NHLABATHI MINERALS (PTY) LTD

RIETKOL MINING OPERATION

REHABILITATION, DECOMMISSIONING AND CLOSURE PLAN AUGUST 2021

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REHABILITATION, DECOMMISSIONING AND CLOSURE PLAN – AUGUST 2021

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This study was carried out with the information available to the specialists at the time of executing the study, within the available timeframe and budget. The sources consulted are not exhaustive and additional information which might strengthen arguments or contradict information in this report might exist.

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1 INTRODUCTION

1.1 Introduction

With the implementation of the One Environmental System and the amendments to the National Environmental Management Act (NEMA), 1998 (Act 107 of 1998) to ensure that all activities, which may have a negative impact on the environment, are all controlled under the same system and treated in a similar manner, the Department of Environmental Affairs (DEA) promulgated Government Notice No. R.1147 (GN R.1147) of 20 November 2015: Regulations pertaining to the Financial Provision for Prospecting, Exploration, Mining or Production Operations (as amended).

GN R.1147 requires a prospecting, exploration, mining, or production rights holder to, on an annual basis, determine the financial provision through a detailed itemisation of all activities and costs. The financial provision must be based on actual costs (current costs). The cost estimates are required for three distinct activities, namely:

- Annual rehabilitation costs (including environmental monitoring costs), as indicated in an annual rehabilitation plan;
- Final rehabilitation, decommissioning and closure of the prospecting, exploration, mining, or production operations at the end of the life of operations, as reflected in a final rehabilitation, decommissioning and mine closure plan; and
- Remediation of latent or residual environmental impacts, which may become known in the future, as reflected in an environmental risk assessment report.

This report has been compiled in support of the Environmental Authorisation (EA) process currently being undertaken by Nhlabathi Minerals (Pty) Ltd for the proposed Rietkol Mining Operation (**Rietkol Project**) to mine silica and associated minerals (clay, sand, etc.).

The intent of this report is to present a **consolidated, documented plan** for the Rehabilitation, Decommissioning and Closure of the planned Rietkol Project operations. This includes the determination of the closure costs for the mine's envisaged life-of-mine (LOM) plan, as well as a baseline qualitative risk assessment for any mine-related residual or latent environmental impacts that may manifest because of the mining development.

As the closure knowledge base improves over time, this baseline qualitative risk assessment would need to be refined to a quantitative risk assessment whereby actual and/or calculated data should be used to more accurately determine the likelihood of the identified event occurring and the severity of its consequence, as well as the closure costs associated with such risks. This implies the need to refine

specialist studies on specific closure-related aspects to address certain knowledge gaps and a regular review of this Rehabilitation, Decommissioning and Closure Plan once mining commences.

1.2 Applicant Details

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1.3 Specialist Details

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Abbreviated Curriculum Vitae	Marietjie Eksteen is the Managing Member of the consulting firm Jacana Enviromentals cc, an environmental consulting firm based in Polokwane. She is an environmental scientist with 30 years' experience, her main fields of expertise being water quality management, mine water management, environmental legal compliance, and project management. She obtained a Masters' degree in Exploration Geophysics (MSc) from the University of Pretoria in 1993. Since establishing Jacana Enviromentals in 2006, she has been involved in a variety of mine- and industry-related environmental projects serving clients such as MC Mining Limited, South32 SA Coal Holdings, Glencore Operations South Africa, Consol Glass and Silicon Smelters, amongst others. 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.

1.4 Supporting Information

The following information was used to inform this plan:

Document Name	Author
Faunal, floral and freshwater assessment as part of the environmental assessment and authorisation process for the proposed Rietkol Mining Operation near Delmas within the Mpumalanga Province	Scientific Aquatic Services, May 2021
Soil and land capability assessment as part of the environmental assessment and authorisation process for the proposed Rietkol Mining Operation near Delmas within the Mpumalanga Province	Scientific Aquatic Services, August 2021
Hydropedological assessment process for the proposed Rietkol Mining Operation near Delmas within the Mpumalanga Province	Scientific Aquatic Services, August 2021
Baseline water quality report as part of the environmental assessment and authorisation process for the proposed Rietkol Mining Operation near Delmas within the Mpumalanga Province	Scientific Aquatic Services, May 2021
Rietkol Silica Project - Report on geohydrological investigation as part of the environmental impact assessment and environmental management programme	Groundwater Complete, May 2021
Environmental noise impact assessment for the proposed Rietkol Mining Operation near Eloff, Mpumalanga	Enviro-Acoustic Research, August 2021
Proposed Rietkol Mining Operation Air Quality Impact Assessment	EBS Advisory, May 2021
Proposed Rietkol Mining Operation Air Quality Impact Assessment: Greenhouse Gas Emissions Statement	EBS Advisory, August 2021
Jacana Environmental Ambient Monitoring: June 2021 monthly report - #1	Rayten Engineering Solutions, August 2021
Visual impact assessment report as part of the environmental assessment and authorisation process for the proposed Rietkol Mining Operation (Rietkol Project) near Delmas, Mpumalanga Province	Scientific Aquatic Services, May 2021
Traffic impact assessment – Proposed Rietkol Mining Operation located within the Victor Khanye Local Municipality, Nkangala District Municipality	AvzconS Civil Engineering, May 2021
Phase 1 Heritage impact assessment report: Proposed Rietkol Mining Operations, Victor Khanye Local Municipality Nkangala District Mpumalanga	R&R Cultural Resource Consultants, August 2021
Desktop palaeontological assessment and for the proposed Rietkol Mining Operation - Nhlabathi Minerals (Pty) Ltd application in the Delmas Local Municipality, Nkangala District Municipality, Mpumalanga Province	ASG Geo Consultants, April 2018
Land Trade-Off Study and Macro-Economic Impact Analysis of the Proposed Rietkol Mining Project near Delmas	Mosaka Economic Consultants, August 2021
Proposed Rietkol Silica Mine Social Impact Assessment Report	Diphororo Development, August 2021
A Hazard Identification and Risk Assessment for the proposed Rietkol Silica Mine	AirCHECK Occupational Health, Environmental and Training Services, May 2017
A human health risk assessment of communities potentially exposed to dust from the proposed Rietkol Silica Mine	M A Oosthuizen, August 2021
Rietkol Silica Surface Water Management Plan: Design Development Report	Onno Fortuin Consulting, July 2021
Proposed Rietkol Mining Operation: Impact Statement on Broiler Farms and Egg Packing Station	C4 Africa Professional Consultants, August 2021
Rietkol Mining Operation: Mining Work Programme	Nhlabathi Minerals, February 2019

Rietkol Mining Operation: Final Scoping Report DMR Ref: MP 30/5/1/2/2/10268 MR	Jacana Environmentals, May 2021
Rietkol Mining Operation: Draft Environmental Impact Assessment Report DMR Ref: MP 30/5/1/2/2/10268 MR	Jacana Environmentals, August 2021
Rietkol Mining Operation: Draft Environmental Management Programme DMR Ref: MP 30/5/1/2/2/10268 MR	Jacana Environmentals, August 2021

2 REGULATORY CONTEXT

2.1 GN R.1147 Regulations

This Rehabilitation, Decommissioning and Closure Plan was compiled in terms Appendices 3, 4 and 5 of the GN R.1147 Regulations, 20 November 2015 (as amended). Because this is a proposed new mine, several of the requirements are not applicable at this stage and is indicated as N/A in the table below.

Regulation	Description	Reference in Report
APPENDIX 3 – ANNUAL REHABILITATION PLAN CHECKLIST		
3 (a)(i)	Person or persons that prepared the plan	Section 1.3
3 (a)(ii)	Professional registrations and experience of the person or persons	Section 1.3
3 (a)(iii)	Timeframes of the implementation of the current, and review of the previous rehabilitation activities	Sections 5.1.1 & 5.1.2
3 (b)	Pertinent environmental and project context relating to the planned rehabilitation and remediation	Section 3.3
3 (c)	Results of monitoring of risks identified in the closure plan with a view of informing rehabilitation and remediation activities	N/A
3 (d)	An identification of the shortcomings experienced in the preceding 12 months	N/A
3 (e)	Details of the planned rehabilitation activities for the following 12 months	Section 5.1.3
3 (e)(iii)	A site plan indicating at least the total area disturbed, area available for rehabilitation and area to be rehabilitated per aspect or activity	N/A
3 (f)	A review of the previous year's annual rehabilitation including a comparison between the planned and actual rehabilitation	N/A
3 (g)(i)	An explanation of the closure cost methodology	Section 4.8.1
3 (g)(ii)	Auditable calculation of costs per activity or infrastructure	Section 4.8.3
3 (g)(iii)	Cost assumptions	Section 4.8.2
3 (g)(iv)	Monitoring and maintenance costs	Section 5.3.2
APPENDIX 4 – REHABILITATION, DECOMMISSIONING AND MINE CLOSURE PLAN CHECKLIST		
3 (a)(i)	Person or persons that prepared the plan	Section 1.3
3 (a)(ii)	Professional registrations and experience of the person or persons	Section 1.3
3 (b)(i) and 3 (b)(ii)	The context of the project including the material project description information and an overview of environmental and social context that may influence closure activities or be influenced by closure activities	Section 3.3
3 (b)(iii)	Stakeholder issues and comments that informed the plan	Section 3.4
3 (b)(iv)	The mine plan and schedule for the full approved operations	Sections 3.2.2 & 4.1.2
3 (c)	Findings of an environmental risk assessment leading to the most appropriate closure strategy	Section 6.2
3 (d)(i)	Design principles including the legal and governance framework and interpretation of these requirements for the closure design principles	Section 2.2
3 (d)(ii)	Design principles including closure vision, objectives and targets	Section 4.2
3 (d)(iii)	Design principles including a description and evaluation of alternative closure and post closure options where these exist that are practicable within the socio-economic and environmental opportunities and constraints in which the operation is located	Section 4.2.4
3 (d)(iv)	Design principles including motivation for the preferred closure action within the context of the risks and impacts that are being mitigated	Section 4.2.4
3 (d)(v)	Design principles including a definition and motivation of the closure and post closure period, taking cognisance of the probable need to implement post closure	Section 4.4.2

Regulation	Description	Reference in Report
	monitoring and maintenance for a period sufficient to demonstrate that relinquishment criteria have been achieved	
3 (d)(vi)	Design principles including details associated with any on-going research on closure options	Section 4.2.5
3 (d)(vii)	Design principles including a detailed description of the assumptions made to develop closure actions in the absence of detailed knowledge on site conditions, potential impacts, material availability, stakeholder requirements and other factors for which information is lacking	Section 4.4.4
3 (e)	Proposed final post-mining land use	Sections 4.3.2 & 4.3.3
3 (f)(i)	Closure actions including the development and documenting of a description of specific technical solutions related to infrastructure and facilities for the preferred closure option or options, which must include all areas, infrastructure, activities and aspects both within the mine lease area and off of the mine lease area associated with mining for which the mine has the responsibility to implement closure actions	Section 4.4.4
3 (f)(ii)	Closure actions including the development and maintenance of a list and assessment of threats and opportunities and any uncertainties associated with the preferred closure option, which list will be used to identify and define any additional work that is needed to reduce the level of uncertainty	Section 4.4.5
3 (g)	A schedule of actions for final rehabilitation, decommissioning and closure	Section 4.4.3
3 (h)	An indication of the organisational capacity that will be put in place to implement the plan	Section 4.5.1
3 (i)	An indication of gaps in the plan, including an auditable action plan and schedule to address the gaps	Section 4.4.4
3 (j)	Relinquishment criteria for each activity or infrastructure in relation to environmental aspects with auditable indicators	Section 4.6
3 (k)	Closure cost estimation procedure, which ensures that identified rehabilitation, decommissioning, closure and post-closure costs, whether on-going or once-off, are realistically estimated and incorporated into the estimate	Section 4.8
3 (l)(i)	Monitoring, auditing and reporting requirements which relate to the risk assessment, legal requirements and knowledge gaps and includes a schedule outlining internal, external and legislated audits of the plan for the year	Sections 4.6 & 4.7 Table 3
3 (l)(ii)	Monitoring, auditing and reporting requirements which relate to the risk assessment, legal requirements and knowledge gaps and includes a schedule of reporting requirements providing an outline of internal and external reporting, including disclosure of updates of the plan to stakeholders	Sections 4.6 & 4.7 Table 3
3 (l)(iii)	Monitoring, auditing and reporting requirements which relate to the risk assessment, legal requirements and knowledge gaps and includes a monitoring plan	Sections 4.6 & 4.7 Table 3
3 (m)	Motivations for any amendments made to the final rehabilitation, decommissioning and mine closure plan	N/A
APPENDIX 5 – ENVIRONMENTAL RISK ASSESSMENT CHECKLIST		
3 (a)(i)	Person or persons that prepared the plan	Section 1.3
3 (a)(ii)	Professional registrations and experience of the person or persons	Section 1.3
3 (b)(i)	Description of the risk assessment methodology inclusive of risk identification and quantification	Section 6.1
3 (b)(ii)	Substantiation why each risk is latent, including why the risk was not or could not be mitigated during concurrent rehabilitation and remediation or during the implementation of the final rehabilitation, decommission and closure plan	Section 6.3
3 (b)(iii)	A detailed description of the drivers that could result in the manifestation of the risks	Table 7
3 (b)(iv)	A description of the expected timeframe in which the risk is likely to manifest	Section 6.3
3 (b)(v)	A detailed description of the triggers which can be used to identify that the risk is imminent or has manifested, how this will be measured and any cost implications thereof	Table 7
3 (b)(vi)	Results and findings of the risk assessment	Table 7

Regulation	Description	Reference in Report
3 (b)(vii)	An explanation of changes to the risk assessment results as applicable in annual updates to the plan	N/A
3 (c)(i)	Monitoring of results and findings	N/A
3 (c)(ii)	An assessment of alternatives to mitigate or manage the impacts once the risk has become manifested	Section 6.3 Table 7
3 (c)(iii)	Motivation why the selected alternative is the appropriate approach to mitigate the impact	N/A
3 (c)(iv)	A detailed description of how the alternative will be implemented	N/A
3 (d)(i)	An explanation of the closure cost methodology	Section 4.8.1
3 (d)(ii)	Auditable calculation of costs per activity or infrastructure	Section 4.8.3
3 (d)(iii)	Cost assumptions	Section 4.8.2
3 (d)(iv)	Monitoring costs post-closure	Section 5.3.2
3 (e)	Monitoring, auditing and reporting requirements	Sections 4.6 & 4.7 Table 3

2.2 Legal and Policy Framework

Apart from the GN R.1147 Regulations summarised above, mine closure planning is also required to be compliant with the following legislation:

- **Mineral and Petroleum Resources Development Act (MPRDA), 1998 (Act 28 of 2002), as amended**
    - Section 43 states that a holder of a prospecting right, mining right, retention permit or mining permit remains responsible for any environmental liability, pollution or ecological degradation and the management thereof, until the Minister has issued a closure certificate to the holder concerned.
- **National Environmental Management Act,1998 (NEMA) (Act 107 of 1998), as amended**
    - If it is determined that a mine, having regard to its known ore reserves, is likely to cease mining operations within a period of five years, the owner of that mine must promptly notify the Minister in writing of the likely cessation of those mining operations and of any plans that are in place or in contemplation for the rehabilitation of the area where the mining operations were conducted after mining operations have stopped and the prevention of pollution of the atmosphere by dust after those operations have stopped.
    - Duty of care to take reasonable measures to prevent significant pollution or degradation of the environment from occurring, continuing, or re-occurring or where such pollution or degradation cannot be reasonably stopped or avoided, such person must take reasonable measures to minimize and rectify such pollution or degradation.

- In terms of section 38 of the MPRDA, holders of reconnaissance permits, prospecting rights, mining rights, mining permits or retention permits must promote compliance with the principles set out in section 2 of the NEMA, which provide that -
  - The disturbance of ecosystems and loss of biological diversity is avoided, or, where it cannot be avoided altogether, is minimised and remedied;
  - Pollution and degradation of the environment is avoided, or where it cannot be avoided altogether, is minimised and remedied;
  - The disturbance of landscapes and sites that constitute a nations cultural heritage is avoided, or where it cannot be avoided altogether, is minimised and remedied;
  - A risk-averse and cautious approach is applied, which considers the limits of current knowledge about the consequences of decisions and actions; and
  - Negative impacts on the environment and on people's environmental rights be anticipated and prevented, and where they cannot be prevented altogether, are minimised and remedied.

- **Environmental Impact Assessment (EIA) Regulations, 2014 (as amended)**

  - An application for an environmental authorisation (Basic Assessment) must be submitted for the decommissioning of any activity requiring:
    - A closure certificate in terms of section 43 of the MPRDA; or
    - A prospecting right, mining right, mining permit, production right or exploration right, where the throughput of the activity has reduced by 90% or more over a period of 5 years excluding where the competent authority has in writing agreed that such reduction in throughput does not constitute closure.

- **National Water Act (NWA), 1998 (Act 36 of 1998), as amended**

  - A duty of care is imposed on the owner of land, a person in control of land or a person who occupies or uses the land to take all reasonable measures to prevent the pollution of a water resource from occurring, continuing, or recurring.
  - Compliance with Regulations on the use of water for mining and related activities aimed at the protection of water resources (GN No. 704 of 4 June 1999):
    - Any person in control of an existing mine must notify the Department of Water and Sanitation (DWS) 14 days before the temporary or permanent cessation of the operation of the mine.

        - Any person in control of a mine must at temporary or permanent cessation of mining operations, ensure that all pollution control measures have been designed, modified, constructed, and maintained in accordance with GN 704 and the in-stream and riparian habitat of any water resource, which may be affected or altered by the mine or activity, is remedied to comply with GN 704.
    - Every person in control of a mine or activity must take reasonable measures to:
        - Prevent water containing waste or any substance which causes or is likely to cause pollution of a water resource from entering any water resource and must retain or collect such substance or water for use, re-use, evaporation or for purification and disposal in terms of the Act;
        - Minimise the flow of any surface water or floodwater into mine workings, opencast workings, other workings, or subterranean caverns, through cracked or fissured formations, subsided ground, sinkholes, outcrop excavations, adits, entrances or any other openings; and
        - Prevent the erosion or leaching of materials from any residue deposit or stockpile from any area and contain such material or substances so eroded and leached in such area by providing suitable and effective barrier dams, evaporation dams or any other effective measures to prevent this material or substance from entering and polluting any water resources.

- **Conservation of Agricultural Resources Act (CARA), 1983 (Act 43 of 1983)**

    - Regulation 15 of the CARA provides a list of Category 1 plants (weeds) and Category 2 and Category 3 plants (invaders) that must be controlled on agricultural land. Category 1, 2 and 3 plants may not occur on any land or inland water surface other than in biological controlled reserves and must be controlled by means of the methods prescribed in the regulations (unless exemption has been granted).

- **National Environmental Management: Biodiversity Act (NEMBA), 2004 (Act 10 of 2004), as amended**

    - Control and eradication of alien and invasive species as required in terms of the 2016 Alien and Invasive Species Regulations promulgated in terms of section 97(1) of the Act.

