that may potentially infiltrate and contaminate the underlying groundwater system.	• All vehicle re-fuelling is to take place within the contractor laydown area only, within a bunded area. • A Spill Management and Emergency Contingency Plan should be put in place to address clean-up measures should a spill and/or a leak occur, as well as preventative measures to prevent ingress to groundwater. • Regular monitoring of soil contamination levels at selected areas within the construction footprint. • A soil chemist should be contacted when contamination occurs, and remediation actions are needed. • Solid waste must either be stored on-site in an approved waste disposal area or removed by credible contractors. • All construction related waste and material is to be disposed of at a registered waste facility, no waste or construction rubble is to be dumped in the surrounding natural habitats.
	Open Pit Mining Infrastructure area	• Construction activities will generate noise, but it will mainly be limited to the project site and adjacent properties. • Noise levels will be less than 45 dBA during the day and less than 35 dB during the night.	• Ensure a good working relationship between mine management and all potentially noise-sensitive receptors staying closer than 2,000 m from the mine. • Ensure that equipment is well maintained and fitted with the correct and appropriate noise abatement measures. Engine bay covers over heavy equipment could be pre-fitted with sound absorbing material. Heavy equipment that fully encloses the engine bay should be considered, ensuring that the seam gap between the hood and vehicle body is minimised. • The operation should investigate the use of white-noise alarms instead of tonal reverse alarms on heavy vehicles operating on roads, within the mining area and at stockpile areas. • Establish complaints register with an open line to a relevant person that can act if there is a noise complaint.
	Access / haul roads	Construction activities resulting in open unprotected soils which are prone to wind erosion leading to an increase in dust and a reduction in ambient air quality in the MRA area and along the access road.	• Set the speed limit for hauling vehicles and vehicles in general to as low a speed possible and enforce the speed limits specified. It is recommended the speed limit be set to 40km/h on unpaved roads. • Include speedbumps to control the speed limits. • Include a program of wet suppression of the unpaved roads with major vehicle activity. The wet suppression can typically be grey water from the mine, or the water can contain a chemical that will increase the dust trapping capability once sprayed over a surface. • Limit the load size of the vehicles to ensure the wind in transit does not pick up more dust that need be. • Limit the area of disturbance to the minimum, keeping the natural vegetation intact as long as possible.
	Open Pit Mining Infrastructure area	Construction activities resulting in open unprotected soils which are prone to wind erosion leading to an increase in dust and a reduction of ambient air quality on and adjacent to the MRA area.	• All development footprint areas to remain as small as possible and vegetation clearing to be limited to what is absolutely essential, e.g. retain as much indigenous vegetation as possible. • Bare soils can be regularly dampened with water to suppress dust during the construction phase, especially when strong wind conditions are predicted according to the local weather forecast.
	Open Pit Mining Infrastructure area	• Visual intrusion on visual receptors during the construction phase. • Visual impact on the landscape character and sense of place associated with the project area and surrounds.	• Areas of disturbance during site clearing and construction infrastructure, where natural vegetation is removed and soils are exposed, should be kept to a minimum. • Large trees surrounding the infrastructure footprint areas should remain intact as far as possible.

ID	Activity	Potential Impact	Impact Management Actions (Mitigation Measures)
			• Any landscaping done around offices, workshops and parking area should only include locally indigenous species. No lawns or AIP species should be introduced due to the long-term effects this may have of species composition. • The use of permanent signage and project construction signs should be minimised and not be visually obtrusive. • Linear infrastructure components should follow natural contours or existing road alignment as far as possible to avoid unnecessary and unsightly cut and fill works, lower erosion potential and avoid visual contrast. • The CHPP and all buildings such as offices and workshops should be designed to fit their surroundings through the appropriate use of colour and material selection in order to lower their visual intrusion. Painting or coating infrastructure components to match darker colours in the natural surroundings may reduce the actual visibility of these components.
	All activities	Recovery of sub-surface sites during construction and/or excavation	• A qualified archaeologist must monitor excavation activities. • Any discovery of artefacts, graves or other remains of archaeological interest should be reported to SAHRA. • Activities must cease immediately upon any discovery of cultural or heritage resources and a qualified archaeologist informed to do further assessment and reporting. • Identified sites of cultural and heritage significance must be demarcated until such time that an instruction to resume work is provided to the contractor, following consultation with the regulating authorities.
	All activities	Economic Displacement due to Secondary Impacts and Environmental Interactions	• Make available land not being used for lease back by neighbouring operators. • Continuous consultation with neighbouring landowners to ensure co-existence and collaboration on mitigation measures for impacts on noise and dust. • Implement a consultation programme with local stakeholders in the development of a closure plan and rehabilitation programme. • Determine the regional needs and characteristics to ensure post mining land use enhances the regional characteristics. • Monitoring the impact on neighbouring properties.
	All activities	Loss of employment opportunities	• Priority employment from local communities with the development of recruitment procedures. • Utilizing the existing skills available from the local communities with special focus on those that is bound to lose their jobs.
	All activities	Disruption of daily living and movement patterns and safety of road users	• Implementation of the recommendations and mitigation measures as contained in the Traffic Impact Assessment. • Establishment of a complaint and grievance procedure.
	All activities	Influx of job seekers and population growth pressures	• Development and implementation of an Influx and Land use Management Plan in collaboration with the municipality and the current landowners. • Prioritise employment from local communities with the development of recruitment procedures. • Implementation of practical skills programmes. • Induction of contractors and workforce regarding their code of conduct in the local area.
	All activities	Creation of temporary construction employment	• Prioritize people residing in local area. • Implementation of practical skills programmes.
OPERATIONAL PHASE			

ID	Activity	Potential Impact	Impact Management Actions (Mitigation Measures)
	Open Pit Mining	• Disturbance of faunal species in the vicinity of the mine leading to faunal species movement out of the MRA area. • Decreased breeding rates which will impact upon faunal diversity and abundance. • Dust and sediment from active mining areas may lead to the smothering of surrounding vegetation, impacting on food resources for herbivorous species.	• Suppress dust in order to mitigate the impact of dust on flora within a proximity of blasting. • Blasting should ideally be done during mid-afternoon and not early mornings or late afternoon/evenings when faunal species are most active. • Edge effects must be suitably managed to ensure that the surrounding habitat is not impacted upon. • Innovative blasting techniques are to be employed in order to minimise ground and air vibrations and disturbances to minimise the impacts on surrounding faunal species. • An effective dust management plan must be designed and implemented in order to mitigate the impact of dust on floral species throughout the operational phase.
		• Loss of floral habitat and diversity. • Further loss of floral SCC. • Increase in AIP species as a result of disturbance. • Increase in erosion as a result of disturbance.	• Stockpiles, discard dumps and PCD positions, and their expansion as material is deposited, should be kept as small as possible. • No additional habitat is to be disturbed during the operational phase of the development. • Vehicles should be restricted to travelling only on designated roadways to limit the ecological footprint of the proposed mining activities. No vehicles must be allowed to indiscriminately drive through sensitive habitat and natural areas. • Upon completion of construction activities and decommissioning of access road, all impacted and disturbed areas should be ripped, reprofiled and reseeded with an indigenous veld grass mixture that will assist to stabilise soils as soon as possible. • Monitoring of relocation success of rescued and relocated floral SCC should take place during the operational phase. • Manage all edge effects stemming from mining operations and infrastructure areas. • Harvesting of protected floral species by mining and operational personnel should be strictly prohibited. • An AIP Control Plan should be implemented by a qualified professional. No chemical control of AIPs to occur without a certified professional. • Implement erosion control measures where necessary to ensure that further habitat loss does not occur. • Erosion must be monitored on a continual basis throughout the operational phase, particularly in the vicinity of disturbed areas and where increased human activities will take place.
	Open Pit Mining Infrastructure area	Loss of catchment yield due to dirty stormwater containment, leading to a reduction in volume of water entering the surrounding environment.	• A professional engineer should be engaged, with input from an environmental specialist, to develop a comprehensive stormwater management plan for the proposed mine. The plan must include proven effective measures for the separation and control of clean and dirty stormwater runoff. • Berms and/or cut off drains on the highwall side of the open pit and infrastructure must be constructed to prevent the influx of clean water into the managed dirty water areas. • All dirty stormwater runoff should be contained and not allowed to pollute the surrounding environment – this includes runoff potentially contaminated by activities associated with stockpile areas, service yards, parking and loading bays, as well as the CHPP. • Dirty runoff also includes areas where soils have been exposed – although no mining may have taken place in these areas, they may still contribute to increases in TSS and deterioration of water quality if released. • Clean water must be discharged into the natural environment in a non-erosive and controlled manner, and not allowed to form concentrated channels.
	Infrastructure area	• Altered surface runoff patterns due to reduced vegetation cover and increased impermeable surfaces.	• As above. • Regular inspection of all infrastructure should be conducted in order to identify areas of failure prior to an incident.

