

# BASIC ASSESSMENT REPORT & ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

PROPOSED COAL, PSEUDOCOAL, TORBANITE AND AGGREGATE MINING  
PERMIT ON PORTION 2 OF THE FARM BLESBOKFONTEIN 31 IS, MAGISTERIAL  
DISTRICT OF EMALAHLENI, MPUMALANGA PROVINCE

Prepared for:



mineral resources  
& energy

Department:  
Minerals Resources and Energy  
REPUBLIC OF SOUTH AFRICA

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DMRE Ref: MP 30/5/1/1/3/13571 MP

2023



mineral resources  
& energy

Department:  
Minerals Resources and Energy  
REPUBLIC OF SOUTH AFRICA

**BASIC ASSESSMENT REPORT**

**AND**

**ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT**

SUBMITTED FOR ENVIRONMENTAL AUTHORIZATION IN TERMS OF THE NATIONAL ENVIRONMENTAL ACT, 1998 AND THE NATIONAL ENVIRONMENTAL MANAGEMENT WASTE ACT, 2008 IN RESPECT OF LISTED ACTIVITIES THAT HAVE BEEN TRIGGERED BY APPLICATIONS IN TERMS OF THE MINERAL AND PETROLEUM RESOURCES DEVELOPMENT ACT, 2002 (MPRDA) (AS AMENDED).

**APPLICANT** : MDZ Fleet Solutions (Pty) Ltd

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## DOCUMENT CONTROL

**Project Title:** Mining Permit Application on portion 2 of the farm Blesbokfontein 31 IS

**Minerals** Coal, Pseudocoal, Torbanite and Aggregate

**Site Location** Magisterial district of eMalahleni, Mpumalanga Province

**Compiled on behalf of** MDZ Fleet Solutions (Pty) Ltd

**Compiled By** Miss Takalani Rakuambo

**First Reviewer** Rudzani Shonisani

**Second Reviewer** Dr Kenneth Singo

**Version 1** Draft BAR & EMPR  
(Stakeholders)

**Submitted to** Stakeholders

**Date** August 2023

## DISCLAIMER

The opinion expressed in this, and associated reports are based on the information provided by MDZ Fleet Solutions (Pty) Ltd to Singo Consulting (Pty) Ltd ("Singo Consulting") and is specific to the scope of work agreed with MDZ Fleet Solutions (Pty) Ltd .

Singo Consulting (Pty) Ltd acts as an advisor to MDZ Fleet Solutions (Pty) Ltd and exercise all reasonable skill and care in the provision of its professional services in a manner consistent with the level of care and expertise exercised by members of the environmental profession.

Where site inspections, testing of fieldwork have taken place, the report is based on the information made available by Singo Consulting (Pty) Ltd during the visit, visual observations and any subsequent discussions with regulatory authorities. The information used in this report were obtained from relevant stakeholders from the sharing of BID's as a way of notifying the stakeholders about the proposed project.

Singo Consulting (Pty) Ltd ("Singo Consulting") takes reasonable care and diligence when providing services and preparing documents, but it has been assumed that the information provided to Singo Consulting (Pty) Ltd ("Singo Consulting") is accurate.

These views do not generally refer to circumstances and features that may occur after the date of this study, which were not previously known to Singo Consulting (Pty) Ltd or had the opportunity to assess.

## EXECUTIVE SUMMARY

MDZ Fleet Solutions (Pty) Ltd has appointed Singo Consulting (Pty) Ltd as an independent environmental consultant to conduct environmental impact assessments (EIA), compile environmental management programme reports (EMPr), and engage in public participation processes (PPP). This is done as part of the procedures to obtain environmental authorization for the planned mining permit application inside of portion 2 of the Farm Blesbokfontein 31 IS, under the Magisterial District of Witbank, Mpumalanga Province. (DMRE REF: MP 30/5/1/1/3/13571 MP). There is prior accepted application by Thevha Sustainable Services with a file reference (DMRE Ref.: MP 30/5/1/1/2/13490 MP).

**Site Accessibility:** The project area is easily accessible via the tertiary road R547 tar road which goes directly to the project area through gravel road. There is an existing gravel road to the site used by Glencore operation. Glencore Operations is located 285 m away from the project and Boschmansfontein located approximately 3.4 m away from mining permit area, the project area is located situated within Emalahleni approximately 61 km Southwest of Middelburg, approximately 40,8 km Southwest of Emalahleni and approximately 32 km Southeast of Ogies. The region of interest is used for cultivation of maize meal.

According to the GIS expert at Singo Consulting's Biodiversity Terrestrial Map, which is on page 37 of the BAR, the planned project area is inside the Highly modified (Areas with no direct benefit to biodiversity). Intensive agriculture, urban and industrial regions, as well as human infrastructure, are examples of non-natural or degraded natural environments that are not required by the ESA. Heavily modified area is transformed areas where biodiversity and ecological functions have been lost to the point that they are not worth considering for conservation at all. No watercourses were discovered during the site assessment within the mining permit or within a 500 m radius of the permit boundary.

Mining activities will be undertaken over a period of two (2) years. This project will entail an open cast method of excavation. The mine design will be developed according to the dimension of the applied mineral deposit within the project area, but overall mining activities will be limited to an area of 5 Ha as per mining permit requirements. The topsoil will be stockpiled elsewhere on site preferably next to the farm boundary and will be used during rehabilitation period. Once a box cut has been made, the overburden and mineral resources where necessary will be loosened by blasting. The loosened material will then be loaded onto trucks by excavators. A haul road will be situated at the side of the open cast, forming a ramp up which trucks can drive, carrying ore and waste rock. Waste rock will be piled up at the surface, near the edge of the open cast (waste dump). The waste dump will be tiered and stepped, to minimize degradation. All the activities will

be guided by the project's EMPr such that the project does not impact the environment negatively.

The project infrastructure and activities will include:

- Site clearance.
- Removal of topsoil and overburden and stockpiling.
- Site establishment, including the establishment of an access route, mobilization of equipment and preparation of area for mining.
- Excavation of a box cut.
- Ripping (Blasting for hard rock)
- Loading zone.
- Loading and dust control.
- Crushing and screening of ore.
- Hauling and transporting of ore.
- Ablution facilities and waste storage area.

## IMPORTANT NOTICE

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

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

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

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

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

## OBJECTIVE OF THE BASIC ASSESSMENT PROCESS

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

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



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

### 1. Contact person and correspondence address.

a) Details of the Environmental Assessment Practitioner

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b) Expertise of the EAP who prepared and Review the BAR and EMPr.

Expertise of the EAP who prepared the Report.

Please refer to Appendix for the EAP's qualifications and Curriculum Vitae.

✚ Ms Takalani Rakuambo

University of Venda, Bachelor of Earth Sciences in Mining and Environmental Geology.

Expertise of the first EAP who Review the Report

✚ Mrs R Radebe

Tshwane University of Technology B. Tech in Geology

Expertise of the second EAP who Review the Report

✚ Dr Kenneth Singo

University of Johannesburg, PhD (Applied Environmental Mineralogy & Geochemistry).

Due to POPI Act, no personal information is disclosed. The CVs and qualifications will be shared with the CA.

In the year 2008, Singo Consulting (Pty) Ltd was established as an Independent Consulting Company focused to create opportunities within the Mining and Environmental Industry. With time, Singo Consulting (Pty) Ltd has diversified its services, it provides high value Geological, Hydrological, Environmental, Cleaning and Rehabilitation specialized services to clients across a range of industries that are primarily natural resource based.



The company aims to be a consulting firm that communicates sound environmental services solutions. Singo Consulting (Pty) Ltd takes pride in the fact that it holds no equity in any project and is owned by the staff, enabling it to offer clients objective support on crucial issues.

**Details of the EAP who reviewed the report:**

Table 1: Details of the first Reviewer

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**2. Location of the overall activity**

<b>Farm name</b>	Portion 2 of the farm Blesbokfontein 31 IS
<b>Application area (ha)</b>	5 ha
<b>Magisterial district</b>	Witbank
<b>Distance and direction from nearest town</b>	approximately 61 km Southwest of Middelburg, approximately 40,8 km Southwest of Emalahleni and approximately 32 km Southeast of Ogies.
<b>21-digit Surveyor General code for each farm portion</b>	TOIS00000000003100002

**2.1 Locality map (show nearest town, scale not smaller than 1:250,000)**

The Mpumalanga province consists of, amongst others, the eMalahleni, popularly known as Witbank. eMalahleni is situated in the Highveld part of Mpumalanga within the eMalahleni

Local Municipality, with Coal, Pseudocoal, Torbanite and Aggregate mining being a major activity in this city. The Mining Permit is situated approximately 61 km Southwest of Middelburg, approximately 40,8 km Southwest of Emalaheni and approximately 32 km Southeast of Ogies. The project area is easily accessible via the tertiary road R547 tar road which goes directly to the project area through gravel road. The farm is situated within a region that is characterized by coal mining activities and agriculture. The mines next to the farm include Glencore Operation and Boschmansfontein.

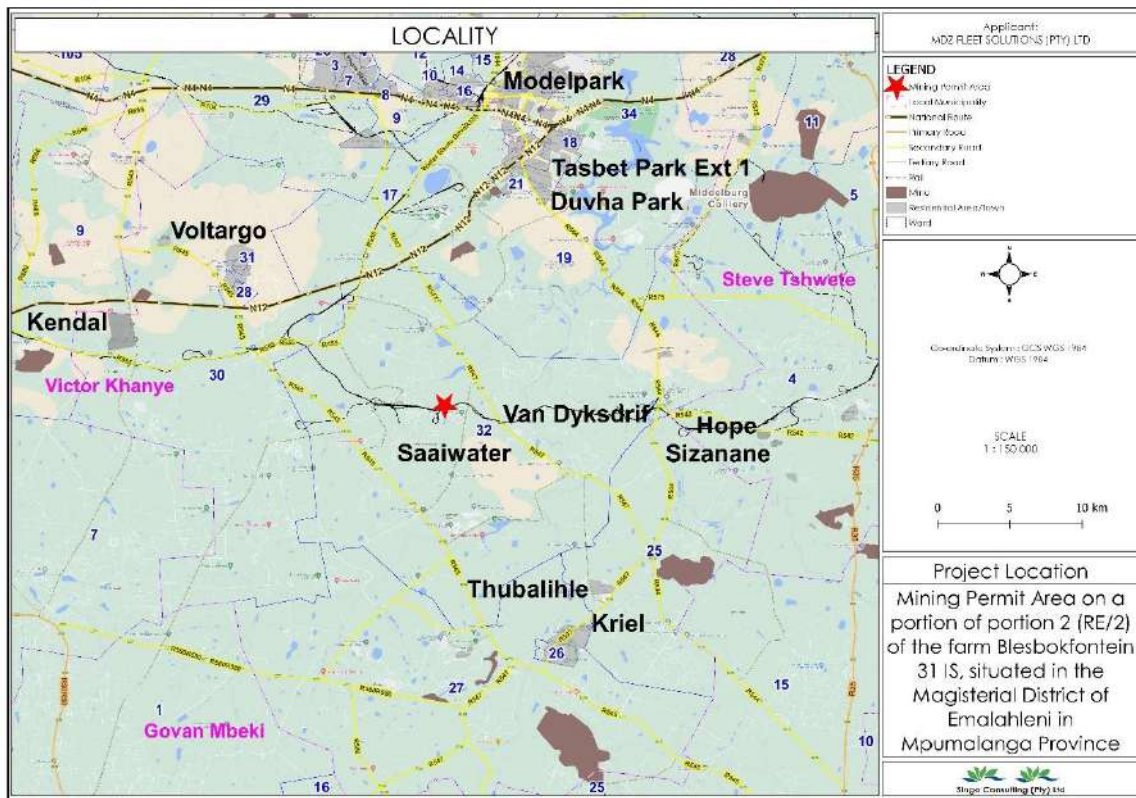


Figure 1: Locality map showing nearest towns (project area represented by a red star)



**Figure 2: Google Earth View of the project area**

## **2.2 Description of the scope of the proposed overall activity**

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

The mining method proposed involves open cast extraction of Coal, Pseudocoal, Torbanite and Aggregate from a proposed mine to be established on the land adjacent to the Glencore Operation. The method that will be employed is a very basic form of open cast mining, and a 5-ha area will be demarcated for mining activities. Blasting and subsequent mining of the Coal, Pseudocoal, Torbanite and Aggregate utilizing a truck and shovel operation will be conducted. The mined Coal, Pseudocoal, Torbanite and Aggregate will be crushed and screened on site utilizing a mobile crushing and screening plant that will be established within the boundaries of the mining area (see Figure 3). A front-end loader will be utilized to load the material into haulage trucks. The mine will operate for a two (2) year permit period with an option to renew for three (3) periods of which each may not exceed one year in terms of Section 27(8)a of the Mineral and Petroleum Resources Development Act (MPRDA), 2002 (Act No. 28 of 2002) as amended. The product (Coal, Pseudocoal, Torbanite and Aggregate) will be stockpiled and transported to clients such as Eskom via trucks and trailers. All activities will be contained within the boundaries of the mining site.

The project infrastructure and activities will include the following:

- Site clearance.
- Removal of topsoil and overburden and stockpiling.
- Site establishment, mobilization of equipment and preparation of the area for mining.
- Excavation of an opencast.
- Blasting.
- Loading zone.
- Hauling and transporting of Coal, Pseudocoal, Torbanite and Aggregate .
- Mobile Crushing and screening.
- Ablution facilities and waste storage area.
- Rehabilitation of site and Monitoring.

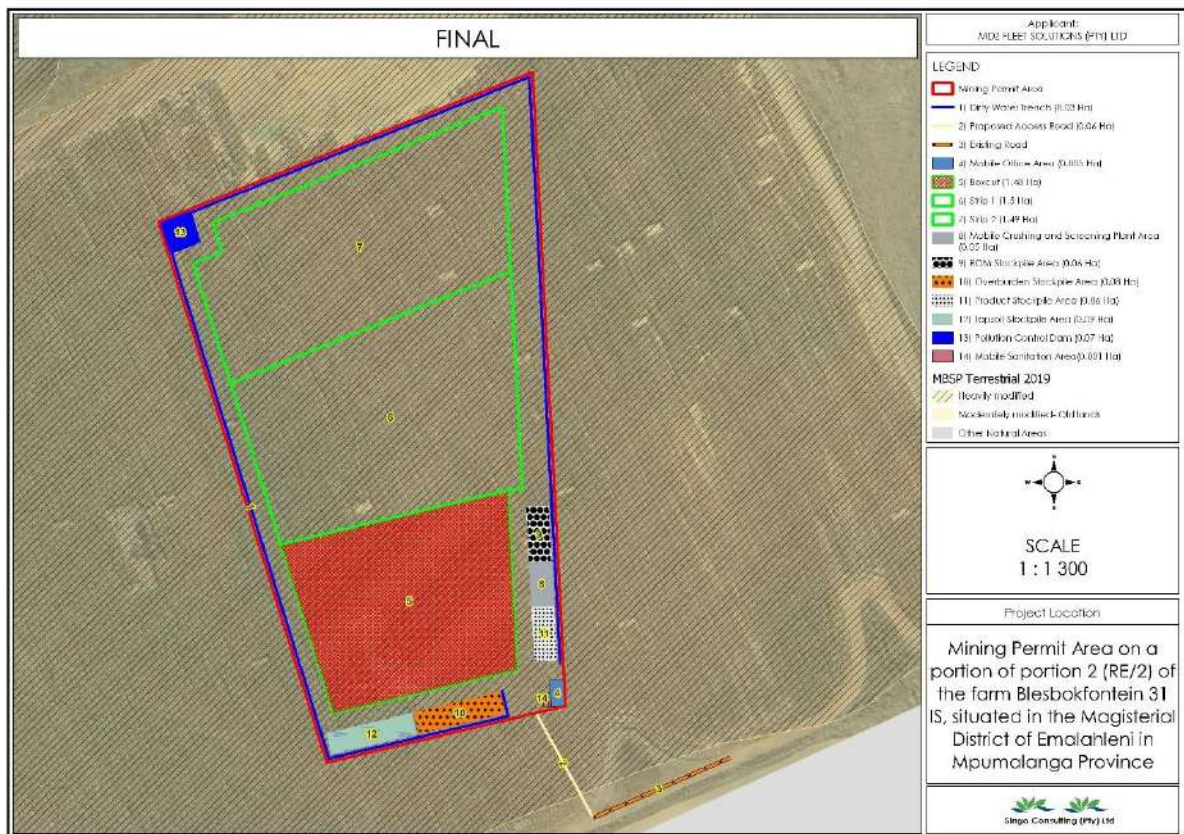


Figure 3: Mine layout Plan

## 2.2 Listed and specified activities

NAME OF ACTIVITY E.g. for prospecting: drill site, site camp, ablution facility, accommodation, equipment storage, sample storage, site office and access route; and for mining: excavations, blasting, stockpiles, discard dumps/ dams, loading, hauling, transport, water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines and conveyors.	Aerial extent of the activity Ha or m <sup>2</sup>	Listed activity Mark with X where applicable	Applicable listing notice  (GN 517/2021)
Open cast mining and crushing to produce Coal, Pseudocoal, Torbanite and Aggregate specs required by clients	4.47 Ha	X	GN 517/2021, Listing notices 1 activity 21: Any activity including the operation of that activity which requires a mining permit in terms of section 27 of the Mineral and Petroleum Resources Development Act, as well as any other applicable activity as contained in this Listing Notice or in Listing Notice 3 of 2014, required to exercise the mining permit.
A closure certificate in terms of section 43 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002)	5 Ha		Not listed
Vegetation Clearance	4.97 Ha	X	GN 517/2021, Listing Notice 1 activity 27: The clearance of an area of 1 hectare or

			more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for - (i) the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a maintenance management plan.
Access road	0.06Ha		Not listed
Overburden stockpile	0.08Ha		Not listed
Topsoil stockpile	0.09Ha		Not listed
ROM stockpile area	0.06Ha		Not listed
Product Stockpile	0.06Ha		Not listed
Dirty water Trench	0.03Ha		Not listed
Pollution Control Dam	0.07		Not listed
Mobile offices	0.005Ha		Not listed
Toilets and sanitation	0.001Ha		Not listed
Box cut construction	1.48Ha		Not listed
Coal, Pseudocoal, Torbanite and Aggregate extraction	4.97Ha		Not listed
Mobile Crushing and Screening Plant Area	0.05Ha		Not listed
Rehabilitation	5 Ha		Not listed

### 2.3 Description of the activities to be undertaken

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

Mining is basically a process of actively extracting an in-situ mineral resource; mineral resources can be mined using surface mining method. Surface mining is used in situations where the minerals are relatively shallow, open cast mining method, will be utilised in this

proposed project.

The mining method proposed involves open cast extraction of Coal, Pseudocoal, Torbanite and Aggregate from a proposed mine. The mining methods will include blasting with non-conventional explosives to loosen the hard rock (overburden). The material will be loaded with excavators and hauled to the mobile crushing and screening plants that will be established within the project area. The Coal, Pseudocoal, Torbanite and Aggregate will be stockpiled and transported to clients such as Eskom via trucks and trailers. All activities will be contained within the boundaries of the mining site.

The trucks transporting Coal, Pseudocoal, Torbanite and Aggregate from the MDZ Fleet Solutions (Pty) Ltd proposed Mining Permit area to dedicated clients, will travel through an existing gravel road that joins an unnamed tar road connecting to the R547 regional road. All mining vehicles using public roads will be in a roadworthy condition and their loads will be secured. They will adhere to the speed limits (40 km/h) and all local, provincial and national regulations with regards to road safety and transport.

At the current stage of the proposed Mining Permit, in terms of the law the applicant is not allowed to conduct exploration before the Mining Permit has been granted and issued by the DMRE. The market can only be confirmed after the proposed mining permit has been granted and a Permit issued by the DMRE. Once drilling commences, core logging will be conducted, and based on the available Coal, Pseudocoal, Torbanite and Aggregate resources, the quantity of Coal, Pseudocoal, Torbanite and Aggregate within the mining permit area will be estimated. Coal, Pseudocoal, Torbanite and Aggregate samples will be taken to the lab to determine the value of the Coal, Pseudocoal, Torbanite and Aggregate to be mined by MDZ Fleet Solutions (Pty) Ltd .

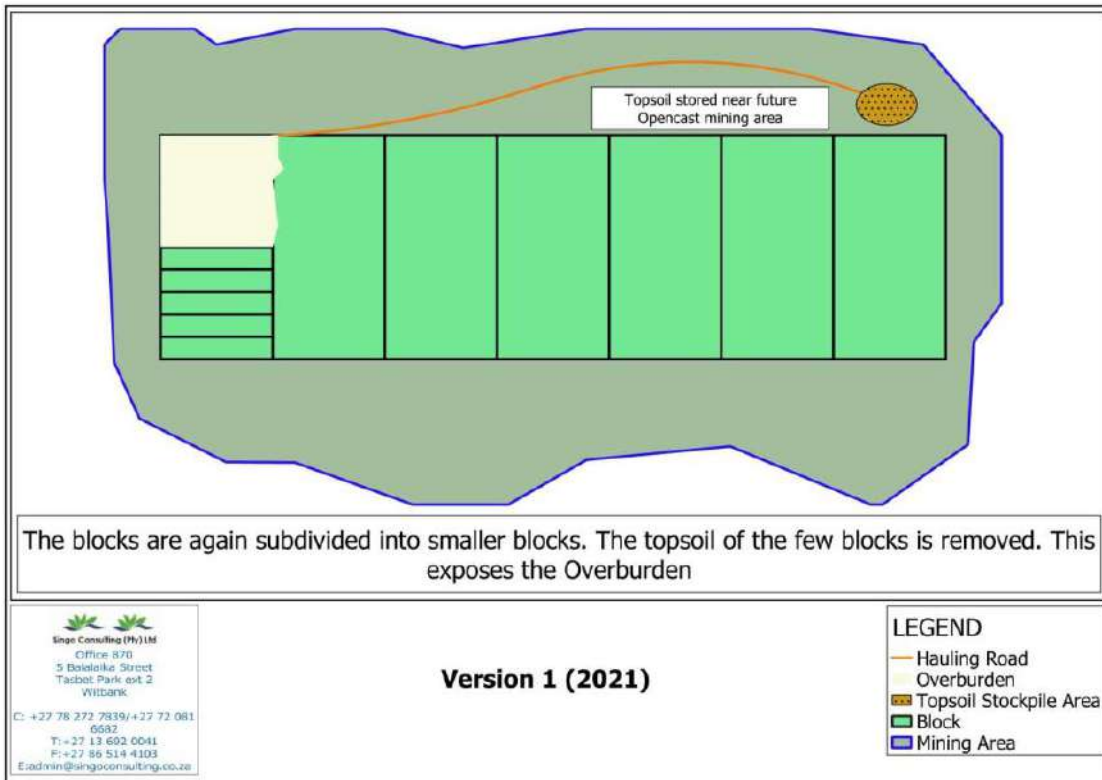


Figure 4: Topsoil removal

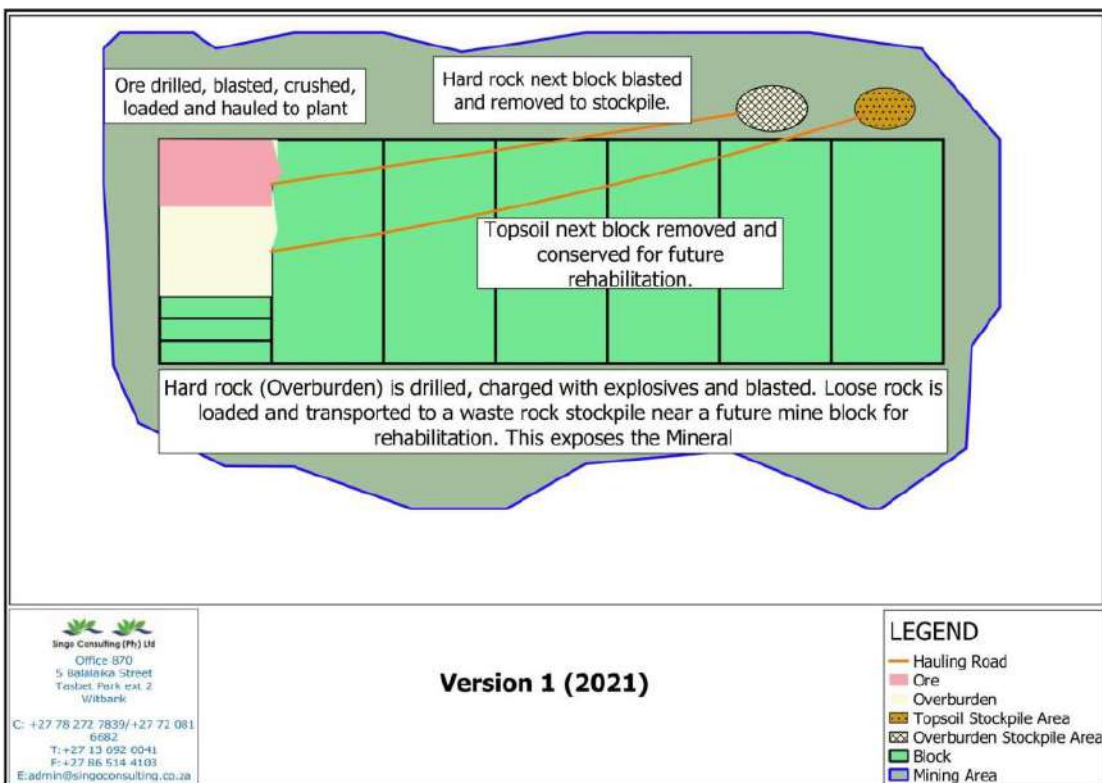
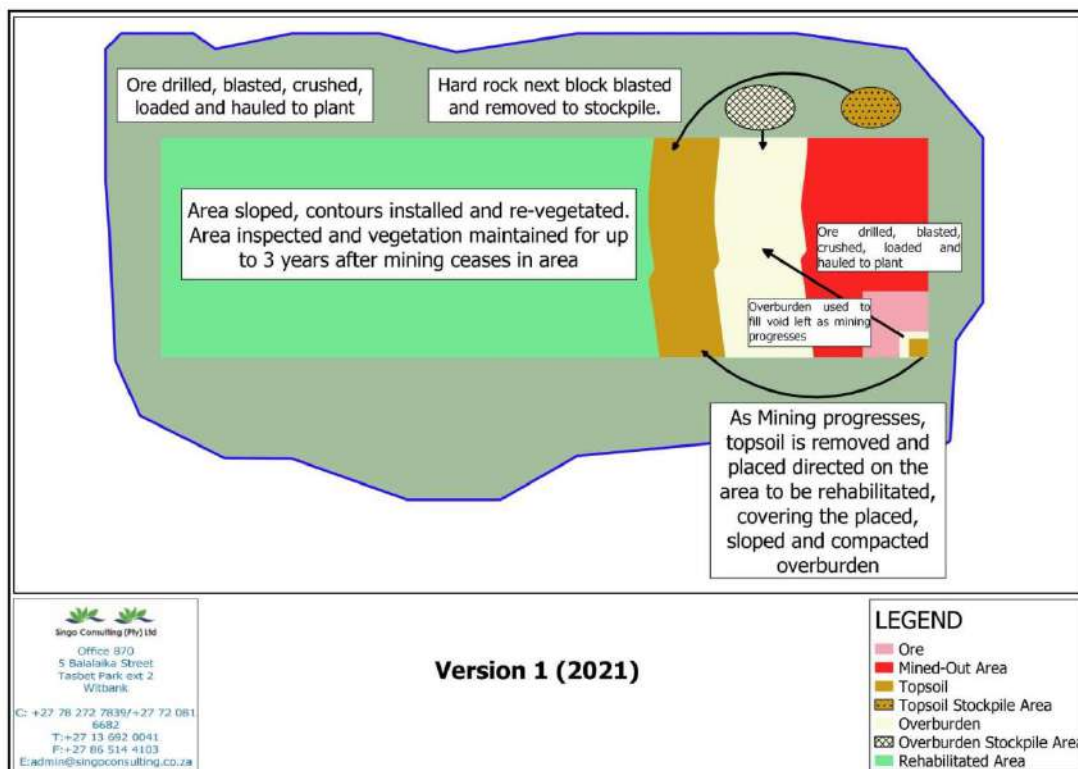


Figure 5: Overburden blasting and removal





**Figure 6:** Backfilling and rehabilitation stage

This project will be carried out in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended and the Environmental Impact Assessment Regulations, 2014 (as amended) read together with regulation 40-43 of the Act. The triggered activities as reflected on GN 517/2021; LN 1 Activity 21 & 27:

- ❖ LN 1 Activity 27: The clearance of an area of 1 hectare or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for -(i) the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a maintenance management plan.
- ❖ Activity 21: Any activity including the operation of that activity which requires a mining permit in terms of section 27 of the Mineral and Petroleum Resources Development Act, as well as any other applicable activity as contained in this Listing Notice or in Listing Notice 3 of 2014, required to exercise the mining permit.

LN 1 Activity 27 is about clearing of vegetation and this application seek to be authorized for this activity. Deforestation process is required before commencement of any mining activity if the area is vegetated, this process allows the mining company to gain access to the mining area and locating other required infrastructures. Therefore, land clearance will be the first stage as part of development.

Phase	Activity no	Activity
<b>Construction</b>	1	Site clearing: Removal of topsoil and vegetation
	2	Construction of any surface infrastructure, e.g. Haul roads, pipes, storm water diversion berms (incl. transportation of materials and stockpiling)
	3	Free digging and development of initial box cut for mining
	4	Temporary storage of hazardous products (fuel, explosives) and waste
<b>Operation</b>	5	Removal of overburden and backfilling when possible (incl. drilling/free digging of hard overburden and stockpiling)
	6	Use and maintenance of haul roads.
	7	Coal, Pseudocoal, Torbanite and Aggregate commodity
	8	Water use and storage on site
	9	Storage, handling and treatment of hazardous products (fuel, explosives, oil) and waste activities (waste, discard)
	10	Concurrent replacement of overburden, topsoil and re-vegetation
<b>Decommissioning</b>	11	Removal of all infrastructure (incl. transportation off site)
	12	Rehabilitation (spreading of soil, re-vegetation and profiling)
	13	Installation of post-closure water infrastructure
	14	Environmental monitoring of decommissioning activities
	15	Storage, handling and treatment of hazardous products (fuel, explosives, oil) and waste activities (waste discard)
<b>Post-closure</b>	16	Rehabilitation and Post-closure monitoring

### 2.3.1 Site establishment/construction phase

During site preparation, the applicant will mark the boundaries of the site and remove topsoil and overburden from the extension area to make it accessible for drilling and blasting. Following stripping, the topsoil and overburden will be placed along the mine's boundaries for use in the rehabilitation stage. Only the areas that will be mined will be subject to topsoil removal. There will be a total removal of the A-horizon, or topsoil (the top 100 to 200 mm of soil, which is typically darker in colour due to high organic matter concentration). The top 300 mm of soil must be removed if it is not evident where the topsoil layer finishes.

Along the edge of the proposed mine, the topsoil will be heaped up in the shape of a berm so that it won't be trampled on, contaminated, flooded, or moved while the mine is operating. If vegetation does not organically establish within 6 months of stockpiling, a topsoil berm with a maximum height of 1.5 m must be planted on it to prevent soil erosion and deter weed growth. The grass's roots will increase the viability of the soil for purposes of

rehabilitation. After the topsoil is taken out, the stripped overburden will be stacked in a certain location.

Waste rock known as overburden, which must be removed in order to reveal the Coal, Pseudocoal, Torbanite and Aggregate beneath, is composed of both consolidated and unconsolidated material. The amount of waste rock extracted increases as the mineral deposit is deep, despite the fact that it is preferable to remove as little overburden as possible in order to get the Coal, Pseudocoal, Torbanite and Aggregate of interest. The removal methods that will be used involve cyclical processes with breaks in the extraction (drilling, blasting, and loading) and removal (haulage) phases. This is particularly true for overburden made of hard rock, which needs to be drilled and blasted first. Dredges used in hydraulic surface mining and other types of loose material mining using bucket wheel excavators are an exception to these cyclical effects. The stripping ratio is the ratio of extracted Coal, Pseudocoal, Torbanite and Aggregate to waste rock. In big mining operations, stripping ratios of 2:1 to 4:1 are frequent. Depending on the commodity, ratios beyond 6:1 tend to be less economically viable. Overburden can be used to build roads and tailings dams once it has been removed, and it may also have non-mining commercial value as fill earth.

The term "surface mining" refers to a mine where the Coal, Pseudocoal, Torbanite and Aggregate is located close to the surface and may be removed by removing the top layers of rock and soil. Since almost all surface mining operations are outdoors, no roof support is necessary. Open cast mining uses a traditional mining cycle of operations to recover minerals, including drilling and blasting for consolidated materials and ripping or direct removal by excavators for unconsolidated soil and/or decomposed rock, then material handling and transportation. Geological information, resource extrapolation from neighbouring mines, the duration of a permit, and the benefit of open cast mining for closure were all taken into consideration while deciding on this kind of mining.

In order to extract natural resources from the soil during the development and exploitation phases of mining, remarkably identical unit activities are typically used. The fundamental procedures for extracting minerals from a deposit are known as unit operations, and the supporting auxiliary procedures are known as unit operations. Production activities, which make up the cycle of operations that directly contribute to mineral extraction, are the steps involved in this process. Auxiliary operations refer to the supplementary steps that assist the production cycle. The production cycle makes use of unit operations, which are often categorized into rock breaking and material handling.

Breakage generally consists of drilling and blasting, and materials handling encompasses loading or excavation and haulage (horizontal transport) and sometimes hoisting (vertical or inclined transport).

Thus, the basic production cycle consists of these unit operations:

**Production cycle=Drill+ Blast + Load+ Haul**

Although production operations tend to be separate and cyclic in nature, the trend in modern mining and tunnelling is to eliminate or combine functions and to increase continuity of extraction. The cycle of operations in surface and underground mining differs primarily by the scale of the equipment. Specialized machines have evolved to meet the unique needs of the two regimes.

The applicant will introduce the mining equipment to the area during the site establishment phase. The equipment to be used on site will include but not limited to:

- Mobile toilet
- Drilling equipment
- Excavating equipment
- Earth moving equipment

**2.3.2 Operational phase**

Drilling and blasting can be defined as the controlled use of explosives and other methods such as gas pressure blasting pyrotechnics, to break rock for excavation. It is practiced most often in mining, quarrying and civil engineering such as dam, tunnel, or road construction. The result of rock blasting is often known as a rock cut.

Currently, a wide variety of explosives with various compositions and performance characteristics are used for drilling and blasting. Low velocity explosives are used on soft rocks to increase gas pressure and the heaving action whereas higher velocity explosives are used on reasonably hard rock to fracture and crush the rock. For instance, a blasting guidebook from the early 20th century equated dynamite's effects to a hammer and black powder's to a wedge. Due to their cheaper cost than dynamite, ANFO-based blends are currently the most often used explosives in mining.



**Figure 7:** Blasting Design and Planning for Blasting

### **2.3.3 Decommissioning phase**

The site's remaining land will be prepared for agricultural usage, such as grazing, and the projected Coal, Pseudocoal, Torbanite and Aggregate mine will be made safe, among other closure goals. The closure goals of the proposed expansion area will include the proposed Coal, Pseudocoal, Torbanite and Aggregate mine. If vegetation does not emerge naturally in the area within six months of the topsoil replacement, the overburden will be top-dressed with soil and planted with a suitable grass mix. After topsoil restoration and seeding (if necessary) have been carried out in an area, controlling weeds and alien invasive plant species is a crucial step. In order to deal with the germination of troublesome plants in the region, site management will apply an alien invasive plant management plan throughout the aftercare phase.

The decommissioning activities will include:

- Sloping and landscaping during rehabilitation
- Replacing of topsoil
- Implementation of an alien invader plant management plan

## 2.4 Policy and legislative context

This Mining Permit application requires authorization in terms of the following interlinked pieces of legislation:

- ❖ The Mineral and Petroleum Resources Development Act, 2002 (MPRDA, Act 28 of 2002), as amended.
- ❖ The National Environmental Management Act, 1998 (NEMA, Act 107 of 1998), as amended.

These pieces of core legislation stipulate the required studies, reports, and legal processes to be conducted and the results thereof are to be submitted to the relevant authorities for approval prior to commencement. In addition to the above, there are various pieces of legislation which govern certain aspects of the mining operations, and these are summarized in Table 3, together with the main legislative requirements mentioned above

**Table 3:** Policy and Legislative context.

Applicable legislation and guidelines used to compile the report	Reference where applied	How does this development comply with and respond to the legislation and policy context
A description of the policy and legislative context within which the development is proposed, including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process.		E.g. In terms of the National Water Act (NWA) a Water Use License has/has not been applied for.
Minerals and Petroleum Development Resources Act, Act 28 of 2002 (MPRDA) and the MPRDA Amendment Act, Act 49 of 2008	Application for a mining permit DMRE reference: MP 30/5/1/1/3/13571 MP	GN 517/2021, Activity 21: Any activity including the operation of that activity which requires a mining permit in terms of section 27 of the Mineral and Petroleum Resources Development Act, as well as

Applicable legislation and guidelines used to compile the report	Reference where applied	How does this development comply with and respond to the legislation and policy context
		any other applicable activity as contained in this Listing Notice or in Listing Notice 3 of 2014, required to exercise the mining permit.
<p>Constitution of South Africa, specifically everyone has the right to:</p> <p>an environment that is not harmful to their health or wellbeing</p> <p>have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that prevent pollution and ecological degradation, promote conservation, and secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development</p>	Republic of South Africa	The mining activities will only proceed after effective consultation.
Environmental Impact Assessment (EIA) regulations	Application for environmental authorization: DMRE Reference: MP 30/5/1/1/3/13571 MP	GN 517/2021 Activities 21 and 27
National Environmental Management Act, Act 107 of 1998 (as amended) (NEMA)	Application for environmental authorization: DMRE Reference: MP 30/5/1/1/3/13571 MP	GN 517/2021 Activities 21 and 27

Applicable legislation and guidelines used to compile the report	Reference where applied	How does this development comply with and respond to the legislation and policy context
National Water Act, 1998 (Act 36 of 1998), and GN 704 regulation. Best Practice Guidelines: Series A, G, & H	S 21 & S 26) Water use & mine water management	Best practice guidelines will be followed for water management, water characterization, water resource protection, water treatment, and the development of the mine water management model
National Environmental Management: Waste Act, Act 59 of 2008 (NEMWA)NEM: WA	Management measures Environmental awareness plan	All type of waste will be managed as prescribed by the regulation (NEMWA)
National Heritage Resources Act, 25 of 1999 (NHRA)	Management measures	No mining activities will take place within 500 m of any identified heritage resource, such as a grave. No graves have been identified on the site in question.
Municipality By-Laws: Waste Management by-law Act 59 of 2008, Air Quality Management By-law Act 39 of 2004, Noise control by-law, Spatial Planning and Land Use Management Act no 16 of 2013 (SPLUMA).	Environmental Management measures awareness plan	Best practice guidelines will be followed for any by-law's management and the development of the mine environmental and other legislative management.