- **Constitution of the Republic of South Africa, 1996 (Act 108 of 1996), Section 33**
    - Everyone has the right to administrative action that is lawful, reasonable and procedurally fair;
    - Everyone whose rights have been adversely affected by administrative action has the right to be given written reasons;
    - Any application for, for example, a closure certificate or an application for transfer of liabilities and responsibilities in terms of the MPRDA must be considered by the relevant authority according to the criteria contained in section 33 of the Constitution;
    - Where the relevant authority has been given a discretion that discretion must be exercised in a reasonable manner and without bias, prejudice, or any personal agenda; and
    - Failing the above, the decision may be set aside by way of an application to court, or any internal procedures prescribed by the empowering legislation.
- **National Heritage Resources Act, 1999 (Act 25 of 1999)**
    - Structures (including graves) older than 60 years may not be demolished without a permit obtained from the South African Heritage Resources Agency (SAHRA).
- **Provincial legislation, policies, and planning documents**
    - Mpumalanga Local Government Ordinance 17 of 1939 that deals with nuisance pollution
    - Mpumalanga Land Administration Act 5 of 1998, which regulates land administration
    - Mpumalanga Nature Conservation Act 10 of 1998, which regulates nature conservation
    - Mpumalanga Biodiversity Sector Plan (2019)
    - Mpumalanga Provincial Growth and Economic Development Strategy
    - Mpumalanga Tourism Growth Strategy / Master Plan
    - Mpumalanga Spatial Development Framework
    - Nkangala District and Victor Khanye Local Municipal Spatial Development Frameworks
    - Nkangala District and Victor Khanye Local Municipal Integrated Development Plans
- **Any lease agreements with landowners and/or agreements with authorities**

3 PROJECT DESCRIPTION AND SCOPE

3.1 Project Location

The Rietkol Project is in Wards 8 and 9 of the Victor Khanye Local Municipality within the Nkangala District Municipality of Mpumalanga Province. Delmas/Botleng are approximately 6 km east and Eloff 4 km south of the Mining Right Application (MRA) area. The Rietkol Project is located strategically close to major roads in the area, including the N12 (to the north-west), R50 (to the north-east) and R555 (to the south). The Springs/Durban Transnet Freight Rail (TFR) railway line is situated to the south, alongside the R555.

The Rietkol MRA covers an area of 221 ha consisting of:

- 16 Modder East Agricultural Holdings on the farm Olifantsfontein 196 IR, each approximately 4.1 ha in extent;
- Portion 71 of the farm Rietkol 237 IR; and
- A portion of Remaining Extent (RE) of portion 31 of the farm Rietkol 237 IR.

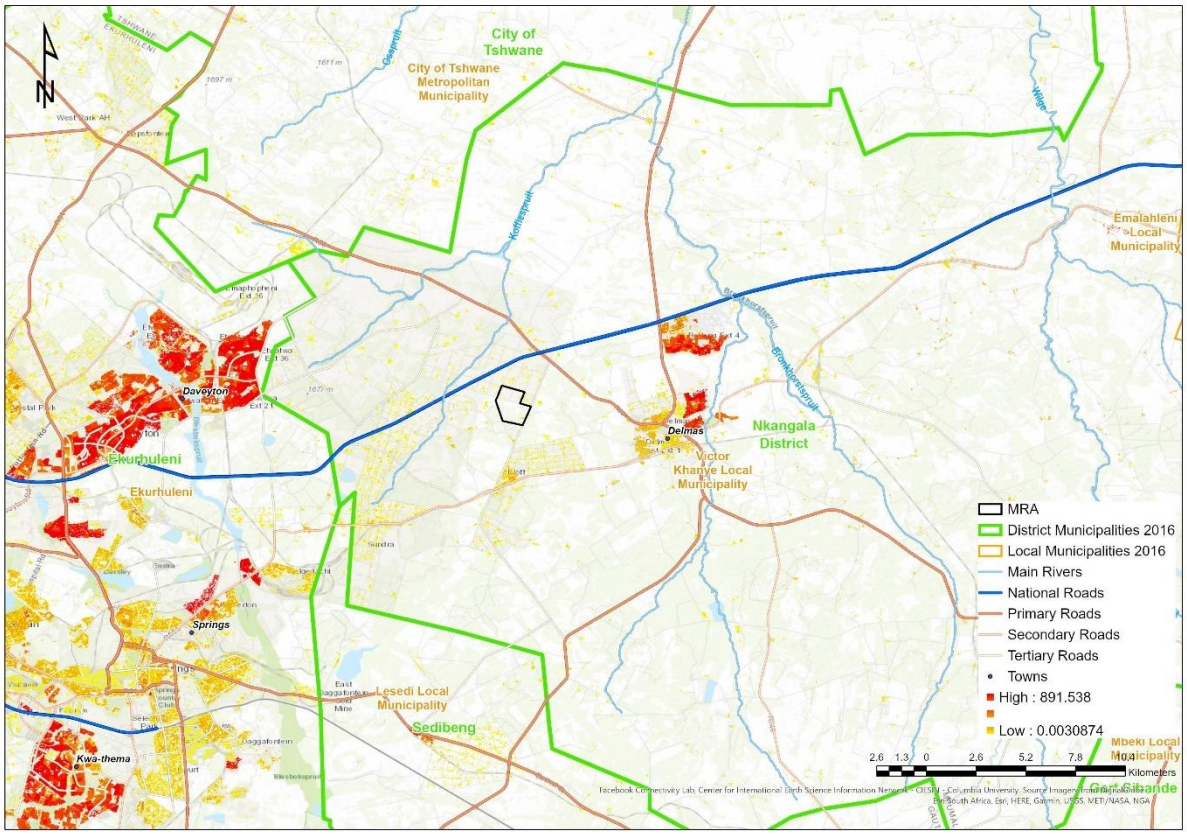

Figure 1: Project locality and institutional map

3.2 Project Description

The Rietkol Project does not currently have any existing operations as the project is still in the planning phase. Silica is planned to be mined by means of conventional opencast methods to a depth of between 30 and 50 meters below surface (mbs). The estimated life of mine (LOM) for the proposed Rietkol Project is 20 years. Further exploration drilling will be conducted during the operational phase, which may increase the LOM and mining depth if the resource proofs viable.

3.2.1 Mine and infrastructure layout

Currently little infrastructure exists to service the planned mining activities and most of the infrastructure requirements will be established as part of the planned mining operation (see Figure 2). The proposed project includes the following mining and related infrastructure:

The proposed project includes the following mining and related infrastructure:

- Opencast pits;
- Run of mine (RoM) stockpiles;
- Processing plant (crushing, screening, washing and drying operations);
- Product stockpiles;
- Administration office facilities (security building, administration and staff offices, reception area, ablution facilities);
- Production facilities (locker rooms, laboratory, workshops, stores, ablution facilities);
- Bagging facility and warehouse;
- Weighbridge;
- Access roads; and
- Clean and dirty water management infrastructure.

The mining method will include (Rietkol MWP, 2019):

- Vegetation and topsoil will be stripped ahead of mining. At least one cut (30m) should already be stripped and available for drilling between the active topsoil stripping operation and the open void;
- The topsoil will be loaded onto dump trucks by excavators and hauled to areas that require rehabilitation or used to construct stormwater berms;
- Drilling operations will commence in the front of the advancing pit after the topsoil has been removed;

- The blasted RoM will be stockpiled with excavators; and
- Thereafter RoM will be transported to the crushing plant by means of haul trucks with a loading capacity of approximately 40 tons.

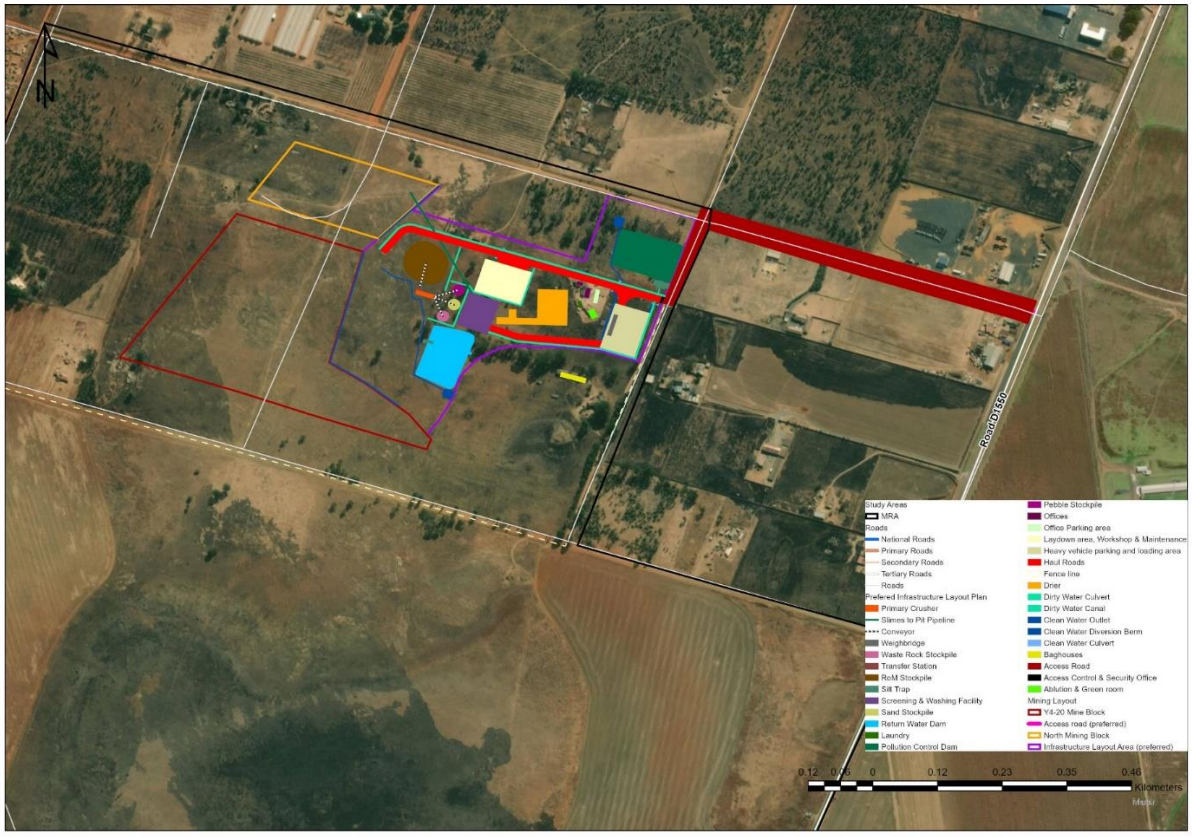

Figure 2: Rietkol Project mine and infrastructure layout

3.2.2 Mining model and schedule

Silica will be mined through an opencast bench mining method. The benches will be mined at a width of 30 m and a height of 5 m. Final mining depth will be between 30 and 50 mbs. Mining will commence in the northern portion of the MRA area and will progress in a south-easterly direction. Access ramps will be located along the eastern pit limit and are laid out within the orebody to minimise the mining of waste.

Drilling and blasting of the rock face will be conducted on a predetermined schedule in accordance with projected volumes of production and will be undertaken by blast professionals and with the required safety procedures applied.

Mining will commence in the blocks to the north of the MRA area that will be utilised as a tailings facility after mining in this block has finished. The North Block will be mined first with mining

commencing at S04, then S03, S02 and S01. Block S04 is the deepest and the ore body floor slopes up to the outcrop in S01. The ore from S04 will be used as a strategic stockpile in readiness for plant start-up. This strip can be mined in a relatively short period (approximately 2 to 3 months).

Once S04 has been mined out a void exists to dump the tailings from the plant while processing the ore from S04. Since it is the deepest portion of the block the water will not negatively impact on the mining operation of S03, S02 and S01. The void created by mining the North block is 309 197 BCM's and tailings can be dumped in the North Block for the first 16 years of mining.

Once the North block has been mined out, mining in the Main Block will commence in YR4 in a southernly direction up to Block 14 in YR20.

Various machinery and vehicles will be used in the pit and to transport the RoM to the crushing plant. The equipment includes excavators, front-end loaders, and ADT's.

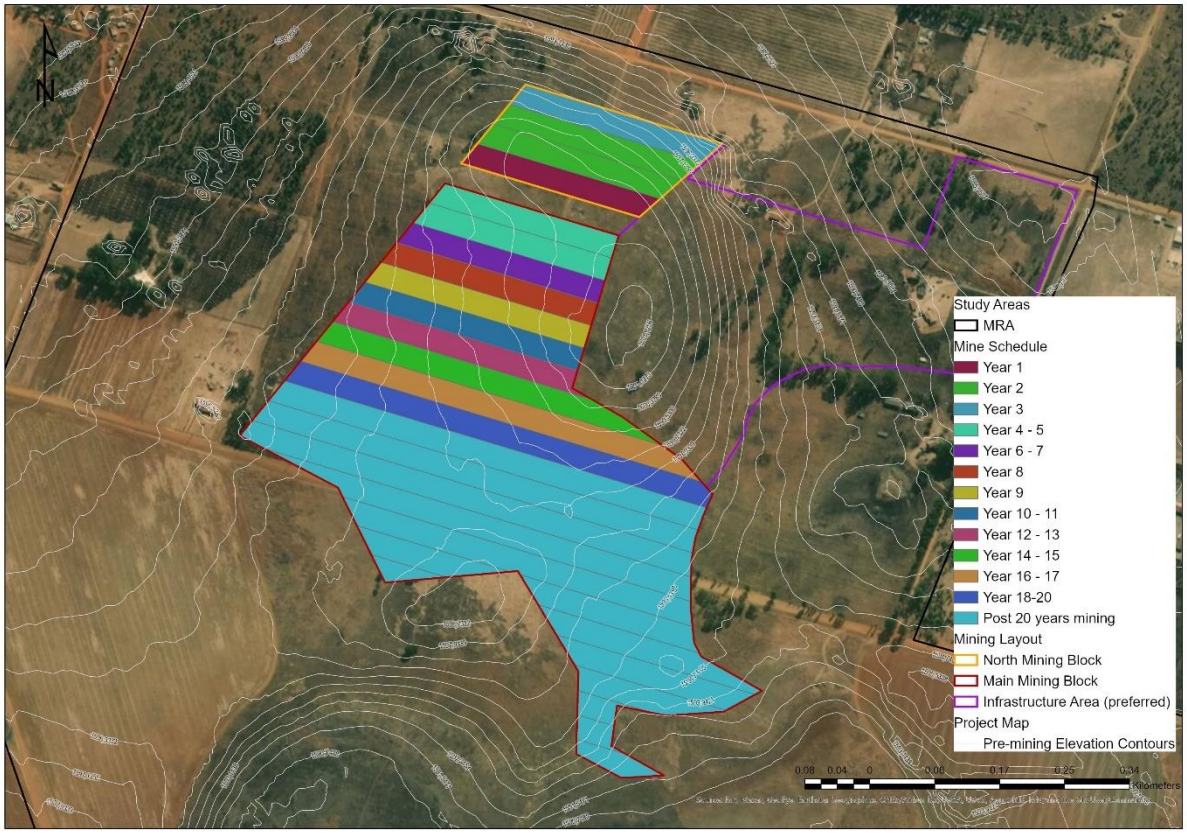

Figure 3: Mine schedule for first 20 years of mining

3.3 Environmental and Social Context

Specific biophysical and socio-economic environmental aspects that could influence and/or inform closure planning are summarised below.

Table 1: Environmental and social context

Environmental Aspect	Information to inform Closure Planning
Topography	The topography associated with the MRA area is mostly level, with some undulations present. No prominent topographical features are present within the MRA area, although some low rocky outcrops are present towards the centre and various large pan wetlands are located to the south. The site drains in the direction of the Koffiespruit, situated approximately 2.5 km to the north-west of the project area. No streams or drainage lines transect the site. The landscape character type can be described as rural, undulating open grasslands, interspersed with cultivated fields, alien tree stands and low-density development. Water is present within the landscape but does not visually dominate in the MRA area.
Climate	The MRA area falls within a predominantly summer-rainfall region, with a Mean Annual Precipitation (MAP) ranging between 650 to 900mm, and very dry winters. The Mean Annual Temperature (MAT) and Mean Annual Evaporation (MAE) averages are 14.7°C and 1 926 mm respectively and the region is a relatively water-stressed area. Winds are mainly light to moderate and blow from the north-easterly and easterly sectors except for short periods during thunderstorms or weather changes when they have a north-westerly component. Because of seasonal climate variations, the appearance and perception of the landscape within and surrounding the MRA area change with the seasons. The MRA area and its surroundings are expected to appear muted during the winter months, while it appears more vibrant and greener during the summer months. Seasonal variation may influence the area from where project components would potentially be visible, with visibility of the proposed project expected to be higher during the winter months when seasonal screening effects such as vegetation density and relative cover is lower.
Geology	The Rietkol silica deposit is referred to as a mega-sinkhole filled with beach sand during the Pretoria Group transgression. The deposit forms a kidney-shape of pure quartzite overlying agrillitic rock and chert breccia. A flat dipping dolerite sill of approximately 30 m thickness cuts through the deposit and divides it into an Upper- and a Lower Quartzite band. Due to the thickness of the sill, mining will not cut through the sill and only the Upper Quartzite band will be mined to a maximum depth of approximately 30-50 meters. From drilling it appears as if the quartzite throughout the deposit is exceptionally pure with a low iron content.
Soils	The dominant soil types within the MRA area include Hutton/Clovelly (Hu)/(Cv), Rocky Outcrop, Westleigh/Avalon (We)/(Av) and Mispah/Glenrosa/Dresden (Ms/Gs/Dr). Notably, the wetlands occupy a fairly large portion of the investigated MRA area. The remainder of the MRA area is occupied by Witbank (Wb) (Anthrosols), Pinedene (Pn), as well as residential properties. • Hutton/Clovelly – 92.5 ha (41.8%) • Rocky outcrop – 31.2 ha (14.1%)

Environmental Aspect	Information to inform Closure Planning
	• Westleigh/Avalon – 20.5 ha (9.3%) • Mispah/Glenrosa/Dresden – 15.1 ha (6.8%) • Witbank (Anthrosols) – 3.7 ha (1.7%) • Pinedene – 1.4 ha (0.6%) • Wetland (Katspruit) – 50.8 ha (23%) • Residential area – 6 ha (2.7%) Soil depths vary between > 80cm (Hutton/Clovelly) to no topsoil (rocky outcrop). The rocky outcrop is indicative of intense erosion likely attributed to historic land uses, particularly overgrazing.
Land capability	The land capability for the MRA area is classified as a mixture of arable, grazing, wetlands, and wilderness (rocky outcrops) – refer to Figure 4. Of the 92.5 (41.8 %) ha of prime agricultural soils (Hutton/Clovelly) within the MRA area a total of 14.4 ha (15.6 %) of prime agricultural soils is anticipated to be affected by the proposed mining project. According to the 1993 grazing capacity index, the grazing capacity is 3 ha/LSU; however, the veld has been transformed due to overgrazing and other historic anthropogenic activities and can be best described as a transformed rangeland. Other limitations include rocky outcrops (low productivity Mispah soils) which are not suitable for any cultivated agricultural related activities. As such, livestock commercial farming is not considered ideal for this area and a grazing capacity of 3 ha/LSU is unlikely to be achieved across most of the proposed extent of the mining footprint (SAS, 2021).
Land use	The MRA area in its present state has not been impacted by mining and industrial activities and therefore the proposed mining activities will lead to a noticeable change in land use in the area. Light industrial activities are however common in the immediate vicinity of the MRA area and a few smaller mining operations are situated within 5 km of the MRA boundary. Several dominant land uses have been identified in the vicinity of the MRA area, namely: • Agricultural, in the form of cultivated lands; • Commercial and industrial structures; • Grazing land and open veld; • Livestock farming; • Cultivated orchards; • Flower and vegetable tunnels; • Residential, which includes low-density residential dwellings associated with individual farms; and • Several main roads are present in the vicinity of the MRA area including the N12, R50, D1550, R555. The dominant land use within the MRA area itself is cultivation and grazing – refer to Figure 5.
Vegetation	The majority of the MRA area is situated within the Grassland Biome, while the depression wetland falls within the Azonal Vegetation Biome. The depression wetland falls within Freshwater Wetlands Bioregion, with the remaining portion of the MRA area situated within the Mesic Highveld Grassland Bioregion. The MRA area is situated within the Eastern Highveld Grassland vegetation type (VU), except for the depression wetland which falls within the Eastern Temperate Freshwater Wetlands vegetation type. The habitat associated with the study area is mostly of low to intermediate sensitivity, with only the wetland habitat unit being of a higher sensitivity rating. Much of the MRA area has been disturbed through agricultural activities because of crop farming and to a