ID	Activity	Potential Impact	Impact Management Actions (Mitigation Measures)
		• Increased flood peaks as a result of formalisation and concentration of surface runoff leading to erosion due to concentration of stormwater runoff and the formation of preferential flow paths. • Risk of contaminated stormwater runoff (e.g. hydrocarbons, sediment, originating from impermeable surfaces).	• All feeding conveyors/pipelines should remain sealed, and if spillages occur, should immediately be cleaned up according to the Spill Management and Emergency Contingency Plan.
	Access / haul roads	• Increased risk of faunal mortality rates due to collisions with mine vehicles. • Risk of SCC mortalities due to collisions with mine vehicles.	• No indiscriminate driving through the veld is allowed. As far as possible vehicles are to utilise the existing roads. Where this is not feasible, new roads must be located in areas of existing high disturbance, and not encroach upon sensitive habitats. • Speed restrictions to be placed on all vehicles within the MRA area to limit faunal and vehicle collisions. • Drivers to be educated through the Environmental Awareness Programme about the presence and importance of faunal species and instructed to actively avoid collisions with faunal species, regardless of size.
	All activities	• Additional pressure on floral habitat by increased human populations associated with the proposed mining activities leading to a loss of floral habitat. • An increase in the collection of plant material for medicinal purposes. • Introduction of AIP species that can outcompete and displace native floral populations and reduce floral diversity within the study area. • Increase in fire frequencies is a risk. • Hunting and trapping of faunal species.	• Manage all edge effects stemming from mining operations and infrastructure areas. • No collection of firewood, floral SCC or medicinal floral species must be allowed. • No uncontrolled or unsanctioned fires are allowed. A Fire Management Plan should be in place. • Implement an AIP Control Plan that includes ongoing monitoring and control of the presence and/or re-emergence of such species. • No hunting or trapping of faunal species should be allowed within the MRA area. Implement an Environmental Awareness Programme on the mine and within the surrounding communities. • Ensure strict access control and patrol boundary fences to ensure perimeter fences are in good stead whilst removing any poachers' snares encountered in the study area. • Educate mine personnel on the biodiversity of the study area and highlight the damaging effects of uncontrolled hunting/poaching to species diversity and abundance;
	Bulk Power	• Mortality of avifaunal species due to collision with the 22kV powerline conductors. • Mortality of avifaunal species due to electrocution on the powerline poles/towers. • Mortality of avifaunal species due to electrocution within the onsite substation.	• Bird flight diverters to be maintained on sections of powerline during the operational life span of the 22kV powerline. • Insulating material to be maintained during the operational life span of the 22kV powerline. • The use of ultraviolet (UV) lights should be investigated to help avoid night-time bird collisions with tall structures and powerlines. Such lights have proven to be effective in mitigating bird strikes with powerlines for cranes and storks in Europe (Dwyer. J et al., 2019). • Post construction monitoring to include powerline surveys to evaluate collision and/or electrocution mortality and assess the efficacy of mitigation measures. • Should electrocutions occur within the onsite substation yard, mitigation can be applied reactively using a range of insulation devices. Site-specific recommendations should be sought from a suitably qualified avifaunal specialist, in conjunction with the Endangered Wildlife Trust's Wildlife & Energy Programme.
	Traffic	Mortality of avifaunal species due to collisions with motor vehicles	• Vehicles must utilise existing roads only. • Speed restrictions to be enforced for all vehicles within the study area to limit avifaunal collisions. • Awareness initiatives to educate road users about the presence of avifaunal species utilising the roads, particularly during dusk and dawn periods. • Should collisions persist site-specific recommendations to be sought from a suitably qualified avifaunal specialist in conjunction with the Endangered Wildlife Trust's Wildlife & Transport Programme.

ID	Activity	Potential Impact	Impact Management Actions (Mitigation Measures)
	Open Pit Mining Infrastructure area	Increased lighting will result in the attraction of insects, which will inevitably attract several insectivorous predators, notably bats. This may result in increased risk of injury or mortality to such predatory species either from collision with operational machinery, infrastructure and vehicles, or as a result of direct human conflict.	• Lighting pollution and its effect on fauna (with special mention of invertebrates, bats and avifauna) must be effectively mitigated with the following guidelines in mind with due cognizance taken of health and safety requirements: • Downward facing lights must be installed and limited to essential areas. • Covers/light diffusers must be installed to lessen the intensity of illumination where possible. • Outside lights are to utilise bulbs of varying wave lengths that do not attract insects.
	Open Pit Mining	Opencast mining, when occurring below the water table, results in an influx of groundwater. Pit dewatering is then required to ensure dry and safe mining conditions, which ultimately leads to a lowering of the local groundwater levels.	• No mitigation measures are available for when mining occurs below the local water table. Only by remaining above the water table can this impact be avoided. • Groundwater monitoring should be implemented for early detection of the lowering of groundwater levels.
	Mine residue and stockpiling	Contamination of surface and groundwater due to acid mine/rock drainage	• Potential dirty surface areas should be lined with concrete to prevent poor quality seepage from reaching the aquifer and contaminating the underlying groundwater. • Stockpile areas should be appropriately lined to prevent potentially poor quality leachate from contaminating the underlying groundwater. • Surface areas should be bunded to prevent clean surface water runoff from being contaminated by dirty surface areas, in line with the Stormwater Management Plan. • Dedicated source monitoring boreholes should be drilled to monitor the groundwater quality conditions and for early detection of groundwater quality impacts. The positions of these boreholes will be determined during the IWULA process.
	Water management facilities	Water retaining facilities such as the planned pollution control/recycling dam are designed and constructed with the objective to prevent any poor quality water from entering the underlying aquifer and contaminating the groundwater. Poor management and maintenance of such facilities may however lead to spills and/or leakages that could contaminate the surface and groundwater resources.	• All water retaining facilities should be lined with an impervious liner to prevent dirty water from reaching the underlying aquifer and contaminating the groundwater. • Water retaining facilities should be designed in line with the requirements of GN704, for a minimum of a 1:50 year rainfall event. • Clean and dirty water separation structures must be maintained throughout the life of mine - O&M Plan. • Spills should be cleaned up immediately in line with the Spill Management and Emergency Contingency Plan. • Proper management and regular inspections for leakages are strongly recommended.
	Waste management	Pollution of the natural environment and water resources	• No operational-related waste material is to enter natural habitats. • It must be ensured that the mine process water system is managed in such a way as to prevent discharge to the receiving environment. • In the event of a vehicle breakdown, maintenance of vehicles must take place with care and the recollection of spillage should be practised near the surface area to prevent the ingress of hydrocarbons into the topsoil and subsequent habitat loss. • Any waste or toxic spills from vehicles or mining infrastructure must be dealt with immediately in accordance with the waste management plan.
	Hydrocarbon management	• Pollution of surface and groundwater as a result of accidental spillages of chemicals and hazardous material. • Leachate into the groundwater as a result of ponding/seepage.	• Surface areas should be appropriately lined/compacted to prevent poor quality seepage from reaching the aquifer and contaminating the underlying groundwater. • Hydrocarbon storage and work areas (workshops etc.) should be bunded to prevent clean surface water runoff from being contaminated by these dirty surface areas. Bulk facilities to be concrete lined and bunded to capacity of 110%. • Reclamation of soils in the event of accidental spillage. • Spills should be cleaned up immediately in line with the Spill Management and Emergency Contingency Plan.