## 2.5 Environmental Authorization Process

### 2.5.1 Mineral and Petroleum Resources Development Act

In terms of the Mineral and Petroleum Resources Development Act (Act 28 of 2002), a Mining Permit must be issued prior to the commencement of any mining activities. As per Section 79(4)(a) and (b) of the MPRDA, the Applicant is required to conduct a Basic Assessment and submit an EMPR for approval as well as to notify in writing and consult with Interested and Affected Parties (I&APs) within 90 days of acceptance of the application.



The MPRDA also requires adherence with related legislation, chief amongst them is the National Environmental Management Act (Act 107 of 1998, NEMA) and the National Water Act (Act 36 of 1998, NWA).

Several amendments have been made to the MPRDA. These include, but are not limited to, the amendment of Section 102, concerning amendment of rights, permits, programmes and plans, to requiring the written permission of the Minister for any amendment or alteration; and the Section 5A(c) requirement that landowners or land occupiers receive twenty-one (21) days' written notice prior to any activities taking place on their properties. One of the most recent amendments requires all mining related activities to follow the full NEMA process as per the 2014 basic assessment Regulations (as amended), which came into effect on 8<sup>th</sup> of December 2014.

A Mining Permit is exclusive, transferable, valid for two (2) years and may be renewed for three periods of which may not exceed one year.

### **2.5.2 National Environmental Management Act**

The main aim of the National Environmental Management Act, 1998 (Act 107 of 1998) (NEMA) is to provide for co-operative governance by establishing decision-making principles on matters affecting the environment. In terms of the NEMA Environmental Impact Assessment (EIA) regulations, the proponent is required to appoint an environmental assessment practitioner (EAP) to undertake the EIA 9 as well as the public participation process. In South Africa, EIA became a legal requirement in 1997 with the promulgation of regulations under the Environmental Conservation Act (ECA). Subsequently, NEMA was passed in 1998. Section 24(2) of NEMA empowers the Minister and any MEC, with the concurrence of the Minister, to identify activities which must be considered, investigated, assessed, and reported on to the competent authority responsible for granting the relevant environmental authorization. On 21 April 2006 the Minister of Environmental Affairs and Tourism promulgated regulations in terms of Chapter 5 of the NEMA.

The objective of the Regulations is to establish the procedures that must be followed in the consideration, investigation, assessment, and reporting of the activities that have been identified. The purpose of these procedures is to provide the competent authority with adequate information to make decisions which ensure that activities which may impact negatively on the environment to an unacceptable degree are not authorized, and that activities which are authorized are undertaken in such a manner that the environmental impacts are managed to acceptable levels.

The aim of the EIA process is to identify and assess the potential impacts associated with the proposed project and to develop measures through which potential negative biophysical and socio-economic impacts can be mitigated and positive benefits can be enhanced. The EIA will ensure that all issues are integrated into the lifecycle of the mining operation and its infrastructure. This will occur during the planning, construction, operation and decommissioning and site closure phases.

The EIA Report and the associated EMPR will indicate how the identified impacts will be avoided, mitigated and/or managed by setting environmental objectives and goals. The EMPR will further outline the implementation programme for the environmental objectives and goals. The EMPR is a legal requirement of the MPRDA and all mines, existing or new, are required to possess an approved EMPR prior to initiating any mining operations. The EMPR is legally binding, and the proponent is required to meet the requirements specified in the document.

The written decision called an Environmental Authorization, is a legal document setting out the conditions of the Authorization and the actions required to protect human health and the environment. Any affected party may appeal against the decision contained in an Environmental Authorization. Appeals must be lodged with the Minister who considers appeals in terms of the relevant provisions of NEMA and the Environmental Regulations.

An important amendment to the NEMA (December 2014) Regulations is that the Department of Mineral Resources has been the responsible authority for approving and issuing of Environmental Authorizations under the NEMA for mining related activities. The Department of Environmental Affairs is the appeal authority for mining related Environmental Authorizations.

### **2.5.3 National Environmental Management: Waste Amendment Act**

The Regulations pertaining to the NEMWA activities were published on 3<sup>rd</sup> of July 2009 in Government Gazette 32368 under GN 718. These were amended in August 2013 in Government Notice Regulation 921. Regulations regarding the planning and management of residue stockpiles and residue deposits were published and commenced on 24 July 2015 in Government Notice Regulation 632 and the List of waste management activities that have or are likely to have a detrimental effect on the environment were amended on the same date by Government Notice Regulation 921. As per this list the following is of important to note:

- ❖ Category A: (15) The establishment or reclamation of a residue stockpile or residue deposit resulting from activities which require a mining permit or mining permit, in terms of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28

of 2002).

Category B: (11) The establishment or reclamation of a residue stockpile or residue deposit resulting from activities which require a mining right, exploration right or production right in terms of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002).

On the 2<sup>nd</sup> of June 2014 the National Environmental Management: Waste Amendment Act came into force. Of importance for mining activities is that according to this amendment, waste resulting from exploration, mining, quarrying, and physical and chemical treatment of minerals is classified as Hazardous Waste. Waste is accordingly no longer governed by the MPRDA but is subject to all the provisions of the National Environmental Management: Waste Act, 2008 (NEMWA). Section 16 of the NEMWA must also be considered which states as follows:

“A holder of waste must, within the holder's power, take all reasonable measures to:

- ❖ Avoid the generation of waste and where such generation cannot be avoided, to minimize the toxicity and amounts of waste that are generated.
- ❖ Reduce, re-use, recycle and recover waste.
- ❖ Where waste must be disposed of, ensure that the waste is treated and disposed of in an environmentally sound manner.
- ❖ Manage the waste in such a manner that it does not endanger health or the environment or cause a nuisance through noise, odours, or visual impacts.
- ❖ Prevent any employee or any person under his or her supervision from contravening the Act.
- ❖ Prevent the waste from being used for unauthorized purposes.

These general principles of responsible waste management are incorporated into the requirements in the EMPR to be implemented for this project.

Schedule 3: Defined Wastes have been broken down into two categories: Category A being hazardous wastes and category B being general wastes. Under Category A (hazardous wastes) the act makes allowance for “wastes resulting from exploration, mining, quarrying, and physical and chemical treatment of minerals”.

In order to understand the implications of this it is important to ensure that the definitions of all the relevant terminologies are defined:

- ❖ Hazardous waste: means “any waste that contains organic or inorganic elements or compounds that may, owing to the inherent physical,

chemical or toxicological characteristic of that waste, have a detrimental impact on health and the environment and includes hazardous substances, materials or objects within business waste, residue deposits and residue stockpiles.

- ❖ Residue deposits: means “any residue stockpile remaining at the termination, cancellation or expiry of a prospecting right, mining right, mining permit, exploration right or production right.
- ❖ Residue stockpile: means “any debris, discard, tailings, slimes, screening, slurry, waste rock, foundry sand, mineral processing plant waste, ash or any other product derived from or incidental to a mining operation and which is stockpiled, stored or accumulated within the mining area for potential re-use, or which is disposed of, by the holder of a mining right, mining permit or, production right or an old order right, including historic mines and dumps created before the implementation of this Act.

Various regulations have been drafted in support of the NEMWA, as discussed below:

- ❖ Proposed Regulations regarding the planning and management of waste from a prospecting, mining, exploration or production operations (2014):
- ❖ Chapter 2, Section 3 states the identification and assessment of any environmental impacts, including those on groundwater, arising from waste must be done as part of the Environmental Impact Assessment (EIA) conducted in terms of the National Environmental Management Act, 1998 (Act No.107 of 1998) (hereafter referred to as the NEMA). The pollution control barrier system shall be defined by the (a) Waste Classification and Management Regulations (2013); (b) National Norms and Standards for the Assessment of Wastes for Landfill Disposal (2013); and (c) National Norms and Standards for Disposal of Waste to Landfill (2013).
- ❖ Waste Characterization must be done in terms of physical and chemical composition as well as content. The classification must be done in terms of the health and safety classification and the environmental classification.

Proposed Regulations to exclude a waste stream or a portion of a waste stream from the definition of a waste (2014):

This regulation will give the holder of the right the opportunity to exclude a waste stream, or a portion of a waste stream from the definition of a waste. Chapter 2, Section 4 of this Regulation, Sub-section (1) states that any portion of a waste generated from a source listed in Category A of Schedule 2 of the NEMWA, may be excluded from being defined as

hazardous on demonstration that such portion of waste is non-hazardous in accordance with the Waste Management and Classification Regulations of 2013. The application process will be in the form of a prescribed process and application must be made to the Minister. This Regulation is however not yet in force. National Norms and Standards for the assessment of waste for landfill disposal (23 August 2013): These norms and standards prescribe the requirements for the assessment of waste prior to disposal to landfill. The aim of the waste classification tests is to characterize the material to be deposited or stored in terms of the above-mentioned waste classification guidelines set by the Department of Environmental Affairs (DEA).

The outcomes of the tests provide the necessary information in terms of:

- ❖ Identification of chemical substances present in the waste.
- ❖ Determination of the total concentrations (TC) and leachable concentrations (LC) of the elements and chemical substances that have been identified in the waste and that are specified in Section 6 of the above-mentioned Regulations. The obtained TC and LC values of the waste material will be compared to the threshold limits for total concentrations (TCT limits) and leachable concentrations (LCT limits) specified in Section 6 of the above-mentioned Regulations. Based on the TC and LC values of the elements and chemical substances in the waste exceeding the corresponding TCT and LCT limits respectively, the specific type of waste for disposal to landfill will be determined in terms of Section 7 of the Regulations.

#### **2.5.4 The National Environmental Management: Biodiversity Act**

The National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004, NEMBA), "provides for: the management and conservation of South Africa's biodiversity within the framework of the NEMA; the protection of species and ecosystems that warrant national protection; the sustainable use of indigenous biological resources; the fair and equitable sharing of benefits arising from bio-prospecting involving indigenous biological resources; the establishment and functions of a South African National Biodiversity Institute (SANBI); and for matters conducted therewith".

In terms of the Biodiversity Act, the applicant has a responsibility for: The conservation of endangered ecosystems and restriction of activities according to categorization of the area (not just by listed activity as specified in the EIA regulations): Promote the application of appropriate environmental management tools in order to ensure integrated environmental management of activities thereby ensuring that all developments within the area are in line with ecological sustainable development and protection of biodiversity.

Limit further loss of biodiversity and conserve endangered ecosystems

Regulations published under the NEMBA also provide a list of protected species, according to the Act (GNR 151 dated 23 February 2007, as amended in GNR 1187 dated 14 December 2007). Section 57 of NEMBA identifies restricted activities involving threatened or protected species. Restricted activities include the gathering, collecting, cutting, uprooting, damaging or destroy a listed species.

### **2.5.5 The National Environmental Management: Protected Areas Act**

The National Environmental Management: Protected Areas Act, 2003 (Act 57 of 2003) (NEMPAA) serves to: “provide for the protection and conservation of ecologically viable areas representative of South Africa's biological biodiversity and its natural landscapes and seascape; for the establishment of a national register of all national, provincial and local protected areas; for the management of those areas in accordance with national norms and standards; for intergovernmental co-operation and public consultation in matters concerning protected areas; for the continued existence, governance and functions of South African National Parks; and for matters in connection therewith.

The objectives of this Act are –

- ❖ To provide, within the framework of the national legislation, including the National Environmental Management Act, for the declaration and management of protected areas.
- ❖ To provide for co-operation governance in the declaration and management of protected areas.
- ❖ To affect a national system of protected areas in South Africa as part of a strategy to manage and conserve its biodiversity.
- ❖ To provide for a diverse and representative network of protected areas on state land, private land, communal land and marine water.
- ❖ To promote sustainable utilization of protected areas for the benefit of people, in a manner that would preserve the ecological character of such areas.
- ❖ To promote participation of local communities in the management of protected areas, when appropriate
- ❖ To provide for the continued existence of South African National Parks.

### **2.5.6 National Water Act**

The National Water Act, 1998 (Act 36 of 1998) (NWA) makes provision for two types of application for water use licenses, namely individual applications, and compulsory

applications. The NWA also provides that the responsible authority may require an assessment by the Applicant of the likely effect of the proposed license on the resource quality, and that such assessment be subject to the EIA regulations. A person may use water if the use is-

- ❖ Permissible as a continuation of an existing lawful water use (ELWU).
- ❖ Permissible in terms of a general Authorization (GA).
- ❖ Permissible under Schedule 1.
- ❖ Authorized by a licensed.

The NWA defines 11 water uses. A water use may only be undertaken if authorized. Water users are required to register certain water uses that took place on the date of registration, irrespective of whether the use was lawful or not.

Section 21 of the National Water Act 1998 lists the following 11 water uses which can only be legally undertaken through the water use Authorization issued by the Department of Water and Sanitation (DWS):

- (a) Taking water from a water resource.
- (b) Storing water.
- (c) Impeding or diverting the flow of water in a watercourse.
- (d) Engaging in a stream flow reduction activity contemplated in Section 36.
- (e) Engaging in a controlled activity identified as such in Section 37(1) or declared under Section 38(1).
- (f) Discharging waste or water containing waste into a water resource through a pipe, canal, sewer, sea outfall or other conduits.
- (g) Disposing of waste in a manner which may detrimentally impact on a water resource.
- (h) Disposing in any manner of water which contains waste from, or which has been heated in, any industrial or power generation process.
- (i) Altering the bed, banks, course or characteristics of a watercourse.
- (j) Removing, discharging or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people.
- (k) Using water for recreational purposes.

In terms of the National Water Act, no Water Use License will be applied for this project. DWS was engaged about this project so they can direct us whether it is viable or not to apply for water use license.

### **2.5.7 National Heritage Resources Act**

The National Heritage Resources Act, 1999 (NHRA) stipulates that cultural heritage resources may not be disturbed without authorization from the relevant heritage authority. Section 34(1) of the NHRA states that, "no person may alter or demolish any structure or part of a structure which is older than 60 years without a permit issued by the relevant provincial heritage resources authority" The NHRA is utilized as the basis for the identification, evaluation, and management of heritage resources and in the case of CRM those resources specifically impacted on by development as stipulated in Section 38 of NHRA, and those developments administered through NEMA, MPRDA and the DFA legislation. In the latter cases the feedback from the relevant heritage resources authority is required by the State and Provincial Departments managing these Acts before any authorizations are granted for development. The last few years have seen a significant change towards the inclusion of heritage assessments as a major component of Environmental Impacts processes required by NEMA and MPRDA. This change requires us to evaluate the Section of these Acts relevant to heritage (Fourie, 2008b).

The NEMA 23(2)(b) states that an integrated environmental management plan should, "...identify, predict and evaluate the actual and potential impact on the environment, socio-economic conditions and cultural heritage". A study of subsections (23)(2)(d), (29)(1)(d), (32)(2)(d) and (34)(b) and their requirements reveals the compulsory inclusion of the identification of cultural resources, the evaluation of the impacts of the proposed activity on these resources, the identification of alternatives and the management procedures for such cultural resources for each of the documents noted in the Environmental Regulations. A further important aspect to be taken account of in the Regulations under NEMA is the Specialist Report requirements laid down in Section 33 (Fourie, 2008b).

MPRDA defines 'environment' as it is in the NEMA and therefore acknowledges cultural resources as part of the environment. Section 39(3)(b) of this Act specifically refers to the evaluation, assessment, and identification of impacts on all heritage resources as identified in Section 3(2) of the National Heritage Resources Act that are to be impacted on by activities governed by the MPRDA. Section 40 of the same Act requires the consultation with any State Department administering any law that has relevance on such an application through Section 39 of the MPRDA. This implies the evaluation of Heritage Assessment Reports in Environmental Management Plans or Programmes by the relevant heritage authorities (Fourie, 2008b).

The NHRA identifies 5 activities that require a Heritage Impact Assessment (HIA). An HIA is the process to be followed in order to determine whether any heritage resources are



located within the area to be developed as well as the possible impact of the proposed development thereon. An Archaeological Impact Assessment (AIA) only looks at archaeological resources.

An HIA must be done under the following circumstances:

1. The construction of a linear development (road, wall, power line, canal etc.) exceeding 300 m in length.
2. The construction of a bridge or similar structure exceeding 50 m in length.
3. Any development or other activity that will change the character of a site and exceed 5 000 m<sup>2</sup> or involve three or more existing erven or subdivisions thereof.
4. Re-zoning of a site exceeding 10 000 m<sup>2</sup>.
5. Any other category provided for in the regulations of SAHRA or a provincial heritage authority.

South African Heritage Resource Agency has been consulted for this project so they can have an input to the proposed application.

#### **2.5.8 Conservation of Agricultural Resources Act 43 of 1967**

The intention of this Act is to control the over-utilization of South Africa's natural agricultural resources, and to promote the conservation of soil and water resources and natural vegetation. The CARA has categorized a large number of invasive plants together with associated obligations of the landowner, including the requirement to remove categorized invasive plants and taking measures to prevent further spread of alien plants.

#### **2.5.9 National Forest Act 84 of 1998**

The protection, sustainable management and use of forests and trees within South Africa are provided for under the National Forests Act (Act 84 of 1998).

#### **2.5.10 Conservation of Agricultural Resources Act 43 of 1967**

The intention of this Act is to control the over-utilization of South Africa's natural agricultural resources, and to promote the conservation of soil and water resources and natural vegetation. The CARA has categorized a large number of invasive plants together with associated obligations of the landowner, including the requirement to remove categorized invasive plants and taking measures to prevent further spread of alien plants.

## **2.6 Need and desirability of the proposed activities**

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

The applicant chose the suggested location because it is immediately accessible and is supported by data examined in the PWP, which has demonstrated that the area has Coal, Pseudocoal, Torbanite and Aggregate resources. While still taking engineering viability and budgetary factors into account, the project design and site layout are based on minimizing the project area footprint and avoiding environmentally and socially sensitive locations as much as feasible. By creating more jobs and enhancing and developing the state of Saaiwater and surrounding communities through maintenance of roads, infrastructure, education, and skill development, the proposed project will directly and indirectly benefit Saaiwater community.

Income from salaries, taxes, and profits will directly assist the economy. The purchase of products and services and the spending power of employees will result in indirect economic gains. The ability to mine construct and operate will be acquired through employment. For the broader population, the mining industry has increased employment prospects. There will be greater employment prospects for provincial residents, particularly those from small communities, in Mpumalanga. The following economic development activities would take place if the proposed mining operation were approved: jobs are created, skills are developed, and business opportunities may arise. Encourage local businesses to grow.

The proposed mine by MDZ Fleet Solutions (Pty) Ltd will provide Coal, Pseudocoal, Torbanite and Aggregate for usage in other domestic and foreign sectors as well as in the production of power. So it is accurate to state that there is already a market for Coal, Pseudocoal, Torbanite and Aggregate in the region. As a result, the proposed operation will enhance local revenue, create jobs in the Saaiwater village and its environs, encourage growth, and strengthen the local economy. South Africa's main source of primary energy is Coal, Pseudocoal, Torbanite and Aggregate .

Coal, Pseudocoal, Torbanite and Aggregate accounts for more than 90% of the nation's electrical production, 30% of its liquid fuel demands, and over 70% of its overall energy requirements (DoE, 2016). In addition, Coal, Pseudocoal, Torbanite and Aggregate — specifically, metallurgical Coal, Pseudocoal, Torbanite and Aggregate — plays a large part in the supply chain for the South African chemicals industry and is a crucial element in the steel sector.

## **2.7 Motivation for the overall preferred site, activities and technology alternative**

The proposed project is located in an open space which is used for cultivation and was

confirmed during site assessment, and it is clear that the proposed land is always used for local livestock. Therefore, current activities will be disturbed for only 2 years and after mining closure. On cessation of mining activities in the area of interest, the disturbed land will be rehabilitated back to its original state as before mining activities commenced and current activities will continue as before mining took place. The proposed site is located in an area where there are mining related activities; it was noticed during site assessment that there are operating mines and Glencore operation next to the project area of which according to the windward search Glencore is the landowner of the project area. Mining activities will be maintained/ contained within an authorised applied 5 ha to avoid unnecessary damages to the natural vegetation.

The proposed site earmarked for the mining of the Coal, Pseudocoal, Torbanite and Aggregate will include the opencast. The proposed site was identified as the preferred alternative due to the following reasons:

- The site offers the sought-after resource.
- The mining impacts can be contained to one area.
- The mining area can be reached by an existing access road from the regional road R 547 joined by an unnamed gravel road to the project area. No new road infrastructure needs to be constructed.
- The open cast mining of the Coal, Pseudocoal, Torbanite and Aggregate has been identified as the most effective method to produce the desired Coal, Pseudocoal, Torbanite and Aggregate . The potential impacts on the surrounding environment, associated with open cast mining, is deemed to be of low significance.
- The general waste produced on-site will be contained in sealed refuse bins to be transported to the authorised local municipal landfill site.
- As equipment maintenance and servicing will be done at an off-site workshop, the amount of hazardous waste to be produced at the site will be minimal and mainly as a result of accidental oil or diesel spillages.
- Contaminated soil will be removed to the depth of the spillage and contained in sealed bins until removed from site by a hazardous waste-handling contractor to be disposed of at a registered hazardous waste handling site.

## **2.8 Full description of process followed to reach proposed preferred alternatives within the site.**

This section is about the determination of the specific site layout and the location of infrastructure and activities on site, having taken into consideration the issues raised by

interested and affected parties (I&APs), and the consideration of alternatives to the initially proposed site layout.

This section is about the determination of the specific site layout and the location of infrastructure and activities on site, having taken into consideration the issues raised by interested and affected parties, and the consideration of alternatives to the initially proposed site layout. Details of the development footprint alternatives have been considered. With reference to the site plan provided and the location of the individual activities on site, provide details of the alternatives considered with respect to:

- The property on which or location where it is proposed to undertake the activity

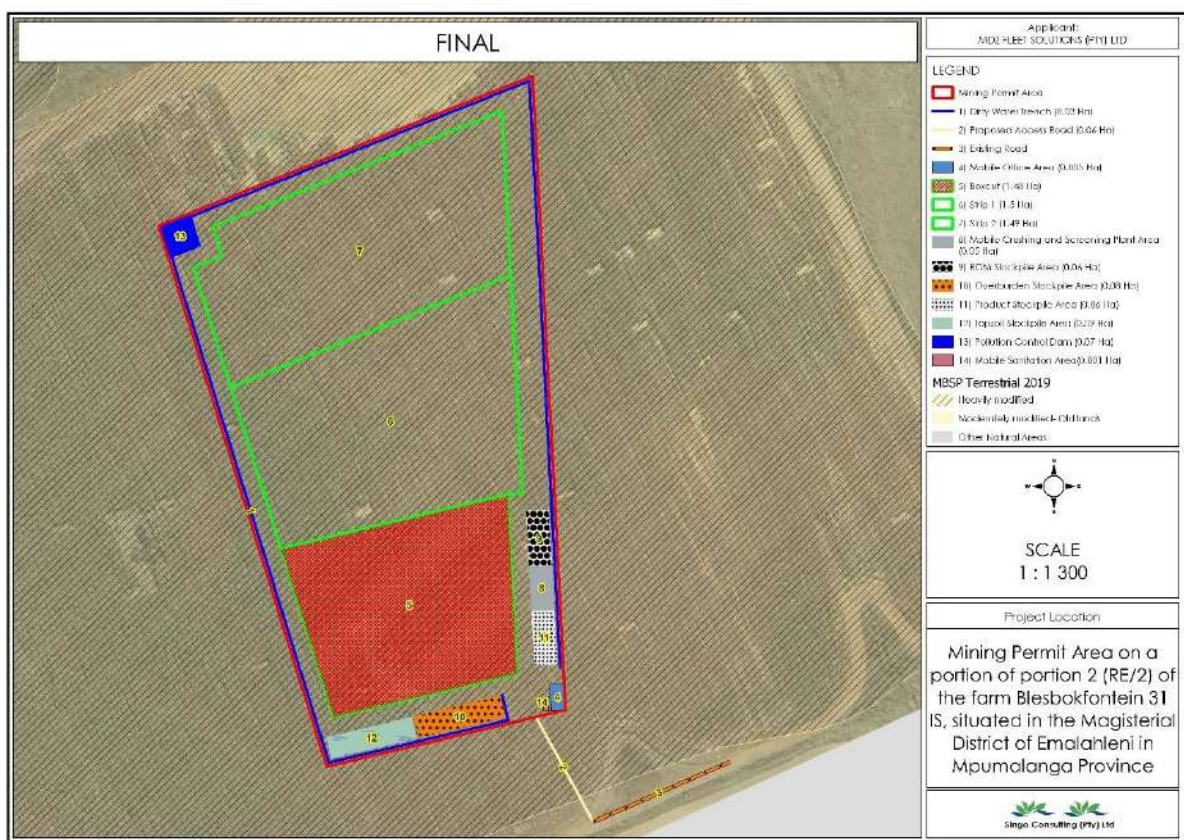


Figure 8: Proposed mine layout (infrastructure plans)

## 2.9 Details of the development footprint alternatives considered

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

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

- (b) the type of activity to be undertaken
- (c) the design or layout of the activity
- (d) the technology to be used in the activity
- (e) the operational aspects of the activity
- (f) the option of not implementing the activity

**a) The property on which or location where it is proposed to undertake the activity**

The proposed project is located within portion 2 of the farm Blesbokfontein 31 IS, which is located within the local municipality of eMalahleni. The Mining Permit is situated approximately 61 km Southwest of Middelburg, approximately 40,8 km Southwest of Emalahleni and approximately 32 km South East of Ogies.

Geology is the primary driver for determining the location of the mining operation. A fraction of the application area, which is 5 hectares, will be expected to develop. Due to an increase in Coal, Pseudocoal, Torbanite and Aggregate usage and demand in the industry, the company recognized the need for the commodity applied for in the region. The applicant therefore described the proposed area as the preferred and only viable site alternative.



**Figure 9:** Google Earth Map showing the Mining Permit.

**b) The type of activity to be undertaken**

On portion 2 of the Farm Blesbokfontein 31 IS, the primary activity to be carried out is the extraction of in-situ Coal, Pseudocoal, Torbanite and Aggregate resources using open cast

mining technique. Since the suggested open-cast mining method does not require as much machinery as other methods and provides for easy access by machinery to the site, small-scale miners can afford to use it. This makes small-scale mining of Coal, Pseudocoal, Torbanite and Aggregate reserves financially viable by lowering the overall expenses related to the mining process.

### **c) The design or layout of the activity**

Opencast mining is the suggested technique. The open cast proposed mine would be worked in a single direction with a traditional truck and shovel equipment. To ensure that the mined-out area is returned to its pre-mining condition, the sustainable development principle must be used during the mining and rehabilitation phase. The following are the main steps that will be taken throughout the mining process:

- Digging and trenching around mining area
- Build a flat ramp for water bowser
- Topsoil to be stripped and stacked
- Ripping of hard overburden and stockpiling
- Excavation of the initial box cut
- Extraction of Coal, Pseudocoal, Torbanite and Aggregate and run of mine (RoM)
- Load and haul
- Backfilling rehabilitation concurrently as mine progress forward

### **d) The technology to be used in the activity**

The opencast mining method will be taken into account in order to fully extract and utilize the local Coal, Pseudocoal, Torbanite and Aggregate resource. Truck and shovel activity will be taking place. Front-end loaders will be used to load material into haulage trucks, which will subsequently transport the Coal, Pseudocoal, Torbanite and Aggregate through newly constructed haul roads within the Mining Permit area. The mined Coal, Pseudocoal, Torbanite and Aggregate will be crushed and screened using a mobile crushing and screening system. The Coal, Pseudocoal, Torbanite and Aggregate will undergo treatment away from the location. These mining procedures are standard practice for opencast mining operations, as was previously indicated. The applicant will be advised to submit an application for changes under

### **Types of Blasting Explosives to be Employed**

Non-Ex Rock Breaking Cartridges will be used to shatter hard rocks in sensitive areas because they don't contain high explosives and vibrate less than conventional explosives.

With the use of a pyrotechnic mixture (low explosives), which creates tensile tension through rapid gas expansion in a sealed (stemmed) drill hole, rocks can be broken without causing environmental damage.

## **Environmental Impacts Associated with the Non-Ex Rock Breaking Cartridges**

### **Air blast Overpressure**

Air blast overpressure is the pressure produced by blasting above and beyond the atmospheric pressure produced by explosives. The three main problems with air blast overpressure are damage to people, damage to property, and damage to windows.

The non-Ex TM method of breaking ensures that expansion gases are maintained in the hole and results in very low overpressure levels by successfully stemming the drill hole. When compared to conventional explosives, Non-ext M produces overpressure levels that are extraordinarily low, short-lived, less frequent, and less damaging. This gives non-ext M a substantial edge over explosives in situations with delicate environmental conditions.

### **Noise**

The portion of the air blast pressure wave that is audible to the human ear is known as noise. The noise that follows a blast is caused by the audible high frequency component of the air pressure wave. Although the lower frequency section is not audible, it has the ability to excite objects like windows, which react by making secondary noises like rattles. The weight, burden, depth of the hole, and effectiveness of the stemming utilized all have a significant impact on the noise levels produced by non-ext M. At 50 meters from the hole, a well-stemmed non-ext M cartridge in granite will typically create noise levels between 80 and 85 dBl. The volume of noise can be attenuated by the use of conveyor belting, or other matting, to cover the holes being fired.

### **Ground Vibration**

Ground-borne vibrations caused by blasting could damage nearby structures and infrastructure. The amount of damage caused by vibrations during blasting depends on the magnitude, frequency, and duration of the vibration. In general, low frequency, long duration vibrations are more harmful than high frequency, short duration vibrations. Non-EXTM vibration waves often have higher frequencies, with a mean of 450 Hz, and shorter durations, making them the least harmful to sensitive structures. Additionally, Non-vibration ExTM's levels are exceptionally low in magnitude when compared to explosives at a comparable distance from the shot hole. When the propellant mixture in a non-ext M cartridge detonates, there is an almost instantaneous change from solid to gaseous matter, as well as a sharp increase in blasthole pressure and temperature. Together with it, there is a pressure wave whose

amplitude reduces the farther away it is from the drillhole. The key factors that are known to influence how much ground vibration is brought on by Non-ExTM cartridges are as follows:

- The weight of propellant per cartridge;
- The distance between the drillholes and the point of measurement;
- The local geological conditions, and the influence of geology and topography on vibration attenuation.

### **Vibration Limits for Structures**

The strength, frequency, and duration of the vibration all affect how much damage is inflicted by blasting. Vibrations with a low frequency and a long duration typically cause more harm than those with a high frequency and a short duration.

Both the US Bureau of Mines' (USB) and the British Standard's (BS) guidelines, which are frequently employed in vibration specifications for rock breaking near sensitive buildings, contain this basic norm. These are the USBM

#### Frequencies above 40 Hz

- PPV less than 50 mm/s- safe zone
- PPV greater than 50 mm/s- damage zone

#### Frequencies below 40 Hz

- PPV less than 13 mm/s- safe zone (old wooden house)
- PPV greater than 19.5 mm/s- safe zone (modern house)



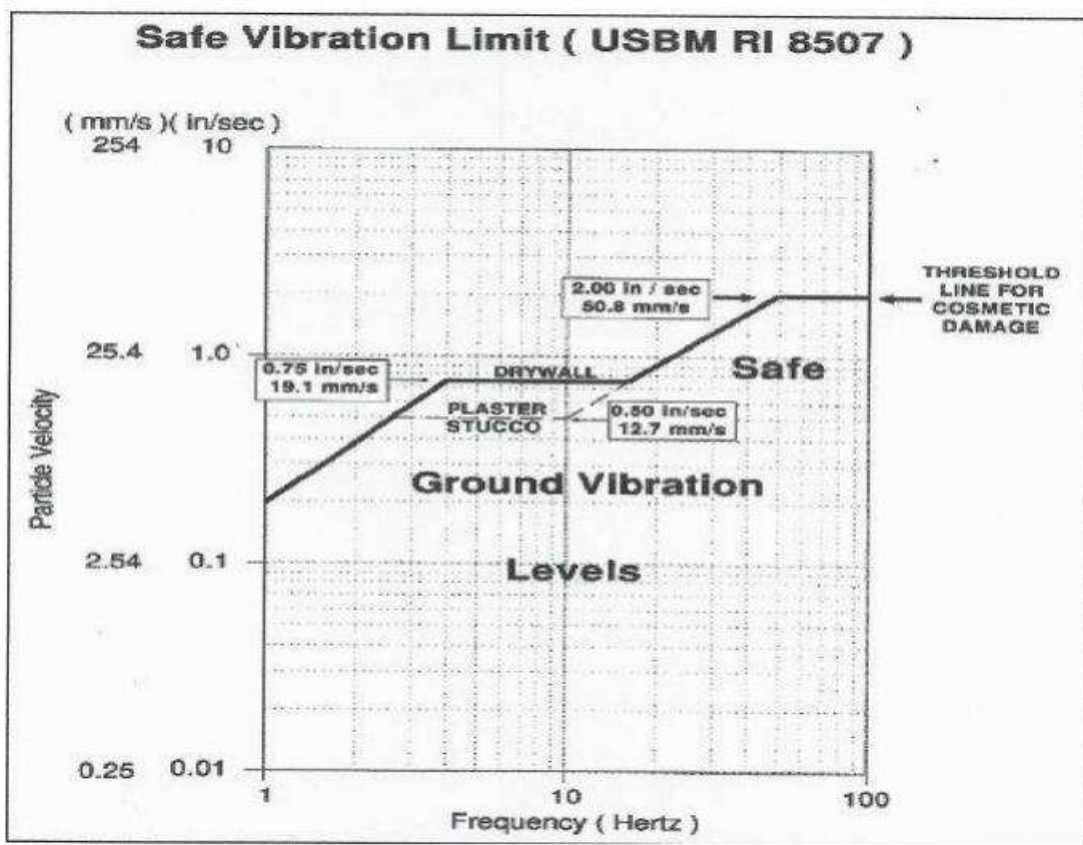


Figure 10: The vibrations generated by Non-Ex™ are well within most imposed restrictions for rock breaking close to sensitive structures.

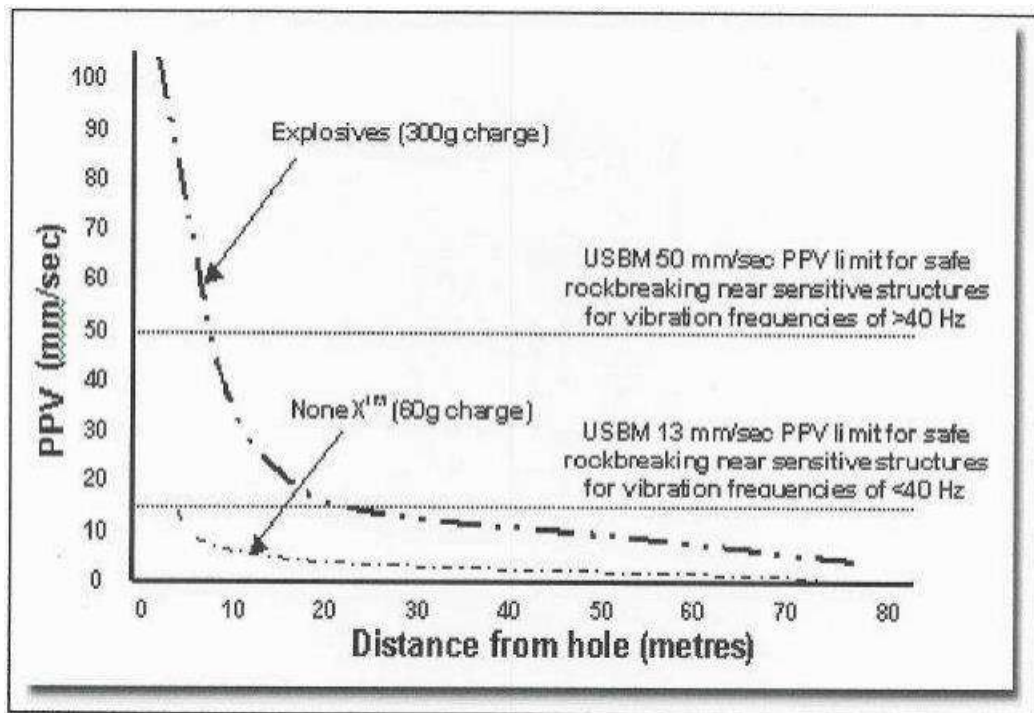


Figure 11: Comparative vibration results of explosives

As can be seen from the above figure, safe vibration levels for rock breaking, as defined in the USBM guidelines, can be achieved by Non-Ex™ within 5 metres of a sensitive structure.

### **Safety Distances**

One of the main advantages of using Non-Ex Rock Breaking Cartridges is that there are around 50 meters of safety distances when blasting oversized rock in the open without any covering. This suggests that a limited clearance is sufficient for people and equipment, rather than a whole site evacuation. A plus is having the rapid and close access to crush rocks and boulders.

The safety distance to delicate machinery and infrastructure is greatly reduced when the explosion is covered with matting and soft ground.

### **Noxious fumes**

By ensuring that there is enough oxygen available for the chemical process to achieve optimal oxidation and produce gases consisting of carbon dioxide, nitrogen, and steam, the oxygen balancing of the Non-Ex™ cartridge minimizes the production of dangerous gases like carbon monoxide and nitrous fumes. Less propellant is used to break the rock as compared to explosives, which significantly reduces the amount of fumes emitted during the rock-breaking operation. Due to the degree of oxidation accomplished during the deflagration process, the incorporation of an effective oxidizing agent, and the relatively tiny amount of propellant utilized in each hole, the Non-Ex™ cartridge produces a limited amount of noxious fumes. When an appropriate level of airflow (nominally a) is provided, these gases are eliminated in a matter of minutes.

### **Fly rock**

Blasting with conventional explosives typically requires the evacuation of the rock-breaking area within a 500-meter radius, which slows down equipment operation and hampers production. Due to the unpredictable nature of fly rock generation, lay-on charges cannot be employed in any situation where fly rock is prohibited.

Contrarily, a Non-Ex™ cartridge produces the best hole pressurization for the given weight and rock type. The parameters of the pressure pulse can be changed to control the speed and range of the dislodged rock.

A tiny amount of low velocity fly rock is produced by a controlled gas release from the Non-Ex™ cartridge at a low pressure, and it is typically contained within 10 meters of the rock breaking event.

The table below shows clear advantages in the use of Non-Ex.

Nonex™ RBC's Compared to Conventional Explosives		
Particulars	Conventional Explosives	Nonex Cartridge
Environmental effect	Adverse Effects – Landslides, crevasses in earth strata, tunnel collapse etc.	No adverse effect.
Fly Rock	High velocity, uncontrolled, fly rocks up to 500metres	Controllable low velocity fly rocks up to 50m
Shockwave	Supersonic shock wave with significant damage	No shock wave
Dust levels	High level of dust produced by crushing effect.	Minimal dust due to better fragmentation.
Vibrations	High level vibrations – unfit for use in built up areas	Low vibrations – ideal for built up areas/sensitive projects
UN Hazard Division	1.1	1.3C
Functions on	Detonation	Deflagrating
Reaction speed	3,000 -10,000 m/sec.	300 – 1000 m/sec.
Pressure	1200 GPa	450 MPa
Working principle	Produces SHOCK WAVE, resulting in Blast and Shattering effect	NO SHOCK WAVE- Produces gases only which split the rock.
Safety Distance	Minimum 500m	Average 100m
Noxious fumes	Underground mines – 3 hour re-entry time	30 minutes re-entry time

**Figure 12: Comparison of Conventional explosives and Nonex Cartridge**

**e) Operation aspect of the activity**

The timing of implementing mining programme will commence as soon as the permit is granted by the DMRE, the landowner, interested and affected parties will be notified about the sinkholes / land subsidence within the proposed mining area and the mining programme to ensure a proper rehabilitation of the area, satisfactory working and adhering relationship.