Environmental Aspect	Information to inform Closure Planning
	lesser extent grazing of cattle, with remnant patches of natural, undisturbed grassland present, including rocky outcrop areas, which are also utilised as grazing for livestock. Stands of alien trees are mainly present in the vicinity of homesteads and vegetation of low height in the form of grassland dominates the vegetation. The occurrence of bare and exposed soils is limited. Due to the dominant vegetation within the MRA area comprising grassland, the recovery time of the environment is of medium duration. Several floral Species of Conservational Concern (SCC), namely *Hypoxis hemerocallidea, Gladiolus vinosomaculatus, Gladiolus permeabilis, Gladiolus crassifolius, Habenaria galpinii* and *Crinum* graminicola*,* which are protected under Schedule 11 of the Mpumalanga Nature Conservation Act, 1998 (Act No. 10 of 1998) (MNCA) were encountered within the MRA area. Two other floral SCC listed by the SANBI PRECIS Red Data List for the MRA area (*Crinum bulbispermum* and *Kniphofia typhoides*) were not encountered, however it is likely that they may occur within the wetland habitat unit. The Mpumalanga Tourism and Parks Agency (MTPA) also raised concern regarding the critically endangered orchid species *Brachycorythis conica subsp. transvaalensis,* which has previously been recorded in nearby areas. However, this orchid species was not observed within the MRA area. A relatively low diversity of alien species occurs within the MRA area, including blue gum, silver wattle, nettle tree, etc. The presence of *Campuloclinium macrophalum* (Pompom weed) is however of great concern, as this species is known to spread rapidly and is hard to control once it is formally established. A moderately low diversity of medicinal species is present, most of which are common and widespread, including star flower, wild geranium, and wild scabious. The Mpumalanga Biodiversity Sector Plan (MBSP, 2019) indicates that the MRA area is dominated by natural areas, with some occurrence of moderately and heavily modified areas. No protected areas are located close to the project.
Fauna	The habitat associated with the MRA area is mostly of intermediate sensitivity, with the exception being that of the Wetland Habitat, which is considered to be moderately high. The MRA area has been disturbed because of anthropogenic activities, notably relating to agriculture (crops), grazing activities and unsuitable veld management. The MRA area provides habitat to several common faunal species, whilst the wetland area was noted to provide habitat to an increased number of species with a higher level of diversity. Furthermore, the wetland habitat and adjacent grasslands are considered important in terms of SCC, namely *Pyxicephalus adspersus* (Giant Bullfrog), *Metisella meninx* (Marsh Sylph), *Geronticus calvus* (Bald Ibis), *Sagittarius serpentarius* (Secretarybird), *Tyto capensis* (African Grass Owl) and *Phoenicopterus ruber* (Greater Flamingo). *Pyxicephalus adspersus* (Giant Bullfrog) is known to utilise the wetlands within the MRA area, and it is important that the wetland habitat and potential movement corridors between the wetlands are maintained as far as possible.
Surface water	The MRA area is located within the B20B quaternary catchment, which covers an area of approximately 323 km^2. A prominent watercourse, namely the Koffiespruit, is located ± 2.5 km west of the Rietkol MRA area and within the same catchment. The Bronkhorstspruit is located approximately 9 km east of the MRA area, but in a neighbouring catchment (B20A). No streams or drainage lines transect the MRA area. The Koffiespruit is regarded as a perennial NFEPA river; however, in its upper reaches and directly west of the Rietkol MRA area this is not the case, and it is not believed to receive any significant baseflow. The Koffiespruit is thus not considered to be an important receptor of contamination that may potentially originate from the MRA area. Furthermore, the mineral to be mined is silica, a chemically inert mineral, that is hosted

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	within a very clean (inert) quartzite. Both the resource mineral and host rock are inert, meaning that any seepage that may potentially originate from the MRA area is expected to be of good quality. The baseline surface water quality is in line with the water quality standards recommended for the Upper Olifants Catchment but is not compliant with the DWAF (1996) guidelines for aquatic ecosystems. Specifically, the concentrations of ammonia, chromium, copper, lead, and zinc exceeded the stipulated standard.
Wetlands	Three hydrogeomorphic (HGM) units were identified within the proposed MRA area, classified as a depression (pan) and two hillslope seep wetlands. In addition, a wetland flat and another depression wetland was identified within the investigation area of the proposed MRA (500m radius). The wetland habitat was observed to be modified in the seep wetlands with extensive modifications including artificial impounding of these features to enhance water collection for livestock and/or aesthetic purposes observed. The pan wetland (Pan 1) located within the southern portion of the MRA area was observed to be fairly intact, with moderate edge-effect modifications attributed to the adjacent cultivation activities and impounding on the western portion of the wetland. These wetlands are considered to be hydrologically isolated from other surface water resources, as inferred from the local micro-topography. The Present Ecological State (PES) varies between Class D (Largely modified) for the hillslope seeps and Class C (Moderately modified) for the pan system. The wetlands are mainly recharged by surface water from seasonal rainfall as well as subsurface flow. According to the hydrocensus report, the groundwater levels around the MRA area varies between ±10 and 100 mbs. Therefore, the groundwater is not anticipated to have a significant direct interaction with the surface and shallow sub-surface hydrogeological processes. From a hydropedological point of view, no significant impact is foreseen on the wetland systems due to the proposed mining and related activities (during all phases) since the soil resources are not regarded as drivers of the wetland systems.
Groundwater	The main finding of the hydrocensus/user survey is that groundwater is used extensively throughout the MRA area and surrounds, especially for irrigation and domestic purposes (66% of all boreholes). Groundwater levels in the project area generally vary between ± 9 and 100 meters below surface (mbs), with the average being ± 42 mbs. Groundwater abstraction for domestic purposes and/or farming related activities has already caused a lowering of the local groundwater levels and is also believed to have affected the natural groundwater flow patterns and velocities. Most user boreholes are dominated by fresh, clean, relatively young groundwater that has started to undergo mineralization with especially magnesium ion exchange. The groundwater is therefore dominated by magnesium cations, while bicarbonate alkalinity dominates the anion content. This is typical of a dolomite aquifer, which is mainly composed of calcium and magnesium carbonates. Groundwater from most of the user and monitoring boreholes is considered to be of good quality and is suitable for human consumption if compared with the South African National Standards (SANS 241:2015). Exceedances in terms of the groundwater nitrate content are, however, observed for some of the user boreholes. Mining will only intersect the shallow weathered zone aquifer to gain access to the underlying Rietkol quartzite leaving the Karoo- and Transvaal Supergroup (i.e. Malmani dolomite) aquifers intact. The quartzite deposit may be regarded as a fourth aquifer; however, its crystalline structure and small size are characteristic of a minor- or even a

Environmental Aspect	Information to inform Closure Planning
	non-aquifer system. The underlying dolomite aquifer will be separated from the overlying opencast pit by a dolerite sill of approximately 30 meters thick and many more meters of quartzite (i.e. Lower Quartzite band). The quartzite deposit in its entirety is expected to act as a buffer between the proposed mining activities and the surrounding and underlying dolomite An important feature from a groundwater perspective that occurs in the area is an underground cave partly filled with groundwater. The cave opening/entrance occurs on AH 138 of Modder East AHs, approximately 2.5 km north of the Rietkol MRA boundary. The cave is recognized as an important feature in terms of environmental sensitivity as well as for heritage purposes. Although information on the cave is limited, the risk of negative impact because of the proposed Rietkol Project on the cave is considered to be very low to negligible. The pit floor was simulated to intersect the water table from year one, resulting in groundwater flowing towards and eventually into the opencast pits. The groundwater influx for Scenario 1 (mining depth of 30m) was simulated to increase from approximately 20 m^3/d at the end of year one to a maximum of ± 90 m^3/d at mine closure. The influx simulated for Scenario 2 (mining depth of 50m) increased from ± 100 m^3/d to nearly 240 m^3/d at the end of mining (YR20). An area of approximately 522 460 m^2 was simulated to be affected by the Scenario 1 pit dewatering activities, while a slightly larger area of ± 724 430 m^2 was simulated for Scenario 2. The water level impacts do extend beyond the MRA area; however, no current groundwater user boreholes are located within these affected areas. After 50 years the groundwater level (where the impact of pit dewatering was greatest) was simulated to have recovered by ± 91% for Scenario 1, while a ± 89% recovery was simulated for Scenario 2. At mine closure an area of approximately 338 900 m^2 was simulated to be affected by the Scenario 1 contamination plumes, while a slightly smaller affected area of ± 268 500 m^2 was simulated for Scenario 2. User borehole 278RR is located barely 25 meters east of the MRA area on AH 278 and was the only outside borehole simulated to be affected. At 50 years post closure the Scenario 1 contamination plumes were simulated to have increased to 486 300 m^2 in size, while an area of 410 500 m^2 was simulated to be affected by the Scenario 2 plumes. No user boreholes located outside of the MRA area were simulated to be adversely affected. Plume concentrations were simulated to increase over time, however natural occurring processes such as dilution and dispersion caused concentrations to only reach ± 80% after 50 years from a source concentration of 100%. Tailings material from the plant will be dumped into the North Block during the operational phase. This fine material will effectively "plug" the mine void, allowing for very little water infiltration and no decanting is therefore envisaged. Main Block will only be partially filled with the remaining tailings and inert building material. Evaporation far exceeds rainfall in the project area and with the Main Block being located on top of a local topographic high (resulting in limited surface water runoff into the pit), no decanting is expected to occur. The in-pit disposal of tailings material is more environmentally friendly for the following main reasons: i) The tailings material is effectively enclosed by mostly quartzite that is characterised by low hydraulic properties. This will greatly reduce the rate of contaminant migration (if present); and ii) The tailings material (or a portion thereof at least) will be deprived of oxygen in the event of the pit being flooded, which will reduce oxidation and the formation of potentially poor quality leachate.

Environmental Aspect	Information to inform Closure Planning
Geochemistry	Exploration drilling in the MRA area found that the Rietkol quartzite deposit is exceptionally pure. No acid-base accounting (ABA) was therefore deemed necessary as the targeted quartzite is predominantly composed of inert silica (i.e. amount of metal sulphide minerals is negligible, if any). The waste classification (i.e. total concentration digestion and distilled water leaching tests) indicated that both the tailings material and waste rock can be regarded a Type 4 or inert waste, requiring a Class D (or GSB-) disposal facility. Explosives will be used in the opencast mining process, which in all likelihood will be nitrate based. Remnants of the explosives still contain significant amounts of nitrate and get attached to the blasted rock material. Nitrate dissolves readily in water, resulting in nitrate enriched leachate being generated whenever water is available for dissolution (usually during and directly after a rainfall event). Waste rock dumps and stockpiles are therefore regarded as potential sources of nitrate contamination.
Air quality	Ambient monitoring (once-off) indicates an ambient particulate load on the lower side of the ambient conditions for the highveld, below the average 24-h standard of 75µg/m³ for PM_{10} (EBS Advisory 2021). Continuous monitoring conducted during the month of June 2021 indicated that concentrations of PM_{10} did not exceed the daily standard of 75 µg/m³ over the monitoring period; the maximum measured was 51.79 µg/m³. However, the 24-h $PM_{2.5}$ standard of 40 µg/m³ was exceeded on several occasions, the maximum 24-h average recorded for PM2.5 being 55.94 µg/m³ (Rayten, 2021). The baseline $PM_{2.5}$ therefore already exceeded the standard. It was further reported that the concentrations of PM_{10} and $PM_{2.5}$ were very similar, indicating that the PM_{10} particulates were predominantly in the $PM_{2.5}$ range. The impact modelling (EBS Advisory, 2021) indicated that the impacts from the mine are below the ambient air quality standards beyond the MRA boundary for PM_{10}, SO_2 and NOx. When combined with the current background concentrations monitored during June 2021, there is possibility of exceedance with the particulate matter standards (worst case). Dust fall-out was also measured over the month of June 2021. The dust fall-out was at 56.27 mg/m²/day, well below the residential standard of 600 mg/m²/day. The alpha quartz content in the dust fall-out sample was determined by an accredited laboratory as an indication of the current (baseline) silica content of the dust. The alpha quartz content was below the detection limit of 0.013 mg of the laboratory. If the concentration is assumed to be at the detection limit (0.013 mg), then the percentage alpha quartz in the baseline sample sent to the laboratory (39.5 mg), was 0.033% (Rayten, 2021). A survey at an existing silica mine in the Delmas area found the silica content (occupational) of the dust to be 26% (AirCHECK, 2017). Predicted dust fallout impacts do exceed the permissible limits for residential areas (600mg/m²/day) at certain sensitive receptors within the MRA boundary, but not beyond. Regarding the potential risk for silica exposure, the occupational health of employees / contractors working on site needs to be carefully considered, however the risk identified for ambient environmental exposure is below the US exposure limit of 100µg/m³. The potential for air quality impacts to occur during the decommissioning and closure phase is much lower than for the construction and operational phases.
Noise	Although ambient noise measurements highlighted high ambient sound levels, when considering the developmental character of the area, the acceptable zone rating level would be typical of an urban area (45 dBA at night and 55 dBA during the day) as defined

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	in SANS 10103:2008 (acceptable for residential use). Road traffic from the N12 is a significant noise source as well as traffic on the R50 and D1550. The proposed mining activities will raise the noise levels at several potential noise-sensitive receptors. These noises can be disturbing and may impact on the quality of living for the receptors. Mining activities (calculated noise levels) should not change the proposed acceptable rating levels with more than 7 dBA (disturbing noise) and ideally with no more than 3 dBA. Noise sensitive receptors within the MRA area should be resettled, especially those located within the Combined High Impact Zone. The potential for a noise impact to occur during the decommissioning and closure phase is much lower than the construction and operational phases.
Visual	The proposed project will be highly visible from within 1 km of the MRA area, mainly because of the 2.4m high perimeter fence and the processing plant. The offices and stores, weighbridge and the opencast pit do not contribute significantly to the viewshed, and the opencast pit will, for instance be mostly screened by the perimeter fence. The processing plant and the perimeter fence will be mostly visible from the north and west of the MRA area up to 5 km (not considering vegetation and local topography). Beyond 5 km it is unlikely that the perimeter fence will be highly visible, however the processing plant may be visible from the southwest and northwest at a distance further than 5 km. The combined viewshed analysis indicates that the project will be visible from beyond 10 km of the MRA area to the northwest, however it is important to note that at a distance further than 10 km from a development, visual exposure and visibility is expected to significantly decrease due to objects being difficult to distinguish from the background at such significant distances. The viewshed analysis indicates that the proposed project will be highly visible from the N12 and R50, but not highly visible from the R555. The proposed project is likely to only be intermittently visible from these main roads due to screening from existing infrastructure and trees and the duration of visual exposure will be of a limited duration. It was determined that the proposed project will not be visible from the town of Delmas, the most prominent town in the region. Night-time lighting during the operational phase will impact on the surrounding area which is still considered to be relatively dark during the night. No additional visual impact is envisaged during the decommissioning and closure phase. The rehabilitation of the area and dismantling of infrastructure will reduce the impact significantly.
Heritage	No Iron or Stone Age sites have been identified. An informal graveyard consisting of about 20 graves was recorded within the MRA area. Some of these graves are delineated by brick-and-mortar walls, whereas others are stone stacked. The informal graveyard is significant and will be impacted on by the development. The graves will be relocated prior to mining within 50m from the site. Several ruins exist on the properties; two of the ruins were homesteads, while the others relate to livestock and farming activities, and have no cultural significance. All other buildings on the properties are modern. An old trigonometrical beacon is situated within the mining footprint. No impact on heritage is envisaged during the decommissioning and closure phase.
Palaeontology	A Very High Paleontological Sensitivity is allocated to the part of study area underlain by the Malmani Subgroup and the Karoo Supergroup sedimentary rocks and a Low sensitivity over the central part of the site underlain by quartzite.

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	A suitably qualified paleontologist must visit the site during the first excavations that exceed 1.5m into the Very Highly significant rock types and should do a Phase 1 PIA and develop a Chance Find Protocol (CFP) if fossils are recorded from any formation in this area during the first week of excavations into areas with a Very High and High Paleontological significance. No further excavations are planned for the decommissioning and closure phase, so no additional impacts are envisaged after mining.
Traffic	The traffic impact assessment (TIA) concluded that the road network surrounding the Rietkol Project will be able to handle the traffic, with no detrimental impact on the traffic on any of the relevant roads, provided the following road improvements are put in place: • Upgrade of intersection of Road D1550 with Road R50 (P36/1). • Upgrade of intersection of mine access road with Road D1550. • Road R50 (P36/1) require some maintenance to the road edges and shoulders. • Road D1550 that is currently without any road markings and painted centre lines. • The gravel access off Road D1550 need to be upgraded to be able to accommodate the future truck movements. Traffic will reduce substantially after closure, and no additional impacts are envisaged in respect of traffic.
Social	There are no formal settlements or towns (with registered erven) in the MRA area or 1 km radius around it. There are, however, built-up areas and residential structures located on many of the AHs, which may constitute a rural dispersed settlement in the broader context. Apart from the land occupants or labour tenant housing located on the various properties, there are two AHs that have occupants that constitute the start of or an informal settlement. These are AH 152 spreading over to AH 151. The Rietkol Project will create approximately 100 temporary employment opportunities during construction. There is an opportunity to create 100 permanent employment opportunities once production reaches steady state, with a further 40-50 employed by support consultants. A full assessment of employee and public exposure to health and safety hazards were conducted, some that may be applicable to the decommissioning phase. Although the health risks are varied, the respiratory impacts due to the inhalation of respirable silica dust are the key health risk related to the industry. The Human Health Risk Assessment indicated that the risk for the surrounding community to develop silicosis from possible exposure to dust (particulate matter) containing silica, is unlikely. This will need to be confirmed with monitoring once the mine is operational. The risk of silica exposure to the general public after closure will be determined by the final end land use for the Main Block wilderness area. Social sensitivity mapping was conducted to determine the potential direct impact on the health and well-being and livelihoods of the sensitive receptors in the area, considering the air quality, ambient noise, blasting and groundwater impact assessments – refer to Figure 6. No additional social impacts are envisaged during the decommissioning and closure phase. The rehabilitation of the area and dismantling of infrastructure will enhance the future land capability of the area, in line with the closure vision for the Rietkol Project.