ID	Activity	Potential Impact	Impact Management Actions (Mitigation Measures)
	All activities	• Operational activities will generate noise, but it will mainly be limited to the project site and directly adjacent properties. • Noise levels will be less than 45 dBA during the day at all receptors. • Noise levels will be less than 35 dBA during the night at all receptors except for the residential receptors on Verloren Valey and Duikerpan.	• Ensure a good working relationship between mine management and all potentially noise-sensitive receptors staying closer than 2,000 m from the mine. • Ensure that equipment is well maintained and fitted with the correct and appropriate noise abatement measures. Engine bay covers over heavy equipment could be pre-fitted with sound absorbing material. Heavy equipment that fully encloses the engine bay should be considered, ensuring that the seam gap between the hood and vehicle body is minimised. • The operation should investigate the use of white-noise alarms instead of tonal reverse alarms on heavy vehicles operating on roads, within the mining area and at stockpile areas. • Establish complaints register with an open line to a relevant person that can act if there is a noise complaint.
	Open Pit Mining	Increase in fugitive dust emissions (PM_{10} and dust)	• Water sprays should be applied during the removal of the waste rock to reduce fugitive emissions. • Drilling and blasting activities should not be undertaken during high wind periods to avoid excess dust being transported across to neighbouring communities. • Monitoring of key meteorological parameters such as wind speed, wind direction, temperature, precipitation and atmospheric pressure.
	Access / haul roads Product transport	• A large amount of dust emissions is generated by vehicle traffic over these temporary unpaved roads. • Substantial secondary emissions may be emitted from material moved during regular grading of the unpaved access road. • Product transport may further lead to a decrease in the regional air quality due to wind erosion of product and spillages. • Impact on well-being and livelihoods due to dust generation along transport routes.	• Set the speed limit for hauling vehicles and vehicles in general to as low a speed possible and enforce the speed limits specified. It is recommended the speed limit be set to 40km/h on unpaved roads. • Include speedbumps to control the speed limits where appropriate. • Include a program of wet suppression of the unpaved roads with major vehicle activity. The wet suppression can typically be grey water from the mine, or the water can contain a chemical that will increase the dust trapping capability once sprayed over a surface. • Limit the load size of the vehicles to ensure the wind in transit does not pick up more dust than need be. • Product transport trucks must be covered with tarpaulins; the covers must be secured. • Spillages along the product transport routes must be cleaned immediately. • Establishment of a Complaint and Grievance Procedure.
	Infrastructure area	Particulate matter and nuisance dust are expected from the working stockpiles, transfer and tipping points during normal operations.	• Limit the height and slope of stockpiles to reduce wind entrainment. • General traffic around the stockpile areas must be limited. • Windshields (barriers) can be implemented on the slopes and surface of the stockpile, these barriers are typically large trees with good foliage. The substitute of a wind barrier is a wind shield made from a prose material.
	Infrastructure area	The crushing and screening process (beneficiation) will further reduce the ambient air quality in and adjacent to the infrastructure area.	• Material should be kept damp during crushing and screening. • Dust suppression should be installed along all conveyors and at conveyor transfer stations.
	Open Pit Mining	• Ground vibration impact on humans and animals - safety and nuisance impacts. • Potential damage to infrastructure. • Potential for fly-rock, which could harm people and animals.	• Mine to implement a vibration and air blast measurement programme to allow the monitoring of all blasts during the first year. The data must be analysed, and the blast impact assessment be reviewed and updated. • Mine not to blast in adverse meteorological conditions (overcast, strong wind blowing in direction of houses, early in the mornings, late in the afternoon). • Mine to initiate a forum to inform the close residents about the likely vibration and air blast levels, the proposed blasting schedule and warning methodology the mine will employ before a blast. • Mine to reduce the charge per delay to ensure that: o maximum ground vibration levels are less than 2.54 mm/s when blasting has to take place within 3,500m from dwellings used for residential purposes. This can be accomplished by reducing the charge per delay to less than 2,985 kg charge per delay.

ID	Activity	Potential Impact	Impact Management Actions (Mitigation Measures)
			○ maximum ground vibration levels are less than 25 mm/s when blasting has to take place within 1,600m from identified potential sensitive structures. This can be accomplished by reducing the charge per delay to less than 13,000 kg charge per delay. • Mine to erect blasting notice boards in the area (on the main access route from the district road to the mine) with blasting dates and times highlighted. • Maintain an evacuation zone of 428m, establish an evacuation procedure with the affected parties prior to blasting. • Any evidence of fly rock must be noted, and the blast design analysed for possible improvements. • Blaster to keep full records of blast (blast design, timing, explosive mass per blast hole, stemming, subdrill, spacing, burden, etc.). • Annual photographic records to be collected at residential houses within 3.5 km from the mine.
	All activities	• Visual intrusion of mining activities on visual receptors. • Visual impact on the landscape character and sense of place associated with the project area and surrounding area.	• Large trees surrounding the infrastructure footprint areas should remain intact as far as possible. • General housekeeping should receive priority to ensure operational areas are always neat and orderly. • Visually intrusive activities must be screened off or make use of local screening opportunities as far as is considered feasible. • Where screening opportunities from topography and vegetation are absent, natural-looking constructed landforms and vegetative or architectural screening may be used to minimise visual impacts. • All operational facilities should be actively maintained. • Backfilling of the open pit should commence as soon as possible in order to avoid discard dumps reaching maximum final heights and limit the operational size of the open pit. • Vegetation growth on dumps and stockpiles should be encouraged, and if required facilitated through seeding with a locally indigenous seed mixture. • Disturbed areas and bare soils should be revegetated as soon as possible during the operational phase. • Vehicles should be restricted to existing roads and the speed of hauling and other vehicles should be limited to minimise dust generation. • Access roads must be suitably maintained to limit and prevent erosion and dust. • Off-site visual mitigation measure that should be considered could include reclaiming unnecessary roads, removing unnecessary fencing, signage and buildings that will not be repurposed, and rehabilitating and revegetating existing erosion or disturbed areas. • If required, additional screening vegetation may be planted at receptor sites from where a clear view towards mining infrastructure of increased height exists.
	All activities	Alteration of topography.	• Backfilling of the open pit should commence as soon as possible in order to avoid discard dumps reaching maximum final heights and limit the operational size of the open pit. • Vegetation growth on dumps and stockpiles should be encouraged, and if required facilitated through seeding with a locally indigenous seed mixture. • The discard dump should be shaped and rounded as it increases in height and as more material is added, to blend in with the surrounding landscape, as far as possible, particularly once the discard dump reaches a height where sky-lining or changes to the horizon may occur.
	All activities	Visual impacts from night-time lighting.	• Existing vegetation will assist in screening surrounding receptors from night-time lighting at ground level, and therefore as much existing vegetation as possible surrounding the proposed infrastructure should be retained and development footprints should remain as small as possible.