**f) Option of not implementing the activity**

It is anticipated that no Coal, Pseudocoal, Torbanite and Aggregate would be produced and the land subsidence would not be fixed if the proposed mining operation is rejected, providing a risk and hazard to surrounding residents and animals. Power facilities that depend on Coal, Pseudocoal, Torbanite and Aggregate for energy generation may not have access to enough Coal, Pseudocoal, Torbanite and Aggregate as a result of rejecting the proposed mining operation, which would be bad for the plants.

The applicant chose the suggested locations as the lone and preferable site alternative in this context. It has been established through significant prior research in this region that the resource sought is present there. Without the need or need to justify it, this area may contain levels of contamination, yet it is thought to have a higher significance.

Various project alternatives were considered during the planning phase of the project. These included the following:

### **2.9.1 Open cast mining (preferred alternative) vs. underground mining**

- The open cast mining method is used when deposits of commercially useful minerals or rock are found near the surface, where the overburden is relatively thin, or the material is structurally unsuitable for tunnelling.
- Underground mining is used where the mineral occurs deep below the surface and the overburden is thick.
- Open cast mining of the Coal, Pseudocoal, Torbanite and Aggregate has been identified as the most cost-effective method to produce the desired Coal, Pseudocoal, Torbanite and Aggregate as it is found near the surface, with only a narrow layer of overburden that needs to be removed.
- The geology of the area and depth of Coal, Pseudocoal, Torbanite and Aggregate to be mined is structurally unsuitable for tunnelling.
- The open cast mining method will not produce any residual waste to be disposed of. Due to the location of the proposed Coal, Pseudocoal, Torbanite and Aggregate mine, the potential impacts on the surrounding environment are expected to be insignificant. It is proposed that all mining-related infrastructure be contained in the boundary of the mining area.

### **2.9.2 Temporary infrastructure (preferred alternative) vs. permanent infrastructure**

- Temporary infrastructure use will entail the use of track-based or easily removable infrastructure. This includes a mobile in-proposed mine crusher plant, temporary weigh bridge and chemical toilet, with off-site vehicle and equipment servicing (at the applicant's existing workshop). The off-site office will be used for project administration purposes.
- Positive aspects: The infrastructure can be moved around in the mining area boundaries as mining progresses, decreasing the distance material has to be transported from the crusher plant to the stockpile area. In addition, the crusher plant and other equipment can move out of the mining area (and onto the existing road) during a blast to prevent potential fly rock damage. During the decommissioning phase, infrastructure will be removed from the mining area, making site rehabilitation easy and effective.
- Permanent infrastructure will entail the construction of an office building with ablution facilities, installation of a septic tank to be connected to the ablution facilities, installation of a permanent weigh bridge and permanent crusher plant.
- The use of permanent infrastructure will increase the impact of the proposed project

on the environment as it will entail the establishment of more structures, necessitate the use of concrete products on site in order to establish this infrastructure, lengthen the period required for rehabilitation as well as increase the rehabilitation cost as the permanent infrastructure will either have to be decommissioned or be maintained after the closure of the site.

- Due to the small size of the mining area the infrastructure may be exposed to fly rock damage during blasting events.
- The construction of permanent infrastructure on site will increase the visual impact of the proposed project on the surrounding environment and additional mitigation measures will have to be implemented to address the impact.
- In the light of the above, the use of temporary infrastructure is deemed to be the most viable preferred alternative.

### **2.9.3 Access onto provincial road (preferred alternative) vs. national road**

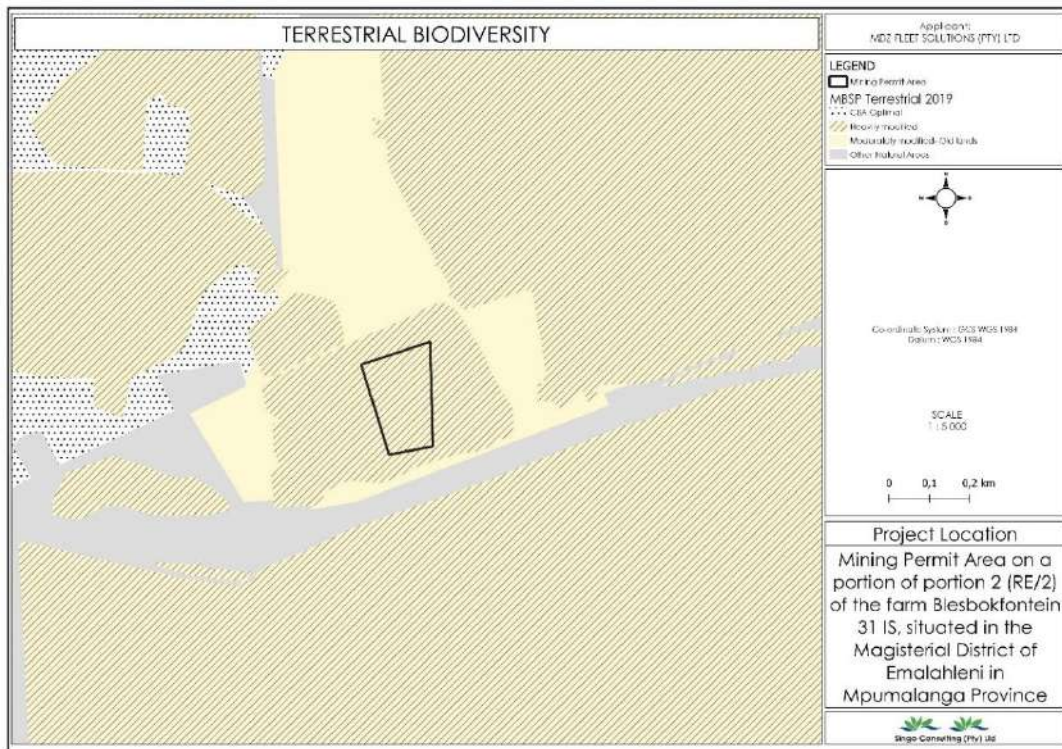
- Provincial roads (R 547): The existing access road connects to gravel road to the farm, It is proposed that this road be used by trucks transporting material from the proposed mine to the clients as it will prevent trucks having to turn from a farm entrance onto the local road, thereby minimising the potential impact on traffic.
- National road (N12): The turning of trucks transporting material from the mining area to clients onto the N12 is not considered here, since the N12 is about 10 km away. To minimise the impact the activity may have on traffic, it is proposed that this option is not implemented, and the alternative provincial road (as mentioned above) be used as access road to and from the proposed mining permit.

### **2.9.4 No-go alternative**

The No-Go alternative entails not mining the Coal, Pseudocoal, Torbanite and Aggregate reserve and leaving the area mainly as Highly modified. According to the GIS expert at Singo Consulting's Biodiversity Terrestrial Map, the planned project area is inside the Heavily modified (Areas with no direct benefit to biodiversity). Intensive agriculture, urban and industrial regions, as well as human infrastructure, are examples of non-natural or degraded natural environments that are not required by the ESA. Heavily modified areas are transformed areas where biodiversity and ecological functions have been lost to the point that they are not worth considering for conservation at all.

The business would need to look at opportunities to find applied minerals elsewhere in Mpumalanga. The land would remain fallow and not economically viable (as it is too small

for crop farming or commercial animal husbandry. The national assets (in this case, Coal, Pseudocoal, Torbanite and Aggregate ), that will not be made available for economic benefit to the South African people, will remain on the property. The ecological services will not be permanently altered by mining and the social benefits will not be obtained from the creation of a specific number of employment opportunities for 2 years.



**Figure 13:Terrestrial Biodiversity Map**

### 3 Details of the Public Participation Process Followed

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

#### 3.1.1 Public Participation Methodology

The right of the public to participate in decision-making was incorporated in South Africa's constitution, which is among the most progressive in the world. The National Assembly may (b) enact rules and orders regarding its business, with due consideration to representative and participatory democracy, accountability, openness, and public involvement, according to Section 57(1) of the new Constitution. This clause, along with a number of others, gave rise to a number of fresh tendencies in South African law. The concept of public participation (or stakeholder engagement) is prominent in environmental legislation, and recent regulations

passed under the National Environmental Management Act, 1998 (Act 107 of 1998, NEMA - as amended) have very strict requirements for public participation in environmental decision-making.

"A process leading to a collaborative effort by stakeholders, technical experts, the authorities, and the proponent who work together to create better outcomes than if they had acted individually" is how public involvement is defined (Greyling, 1999). It is clear from this definition that the public's input is given considerable weight.

The Public Participation Process (PPP) is designed to provide sufficient and accessible information to Interested and Affected Parties (I&APs) in an objective manner to assist them to:

- ❖ Raise issues of concern and suggestions for enhanced benefits.
- ❖ Verify that their issues have been recorded.
- ❖ Assist in identifying reasonable alternatives.
- ❖ Contribute relevant local information and knowledge to the environmental assessment.
- ❖ Comment on the findings of the environmental assessments.
- ❖ Obtain information on the outcome, i.e. the competent authority's decision, and how and by when the decision can be appealed.

### 3.2 Notification of I&APs

A crucial component of the Environmental Impact Assessment procedure is public participation. It guarantees the presentation of enough and pertinent information in an open and transparent manner. I&APs have the chance to learn more about the project through the public participation procedure, which also gives them the chance to contribute significantly to the fundamental evaluation process.

Any individual, group of individuals, or organization that is interested in or impacted by the proposed activity, as well as any state organ that may have jurisdiction over a component of the activity, may be an I&AP. The main goal of PPP during the basic evaluation Process is to give the I&APs a chance to comment and offer helpful ideas throughout the project's planning phase. The project timelines have been developed on the section below.

- **Announcement of the project:** 07th of July 2023
- **Review of Draft BAR & EMPr:** 07th of August 2023 until the 06th of September 2023.

From the day they received the DBAR & EMPr, stakeholders had 30 days to assess it. The process of involving I&APs included newspaper publication (see Figure 15), site notice (see Figure 16), emails, one-on-one consultation, phone calls, and meetings. Advertisements for the project were posted on-site at the R 547 turnoff leading to the intended location, as well next Saaiwater community next to the project area. Notices were also posted at the neighborhood public library (Ogies Public Library).



# TUT proud of communication skills lecturer

It is no tale or myth, TUT is overflowing with brainy students. Recently Dr Vukosi Mahleke, a communication skills lecturer at the eMalahleni Campus obtained her PhD. She started her journey with TUT in 2020 when she was employed by the TUT Department of Applied Languages, based in Soshanguve. "I lectured Xitsonga at levels two and three students at the school of education. In 2021, I lectured level one applied Tsonga to BTEch students and practical Tsonga (communication)," she said. As a folklore enthusiast, she wanted to learn more about the teacher and learner perspectives on engaging with English folklore in the English First Additional Language classroom. That became the topic for her thesis.

“She started her journey with TUT in 2020 when she was employed by the TUT”

"My PhD thesis was about teacher and learner perspectives on teaching folklore in grade nine English first additional language classroom." The aim was to investigate the rationale behind the perspectives on folklore in the English classroom to contribute to second language acquisition. "I also wanted to know if folklore could have a greater impact in schools. I chose grade nines because their ages are in the middle of adolescence. My wish for them is that when they reach adulthood, they will be prepared with life skills learned from folklore." She said she chose English folklore over African folklore because she wanted them to practice their English during story time. "I investigated further into this topic to ensure the teacher and learner perspectives on engaging with English folklore." Vukosi started lecturing at the eMalahleni campus in 2022.



Dr Vukosi Mahleke.



Pat May en Susan Langeveldt.



Ronel Mostert en Vanessa Grobler.



Wanda Bignaut, Reina Steyl en Vanessa Grobler.

NOTICE OF PUBLIC PARTICIPATION FOR MINING PERMIT AND ENVIRONMENTAL AUTHORISATION APPLICATION	
ISIZULU	ENGLISH
<p>Isicelo Semruve Yezimayini: I-MDZ Fleet Solutions (Pty) Ltd ifake isicelo Semruve Yezimayini ku-DIME Ref: MP 30/5/1/13/13571 MP ngenhloso yokumbisa amalahle, i-Pseudocoal, i-Ionbanite kanye ne-Aggregate engemveni z yepalazi I-Blesbekfontein 3115, esendaweni yeMantsi yase-eMalahleni eSifundazweni saseMpumalanga.</p>	<p>Application for a Mining Permit: MDZ Fleet Solutions (Pty) Ltd has lodged an application for a Mining Permit with DIME Ref: MP 30/5/1/13/13571 MP for the purpose of extracting Coal, Pseudocoal, Ionbanite and Aggregate on portion 2 of the Farm Blesbekfontein 31 15, situated in the Magisterial District of eMalahleni in the Mpumalanga Province.</p>
ISIMELO SOKUPHAWULA NONOYEZA IMIBONO MAYELANA NALE APPLICATIONI	INVITATION TO COMMENT
<p>Isizolo sinikezwe ngokuthetho Wokuthuthukisa Kwezimava kanye Nezamalunga (MPPDA) (iMithetho yama-28 ka-2002) kanye nemithetho yase-e-IAA ka-2014, ehlukile ngqamisa kweSizwe Sakhalumethi ka-2014 kanye No. ukuthi I-MDZ Fleet Solutions (Pty) Ltd ifake isicelo Semruve Yezimayini yale mineral eshwo ngenhlo yase-DIME Ref: MP 30/5/1/13/13571 MP.</p>	<p>Notice is hereby given in terms of the Mineral and Petroleum Resources Development Act (MPRDA) (Act 28 of 2002) and EIA regulations 2014, published under Government Notice No. 982 in Gazette No. 3822 of 8 December 2014, amended on 7 April 2017 and by GN 517 on 11 June 2021, that MDZ Fleet Solutions (Pty) Ltd has applied for a Mining Permit for the above-mentioned mineral with DIME Ref: MP 30/5/1/13/13571 MP.</p>
<p><b>Ukubhalisa Njengabantu Abanentshisekelo Nshathintekayo:</b> Njengengemvele yezulu ye-EIA, ikhululakazi Inqubo yokumbisa iqhamba komphakathi kule phrojekthi elingqongayo, Abanentshisekelo lizathathekayo (IIPAs) bayaminyana utaba babhalise futhi bathumele nomisa noma yikuphi ukuphawula noma utukuthazeka ukwe kutinyelwe uMKZ Takalani Rakaambo.</p>	<p><b>Registration as Interested &amp; Affected Party:</b> As part of the EIA process, more especially the public participation process for this proposed project, Interested and Affected Parties (I&amp;APs) are invited to register and kindly submit any comments or concerns to reach <b>Miss Takalani Rakaambo</b>.</p>
<p>Umpakathi uyaminyana futhi ukuthi ubuyeleze futhi uphawule ngombono Omuhleka Wokuthuthukisa Okusobekile (BAR) kanye nomthetho wokuqinisekisa Kwemvelo (EMP). Uthaxo Iw-IAA &amp; EMP izothobakala ukuthi kuthekezwe esikhathini sekhelodane izimvuku ezingama-30 ngoMombutho zizama-07 Agasti 2023 (kule lude utwelatharu zizama-06 kuSeptemba 2023 (Ngaphandle Kwamahlali Omphakathi), lo mbizo uzotholala e-Lynville Public Library (Vector Road, Lynville, Emalahleni, 1034, South Africa) and eMalahleni Local Municipality (Mandela Street eMalahleni 1034) futhi ngaphazwa kwelakho, amaqoqo e-electronic inge-imele: kumhantsi se-WhatsApp: i-#goode drayve; iSifilisa, nji.) uzotholala una aolwazi kwi-Singo Consulting (Pty) Ltd, kuetsheziwano imininingwane yokuthunana ye-EAP. Miss Takalani Rakaambo ngozansi. <b>Amarwana nge-DBAR &amp; EMP kufanele athunyelwe ngaphambi komhla zi 06 kuSeptemba 2023.</b></p>	<p>The public is also invited to review and comment on the Draft Basic Assessment Report (BAR) and Environmental Management Programme report (EMP). The draft BAR &amp; EMP will be available for review for 30 days calendar period <b>Monday the 07th of August 2023 until Wednesday the 06th of September 2023 (Excluding Public Holidays)</b>. This report will be available at <b>Lynville Public Library (Vector Road, Lynville, eMalahleni, 1034, South Africa) and eMalahleni Local Municipality (Mandela Street, eMalahleni, 1034) and furthermore, electronic copies (via email, Dropbox link, Google Drive, We Transfer, etc.) will be made available upon request from Singo Consulting (Pty) Ltd, using the contact details of the EAP Miss Takalani Rakaambo below. Comments on the DBAR &amp; EMP must be submitted no later than <b>06th September 2023</b>.</b></p>
EAP DETAILS:	APPLICANT DETAILS:
<p><b>Singo Consulting (Pty) Ltd</b> Physical Address: Office 870, 5 Balalaika Street, Tashet Park Ext 2, Witbank, 1040 Contact person: Miss Takalani Rakaambo Cell No.: +27 82 767 4011 Tel No.: +27 13 6920 0411 Fax No.: +27 86 5144 103 Email: takalani@singoconsulting.co.za</p>	<p><b>MDZ HOLDINGS</b> Physical address: Unit 147, Fernridge Estate, 1944 Fourways Ext 34, Fourways, 2191 Contact person: Mr. Percy Aluwani Ramathulana Tel No.: +27 10 900 4996 Email: aluwani@mdzhldings.co.za</p>

# Nocturne se eie gemmerboere

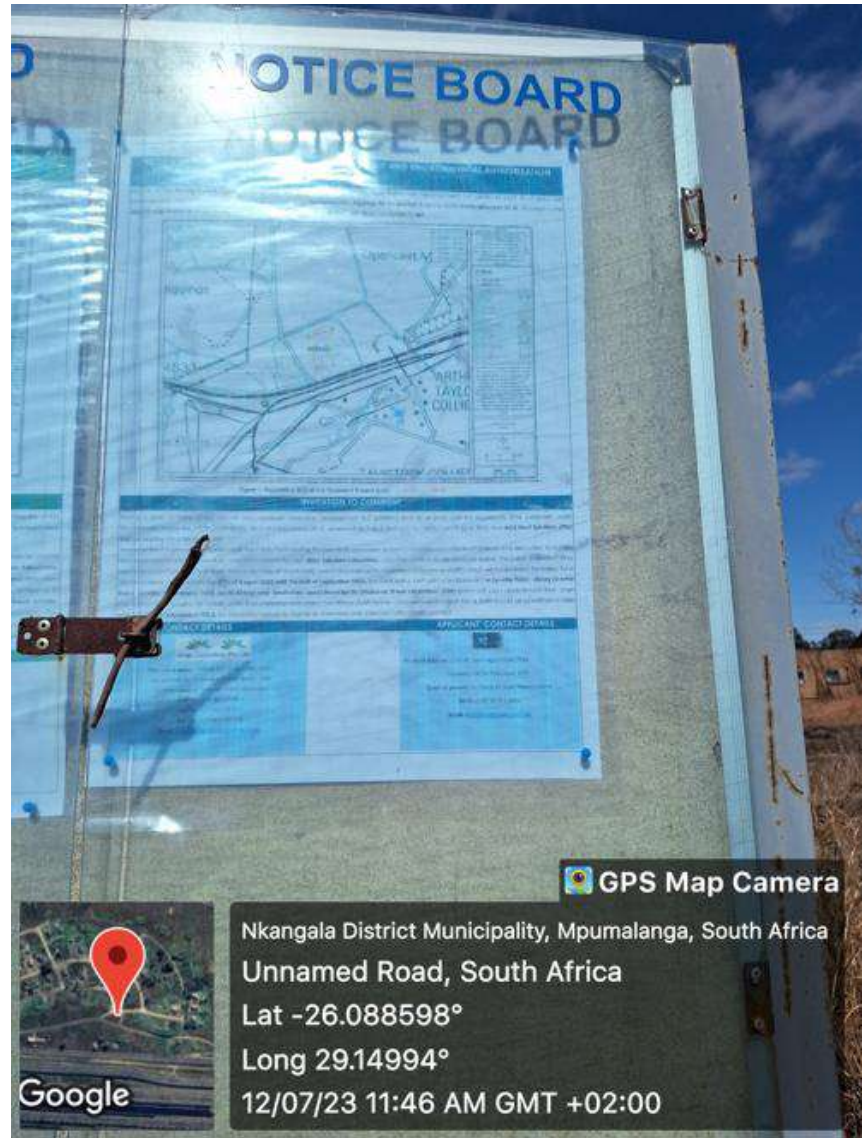
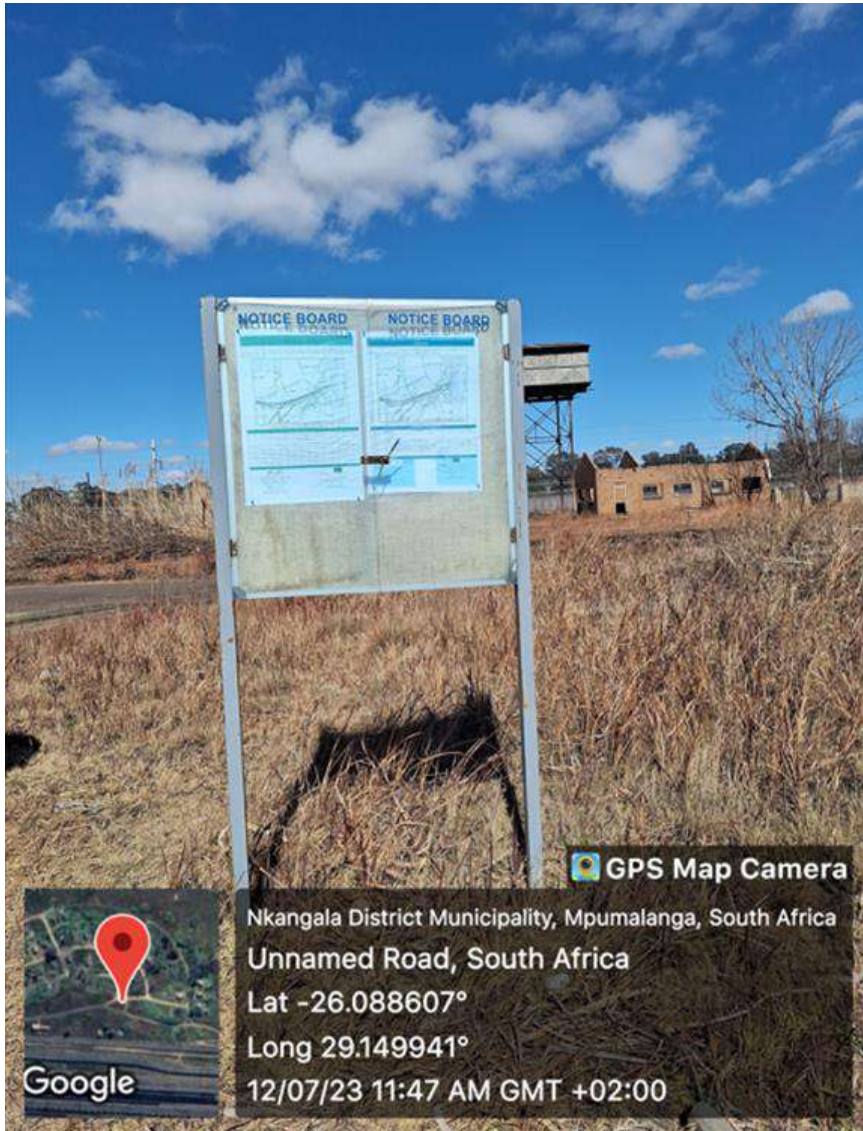
Die Nocturne-tak het nog 'n suksesvolle en prettige vergadering gehou. Op Donderdag, 29 Junie het die lede 'n kamaval-aand gehou. Daar was verskillende spelletjies en gelukkige trekkings met hope en hope pryse. Die dames is ook bederf met heerlike kerrie-en-rys en karamel-pannekoek vir nagereg. Die tak het ook hul gemmer-kampioen gekroon. In November 2022 het Katy Symms die tak uitgedaag om gemmer te plant. Gemmer was ook die tak se produk van die jaar en 14 lede van die tak het weggespring en

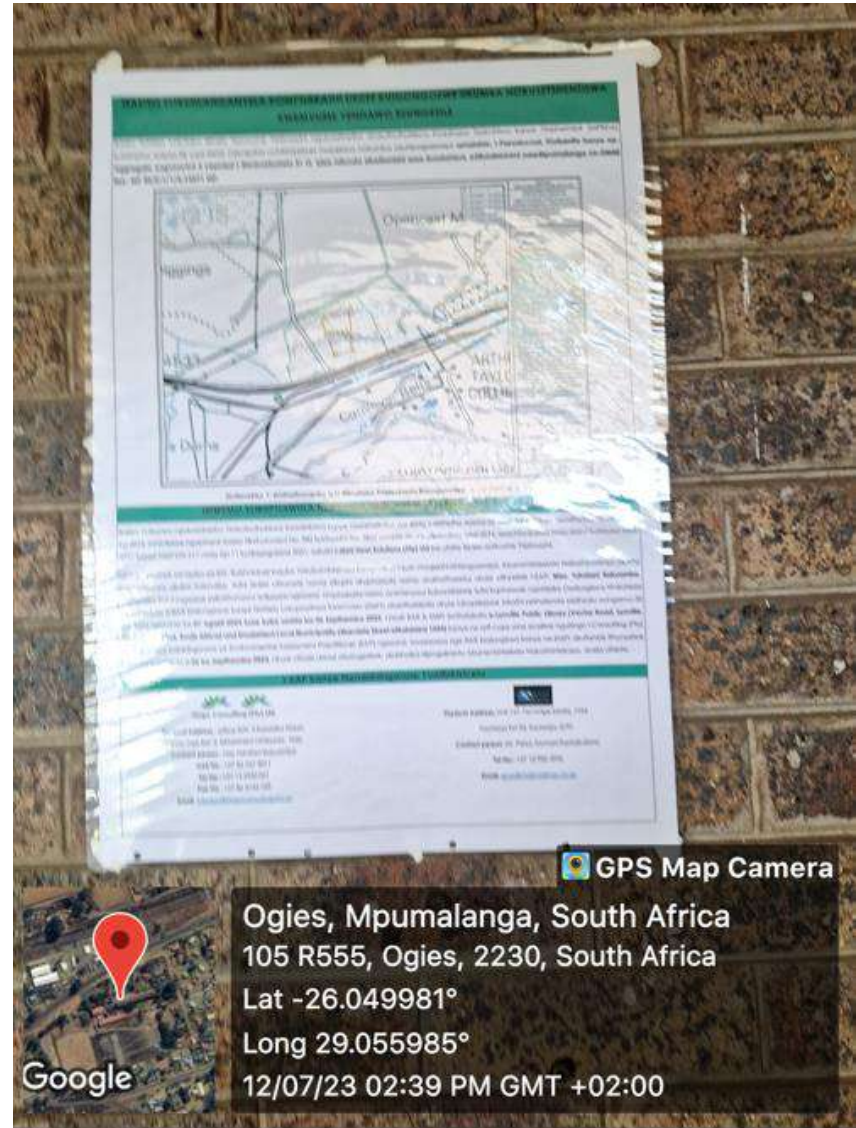
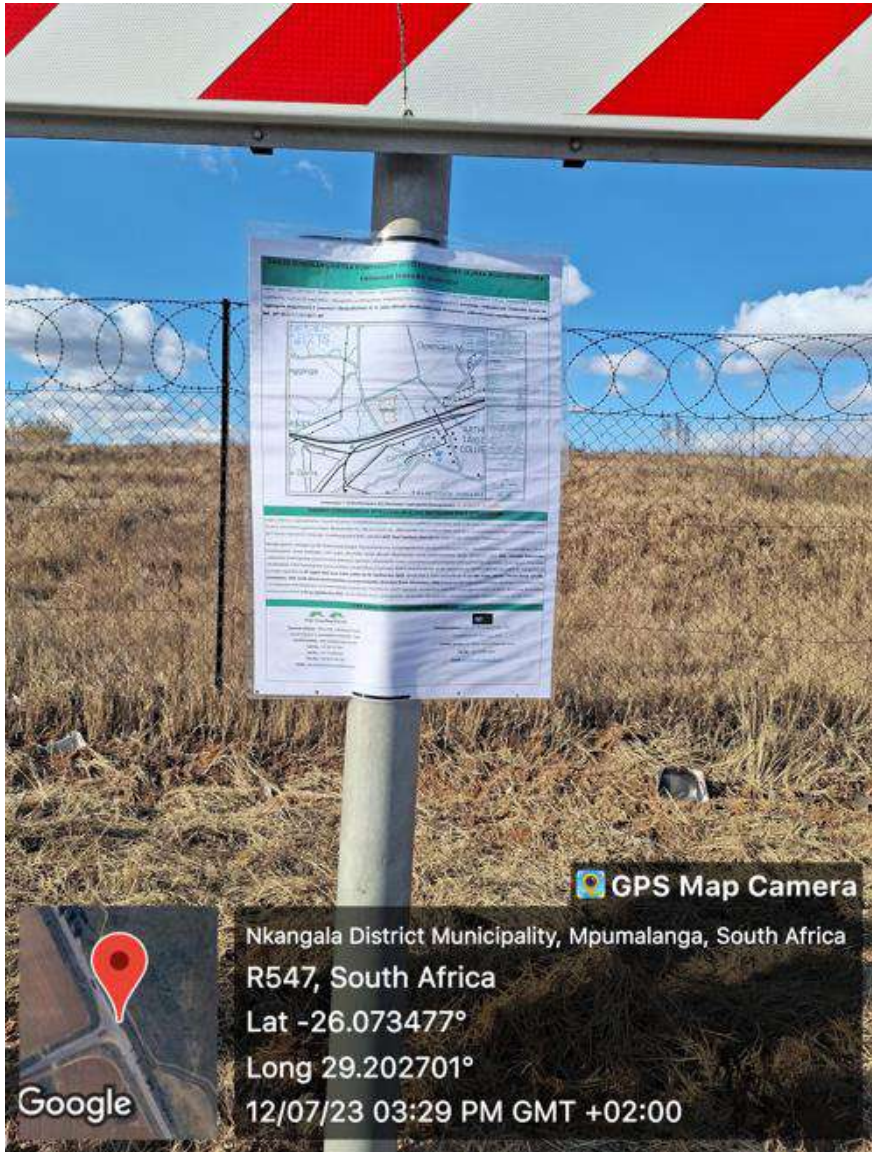
hul eie gemmer geplant wat ses tot sewe maande groei voorraat dit geoes kan word. In die afgelope tyd het die lede gereeld foto's geneem om sodanige die groeiproses te deel. Tyd vir oes het aangebreek einde Junie en Vikki van der Merwe is as die gemmer-kampioen aangewys met haar 678 gram gemmer wat sy geoes het. Vikki het ook met 'n prys weggestap. Die gemmer-prinses was Leigh Ann Pansegrouw wat 530 gram gemmer geoes het. Voorsitter Wilma van Zyl het met trots gesê sy is bevoorreg om deel te wees van 'n wenspan soos Nocturne-tak.

<p><b>BRITISH INTERNATIONAL DISTANCE COLLEGE</b> CAMBRIDGE International Examinations</p>	<p><b>DISTANCE EDUCATION THAT WORKS!</b></p> <ul style="list-style-type: none"> <li>✓ Checkpoint (11-14yrs)</li> <li>✓ IGCSE (O Levels) (14-16yrs)</li> <li>✓ AS Levels (16-20yrs+)</li> </ul>
<p>CONTACT: 130 Brysonson Drive, Bryanston 011 706 7775   info@bidc.co.za www.bidc.co.za</p>	<p><b>Best Joburg</b> WINNER</p>

Figure 14: Published newspaper advert, Witbank News, (07 July 2023)







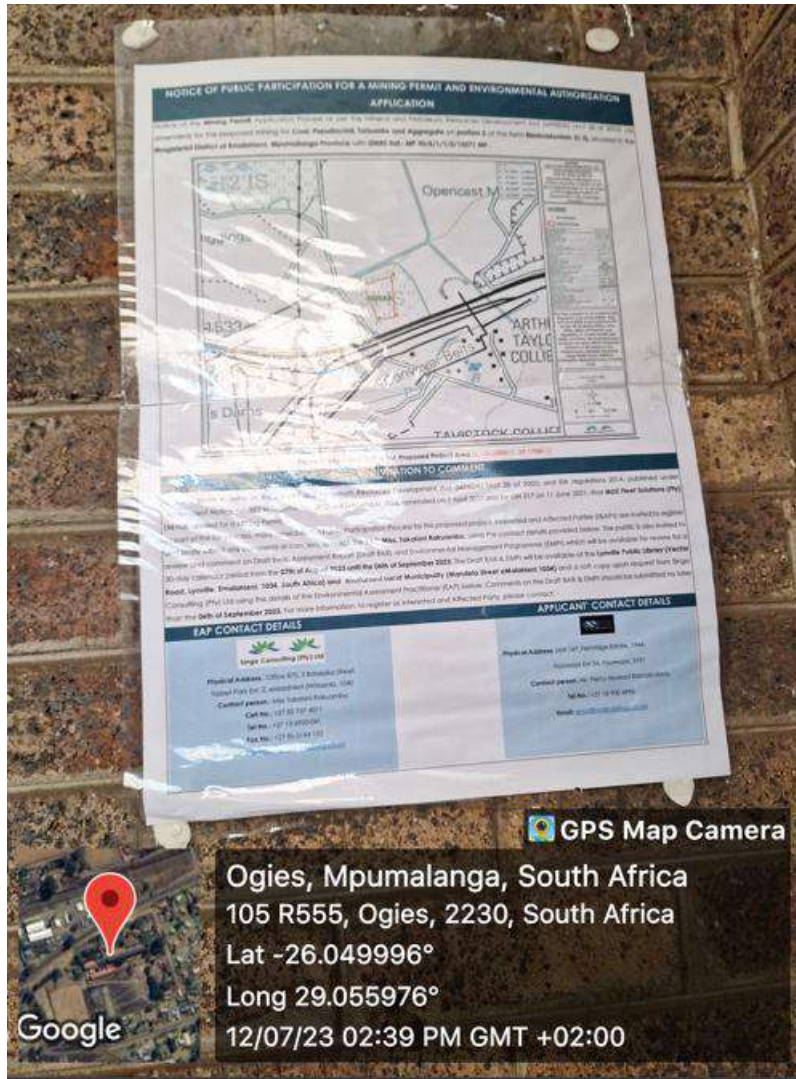


Figure 15: Placement of site notices

### **3.3 List Authorities Identified and Notified**

The following authorities have been identified and notified of the proposed Mining Permit project:

- eMalahleni Local Municipality
- Department of Water Affairs
- Department of Agriculture, Forestry and Fisheries
- Department of Environmental Affairs
- Mpumalanga Tourism and Parks Agency
- Department of Land Restitution Commission
- Department of Rural Development and Land Reform
- South African National Roads Agency Ltd (SANRAL).
- South African Heritage Resources Agency.
- Eskom SOC Limited.
- Sasol

#### **3.3.1 List of Surface Rights/Landowners Identified and Notified**

The land belongs to Glencore Operation (Pty)Ltd as per the title deed illustrated in Figure 17

Any personal information obtained from this search will only be used as per the Terms and Conditions agreed to and in accordance with applicable data protection laws including the Protection of Personal Information Act, 2013 (POPI), and shall not be used for marketing purposes.

**SEARCH CRITERIA**

Search Date	2023/06/21 08:43	Farm Number	31
Reference	-	Registration Division	IS
Report Print Date	2023/06/21 08:44	Portion Number	-
Farm Name	BLESBOKFONTEIN	Remaining Extent	NO
Deeds Office	Mpumalanga	Search Source	WinDeed Database

**PORTION LIST**

Portion	Owner	Title Deed	Registration Date	Price (R)
0	GLENCORE OPERATIONS PTY LTD			
2	GLENCORE OPERATIONS PTY LTD			
3	TRANSNET LTD			
4	TRANSNET LTD			

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0861 946 333  
windeed.support@lexisnexis.co.za  
search.windeed.co.za | www.windeed.co.za

**Figure 16:** Windeed results

### **3.3.2 Summary of Issues Raised by I&APs**




The project's stakeholders, interested parties, and impacted parties were made aware of it through the publication of a newspaper, the posting of site notifications, and email consultations that included the BID and the Reg 2.2 map. The BID, KML and letter of landowner notification were sent along with an email to the landowner for consultation. Glencore Operation as Landowner of the portion have been consulted through email saying they have taken instructions from their client, Glencore Operations SA (Pty) Ltd they will revert with their client's response.










**Table 4:** Issues raised by I&APs

Compile the table summarising comments and issues raised, and reaction to those responses.

Interested and Affected Parties		Date	Issues raised	EAPs response to issues as mandated by the applicant	Section and paragraph reference in this report where the issues and or response were incorporated.
List the name of persons consulted in this column, and		Comments			
Mark with an X where those who must be consulted were in fact consulted		Received (Call, Fax, emails)			
<b><u>AFFECTED PARTIES</u></b>					
<b>Landowner/s</b>					
Melissa Grobbelaar Glencore Operations (Pty) Ltd	X	21/07/2023 (email)	acknowledged, we have taken instructions from our client, Glencore Operations SA (Pty) Ltd – and will respond to our client's response.	registered as an interested and affected party, looking forward to hearing from you.	Refer to Appendix 4 for full consultation.
<b>Adjacent Landowner</b>					
<b>Local Municipality:</b>					

	x		No issue raised yet,	BID was shared along with consultation email 08 <sup>th</sup> of July 2023.	Refer to Appendix 4 for full consultation.
<b>Organs of state (Responsible for infrastructure that may be affected: Roads, Departments, Eskom, Telkom&amp; DWS)</b>					
					
	x	02/08/2023 (email)	Eskom Distribution will raise no objection to the proposed development, provided Eskom's rights and services are acknowledged and respected at all times.	email acknowledged, please note that the Consent Letter will be send back to you before commencement of the project.	Refer to Appendix 4 for full consultation.

	x		No issue raised yet,	BID was shared along with consultation email 08th of July 2023.	Refer to Appendix 4 for full consultation.
Communities					
Saaiwater Community	x	12/07/2023 (Face to Face)	We want the meeting to be arranged with all community members for decision making.	Meeting will be arranged with date to hear views from all members of the community.	Refer to Appendix 4 for full consultation.
Tribal leaders					
There are no tribal leaders					
Dept. of Environmental affairs					
 <b>environmental affairs</b> <small>Department: Environmental Affairs REPUBLIC OF SOUTH AFRICA</small>	x		No issue raised yet,	BID was shared along with consultation email 08th of July 2023.	Refer to Appendix 4 for full consultation.
Dept. Agriculture, land reform & rural development					
 <b>agriculture, land reform &amp; rural development</b> <small>Department: Agriculture, Land Reform and Rural Development REPUBLIC OF SOUTH AFRICA</small>	x	17/07/2023 (email)	The Department do not have comment at this stage. Register the Department as interested and affected parties	registered as an interested and affected party. The BAR and EMPr will be shared during the review period.	Refer to Appendix 4 for full consultation.