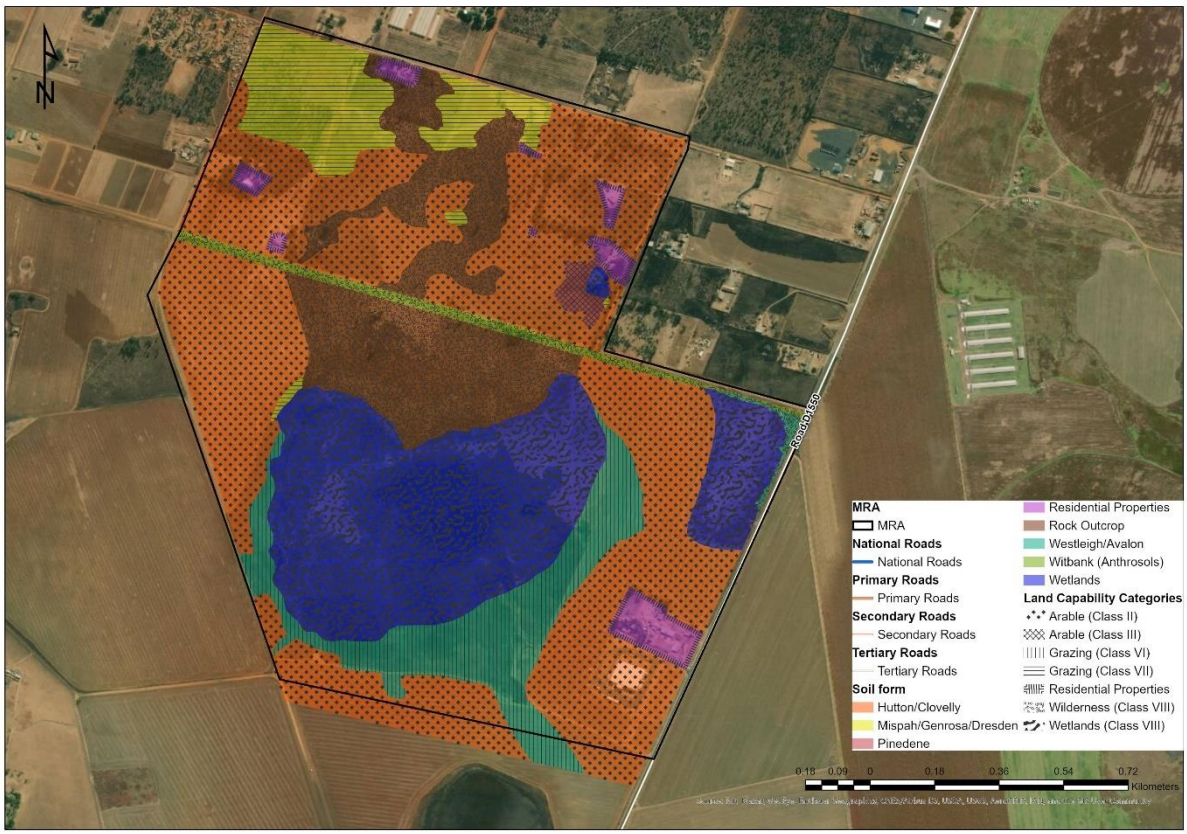


Figure 4: Land capability map

Figure 5: Existing land use map

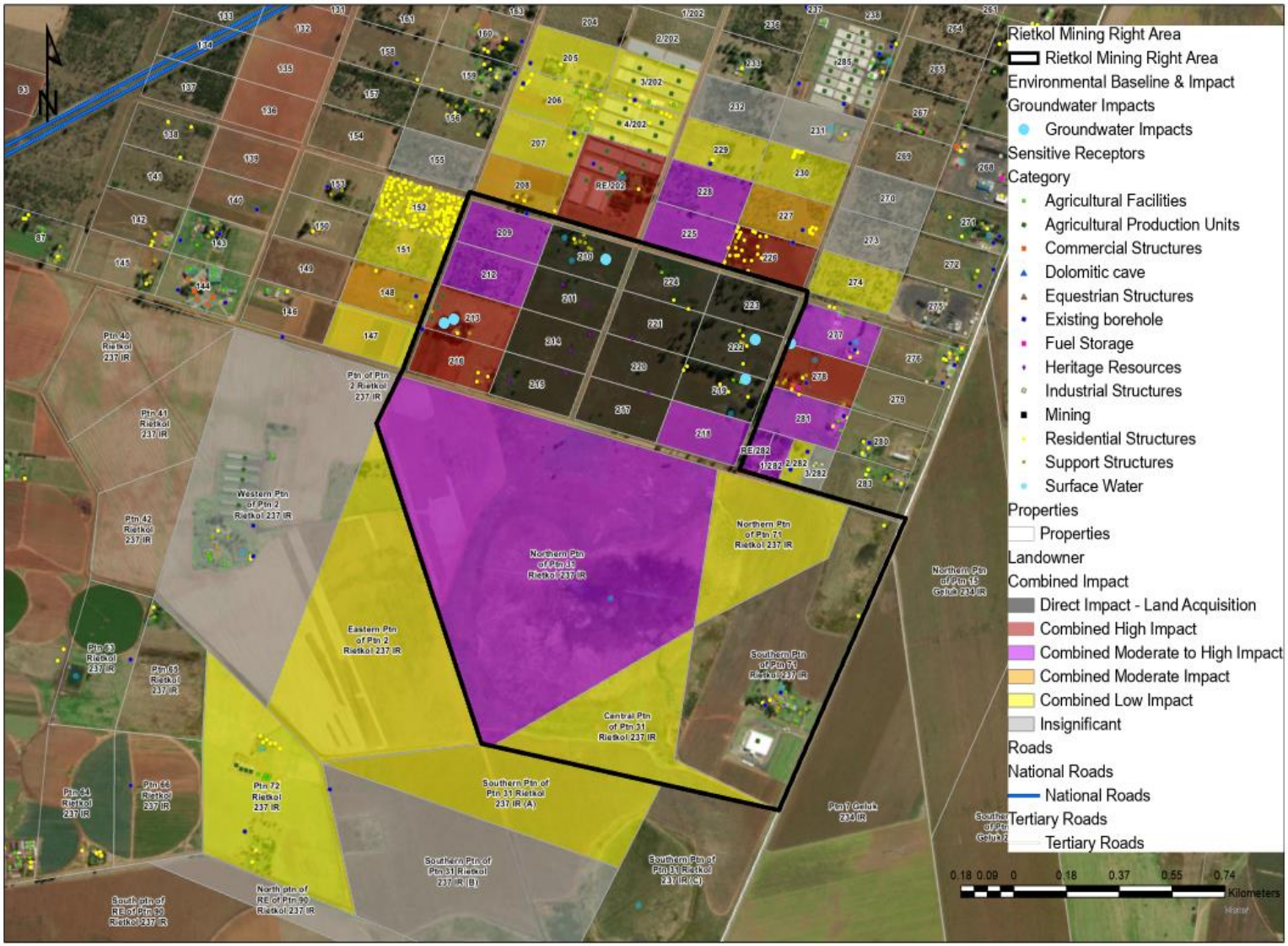


Figure 6: Cumulative (combined) sensitivity map and property risk classification

3.4 Stakeholder Issues and Comments

The stakeholder issues and comments raised during the Scoping Phase of the EIA process informed the compilation of this report, as applicable. Table 2 provides a summary of the comments and responses.

Table 2: Comments and Response Summary

Interested and Affected Parties		Date Comments Received	Issues Raised	Response	Consultation Status (Consensus, Dispute, Not Finalised)
AFFECTED PARTIES					
MRA Landowners					
Landowners within the MRA area	X	Feb 2016 March 2016 Nov 2016 Feb 2021 Apr 2021	Impact on water, air quality (silica), health, noise, economic livelihoods and security. Cumulative impacts of other existing and planned mining operations.	The process will be conducted through two phases (the Scoping and EIA Phases) where opportunity will be provided to the public for participation, input and provision of information regarding the various specialist studies.	Not finalised
Landowners within the MRA area	X	Apr 2021	Inclusion of specific studies such as a Medical Research study and Poultry Impact Assessment to determine the impact on human health and on poultry production of the nearby broiler and packhouse businesses.	The health risks and medical conditions associated with silicosis have been well researched for many years, specifically WHO and US Occupational Safety and Health Administration who have set standards based on their research, 40 and 100 µg/m^3 respectively. The potential for silica dust-fallout will be addressed in the Air Quality Impact Assessment, which will provide an indication of the risk to not only employees, but also the general public adjacent to the proposed mine. In addition, Nhlabathi has committed to undertake a Medical Research Study. The specialist studies do address the potential impacts on mammals / poultry to the extent that data is available in this regard. Very limited data is however available.	Not finalised

Interested and Affected Parties		Date Comments Received	Issues Raised	Response	Consultation Status (Consensus, Dispute, Not Finalised)
Landowners within the MRA area	X	March 2018 Feb 2021 April 2021	Concerns raised regarding the impacts on: Groundwater – quality and quantity including the effect blasting & vibrations may have on groundwater. Air quality and its associated health risks, with specific reference to silicosis as well as the impact it would have on the agriculture businesses (crops, livestock, etc). Security and the increase in crime. Noise and blasting impacts. Economic impact on businesses due to above impacts. Cumulative impacts considering the existing baseline and planned other developments.	Impacts associated with the proposed Rietkol Project will be identified during the EIA Phase through the various specialist studies being conducted. The potential impact on the economic activities of MRA landowners will be assessed as part of the macro-economic impact assessment. Cumulative effects will be investigated as far as it is practical and relevant. The regional air quality will be taken into account to identify any cumulative effects.	Not finalised
Landowners within the MRA area	X	Feb 2021	Relocation of packing stores will have a very serious financial and logistical impact on business.	The potential impact on the economic activities and business activities will be assessed as part of the macro-economic impact assessment, including impacts on GDP and employment.	Not finalised
		Apr 2021	Concerns of irreparable loss and damages that will be suffered because of the proposed mining.	The socio- and macro-economic specialists have secured several meetings with stakeholders that have raised concerns and objections, to discuss their concerns and include these in the impact assessment process.	Not finalised
Traditional Leaders, Communities, Settlements					
Traditional Leader			*Not applicable*		
Lawful Occupier, Community / Settlement			*Not applicable*		
Land Claimants					
Land Claims Commissioner	X	March 2018	No land claims registered on the MRA properties.		Consensus
Land Claimants			*Not applicable*		
Municipalities					
District Municipality			*No comments received to date*		
Local Municipality	X	Oct 2016 Nov 2016	The area is an eco-sensitive area with an underground lake that supplies the town with water. Also, the area is underlain by dolomitic geology. 800m buffer zone between the residential area and the proposed mine.	Noted, further engagement with the municipality will be arranged as part of the EIA process. The information was forwarded to the groundwater specialist who made further enquiries in this regard.	Not finalised

Interested and Affected Parties		Date Comments Received	Issues Raised	Response	Consultation Status (Consensus, Dispute, Not Finalised)
			The intended mine is within the urban edge of Delmas and falls within the residential component of the farms of Modder East Orchards. The area is agricultural zoned. The proposed mine is not in line with the SDF of Delmas.	Full details will be provided in the geohydrological impact assessment.	
Local Municipality	X	March 2018	Impact on local roads – need for coordination with the municipality. Impact and monitoring of groundwater – quality & quantity. Influx and management of informal settlements. Blasting impact on groundwater.	Impacts associated with the proposed Rietkol Project will be identified during the EIA Phase through the various specialist studies being conducted. The municipality will be kept up to date as more information becomes available.	Not finalised
Ward Councillors	X	March 2018	Management of influx and the impact on the informal settlement neighbouring the planned mining area.	Once all specialist studies are complete, a cumulative impact zone will be determined, and only at that time will we be able to determine if resettlement is required. At this stage, the first approach will be to avoid resettlement.	Not finalised
Organs of State					
DMRE	X	August 2021	Acceptance of Scoping Report and Plan of Study. Requirements for EIAR: • Activities to be described and impacts assessed • Impact management objectives and mitigation measures for risks that need to be managed • Feasible and reasonable alternatives to be assessed • PP must be transparent, all comments to be included • Proof of correspondence with stakeholders to be included • All IAP comments must be adequately addressed • Motivation for need and desirability	This report adheres to the requirements stipulated in the NEMA and the recently published EIA Regulations, 2014 (as amended). The DMRE guidelines were used as framework. All aspects raised by DMRE was addressed within this report. Stakeholder consultation records and proof of correspondence are included in the PP Report (Appendix 1).	Not finalised
MDARDLEA			*No comments received to date*		
DoA	X	March 2018	Aspects to be considered during the EIA is current land use, grazing capacity, land capability and a detailed soil study.	These aspects will be addressed in the Soils, Land Use and Land Capability specialist assessment and in the EIAR.	Not finalised
DALRRD	X	Feb 2021 May 2021	Soils and land use investigations. Weeds and alien invader plant management plan. Land capability class and grazing capacity.	These aspects will be addressed in the Soils, Land Use and Land Capability specialist assessment and in the EIAR.	Not finalised

Interested and Affected Parties		Date Comments Received	Issues Raised	Response	Consultation Status (Consensus, Dispute, Not Finalised)
			Sensitive areas and wetlands not to be disturbed.		
		April 2021	Land capability is II high potential arable land. According to the 1993 grazing capacity index this area is regarded as having a 3 ha/LSU demarcation making it suited for grazing. DALRRD does not support the environmental authorisation on the farm Rietkol 237 IR – land must be protected for food security purposes.	The concerns raised are noted. These aspects will be addressed in the Soils, Land Use and Land Capability specialist assessment and in the EIAR.	Not finalised
SAHRA	X	March 2018	Mitigation for the conservation of historical structures. MRA underlain Very High palaeontological sensitive rocks, as seen by the SAHRIS palaeomap. All reports and appendices to be uploaded to the SAHRIS system.	This section of the report will be rephrased and clarified. It is unlikely that the structures are older than 60 years and not regarded as significant. No mitigation measures are recommended. The area falls in the BLUE category of SAHRA's Palaeontological Sensitivity Map because of the underlying Vryheid formation. Blue is low in sensitivity and no palaeontological studies are required; however, a protocol for finds is required. A palaeontological study will be conducted, to the level proposed by the professional palaeontologist.	Not finalised
		May 2021	The SAHRA Archaeology, Palaeontology and Meteorites (APM) notes the submission of the HIA and PIA report however further comments will only be issued once the draft EIA report is submitted to the case during the public review period.	The draft EIA report will be uploaded onto the SAHRIS system, together with all specialist reports.	Not finalised
MTPA	X	March 2018	No objection. Aspects to be addressed in the EIA include terrestrial assessment, freshwater assessment, critically endangered terrestrial orchid. Recommendations include a detail flora study, wetland delineation, if orchid is found inform MTPA, plans for active water purification.	We take note of your comments, which will be addressed in the relevant specialist reports and EIAR/EMPr.	Not finalised
		August 2021	MTPA requests that you send a hard copy of the Draft EIAR and EMPr once available.	A hard copy of the draft EIAR and EMPr will be submitted to MTPA for their comments.	Not finalised
Roads and Transport	X	Feb 2021	Concerned how roads will be affected – access and building line	The potential impact on roads will be addressed in the Traffic Impact Assessment. Further consultation will be initiated with the Dept.	Not finalised

Interested and Affected Parties		Date Comments Received	Issues Raised	Response	Consultation Status (Consensus, Dispute, Not Finalised)
DFFE	X	June 2021	It is required that after the issuance of the Environmental Authorisation the facility must apply and be in the possession of a Provincial Atmospheric Emission Licence (PAEL) issued by the Minister of DFFE for all proposed activities that are listed in terms of section 21 of NEM:AQA before operation.	The need for a AEL was identified – refer to Section 3.2 of this report. The application for an AEL will follow once the mining right is granted, prior to construction of the dryer plant.	Not finalised
OTHER AFFECTED PARTIES					
Other landowners					
Direct Neighbours	X	March 2018 Feb 2021 April 2021	Concerns raised regarding the impacts on: Groundwater – quality and quantity including the effect blasting & vibrations may have on groundwater. Damage to property due to drilling & blasting. Heavy motor vehicles on the access road. Air quality and its associated health risks, with specific reference to silicosis as well as the impact it would have on the agriculture businesses (crops, livestock, etc). Biodiversity impacts, visual impacts and sense of place. Increased noise and traffic. Economic impact on businesses due to above impacts, including property value. Cumulative impacts taking into account the existing baseline and planned other developments. Monitoring programmes and feedback to landowners on the results.	Impacts associated with the proposed Rietkol Project will be identified during the EIA Phase through the various specialist studies being conducted. The potential impact on the economic activities in the area will be assessed as part of the macro-economic impact assessment. Cumulative effects will be investigated as far as it is practical and relevant. The regional air quality will be taken into account to identify any cumulative effects. The specialist studies will recommend the type, method and frequency of monitoring required.	Not finalised
		Apr 2021	This cumulative impact from an economic, social and environmental perspective should be investigated and included as part of the specialized environmental studies.	Cumulative effects will be investigated as far as it is practical and relevant. It is noted that the closest operational mine to the proposed Rietkol Project is more than 8 km away (Kangala Coal). Once all specialist studies are complete, a cumulative impact zone will be determined based on the impact modelling by the specialists.	Not finalised
Landowners within a 1km radius	X	Feb 2016 March 2016 April 2016 March 2018 April 2021	Concerns raised regarding the impacts on: Groundwater – quality and quantity including the effect blasting & vibrations may have on the dolomitic aquifer and groundwater in general, formation of sinkholes. Air quality and its associated health risks, with specific reference to silicosis as well as the impact it would have	Impacts associated with the proposed Rietkol Project will be identified during the EIA Phase through the various specialist studies being conducted. The concerns raised will be forwarded to the specialists for consideration during their assessments.	Not finalised

Interested and Affected Parties		Date Comments Received	Issues Raised	Response	Consultation Status (Consensus, Dispute, Not Finalised)
			on the agriculture businesses (crops, livestock, greenhouses etc). Biodiversity impacts (including specie movement). Visual impacts and sense of place. Increased noise and traffic. Blasting effects on structures and animals especially horses. Economic impact on businesses due to above impacts including property value and method/procedure to address damages and compensation to be paid. Cumulative impacts taking into account the existing baseline and planned other developments. Monitoring programmes and feedback to landowners on the results. Job creation and losses.	Impact of blasting on infrastructure and animals (horses) will be addressed as part of the blasting impact assessment. The structures and structure types will be identified as best possible and evaluation done accordingly. Cumulative effects will be investigated as far as it is practical and relevant. The regional air quality will be taken into account to identify any cumulative effects. The specialist studies will recommend the type, method and frequency of monitoring required. The potential impact on the existing economic activities and the benefits of the proposed mining activity will be assessed as part of the macro-economic impact assessment, including impacts/benefits on GDP and employment.	
Neighbouring land occupants, settlements or communities					
Adjacent Traditional Leaders			*Not applicable*		
Neighbouring land occupants, settlements or communities	X	March 2016 Feb 2021	Will the project require resettlement? In support as the mine as it will generate job opportunities and skills development. Impact on water, air quality and health.	Your comments will be considered during the social impact assessment that addresses both impacts and benefits to the community. Impacts associated with the proposed Rietkol Project will be identified during the EIA Phase. A cumulative impact zone will be determined around the proposed mining activities to understand the need for resettlement.	Not finalised
Neighbouring land occupants, settlements or communities	X	March 2018 Feb 2021	Concerns raised regarding: Resettlement. Graves and ancestral beliefs. Limited employment opportunities.	The specialist studies (specifically Air Quality, Noise and Blasting), that will determine the likely impacts on the communities, are still underway. Once these studies are complete, we will be able, at the next meeting, to explain to you what those impacts will be, as well as what we propose the mine does to protect the community. The families (next of kin) of any grave sites affected will be consulted.	Not finalised

Interested and Affected Parties		Date Comments Received	Issues Raised	Response	Consultation Status (Consensus, Dispute, Not Finalised)
				With employment, for every person employed in a family, up to 5 dependents may be uplifted. At a mine there are skilled and unskilled opportunities, but those that are unskilled can be developed through skills development. If the skills required does not exist in the local area, this can be remedied over time with skills development programmes. Also, benefits are not only focussed on employment, there are procurement and enterprise development opportunities as well as bursaries, internships and learnerships. All these programmes must be described in the 5-year SLP, which forms part of the commitment the mining company makes.	
	X	Apr 2021	Corporate Social Investment Road Infrastructure Housing Health Care Services (Clinics/Hospital) Educational Infrastructure Water Infrastructure Creation of Job opportunities to alleviate poverty preferably to local stakeholders. Black economic empowerment businesses residing in the community. Environmental management	Noted, your comments will be considered during the social impact assessment that addresses both impacts and benefits to the community.	Not finalised
INTERESTED PARTIES					
Regional Landowners (outside 1km buffer)	X	Feb 2016 March 2016	Scope of work of specialist tests. Underground lake and cave on plot 183 Impact on air quality and health Benefits to be invested locally through job creation and procurement. Concerned about mining over aquifer Impacts on groundwater, increased subsidence and incidents of sinkholes, degradation of current poorly maintained local and provincial infrastructure, increase in noise and air pollution as well as blasting and tremors, increase in socio-economic problems due to a lack of	As described in the BID, the process will go through two phases where opportunity will be provided for you to participate, provide inputs and receive information regarding all the various specialist studies being conducted for the project. The first report that will be made available will be the draft Scoping Report, which will describe the environmental baseline (what the current status is) and the Plan of Study of the further in-depth specialist studies, only thereafter will the full EIAR be compiled and made available. Your concerns have been forwarded to our specialists for further	Not finalised

Interested and Affected Parties		Date Comments Received	Issues Raised	Response	Consultation Status (Consensus, Dispute, Not Finalised)
			housing, crime, etc and a decline in property value and sense of place.	investigation. We will keep you up to date of any further information and engagements.	
Regional Landowners (outside 1km buffer)	X	March 2018	Groundwater – quality and quantity including the effect blasting & vibrations may have on the dolomitic aquifer and groundwater in general, formation of sinkholes. Air quality and its associated health risks, with specific reference to silicosis. Economic impact including property value. Increase in crime and safety concerns. Blasting effects on animals especially horses. Monitoring and the reporting protocol when limits are exceeded.	Impacts associated with the proposed Rietkol Project will be identified during the EIA Phase through the various specialist studies being conducted. The concerns raised will be forwarded to the specialists for consideration during their assessments. Impact of blasting on infrastructure and animals (horses) will be addressed as part of the blasting impact assessment. The potential impact on the existing economic activities and the benefits of the proposed mining activity will be assessed as part of the macro-economic impact assessment, including impacts/benefits on GDP and employment.	Not finalised
	X	Mar 2021	Concerns regarding dust and air quality for cattle. Negative effects on bull frogs, cranes and secretary birds. Negative effects on water levels.	Your concerns around environmental degradation are noted and will be considered during the EIA process and within the relevant specialist impact studies. Mitigation measures will be determined to deal with any of the concerns raised and impacts identified by the specialists for inclusion in the EMPr.	Not finalised
Interested Parties (Stefan Roets)	X	Feb 2018 Feb 2021	Impact on land use and zoning surrounding the mining area. Rezoning application process. Concerned about infrastructure, mainly roads.	The latest update of the SDF was supplied by Mr Steenekamp on 9 March 2018 and will be reviewed further by the EAP during the EIA Phase. Further engagement with the municipality will be conducted to discuss the land zonation as contemplated in the SDF. The rezoning process will be done after the EIA process is complete, as this application normally requires the specialist studies conducted during the EIA. They also normally require the Authorisations and Licenses. It will happen before we go on site. The potential impact on roads will be addressed in the Traffic Impact Assessment.	Not finalised
Other, as registered	X	Mar 2021	We are grateful about the report hoping for life changing opportunities.	Noted.	