ID	Activity	Potential Impact	Impact Management Actions (Mitigation Measures)
			• A lighting engineer should be consulted to assist in the planning and placement of light fixtures for the CHPP and all ancillary infrastructure in order to reduce visual impacts associated with glare and light trespass. • Placement of lighting outside of the project area should be avoided or strictly limited. • All outdoor lighting must be strictly controlled, and lighting shields installed where required. • The use of high light masts should be avoided to reduce sky glow. • Up-lighting of structures must be avoided, with lighting installed at downward angles that provide precisely directed illumination. • Localised and portable lighting should be used where and when the operations or maintenance work is occurring. Vehicle-mounted lights or portable light towers are preferred over permanently mounted lighting for night-time maintenance activities. • Censored and motion/ movement-activated lighting should be installed for security purposes at offices and workshops to prevent use of lights when not needed. • Minimum wattage light fixtures should be used, with the minimum intensity necessary to accomplish the light's purpose. • The use of low-pressure sodium lamps, yellow Light Emitting Diode (LED) lighting, or an equivalent reduces skyglow and wildlife impacts. Bluish-white lighting is more likely to cause glare. • Off-site hauling of product should be limited to daylight hours.
	Product transport	• The road network will be able to handle the additional traffic, with the identified road improvements, with no detrimental impact on the traffic on any of the relevant roads. • Safety of other road users do require some intervention.	• Upgrade of intersection of Road D175 with Road D1675: a dedicated right turn lane on the eastern and western approaches (on D1675) to allow for the speed difference between the through traffic and slow-moving right-turning trucks and/or busses. • Upgrade of delivery access to/from Medupi off Road D1675: a dedicated right turn lane on the western approach (on D1675 coming from the Steenbokpan) to allow for the speed difference between the through traffic and slow-moving right-turning trucks. • A bitumen-based emulsion (“dust-a-side” or similar product) should be applied to the section of Road D175 between Road D1675 and the planned access to the mine, in accordance with a regular and official maintenance program. • All proposed road upgrades and improvements are to be designed by a professional engineer and submitted for official approval, by the Roads Agency Limpopo, prior to implementation. • Spillage from loaded trucks between the mining area and the Medupi Power Station must be prevented as far as possible. Regular inspections and clean-up operations should be conducted. • The loaded trucks should be covered to prevent spillage and hazards to other road users (tarpaulins). • Speed and safety control of truck movements must be implemented, with specific reference regarding a 40km/h speed limit for truck movements within built-up areas and 80km/h on provincial roads with a regular monitoring process. • Establishment of a Complaint and Grievance Procedure.
	Open Pit Mining	Recovery of sub-surface archaeological sites during mining operations.	• A qualified archaeologist must monitor excavation activities. • Any discovery of artefacts, graves or other remains of archaeological interest should be reported to SAHRA. • Activities must cease immediately upon any discovery of cultural or heritage resources and a qualified archaeologist informed to do further assessment and reporting.

ID	Activity	Potential Impact	Impact Management Actions (Mitigation Measures)
			• Identified sites of cultural and heritage significance must be demarcated until such time that an instruction to resume work is provided to the contractor, following consultation with the regulating authorities.
	Open Pit Mining	• There is a very high likelihood of the occurrence of fossils, typically palaeoflora of *Glossopteris*, *Dadoxylon* and *Vertebraria* within the lower Karoo strata. • The Lisbon Formation may contain trace fossils such as *Cruziana* and *Skolithos*, with also a possibility of dinosaur fossils such as *Euskelsaurus* and *Massospondylus*.	• Once the open pit mining commences, the developer should appoint a recognised suitably qualified palaeontologist to re-assess the palaeontology of the operation to develop a protocol for further assessments and/or chance fossil finds. • Any fossils such obtained should be deposited with a recognised authority such as the Council for Geoscience, Bernard Price Institute for Palaeontology or the Department of Geology and Mining, University of Limpopo.
	All activities	• Economic or Physical Displacement due to Secondary Impacts and Environmental Interactions (noise, visual). • Impact on Aesthetic Value and Sense of Place due to Visual intrusions and increase Nuisance Noise.	• Make available land not being used for lease back by neighbouring operators. • Continuous consultation with neighbouring landowners to ensure co-existence and collaboration on mitigation measures for impacts on noise and dust. • Implement a consultation programme with local stakeholders in the development of a closure plan and rehabilitation programme. • Determine the regional needs and characteristics to ensure post mining land use enhances the regional characteristics. • Monitoring the impact on neighbouring properties. • Establish a complaint and grievance procedure.
	All activities	Increase in social pathologies and crime.	• Implement health awareness programmes for workers and communities including education programmes on sexually transmitted diseases and HIV/AIDS and other illnesses such as TB. • Increased security on mine premises: Properly constructed and secured fences can control access to mine site. Implementing strict access control to the project site. • Employment of local people on the mine to improve the poverty levels in the neighbouring towns and suburbs. • Code of Conduct to form part of induction of new workers with a clear statement and procedure regarding access, conduct and identification. • Establish a complaint and grievance procedure.
	All activities	Creation of permanent operational employment.	• Prioritize people residing in local area. • Implementation of practical skills programmes.
	All activities	Contribution to Human Resource and Socio-economic Development Programmes	• Implementation of the SLP, with a focus on local settlement residents.
	All activities	Generation of tax base, revenue and GDP contribution	• Optimize local involvement in on-mine business opportunities to maximize local economic growth. • Identify contracts or part of contracts that may be suitable to smaller local companies. • Facilitate and encourage the involvement of SMME's in larger contracts as sub-contractors. • Establish SMME development programmes to support upcoming and SMME businesses.
	All activities	Secondary benefits in the creation of electricity to supply the domestic demand.	• None.
DECOMMISSIONING PHASE			
	Open Pit Mining	• Highly compacted soils limiting the re-establishment of natural vegetation. • Increased risk of erosion in disturbed areas. • Proliferation of AIP species leading to ongoing floral loss.	• Ensure sound implementation of AIP Control Plan. • A bi-annual AIP clearance programme should be implemented for up to 2 years after closure. • Follow up with AIP control measures for a period of 5 years post-closure. • Where soils have been compacted, they are to be ripped and where necessary reprofiled. • Indigenous grass species are to be used for revegetation of disturbed areas.