 <p><b>water &amp; sanitation</b> Department: Water and Sanitation REPUBLIC OF SOUTH AFRICA</p>	X		No issue raised yet	BID was shared along with consultation email 10th of July 2023.	Refer to Appendix 4 for full consultation.
 <p>Mpumalanga TOURISM AND PARKS AGENCY</p>					
<b>SAHRA</b>					
	X		No issue raised yet,	20/07/2023 Online application was completed on Sahra website.	Refer to for full consultation.
<b>Other Interested &amp; Affected Parties</b>					
 <p>Thevha</p>	X	18/07/2023 (email)	Assist with the email address for Glencore so that we can share our experiences for this application.	The request made regarding details of the landowner it is beyond the regulations in terms of POPIA, thus we unfortunately can't share the details of the landowner. However, we require to have a meeting with you so we can map a way forward seeing that we are overlapping.	Refer to Appendix 4 for full consultation.

			We can schedule the meeting for next week.	will stay in touch to finalize the time and location of the meeting.	
New Venture	X		No issue raised yet,	BID was shared along with consultation email 10th of July 2023.	Refer to Appendix 4 for full consultation.

## **The environmental attributes associated with the alternatives.**

The environmental attributes described must include socio-economic, social, heritage, cultural, geographical, physical and biological aspects.

### **4 Baseline environment**

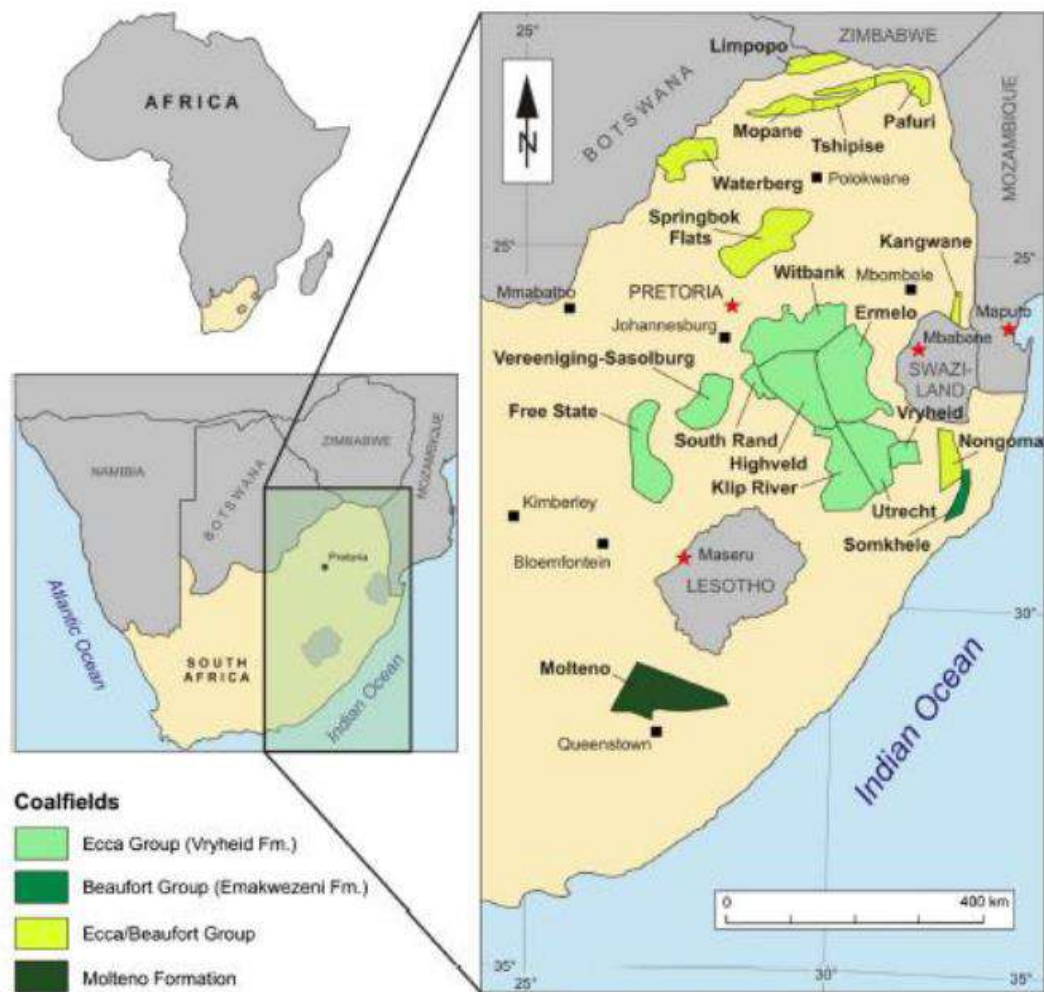
#### **4.1 Type of environment affected by the proposed activity**

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

##### **4.1.1 Regional geology**

###### **Karoo Supergroup**

The proposed project area falls under the main Karoo supergroup, under Ecca group. The sedimentary part of the Karoo Supergroup is subdivided into four main lithostratigraphic units, which from the base up are the Dwyka, Ecca, Beaufort and Stormberg (Molteno, Elliot and Clarens formations) groups (Johnson et al., 1996; SACS, 1980;). These are capped by some 1.48 km of basaltic lavas of the Drakensberg Group (Johnson et al., 1996; Veevers et al., 1994), the extrusion of which is related to the break-up of Gondwana (Cox, 1992). The basement to the Karoo Supergroup fill in both the MKB and in the northern basins is heterogeneous (Bordy et al., 2004; Hancox, 1998; Rutherford, 2009) and this heterogeneity plays a significant control on the nature of the fill, particularly during the early phases of the deposition of the Karoo Supergroup.



**Figure 17:** Coal, Pseudocoal, Torbanite and Aggregate field of South Africa (adopted from Hancox and Gotz, 2014).

### Dwyka Group

The rocks of the Dwyka Group in South Africa are amongst the most important glaciogenic deposits from Gondwana. This Group is named for exposures along the Dwyka River east of Laingsburg and forms the basal succession of the Karoo Supergroup. Dwyka Group strata are mostly contained within bedrock valleys incised into Archean to lower Palaeozoic bedrock (Visser, 1990; Visser and Kingsley, 1982; Von Brunn, 1996). The lithologies in the areas underlying the Coal, Pseudocoal, Torbanite and Aggregate fields of South Africa consist of a heterolithic arrangement of massive and stratified polymictic diamictites, conglomerates, sandstones and drop stone-bearing varved mudstones. The easily identifiable lithologies form a good marker below the Coal, Pseudocoal, Torbanite and Aggregate bearing Ecca Group. In the distal sector of the MKB these sedimentary strata accumulated largely as ground moraine associated with continental ice sheets and is generally composed of basal lodgement and supraglacial tills. These deposits are generally massive, but crude horizontal bedding occurs in places towards the top (Tankard et al., 1982).

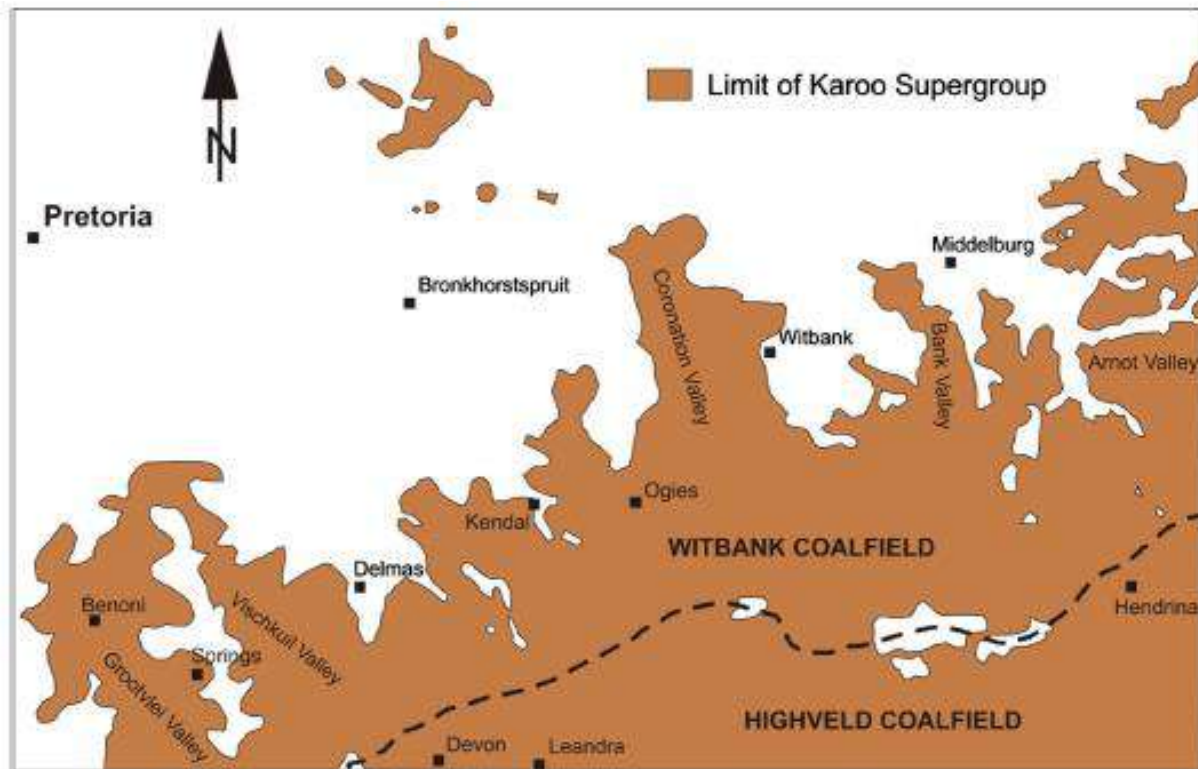
## **Ecce Group**

In the 1970s a number of studies (Cadle, 1974; Hobday, 1973, 1978; Mathew, 1974; Van Vuuren and Cole, 1979) showed that the Ecce Group could be subdivided into several informal units based on the cyclic nature of the sedimentary fills. In 1980 the South African Committee for Stratigraphy (SACS, 1980) introduced a formal lithostratigraphic nomenclature for the Ecce Group in the northern, distal sector of the MKB, which replaced the previously used informal Lower, Middle and Upper subdivisions with the Pietermaritzburg Shale Formation, the Vryheid Formation and the Volksrust Shale Formation.

## **Witbank Coal, Pseudocoal, Torbanite and Aggregate field**

The Witbank Coal, Pseudocoal, Torbanite and Aggregate field is elongated over 180 km in a west to east direction, it is not surprising that the basement to the Karoo Supergroup succession is varied. From west to east the basement rocks include metasedimentary, metavolcanic, and dolomitic rocks of the Neoproterozoic Transvaal Supergroup, metasedimentary and metavolcanic rocks of the Palaeoproterozoic Waterberg Group and BIC age intrusives (felsites and granites). The changing nature of the basement plays a major role in the nature of the palaeotopography created. For example, in the far east of the Witbank Coal, Pseudocoal, Torbanite and Aggregate field, where dolomites of the Transvaal Supergroup form the basement, abnormally thick Coal, Pseudocoal, Torbanite and Aggregate s filling karst topography are known. A similar but more extreme case is documented at the Syferfontein Colliery in the West Rand outlier (Stuart-Williams, 1986). In some areas close to the north-western basin margin, the stratigraphic column is reduced to only 80 m. It was also the focus of much of the academic research, including the works of Cairncross (1979) in the Van Dykes Drift area, Le Blanc Smith and Eriksson (1979) to the west of Witbank, and Holland et al. (1989) to the east of Witbank. Cadle and Cairncross (1993) described a sandy bedload dominated system with lateral accretion surfaces from the southern part of the central sector. More recently it has been covered in the regional geological model of Grodner (2002) and Grodner and Cairncross (2006) and various Competent Persons' Reports available on various companies' websites (Goldschmidt et al., 2010a).





**Figure 18:** Geographic extent of Witbank Coal, Pseudocoal, Torbanite and Aggregate field

-Five Coal, Pseudocoal, Torbanite and Aggregate seams occur in the Vryheid Formation and these are associated predominantly with the coarser-grained fluvial facies at the top of each sequence. These Coal, Pseudocoal, Torbanite and Aggregate seams can be traced laterally across the entire area of occurrence of the Vryheid Formation in the MKB; however, some disagreement exists as to the exact correlation in the various Coal, Pseudocoal, Torbanite and Aggregate fields. Regional differences allow for the considerable diversity of Coal, Pseudocoal, Torbanite and Aggregate types (organic content), mineral matter composition, and rank (maturity) that is found within the Coal, Pseudocoal, Torbanite and Aggregate fields of South Africa (Falcon, 1986b). The majority of the economically extracted Coal, Pseudocoal, Torbanite and Aggregate in South Africa occurs in rocks of the Vryheid Formation, which ranges in thickness in the MKB from less than 70.0 m to over 500.0 m. It is thickest to the south of the towns of Newcastle and Vryheid, where maximum subsidence took place (Du Toit, 1918; Cadle, 1975; Whateley, 1980a; Stavarakis, 1989; Cadle et al., 1982) and where the basin was the deepest.

The No. 2 Seam Sequence (Figure 4) includes the succession from the top of the basement to the top of the No. 2 Seam, which may be up to a maximum development of 60 m in places (Le Blanc Smith, 1980a). It incorporates the rocks of the Dwyka Group, as well as the overlying No. 1 and No. 2 Coal, Pseudocoal, Torbanite and Aggregate seams. It should be noted that we accept that the Dwyka has separate Group status, but that it is described as the basal part of the No. 2 Seam Sequence. The thickness of the Dwyka Group in the Witbank Coal, Pseudocoal, Torbanite and Aggregate field also varies considerably dependant on the nature of the underlying topography.

It ranges from being thin or absent over the most prominent pre-Karoo topographic highs, to over 25 m thick in the central part of the Witbank Coal, Pseudocoal, Torbanite and Aggregate field (Le Blanc Smith and Eriksson, 1979) to 30 m thick (Glasspool, 2003) in the deeper palaeo valleys. Le Blanc Smith and Eriksson (1979) note that the fill consists of poorly sorted matrix rich diamictites, laminated sandstones and siltstones, stratified pebbly mudstones and cross-stratified conglomerates.

In the western Witbank Coal, Pseudocoal, Torbanite and Aggregate field, the No. 2 Seam Sequence tends to be much more variable in nature than it is in the central part. This is mainly due to the irregular nature of the Transvaal Supergroup (Malmani Group) dolomite floor. The Dwyka Group outcrops in the area around Delmas and is also well known from borehole core, which show the succession to be between 0 and 10 m in thickness. The base of the No. 2 Seam Sequence is usually formed by poorly sorted matrix rich diamictites, with angular to rounded basement clasts, set in a matrix of fine- to medium-grained sandstone, which may be highly carbonaceous in places. Maximum clasts sizes documented by the authors are in the region of 30 cm. According to Le Blanc Smith (1980a) the Dwyka Group diamictites may in turn be overlain by a succession up to 36 m thick of mudstone and siltstone, which grades upwards to sandstone and conglomerate that form the floor of the No. 1 Seam or its carbonaceous mudstone equivalent.

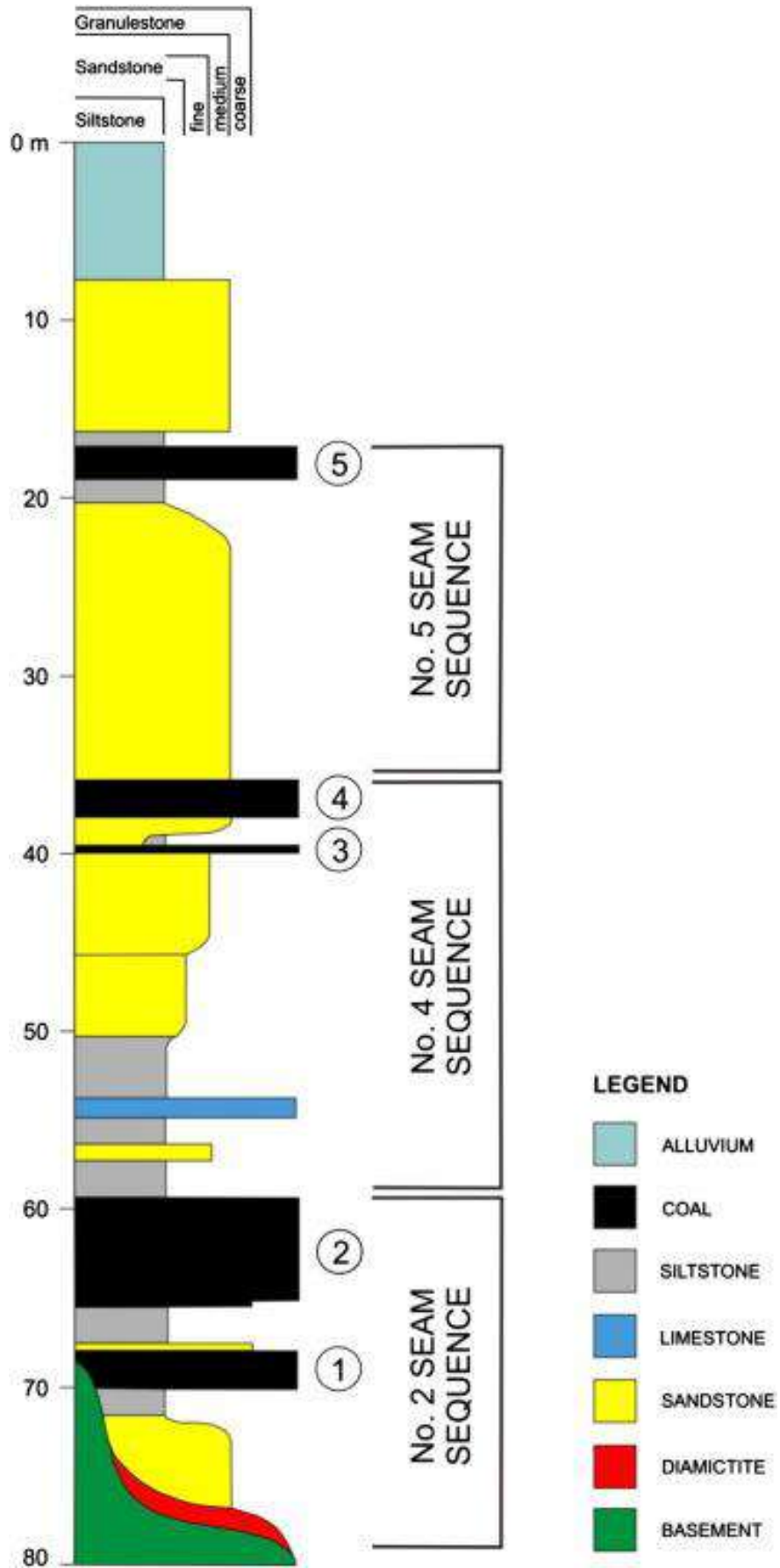


Figure 19: Typical Coal, Pseudocoal, Torbanite and Aggregate seam of the area.

#### 4.1.1.1 Local geology

The Vryheid Formation consists mainly of sandstone and shale with some subordinate Coal, Pseudocoal, Torbanite and Aggregate seams associated with it (SACS, 1980). The sediments of the Vryheid Formation probably represent alluvial plain, upper, and lower delta plain deposits with associated shallow lagoon and coastal swamps (Jermy and Bell, 1990). The change from stable margin to subsiding foreland basin confined the Vryheid.

The Vryheid Formation contains 5 major Coal, Pseudocoal, Torbanite and Aggregate seams, with locally developed partings and splits in the Coal, Pseudocoal, Torbanite and Aggregate seams increasing the number to 8, within an 85 m thick stratigraphic horizon (Greenshields, 1986) although this horizon can attain thicknesses up to 160 m in the deeper parts of the basin (Cadle et al., 1990). According to Cadle et al. (1990) all five major seams are still present in the thinnest and most proximal parts of the formation.

Greenshields (1986) states that all four cyclothem exhibit aggressive phase where sedimentation occur red influvio-deltaic environments, followed by a transgressive phase where sedimentation was typical of both marine and non-marine transgressive shorelines. A seam is therefore associated with clastic successions comprising carbonaceous shale or siltstone, fine to coarse-grained sandstone and minor conglomerate (Cadle et al. 1990).

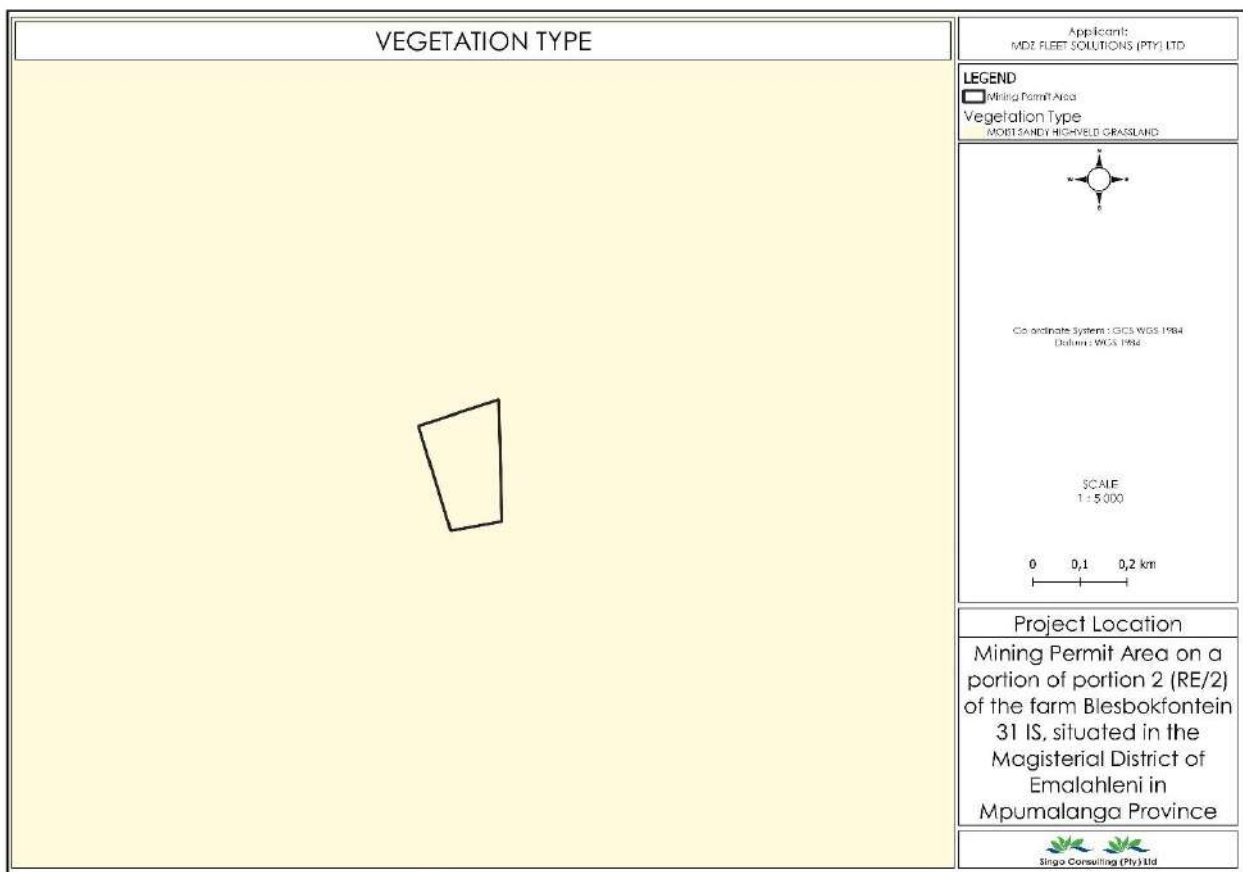


**Figure 20:** Geological formation within the proposed project

**4.1.1.2 Natural vegetation**

The vegetation cover in the proposed area is classified as moist sandy highveld grassland as indicated in Figure 21. Grasslands are dominated by a single layer of grasses (Rutherford & Westfall, 1986). The amount of cover depends on rainfall and the degree of grazing. The vegetation type is endangered nationally with none conserved and 55% altered, primarily by cultivation. The conservation status of this vegetation type is very poor, with large parts that are either currently cultivated or have been previously ploughed, and the remaining untransformed vegetation that occurs as patchy remnants that are often heavily grazed.

The Moist Sandy Highveld Grassland is also found in the sandy plains west of the Belfast-Carolina-Ermelo area, and north of Volksrust in Mpumalanga, at an altitude of 1,600 to 1,800 m. Moist Sandy Highveld Grassland is dominated by the grasses *Eragrostis plana*, *Eragrostis curvula*, *Heteropogon contortus*, *Trachypogon spicatus* and *Themeda triandra*.



**Figure 21:** Vegetation map of the project area

According to the screening report the area is characterised by Low sensitivity of plant species.

### MAP OF RELATIVE PLANT SPECIES THEME SENSITIVITY



**Figure 22:** Map of relative plant species theme sensitivity (source, screening report)

Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
			X

**Sensitivity Features:**

Sensitivity	Feature(s)
Low	Low Sensitivity

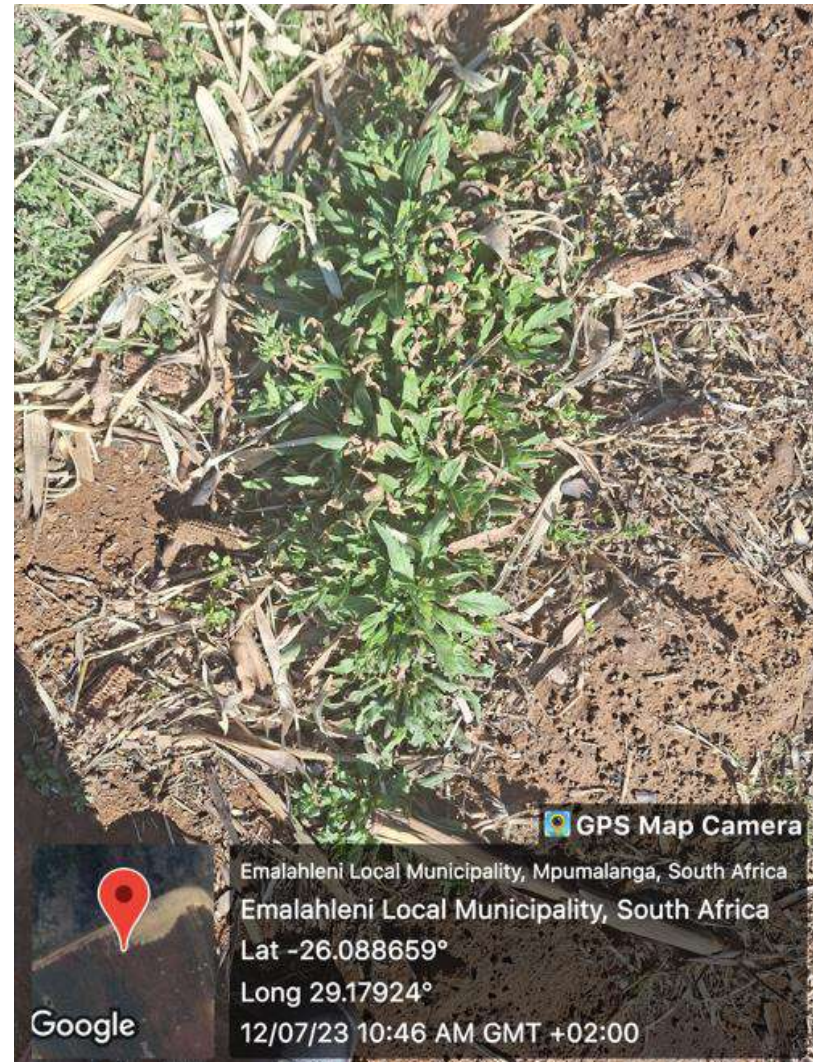
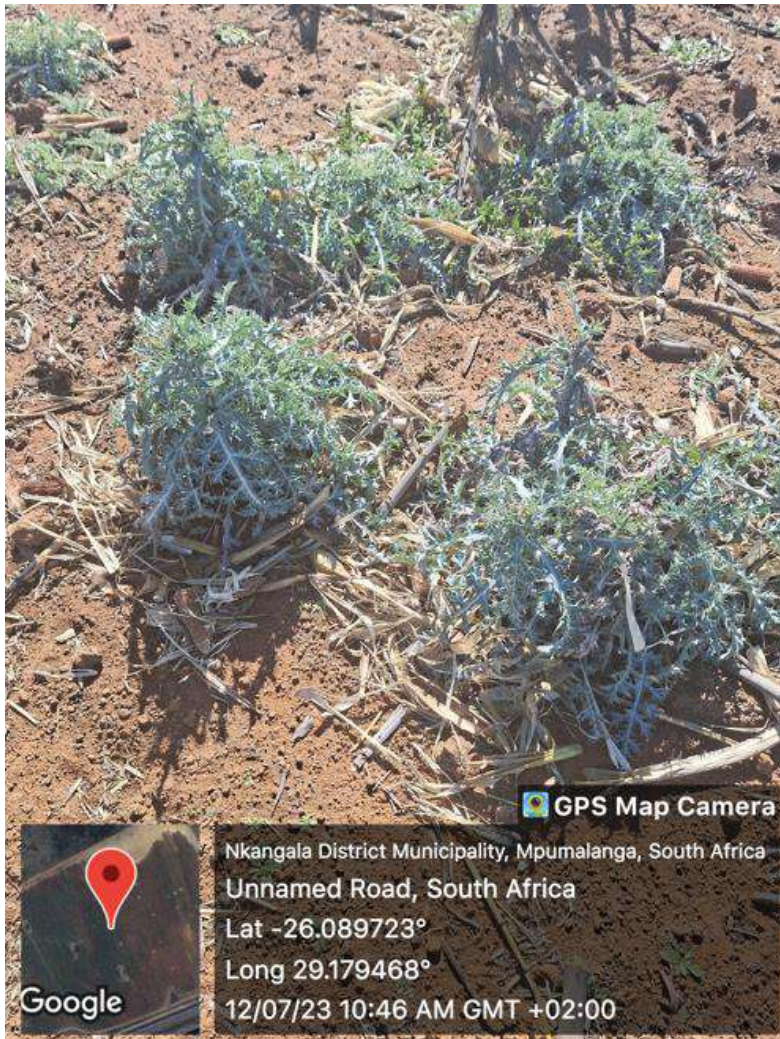


Figure 23: Vegetation types observed on site.

#### 4.1.1.3 Fauna

No domestic fauna was observed during site assessment such as cows and birds like doves although no wild fauna was observed at the time of the site inspection. Should any wild fauna enter the mining area there will be no impact on the proposed mining activity as they will be able to move away or through the site, without being harmed. The fauna at the site will not be impacted by the proposed processing activity, as they will be able to move away from or through the site unharmed. Workers must be educated and managed to ensure that no fauna at the site is harmed. Upon commencement of the proposed processing activities, the processing area will be fenced off to prevent livestock, such as cattle from wandering into the work areas.

According to the screening report the proposed mining area has medium animal sensitivity. The identified animal species include *Chrysospalax villosus*, *Crocidura maquassiensis*, *Dasymys robertsii* and *Hydrichtis Maculicollis*. (*Mammalia-Crocidura maquassiensis*) is a species of mammal in the family Soricidae. This is a rare species endemic to South Africa, Swaziland, and Zimbabwe, existing in moist grassland habitats in the Savannah and Grassland biomes.

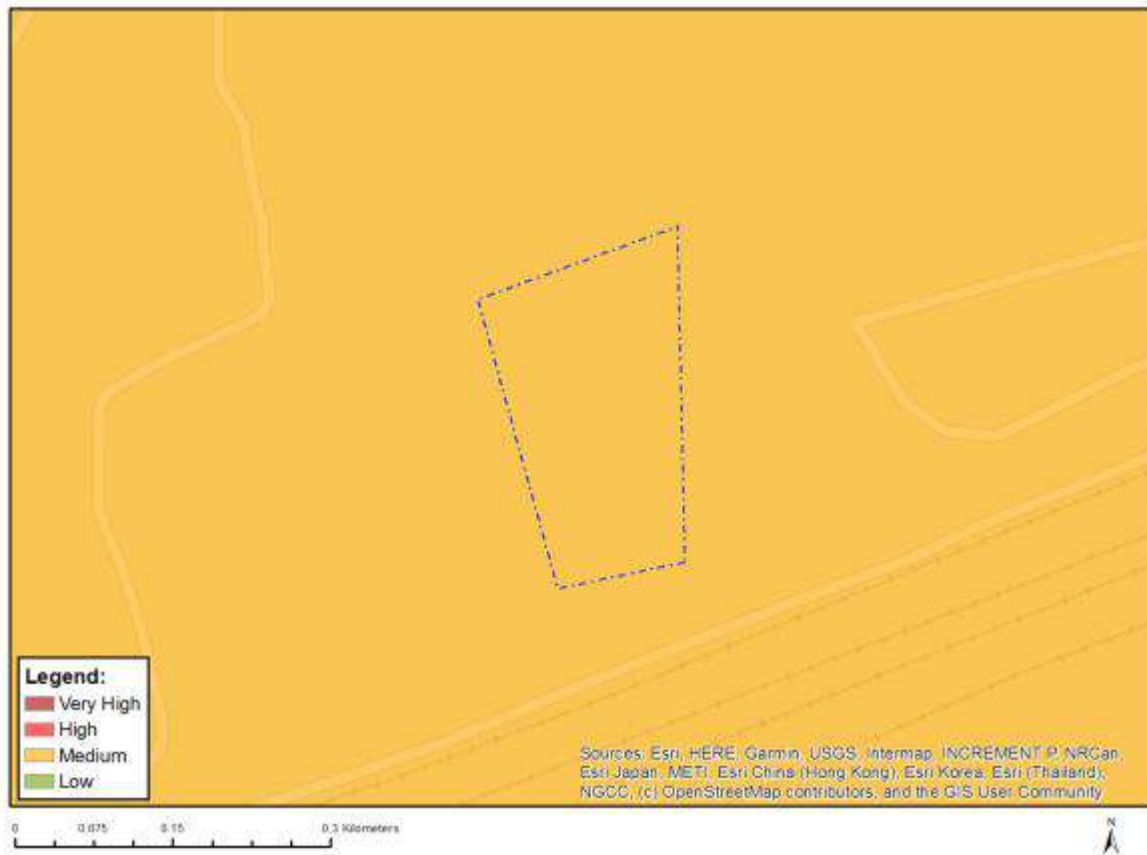


**Figure 24:** Typical example of *Mammalia-Crocidura maquassiensis* (adopted from mindat.org)

According to the screening report the area is characterised by medium sensitivity of animal species.



## MAP OF RELATIVE ANIMAL SPECIES THEME SENSITIVITY



**Figure 25:** Map of relative animal species theme sensitivity (source, screening report)

Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
		X	

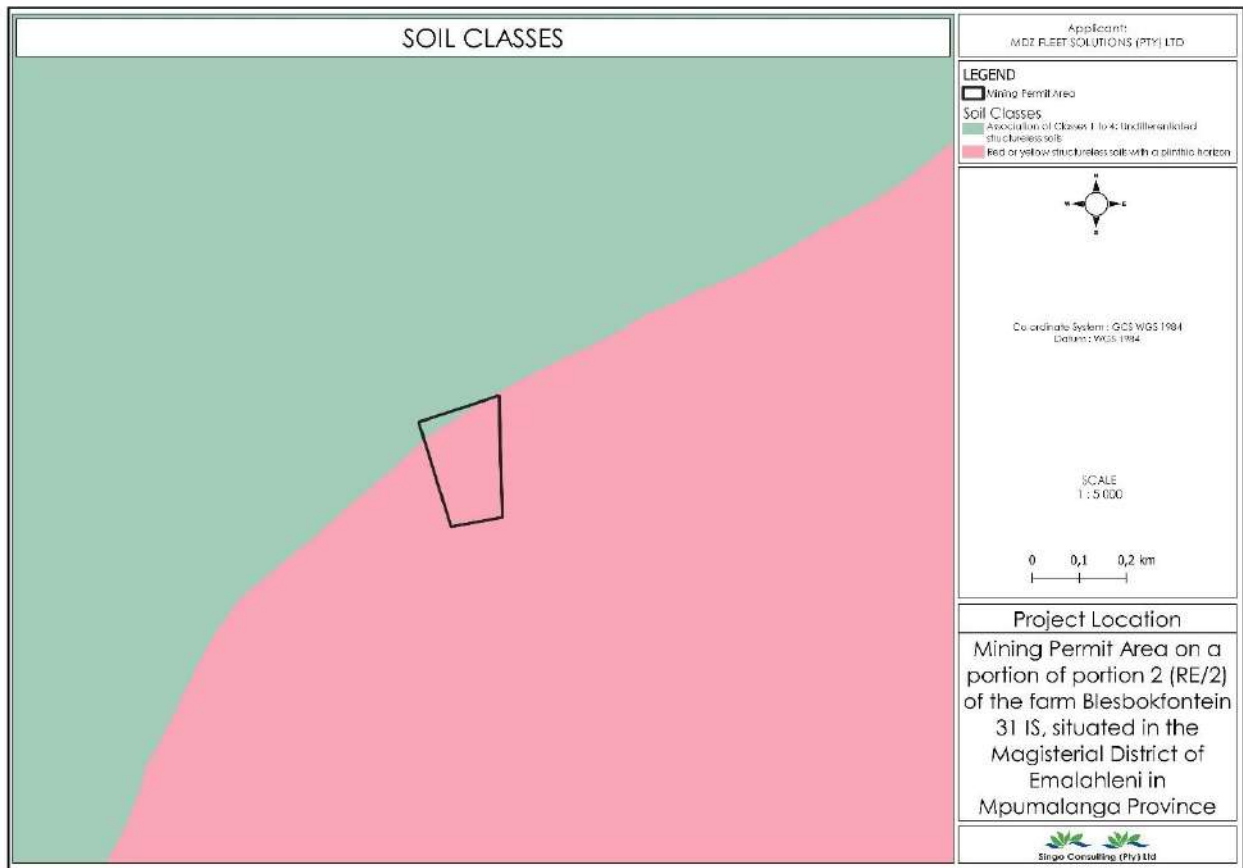
### Sensitivity Features:

Sensitivity	Feature(s)
Medium	Mammalia-Chrysospalax villosus
Medium	Mammalia-Crocidura maquassiensis
Medium	Mammalia-Dasymys robertsii
Medium	Mammalia-Hydricotis maculicollis

#### 4.1.1.4 Soil

Soil study was undertaken by a specialist at Singo consulting as attached on Appendix. The soil classes map in Figure 26 below, shows that the mining permit area is largely covered with Red or yellow structureless soils with a plinthic horizon. The soils are Red to yellow sandy soils of the Ba and Bb land types found on shales and sandstones of the Madzaringwe Formation (Karoo Supergroup)

Soil class	Favourable properties	Limitations
Red or yellow structureless soils with a plinthic horizon	Favourable water-holding properties	Imperfect drainage unfavourable in high rainfall areas



**Figure 26:** Soil map of the farm (Singo Consulting GIS Team, 2023)

Soil chemical conditions of the study area

The main aim for soil sampling is to identify the soil moisture, colour, consistency, structure, soil type and origin (MCCSSO) of the soil.