4 REHABILITATION, DECOMMISSIONING AND CLOSURE PLAN

4.1 Mine and Infrastructure Planning

4.1.1 Mine and infrastructure layout

The mine and infrastructure layout is presented in Section 3.2.1 of this report. The pre-mining elevations and drainage directions in the disturbed footprints are indicated in Figure 7.

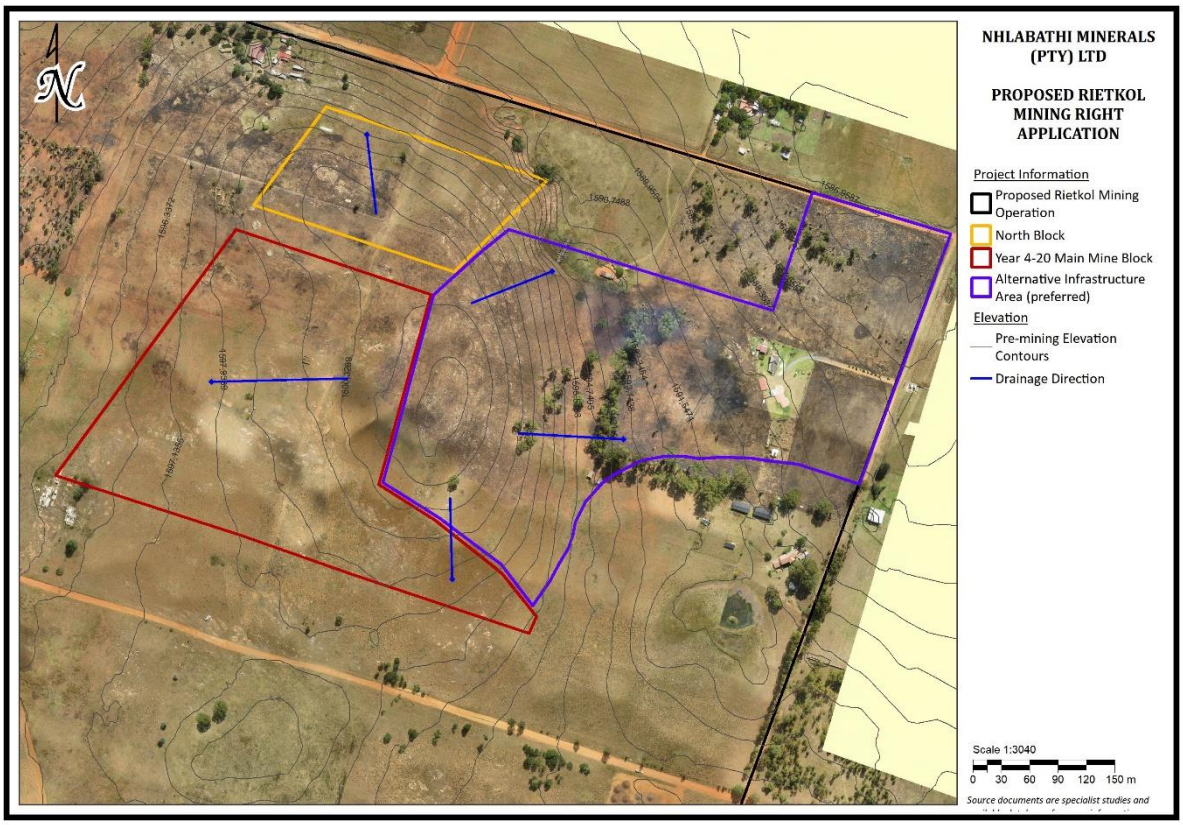


Figure 7: Pre-mining elevations and drainage directions

The total area of disturbance amounts to approximately 25 hectares (ha), as follow:

	Extent	Current Land Use
North Block	2.77 ha	Grazing = 1.45 ha Wilderness = 1.32 ha
Main Block	9.36 ha	Grazing = 5.32 ha Wilderness = 4.04 ha
Infrastructure and stockpile area	12.89 ha	Grazing = 9.34 ha Wilderness = 2.8 ha Residential = 0.75 ha

A total area of approximately 16 ha currently used as grazing will therefore be destroyed. A total of approximately 8 ha is classified as wilderness (rocky outcrops).

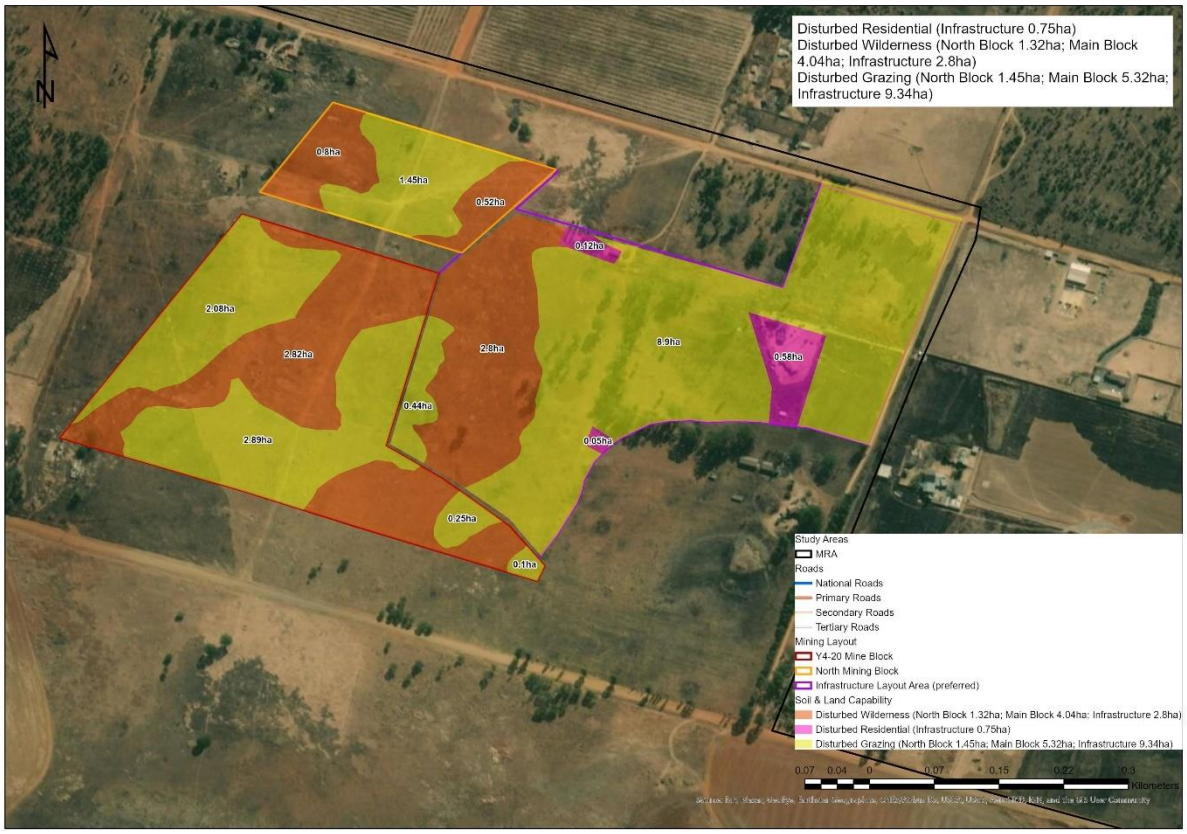


Figure 8: Pre-mining land use within disturbed footprint for mining and infrastructure

4.1.2 Production schedule

The mine model and schedule are presented in Section 3.2.2 of this report.

The North Block will be mined for the first 3 years of LOM in a northernly direction, commencing from Block S04. Block S04 is the deepest and the ore body floor slopes up to the outcrop in Block S01. The ore from Block S04 will be used as a strategic stockpile in readiness for plant start-up.

Once Block S04 has been mined out, a void exists to dump the tailings from the washing plant from about YR2 onwards. Once the North block has been mined out, mining in the Main Block will commence in YR4, in a southernly direction up to Block 14 in YR20.

Figure 9 shows a cross-section of the North and Main Blocks in a north-south direction.

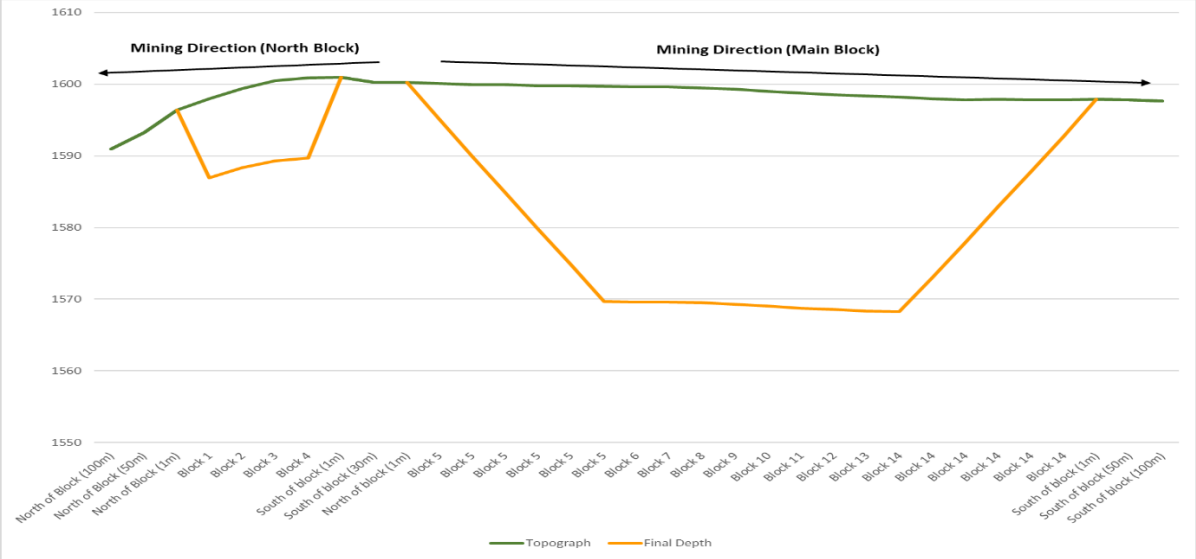
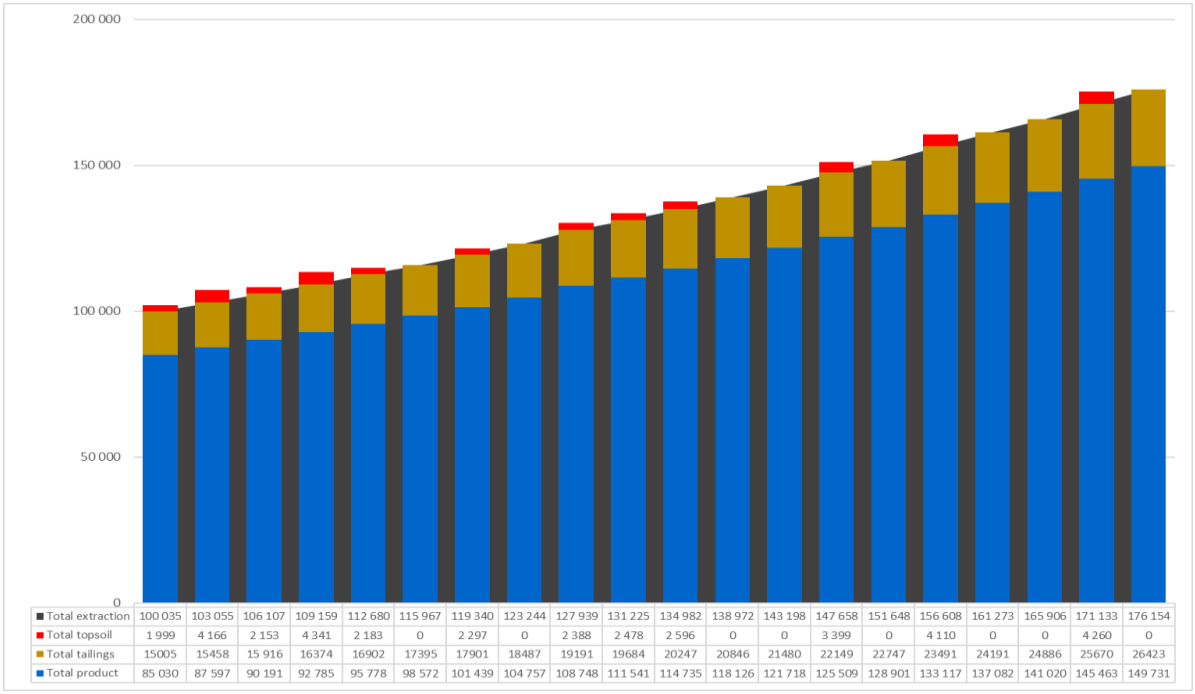


Figure 9: Cross-section through the Rietkol mining pits

It is noted that further exploration drilling planned for the operational phase may extend the LOM beyond 20 years; however, this Rehabilitation, Decommissioning and Closure Plan focuses on the first 20 years of mining only.

The production schedule over the first 20 years of mining is indicated in Figure 10 below.



Total extraction	100 035	103 055	106 107	109 159	112 680	115 967	119 340	123 244	127 939	131 225	134 982	138 972	143 198	147 658	151 648	156 608	161 273	165 906	171 133	176 154
Total topsoil	1 999	4 166	2 153	4 341	2 183	0	2 297	0	2 388	2 478	2 596	0	0	3 399	0	4 110	0	0	4 260	0
Total tailings	15005	15458	15 916	16374	16902	17395	17901	18487	19191	19684	20247	20846	21480	22149	22747	23491	24191	24886	25670	26423
Total product	85 030	87 597	90 191	92 785	95 778	98 572	101 439	104 757	108 748	111 541	114 735	118 126	121 718	125 509	128 901	133 117	137 082	141 020	145 463	149 731

Figure 10: Rietkol Project production schedule

4.2 Closure Vision and Objectives

4.2.1 Closure guiding principles

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

- To comply with relevant or applicable local legislative requirements;
- To ensure that stakeholders' needs, concerns and aspirations are taken into account 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 in which an operation is located 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.

4.2.2 Closure vision

The overall closure vision for the Rietkol 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

4.2.3 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 over the rehabilitated portions of the mine site	• 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 species in the rehabilitated areas to enable the natural re-instatement of biodiversity over time	• Implementation of a low maintenance alien and invasive eradication plan • 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	• Establishment of a suitable final landform in the North Block and infrastructure rehabilitated areas that is free-draining and non-erosive • Establishment of a recreational area within the Main Block final void area, as per the agreement with the stakeholders and authorities
Water resources	To limit the impact on the wetland systems in and around the mine site	• Surface water quality indicates that the surface water runoff is unpolluted • Biomonitoring indicates that the Recommended Ecological Category (REC) is maintained
	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 is safe-guarded and monitored • Risk of silica exposure to the general public is restricted
	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

4.2.4 Alternatives considered for closure

The following alternatives have been identified during the compilation of this plan:

4.2.4.1 Infrastructure and haul roads

- Option 1: To demolish all infrastructure and haul roads during decommissioning, thereby reducing future risks to the company.
- Option 2: To identify and retain infrastructure and haul roads that have a beneficial post-mining use.

Option 2 was selected as the preferred option, as some of the infrastructure may be of benefit to the community after mining and/or used as part of the livelihood retention projects and future land uses.

4.2.4.2 End land use – Infrastructure area and North Block

- Option 1: To rehabilitate area back to grazing land conditions.
- Option 2: To rehabilitate area back to arable land capability.

Currently the land that will be disturbed for the Rietkol Project is utilised for grazing, no cultivation takes place. Due to the limited topsoil that is expected from the rocky outcrop areas, it was decided to commit to a final end land use of grazing as it is uncertain whether sufficient topsoil of good quality will be available to achieve arable land capability.

4.2.4.3 End land use – Main Block

Several options are plausible for this area. This has been identified as an area where further work needs to be conducted to identify and evaluate feasible end land uses in consultation with the stakeholders and relevant authorities – see below.

4.2.5 On-going research for closure options

To enhance the feasibility of achieving the closure vision, the following research has been identified for implementation during the operational period:

- Development and implementation of a low maintenance alien and invasive eradication plan. This could be considered for a community project as part of the Social and Labour Plan (SLP).
- Conduct appropriate research to refine the soil amelioration and/or seed mix requirements to improve vegetation growth in high-risk erosion areas.

- Identify and develop livelihood retention projects to create off-mine livelihoods during and post-mining in consultation with the communities and employees and conduct appropriate feasibility studies to ensure the viability of the projects.
- Identify and evaluate potential end land uses for the Main Block wilderness area after closure, considering the Nkangala Spatial Development Framework (SDF) and Integrated Development Plan (IDP) and expectations from the surrounding communities and landowners. Possible projects may include:
    - Creation of a recreational area for fishing and angling
    - Renewable energy facility – solar
    - Waste recycling facility
- Determination of mining-related infrastructure and associated roads that could have a beneficial post-mining use, as well as the way this may need to be maintained by a new owner/third party.