ID	Activity	Potential Impact	Impact Management Actions (Mitigation Measures)
		• Inadequate rehabilitation of open pit mining blocks and disturbed areas leading to permanent habitat loss. • Altered vegetation communities within the study area. • Ongoing erosion, habitat loss, AIP proliferation and the loss of species diversity. • Potential permanent habitat transformation leading to a long term and significant cumulative loss of natural habitat and species in the region.	• All surface infrastructure is to be removed and waste material disposed of at a registered dump site. Waste and remnant mine related material are not to be dumped or left within the focus area. • Implement all recommendations as per the mine closure plan. • Use of a nursery developed by the mine to cultivate indigenous/endemic and SCC plant species with a focus on rehabilitation during the post-closure phase in conjunction with a suitably qualified specialist. This will assist in areas where regrowth is not to an acceptable standard. • Continue monitoring of rehabilitation activities for a minimum period of 5 years following the mine closure or until an acceptable level of habitat and biodiversity re-instatement has occurred, in such a way as to ensure that natural processes and veld succession will lead to the re-establishment of the natural wilderness conditions which are analogous to the pre-mining conditions of the area.
	Infrastructure area	• Highly compacted soils limiting the re-establishment of natural vegetation. • Increased runoff volumes and formation of preferential surface flow paths as a result of compacted soils and unvegetated areas, leading to increased sedimentation and erosion. • Proliferation of AIP species leading to ongoing floral and faunal habitat loss. • Improper rehabilitation of disturbed areas leading to permanent floral and faunal habitat loss.	• Ensure that soils are replaced, ripped and re-profiled post-closure, and that vegetation is restored (revegetated with indigenous vegetation species) to a point where succession will lead to the same conditions as the pre-mining state as a minimum. • Rehabilitation measures stipulated in Rehabilitation, Decommissioning and Closure Plan must be implemented. Implementation must be overseen by a suitably qualified Environmental Site Officer. • Where necessary hessian sheets (or similar products) are to be used in order to stabilise the soil surface until complete revegetation has occurred. Minimum of three year's post-closure monitoring to be undertaken. • Ensure sound implementation of AIP control plan. • During the removal of infrastructure and waste, remediation of contamination be found should be carried out, where this is not possible these soils are to be removed to an appropriate waste facility.
	Open Pit Mining Infrastructure area	Visual intrusion of decommissioning activities on visual receptors.	• Once mining activities have been completed, it must be ensured that all surface infrastructure, including foundations to the depth specified, signage and moveable infrastructure, must be removed from site (unless otherwise agreed with stakeholders). • It must be ensured that all dumps and stockpiles have been completely removed by using this material as backfill in the open pit. • It must be ensured that that the open pit has been completely backfilled, shaped to follow natural contours and is stable. • All bare and impacted areas must be sufficiently graded, shaped and vegetated to blend in with the surroundings. • It must be ensured that revegetation takes place to a high standard to ensure that vegetation structure, height and composition as per pre-mining conditions are achieved as far as possible. Locally indigenous species should be used for this purpose. • AIP control must continue post-closure as specified in the BAP. • Erosion control measures must be implemented, or existing erosion control measures should remain in place where applicable.
	Infrastructure area	• Migration of residual groundwater contamination plume away from rehabilitated areas. • Groundwater contamination due to acid mine/rock drainage.	• Deposit mine wastes in the open pit, controlling the migration of high sulphate leachate. • The horizons that are potentially acid generating, the coal middlings and carbonaceous mudstones should be placed at the bottom of the pit, where they will be submerged below the water table, preventing oxidation. • Open pit areas will be rehabilitated and vegetated as soon as possible to reduce the oxidation and the potential generation of acid-mine drainage.

ID	Activity	Potential Impact	Impact Management Actions (Mitigation Measures)
			• Grass cover should be re-established, as soon as possible after top soiling to minimise infiltration of water through residue material. • Dedicated plume monitoring boreholes should be drilled in the down-gradient groundwater flow direction and sampled at quarterly intervals to monitor plume migration. • Should the monitoring program indicate significant plume migration, interception trenches and/or rehabilitation boreholes may be considered as a form of mitigation.
	Open Pit Mining Infrastructure area	Final decommissioning activities will have a noise impact lower than either the construction or operational phases.	• Restrict rehabilitation activities to day-time only.
	Open Pit Mining Infrastructure area	The decommissioning phase may result in some reduction to the ambient air quality, but to a lesser extent than the operational phase.	• Revegetation of exposed areas for long-term dust and water erosion control is commonly used and is the most cost-effective option. Plant roots bind the soil, and vegetation cover breaks the impact of falling raindrops, thus preventing wind and water erosion. Plants used for revegetation should be indigenous to the area, hardy, fast-growing, nitrogen-fixing, provide high plant cover, be adapted to growing on exposed and disturbed soil (pioneer plants) and should easily be propagated by seed or cuttings.
	All activities	Loss of job opportunities due to downscaling of the mine employment.	• Implementation of portable skills programmes to assist employees, especially those from the local area, to re-enter the agricultural and other sectors prevalent in the Municipal area. • Establish a future forum with representation from the workforce to discuss potential difficulties and solutions.
POST-CLOSURE			
	All activities	Impact on ecosystem	• Since effective mitigation through avoidance, impact minimisation and rehabilitation are deemed unlikely to adequately limit the impact on the receiving ecology, it is deemed important that an ecological offset initiative be initiated to contribute to the conservation of the area.
	All activities	Post-closure land use and land capability	• Define, in consultation with all IAPs, the final (post-closure) land use for the mining area, including mining areas, surface and water management infrastructure, mine residue facilities, etc. • Develop a final land use plan and implementation programme as part of the closure plan, considering important issues such as ongoing operational and maintenance requirements and long-term responsibilities and ownership. • Set final closure objectives and standards to ensure conformance to the final land use plan and the requirements of the IAPs and relevant environmental legislation. • Develop a detailed closure plan five years prior to closure and obtain approval from the relevant authorities.
	All activities	• Deterioration of groundwater quality within the back-filled open pit due to AMD reactions. • Decant into the shallow aquifer or on surface at the lowest surface elevations intersected by the pit.	• Dedicated plume monitoring boreholes should be drilled in the down-gradient groundwater flow direction and sampled at quarterly intervals to monitor plume migration. • Should the monitoring program indicate significant plume migration, interception trenches and/or rehabilitation boreholes may be considered as a form of mitigation. • Ongoing evaluation and reassessment of alternative options for the final water use and required associated water quality, together with the technologies required to achieve the required quality. • The final land use will also be used to evaluate the post closure water management. • Active involvement in any regional integrated water management plans developed in the area.

Table 10: Mechanisms and responsibilities for implementation of Impact Management Actions

Source Activity / Impacts	Mechanisms / Actions Required	Time Period for Implementation	Frequency	Roles and Responsibility
Impact on biophysical environment as a result of mining and infrastructure development	Develop and implement detail Monitoring Procedure	Prior to mining	Annual review of monitoring programme or if major change in scheduling	EO EMC
Impact on biophysical and social environment as a result of mining and infrastructure development	Implement environmental awareness programme (internal & external)	Construction Phase	Ongoing review Include in annual induction programme	EO HRD
Impact on biophysical environment as a result of mining and infrastructure development	Review and analyses of monitoring data for: • Groundwater • Mine water balance • Land use management • Air quality • Environmental noise • Blasting • Waste management • Erosion control	Commencement of mining	Annual review	EO EMC
Impact on SCC/protected fauna & flora species, including avifauna	Pre-construction walk-through to identify SCC/protected species Develop and implement Rescue and Relocation Plan	Prior to mining	Annual rescue operation for areas to be disturbed in the next 12 months	EO ES
Biodiversity impact as a result of mining an infrastructure development and vegetation clearance	Develop and implement Biodiversity Action Plan (BAP)	Within one year of mining	Annual review	EO ES
Impact on soils and land use as a result of mining an infrastructure development	Develop and implement Rehabilitation, Decommissioning and Closure Plan	Prior to mining	Annual review or if major change in scheduling	Rehab M
Impact on soils, land use and biodiversity as a result of mining an infrastructure development	Conduct research (soil amelioration and/or seed mix requirements) to re-instate suitable grazing capabilities over the rehabilitated portions of the mine site	Within first 2 years of mining (after rehabilitation of construction areas)	Ongoing review and improvement	Rehab M EO ES
Impact on soils, land use and biodiversity as a result of mining an infrastructure development	Vegetation audit to determine effectiveness of and long-term sustainability of vegetated areas	Within first 2 years of mining (after rehabilitation of construction areas)	Annually	Rehab M EO ES
Impact on soils, land use and biodiversity as a result of mining an infrastructure development	Implement aftercare and maintenance programme for rehabilitated areas	Within 2 years of mining	Ongoing implementation as per specialist recommendations	Rehab M