**Table 5:** Site pictures and description

Site pictures and equipment's	Description
The equipment's used included:	Operation of soil Sampling


<ul style="list-style-type: none"> <li>• Auger/TLB</li> <li>• plastics,</li> <li>• shovel,</li> <li>• GPS,</li> <li>• Buff tags,</li> <li>• Sampling forms.</li> <li>• Cable ties</li> </ul>	<p>Selecting an acceptable sampling location, then collecting a soil sample with an Auger/ TLB while identifying the different layers of soil in the area are all part of the method. The soil samples are stored in various plastics and recorded before being sent to the lab for analysis. Some of the types of analyses undertaken include pH (alkalinity and acidity), Soil Texture Composition, and Chemical Compositions.</p>
	<p>The Auger was used to remove ground samples and capture the many different strata found underground. Soil samples were collected to determine chemical composition, soil texture, pH level, and soil nutrients.</p>



Figure 27: Soil type within the proposed project

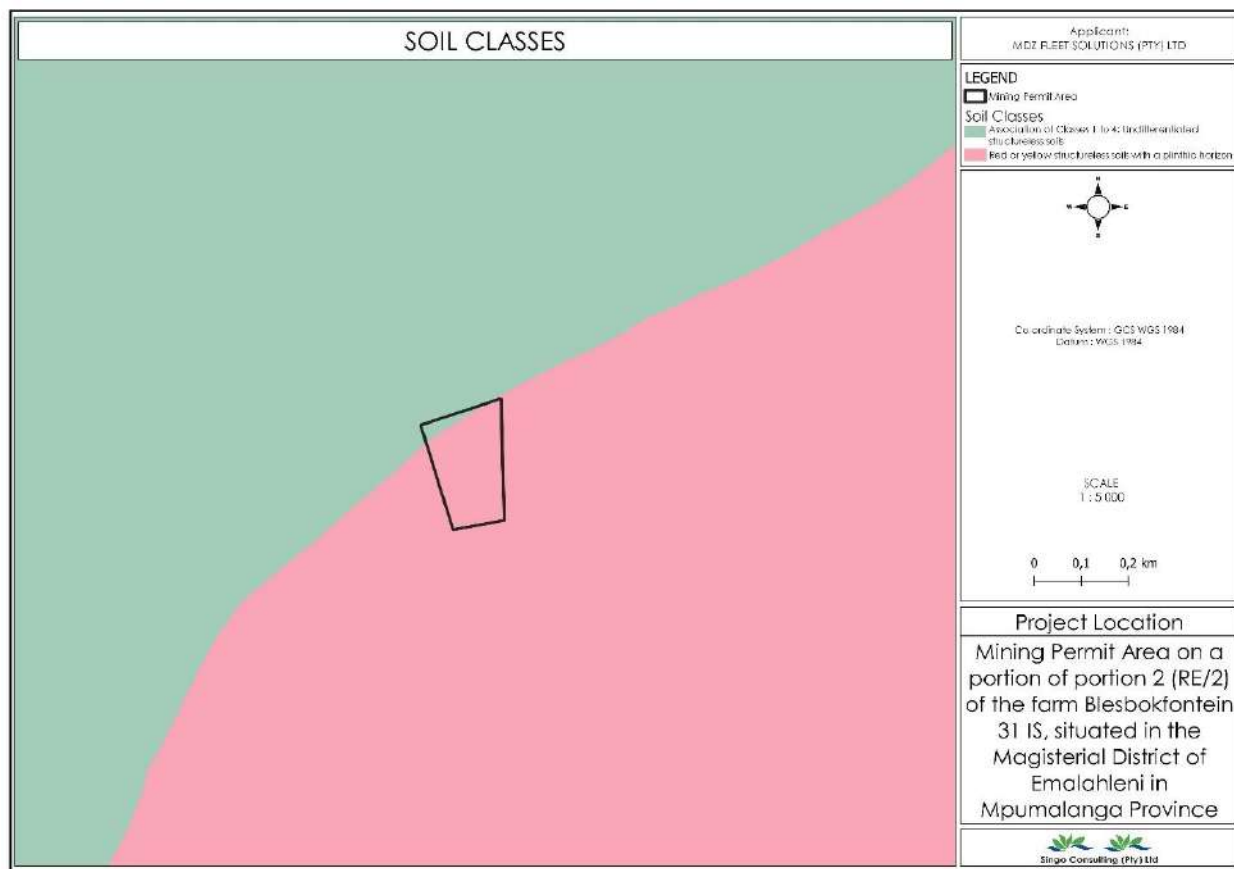


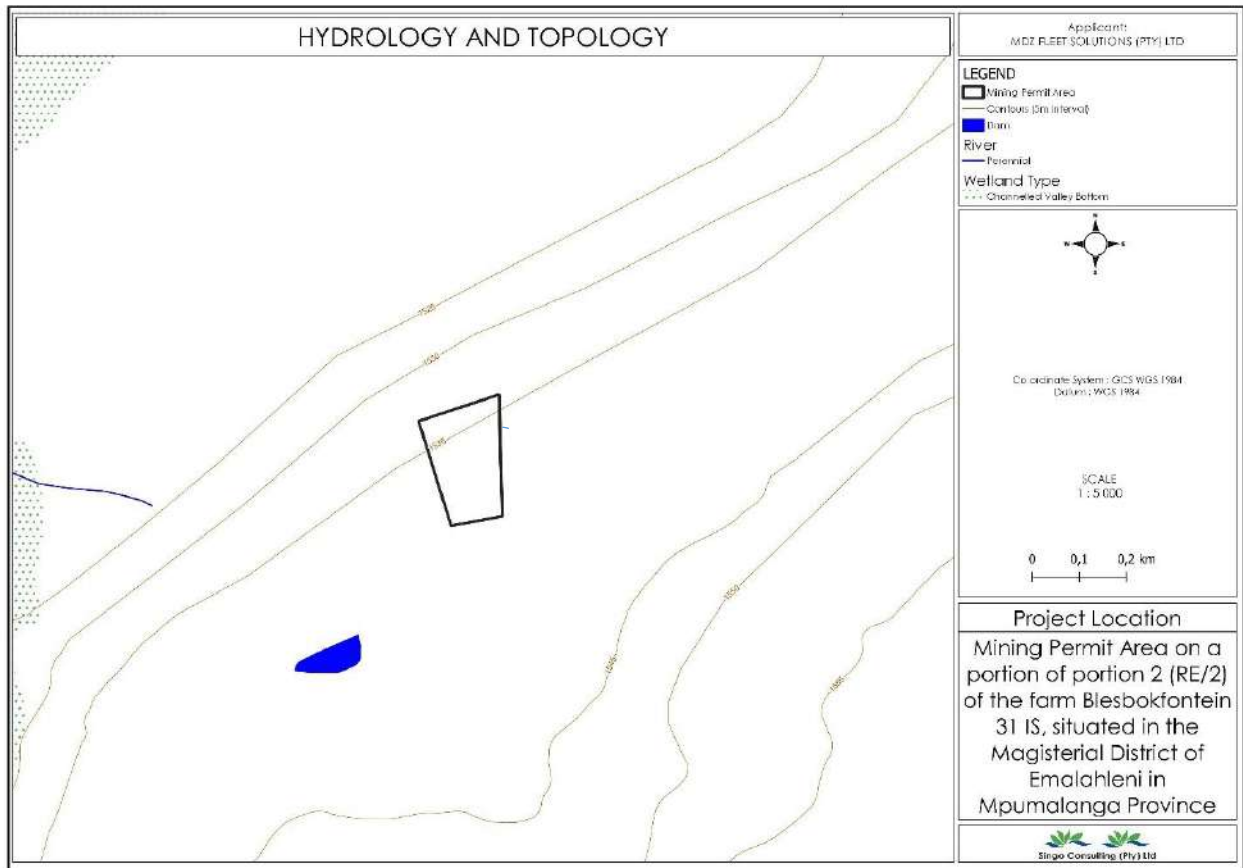
Figure 28: Soil map of the farm

#### 4.1.1.5 Surface and ground water

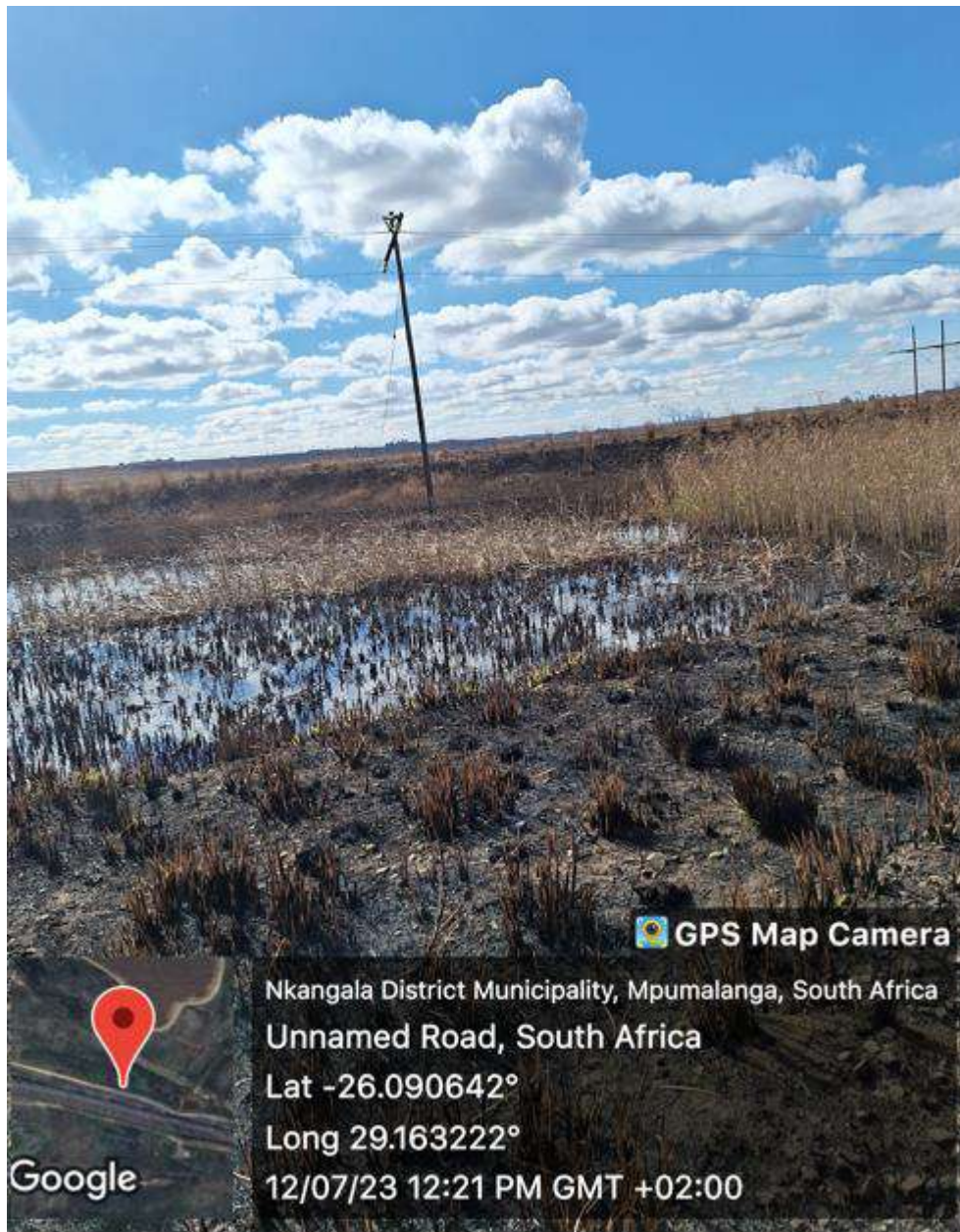
Hydrology study was undertaken by a specialist at Singo consulting as attached on Appendix. A Topographic map is a map which indicates, to scale, the natural features of the Earth's surface, as well as human features, with features at the correct relationship to each other (Oxford Dictionary; 2020). The topography map other than showing landform features, rivers, and associated water resources, it also shows the height above sea level with the use of contour lines. Contour lines are an Imaginary line on the ground surface joining the points of equal elevation.

In this environmental project, topography is used to determine how surface water flows during rainy seasons or how it would flow during the existence of the project. The topography also influences groundwater vulnerability, as topography also influences run-off and infiltration rate by means of residence time. The slope of the study area is gentle, this is seen by the contours being widely spread, and the contour elevation is decreasing away from the mining permit area. The **Error! Reference source not found.**, illustrates a 5m contour interval of the study area.

The project area has a flat topography, and no waterbodies within the project site, however a channelled as shown on a map, a dam exist in approximately 0.2 km south-west of the mining permit and a perennial river is observed situated on west direction of the mining permit area.



**Figure 29:** Surface water map



**Figure 30:** Dam observed during site visit next to the project area.

#### **4.1.1.6 Catchment description**

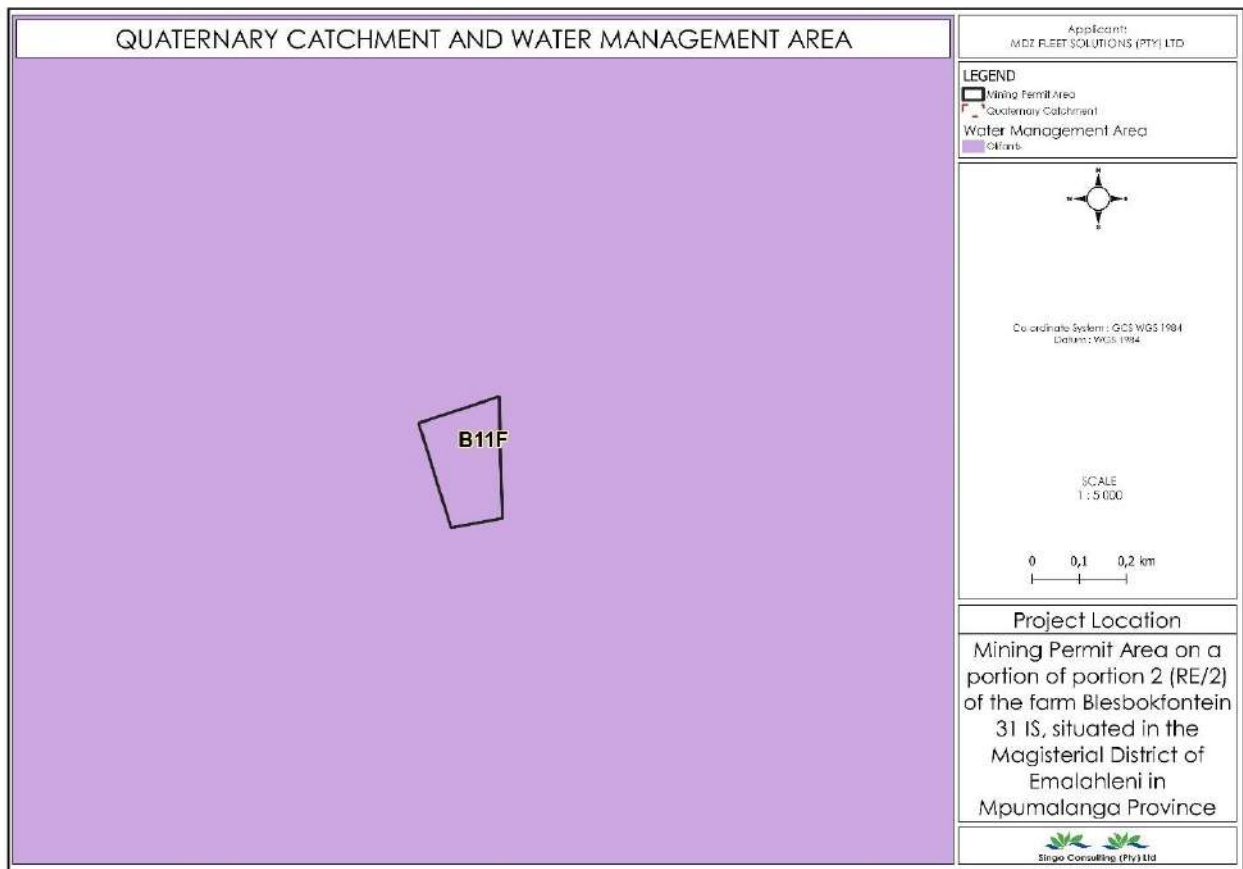
South Africa's water resources are divided into quaternary catchments, which are the country's primary water management units (DWA 2011). In a hierarchical classification system, a quaternary catchment is a fourth order catchment below the primary catchments. The primary drainages are further classified as Water Management Areas (WMA) and Catchment Management Agencies (CMA). In accordance with Section 5 subsection 5(1) of the National Water Act, 1998, the Department of Water and Sanitation (DWS) has established nine WMAs and nine CMAs as outlined in the National Water Resource Strategy 2 (2013). (Act No. 36 of 1998). The purpose of establishing these WMAs and CMAs is to improve water governance in various regions

of the country, ensuring a fair and equal distribution of the Nation's water resources while ensuring resource quality is maintained.

The mining permit area falls within the Olifants Water Management Area (WMA). The quaternary catchment is the B11F. The WRC 2012 study, presents hydrological parameters for each quaternary catchment including area, mean annual precipitation (MAP) and mean annual runoff (MAR).

**Table 6:** Quaternary Information Data

Quaternary Catchment	Water Management Area	S-Pan Evaporation		Rainfall		Catchment Area
		Evaporation Zone	MAE (mm)	Rainfall Zone	MAP (mm)	
B11F	Olifants	4A	1600	B1C(ZB1CB)	692	428



**Figure 31:** Quaternary catchment and water management.



The Vryheid formation is described by SACS (1980) as "consisting essentially of sandstone, shale, and subordinate coal beds, and has maximum thickness of 500 m<sup>2</sup>. It consists of thick beds of yellow to white, cross bedded sandstone and grit, alternating with beds of soft, dark grey, sandy shale and coal seams. Flakes of muscovite may be contained in the rock matrix. Plant fossils and trace fossils are plentiful in the Vryheid formation (Geel, 2014). As previously stated, the Vryheid is made up of sandstones, these sandstones are the ones that act as water storages in the area.

The groundwater potential of the Karoo formations located in the study area is limited in their pristine state due to low permeability and storage capacity. Secondary processes, such as weathering, fracturing, etc., are required to enhance the groundwater potential. Based on regional data, the hydrogeological resource maps, the following hydrogeological information is available for the formations within the study area:

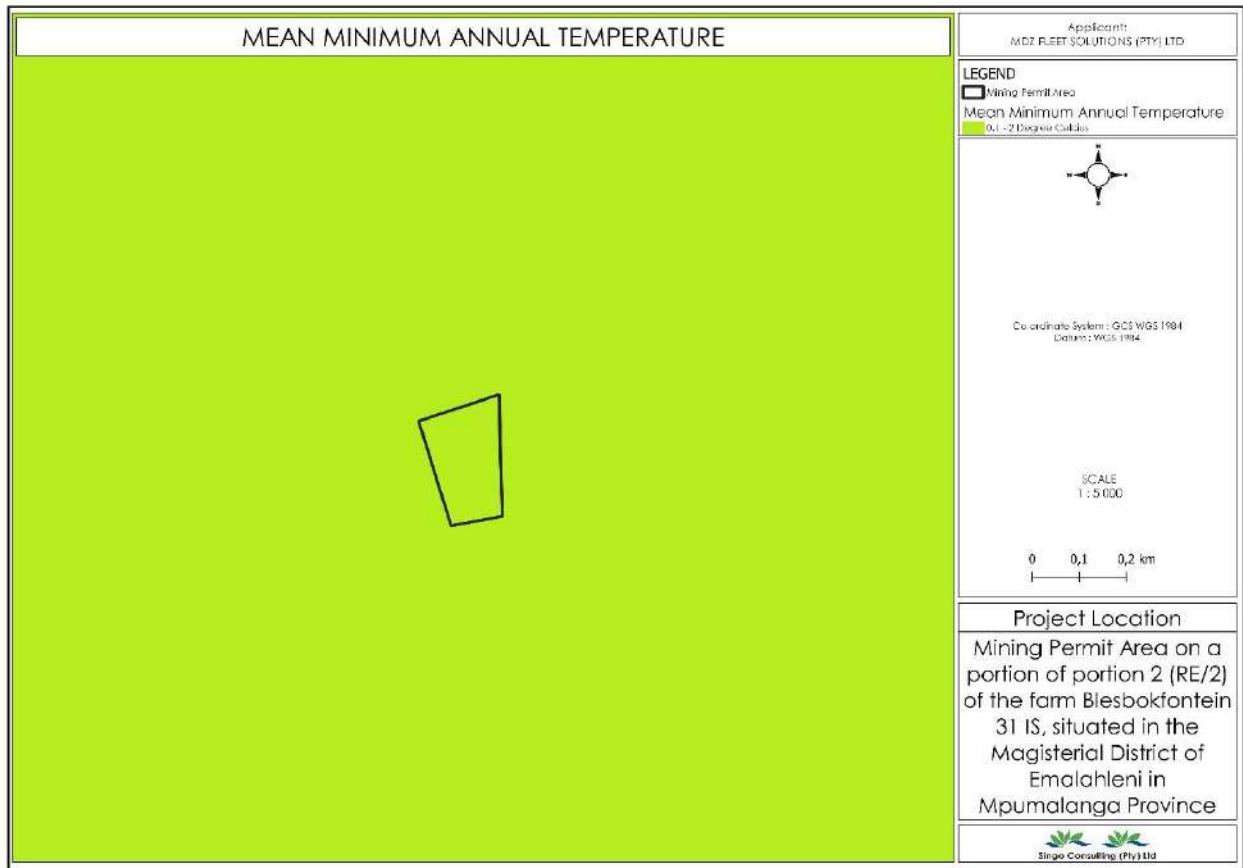
Vryheid Formation:

- Lower Eccca
- Intergranular and fractured aquifers
- Borehole yields 0.1 to 0.5 l/s Groundwater.

The sandstones of the Vryheid Formation of the Eccca Group can be massive and dense and have limited permeability and storage. It thus offers only moderate groundwater yield, especially in the absence of dolerite intrusions. Contacts between different rock lithologies and bedding planes within the sediments often yield groundwater. The contact zone between the dolerites and the sandstone lithologies can be high yielding. Fractured fault zones, especially if related to tensional stresses, are potentially rich targets for groundwater development. Groundwater occurs within the joints, bedding planes, and along dolerite contacts within the sediments.

#### **4.1.1.7 Climate**

Climate, amongst other factors, influences soil-water processes and water availability in open to air systems in a water balance. The most influential climatic parameter is rainfall and evaporation. Rainfall intensity, duration, evaporative demand, and runoff were considered in this study to indicate rainfall partitioning within the project area.



**Figure 32:** Annual minimum temperatures

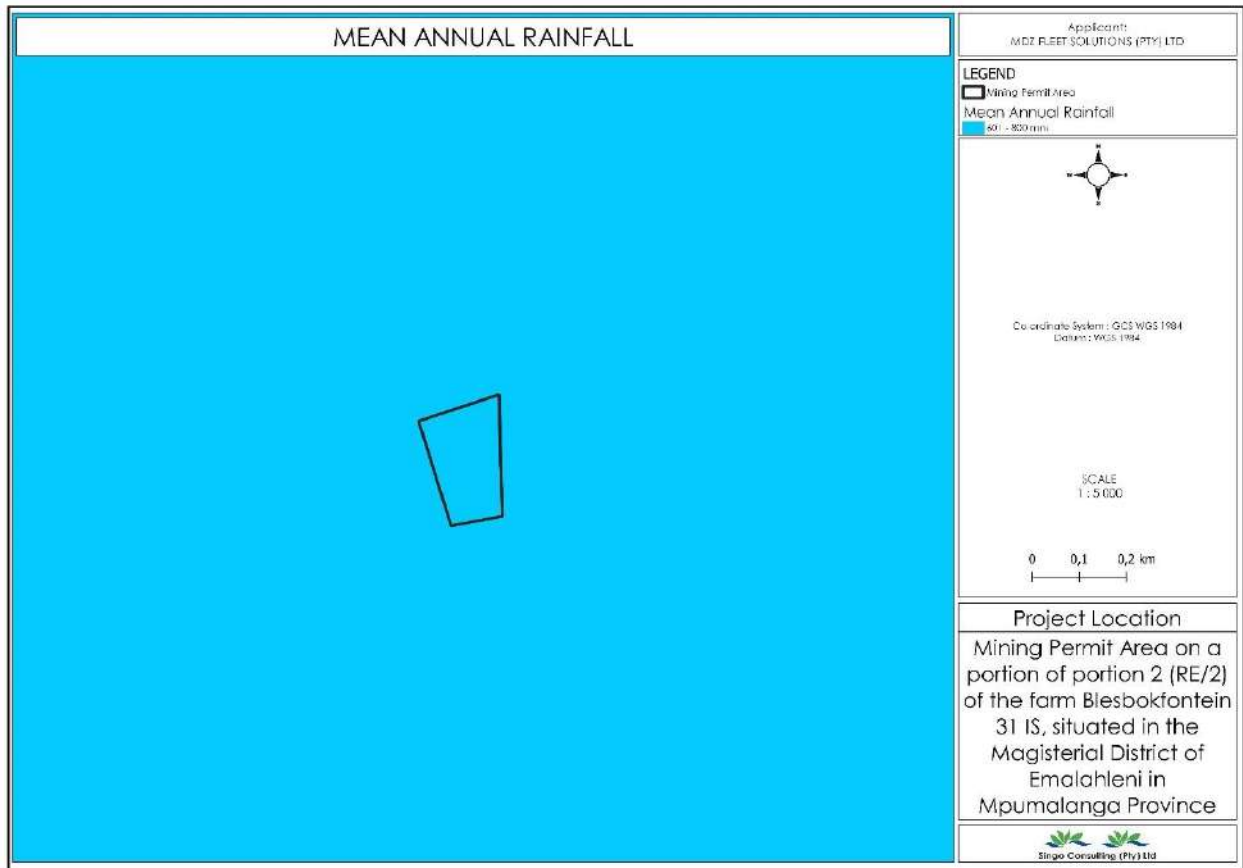


Figure 33: Mean annual rainfall.

#### 4.1.1.8 Surface wind field

The average hourly wind speed in Witbank experiences mild seasonal variation over the course of the year. The windier part of the year lasts for 3.9 months, from July 29 to November 26, with average wind speeds of more than 34 m/s. The windiest month of the year in Witbank is September, with an average hourly wind speed of 4 m/s. The calmer time of year lasts for 8.1 months, from November 26 to July 29. The calmest month of the year in Witbank is March, with an average hourly wind speed of 28 m/s.

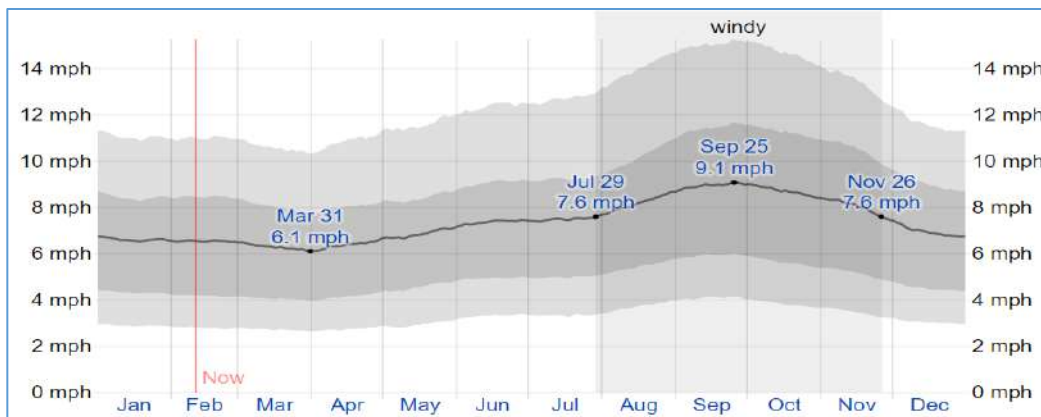


Figure 34: Average wind speed in Witbank.

#### 4.1.1.9 Topography

The topographical map of the study area is depicted as shown on Figure 35 below which shows the elevation changes and landforms. Elevation is represented by contour lines and a contour interval of 5 m was used. In this environmental project, topography is used to determine how surface water flows during rainy seasons or how it would flow during the existence of the project. In this study area contours are widely spaced, when contour lines are widely spaced, it means that the terrain is relatively flat or gentle.

The topography of the proposed mining permit has approximately a minimum and maximum elevation of 1539 mamsl and 1542 mamsl respectively with an average slope of 1.9%.

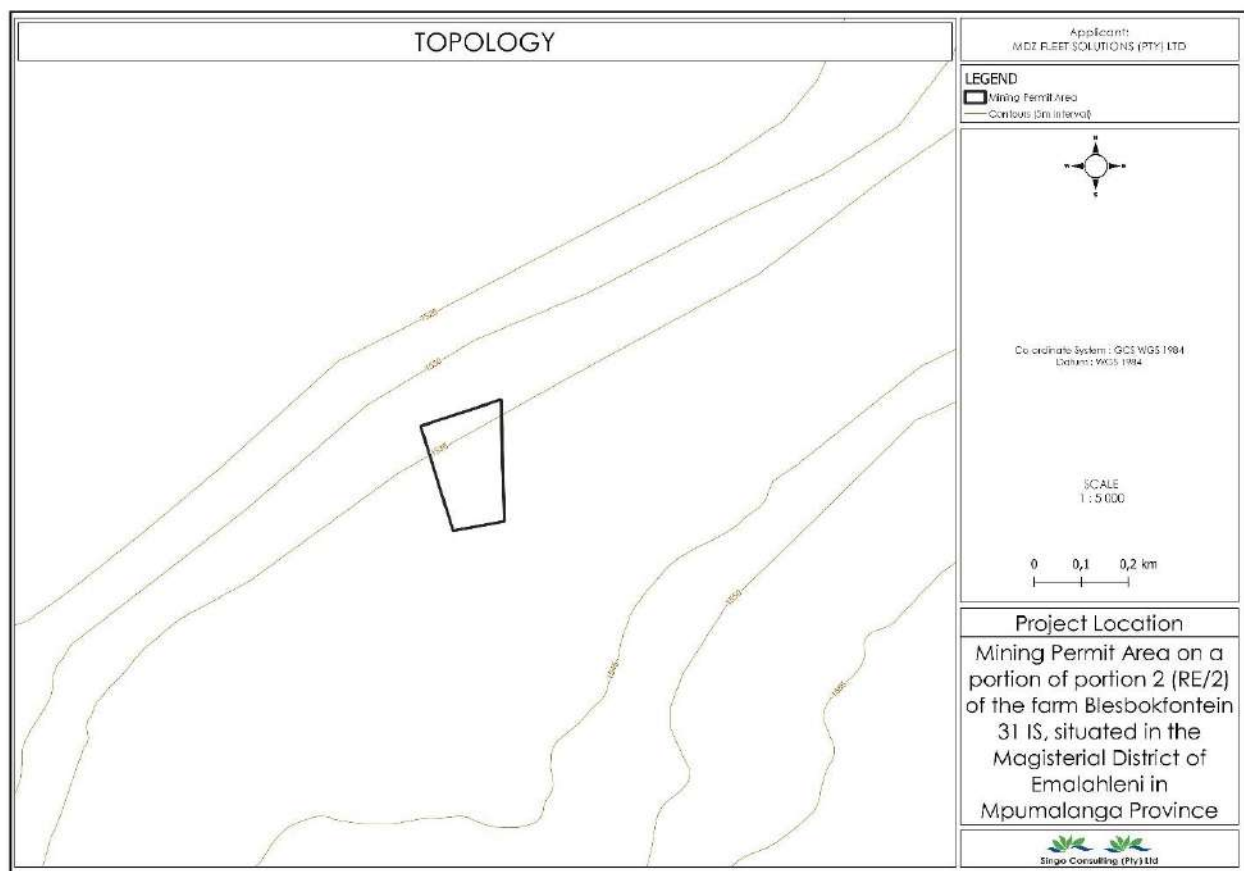


Figure 35: Topography of the study area

#### 4.1.1.10 Public roads

The site will be accessed via unnamed road from the R547 which will also be used to transport Coal, Pseudocoal, Torbanite and Aggregate to clients. Existing Access gravel road from the unnamed tar road connecting to the R547 Regional Road



**Figure 36:** Access gravel road to the project area.

#### **4.1.1.11 Graves, heritage, archaeological and cultural resources**

No sites of archaeological or cultural interests were identified on site during a site reconnaissance visit. Property owner should be provided with a registration and comment sheet in order to highlight cultural or archaeological features that may be occurring on site. The project area is comprised of open spaces where it was simple to see everything on the ground. As a matter of precaution, should any further information confirm existence of such sites, steps will be taken to put measures in place for preservation thereof in line with the National Heritage Resources Act, 1999 (Act No. 25 of 1999). According to relative sensitivity sourced from screening report generated, palaeontology is rated very high and archaeological/heritage is rated low. During ground truthing, no evidence of heritage sites was observed on site. SAHRA was consulted for this project.

#### 4.1.1.12 Railway line

There is a railway line located 80m away from the proposed mining area.

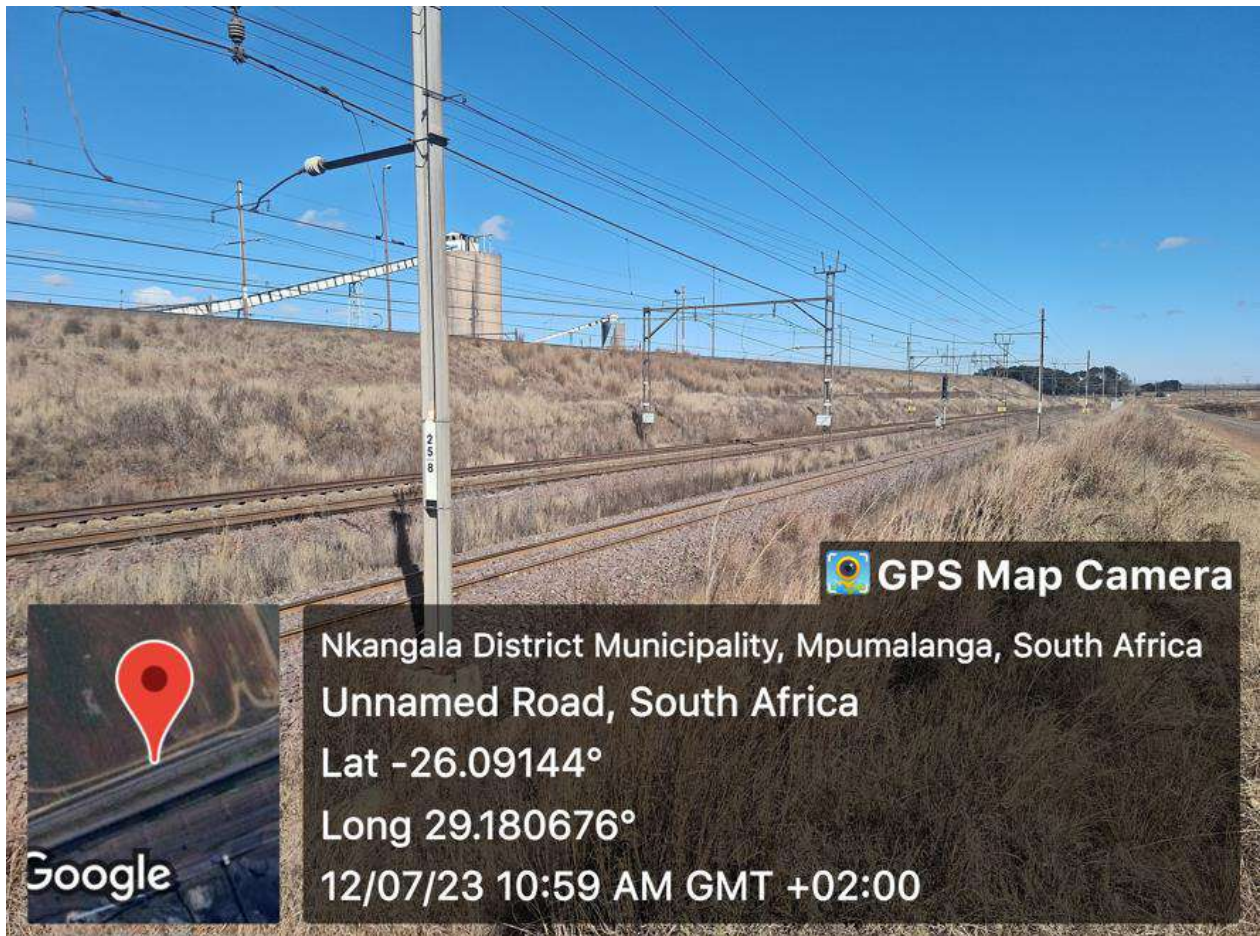


Figure 37: Railway line observed during site assesment.

#### 4.1.1.13 Noise

The proposed mine is located 2,7 m away from Saaiwater residential and partial industrial setting and approximately 285 m away from the Glencore Operation and 3.4 m away from Boschmansfontein which already emits noise to the local environment. The traffic on the public roads surrounding the property contributes to the ambient noise of the area. The noise to be generated at the proposed mine operation is expected to temporarily increase the noise levels of the area. Blasting noise will be instantaneous and of short duration. Crushing and transportation of the material will generate noise daily. The closest residence (Saaiwater) located 2,7 m, which makes the significance of noise on the surrounding settlement quite medium to high. Mitigation measures should be implemented to ensure employees conduct them in an acceptable manner while on site in order to lessen the noise impact of the proposed activity on the surrounding environment.

#### 4.1.1.14 Visual exposure

The proposed mining area will include the Coal, Pseudocoal, Torbanite and Aggregate

opencast on the farm. The mining area will not be visible from the N12 but will be noticeable from surrounding community and regional road R547.

The applicant should ensure that housekeeping is managed to standard, as this will mitigate the visual impact during the operational phase of the mine. Upon closure of the mine and decommissioning of the site, the area should be fully rehabilitated, and all exposed areas should be seeded to enhance vegetation recovery should natural vegetation not establish within six months of rehabilitation completion.

#### **4.1.1.15 Socio-economic**

eMalahleni Local Municipality is located within the Mpumalanga Province and is situated in the jurisdictional area of the Nkangala District Municipality. The district is located to the northwest of the province and is the smallest district in terms of area (21 %) with the second largest population concentration in the province. It covers an area of about 2 678 km<sup>2</sup> (IDP, 2014/2015).