Once the Rietkol Project is approved and mining commences, alternative or additional research opportunities may arise. These could be generated from the outcome of annual performance assessments, audits and/or monitoring programmes.

4.3 Closure Planning

4.3.1 Closure design criteria

The following design criteria have been adopted in developing the rehabilitation plan for mine closure:

- In the infrastructure area a minimum of 300mm of topsoil will be stripped ahead of construction and utilised for the construction of stormwater berms as it cannot be stored indefinitely.

- In the mining area the maximum amount of topsoil should be stripped ahead of mining. It is envisaged that the rocky outcrop areas will not provide any topsoil; however, the surrounding areas (mainly Hutton/Clovelly soils) could provide topsoil of up to 800mm.

- A minimum of 300mm topsoil should be replaced in the rehabilitated infrastructure and North Block areas.

- North Block will be backfilled with tailings to original pre-mining levels, topsoiled and revegetated. This will be completed prior to decommissioning.

- As most of the material mined is processed and removed from site as product, backfilling of the Main Block will not be possible as insufficient tailings will be produced. A final void of approximately 2 Mm^3 will be left after mining.
- The sides of the pit will be sloped and vegetated to a stable environment.
- Safety / access control berms will be constructed around the Main Block to prevent unsafe access to the open void high-risk areas.
- Infrastructure with a beneficial re-use potential will be retained for transfer to a third party. This could include the water dams, provided that the water quality is acceptable for third party use.
- All non-beneficial infrastructure will demolished/dismantled, and the area rehabilitated to facilitate the post-mining land use.
- Demolition material will be recycled as far as possible. The Main Block will be backfilled with inert demolition material and building rubble, all other material will be disposed of at an appropriate landfill site.
- No remnant stockpiles would remain on site post-closure. All remaining stockpile material will be dumped into Main Block.

4.3.2 Proposed final post-mining land use

The proposed final post-mining land use in the infrastructure areas and at North Block will be grazing, with the Main Block area constituting wilderness area – refer to Figure 11.

Of the total disturbed area of approximately 25 ha, approximately 15.65 ha will constitute a final post-mining use of grazing, the remaining 9.35 ha associated with the Main Block will be wilderness. The post-mining land use is therefore very similar to the pre-mining land use as discussed in Section 4.1.1.

4.3.3 Final landform

The final landform and associated elevations and drainage directions are indicated in Figure 12.

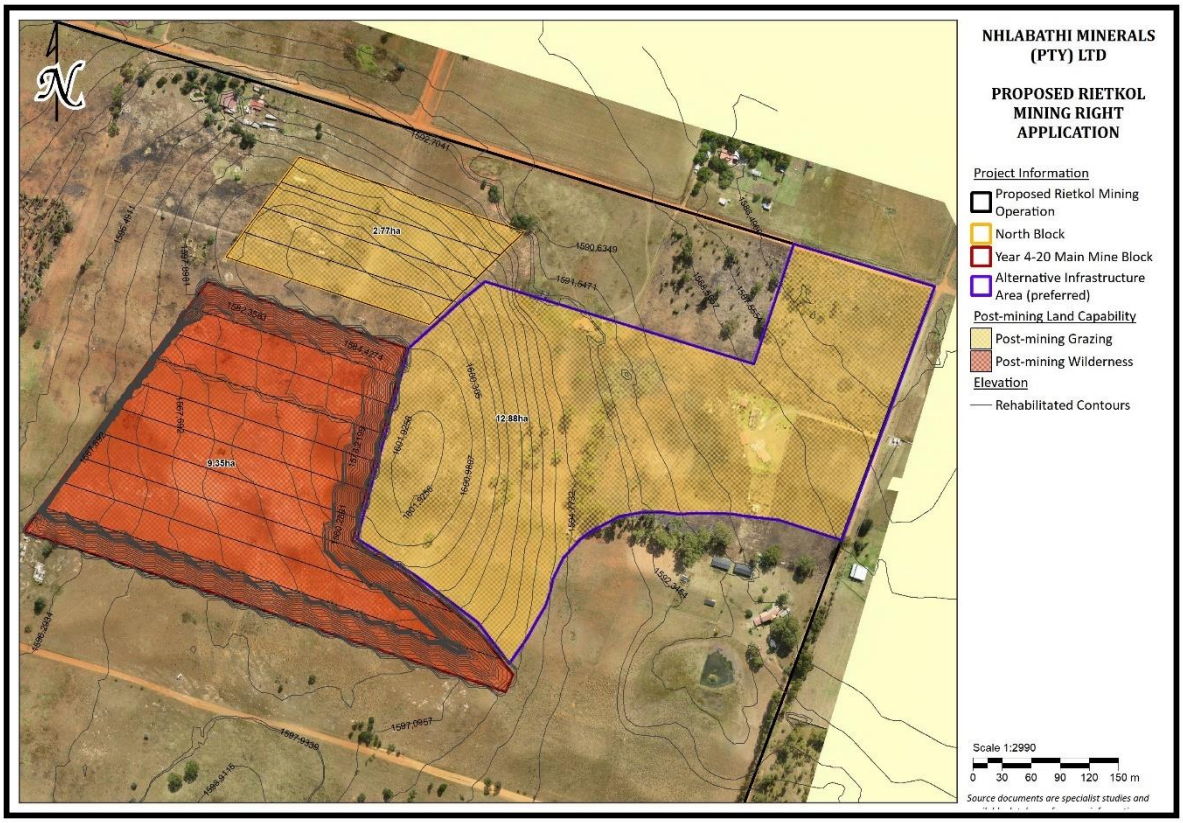


Figure 11: Proposed post-mining land use within disturbed footprint for mining and infrastructure

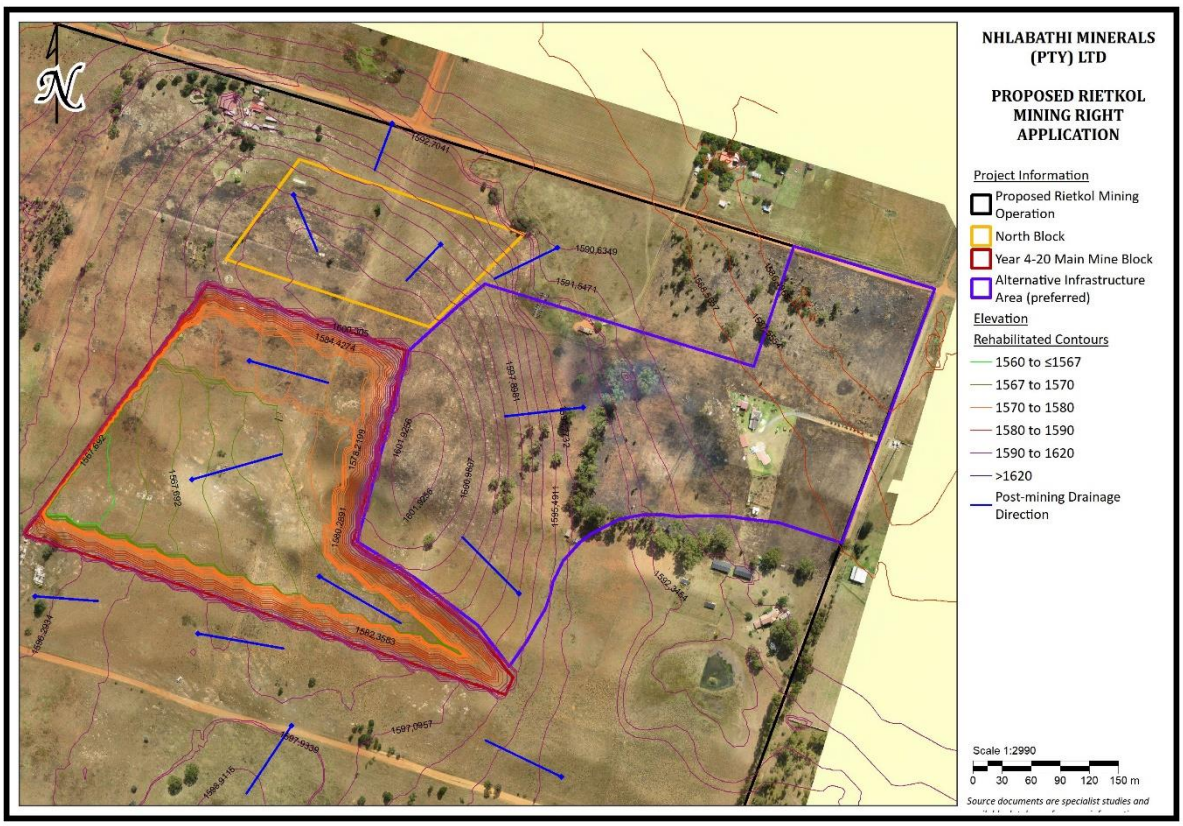


Figure 12: Final landform for Rietkol Project footprint after rehabilitation

4.4 Schedule for Rehabilitation, Decommissioning and Closure

4.4.1 Tailings backfill schedule

The tailings backfill schedule of North and Main Blocks are presented in Figure 13.

The void created by mining the North Block is 309 197 BCM's and tailings can be dumped in the North Block for the first 16 years of mining. From YR17 onwards the tailings will be dumped in Block S05 – 07 of the Main Block. A berm of 2m will separate the tailings disposal area from the active mining operations to the south. Figure 14 shows the final pits and associated voids after backfilling (at decommissioning).

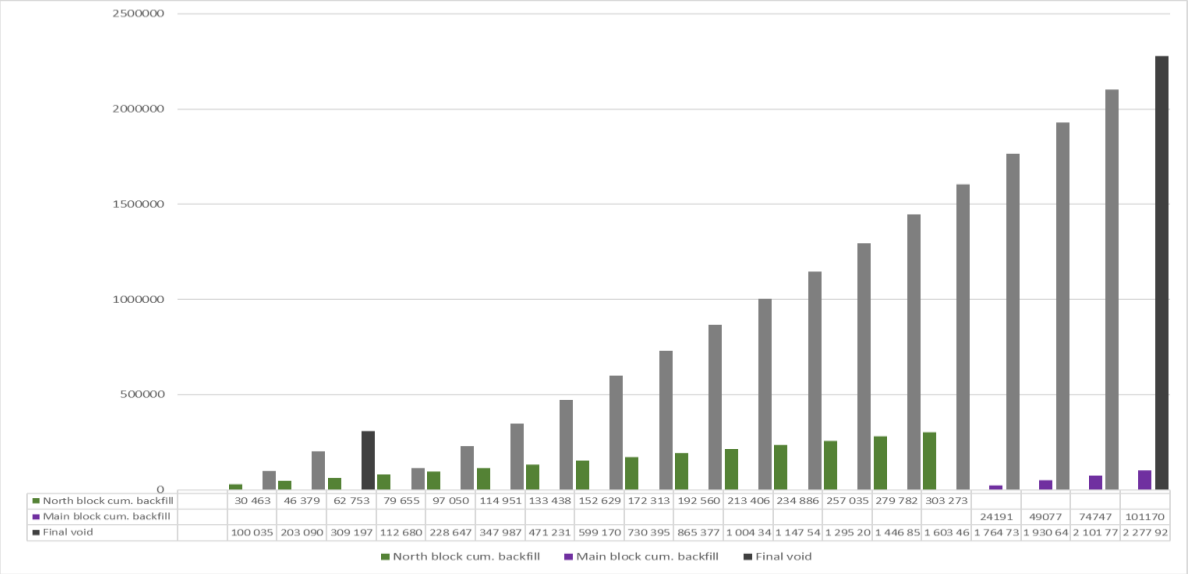


Figure 13: Tailings backfill schedule

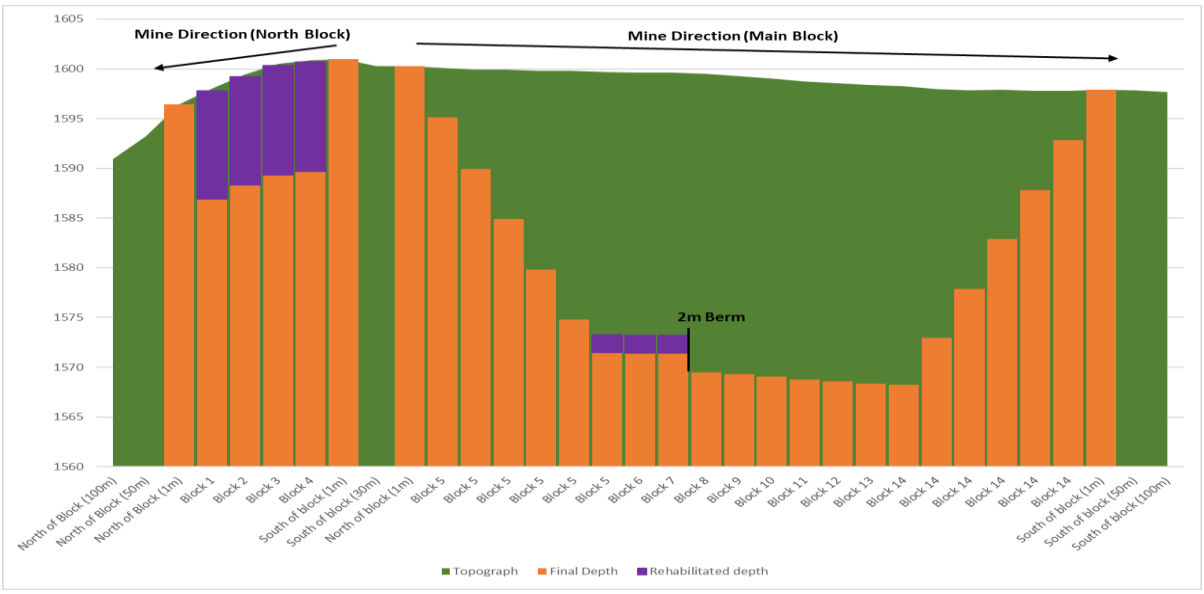


Figure 14: Cross-section through the Rietkol mining pits after backfilling

4.4.2 Rehabilitation, closure and post-closure timeline

- **Short-term (2-year review):**

- Surface rehabilitation of areas disturbed by construction activities, as these become available, including levelling, ripping and vegetation of disturbed areas.

- **Medium-term (17-year review):**

- Backfilling of North Block with tailings (YR2-16).
- Backfilling of Main Block with tailings (YR17 onwards).
- Levelling, topsoiling and vegetation of North Block.

- **Long-term (at scheduled decommissioning):**

- As most of the material mined is processed and removed from site as product, backfilling of the pit to a free-draining state will not be possible for the Rietkol Project. At decommissioning rehabilitation will be implemented in line with the requirements of the final Rehabilitation, Decommissioning and Closure Plan, including the following:
    - Demolition of surface infrastructure not required post closure;
    - Rehabilitate infrastructure and stockpile areas;
    - Rehabilitate all access and haul roads not required post closure;
    - Sloping of Main Block highwall areas;
    - Construction of safety / access control berms around Main Block; and
    - Shaping / levelling and vegetation of rehabilitated areas, highwall areas and safety berms.

- **Long-term (post-closure):**

- Monitoring and care-and-maintenance period, for a minimum of 3 years.
- Obtain Environmental Authorisation for decommissioning and closure.

4.4.3 Actions for final rehabilitation, decommissioning and closure

4.4.3.1 Infrastructure and stockpile areas

- Undertake a contaminated land assessment at closure to determine extent of soil contamination, with specific focus on the workshop and stockpile areas. Excavate any

contaminated soils and dispose at a registered hazardous waste facility (e.g. Holfontein Landfill).

- Compile an inventory of surface infrastructure that will remain to support and underpin the defined post-mining land uses, with associated risk assessments and transfer agreements.
- Establish a salvage yard for the sorting and screening of demolition waste.
- Establish a decontamination bay for the cleaning of contaminated demolition waste.
- Demolish and remove non-beneficial concrete and/or brick structures and remove concrete footings to 1m below the final surface topography.
- Sort and screen demolition waste.
- Decontaminate and crush inert waste for disposal within the Main Block final void.
- Dismantle steel structures, decontaminate, and salvage steel waste.
- Remove all contaminated and hazardous waste for disposal at a registered landfill site (e.g. Holfontein).
- Remove all unwanted (unsold) material from stockpile areas and dispose within the final Main Block void.
- Shape and profile footprint areas to match surrounding topography and to be free draining.
- Rip the resultant surface to a depth of 500mm to alleviate compaction.
- Place and level topsoil across ripped areas and conduct soil land capability assessments.
- Apply fertility treatment and other soil ameliorants as required and seed with identified vegetative species to achieve required end land capability.
- Implement monitoring and maintenance programme.

4.4.3.2 Fencing

- Dismantle all security fencing that will no longer be required post closure.
- Demolish all concrete foundations / supports to 1 m below ground level.
- Rip tracks along the fence to a depth of 500mm and allow for natural re-vegetation.
- If required, erect stock fencing around rehabilitated areas.

4.4.3.3 Pipelines and power lines

- Dismantle the remaining equipment and associated water supply pipelines in the same manner as other non-hazardous material.
- Remove buried pipelines if required, and if not, the pipelines should be fully covered with no exposed open ends.
- Where possible, reuse and/or recycle salvaged material.

4.4.3.4 Access and haul roads

- Identify the access and haul roads that will not be of beneficial use to the local community.
- For gravel roads, rip to a depth of approximately 500mm to alleviate compaction.
- Profile to be free draining and emulating the natural surface topography.
- Re-establish natural drainage, including the removal of culverts and/or trenching where appropriate.
- Establish vegetation. If required, stabilise disturbed areas to prevent erosion and sediment mobilisation in the short- to medium-term until a suitable vegetation cover has been established.

4.4.3.5 Main Block area

- Slope and stabilise the highwall areas of the Main Block final void in line with geotechnical studies and specialist recommendations.
- Construct safety / access control berms around the Main Block to prevent unsafe access to the open void and uncontrolled surface water flows into the void.
- Shape berms and seed with identified vegetative species to improve stability and prevent erosion.
- Identify high-risk erosion areas and implement additional measures as required.
- Monitor and control access to final void area.
- Implement monitoring and maintenance programme.

4.4.4 Technical gaps in knowledge and solutions

Certain gaps in technical knowledge have been identified that need to be further investigated to ensure the viability of the proposed closure plan:

1. Geotechnical stability of final highwall of Main Block, which could impact on the final end land use chosen for this area.

2. Refinement of geohydrological study to improve knowledge of post-mining groundwater recovery rates and levels once mining has commenced.

3. Potential for differential settlement of backfilled tailings in North Block and the effect this could have the final landform and land use.

The work required to close the above knowledge gaps are:

1. A detail geotechnical investigation and joint orientation mapping will be conducted on the highwalls to determine the primary modes of failures once mining has commenced, to determine the most likely mode of failure and to identify high risk areas. This information will be utilised to determine the stability of the final highwall and the stability requirements that need to be implemented post-closure to prevent any failure.

2. Revised geohydrological study to assess whether current predictions are relevant in terms of yield and quality impacts. It is foreseen that the update of this study should be undertaken within a 2-year timeframe once operations have commenced and refined on a regular basis thereafter.

3. Backfilling of the North Block will be monitored to determine the potential for differential settlement over time. This will be implemented during YR3, after 1 year of tailings disposal.

4.4.5 Threats, opportunities and uncertainties

The threats and uncertainties are highlighted in the technical knowledge gaps in Section 4.4.4. Opportunities include:

- The post-mining beneficial use of mine infrastructure, including roads and dams.
- Development of livelihood retention community projects with appropriate third-party implementing partners.
- Possible recreational post-closure land use for the Main Block wilderness area that could be beneficial for the surrounding communities.