Source Activity / Impacts	Mechanisms / Actions Required	Time Period for Implementation	Frequency	Roles and Responsibility
Encroaching / spreading of alien vegetation as a result of vegetation clearance and rehabilitation	Initiate AIP Control Plan	Construction Phase	Annual review	Rehab M EO
Impact on cultural and heritage aspects due to excavations	Heritage monitoring	Construction phase LOM	Monthly or as new areas are excavated	ES
Impact on palaeontological aspects due to excavations	Palaeontology monitoring	Operational Phase	Monthly or as new areas are excavated	ES
Impact on surrounding boreholes, groundwater levels as a result of dewatering	Establish baseline groundwater levels of all boreholes within the impact zone	Prior to any activities	Quarterly monitoring	EO ES
Impact on surrounding boreholes, groundwater levels as a result of dewatering	Enter into negotiations with surrounding landowners and communities impacted regarding compensation or alternative water supply	Once monitoring indicates a lowering in water levels of boreholes	Ongoing review, based on quarterly monitoring results	GM EO
Impact on groundwater quality and levels	Revision of groundwater flow and geochemical model	Within 2 years of mining	Revise every 5 years	ES
Impact as a result of blasting	Develop detail blasting procedure in line with specialist advise, including evacuation procedures	Prior to opencast mining	Ongoing review based on monitoring data	Mine M ES
Impact on infrastructure as a result of blasting (ground vibration)	Pre-blast survey of all structures within a radius of 3500m	Prior to opencast mining (blasting)	Once-off	ES
Noise impacts on sensitive receptors and surrounding communities	Stipulate best practice requirements in tender documentation i.r.o. emissions, noise, equipment, transport, etc.	Prior to appointment of contractors	Ongoing review as new technology becomes available	Eng M
Air quality impacts on sensitive receptors and surrounding communities	Develop and implement AQMP	Prior to construction / mining	Annual review through EMC	EO EMC
Impact on water resources as a result of mining and infrastructure development	Development and implementation of a detail water management plan and infrastructure designs	Prior to construction	Annual review or if major change in scheduling	Eng M Mine M
Impact on water resources as a result of mining and infrastructure development	Maintenance of clean and dirty water system	Operational Phase LOM	Monthly or after a large rain event	Eng M EO
Product transport, increase in traffic	Initiate agreement with Roads Agency Limpopo (RAL) for upgrading of road intersections, product transport roads and road maintenance	Prior to mining	Once-off	GM Eng M
Product transport	Identify and clean-up of any spillages along access and product transport roads	Construction Phase LOM	Weekly	Eng M EO
Product transport	Identify and report any road maintenance issues	Construction Phase LOM	Ongoing discussions and auditing of road conditions	Eng M Roads Dept
Social aspects identified as a result of the proposed mining development	Develop and implement Social Management and Monitoring Strategies	Prior to and during construction	Ongoing review through the EMC	HRD EO

Source Activity / Impacts	Mechanisms / Actions Required	Time Period for Implementation	Frequency	Roles and Responsibility
		LOM		EMC
Consultation	Establishment of EMC	Commencement of mining	Annual meetings	EO
Consultation	HSEC stakeholder meeting	Commencement of mining	Annually	GM EO
EMPr compliance review	Internal review of EMP compliance, conformance to environmental objectives and strategies and the implementation thereof	Commencement of mining	Annually	EO EMC
EMPr compliance review	EMP performance assessment to determine conformance with the EMPr, including effectiveness and appropriateness of EMP	Within first 2 years of mining	Annually	ES
EMPr compliance review	Environmental legal compliance audit	Commencement of mining	Annually	ES
EMPr compliance review	Revision of Rehabilitation, Decommissioning and Closure Plan and closure cost provision requirements	Commencement of mining	Annually	Rehab M Eng M ES

5 ENVIRONMENTAL MONITORING AND AUDITING

5.1 MONITORING

A comprehensive monitoring system was developed for the Gruisfontein Project in line with the proposals of the specialists – refer to Table 11. The objective of the environmental monitoring system is to:

- Prevent and/or minimise the environmental impact associated with the proposed mining operation;
- Ensure conformance with the management objectives and outcomes;
- Act as a pollution early-warning system;
- Obtain the necessary data required to address knowledge gaps;
- Check compliance with license requirements; and
- Ensure consistent auditing and reporting protocols.

Prior to commencement, a detail Monitoring Procedure will be developed for implementation. A proper data management system will be set up to facilitate trend analyses and preparation of reports. All the monitoring data will be collated and analysed on an annual basis and included in management reports. The results will be reviewed by the EMC.

It must be noted that the monitoring programme is a dynamic system changing over the different life-cycle phases of the mine. The programme will be reviewed on an annual basis by the EMC and revised if necessary.

Table 11: Environmental monitoring programme for the Gruisfontein Project

Aspect	Issue	Purpose	Monitoring points	Frequency	Sampling Method	Variables
Surface water	Potable water	To determine quality of drinking water	Outflow of potable treatment facility	Weekly	Grab sampling	Turbidity and micro-biological constituents
	Sewage effluent	To determine water quality of sewage effluent (if applicable)	Outflow of STP	Weekly	Grab sampling	Turbidity and micro-biological constituents
	Water management infrastructure	Monitoring of infrastructure condition/ functionality, identifying areas that require maintenance	Along clean & dirty water canals, PCD and RWD Mine reside dumps	Monthly After a big rain event	Visual	Evidence of erosion, cracks, subsidence, overgrowth, leachate, etc.
	Dirty water systems	To determine the water quality and long-term chemical changes in the dirty water systems	PCD RWD	Quarterly	Grab sampling	EC, pH, TDS, total hardness, total alkalinity, calcium, magnesium, sodium, potassium, chloride, sulphate, fluoride, nitrate, iron, manganese, aluminium and turbidity
				Annually	Grab sampling	Analyses to 95% charge balance, including all metals and hydrocarbons
Groundwater	Groundwater quality	To determine any impact on the groundwater quality as a result of mining	GRU01, GRU06, GRU07 MBH01-09 (new boreholes)	Quarterly	High integrity grab sampler (double valve), preferably made from PVC/Teflon	EC, pH, TDS, total hardness, total alkalinity, calcium, magnesium, sodium, potassium, chloride, sulphate, fluoride, nitrate, iron, manganese, aluminium and turbidity
				Annually	As above	Analyses to 95% charge balance, including all metals and hydrocarbons
	Groundwater levels	To determine any impact on the groundwater levels as a result of mining	As above	Monthly	Dip meter	Water level (mbs)
Mine water balance	Water levels in dams	To verify water balance and volume of water stored	PCD RWD	Monthly	Survey	Height (m)
	Dirty water recycled	To determine volume of dirty water abstracted & recycled for processing and dust suppression	Pit dewatering at the dewatering pumps Dust suppression abstraction points	Monthly reading	Flow meters	Volume (m^3)
	Clean water abstraction	To determine volume of clean water abstracted	Water supply abstraction points (boreholes)	Monthly reading	Flow meters	Volume (m^3)
	Process flow	To determine accurate process water balance	Inflows & outflows	Monthly	Water meters	Volume (m^3)