The eMalahleni Municipality is expected to record a Gross Domestic Product (GDP) growth rate of 3.3% per annum from 2011-2016. The growth rate per annum for the period 1996-2011 was 2.8%. eMalahleni contributed 17.9% to the provincial economy in 2011. eMalahleni Municipality has the third largest economy in the province.

#### **4.1.1.16 Population demographics**

According to the 2011 Census by Stats SA, the population of eMalahleni is 395 466. The population grew by 43.1% between 2001 and 2011. The average annual population growth rate was measured at 3.6%. In terms of racial diversity, eMalahleni's population is predominantly black (81.3%) with the remaining portion consisting of 15.7% whites, 1.7% coloured, 0.9% Asians and other 0.3% (IDP, 2014/2015). The population consists of more males than females due to the nature of the local industries, which dictate the type of work available in the area. The sex ratio is 53% male to 47% female (IDP, 2014/2015).

#### **4.1.1.17 Education**

The number of people over the age of 20 with no schooling totals 14 993, which is 5.8 % of the Municipality's population. The percentage of the population over the age of 20 with matric or higher was 45.3%. This was the third best in comparison with the other 18 municipal areas. The matric pass rate in 2012 was 72.0%, which places the Municipality 7<sup>th</sup> in the province. The University/degree admission rate was found to be low at only 19.0% in 2012 (IDP, 2014/2015).

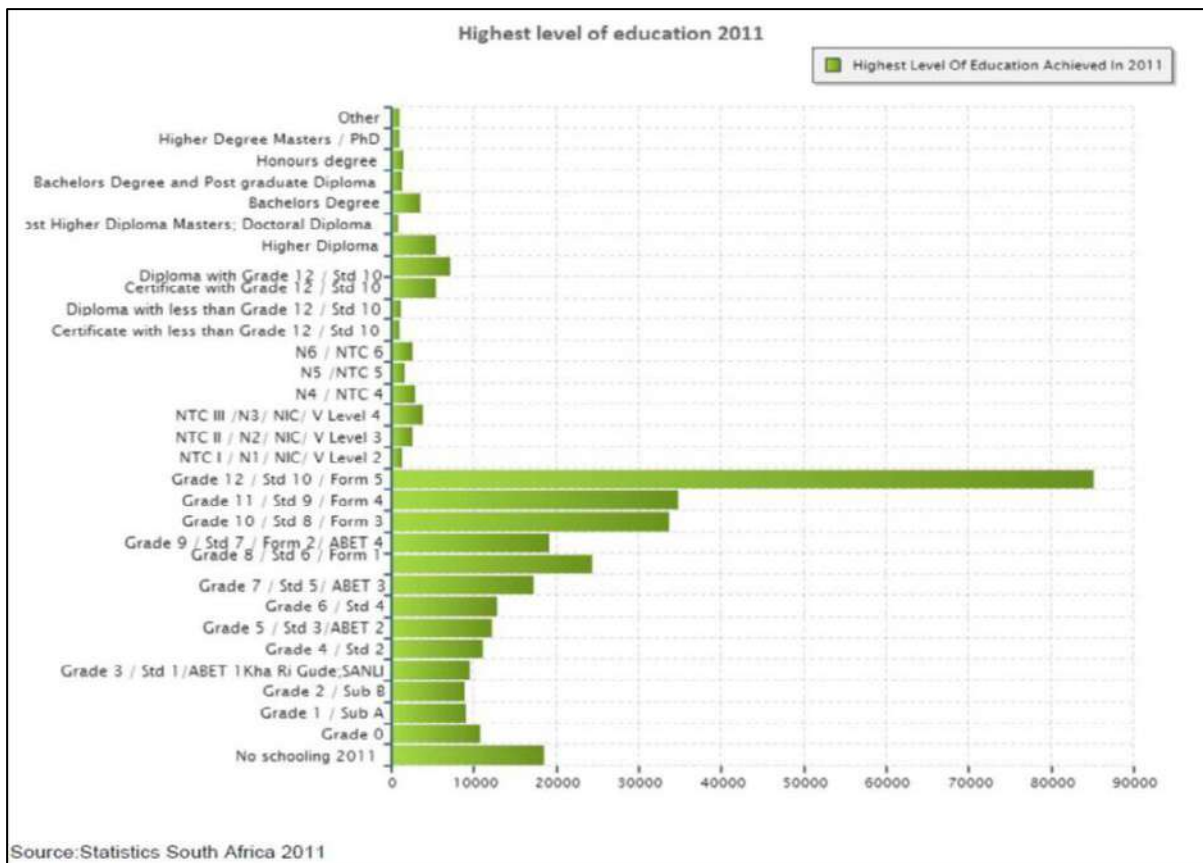


Figure 38: Statistics of South Africa with a reference of eMalahleni

#### 4.1.1.18 Employment and income

The leading industry in terms of employment is trade at 21.1%, followed by mining 20.6% and manufacturing 14.2%. Since 2001, there has been an increase in employment in the mining, construction, community services and financial sectors and a decrease in the trade, manufacturing, transport, agriculture, private households and utility sectors.

#### 4.1.1.19 HIV, health and wellbeing

HIV, AIDS and Tuberculosis contribute significantly to the burden of disease faced by the South African Government. Huge amounts of resources are expended on serving the health needs of citizens. If the situation continues unabated, it creates a situation where other services are sacrificed in order to meet the high costs of providing health services to a disproportionately large section of the population. It is for this reason that the South African Government has placed HIV/AIDS at the top of its health priorities.

This goal is in line with the Millennium Development Goals of eradicating HIV/AIDS by 2015. The eMalahleni Metro is equally challenged by its vulnerability to HIV/AIDS. It can never be over-emphasised that the situation needs serious and urgent attention. For South Africa to achieve its goal of eradicating HIV/AIDS by 2015, the responsibility lies with local municipalities, especially metropolitan municipalities, given their expanded functions which include the provision of health services and proximity to local residents. The applicant acknowledges that HIV/AIDS is a national



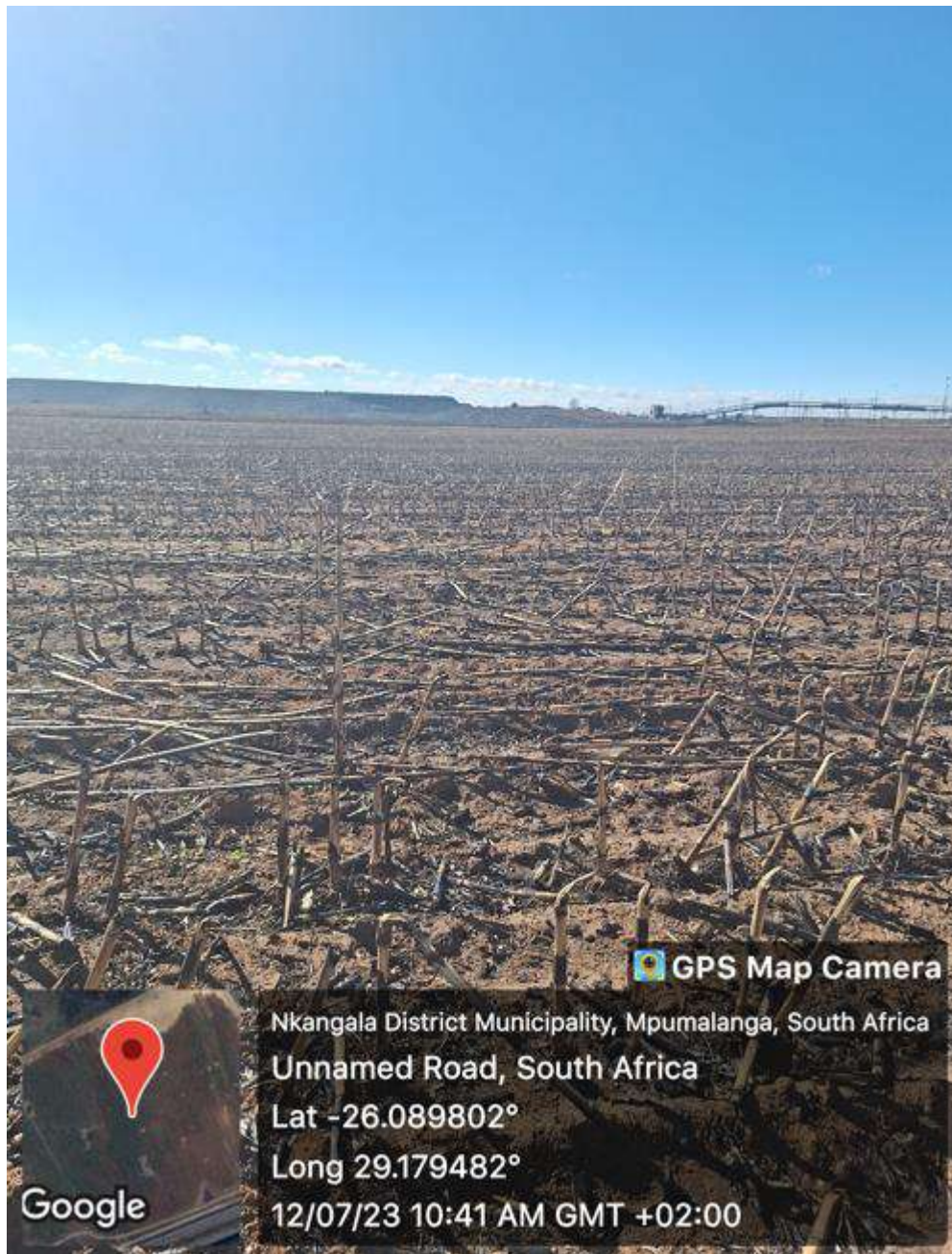
problem and will encourage employees to get tested and know their status by participating in local HIV/AIDS awareness campaigns. Educating employees on the subject matter is important and therefore the project will support the local municipality in its programmes.

#### **4.2 Description of current land uses within the proposed Mining Permit Area**

The following provides a description of the land uses and/or prominent features that currently occur within a 500 m radius of the site:

##### **Environmental features**

The area of interest was found to be covered by cultivation of maize meal. The proposed project area is heavily modified as a result agricultural activity. According to the land use and land cover map provided in figure 30 below, the proposed area comprises of the cultivated land. During site assessment no watercourses were found within the mining permit area and around the 500 m radius from the permit boundary.



**Figure 39:** Cultivation of maize meal observed on site.

### **Infrastructure**

Infrastructure is the basic facilities and systems that serve a state, region, or other place, including the services and facilities necessary for the functioning of its economy. Infrastructure consists of infrastructure developments, both public and private, such as Buildings, highways, bridges, tunnels, sewage electric grids and telecommunications. The property lies within the proposed project area, there is Eskom electricity powerlines infrastructure within the proposed area .

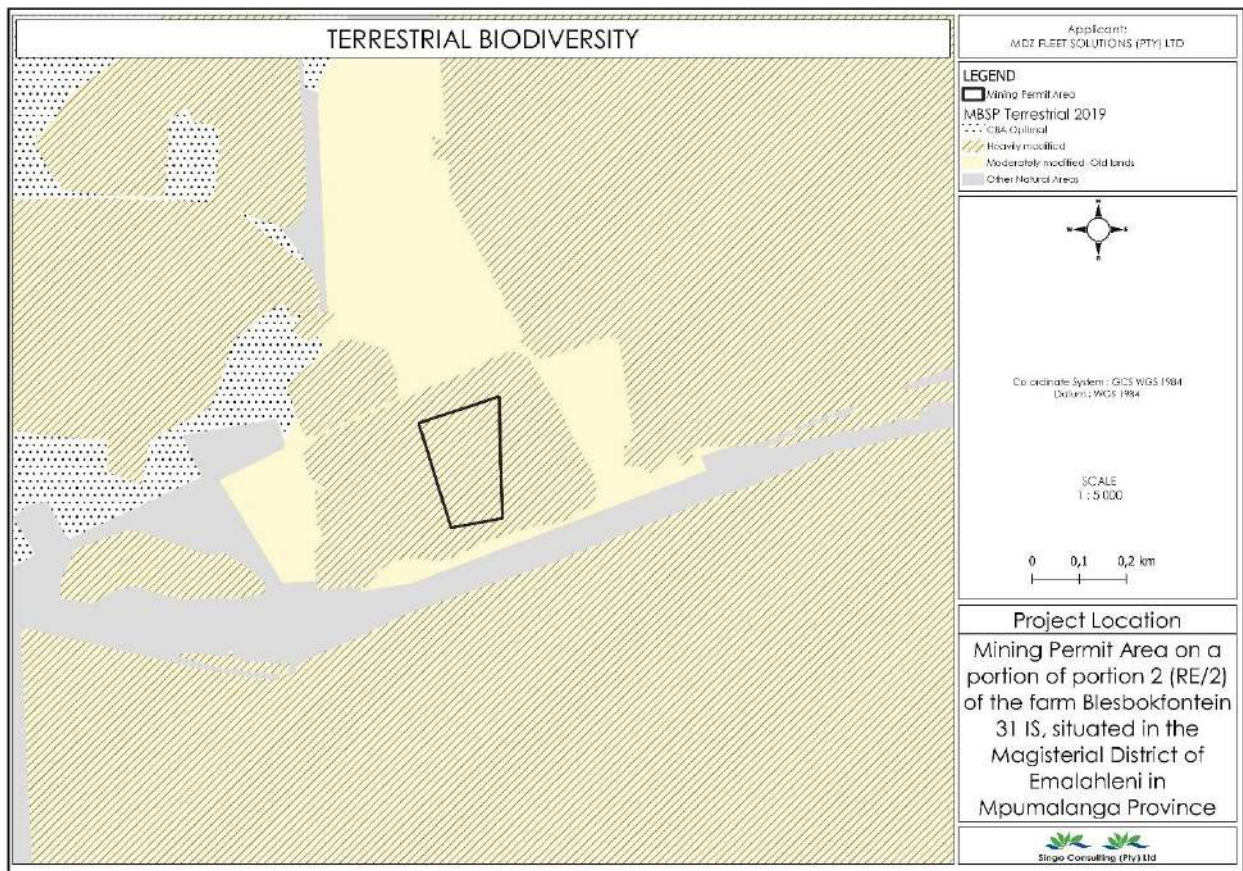


**Figure 40:** Eskom Powerline identified on site.

As per the Biodiversity Terrestrial Map produced by the GIS specialist at Singo Consulting, the proposed project area falls within heavily modified. The permit area is heavily modified transformed areas, biodiversity and ecological function have been lost to the point that they are not worth considering for conservation. These are types of areas that have been excessively altered from their natural state.

There are no critical species will be affected by the proposed project as there are critical plants and sensitivity within and around the proposed mining permit. Therefore, critical species will be harmed even though identified during the operation of proposed project as Eco will be onsite every day to monitor the operation. Although the area is characterized by Moist Sandy Highveld Grassland according to the GIS specialist, the area is heavily modified by other activities which

leads to vanished of these Moist Sandy Highveld grassland mentioned on the vegetation type section.



**Figure 41:**The Biodiversity Terrestrial Map produced by the GIS Specialist of Singo Consulting (Pty) Ltd

## MAP OF RELATIVE TERRESTRIAL BIODIVERSITY THEME SENSITIVITY

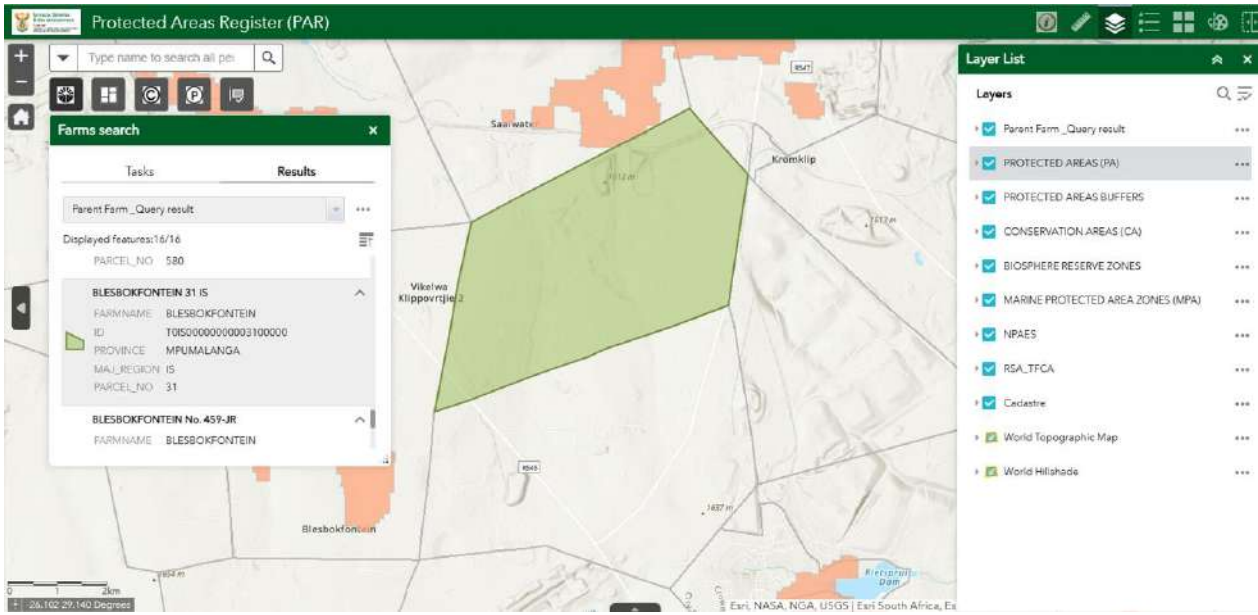


Figure 42: Screening Map (source: Screening Report)

Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
X			

### Sensitivity Features:

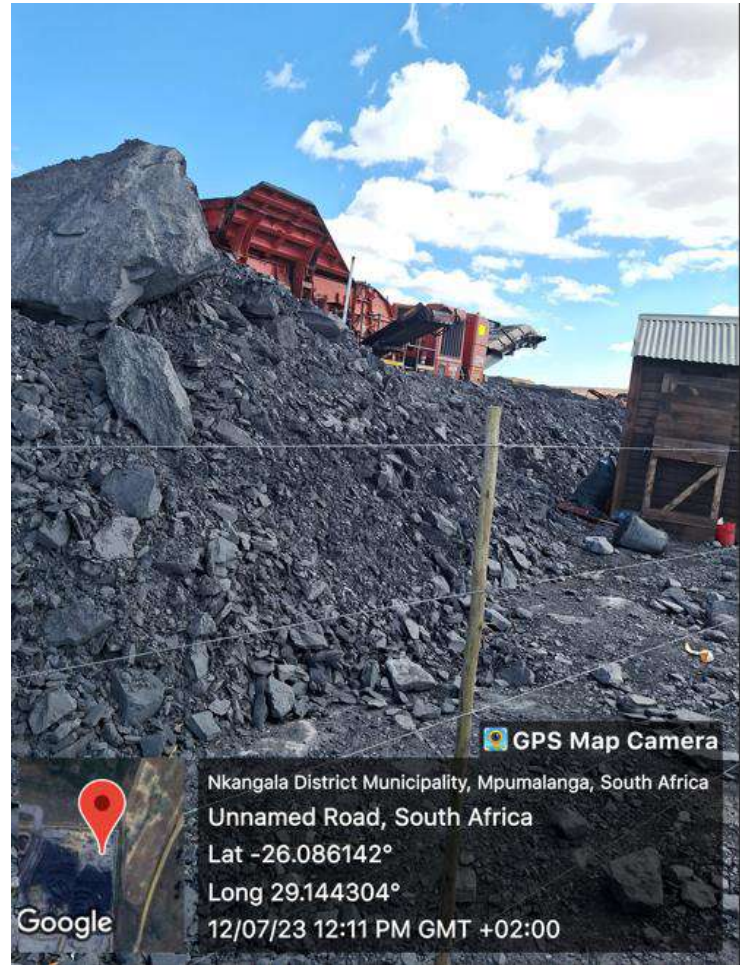
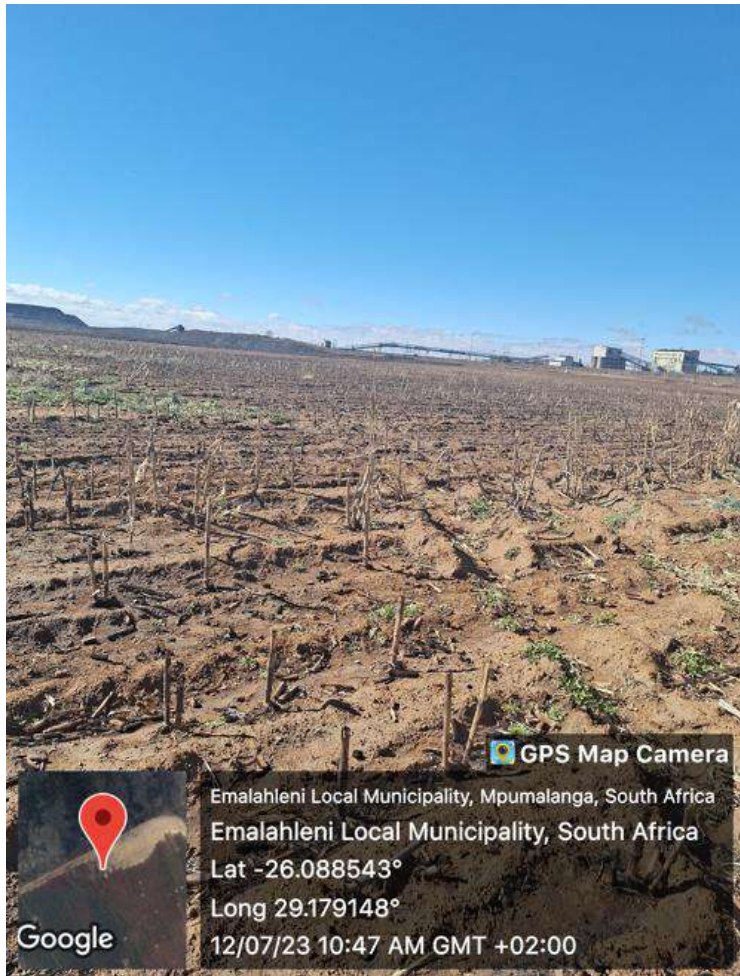
Sensitivity	Feature(s)
Very High	EN_Eastern Highveld Grassland



**Figure 43:** Screenshot of the assessment conducted of DEA online platform.

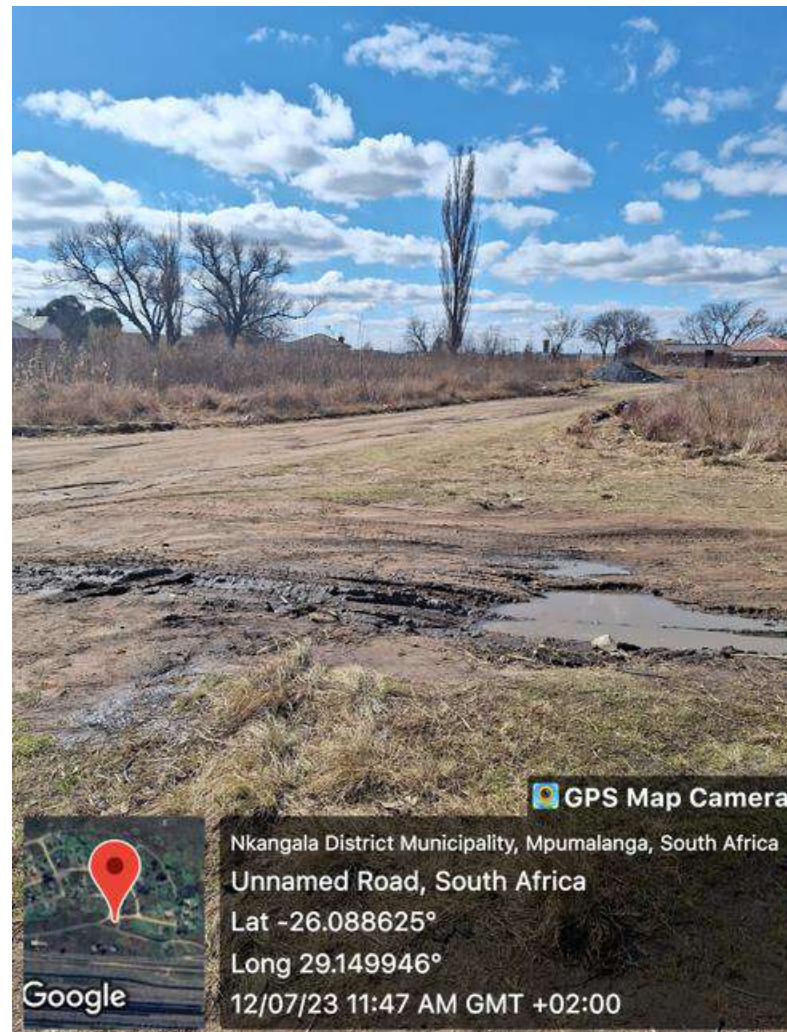
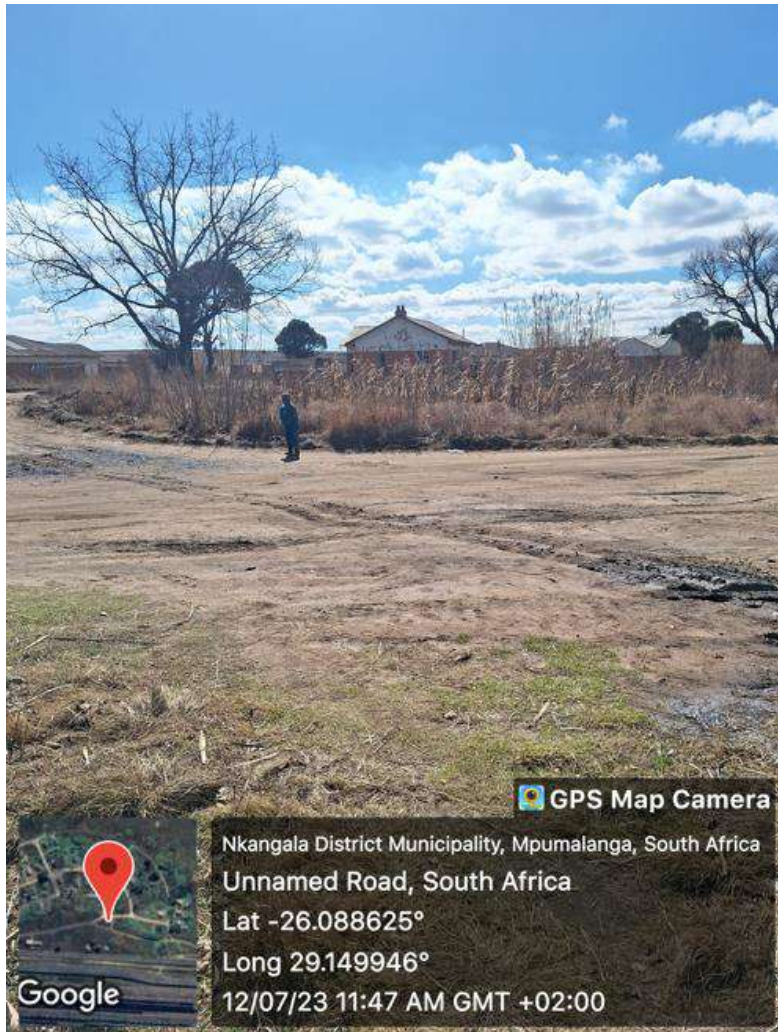


**Figure 44:** Google Earth Map showing the Infrastructure and Operations Surrounding the Proposed MDZ Fleet Solutions (Pty) Ltd Mining Permit



**Figure 45:** Glencore Operation and Boschmansfontein.





**Figure 46:** Nearest community (Saiiwater) to the project area.

### 4.3 Description of site-specific environmental features and infrastructure

The following table provides a description of the land uses and/or prominent features that currently occur within a 1 km radius of the site:

Land use character	Yes	No	Description
Natural area		No	
Low-density residential	Yes		
Medium-density residential		No	
High-density residential		No	
Informal residential		No	
Retail commercial and warehousing	[	No	
Light industrial		No	
Medium industrial		Yes	
Heavy industrial		No	
Power station		No	
Office/consulting room		No	
Military or police base/ station/compound		No	
Soil heap or slimes dam		No	
Coal, Pseudocoal, Torbanite and Aggregate mine or borrow proposed mine		No	
Dam or reservoir		No	
Hospital/medical centre		No	
School or crèche		No	
School		No	
Tertiary education facility		No	
Church		No	
Old age home		No	
Sewage treatment plant		No	
Train station or shunting yard		No	
Railway line	Yes		Railway line is located 9 km from the project area.

Land use character	Yes	No	Description
Major (road 4 lines or more)		No	N12 is located 10 km north from the project area. The site will be accessed via unnamed road from the R547 which will also be used to transport Coal, Pseudocoal, Torbanite and Aggregate to delegates.
River, stream or wetland		No	
Agriculture	Yes		The area is covered by cultivation of maize meal.
Nature conservation area		No	
Mountain, hill or ridge		No	
Museum		No	
Historical building		No	
Plantation		No	
Landfill/waste treatment site		No	
Archaeological sites		No	
Other land uses		No	

#### 4.4 Environmental and current land use map

Show all environmental and current land use features.

According to figure 38 the area is characterised by natural environment. During site assessment the area was confirmed to have cultivation of maize meal.

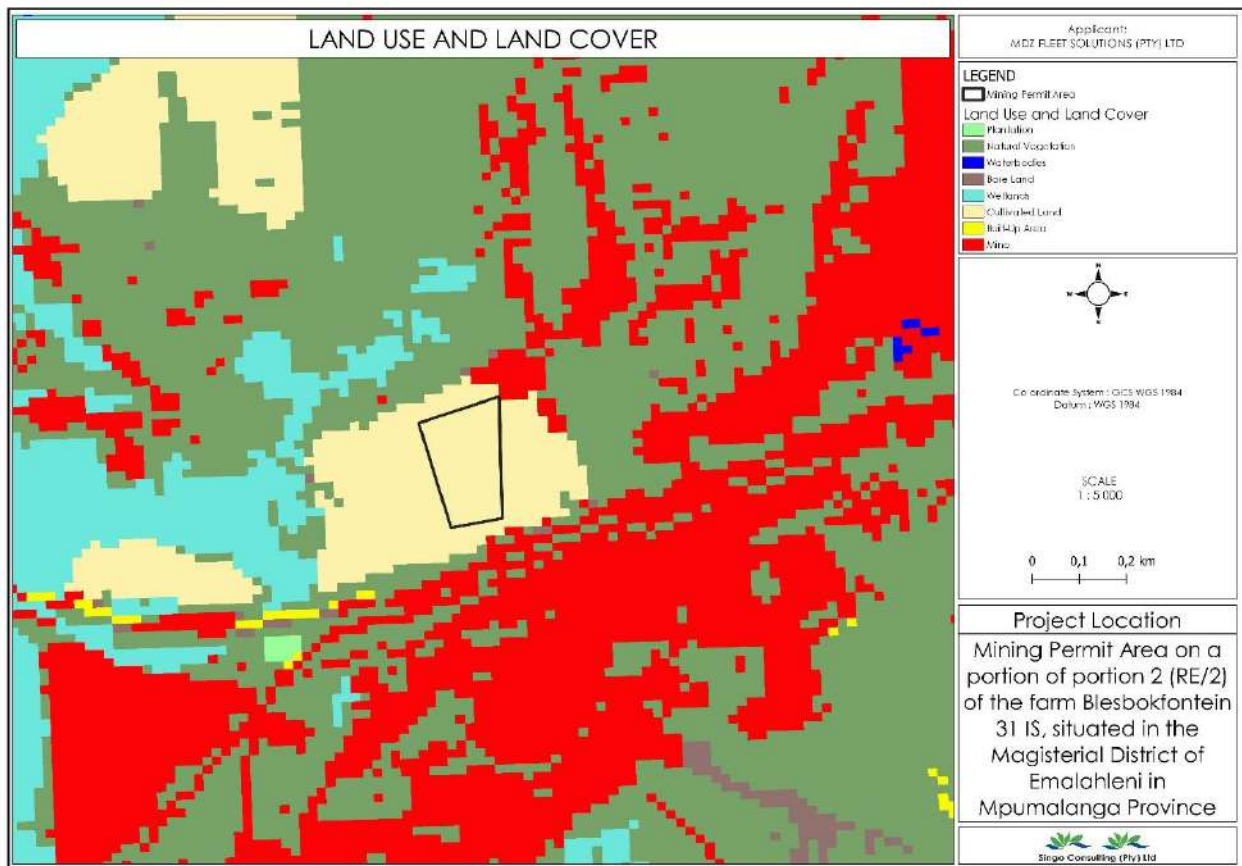


Figure 47: The environmental and current land use map

#### 4.5 Impacts and risks identified, including the nature, significance, consequence, extent, duration and probability of the impacts.

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

The following potential impacts were identified of each main activity in each phase. The significance rating was determined using the methodology described in. The impact rating listed below was determined for each impact prior to bringing the proposed mitigation measures into

consideration. The degree of mitigation indicates the possibility of partial, full or no mitigation of the identified impact.

#### **4.5.1 Stripping and stockpiling of topsoil**

##### **Significant impacts:**

Visual intrusion associated with the establishment of the mining area

Dust nuisance caused by soil disturbance.

Noise nuisance caused by machinery stripping and stockpiling the topsoil.

Infestation of the topsoil heaps by weeds or invader plants.

Loss of topsoil due to incorrect storm water management.

Contamination of area with hydrocarbons or hazardous waste materials.

#### **4.5.2 Blasting**

##### **Significant impacts:**

Health and safety risk posed by blasting activities.

Dust nuisance caused by blasting activities.

Noise nuisance caused by blasting activities.

#### **4.5.3 Excavation**

##### **Significant impacts:**

Visual intrusion associated with the excavation activities.

Dust nuisance due to excavation activities.

Noise nuisance generated by excavation equipment.

Unsafe working conditions for employees.

Negative impact of the fauna and flora of the area.

Contamination of area with hydrocarbons or hazardous waste materials.

Weed and invader plant infestation of the area.

#### **4.5.4 In-proposed mine crushing**

##### **Significant impacts:**

Dust nuisance due to the crushing activities.

Noise nuisance generated by the crushing activities.

Contamination of area with hydrocarbons or hazardous waste materials.

#### **4.5.5 Stockpiling and transporting**

##### **Significant impacts:**

Visual intrusion associated with the stockpiled material and vehicles transporting material.

Loss of material due to ineffective storm water handling.

Weed and invader plant infestation of the area due to the disturbance of the soil

Dust nuisance from stockpiled material and vehicles transporting the material

Degradation of access roads

Noise nuisance caused by vehicles

Contamination of area with hydrocarbons or hazardous waste materials

#### **4.5.6 Sloping and landscaping during rehabilitation**

##### **Significant impacts:**

Soil erosion

Health and safety risk posed by un-sloped areas

Dust nuisance caused during sloping and landscaping activities

Noise nuisance caused by machinery

Contamination of area with hydrocarbons or hazardous waste materials

#### **4.5.7 Replacing of topsoil and rehabilitation of disturbed area**

##### **Significant impacts:**

Loss of reinstated topsoil due to the absence of vegetation

Infestation of the area by weed and invader plants

#### **4.6 Methodology for the assessment of the potential environmental, social and cultural impacts**

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

The impact assessment process may be summarized as follows:

- ❖ Identification of proposed mining activities including their nature and duration.
- ❖ Screening of activities likely to result in impacts or risks.
- ❖ Utilization of the above-mentioned methodology to assess and score preliminary impacts and risks identified.
- ❖ Inclusion of I&AP comments regarding impact identification and assessment.

- ❖ Finalization of impact identification and scoring.

The impact significance rating methodology is guided by the requirements of the NEMA 2014 EIA Regulations (as amended). Please refer to Section 9.1 for a full description of the impact assessment methodology. Please refer to Table 20 for a description of the activities and associated impacts.

## 4.7 The Impact Assessment Methodology

The subsections below present the approach to assessing the identified potential environmental impact with the aim of determining the relevant environmental significance.

### 4.7.1 Method of Assessing Impacts

The requirements of the NEMA 2014 EIA Regulations guide the impact assessment process (as amended). The Environmental Risk (ER) is calculated by comparing the Consequence (C) of each effect (which includes Nature, Extent, Duration, Magnitude, and Reversibility) to the Probability/Likelihood (P) of the impact occurring. The Environmental Risk is determined by this. Other criteria, including as cumulative impacts, public concern, and the risk of irreversible resource loss, are also considered when determining a Prioritization Factor (PF), which is then applied to the ER to establish the overall Significance (S).

### 4.7.2 Determination of Environmental Risk

The significance (S) of an impact is determined by applying a Prioritization Factor (PF) to the Environmental Risk (ER).

The Environmental Risk is dependent on the Consequence (C) of the particular impact and the Probability (P) of the impact occurring. Consequence is determined through the consideration of the Nature (N), Extent (E), Duration (D), Magnitude (M) and Reversibility (R) applicable to the specific impact.

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

Aspect	Score	Definition
Nature	- 1	Likely to result in a negative/ detrimental impact
	+1	Likely to result in a positive/ beneficial impact
Extent	1	Activity (i.e. limited to the area applicable to the specific activity)
	2	Site (i.e. within the development property boundary),
	3	Local (i.e. the area within 5 km of the site),
	4	Regional (i.e. extends between 5 and 50 km from the site
	5	Provincial / National (i.e. extends beyond 50 km from the site)

<b>Duration</b>	1	<b>Immediate (&lt;1 year)</b>
	2	<b>Short term (1-5 years)</b>
	3	<b>Medium term (6-15 years)</b>
	4	<b>Long term (the impact will cease after the operational life span of the project),</b>
	5	<b>Permanent (no mitigation measure of natural process will reduce the impact after construction).</b>
<b>Magnitude/ Intensity</b>	1	<b>Minor (where the impact affects the environment in such a way that natural, cultural and social functions and processes are not affected)</b>
	2	<b>Low (where the impact affects the environment in such a way that natural, cultural and social functions and processes are slightly affected)</b>
	3	<b>Moderate (where the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way)</b>
	4	<b>High (where natural, cultural or social functions or processes are altered to the extent that it will temporarily cease) or</b>
	5	<b>Very high / don't know (where natural, cultural or social functions or processes are altered to the extent that it will permanently cease)</b>
<b>Reversibility</b>	1	<b>Impact is reversible without any time and cost</b>
	2	<b>Impact is reversible without incurring significant time and cost</b>
	3	<b>Impact is reversible only by incurring significant time and cost</b>
	4	<b>Impact is reversible only by incurring prohibitively high time and cost</b>

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

Each individual aspect in the determination of the Consequence is represented by a rating scale as defined in Table 7.



Table 7: Criteria for determination of impact Consequence.

Aspect	Score	Definition
	5	Irreversible Impact

Once the C has been determined the ER is determined in accordance with the standard risk assessment relationship by multiplying the C and the P. Probability is rated/scored as per Table 8.

Table 8: Probability scoring.