4.5 Organisational Capacity

4.5.1 Organisational structure

The following resources will be required for the implementation of the Rehabilitation, Decommissioning and Closure Plan:

- **Rehabilitation / Environmental Officer**: Responsibilities are to ensure the implementation of appropriate rehabilitation and closure measures and monitoring during the operational period and at closure to ensure that risks are mitigated to limit potential residual and/or latent impacts at closure. This should preferably be an in-house appointment to ensure that the necessary operational activities such as topsoil stripping are in place to facilitate decommissioning and closure in accordance with this plan.

- **Closure Manager**: Responsibilities are to devise a closure business plan to provide the basis for implementing the closure plan and to integrate closure planning into overall project and mine planning. On-going management and monitoring requirements, and specifically in relation to the knowledge gaps identified, must form part of this position's responsibilities.

- **Socio-economic and Community Development Manager**: This person will be responsible for the implementation of the SLP, employee and community skills development programmes and the development of livelihood retention projects in conjunction with the surrounding communities and relevant authorities. Consultation will form a very important component of this position's responsibilities.

- **Technical Specialists**: Technical specialists such as geotechnical engineers, groundwater specialists, ecological and soils specialists will be required on an ad hoc basis to conduct the necessary specialist studies, auditing, and monitoring to ensure the successful implementation of this plan during operations and thereafter.

4.5.2 Training and capacity building

As the mine approaches closure (approximately 5 years from closure), capacity building through training of the relevant employees will be implemented to ensure that the Rehabilitation, Decommissioning and Closure Plan is up to date and that the team can implement the necessary rehabilitation and closure actions on site. As this Rehabilitation, Decommissioning and Closure Plan is updated, training programs are to be developed and implemented as required.

4.6 Relinquishment Criteria and Monitoring

Relinquishment is defined as the formal approval by the relevant regulating authority indicating that the completion criteria for the mine have been met to the satisfaction of the authority. Relinquishment criteria represent the milestones in the biophysical process of rehabilitation that provide a high degree of confidence that the rehabilitated site will eventually reach the desired rehabilitation / closure objectives.

The process normally involves a final evaluation of the site to ensure that it has met all the designated performance and outcome criteria. This may involve a third-party assessor or a panel of experts or stakeholders who can perform the final review and provide a recommendation to the regulatory authorities. It is also an opportunity for the community closure committee (or equivalent group) to be involved and advise on whether the company has met all the community closure concerns raised throughout the duration of the project. This process highlights the need to ensure that mine closure (relinquishment) criteria are drafted carefully to make them both measurable and achievable to allow for successful relinquishment.

The relinquishment criteria must be aligned to the stated closure objectives and performance targets and are closely linked with the environmental monitoring. The relinquishment criteria and associated monitoring requirements for following planning aspects are indicated in Table 3:

- Land capability and Biodiversity
- Post-mining land use
- Surface water (wetlands)
- Groundwater resources
- Social – air quality (silica exposure)

4.7 Auditing and Reporting

As a minimum, this 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.

Auditing and reporting on monitoring results will also be aligned to the authorisation conditions obtained for the Rietkol Project, and will include the Environmental Authorisation, water use licence and waste management licence conditions. This section will be updated with the monitoring, auditing, and reporting needs as stipulated in the authorisations once mining has commenced.

Table 3: Relinquishment criteria and monitoring requirements for the Rietkol Project

Aspect	Closure Objective	Monitoring		Rehabilitation-Related Performance Target	Relinquishment Criteria
		Method	Frequency#		
Land capability	To re-instate suitable grazing capabilities over the rehabilitated portions of the mine site	• Perform soil sampling every 0.5 ha • Analysis of soil chemical properties • Identify areas of poor vegetation cover that require special attention • Identify areas where erosion is evident	Bi-annually for 3 years after seeding, thereafter annually until site relinquishment	• Establishment of a self-sustaining, grazing land capability over the rehabilitated areas	• Land capability classes in post-mining landscape do not vary by more than 5% from defined land capability targets • Soil fertility analyses show: o pH >5 o Resistance > 300 Ω o P > 20 mg/kg o K > 100 mg/kg • Verification that no new erosion evident 3 years after final rehabilitation
Biodiversity	To re-establish an appropriate mix of grassland and other native flora species in the rehabilitated areas to enable the natural re-instatement of biodiversity over time	• Fixed point vegetation monitoring to determine species composition & abundance and plant basal cover • Conduct a visual inspection for alien and invasive species	Bi-annually for 3 years after seeding, thereafter annually until site relinquishment	• Implementation of a low maintenance alien and invasive eradication plan • Establishment of a sustainable vegetation cover to facilitate the final grazing land capability requirements	• Even establishment of vegetation with an 80% basal cover in the grazing post-mining land capability areas • Monitoring shows that native species persist, and that undesirable species do not dominate • Surveys demonstrate that control measures have effectively eradicated alien and invasive species, and that re-infestation are prevented through appropriate maintenance controls
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	• Compile a post-mining land use map, aligned to pre-defined supporting land capabilities	Three years after decommissioning or at site relinquishment	• Establishment of a suitable final landform in the North Block and infrastructure rehabilitated areas that is free-draining and non-erosive • Establishment of a recreational area within the	• Area is achieving land capabilities to support grazing and wilderness end land uses as defined in the Closure Plan and agreed with stakeholders

Aspect	Closure Objective	Monitoring		Rehabilitation-Related Performance Target	Relinquishment Criteria
		Method	Frequency#		
	appearance aligned to the surrounding landscape			Main Block final void area, as per the agreement with the stakeholders and authorities	• Legal and zoning issues related to the post-mining uses are addressed
Wetlands (surface water resources)	To limit the impact on the wetland systems in and around the mine site	• Undertake aquatic biomonitoring at sites 1-4 (aligned with EMPr) • Determine PES and EIS	Bi-annually for 3 years, thereafter annually until site relinquishment	• Surface water quality indicates that the surface water runoff is unpolluted • Biomonitoring indicates that the Recommended Ecological Category (REC) is maintained	• PES and EIS doesn't deteriorate from baseline • REC targets are met • Water quality is meeting RWQO for aquatic systems
Groundwater	Limit the impact on the groundwater quality and yields	• Undertake groundwater monitoring at points aligned with the EMPr	Quarterly monitoring of water levels and quality for 3 years, thereafter bi-annually until site relinquishment	• Demonstrate that the surrounding groundwater users are not impacted in terms of quality or yield • Implementation of a compensation strategy if the above cannot be demonstrated	• Water quality meets the requirements for potable use • No external boreholes are impacted in respect of water levels or quality • Compensation strategy implemented successfully, if required
Social	Limit the possible health and safety threats to humans and animals that will utilise the mining site post-closure	• Dust fallout monitoring on site boundary and within Main Block wilderness area	Monthly for 3 years or until site relinquishment	• Risk of silica exposure to the general public is restricted	• Dust fallout and silica exposure monitoring results meet set health standards

#: Note that the frequency stated in this table refers to the decommissioning and closure phase and may differ from the operational monitoring frequency stipulated in the EMPr.

4.8 Closure Cost Estimation

North Block will be backfilled by YR16. For this plan it is assumed that levelling and shaping, topsoiling and revegetation of North Block will be completed by the end of FY17. The cost of final rehabilitation of North Block will form part of the operational costs and is therefore not included in the closure cost estimate.

4.8.1 Closure cost methodology

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	2013	0.057
2006	0.047	2014	0.061
2007	0.071	2015	0.046
2008	0.115	2016	0.064
2009	0.071	2017	0.053
2010	0.043	2018	0.047
2011	0.050	2019	0.041
2012	0.056	2020	0.033

[#]Source: South African Reserve Bank Bulletin (Mosaka, 2021)

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.

4.8.2 Closure cost assumptions

The size and quantity of the various rehabilitation components were measured from the layout plans using GIS. The DMR Item allocated to each of the rehabilitation components (buildings or disturbed areas) are indicated in Table 4 together with the quantities and areal extent.

Table 4: Rehabilitation activities and associated quantities and areal extent

Type	Building / Area	Unit	Measurement	DMR Item No.
Concrete	Offices	m^2	243.6	5
	Laundry	m^2	74.9	5
	Ablution	m^2	180.2	5
	Weighbridge	m^2	326.9	2b
	Conveyor	m^2	471.0	2b
	Silt traps	m^2	476.1	2b
	Total	m^2	**1 772.7**	
Steel buildings	Screening & washing	m^2	3 216.8	2b
	Drier	m^2	4 043.4	2b
	Workshop	m^2	4 720.6	2b
	Baghouses	m^2	383.2	2a
	Total	m^2	**12 364.0**	
Dams	Pollution control dam	m^2	7 185.4	8b
	Return water dam	m^2	6 836.4	8b
	Total	m^2	**14 021.8**	
Pipelines/canals	Clean water	m	213.5	
	Dirty water	m	1 292.9	
Fence		m	3 420.0	12
Access / haul roads		m^2	35 432.5	3
Mining pits	North Pit	ha	2.8	9
	Main Pit	ha	9.4	6
Infrastructure area		ha	12.9	
Overburden & spoils	Stockpile area	ha	1.25	8a
Total disturbed area		ha	25.1	10, 13, 14

The following assumptions apply:

- The dismantling quantity (DMR Item No. 1) was provided by Nhlabathi Minerals and is based on a similar operation near the Rietkol Project. This was not verified for the purposes of this conceptual closure cost calculation.
- The footprint of all the steel buildings were included in the quantity for concrete structures (DMR Item No. 2b) as it is assumed that all these building will have concrete foundations.
- Opencast rehabilitation (DMR Item No. 6) excludes North Block as it is assumed that the cost of final rehabilitation of North Block will form part of the operational costs.
- The larger stockpile area was considered under the item for rehabilitation of overburden and spoils (DMR Item No. 8a).

- The rehabilitation of the Pollution Control Dam (PCD) and Return Water Dam (RWD) is included under basic salt-producing evaporations ponds (DMR Item No. 8b) as the groundwater specialist study indicated that no acid-mine drainage is envisaged.
- North Block may potentially pose a risk for subsidence (still to be confirmed) and was thus considered under DMR Item No. 9 (Rehab of subsided areas).
- The total disturbed area includes the plant infrastructure, stockpile areas and mining pits areas, amounting to 25.1 ha. This areal extent was used for Items No. 10 (general surface rehabilitation, vegetation), No. 13 (water management) and No. 14 (aftercare and maintenance).
- The closure calculation further assumes that all buildings, dams, roads, and other infrastructure will be demolished, which may not be the case if one could determine a beneficial post-mining use for such.
- Further exploration drilling planned for the operational phase may extend the LOM beyond 20 years; however, this Rehabilitation, Decommissioning and Closure Plan and hence the closure cost estimate focuses on the first 20 years of mining only.

4.8.3 Closure cost calculation

The decommissioning and closure cost estimate for the Rietkol Project was calculated as R 21 590 340 (including 15% VAT). Refer to Table 5 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.

Table 5: Decommissioning and Closure Cost Estimate for the Rietkol Project

No	Description	Unit	Quantity	Master Rate	Multiplication Factor	Weighting Factor	Closure Cost Estimate
1	Dismantling of the plant structures	m^3	7 558.1	R 15.63	1	1.05	R 124 026.39
2a	Demolition of steel buildings (outside of plant area)	m^2	383.2	R 217.70	1	1.05	R 87 592.36
2b	Concrete structures (incl. plant foundations)	m^2	13 753.5	R 320.82	1	1.05	R 4 632 941.24
3	Roads	m^2	35 432.5	R 38.96	1	1.05	R 1 449 331.80
4a	Demolition and rehabilitation of electrified railway lines	m	0.0	R 378.10	1	1.05	R 0.00
4b	Demolition and rehabilitation of non-electrified railway lines	m	0.0	R 206.24	1	1.05	R 0.00
5	Removal of offices and other temporary structures	m	498.7	R 435.39	1	1.05	R 227 986.99
6	Opencast rehabilitation (final void and ramps)	ha	9.4	R 228 237.57	1	1.05	R 2 252 704.86
7	Rehab of Underground mining	m^3	0.0	R 116.87	1	1.05	R 0.00
8a	Rehabilitation of overburden and spoils	ha	1.25	R 152 158.38	1	1.05	R 199 707.88
8b	Rehabilitation of processing waste deposits and evaporations ponds (basic, salt producing waste)	ha	1.4	R 189 510.52	1	1.05	R 279 014.25
8c	Rehabilitation of processing waste deposits and evaporations ponds (acidic salt producing waste)	ha	0.0	R 550 428.37	1	1.05	R 0.00
9	Rehab of subsided areas	ha	2.8	R 127 409.73	1	1.05	R 374 584.61
10	General surface rehabilitation, vegetation	ha	25.1	R 120 535.10	1	1.05	R 3 176 702.67
11	River diversions	ha	0.0	R 120 535.10	1	1.05	R 0.00
12	Fencing	m	3 420.0	R 137.49	1	1.05	R 493 735.62
13	Water management (separating clean and dirty water areas)	ha	25.1	R 45 830.84	0.17	1.05	R 205 338.20
14	2-3 years of maintenance and aftercare	ha	25.1	R 16 040.79	1	1.05	R 422 755.11
15	Specialist studies (10%)	Sum		R 1 392 642.20	1	1.05	R 1 462 274.31
	Subtotal 1 (Sum of items 1 to 15)						R 15 388 696.27
	Preliminary and General & Management (12% of Subtotal 1)						R 1 846 643.55
	Contingency (10% of Subtotal 1)						R 1 538 869.63
	Subtotal 2						R 3 385 513.18
	Subtotal 3 (Subtotal 1 plus Subtotal 2)						R 18 774 209.45
	VAT (15%)						R 2 816 131.42
	GRAND TOTAL (Subtotal 3 plus VAT)						**R 21 590 340.86**

5 ANNUAL REHABILITATION PLAN

5.1 Current, Previous and Planned Rehabilitation

The Rietkol Project is currently in the planning phase and authorisation for the mining activities are still pending. As a result, no rehabilitation has been conducted to date. This section therefore documents the planned rehabilitation measures for implementation once the project has been authorised, focusing specifically on the first 12-month period rehabilitation activities envisaged for the proposed Rietkol Project.

Future iterations of this plan will delineate any rehabilitation undergone once mining operations have commenced.

5.1.1 Current rehabilitation activities

Not applicable at the time of compilation of this plan.

5.1.2 Previous rehabilitation activities

Not applicable at the time of compilation of this plan.

5.1.3 Planned rehabilitation activities (next 12 months)

Within the first 12-24 months of the project no rehabilitation will be possible as the North Block open pit will be established, and the necessary infrastructure constructed. For the first year of the LOM, most of the early rehabilitation will be associated with construction, as the disturbed areas become available for rehabilitation. This will depend on the construction schedule and is not deliberated on at this early stage.

5.1.4 Details of rehabilitation activity planned over LOM

- **Short-term (2-year review):**

- Surface rehabilitation of disturbed areas due to construction activities, as these become available, including levelling, ripping and vegetation of disturbed areas.

- **Medium-term (17-year review):**

- Backfilling of North Block with tailings (YR2-16).
- Backfilling of Main Block with tailings (YR17 onwards).
- Levelling, topsoiling and vegetation of North Block in line with the Rehabilitation, Decommissioning and Closure Plan.

- **Long-term (at scheduled decommissioning):**

- As most of the material mined is processed and removed from site as product, backfilling of the pit to a free-draining state will not be possible for the Rietkol Project. At decommissioning rehabilitation will be implemented in line with the requirements of the final Rehabilitation, Decommissioning and Closure Plan, including the following:
    - Demolition of surface infrastructure not required post closure;
    - Rehabilitate infrastructure and stockpile areas;
    - Rehabilitate all access and haul roads not required post closure;
    - Sloping of Main Block highwall areas;
    - Construction of safety/access control berms around Main Block; and
    - Shaping, levelling and vegetation of rehabilitated areas, highwall areas and safety berms.

5.2 Closure Objectives

Refer to Section 4.2.

5.3 Annual Rehabilitation Costs

5.3.1 Current provision requirements – annual rehabilitation

Not applicable at this stage. Limited rehabilitation is expected to be undertaken within the first year of operation. Any rehabilitation costs incurred during construction will form part of the construction cost.

5.3.2 Monitoring and maintenance costs

Monitoring costs will be incurred once the project is authorised and are included as part of the annual rehabilitation cost. The envisaged cost associated with the environmental and social monitoring as proposed in the Environmental Management Programme (EMPr) was estimated based on costs associated with recent projects in the area and is indicated in Table 6.

Table 6: Environmental and social monitoring cost requirements

Environmental aspect	Item	Units	Unit cost estimate#	Monthly cost	Quarterly cost	Bi-annual cost	Total per annum
Air quality monitoring	Dust analyses (monthly)	12	R 380	R 4 560			R 54 720
	PM monitoring (annually)	1	R 34 500				R 34 500
Water monitoring	SW quality analyses (quarterly)	4	R 1 500		R 6 000		R 24 000
	GW quality analyses (quarterly)	12	R 1 500		R 18 000		R 72 000
Terrestrial & Wetlands	Ecological / PES / EIS determination (annually)	1	R 60 000				R 60 000
Land capability	Soil sampling (bi-annually)	12	R 3 000			R 36 000	R 72 000
Noise	Noise measurements at sensitive receptors (quarterly)	1	R 20 000		R 20 000		R 80 000
Disbursements	Water quality sampling (quarterly)	1	R 9 250		R 9 250		R 37 000
Professional fees	Annual monitoring report	1	R 45 000				R 45 000
	Total (per annum)						**R 479 220**

6 RISK ASSESSMENT

6.1 Risk Assessment Methodology

6.1.1 Impact significance

6.1.1.1 Nature and status

The 'nature' of the impact describes what is being affected and how. The 'status' is based on whether the impact is positive, negative or neutral.

6.1.1.2 Spatial extent

'Spatial Extent' defines the spatial or geographical scale of the impact.

Category	Rate	Descriptor
Site	1	Site of the proposed development
Local	2	Limited to site and/or immediate surrounds
District	3	Victor Khanye Local Municipal Area
Region	4	Nkangala District Municipal Area
Provincial	5	Mpumalanga Province
National	6	South Africa
International	7	Beyond South African borders

6.1.1.3 Duration

'Duration' gives the temporal scale of the impact.

Category	Rate	Descriptor
Temporary	1	0 – 1 years
Short term	2	1 – 5 years
Medium term	3	5 – 20 years
Long term	4	Where the impact will cease after the operational life of the activity either because of natural process or by human intervention
Permanent	5	Where mitigation either by natural processes or by human intervention will not occur in such a way or in such a time span that the impact can be considered as transient

6.1.1.4 Probability

The 'probability' describes the likelihood of the impact actually occurring.

Category	Rate	Descriptor
Rare	1	Where the impact may occur in exceptional circumstances only
Improbable	2	Where the possibility of the impact materialising is very low either because of design or historic experience
Probable	3	Where there is a distinct possibility that the impact will occur
Highly probable	4	Where it is most likely that the impact will occur
Definite	5	Where the impact will occur regardless of any prevention measures

6.1.1.5 Intensity

'Intensity' defines whether the impact is destructive or benign, in other words the level of impact on the environment.

Category	Rate	Descriptor
Insignificant	1	Where the impact affects the environment is such a way that natural, cultural and social functions and processes are not affected. Localised impact and a small percentage of the population is affected
Low	2	Where the impact affects the environment is such a way that natural, cultural and social functions and processes are affected to a limited extent
Medium	3	Where the affected environment is altered in terms of natural, cultural and social functions and processes continue albeit in a modified way
High	4	Where natural, cultural or social functions or processes are altered to the extent that they will temporarily or permanently cease
Very High	5	Where natural, cultural or social functions or processes are altered to the extent that they will permanently cease, and it is not possible to mitigate or remedy the impact

6.1.1.6 Ranking, weighting and scaling

The weight of significance defines the level or limit at which point an impact changes from low to medium significance, or medium to high significance. The purpose of assigning such weights serves to highlight those aspects that are considered the most critical to the various stakeholders and ensure that the element of bias is taken into account. These weights are often determined by current societal values or alternatively by scientific evidence (norms, etc.) that define what would be acceptable or unacceptable to society and may be expressed in the form of legislated standards, guidelines or objectives.