Aspect	Issue	Purpose	Monitoring points	Frequency	Sampling Method	Variables
			Moisture content of the product & residue			
Biodiversity / Land use management	Soil erosion	To pro-actively identify soil erosion in order to rectify prior to serious degradation	MRA area Clean water discharge points Topsoil stockpiles & berms	Routinely (monthly)	Field survey	-
	Terrestrial ecological	To determine floral & faunal species composition & abundance and plant basal cover	Fixed point vegetation monitoring in MRA area Rehabilitated areas	Bi-annually	Field survey	As per specialist advise
	Floral species	To assess relocation success of rescued and relocated floral SCC should take place during the operational phase	Relocation area(s)	Annually	Field survey	As per specialist advise
	Avifauna	To assess actual impacts, determine diversity trends and assess mitigation efficacy To evaluate collision and/or electrocution mortality	MRA area and surrounds	Bi-annually	Field survey	As per specialist advise
	Alien vegetation	To monitor conformance with alien and invasive eradication plan	MRA area	Monthly (during eradication programme)	Survey	Area (hectares)
	Soils	To monitor soil fertility level of stockpiled soils	Topsoil stockpiles & berms	Annually	Soil sampling	As per specialist advise
	Land capability	To determine land capability over rehabilitated areas	Fixed point soil monitoring in rehabilitated areas	Bi-annually for 3 years after seeding, thereafter annually	Soil sampling	Soil fertility analyses, as per specialist advise
Air quality	Dust outfall	To determine the levels of dust fallout as a result of the mining activities	Sensitive receptor(s) Along transport routes	Monthly	Dust fallout buckets	Settleable particles ($mg/m^2/day$)
	Particulate matter	To determine the particular matter levels for PM_{10} and $PM_{2.5}$	As above	Annually	PM monitor	$\mu g/m^3$
Environmental noise	Noise levels	To determine the noise levels within the surrounding areas	Sensitive receptor(s)	If complaint is registered	As required by GN R154 of 1992 and SANS 10103:2008	dBA
Blasting	Ground vibration and air blast	To ensure adherence to blast design guidelines and blasting limits	Sensitive receptor(s)	During each blast for first year	Seismograph	Ground vibration (mm/s) Air blast (dB) Blast & meteorological information Video recording of blast Fly rock observations
	Structural monitoring	To measure crack changes on sensitive structures	Pre-selected sensitive structures within 3500m radius	Annually	Photographic survey Gauge measurements	Crack changes

Aspect	Issue	Purpose	Monitoring points	Frequency	Sampling Method	Variables
Waste	Waste generation & management	To determine volume of waste generated & disposed	Site	Weekly	Contractor report	Waste types
Heritage	Heritage/cultural resources	To capture all heritage/cultural resources exposed by development	Mining and Infrastructure area	As required	Archaeologist site visit	-
Palaeontology	Palaeontological resources	To capture all palaeontological resources exposed by development	Mining area	Once coal horizon is reached	Palaeontological site survey	-
Sense of place	Visual	To review the effectiveness of mitigation measures to address visual impacts	Important Observation Points	Monthly during construction & decommissioning Bi-annually during operational phase	Photographs	-

5.2 COMPLIANCE AUDITING AND REPORTING

To ensure compliance with this EMPr and to assess the continued appropriateness and adequacy of the report, Nozala Coal commits to:

- Regular monitoring of all the impact management actions and components shall be carried out by the mine to ensure that the provisions of this programme are adhered to.
- Compile and submit to the Director: Mineral Resources a report on the performance assessment of the EMPr, including the ongoing effectiveness and appropriateness thereof.
- The performance assessments of the EMPr and the compilation and submission of the reports will occur annually.
- Nozala Coal will appoint a responsible person(s), in writing, who will monitor all environmental aspects of the site on a regular basis.
- Various points of compliance will be identified regarding the various impacts that the operations will have on the environment and the surrounding community. Inspections and monitoring shall be carried out on both the implementation of the programme and the impact on the community and the environment.

5.2.1 Internal Review

- Management meetings – The mine will conduct monthly meetings where relevant Health, Safety, Environmental, Community (HSEC) issues are discussed with the Management Team.
- Review meetings – The Management Team will provide feedback to the General Manager (GM) monthly and all HSEC issues will be included in these meetings.
- Perform annual internal audits as part of the HSEC reporting schedule to ensure conformance to environmental objectives and strategies and the implementation thereof.

5.2.2 External Review

- Environmental Management Committee (EMC) – The EMC will meet annually to review the implementation of the EMPr commitments, environmental monitoring results, the BAP and the Rehabilitation, Decommissioning and Closure Plan, as appropriate at the time in the LOM.
- External EMP performance assessments, as required in terms of the MPRDA, will be performed on an annual basis and submitted to the DMR for distribution to other relevant authorities.

6 ENVIRONMENTAL AWARENESS PROGRAMME

Environmental awareness communication and reporting forms an integral part of an EMP and includes social awareness programmes. For this reason, a procedure will be developed that will describe how the mine will communicate with its employees and with IAPs on environmental issues. The mine acknowledges the importance of effective internal and external communication and as such will maintain communication channels, both within the company and with the IAPs of the mine.

The awareness plan will be implemented at all employees' and contractors' levels, i.e. junior, senior and middle management levels (for unskilled, semi-skilled and skilled workforce). In general, the objectives of the environmental awareness plan will be to:

- Ensure that all employees/contractors understand the HSEC Objectives and Policies;
- Ensure that information regarding the environment is communicated effectively and is readily accessible to all relevant parties;
- Ensure feedback of operational and environmental performance to management;
- Provide for the establishment of forums to discuss environmental issues, allocate resources and ensure that adequate measures are being taken to address the environmental problems;
- Provide guidelines for communication with outside organisations and IAPs;
- Ensure effective and constructive response with IAPs; and
- Ensure that environmental communication and interactions are documented and recorded and accessible.

The formal training, awareness campaigns, sharing of environmental information in meetings and issuing of management instructions will be used to inform employees of potential environmental degradation, compliance levels and feedback on implementation of the required standards.

6.1 INDUCTION PROGRAMME

All new employees and contractors carrying out work on the mine property will undergo the environmental induction programme. Included in the programme will be all relevant environmental aspects and conditions of the Environmental Authorisation. All employees will as a condition of employment, be subject to undergo the annual environmental refresher programme.

6.2 ADVANCED TRAINING PROGRAMME

An advanced awareness programme will be conducted for all employees in line with the job descriptions or work specific tasks, after the initial environmental induction training has been conducted. The training will be applicable and specific to certain employees working in specialized areas of the operation and/or performing specific tasks (e.g. workshop workers) that have a high-risk potential to impact negatively on the receiving environment. The training will include, but not limited to waste management, spill kit training, conservation of water, soil, energy and oil, and firefighting.

6.3 INTERNAL COMMUNICATION AND AWARENESS CAMPAIGN

Internal communication will be conducted as follow:

- Notices – Awareness raising initiatives to capacitate both employees and communities and equip them with environmental knowledge will be implemented. Environmental news flashes with relevant messages will be distributed and placed at strategic sites monthly. The environmental news flashes will be discussed in employee's HSEC forums and form part of the toolbox talks. Awareness raising intervention will further be conducted for specific employees in areas where constant environmental non-compliance activities are experienced. The most effective communication methods will be utilized to communicate environmental topics.
- Environmental information-sharing sessions on environmental risks and performance will be conducted. All employees will be afforded an opportunity to interrogate environmental issues. Monitoring and environmental performance reports will be made available to employees and managers of specific business units.