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

The result is a qualitative representation of relative ER associated with the impact. ER is therefore calculated as follows (Table 9):

$$ER = C \times P$$

Table 9: Determination of Environmental Risk.

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

The outcome of the environmental risk assessment will result in a range of scores, ranging from 1 through to 25. These ER scores are then grouped into respective classes as described in Table 10.

Table 10: Significance classes.

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

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

#### 4.7.3 Impact Prioritization

In accordance with Appendix 3(1)(j) of the NEMA 2014 EIA Regulations (as amended) (GNR 326 of 2017), and in addition to the assessment criteria presented in the Section above, each potentially significant impact must be evaluated in terms of cumulative impacts and the degree to which the impact may cause irreplaceable resource loss.

Furthermore, public opinion and attitude about a potential development, as well as its potential consequences, must be considered during the decision-making process.

An impact Prioritization Factor (PF) will be assigned to each impact ER in order to ensure that these considerations are considered (post-mitigation). This element is used to direct the attention of the decision-making authority on the higher priority/significant issues and impacts, rather than to distract from the risk assessments. The PF will be applied to the ER score assuming that all recommended management/mitigation measures are executed.

Table 11: Criteria for the determination of prioritization.

Public response (PR)	Low (1)	Issue not raised in public response.
	Medium (2)	Issue has received a meaningful and justifiable public response.
	High (3)	Issue has received an intense meaningful and justifiable public response.

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

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

$$\text{Priority} = \text{PR} + \text{CI} + \text{LR}$$

The result is a priority score which ranges from 3 to 9 and a consequent PF ranging from 1 to 2 (Table 12).

Table 12: Determination of prioritization factor.

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

In order to determine the final impact significance the PF is multiplied by the ER of the post mitigation scoring. The ultimate aim of the PF is to be able to increase the post mitigation environmental risk rating by a full ranking class, if all the priority attributes are high (i.e. if an impact comes out with a medium environmental risk after the conventional impact rating, but there is significant cumulative impact potential, significant public response, and significant potential for irreplaceable loss of resources, then the net result would be to upscale the impact to a high significance (Table 13).

Table 13: Environmental significance rating.

Environmental Significance Rating	
Value	Description
≤ 1	Very low (impact is negligible. No mitigation required)
>1≤2	Low negative (i.e. where this impact would not have a direct influence on the decision to develop in the area).
>2≤3	Moderate negative (i.e. where the impact could influence the decision to develop in the area).
>3≤4	High negative (i.e. where the impact must have an influence on the decision process to develop in the area).
>4≤5	Very high negative (impact is of highest order possible. Mitigation is required to lower impacts to acceptable levels. Potential fatal flaw)
0	No impact
>1≤2	Low positive (i.e. where this impact would not have a direct influence on the decision to develop in the area).
>2≤3	Moderate positive (i.e. where the impact could influence the decision to develop in the area).
>3≤4	
>4≤5	High positive (i.e. where the impact must have an influence on the decision process to develop in the area)

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

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

The proposed Coal, Pseudocoal, Torbanite and Aggregate mine will be established on an area that is being used for agricultural field. The adjacent land hosts the Glencore Operations located 285 m away and Boschmansfontein located approximately 3.4 m away from the proposed project area and some parts are being utilised for agricultural (grazing) and mining purposes. Upon the closure of the mining area the land will revert back to agriculture.

The existence of a new mine in the proposed area will lead to increased significant negative impacts on the receiving environment and the surrounding communities as a result of the already existing operations on site such as Glencore Operation and identified adjacent mines. The dust and noise impacts that may emanate from the mining area during the operational phase will have unacceptable negative impacts on the surrounding community if the mitigation measures proposed in this document are not implemented and managed on-site. The operation of the mine will, however, also have a number of positive impacts, such as permanent job creation for skilled, semi-skilled and un-skilled workers. The proposed mine will, therefore, contribute to upgrading/ maintaining infrastructure in and around Witbank area, which will indirectly contribute to the economy of the area.

#### **4.9 The possible mitigation measures that could be applied and the level of risk**

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

##### **4.9.1 Visual mitigation**

The risk of the proposed mining activities having a negative impact on the aesthetic quality of the surrounding environment can be reduced to medium risk through the implementation of the following mitigation measures:

- The site must be kept neat and in good condition at all times.
- Upon closure, the site must be rehabilitated and sloped to ensure that the visual impact on the aesthetic value of the area is minimal.

##### **4.9.2 Dust handling**

The risk of dust generated from the proposed mining activities having a negative impact on the

surrounding environment can be reduced to low-medium through the implementation of the following mitigation measures:

- Dust liberation into the surrounding environment must be effectively controlled by the use of, *inter alia*, water spraying and/or other dust-allaying agents.
- The site manager must ensure continuous assessment of all dust suppression equipment to confirm its effectiveness in addressing dust suppression.
- Access road speeds must be limited to 40km/h to prevent excessive dust generation.
- Roads must be sprayed with water or an environmentally friendly dust allaying agent, that contains no PCBs (e.g., DAS products), if dust is generated above acceptable limits.
- The in-proposed mine crusher plant must have operational water sprayers to alleviate dust generation from the conveyor belts.

#### **4.9.3 Noise handling**

The risk of noise, generated from the proposed mining activities, having a negative impact on the surrounding environment can be reduced to low - medium through the implementation of the following mitigation measures:

- The applicant must ensure that employees and staff conduct themselves in an acceptable manner while on site, both during work hours and after hours.
- No loud music may be permitted at the mining area.
- All mining vehicles must be equipped with silencers and kept roadworthy in terms of the Road Transport Act.
- The type, duration and timing of the blasting procedures must be planned with due cognisance of other land users and structures in the vicinity.
- Surrounding landowners must be notified, in writing, prior to blasting occasions.

#### **4.9.4 Management of weed or invader plants**

The risk of weeds or invader plants invading the disturbed area can be reduced to low through the implementation of the following mitigation measures:

- A weed and invader plant control management plan must be implemented at the site to ensure eradication of all listed invader plants in terms of Conservation of Agricultural Act (Act No 43 1983).
- Management must take responsibility to control declared invader or exotic species on the rehabilitated areas. The following control methods can be used:
  - The plants can be uprooted, felled or cut off and destroyed completely.

- The plants can be treated with an herbicide that is registered for use in connection therewith and in accordance with the directions for the use of such an herbicide.
- The temporary topsoil stockpiles must be kept free of weeds.

#### **4.9.5 Storm water handling**

The risk of contamination through dirty storm water escaping from work areas, or erosion or loss of material caused by uncontrolled storm water flowing through the mining area, can be reduced to low by implementing the following mitigation measures:

- Storm water must be diverted around the topsoil heaps, stockpile areas and access roads to prevent erosion and loss of material.
- Runoff water must also be diverted around the stockpile areas with trenches and contour structures to prevent erosion of the work areas.
- Mining must be conducted in accordance with the Best Practice Guideline for small scale mining that relates to storm water management, erosion and sediment control and waste management, developed by the Department of Water and Sanitation (DWS), and any other conditions the DWS may impose:
  - Clean water (e.g. rainwater) must be kept clean and routed to a natural watercourse by a system to separate from the dirty water system. Clean water must be prevented from running or spilling into dirty water systems.
  - Dirty water must be collected and contained in a system separate from the clean water system.
  - Dirty water must be prevented from spilling/seeping into clean water systems.
  - The storm water management plan must apply for the entire life cycle of the mine and over different hydrological cycles (rainfall patterns).
  - The statutory requirements of various regulatory agencies and the interests of stakeholders must be considered and incorporated into the storm water management plan.

#### **4.9.6 Management of health and safety risks**

The health and safety risk posed by the proposed mining activities can be reduced to low through the implementation of the following mitigation measures:

- The type, duration and timing of the blasting procedures must be planned with due cognisance of other land users and structures in the vicinity,
- The surrounding landowners and communities must be informed, in writing, ahead of any blasting event.

- Measures to limit fly rock must be taken.
- Audible warning of a pending blast must be given at least 3 minutes before the blast.
- All fly rock (with diameters of 150 mm and larger) which falls beyond the working area, together with the rock spill, must be collected and removed,
- Workers must have access to the correct PPE, as required by law.
- All operations must comply with the Occupational Health and Safety Act (OHSA).

#### **4.9.7 Waste management**

The risk of waste generation having a negative impact on the surrounding environment can be reduced to low through by implementing the following mitigation measures:

- No processing area or waste pile may be established within 100 m of the edge of any river channel or other water bodies.
- Regular vehicle maintenance may only take place within the service bay area of the off-site workshop. If emergency repairs are needed on equipment unable to move to the workshop, drip trays must be present. All waste products must be disposed of in a 200L closed container/bin to be removed from the emergency service area to the workshop in order to ensure proper disposal.
- Any effluents containing oil, grease or other industrial substances must be collected in a suitable receptacle and removed from the site, either for resale or for appropriate disposal at a recognised facility.
- Spills must be cleaned up immediately to the satisfaction of the Regional Manager by removing the spillage and the polluted soil and disposing of it at a recognised facility. Proof hereof should be filed.
- Suitable covered receptacles should be available at all times and conveniently placed for waste disposal.
- Non-biodegradable refuse, such as glass bottles, plastic bags, metal scrap, etc., should be stored in a container with a closable lid at a collecting point, collected on a regular basis and disposed of at a recognised landfill site. Specific precautions should be taken to prevent refuse from being dumped on or in the vicinity of the mine area.
- Biodegradable refuse generated should be handled as indicated above.

#### **4.9.8 Management of access roads**

The risk on the condition of the roads, as a result of the proposed mining activities, can be reduced to low-medium by implementing the following mitigation measures:

- Storm water must be diverted around the access roads to prevent erosion.



- Erosion of access road: Vehicular movement must be restricted to existing access routes to prevent criss-crossing of tracks through undisturbed areas. Rutting and erosion of the access road as a result of the mining activities should be repaired by the applicant.

#### **4.9.9 Topsoil handling**

The risk of topsoil loss can be reduced to low by implementing the following mitigation measures:

- Where applicable, the first 300 mm of topsoil should be removed in strips and stored along the boundary of the mining area. Stockpiling of topsoil must be done to protect it from erosion, which includes mixing it with overburden or other material. The topsoil must be used to cover the rehabilitated area and improve the establishment of natural vegetation.
- The temporary topsoil stockpiles of each removed strip must be kept weed free.
- Topsoil stockpiles must be placed on a levelled area and measures should be implemented to safeguard the piles from being washed away in the event of heavy rain/storm water.
- Topsoil heaps should not exceed 1.5 m, in order to preserve micro-organisms in the topsoil, which can be lost due to compaction and lack of oxygen.
- Should natural vegetation not establish on the heaps within 6 months of stockpiling, it must be planted with an indigenous grass species.
- Storm and runoff water should be diverted around the stockpile area and access roads to prevent erosion.

#### **4.9.10 Protection of fauna and flora**

The risk on the fauna and flora of the footprint area, as well as the surrounding environment, as a result of the proposed mining activities, can be reduced to low by implementing the following mitigation measures:

- The site manager must ensure that no fauna is caught, killed, harmed, sold or played with.
- Workers must be instructed to report any animals that may be trapped in the working area.
- No snares may be set, or nests raided for eggs or young.
- No plants or trees may be removed without the approval of the ECO.

#### **4.10 Motivation where no alternative sites were considered**

**MDZ Fleet Solutions (Pty) Ltd** identified the growing need for Coal, Pseudocoal, Torbanite and

Aggregate resources due to an increase in power demand. In this light, the applicant identified the proposed area as the preferred and only viable site alternative because of its immediate availability backed by data reviewed in the PWP, which has proven that Coal, Pseudocoal, Torbanite and Aggregate resources are available in the area. The establishment of a Coal, Pseudocoal, Torbanite and Aggregate proposed mine in this un-utilised area was found to be most viable.

Various project alternatives were considered during the planning phase of the project and the preferred alternatives proved to be:

- The open cast mining of the Coal, Pseudocoal, Torbanite and Aggregate has been identified as the most effective method to produce the desired Coal, Pseudocoal, Torbanite and Aggregate product.
- The use of temporary infrastructure will reduce the impact on the environment and decrease closure objectives with regard to infrastructure decommissioning.
- It is recommended that the existing farm road connected to the provincial road to the north of the property be used as an access road instead of trucks turning from the farm entrance onto the N12.

#### **4.11 Statement motivating the alternative development location within overall site**

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

The open cast mining of the Coal, Pseudocoal, Torbanite and Aggregate has been identified as the most cost-effective method to produce the desired Coal, Pseudocoal, Torbanite and Aggregate product. The proposed method will produce any residual (overburden) waste to be disposed of. Due to the remote location of the Coal, Pseudocoal, Torbanite and Aggregate proposed mine, the potential impacts on the surrounding environment, associated with open cast mining, is considered of low significance. It is proposed that all mining-related infrastructure will be contained within the boundaries of the mining area. As no permanent infrastructure will be established on site, the layout/position of the temporary infrastructure will be determined by the mining progress and available space in the mining area.

#### **4.12 Process undertaken to identify, assess and rank impacts and risk of site activities**

Full description of the process undertaken to identify, assess and rank the impacts and risks the activity will impose on the preferred site (In respect of the final site layout plan) through the life of the activity, including (i) a description of all environmental issues and risks that were identified during the environmental impact assessment process and (ii) an assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures.

During the impact assessment process, several potential impacts were identified of each main activity in each phase. An initial significance rating was determined for each potential impact, should the mitigation measures proposed in this document not be implemented on-site. The impact assessment process continued to identify mitigation measures to address the impact that the proposed mining activity may have on the surrounding environment. A significance rating was again determined for each impact using a relevant methodology. The impact ratings listed in the following section was determined for each impact after bringing the proposed mitigation measures into consideration and therefore represents the final layout/activity proposal.

#### **4.13 Assessment of each identified potentially significant impact and risk**

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

Unit Number	Activity	Aspect	Impact	Significance Rating Before Mitigation Measures									Mitigation Measures
				I	F	D	E	P	S	C	IS	SIGNIFICANCE	
1,0	Employment of workers and procurement of materials	Social	Creation of employment	3	3	5	1	1,0	3,7	2,3	2,3	Moderate	<p>Emphasis to employ local individuals must be maximised, reducing the need for migrant labour;</p> <p>the mine should prioritise employment of the local community members and contracts must include employment targets as part of their contractual agreements;</p> <p>Employment requirements should be broadly publicised to ensure that job-seekers do not have unrealistic job expectations;</p> <p>Liaison structures with the local police and community policing forums must be established and development of informal settlements within the proposed mining areas to be</p>

														communicated to the forums for potential monitoring and addressing
2,0	Site clearance and topsoil removal as a result of the proposed Project.	Air Quality	Dust generation emanating from the activities associated with the Mining Project areas	4	4	4	2	1,0	4,0	3,0	3,0	Moderate	<p>The area of disturbance must be restricted to the required footprint size;</p> <p>Ensure that only vegetation within the designated areas is removed;</p> <p>The drop heights used during the loading of the cleared soils into trucks should be minimised as far as possible; and</p> <p>Dirt roads to be wetted by a water browser and/or any applicable dust suppressant so as to reduce dust plumes.</p>	

Unit Number	Activity	Aspect	Impact	Significance Rating Before Mitigation Measures									Mitigation Measures
				I	F	D	E	P	S	C	IS	SIGNIFICANCE	
		Topography and Visual Environment	<p>Topography changes and the disruption of surface water flow.</p> <p>Soil erosion and topsoil loss.</p> <p>Visual impact caused by vegetation and topsoil removal.</p>	3	3	4	1	0,8	3,3	2,2	1,7	Low	<p>Ensure vegetation and topsoil is only cleared when necessary and within the demarcated areas;</p> <p>Ensure topsoil stockpiles are vegetated as soon as possible; and</p> <p>Ensure topsoil stockpiles are contoured and have a steepness of less than 18° to prevent slope failure and erosion and aid in vegetation establishment.</p> <p>Topsoil stockpiles that will be kept for more than a year are to be vegetated to sustain ecological components and further prevent dust emissions and growth of alien vegetation.</p>
		Soil	Soil contamination and	3	4	4	1	0,8	3,7	2,3	1,9	Low	Excavation and long-term stockpiling of soil should be limited within the







Unit Number	Activity	Aspect	Impact	Significance Rating Before Mitigation Measures									SIGNIFICANCE	Mitigation Measures
				I	F	D	E	P	S	C	IS			
			Loss of land capability and land use potential	2	1	4	1	0,8	2,3	1,7	1,3	Low	<ul style="list-style-type: none"> <li>• Any compacted soils must be ripped to alleviate compaction;</li> <li>• Stored topsoil should be replaced (if any) and the footprint graded to a smooth surface;</li> <li>• The landscape should be backfilled and reprofiled to mimic the natural topography for potential agricultural activities and grazing opportunities post mining. If possible, ensure a continuation of the pre mining surface drainage pattern;</li> <li>• Slopes of the backfilled surface should change gradually since abrupt changes in slope gradient increase the susceptibility for erosion initiation;</li> <li>• The soil fertility status to be determined by soil chemical analysis after levelling (before seeding/re-vegetation).</li> </ul>	









		integrity, potential impacts to freshwater resources further downstream of this point.											
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Unite Number	Activity	Aspect	Impact	Significance Rating Before Mitigation Measures									Mitigation Measures
				I	F	D	E	P	S	C	IS	SIGNIFICANCE	
			Destruction of natural habitat and animal life within the development area and to maintain ecological connectivity to neighbouring sites and, where possible, to regional ecological corridors.	4	5	4	1	1,0	4,3	2,7	2,7	Moderate	<ul style="list-style-type: none"> <li>• Environmental awareness training must include the prohibition of any harm or hindrance to any indigenous fauna species and the consequences of such actions.</li> <li>• Allow unhindered movement of fauna to allow them the opportunity to freely leave activity areas.</li> <li>• Ensure safe speed limits in the development area and no open fires.</li> <li>• Do not feed wild life and ensure that all food and food waste, including domestic waste, is placed in sealed containers and not exposed on site.</li> <li>• Ensure that the outside areas are kept clean and tidy and provide adequate waste removal services to prevent the attraction of rats and other alien scavenging species to the site.</li> <li>• Regularly (daily) inspect the haul</li> </ul>







			The destruction or degradation of watercourse vegetation.	1	1	4	2	0,6	2,0	2,0	1,2	Low	<ul style="list-style-type: none"> <li>• Ensure the flow of water through the moist grassland areas remain unchanged.</li> <li>• Monitor the presence of hydrophytes and species with an affinity for moist soils within the moist grasslands. Should such species decrease or be replaced by terrestrial species, then it is likely that the hydrological regime on the site has changed.</li> <li>• If moist grasslands are found to become drier, the Crinum species must be relocated to suitable habitat.</li> <li>• Input of sediment due to any related mining activities should be prevented at all cost.</li> <li>• Pollution of the surface and groundwater. Mitigation for this potential impact includes: <ul style="list-style-type: none"> <li>o In the case of pollution of any surface or groundwater, the Regional Representative of the Department of Water and Sanitation must be informed immediately;</li> <li>o Store all litter carefully so it cannot be</li> </ul> </li> </ul>
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Unite Number	Activity	Aspect	Impact	Significance Rating Before Mitigation Measures									SIGNIFICANCE	Mitigation Measures
				I	F	D	E	P	S	C	IS			
			Destruction of vegetation.	4	5	4	1	1,0	4,3	2,7	2,7	Moderate	<p>An independent Environmental Control Officer (ECO) should be appointed to oversee construction activities and ensure the following:</p> <ul style="list-style-type: none"> <li>• Keep the development footprint in Medium categories as small as possible.</li> <li>• A temporary fence or demarcation must be erected around the construction area (include the actual footprint, as well as areas where material is stored).</li> <li>• Maintain site demarcations in position until the cessation of construction work.</li> <li>• Only remove vegetation where necessary and retain vegetation in place for as long as possible prior to removal.</li> <li>• Prohibit vehicular or pedestrian access into natural areas beyond the</li> </ul>	

													<p>demarcated boundary of the construction area.</p> <ul style="list-style-type: none"> <li>• Formalise access roads and make use of existing roads and tracks where feasible, rather than creating new routes through naturally vegetated areas.</li> <li>• Implement a vegetation rehabilitation plan to ensure areas that can be rehabilitated post construction are adequately vegetated with indigenous grass species.</li> <li>• After construction, the land must be cleared of rubbish, surplus materials, and equipment, and all parts of the land must be left in a condition as close as possible to that prior to construction.</li> </ul>
			Erosion and subsequent sedimentation or pollution of proximate moist grassland (watercourse).	4	5	4	1	0,8	4,3	2,7	2,1	Moderate	<ul style="list-style-type: none"> <li>• Make use of existing roads and tracks where feasible, rather than creating new routes through grassland areas.</li> <li>• Retain vegetation and soil in position for as long as possible, removing it immediately ahead of construction / earthworks in that area (DWAF, 2005).</li> <li>• Runoff from access roads must be</li> </ul>









Unit Number	Activity	Aspect	Impact	Significance Rating Before Mitigation Measures									Mitigation Measures
				I	F	D	E	P	S	C	IS	SIGNIFICANCE	
		water courses	Siltation of surface water resources.	4	4	5	2	0,8	4,3	3,2	2,5	Moderate	<ul style="list-style-type: none"> <li>• Ensure site clearing is limited to the designated areas, and</li> <li>• Implement Stormwater Management designs to prevent erosion and divert dirty water to the appropriate storage dams (PCDs).</li> </ul>
			Contamination of groundwater resources	4	5	5	3	1,0	4,7	3,8	3,8	High	<ul style="list-style-type: none"> <li>• Ensure that a stormwater management plan is in place to separate clean and dirty water; and</li> <li>• Groundwater monitoring of the water quality and levels must take place quarterly, especially for the water supply boreholes to ensure a sustainable resource and identify impacts on local users.</li> </ul>
		Noise	Noise emanating from the construction machinery and	4	5	4	2	1,0	4,3	3,2	3,2	High	<ul style="list-style-type: none"> <li>• Ensure site clearing activities are only undertaken during daylight hours;</li> <li>• Mining related machines and vehicles should be serviced on a regular basis to ensure noise</li> </ul>

			vehicles impacting on surrounding sensitive receptors.												suppression mechanisms are effective (e.g. installed exhaust mufflers); and • Ensure equipment and machinery is switched off when not in use.
3,0	Stripping and stockpiling of topsoil	Air Quality	Dust generation emanating from the disturbance of soil.	4	1	1	1	1,0	2,0	1,5	1,5	Low	Ensure that dust suppressants are applied regularly  Ensure that dust suppressants are applied to gravel or unpaved roads that are in use;  Vehicles should obey speed limits		
		Topography and Visual Environment.	Topographical change Negative visual impact caused by vehicular activity.	4	4	4	1	0,8	4,0	2,5	2,0	Low	Ensure liaison with the local authorities for the maintenance and upkeep of roads; Ensure that dust suppressants are applied to gravel or unpaved roads that are in use; and Vehicles will obey speed limits.		
		Noise pollution	Noise nuisance caused by machinery	3	5	4	1	1,0	4,0	2,5	2,5	Moderate	Avoid through preventative measures (e.g. communication with landowners and timing of activities).  Control through implementation of		

													EMPR mitigation measures (e.g. noise abatement measures).
		Traffic	The degradation of the road structures	5	5	4	1	1,0	4,7	2,8	2,8	Moderate	Adhere to the Mine's Traffic Management Plan; and  Gravel roads used must be graded and compacted regularly, should the roads remain unpaved.
4,0	development and operation of the mine	Soil	Soil contamination and degradation.	4	5	5	2	0,8	4,7	3,3	2,7	Moderate	In case whereby contractors bring on site mobile bowsers and lubricants, these are to be stored in a bunded area when parked at the construction areas;  All potential hydrocarbon spillages and leaks must be cleaned up immediately and the soils remediated;  Spillage control kits will be readily available on site to contain the mobilisation of contaminants and clean up spills;







Unite Number	Activity	Aspect	Impact	Significance Rating Before Mitigation Measures									Mitigation Measures
				I	F	D	E	P	S	C	IS	SIGNIFICANCE	
5,0	Mining operations	Social	safety and security risks to landowners and lawful occupiers	3	5	4	1	0,8	4,0	2,5	2,0	Low	<p>The area of disturbance must be restricted to the required footprint size;</p> <p>Ensure that only vegetation within the designated areas is removed;</p> <p>The drop heights used during the loading of the cleared soils into trucks should be minimised as far as possible; and</p> <p>Dirt roads to be wetted by a water browser and/or any applicable dust suppressant so as to reduce dust plumes.</p>
			interference with existing land uses Crime and violence	3	4	4	1	0,6	3,7	2,3	1,4	Low	<p>Ensure vegetation and topsoil is only cleared when necessary and within the demarcated areas; Ensure topsoil stockpiles are vegetated as soon as possible; and Ensure topsoil stockpiles</p>



														are contoured and have a steepness of less than 18° to prevent slope failure and erosion and aid in vegetation establishment. Topsoil stockpiles that will be kept for more than a year are to be vegetated to sustain ecological components and further prevent dust emissions and growth of alien vegetation.
6,0	Drilling and Blasting	Air Quality	Fugitive dust generation emanating.	4	2	1	1	0,8	2,3	1,7	1,3	Low	<ul style="list-style-type: none"> <li>• Ensure that the areas of disturbance are minimised and restricted to the required footprint areas; and</li> <li>• Ensure that dust suppressants are applied to exposed surfaces.</li> </ul>	
		Topography and Visual Environment	Topography changes and disruption of surface water flow.	4	2	5	3	0,8	3,7	3,3	2,7	Moderate	<ul style="list-style-type: none"> <li>• Limit the footprint areas of the of the surface infrastructure, where possible, especially the width of the link road to be within the servitude;</li> <li>• Ensure that access and haul roads are contoured to limit erosion from surface runoff, preventing further alteration to the topography;</li> <li>• Establish vegetation, where possible, to aid in screening infrastructure;</li> <li>• Surface infrastructure should be</li> </ul>	



			maintain ecological connectivity to neighbouring sites and, where possible, to regional ecological corridors.											fauna to allow them the opportunity to freely leave activity areas. <ul style="list-style-type: none"> <li>• Ensure safe speed limits in the development area and no open fires.</li> <li>• Do not feed wildlife and ensure that all food and food waste, including domestic waste, is placed in sealed containers and not exposed on site.</li> <li>• Ensure that the outside areas are kept clean and tidy and provide adequate waste removal services to prevent the attraction of rats and other alien scavenging species to the site.</li> <li>• Regularly (daily) inspect the haul road and clear Coal, Pseudocoal, Torbanite and Aggregate spills and Coal, Pseudocoal, Torbanite and Aggregate fines to reduce Coal, Pseudocoal, Torbanite and Aggregate dust contamination to the neighbouring wetland areas.</li> </ul>
		Flora	Alien invasive plant species.	4	4	5	2	0,8	4,3	3,2	2,5	Moderate	<ul style="list-style-type: none"> <li>• Areas cleared of invasive to be monitored in the growing season (summer).</li> <li>• If re-sprouting or reseeding is noted,</li> </ul>	

													<p>follow-up control to be initialised.</p> <ul style="list-style-type: none"> <li>• Cleared and denuded areas to be rehabilitated as soon as possible with indigenous grass species.</li> <li>• Monitor the establishment of invasive species and remove as soon as detected, whenever possible before regenerative material can be formed.</li> <li>• Monitor all sites disturbed by localised activities for colonisation by exotics or invasive plants and control these as they emerge.</li> <li>• Monitoring should continue for at least two years after such activities cease.</li> </ul>
		Wetlands and Aquatic Ecology	Contamination and sedimentation of the wetland systems and aquatic ecosystems.	2	5	4	1	0,8	3,7	2,3	1,9	Low	<ul style="list-style-type: none"> <li>• Ensure soil management programme is implemented and maintained to minimise erosion and sedimentation;</li> <li>• Active rehabilitation, re-sloping, and re-vegetation of disturbed areas immediately after construction;</li> <li>• Implement and maintain alien vegetation management programme;</li> <li>• Appropriate sanitary facilities must be provided for the duration of the</li> </ul>

																construction activities and all waste must be removed to an appropriate waste facility.
		Surface Water	Siltation of surface water resources.	4	4	5	2	0,8	4,3	3,2	2,5	Moderate	<ul style="list-style-type: none"> <li>• Ensure soil management programme is implemented and maintained to minimise erosion and sedimentation;</li> <li>• Active rehabilitation, re-sloping, and re-vegetation of disturbed areas immediately after construction;</li> <li>• Implement and maintain alien vegetation management programme;</li> <li>• Limit the footprint area of the construction activities to what is absolutely essential in order to minimise impacts as a result of vegetation clearing and compaction of soils;</li> <li>• All erosion noted within the construction footprint to be remedied immediately and included as part of an ongoing rehabilitation plan;</li> <li>• All delineated watercourses and their associated 100 m zones of regulation in terms of GN704 must be designated as "No-Go" areas and be off limits to all</li> </ul>			



Unite Number	Activity	Aspect	Impact	Significance Rating Before Mitigation Measures								Mitigation Measures	
				I	F	D	E	P	S	C	IS		SIGNIFICANCE
													stockpiled within delineated watercourses;
		Noise	Increased noise levels.	4	2	3	1	0,8	3,0	2,0	1,6	Low	<ul style="list-style-type: none"> <li>Ensuring that all construction equipment operators receive proper training in the use of the equipment and that the equipment is serviced regularly.</li> <li>All blasting and piling driving, if required, should only occur during the day.</li> <li>An environmental noise monitoring survey should be conducted during the construction phase to assess the impact and recommend further actions if required.</li> <li>A public complaints and actions registry should be established to capture public perceptions and complaints regarding noise impacts,</li> </ul>





														complaints be received from surrounding residents or communities. Additional monitoring points should be included in the vicinity if required/ requested.
7,0	Construction of RoM Stockpile and associated Water Management Infrastructure.	Air Quality	Fugitive dust generation emanating the RoM Stockpile construction activities.	4	4	5	2	0,8	4,3	3,2	2,5	Moderate	<ul style="list-style-type: none"> <li>Regular maintenance schedules should include a check for noise emissions, e.g., the functional state of all intake and exhaust noise attenuators and effectiveness of enclosures in accordance with standard operating procedures; and</li> <li>Construction related machines and vehicles should be serviced on a regular basis to ensure noise suppression mechanisms are effective (e.g., installed exhaust mufflers).</li> </ul>	

													<ul style="list-style-type: none"> <li>• Dust fallout monitoring must be conducted throughout the life of operation of existing mining operation to confirm model predictions.</li> <li>• Reduce, control and manage the height of material drops (e.g., Transfer chute to RoM Stockpile); and</li> <li>• Increase moisture content of material by using water sprays prior to or during conveying, crushing, and screening material.</li> </ul>
		Topography and Visual Environment	<p>Topography changes and disruption of surface water flow.</p> <p>Soil erosion and topsoil loss.</p> <p>visual impact caused by stockpiling of Coal, Pseudocoal,</p>	2	5	5	2	0,6	4,0	3,0	1,8	Low	<ul style="list-style-type: none"> <li>• Ensure that the stockpile is constructed with the planned disturbed areas;</li> <li>• Operate, manage and maintain the stockpile in line with the design plans, as-built plans and operating and maintenance manual.</li> </ul>

			Torbanite and Aggregate .											
		Soils	Soil degradation.	4	4	5	2	0,8	4,3	3,2	2,5	Moderate	<ul style="list-style-type: none"> <li>• Minimise topsoil stockpile heights as far as possible;</li> <li>• Ensure soils are stripped and stockpiled prior to the excavation of infrastructure foundations;</li> <li>• Ensure stockpiles are maintained in a fertile and erosion free state by sampling and analysing for macro nutrients and pH on an annual basis;</li> <li>• Traffic and access to the stockpiles will be restricted;</li> <li>• Ensure that the topsoil stockpiles are vegetated to prevent soil erosion and to reinstitute the ecological processes within the soil; and</li> <li>• Implement Stormwater Management designs to prevent erosion.</li> </ul>	
		Fauna and Flora	Loss of vegetation communities	2	5	5	2	0,6	4,0	3,0	1,8	Low	Vegetate open and exposed areas to prevent soil erosion and the establishment of alien invasive vegetation;	



														construction, operation and maintenance of water management facilities must be in accordance with GN R 704 capacity requirements.
		Noise	Increased Noise Levels	2	2	2	2	0,8	2,0	2,0	1,6	Low	<p>Noise levels in the area are already well within 70dBA for the industrial areas during the day and 60 dBA at night as may be associated with mining. Therefore, it is expected that additional noise levels contributed by existing Mine will be insignificant.</p> <p>Trucks, machinery, and equipment will be regularly serviced to ensure acceptable noise levels are not exceeded. Silencers will be utilised where possible.</p>	
		Groundwater	Contamination of groundwater resources Seepage through and runoff from the Coal,	4	4	5	2	1,0	4,3	3,2	3,2	High	<ul style="list-style-type: none"> <li>A groundwater monitoring system must be implemented and test the water on a quarterly basis for changes in water quality and water levels. Should impacts be identified, management measures must be implemented based on the contaminant or water level change;</li> </ul>	

			Pseudocoal, Torbanite and Aggregate stockpile.											<ul style="list-style-type: none"> <li>• Implement a Surface Water Management Plan to minimise the volume of dirty water produced, as well as the effectiveness of the containment of dirty water, thereby reducing the probability of contamination of groundwater from infiltration of dirty surface water;</li> <li>• Refine and update the conceptual and numerical models annually for the first four years and thereafter every five years based on groundwater monitoring results. This will help to better quantify impacts to water quantity and quality; and</li> <li>• All contaminant, waste and hazardous waste storage facilities and other contaminated water storage areas (PCD) must be lined to proactively prevent infiltration of contaminated seepage water.</li> </ul>
10,0	Storage, use and control of fuel and lubricants to	Soil	Soil contamination and degradation	4	4	5	2	0,8	4,3	3,2	2,5	Moderate	<ul style="list-style-type: none"> <li>• All potential hydrocarbon spillages and leaks must be cleaned up immediately and the soils remediated;</li> <li>• Spillage control kits will be readily</li> </ul>	

	be used for the mining activities.													<p>available on site to contain the mobilisation of contaminants and clean up spills;</p> <ul style="list-style-type: none"> <li>• All vehicles and machinery to be serviced in a hard park area or at an off-site location;</li> <li>• Storage of hydrocarbons and explosives must be managed according to the Hazardous Substances Act, 1973 (Act No. 15 of 1973);</li> <li>• Hydrocarbons and explosives storage facilities must be in a hard park bunded facility; and</li> <li>• Vehicles with leaks must have drip trays in place.</li> </ul>
		Groundwater	Groundwater contamination	5	5	5	3	1,0	5,0	4,0	4,0	High	<ul style="list-style-type: none"> <li>• All potential hydrocarbon leaks must be repaired immediately and spillages be cleaned up immediately and the soils remediated;</li> <li>• Spillage control kits will be readily available on site to contain the mobilisation of contaminants and clean up spills;</li> <li>• All vehicles and machinery to be</li> </ul>	

													<p>serviced in a hard park area or at an off-site location;</p> <ul style="list-style-type: none"> <li>• Storage of hydrocarbons and explosives must be managed according to the Hazardous Substances Act, 1973 (Act No. 15 of 1973);</li> <li>• Hydrocarbons and explosives storage facilities must be in a hard park bunded facility; and</li> <li>• Vehicles with leaks must have drip trays in place; and</li> <li>• Groundwater monitoring of the water quality and levels must take place quarterly especially for the water supply boreholes to ensure a sustainable resource and identify impacts on local users.</li> </ul>
11,0	Operation of the RoM Stockpile and associated Water Management Infrastructure.	Air Quality	Fugitive dust generation emanating the RoM Stockpile operational activities.	2	3	4	1	0,8	3,0	2,0	1,6	Low	<ul style="list-style-type: none"> <li>• Ensure that the areas of disturbance are minimised and restricted to the required footprint areas;</li> <li>• Public complaints and actions registry should be established to capture public perceptions and complaints regarding increased air quality</li> </ul>





Unite Number	Activity	Aspect	Impact	Significance Rating Before Mitigation Measures									SIGNIFICANCE	Mitigation Measures
				I	F	D	E	P	S	C	IS			
			Soil degradation.	3	3	3	1	1,0	3,0	2,0	2,0	Moderate	<ul style="list-style-type: none"> <li>• Minimise topsoil stockpile heights as far as possible;</li> <li>• Ensure soils are stripped and stockpiled prior to the excavation of infrastructure foundations;</li> <li>• Ensure stockpiles are maintained in a fertile and erosion free state by sampling and analysing for macro nutrients and pH on an annual basis;</li> <li>• Traffic and access to the stockpiles will be restricted;</li> <li>• Ensure that the topsoil stockpiles are vegetated to prevent soil erosion and to reinstitute the ecological processes within the soil; and</li> <li>• Implement Stormwater Management designs to prevent erosion.</li> </ul>	
		Fauna and Flora	Loss of vegetation communities.	2	3	3	2	0,6	2,7	2,3	1,4	Low	<ul style="list-style-type: none"> <li>• Vegetate open and exposed areas to prevent soil erosion and the establishment of alien invasive</li> </ul>	







		Wetland and aquatic environment	Increased movement of heavy vehicles	2	5	4	1	0,8	3,7	2,3	1,9	Low	<ul style="list-style-type: none"> <li>• Clean and dirty water separation systems to be implemented prior to the commencement of activities and to be maintained throughout the life of the proposed project;</li> <li>• Ensure that as far as possible all operational infrastructures are placed outside of wetland/riparian areas and their associated 32 or 100m zones of regulation respectively;</li> <li>• Limit the footprint area of the operational activities to what is absolutely essential in order to minimise impacts as a result of subsidence;</li> <li>• Ensure that no incision and canalisation of the wetland features present takes place as a result of the proposed operational activities;</li> <li>• All erosion noted within the operational footprint as a result of either subsidence or any potential surface activities should be remedied immediately and included as part of the ongoing rehabilitation plan;</li> <li>• Erosion berms should be installed on</li> </ul>
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													inspected for leaks; <ul style="list-style-type: none"> <li>• Re-fueling must take place on a sealed surface area away from wetlands to prevent ingress of hydrocarbons into topsoil;</li> <li>• All spills should be immediately cleaned up and treated accordingly;</li> <li>• Appropriate sanitary facilities must be provided for the duration of the operational activities and all waste must be removed to an appropriate waste facility;</li> <li>• Monitor all systems for erosion and incision;</li> <li>• Areas across watercourses where cross-sectional subsidence is observed should be rehabilitated in such a way as to maintain stream connectivity in a downstream direction.</li> </ul>
		Surface water and groundwater	Contamination of surface water due to potential hydrocarbon spillages.	4	4	5	2	0,8	4,3	3,2	2,5	Moderate	<ul style="list-style-type: none"> <li>• All potential hydrocarbon spillages and leaks must be cleaned up immediately and the soils remediated;</li> <li>• Spillage control kits will be readily available on site to contain the mobilisation of contaminants and</li> </ul>



																clean up spills; <ul style="list-style-type: none"> <li>• All vehicles and machinery to be serviced in a hard park area or at an off-site location;</li> <li>• Storage of hydrocarbons must be managed according to the Hazardous Substances Act, 1973 (Act No. 15 of 1973); and</li> <li>• Vehicles with leaks must have drip trays in place.</li> </ul>
13,0	Vehicular activity.	Air Quality	Fugitive dust generation emanating.	4	5	4	3	1,0	4,3	3,7	3,7	High	<ul style="list-style-type: none"> <li>• Ensure the area of disturbance during the mining activities is restricted to the to the identified mining strips;</li> <li>• Ensure that dust suppressants are applied to gravel or unpaved roads that are in use;</li> <li>• Cover the road going trucks from the tip to KPS with a tarpaulin to prevent Coal, Pseudocoal, Torbanite and Aggregate dust generation; and</li> <li>• Vehicles will obey speed limits. Maintenance equipment and heavy vehicle speeds should be reduced, where possible, to prevent dust emissions.</li> </ul>			