The weighting factor provides a means whereby the impact assessor can successfully deal with the complexities that exist between the different impacts and associated aspect criteria.

Spatial Extent	Duration	Intensity / Severity	Probability	Weighting factor	Significance Rating (SR - WOM) Pre-mitigation	Mitigation Efficiency (ME)	Significance Rating (SR-WM) Post Mitigation
Site (1)	Short term (1)	Insignificant (1)	Rare (1)	Low (1)	Low (0 – 19)	High (0.2)	Low (0 – 19)
Local (2)	Short to Medium term (2)	Minor (2)	Unlikely (2)	Low to Medium (2)	Low to Medium (20 – 39)	Medium to High (0.4)	Low to Medium (20 – 39)
District (3)							
Regional (4)	Medium term (3)	Medium (3)	Possible (3)	Medium (3)	Medium (40 – 59)	Medium (0.6)	Medium (40 – 59)
Provincial (5)	Long term (4)	High (4)	Likely (4)	Medium to High (4)	Medium to High (60 – 79)	Low to Medium (0.8)	Medium to High (60 – 79)
National (6)							
International (7)	Permanent (5)	Very high (5)	Almost certain (5)	High (5)	High (80 – 110)	Low (1.0)	High (80 – 110)

6.1.1.7 Impact significance without mitigation (WOM)

Following the assignment of the necessary weights to the respective aspects, criteria are summed and multiplied by their assigned weightings, resulting in a value for each impact (prior to the implementation of mitigation measures).

Equation 1:
Significance Rating (WOM) = (Extent + Intensity + Duration + Probability) x Weighting Factor

6.1.1.8 Effect of significance on decision-making

Significance is determined through a synthesis of impact characteristics as described in the above paragraphs. It provides an indication of the importance of the impact in terms of both tangible and intangible characteristics. The significance of the impact "without mitigation" is the prime determinant of the nature and degree of mitigation required.

Rating	Rate	Descriptor
Negligible	0	The impact is non-existent or insignificant, is of no or little importance to decision making.
Low	1-19	The impact is limited in extent, even if the intensity is major; the probability of occurrence is low, and the impact will not have a significant influence on decision-making and is unlikely to require management intervention bearing significant costs.
Low to Medium	20 – 39	The impact is of importance, however, through the implementation of the correct mitigation measures such potential impacts can be reduced to acceptable levels. The impact and proposed mitigation measures can be considered in the decision-making process
Medium	40 – 59	The impact is significant to one or more affected stakeholder, and its intensity will be medium or high; but can be avoided or mitigated and therefore reduced to acceptable levels. The impact and mitigation proposed should have an influence on the decision.
Medium to High	60 -79	The impact is of major importance but through the implementation of the correct mitigation measures, the negative impacts will be reduced to acceptable levels.
High	80 – 110	The impact could render development options controversial or the entire project unacceptable if it cannot be reduced to acceptable levels; and/or the cost of management intervention will be a significant factor and must influence decision-making.

6.1.2 Mitigation

"Mitigation" is a broad term that covers all components of the 'mitigation hierarchy' defined hereunder. It involves selecting and implementing measures, amongst others, to conserve biodiversity and to protect, the users of biodiversity and other affected stakeholders from potentially adverse impacts because of mining or any other land use. The aim is to prevent adverse impacts from occurring or, where this is unavoidable, to limit their significance to an acceptable level. Offsetting of impacts is considered the last option in the mitigation hierarchy for any project.

The mitigation hierarchy in general consists of the following in order of which impacts should be mitigated:

- Avoid/prevent impact: can be done through utilising alternative sites, technology and scale of projects to prevent impacts. In some cases, if impacts are expected to be too high, the "no project" option should also be considered, especially where it is expected that the lower levels of mitigation will not be adequate to limit environmental damage and eco-service provision to suitable levels.
- Minimise (reduce) impact: can be done through utilisation of alternatives that will ensure that impacts on biodiversity and eco-services provision are reduced. Impact minimisation is considered an essential part of any development project.
- Rehabilitate (restore) impact is applicable to areas where impact avoidance and minimisation are unavoidable where an attempt to re-instate impacted areas and return them to conditions which are ecologically similar to the pre-project condition or an agreed post project land use, for example arable land. Rehabilitation can however not be considered as the primary mitigation toll as even with significant resources and effort rehabilitation that usually does not lead to adequate replication of the diversity and complexity of the natural system. Rehabilitation often only restores ecological function to some degree to avoid ongoing negative impacts and to minimise aesthetic damage to the setting of a project. Practical rehabilitation should consist of the following phases in best practice:
    - Structural rehabilitation which includes physical rehabilitation of areas by means of earthworks, potential stabilisation of areas as well as any other activities required to develop a long-term sustainable ecological structure;
    - Functional rehabilitation, which focuses on ensuring that the ecological functionality of the ecological resources on the subject property supports the intended post-closure land use. In this regard, special mention is made of the need to ensure the continued functioning and integrity of wetland and riverine areas throughout and after the rehabilitation phase;
    - Biodiversity reinstatement that focuses on ensuring that a reasonable level of biodiversity is re-instated to a level that supports the local post-closure land uses. In this regard, special mention is made of re-instating vegetation to levels which will allow the natural climax vegetation community of community suitable for supporting the intended post-closure land use; and

- Species reinstatement that focuses on the re-introduction of any ecologically important species, which may be important for socio-cultural reasons, ecosystem functioning reasons and for conservation reasons. Species re-instatement need only occur if deemed necessary.

- Offset impact refers to compensating for latent or unavoidable negative impacts on biodiversity. Offsetting should take place to address any impacts deemed unacceptable which cannot be mitigated through the other mechanisms in the mitigation hierarchy. The objective of biodiversity offsets should be to ensure no net loss of biodiversity. Biodiversity offsets can be considered a last resort to compensate for residual negative impacts on biodiversity.

According to the DMR (2013) "Closure" refers to the process for ensuring that mining operations are closed in an environmentally responsible manner, usually with the dual objectives of ensuring sustainable post-mining land uses and remedying negative impacts on biodiversity and ecosystem services.

The significance of residual impacts should be identified on a regional as well as national scale when considering biodiversity conservation initiatives. If the residual impacts lead to irreversible loss or irreplaceable biodiversity, the residual impacts should be of very high significance and when residual impacts are of very high significance, offset initiatives are not considered an appropriate way to deal with the magnitude and/or significance of the biodiversity loss. In the case of residual impacts determined to have medium to high significance, an offset initiative may be investigated. If the residual biodiversity impacts are considered of low significance, no biodiversity offset is required.

6.1.2.1 Impact significance with mitigation measures (WM)

To gain a comprehensive understanding of the overall significance of the impact, after implementation of the mitigation measures, it is necessary to re-evaluate the impact.

6.1.2.2 Mitigation efficiency (ME)

The most effective means of deriving a quantitative value of mitigated impacts is to assign each significance rating value (WOM) a mitigation effectiveness (ME) rating. The allocation of such a rating is a measure of the efficiency and effectiveness, as identified through professional experience and empirical evidence of how effectively the proposed mitigation measures will manage the impact. Thus, the lower the assigned value the greater the effectiveness of the proposed mitigation measures and subsequently, the lower the impacts with mitigation.

Equation 2: Significance Rating (WM) = Significance Rating (WOM) x Mitigation Efficiency (ME)

Mitigation Efficiency is rated out of 1 as follows:

Category	Rate	Descriptor
Not Efficient (Low)	1	Mitigation cannot make a difference to the impact
Low to Medium	0.8	Mitigation will minimize impact slightly
Medium	0.6	Mitigation will minimize impact to such an extent that it becomes within acceptable standards
Medium to High	0.4	Mitigation will minimize impact to such an extent that it is below acceptable standards
High	0.2	Mitigation will minimize impact to such an extent that it becomes insignificant

6.1.2.3 Significance following mitigation (SFM)

The significance of the impact after the mitigation measures are taken into consideration. The efficiency of the mitigation measure determines the significance of the impact. The level of impact is therefore seen in its entirety with all considerations taken into account.

6.2 Risk Assessment

The decommissioning and closure risk assessment focus on the key aspects that could manifest after decommissioning, and specifically on residual and/or latent risks.

Residual risks are those that remain at decommissioning after preventative and corrective measures have been implemented during the operational phase. However, their triggers and drivers are known, and the necessary closure actions (mitigation) can be implemented to achieve the relinquishment of the site. Latent risks are those that could manifest at any time after decommissioning and site relinquishment, and which are difficult to predict and/or quantify.

The baseline qualitative risk assessment for decommissioning and closure is presented in Table 7 and is aligned with the set closure objectives for the Rietkol Project. This qualitative risk assessment has been undertaken as a first step in identifying the possible uncertain future events that could influence the achievement of the closure objectives and relinquish criteria for the Rietkol Project.

As the closure knowledge base improves over time, this baseline qualitative risk assessment would need to be refined to a quantitative risk assessment whereby actual and/or calculated data should be used to more accurately determine the likelihood of the identified event occurring and the severity of its consequence. This implies the need to refine specialist studies on specific closure-related aspects, to address certain knowledge gaps.

Table 7: Rietkol Project decommissioning and closure risk assessment

ID	Closure Objective	Risk Drivers / Triggers	Closure Actions (Mitigation)	Duration	Extent	Probability	Intensity	Weighting Factor	Impact Significance	Mitigation Efficiency	Impact Significance (WM)	Latent Risk Potential
1	To remove and/or stabilise surface infrastructure to facilitate the implementation of post-mining land uses	Damage to infrastructure due to lack of maintenance	Retained infrastructure must be transferred to a third party for management and maintenance purposes. Conclude transfer agreements that include long-term maintenance requirements. Dismantle / demolish infrastructure prone to damage to prevent high-cost long-term maintenance requirements.	Permanent	Local	Probable	Low	Low to Medium	Low to Medium	Medium	Low	No
2	To re-instate suitable grazing capabilities over the rehabilitated portions of the mine site	Potential soil contamination, particularly in the vicinity of the workshop and stockpile areas, limiting the post-closure land capability	Undertake a contaminated land assessment at closure to determine the extent of contamination. Excavate any contaminated soils and dispose at a registered hazardous waste facility (e.g. Holfontein Landfill).	Medium Term	Site specific	Probable	Medium	Medium to High	Medium	High	Low	No
		Compaction of soils underlying infrastructure area leading to poor soil structure and inability to achieve post-closure land capability	Ripping for alleviation of infrastructure areas to a depth of approximately 500mm. Conduct ongoing post-mining land capability assessments.	Medium Term	Site specific	Highly Probable	Medium	High	Medium	Medium to High	Low to Medium	No

ID	Closure Objective	Risk Drivers / Triggers	Closure Actions (Mitigation)	Duration	Extent	Probability	Intensity	Weighting Factor	Impact Significance	Mitigation Efficiency	Impact Significance (WM)	Latent Risk Potential
		Insufficient topsoil available for rehabilitation resulting in significantly reduced land use potential / capability	Ensure that sufficient topsoil is stripped for final rehabilitation.	Medium Term	Site specific	Probable	Medium	Medium to High	Medium	Medium to High	Low	No
3	To re-establish an appropriate mix of grassland and other native flora species in the rehabilitated areas to enable the natural re-instatement of biodiversity over time	Poor management of invasive alien plants post-closure leading to inability to re-establish vegetation on rehabilitated areas	Implement a low maintenance alien and invasive eradication plan. Conduct monitoring of the site for a minimum period of 3 years.	Permanent	Local	Highly Probable	Medium	Medium to High	Medium	Medium	Low to Medium	No
		Poor species selection leading to poor establishment of vegetation	Establish of a sustainable vegetation cover / seed mix with the assistance of specialists in the field. Make allowance for care-and-maintenance of the site for a period of 3 years. Re-seed bare patches and apply fertilisers as required to enhance vegetation growth.	Long Term	Site specific	Probable	Medium	High	Medium	Medium	Low to Medium	No
4	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	Conflict in desired post-mining land use due to no buy-in from stakeholders & authorities	Develop a land use plan considering the local SDF and IDP. Present the land use options to the stakeholders & authorities to obtain alignment.	Long Term	Local	Probable	High	High	Medium to High	Medium	Low to Medium	No
		Ongoing changes in closure-related legislation and	Continuous revision of Closure Plan and financial	Long Term	Local	Probable	High	Medium to High	Medium	Medium	Low to Medium	No

ID	Closure Objective	Risk Drivers / Triggers	Closure Actions (Mitigation)	Duration	Extent	Probability	Intensity	Weighting Factor	Impact Significance	Mitigation Efficiency	Impact Significance (WM)	Latent Risk Potential
	to the surrounding landscape	stakeholder expectations	provision to ensure legal compliance. Regular stakeholder engagement to present revised plans and monitoring results.									
5	To limit the impact on the wetland systems in and around the mine site	Poor shaping / levelling of rehabilitated areas resulting in accelerated surface runoff, erosion, and siltation of the wetland systems	Ensure surface profiling is undertaken in line with the final levels indicated in the rehabilitation design. Undertake a survey of the final landform to confirm surface profiling and undertake corrective actions if required. Refine soil amelioration and/or seed mix requirements to improve vegetation growth in high-risk erosion areas.	Permanent	Local	Probable	Medium	High	Medium to High	Medium	Low to Medium	No
		Reduction in surface runoff could lead to water deficit in the wetland systems and reduce the ecological functioning thereof	Maximise surface runoff from rehabilitated areas to reduce reduction in catchment yield and inflows into the wetland systems. Establish a berm around the Main Block final void to prevent surface water from entering the void.	Permanent	Local	Probable	High	High	Medium to High	Medium	Medium	No
6	Limit the impact on the groundwater quality and yields	Potential impact on yield / water levels of user boreholes due to groundwater inflows	Implement a groundwater monitoring programme to determine any impacts on water levels.	Permanent	Local	Probable	High	High	Medium to High	Low to Medium	Medium	Yes

ID	Closure Objective	Risk Drivers / Triggers	Closure Actions (Mitigation)	Duration	Extent	Probability	Intensity	Weighting Factor	Impact Significance	Mitigation Efficiency	Impact Significance (WM)	Latent Risk Potential
		into the Main Block final void	Implement a compensation strategy in the event of any groundwater yield impacts.									
		Potential contamination of user boreholes due to contaminant mobilisation	Implement a groundwater monitoring programme to determine any impacts on water quality. Implement a compensation strategy in the event of any groundwater contamination.	Long Term	Local	Probable	Medium	High	Medium to High	Medium	Low to Medium	Yes
		Contamination of groundwater due to inappropriate disposal of demolition waste	Sort and screen demolition waste. Decontaminate and crush inert waste for disposal within the Main Block final void. Decontaminate and salvage steel waste. Remove all contaminated and hazardous waste for disposal at a registered landfill site (e.g. Holfontein).	Long Term	Local	Improbable	High	High	Medium to High	Medium to High	Low to Medium	No
7	Limit the possible health and safety threats to humans and animals that will utilise the mining site post-closure	Injury, disability, or potential fatality because of post-closure use of Main Block final void by local communities/ general public, including potential silica exposure	Construct safety / access control berms around the Main Block to prevent unsafe access to the open void. Monitor and control access to final void area. Continue dust fallout monitoring for a period of 3	Permanent	District	Highly Probable	Very High	High	High	Medium	Medium	Yes

ID	Closure Objective	Risk Drivers / Triggers	Closure Actions (Mitigation)	Duration	Extent	Probability	Intensity	Weighting Factor	Impact Significance	Mitigation Efficiency	Impact Significance (WM)	Latent Risk Potential
			years or until site relinquishment.									
		Injury or potential killing of animals entering the Main Block final void	Construct safety / access control berms around the Main Block to prevent unsafe access to the open void.	Permanent	District	Highly Probable	High	Medium	Medium	Medium	Low to Medium	Yes
		Collapse of Main Block highwall, leading to potential injury to people or animals	Slope and stabilise the highwall areas of Main Block final void in line with geotechnical studies and recommendations.	Permanent	District	Highly Probable	High	High	High	Medium to High	Low to Medium	Yes
		Poorly vegetated areas could lead to excessive dust generation and silica exposure on the surrounding environment and neighbours	Establish of a sustainable vegetation cover with the assistance of specialists in the field. Make allowance for care-and-maintenance of the site for a period of 3 years. Re-seed bare patches and apply fertilisers as required to enhance vegetation growth and stabilise the site. Refine soil amelioration and/or seed mix requirements to improve vegetation growth in high-risk erosion areas. Continue dust fallout monitoring for a period of 3 years or until site relinquishment.	Permanent	Local	Probable	Medium	High	Medium to High	Medium to High	Low to Medium	No

ID	Closure Objective	Risk Drivers / Triggers	Closure Actions (Mitigation)	Duration	Extent	Probability	Intensity	Weighting Factor	Impact Significance	Mitigation Efficiency	Impact Significance (WM)	Latent Risk Potential
8	Identify and establish livelihood retention projects to create off-mine livelihoods during and post-mining	Project failure due to poor planning and/or management	Identify and develop projects in consultation with the communities and employees to ensure buy-in and support. Conduct appropriate feasibility studies to ensure the viability of the projects. Ensure roles & responsibilities of livelihood retention projects are clearly defined, with fall-back measures to mitigate possible project failures. Actively engage with suitable partners for implementation that has a direct interest in the projects.	Permanent	District	Probable	High	Medium to High	Medium to High	Medium	Low to Medium	No
9	Equip employees with portable skills that can be used in other sectors post-mining	Lack of alternative work opportunities	Implementation of capacity building programmes to minimise and mitigate the impact of down-scaling and retrenchment.	Long Term	District	Probable	High	Medium to High	Medium	Medium to High	Low to Medium	No

6.3 Latent Risks and Required Actions

The following section highlights potential latent risks after site relinquishment identified for the Rietkol Project. It is important to note that these risks have been identified mainly because of certain gaps in technical knowledge and outstanding research as identified in the plan. These risks are all related to groundwater management and health and safety closure objectives.

Table 8: Latent risks and management actions required for the Rietkol Project

Closure Objective	Latent Risks	Management Action
Limit the impact on the groundwater quality and yields	• ***Medium Risk***: Potential impact on yield / water levels of user boreholes due to groundwater inflows into the Main Block final void • ***Low to Medium Risk***: Potential contamination of user boreholes due to contaminant mobilisation	Although the groundwater impact assessment indicated that the potential for impact on groundwater quality and yield is low, this need to be verified against long-term monitoring data trend analysis once mining commences. The predicted impacts after decommissioning need to be verified and refined over the LOM against dedicated geohydrological modelling. The final post-closure use of the Main Block should be considered during the further work as this will influence the calculations.
Limit the possible health and safety threats to humans and animals that will utilise the mining site post-closure	• ***Medium Risk***: Injury, disability, or potential fatality because of post-closure use of Main Block final void by local communities/ general public, including potential silica exposure • ***Low to Medium Risk***: Injury or potential killing of animals entering the Main Block final void • ***Low to Medium Risk***: Collapse of Main Block highwall, leading to potential injury to people or animals	Geotechnical stability of the final highwall of Main Block, and the potential for collapse over time (after relinquishment of the site) is unknown at this point in time. The final end land use chosen for the Main Block wilderness area after closure will further determine the latent risk associated with its use. Further research and geotechnical studies need to be conducted to confirm or deny this latent risk. Specific attention should be given to the risk of silica exposure to the general public and end land users.

Once mining has commenced, execution of specialist studies to address closure-related latent risks and knowledge gaps will enable viable assessment of alternative closure actions to confirm or deny such risks, as well as the potential timeframes in which these latent risks could manifest.