6.4 EXTERNAL COMMUNICATION AND AWARENESS CAMPAIGN

External communication will be conducted as follow:

- Stakeholder Register – The Gruisfontein Project has a comprehensive Stakeholder Register because of the EIA process. The register contains a list of all stakeholders and includes the name of the stakeholder organisation, contact details of the IAPs, such as the address (both physical and postal), e-mail address, telephone number, cell phone number and fax number. This register will be maintained and updated on an annual basis.
- Environmental Monitoring Committee (EMC) – The EMC will have representatives from the local communities and landowners, authorities and the mine. The objective of the EMC will be to review the monitoring data on an annual basis and to identify any issues that may be reflected in the data. In addition, the EMC will review monitoring programme for compliance, as well as other aspects associated with the EMPr.
- Stakeholder Engagement Forums – Annual public meetings will be held with major stakeholders to present and discuss HSEC issues. A register of attendees will be completed, and minutes taken during the proceedings, which will be distributed to all the major stakeholders for information purposes, whether they attended the meeting or not. To encourage feedback and facilitate stakeholder participation, feedback sheets will be handed to each stakeholder upon registration and collected after the forum. This will allow the stakeholders to change their contact details, if necessary, and to comment on or enquire as to HSEC matters. Any feedback sheets received will be managed according to fixed operating procedures and any actions taken will be recorded for reference purposes.
- External Complaints Register – An external complaints register will be stationed at the mine security. If a complaint and/or concern are raised, a formal Incident Investigation will be opened, managed and investigated in accordance with the appropriate operating procedure. Records will be kept of the external complaints, as well as the follow-up investigation and actions taken. Regular contact will be kept with the complainant until the complaint has been suitably addressed.

7 FINANCIAL PROVISION

7.1 CLOSURE COST ASSESSMENT

It is firstly important that the various components that need to be part of the closure cost be quantified. The *Guideline Document for the Evaluation of the Quantum of Closure-Related Financial Provision Provided by a Mine* (DMR, 2004) was used as a guideline to identify the various components that would form part of such an assessment. In addition to that, attention was also given to the closure objectives and relinquishment criteria.

A rules-based approach was used and related back to the surface area of the various components included in the closure costs. The unit rate (master rate) for each closure component was taken from the DMR guideline and inflated by the Consumer Price Index (CPI) to account for escalation since January 2005. The CPI rates used in this assessment is listed below.

Year	CPI rate	Year	CPI rate
2005	0.034	2012	0.056
2006	0.046	2013	0.054
2007	0.072	2014	0.054
2008	0.115	2015	0.060
2009	0.071	2016	0.070
2010	0.043	2017	0.053
2011	0.050	2018	0.045

The decommissioning and closure cost estimate for the Gruisfontein Project was calculated as R344 million (rounded, inclusive of 15% VAT). Refer to Table 12 for detail calculation in line with the *Guideline Document for the Evaluation of the Quantum of Closure-Related Financial Provision Provided by a Mine* (DMR, 2004), as escalated by the annual CPI rate.

This is a high-level estimate for the full LOM implying no concurrent rehabilitation during the operational phase. As the mine is still in the planning stages, a conceptual level of costing (50% accuracy) is adequate. However, when the project is authorised, this will need to be refined to a 70% accuracy level.

Once the Feasibility Study and final designs have been completed, a materials balance and final placement plan will be developed by the mine planners for inclusion in the EMPr, in line with the requirements of Government Notice No. R.1147 (GN R.1147): "*Regulations pertaining to the Financial Provision for Prospecting, Exploration, Mining or Production Operations*" promulgated in November 2015.

Table 12: Closure Cost Assessment for the Gruisfontein Project

No	Description	Unit	Quantity	Master Rate	Multiplication factor	Weighting factor 1	E=A*B*C*D
1	Dismantling of the plant structures	m^3	157 000.0	R 15.14	1	1.1	R 2 614 815.86
2a	Demolition of steel buildings (outside of plant area)	m^2	0.0	R 210.91	1	1.1	R 0.00
2b	Concrete structures (incl. plant foundations)	m^2	27 481.7	R 310.81	1	1.1	R 9 395 690.75
3	Roads	m^2	103 258.2	R 37.74	1	1.1	R 4 286 773.68
4a	Demolition and rehabilitation of electrified railway lines	m	0.0	R 366.31	1	1.1	R 0.00
4b	Demolition and rehabilitation of non-electrified railway lines	m	0.0	R 199.81	1	1.1	R 0.00
5	Removal of offices and other temporary structures	m^2	6 000.0	R 421.81	1	1.1	R 2 783 953.23
6	Opencast rehabilitation (final void and ramps)	ha	134.0	R 221 117.82	1	1.1	R 32 592 766.17
7	Rehabilitation of underground mining	m^3	0.0	R 113.22	1	1.1	R 0.00
8a	Rehabilitation of overburden and spoils#	ha	0.0	R 147 411.88	1	1.1	R 0.00
8b	Rehabilitation of processing waste deposits and evaporations ponds (basic, salt-producing waste)	ha	0.0	R 183 598.83	1	1.1	R 0.00
8c	Rehabilitation of processing waste deposits and evaporations ponds (acidic, metal-rich waste)	ha	11.8	R 533 258.03	1	1.1	R 6 921 689.20
9	Rehabilitation of subsided areas	ha	0.0	R 123 435.25	1	1.1	R 0.00
10	General surface rehabilitation, vegetation	ha	830.0	R 116 775.07	1	1.1	R 106 615 640.57
11	River diversions	ha	0.0	R 0.00	1	1.1	R 0.00
12	Fencing	m	10 534.3	R 133.20	1	1.1	R 1 543 526.81
13	Water management (separating clean and dirty water areas)	ha	830.0	R 44 401.17	1	1.1	R 40 538 266.38
14	2-3 years of maintenance and aftercare	ha	830.0	R 15 540.41	1	1.1	R 14 188 393.23
15	Specialist studies (10%)	Sum		R 22 148 151.59	1	1.1	R 24 362 966.75
				Sum of items 1 to 15			R 245 844 482.63
	SUBTOTAL 1 {Multiply by weighting factor 2 = 1.05 (peri-urban)}						**R 258 136 706.76**
	Preliminary and General	6 % of Subtotal 1		Add 6 % to subtotal if 1 >R 100,000,000			
				Add 12 % to subtotal if 1<R 100,000,000			R 15 488 202.41
	Contingency	10% of subtotal 1					R 25 813 670.68
	SUBTOTAL 2 {Management}						**R 41 301 873.08**

No	Description	Unit	Quantity	Master Rate	Multiplication factor	Weighting factor 1	E=A*B*C*D
	SUBTOTAL 3 {Subtotal 1 & 2}						**R 299 438 579.84**
	VAT (15%)						R 44 915 786.98
	GRAND TOTAL {Subtotal 3 plus VAT}						**R 344 354 366.81**

#Note: The overburden forms part of the opencast rehab. Rehab of the dump areas after removal of material forms part of the general surface rehab & vegetation.

8 OTHER INFORMATION REQUIRED BY THE COMPETENT AUTHORITY

8.1 FINANCIAL PROVISION

As a minimum, the Rehabilitation, Decommissioning, and Closure Plan, together with the associated closure costs, will be updated on an annual basis once mining has commenced, as required in terms of the GN R.1147 Regulations. Auditing and review of the closure-related monitoring will be undertaken as part of this annual review.

8.2 UNDERTAKING

I, Maria Catharina Eksteen, herewith confirms:

i) The correctness of the information provided in the reports;
ii) The inclusion of comments and inputs from stakeholders and IAPs;
iii) The inclusion of inputs and recommendations from the specialist reports where relevant; and
iv) The acceptability of the project in relation to the findings of the assessment and level of mitigation proposed.

Signature of EAP

Date: 31 October 2019