	Topography and Visual Environment	Topography change and disruption of surface water flow	2	5	5	2	0,6	4,0	3,0	1,8	Low	<ul style="list-style-type: none"> <li>• Ensure that access and haul roads are contoured to limit erosion from surface runoff, preventing further alteration to the topography;</li> <li>• Ensure that dust suppressants are applied to gravel or unpaved roads that are in use; and</li> <li>• Vehicles will obey speed limits.</li> </ul>
	Soil	Soil contamination and degradation.	4	4	5	2	0,8	4,3	3,2	2,5	Moderate	<ul style="list-style-type: none"> <li>• All potential hydrocarbon spillages and leaks must be cleaned up immediately and the soils remediated;</li> <li>• Spillage control kits will be readily available on site to contain the mobilisation of contaminants and clean up spills;</li> <li>• All vehicles and machinery to be serviced in a hard park area or at an off-site location;</li> <li>• Storage of hydrocarbons and explosives must be managed according to the Hazardous Substances Act, 1973 (Act No. 15 of 1973);</li> <li>• Hydrocarbons and explosives storage facilities must be in a hard park bunded</li> </ul>

													facility; and • Vehicles with leaks must have drip trays in place.
	Fauna and Flora	Loss of biodiversity and minimise impacts on floral species	4	4	5	2	0,8	4,3	3,2	2,5	Moderate		<ul style="list-style-type: none"> <li>• Ensure that dust suppressants are applied to gravel or unpaved roads that are in use;</li> <li>• Cover the road going trucks from the tip to KPS with a tarpaulin to prevent Coal, Pseudocoal, Torbanite and Aggregate dust generation; and</li> <li>• Vehicles will obey speed limits.</li> </ul>
	Wetlands and Aquatic Ecology	Contamination and sedimentation of the wetland systems and aquatic ecosystems	2	2	4	3	1,0	2,7	2,8	2,8	Moderate		<ul style="list-style-type: none"> <li>• Ensure a Storm Water Management Plan is implemented;</li> <li>• Ensure that dust suppressants are applied to gravel or unpaved roads that are in use and exposed surfaces;</li> <li>• Cover the road going trucks from the tip to KPS with a tarpaulin to prevent Coal, Pseudocoal, Torbanite and Aggregate dust generation;</li> <li>• Vehicles will obey speed limits; and</li> <li>• Implement a biannual Aquatic Monitoring Programme to monitor potential impacts and implement</li> </ul>

												corrective actions, should it be required.
	Surface Water	Contamination and sedimentation of clean water resources.	4	4	5	2	0,8	4,3	3,2	2,5	Moderate	<ul style="list-style-type: none"> <li>• Ensure that dust suppressants are applied to gravel or unpaved roads that are in use and exposed surfaces;</li> <li>• Cover the road going trucks from the tip to KPS with a tarpaulin to prevent Coal, Pseudocoal, Torbanite and Aggregate dust generation;</li> <li>• Vehicles will obey speed limits; and</li> <li>• Monitor surface water resources up and downstream of the Project area to identify potential contamination.</li> </ul>

Unit Number	Activity	Aspect	Impact	Significance Rating Before Mitigation Measures									Mitigation Measures
				I	F	D	E	P	S	C	IS	SIGNIFICANCE	
		Noise	noise emanating from mining and vehicular activities impacting on surrounding sensitive receptors.	4	4	5	2	0,8	4,3	3,2	2,5	Moderate	<ul style="list-style-type: none"> <li>• Mining related machines and vehicles should be serviced on a regular basis to ensure noise suppression mechanisms are effective (e.g., installed exhaust mufflers); and</li> <li>• Ensure equipment and machinery is switched off when not in use.</li> <li>• The gravel roads must be graded and compacted on a regular basis and as when required, should the roads remain unpaved; and</li> <li>• Adhere to the set speed limit in accordance to the Traffic Management Plan.</li> </ul>
		Traffic	Degradation of the road structures resulting in potential health and	3	4	5	2	0,8	4,0	3,0	2,4	Moderate	<ul style="list-style-type: none"> <li>• The gravel roads must be graded and compacted on a regular basis and as when required, should the roads remain unpaved; and</li> <li>• Adhere to the set speed limit in</li> </ul>

			safety risks and soil erosion.												accordance to the Traffic Management Plan.
14,0	Dirty water management.	Wetlands and Aquatic Ecology	Contamination of the wetland systems and aquatic ecosystems	4	4	5	2	0,8	4,3	3,2	2,5	Moderate	<ul style="list-style-type: none"> <li>• Ensure a Stormwater Management Plan is implemented;</li> <li>• Ensure that no incision and canalisation of the watercourses;</li> <li>• Dirty water from the infrastructure areas must be diverted by channels and berms and separated from clean water. The dirty water must be stored in the existing PCDs;</li> <li>• No waste and/or contaminated material may be dumped or stockpiled within any watercourses;</li> <li>• The operation and maintenance of the PCD must be in accordance with the NWA Regulations set out in GN R704 and must have a minimum freeboard of 0.8 m and be able to contain a 1:50 year, 24-hour storm event; and</li> <li>• Implement a biannual Aquatic Monitoring Programme to monitor potential impacts and implement</li> </ul>		

																corrective actions, should it be required.
			Contamination of clean water resources.	4	4	5	2	0,8	4,3	3,2	2,5	Moderate				<ul style="list-style-type: none"> <li>• Continue with water quality monitoring at the existing sample at the current monitoring locations and frequency. Increase monitoring frequency for those monitoring points that show constant non-compliances;</li> <li>• The water levels in the Surface Main PCD and the Main Underground dams must be constantly monitoring and recorded for evaluation of additional future capacity and/or treatment requirements;</li> <li>• Pipelines used for dewatering activities need to be sized based on the dewatering rates and volumes;</li> <li>• The operation and maintenance of the existing PCD must be in accordance with the NWA Regulations set out in GN R704 and must have a minimum freeboard of 0.8 m and be able to contain a 1:50 year, 24-hour</li> </ul>





																<p>managed to stay well below the decant level of 1594 mamsl;</p> <ul style="list-style-type: none"> <li>• Monitor the borehole water quality and if the quality deteriorates, it is recommended to start pumping to contain the plume;</li> <li>• Ensure that a stormwater management plan is in place to separate clean and dirty water; and</li> <li>• Groundwater monitoring of the water quality and levels must take place quarterly especially for the water supply boreholes to ensure a sustainable resource and identify impacts on local users.</li> </ul>
15,0	Waste and sewage generation and disposal.	Topography and Visual Environment	Topography change	2	3	3	2	0,8	2,7	2,3	1,9	Low	<ul style="list-style-type: none"> <li>• Waste must be stored away from surface water and drainage lines; and</li> <li>• General and hazardous waste must be removed and disposed of frequently at a registered disposal site.</li> </ul>			
		soil	Degradation and contamination of soil	4	4	5	2	0,8	4,3	3,2	2,5	Moderate	<ul style="list-style-type: none"> <li>• Burying of any waste including rubble, domestic waste, empty containers on the site must be strictly prohibited;</li> <li>• Proper waste storage facilities should be available and used for the correct</li> </ul>			

												separation and storage of waste prior to collection and disposal; and <ul style="list-style-type: none"> <li>Generated waste must be removed to an approved disposal facility.</li> </ul>
	Surface Water	Contamination of clean water resources.	4	4	5	2	0,8	4,3	3,2	2,5	Moderate	<ul style="list-style-type: none"> <li>The sewer waster collected from the workings must be disposed of at a licensed sewage treatment facility;</li> <li>Monitor surface water resources up and downstream of the Project area to identify potential contamination;</li> <li>Ensure that a stormwater management plan is in place to separate clean and dirty water; and</li> <li>Waste must be separated at source and stored in appropriately designated areas for disposal at a licensed facility or by a reputable contractor.</li> </ul>

#### 4.14 Summary of specialist reports

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

List of studies undertaken	Recommendations of specialist reports	Specialist recommendations included in the BASIC ASSESSMENT report Mark with an X where applicable	Reference to applicable report section Where specialist recommendations have been included
<b>Soil Study</b>	<ul style="list-style-type: none"> <li>The proposed mining land should be returned to its origin as before mining activities and the rehabilitation performance assessment in the proposed land must be done progressively (annually) during the operational phase by a soil specialist.</li> <li>Final surface rehabilitation of all disturbed areas during mining activities. Rehabilitation of unnecessary water management facilities once appropriate to do so.</li> <li>Specialists should be used to evaluate the erosion and other possible impacts during the entire mining process.</li> <li>Limit impacts to the footprints to keep physical impacts as small as possible. Areas for road, site lay-out should be minimized, dust generation.</li> </ul>	<b>X</b>	Appendix 10

List of studies undertaken	Recommendations of specialist reports	Specialist recommendations included in the BASIC ASSESSMENT report Mark with an X where applicable	Reference to applicable report section Where specialist recommendations have been included
	<ul style="list-style-type: none"> <li>• Ensure all stockpiles (especially topsoil) are clearly and permanently demarcated and located in defined no-go areas.</li> <li>• Stockpile height should be restricted, A maximum height of 2-3 m is therefore proposed.</li> <li>• Stockpiles should also be always kept free of alien vegetation to prevent loss of soil quality.</li> <li>• The recovered soil should be re-used to rehabilitate the mine footprint following mine closure.</li> </ul>		
Hydrology Study	<ul style="list-style-type: none"> <li>• Drilling of well-constructed boreholes which will be monitored monthly, during the project construction and operational phases.</li> <li>• An independent ECO is to be appointed during construction. The mine's internal Environmental officers will be conversant with best practices in accordance with rehabilitation during decommissioning and an audit is to be performed before and after rehabilitation.</li> <li>• Where mining infrastructure, such as haul roads, are required across natural watercourses, new storm water infrastructure, such as pipes and culverts</li> </ul>	X	Appendix 10

List of studies undertaken	Recommendations of specialist reports	Specialist recommendations included in the BASIC ASSESSMENT report Mark with an X where applicable	Reference to applicable report section Where specialist recommendations have been included
	<p>could replace the hydraulic function currently offered by the natural water courses. This infrastructure should be designed for both hydraulic performance and environmental functionality.</p> <ul style="list-style-type: none"> <li>• Around operating areas, temporary erosion control measures (e.g., sediment nets berms, etc.) must be used.</li> <li>• No dirty water should be released into the ecosystem. Excess water in the mine water circuit must be dealt with properly in accordance with the DWS.</li> </ul>		
Hydrogeological Study	<ul style="list-style-type: none"> <li>• The study area falls on a fractured aquifer system, the mine planning should take into consideration the fracture zones in the Vryheid formation, drilling activities should not contact the fractures as that is where most groundwater in the area is found and to prevent possible groundwater pollution from residual explosive material used.</li> <li>• It is recommended that there should be regular testing or monitoring of surrounding soil, water resources to detect any change in chemistry so that remedial measures are implemented in time.</li> <li>• The monitoring process throughout the existence of the project, the chemical and physical parameters of the water samples should be tested and</li> </ul>	X	Appendix 10

List of studies undertaken	Recommendations of specialist reports	Specialist recommendations included in the BASIC ASSESSMENT report Mark with an X where applicable	Reference to applicable report section Where specialist recommendations have been included
	<p>compared with the SANS 241: 2015.</p> <ul style="list-style-type: none"> <li>• There should be soil, water resources and land pollution mitigation measures on site.</li> <li>• Wastewater source should be identified, and mitigation measures put in place to prevent groundwater contamination.</li> <li>• The stockpile, there should be regular monitoring of any heavy metal which could be exposed, as such could result in leaching during rainfall.</li> <li>• Proper and competent structure of the tailings dam should be built, to contain liquid, or solid waste and to prevent such waste from entering the outside environment.</li> <li>• According to section 21 (S21) of the National Water Act 36 of 1998, if a proposed project triggers any of the listed S21 activities, a water use license must be applied for. For this project, there will be activities which includes abstraction of water from groundwater, mining activities from the water courses dust suppression, dewatering, and ROM stockpiles. It is therefore recommended that a water use license be applied for.</li> <li>• It is recommended that compliance of relevant legislations be ensured, NEMA</li> </ul>		

List of studies undertaken	Recommendations of specialist reports	Specialist recommendations included in the <b>BASIC ASSESSMENT</b> report Mark with an X where applicable	Reference to applicable report section Where specialist recommendations have been included
	<p>Act 107 of 1998, NWA Act 36 of 1998, NEM: waste Management Act 59 of 2008.</p> <ul style="list-style-type: none"> <li>It is recommended that during the existence of the project there should also be regular maintenance of mobile ablutions, to avoid leakage of waste into the ground.</li> <li>There should be boreholes in and around the mining permit area, to monitor the groundwater quality and quantity.</li> </ul>		
Rehab Plan	<ul style="list-style-type: none"> <li>It is recommended that the financial provision for closure and rehabilitation be annually updated as per the requirements of the MPRDA.</li> <li>Surface water monitoring of the pans and associated wetlands surrounding the project area is to be undertaken to determine the impacts associated with operations of the mine.</li> <li>Regular audits should be undertaken by a soil scientist during the soil stripping process. This will guarantee that soil is stripped and stockpiled correctly.</li> <li>Regular audits should be undertaken to monitor the progress of areas that have been rehabilitated.</li> </ul>	<b>X</b>	Appendix 10

List of studies undertaken	Recommendations of specialist reports	Specialist recommendations included in the <b>BASIC ASSESSMENT</b> report Mark with an X where applicable	Reference to applicable report section Where specialist recommendations have been included
	<ul style="list-style-type: none"> <li>• Long-term management of the rehabilitated areas will be required via contractual agreements with landowners in the area and rehabilitation should also be undertaken to best practice.</li> <li>• An independent Environmental Assessment Practitioner shall be appointed to ensure compliance with requirements of the Final Rehabilitation, decommissioning and Closure Plan</li> </ul>		



## **4.15 Environmental impact statement**

### **4.15.1 Summary of the key findings of the basic assessment**

The key findings of the basic assessment are as follows:

- The project entails the establishment of a Coal, Pseudocoal, Torbanite and Aggregate mine on a heavily modified area as a result of previous underground activities with minimal natural vegetation cover therefore, natural vegetation has to be disturbed by mining activities.
- The existing roads to the proposed Coal, Pseudocoal, Torbanite and Aggregate mine will be used to gain access to the site. No new roads are established/ constructed.
- The applicant's off-site workshop will be used for servicing vehicles, thereby reducing the risk of hazardous spills and contamination at the mining site.
- Due to the setting of the Coal, Pseudocoal, Torbanite and Aggregate proposed mine, the majority of potential impacts will be contained within the boundaries of the 5 hectares, provided that mitigation measures proposed in this document are implemented on-site.
- The mining operation will have a temporary visual impact on the surrounding environment. During operational and closure of the proposed mining area the visual impact on the proposed mining area will be mitigated and addressed.
- There are no watercourses within the 500 m radius from the permit boundary.

### **4.15.2 Final site map**

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

The map indicating site activities is attached as Appendix.

### **4.15.3 Positive and negative impacts of the proposed activity and alternatives**

The positive impacts associated with the project include:

- Job creation, although a fixed number of jobs to be created cannot be stated at this stage, will include multiple job opportunities for skilled, semi-skilled and unskilled personnel will be created by this project. This will contribute to the socio-economic status of the Witbank area.

The negative impacts associated with the project and that were considered to be of Low-Medium significance includes:

Visual intrusion associated with the establishment of the mining area	Medium
Visual intrusion associated with the excavation activities	Medium
Visual intrusion associated with the stockpiled material and vehicles transporting the material	Low-medium
Dust nuisance caused by blasting activities	Low-medium
Dust nuisance due to the crushing activities	Low-medium
Noise nuisance generated by excavation equipment	Low-medium
Noise nuisance generated by the crushing activities	Low-medium
Degradation of access roads	Low-medium

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

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

Management objectives	Role	Management outcomes
Dust handling	Site Manager to ensure compliance with EMP guidelines. Compliance to be monitored by the Environmental Control Officer.	<ul style="list-style-type: none"> <li>• Control dust liberation into the surrounding environment by using water spraying and/or other dust allaying agents.</li> <li>• Limit speed on the access roads to 40km/h to prevent the generation of excess dust.</li> <li>• Spray roads with water or an environmentally friendly dust-allaying agent that contains no PCB's (e.g. DAS products) if dust is generated above acceptable limits.</li> <li>• Assess effectiveness of dust suppression equipment.</li> <li>• Ensure the crusher plant has operational water sprayer to alleviate dust generation from the conveyor belts.</li> </ul>
Noise handling	Site Manager to ensure compliance with EMP guidelines. Compliance to be monitored by the Environmental Control Officer.	<ul style="list-style-type: none"> <li>• Ensure that employees and staff conduct themselves in an acceptable manner while on site.</li> <li>• No loud music may be permitted at the mining area.</li> <li>• Ensure that all mining vehicles are equipped with silencers and maintained in a road worthy condition in terms of the Road Transport Act.</li> <li>• Plan the type, duration and timing of the blasting procedures with due cognizance of other land users and structures in the vicinity.</li> <li>• Notify surrounding landowners in writing prior to blasting.</li> </ul>
Management of weed/ invader	Site Manager to ensure compliance with EMP guidelines. Compliance to be monitored by the Environmental	<ul style="list-style-type: none"> <li>• Implement a weed and invader plant control management plan.</li> <li>• Control declared invader or exotic species on the rehabilitated areas.</li> <li>• Keep the temporary topsoil stockpiles free of weeds.</li> </ul>

Management objectives	Role	Management outcomes
plants	Control Officer.	
Surface and storm water handling	Site Manager to ensure compliance with EMP guidelines. Compliance to be monitored by the Environmental Control Officer.	<ul style="list-style-type: none"> <li>• Divert storm water around topsoil heaps, stockpile areas and access roads to prevent erosion and material loss.</li> <li>• Divert runoff water around stockpile areas with trenches and contour structures to prevent erosion of work areas.</li> <li>• Conduct mining in accordance with the Best Practice Guideline for small scale mining that relates to storm water management, erosion and sediment control and waste management, developed by the Department of Water and Sanitation (DWS), and any other conditions which that Department may impose.</li> </ul>
Management of health and safety risks	Site Manager to ensure compliance with EMP guidelines. Compliance to be monitored by the Environmental Control Officer. Blasting contractor to comply with national blasting requirements.	<ul style="list-style-type: none"> <li>• Plan the type, duration and timing of the blasting procedures with due cognizance of other land users and structures in the vicinity.</li> <li>• Inform the surrounding landowners and communities of any blasting event.</li> <li>• Use noise mufflers and/or soft explosives during blasting, limit fly rock.</li> <li>• Give audible warning of a pending blast at least 3 minutes in advance of the blast.</li> <li>• Remove all fly rock (of diameter 150 mm and larger) which falls beyond the working area, with the rock spill.</li> <li>• Ensure that workers have access to the correct PPE as required by law.</li> <li>• Ensure all operations comply with the Occupational Health and Safety Act.</li> </ul>
Waste management	Site Manager to ensure compliance with EMP guidelines. Compliance to be monitored by the Environmental Control Officer.	<ul style="list-style-type: none"> <li>• Ensure no waste pile is established within 100 m of the edge of any river channel or other water bodies.</li> <li>• Ensure regular vehicle maintenance take place within the service bay area of the off-site workshop. If emergency repairs are needed on site, ensure drip trays is present. Ensure all waste products are disposed of in a 200 l closed container/bin inside the emergency</li> </ul>

Management objectives	Role	Management outcomes
		<p>service area.</p> <ul style="list-style-type: none"> <li>• Collect effluents containing oil, grease or other industrial substances in a suitable receptacle and remove from site, for resale or appropriate disposal at a recognized facility.</li> <li>• Clean spills immediately to the satisfaction of the Regional Manager by removing the spillage and polluted soil and disposing thereof at a recognized facility. File proof.</li> <li>• Ensure availability of suitable covered, conveniently placed receptacles at all times for waste disposal.</li> <li>• Store non-biodegradable refuse such as glass bottles, plastic bags, metal scrap, etc., in a container with a closable lid at a collecting point. Collection should take place on a regular basis and disposed of at the recognized approved landfill site at Witbank. Prevent refuse from being dumped on or in the vicinity of the mine area.</li> <li>• Biodegradable refuse to be handled as indicated above.</li> </ul>
Management of access roads	Site Manager to ensure compliance with EMP guidelines. Compliance to be monitored by the Environmental Control Officer.	<ul style="list-style-type: none"> <li>• Divert storm water around access roads to prevent erosion.</li> <li>• Erosion of access road: Restrict vehicular movement to existing access routes to prevent crisscrossing of tracks through undisturbed areas.</li> </ul>
Topsoil handling	Site Manager to ensure compliance with EMP guidelines. Compliance to be monitored by the Environmental Control Officer.	<ul style="list-style-type: none"> <li>• Remove the first 300mm of topsoil in strips and store at stockpile area.</li> <li>• Keep the temporary topsoil stockpiles free of weeds.</li> <li>• Place topsoil stockpiles on a levelled area and implement measures to safeguard the piles from being washed away in the event of heavy rains/storm water.</li> <li>• Topsoil heaps should not exceed 1.5 m in order to preserve micro-organisms within the topsoil, which can be lost due to compaction and lack of oxygen.</li> </ul>

Management objectives	Role	Management outcomes
		<ul style="list-style-type: none"> <li>• Seed the stockpiled topsoil heaps if vegetation does not re-establish within 6 months of stockpiling.</li> <li>• Divert storm- and runoff water around the stockpile area and access roads to prevent erosion.</li> </ul>
Fauna and flora	Site Manager to ensure compliance with EMP guidelines. Compliance to be monitored by the Environmental Control Officer.	<ul style="list-style-type: none"> <li>• Ensure no fauna is caught, killed, harmed, sold or played with.</li> <li>• Instruct workers to report any animals that may be trapped in the working area. Ensure no snares are set or nests raided for eggs or young.</li> <li>• Do not remove plants/trees without ECO approval.</li> </ul>

#### **4.17 Aspects for inclusion as conditions of authorisation**

Any aspects which must be made conditions of the Environmental Authorisation.

The management objectives listed in this report (5.3) should be considered for inclusion in the environmental authorisation.

#### **4.18 Description of any assumptions, uncertainties and gaps in knowledge**

Which relate to the assessment and mitigation measures proposed.

The assumptions made in this document, which relate to the assessment and mitigation measures proposed, stem from site-specific information gathered from the property owner, as well as site inspections and background information gathering.

#### **4.19 Reasoned opinion as to whether the proposed activity should be authorised**

No fatal flaws could be identified that were deemed severe enough to prevent the activity from continuing, should the mitigation measures and monitoring programmes proposed in this document be implemented on site. The management objectives listed in this report should be considered for inclusion in the Environmental Authorisation.

#### **4.20 Period for which the Environmental Authorisation is required**

The applicant requests the Environmental Authorisation to be valid for a two-year period.

#### **4.21 Undertaking**

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

The undertaking required to meet the requirements of this section is provided at the end of the EMPr and is applicable to the Basic Assessment Report and the Environmental Management Programme report.

#### **4.22 Financial provision**

State the amount required to manage and rehabilitate the environment.

		CALCULATION OF THE QUANTUM					
Applicant: Evaluator: <b>Singo Consulting (Pty) Ltd</b>		Ref No.: <b>MP 30/5/1/1/3/13571 MP</b>		Date: <b>31/07/2023</b>			
No.	Description	Unit	A	B	C	D	E=A*B*C*D
			Quantity	Master Rate	Multiplication factor	Weighting factor 1	Amount (Rands)
1	Dismantling of processing plant and related structures (including overland conveyors and power lines)	m3	0	19	1	1	0
2 (A)	Demolition of steel buildings and structures	m2	0	271	1	1	0
2(B)	Demolition of reinforced concrete buildings and structures	m2	0	400	1	1	0
3	Rehabilitation of access roads	m2	0,06	49	1	0,01	0,0294
4 (A)	Demolition and rehabilitation of electrified railway lines	m	0	471	1	1	0
4 (A)	Demolition and rehabilitation of non-electrified railway lines	m	0	257	1	1	0
5	Demolition of housing and/or administration facilities	m2	0	542	1	1	0
6	Opencast rehabilitation including final voids and ramps	ha	4,97	284292	0	1	0
7	Sealing of shafts adits and inclines	m3	0	146	1	1	0
8 (A)	Rehabilitation of overburden and spoils	ha	0,29	189528	0	1	0
8 (B)	Rehabilitation of processing waste deposits and evaporation ponds (non-polluting potential)	ha	0	236054	1	1	0
8 (C)	Rehabilitation of processing waste deposits and evaporation ponds (polluting potential)	ha	0	685612	1	1	0
9	Rehabilitation of subsided areas	ha	0	158701	1	0,01	0
10	General surface rehabilitation	ha	4,97	150138	1	1	746185,86
11	River diversions	ha	0	150138	1	1	0
12	Fencing	m	0	171	1	1	0
13	Water management	ha	0,1	57087	1	0,01	57,087
14	2 to 3 years of maintenance and aftercare	ha	4,97	19980	1	1	99300,6
15 (A)	Specialist study	Sum	0			1	0
15 (B)	Specialist study	Sum				1	0
Sub Total 1							845543,5764
1	Preliminary and General		101465,2292	weighting factor 2 1			101465,2292
2	Contingencies			84554,35764			84554,35764
Subtotal 2							1031563,16
Signed Date		31/07/2023		VAT (15%)			154734,47
<b>Grand Total</b>							<b>1186298</b>

**Table 14:** Financial provision

#### 4.22.1 Explain how the aforesaid amount was derived

The financial provision amount was derived from the financial calculator/ quantum. The annual amount required to manage and rehabilitate the environment was estimated to be **R1 186 298**

#### 4.22.2 Confirm that this amount can be provided from operating expenditure

Confirm that the amount is anticipated to be an operating cost and is provided for as such in the Mining Work Programme, Financial and Technical Competence Report or PWP.

The mining operation will be self-funded through income generated by sales of the Coal, Pseudocoal, Torbanite and Aggregate mined. Bridging finance, will be supplied where needed by potential investors.

#### 4.23 Specific information required by the Competent Authority

Compliance with the provisions of sections 24(4) (a) and (b) read with section 24 (3)(a) and (7) of the NEMA (107 of 1998). The BASIC ASSESSMENT report must include the:

No specific information was required.



#### **4.23.1 Impact on the socio-economic conditions of any directly affected person**

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

The proposed Coal, Pseudocoal, Torbanite and Aggregate mine will be established on a heavily modified area as a result of agricultural activities with cultivated cover. Upon closure, the land will be rehabilitated to its original state.

The dust and noise impacts that may emanate from the mining area during the operational phase will have a negative impact on the surrounding community if the mitigation measures proposed in this document are not implemented and managed on-site. However, due to the distance of the community from the mining area (approximately 880m) these impacts are considered to be of medium-high significance.

The operation of the mine will have a number of positive impacts, such as job creation for skilled, semi-skilled and unskilled permanent workers. The proposed Coal, Pseudocoal, Torbanite and Aggregate mine will therefore contribute locally by aiding in the development of the area and boosting the local economy through increased municipal revenue. On a national scale, this will aid by boosting the slowly growing SA economy.

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

Provide the results of investigation, assessment and evaluation of the impact of the mining, bulk sampling or alluvial diamond prospecting on any national estate referred to in section 3(2) of the National Heritage Resources Act, 1999 (Act No 25 of 1999) with the exception of the national estate contemplated in section 3(2)(i)(vi) and (vii) of the Act, attach the investigation report as **Error! Reference source not found.** and confirm that the applicable mitigation is reflected herein.

Due to the already disturbed nature of the proposed project areas, no area of archaeological or cultural importance could be identified on site.

#### **4.24 Other matters required in terms of section 24(4)(a) and (b) of the Act**

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

The site and project alternatives investigated during the impact assessment process were done at the hand of information obtained during the site investigation, public participation process and desktop studies conducted of the study area. As discussed earlier, the following alternatives

were considered:

- Establishment of a Coal, Pseudocoal, Torbanite and Aggregate mine 2,7 m away from the residential area or any form of development vs. establishment of a Coal, Pseudocoal, Torbanite and Aggregate mine in an un-utilised area (preferred alternative)
- Open cast mining (preferred alternative) vs. underground mining
- Temporary Infrastructure (preferred alternative) vs. permanent Infrastructure
- Access onto provincial road (preferred alternative) vs. access onto national road

## PART B

### ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

#### 5 Environmental management programme

##### 1.1 Details of the EAP

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

Refer to section 1 of Part A

##### 5.1 Description of the aspects of the activity

Confirm that the requirements to describe the aspects of the activity that are covered by the draft environmental management programme is already included in Part A, 0, herein, as required.

The aspects of the activity that are covered by the environmental management programme has been described and included in Part A, 0.

##### 5.2 Composite map

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

As mentioned in Part A, section 2.2 (Figure 3) this map has been compiled and is attached as **Error! Reference source not found..**

##### 5.3 Description of impact management objectives, including management statements

###### 5.3.1 Determination of closure objectives

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

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

1. Making the area safe, i.e. decommission mining activities to ensure that the environment is safe for people and animals. This entails refilling the excavations.

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

#### **5.4 Volume and rate of water use required for the operation**

It is estimated that the mining activities will require approximately 18000L of water per day for dust suppression purposes.

#### **5.5 Has a water use licence has been applied for?**

Water Use License (WUL) Application will be applied to the Department of Water and Sanitation upon issuing of the Mining Permit by the Department of Mineral Resources and Energy.

## 5.6 Impacts to be mitigated in their respective phases

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

Activities	Phase	Size and scale of disturbance	Mitigation measures	Compliance with standards	Time period for implementation
<p>E.g. for prospecting – drill site, site camp, ablution, facilities, accommodation, equipment storage, sample storage, site office, access route, etc.</p> <p>E.g. for mining – excavations, blasting, stockpiles, discard dumps/dams, loading, hauling and transport. Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water</p>	<p>Of operation in which activity will take place. State: Planning and design, pre-construction, construction operational, rehabilitation, closure, post-closure</p>	<p>Volumes, tonnages and hectares or m<sup>2</sup></p>	<p>Describe how recommendations herein will remedy the cause of pollution or degradation</p>	<p>Description of how each recommendation herein will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities</p>	<p>Describe the time period when the measures in the environmental management programme must be implemented. Measures must be implemented when required. With regard to rehabilitation specifically this must take place at the earliest opportunity. With regard to rehabilitation, therefore state either: Upon cessation of the individual activity or, upon cessation of mining, bulk sampling or alluvial diamond prospecting as the case may be.</p>

Activities	Phase	Size and scale of disturbance	Mitigation measures	Compliance with standards	Time period for implementation
control, berms, roads, pipelines, power lines, conveyors, etc.					
Stripping and stockpiling of topsoil	Site establishment/ construction phase	4.84ha	<p><b>Visual mitigation</b></p> <ul style="list-style-type: none"> <li>• The site must be neat and kept in good condition at all times.</li> <li>• Upon closure, the site must be rehabilitated and sloped to ensure that visual impact on the aesthetic value of the area is minimal.</li> </ul> <p><b>Dust handling</b></p> <ul style="list-style-type: none"> <li>• Dust liberation into the surrounding environment must be effectively controlled by the use of, inter alia, water spraying and/or other dust-</li> </ul>	<ul style="list-style-type: none"> <li>• Dust and Noise: NEMAQA, 2004</li> <li>• Regulation 6(1)</li> <li>• Weeds: CARA, 1983</li> <li>• Storm Water: NWA, 1998</li> <li>• Waste: NEM:WA, 2008</li> </ul>	Throughout the site establishment phase.

Activities	Phase	Size and scale of disturbance	Mitigation measures	Compliance with standards	Time period for implementation
			<p>allaying agents.</p> <ul style="list-style-type: none"> <li>• The site manager must ensure continuous assessment of all dust suppression equipment to confirm its effectiveness.</li> <li>• Speed on the access roads must be limited to 40km/h to prevent excess dust generation.</li> <li>• Roads must be sprayed with water or an environmentally friendly dust-allaying agent that contains no PCBs (e.g. DAS products) if dust is</li> </ul>		

Activities	Phase	Size and scale of disturbance	Mitigation measures	Compliance with standards	Time period for implementation
			<p>generated above acceptable limits.</p> <p><b>Noise handling</b></p> <ul style="list-style-type: none"> <li>• The applicant must ensure that staff conduct themselves in an acceptable manner while on site, both during work hours and after hours.</li> <li>• No loud music permitted at the mining area.</li> <li>• All mining vehicles must be equipped with silencers and kept roadworthy in terms of the Road Transport Act.</li> </ul> <p><b>Weed and invader plant management</b></p>		



Activities	Phase	Size and scale of disturbance	Mitigation measures	Compliance with standards	Time period for implementation
			<ul style="list-style-type: none"> <li>• A weed and invader plant control management plan must be implemented at the site to ensure eradication of all listed invader plants in terms of CORA (Act No 43 1983).</li> <li>• Management must take responsibility to control declared invader or exotic species on the rehabilitated areas. The following control methods can be used: <ul style="list-style-type: none"> <li>○ The plants can be uprooted, felled or cut off</li> </ul> </li> </ul>		

Activities	Phase	Size and scale of disturbance	Mitigation measures	Compliance with standards	Time period for implementation
			<p>and can be destroyed completely.</p> <ul style="list-style-type: none"> <li>○ The plants can be treated with an herbicide that is registered for use in connection therewith and in accordance with the directions for the use of such an herbicide.</li> <li>○ The temporary topsoil stockpiles must be kept free of weeds.</li> </ul> <p><b>Storm water handling</b></p> <ul style="list-style-type: none"> <li>● Storm water must be diverted around the</li> </ul>		

Activities	Phase	Size and scale of disturbance	Mitigation measures	Compliance with standards	Time period for implementation
			<p>topsoil heaps, stockpile areas and access roads to prevent erosion and material loss.</p> <ul style="list-style-type: none"> <li>• Runoff water must be diverted around the stockpile areas with trenches and contour structures to prevent erosion of the work areas.</li> </ul> <p><b>Waste management</b></p> <ul style="list-style-type: none"> <li>• No processing area or waste pile may be established within 100 m of the edge of any river channel or other water bodies.</li> <li>• Regular vehicle maintenance may only take place in the</li> </ul>		

Activities	Phase	Size and scale of disturbance	Mitigation measures	Compliance with standards	Time period for implementation
			<p>service bay area of the off-site workshop. If emergency repairs are needed on equipment not able to move to the workshop, drip trays must be present. All waste products must be disposed of in a 200 l closed container/bin to be removed from the emergency service area to the workshop to ensure proper disposal.</p> <ul style="list-style-type: none"> <li>• Any effluents containing oil, grease or other industrial substances must be collected in</li> </ul>		

Activities	Phase	Size and scale of disturbance	Mitigation measures	Compliance with standards	Time period for implementation
			<p>a suitable receptacle and removed from the site, for resale or appropriate disposal at a recognized facility.</p> <ul style="list-style-type: none"> <li>• Spills must be cleaned immediately to the satisfaction of the Regional Manager by removing the spillage and the polluted soil and disposing it at a recognized facility. Proof must be filed.</li> <li>• Suitable covered receptacles must be available at all times and conveniently placed for waste</li> </ul>		

Activities	Phase	Size and scale of disturbance	Mitigation measures	Compliance with standards	Time period for implementation
			<p>disposal.</p> <ul style="list-style-type: none"> <li>• Non-biodegradable refuse, such as glass bottles, plastic bags, metal scrap, etc., must be stored in a container with a closable lid at a collecting point and collected on a regular basis and disposed of at a recognized landfill site. Specific precautions must be taken to prevent refuse from being dumped on or in the vicinity of the mine area.</li> <li>• Biodegradable refuse generated</li> </ul>		

Activities	Phase	Size and scale of disturbance	Mitigation measures	Compliance with standards	Time period for implementation
			must be handled as indicated above.		
Blasting	Operational phase	3.9ha	<p><b>Management of Health and Safety Risks</b></p> <ul style="list-style-type: none"> <li>• The type, duration and timing of the blasting procedures must be planned with due cognizance of other land users and structures in the vicinity,</li> <li>• The surrounding landowners and communities must be informed in writing ahead of any blasting event</li> <li>• Measures to limit fly rock must be taken</li> <li>• Audible warning of a pending blast must</li> </ul>	<p><b>Health and safety</b></p> <ul style="list-style-type: none"> <li>• MHSA, 1996</li> <li>• OHSA, 1993</li> <li>• OHSAS 18001</li> </ul> <p><b>Dust and noise</b></p> <p>NEMAQA, 2004 Regulation 6(1)</p>	Applicable with each blasting event.

Activities	Phase	Size and scale of disturbance	Mitigation measures	Compliance with standards	Time period for implementation
			<p>be given at least 3 minutes before the blast</p> <ul style="list-style-type: none"> <li>• All fly rock (of diameter 150mm and larger) which falls beyond the working area, together with the rock spill must be collected and removed,</li> <li>• Workers must have access to the correct PPE as required by law.</li> <li>• All operations must comply with the OHSA.</li> </ul> <p><b>Dust handling</b></p> <ul style="list-style-type: none"> <li>• Dust liberation into the surrounding</li> </ul>		



Activities	Phase	Size and scale of disturbance	Mitigation measures	Compliance with standards	Time period for implementation
			<p>environment must be effectively controlled by the use of, inter alia, water spraying and/or other dust-allaying agents.</p> <ul style="list-style-type: none"> <li>• Speed on the access roads must be limited to 40km/h to prevent the generation of excess dust.</li> </ul> <p><b>Noise handling</b></p> <ul style="list-style-type: none"> <li>• The applicant must ensure that staff conduct themselves in an acceptable manner while on site, both during work hours and after hours.</li> <li>• No loud music permitted at the</li> </ul>		

Activities	Phase	Size and scale of disturbance	Mitigation measures	Compliance with standards	Time period for implementation
			<p>mining area.</p> <ul style="list-style-type: none"> <li>All mining vehicles must be equipped with silencers and maintained in a road worthy condition in terms of the Road Transport Act.</li> <li>The type, duration and timing of the blasting procedures must be planned with due cognizance of other land users and structures in the vicinity. Surrounding land owners must be notified in writing prior to blasting.</li> </ul>		
Excavation	Operational phase	4.47 ha	<p><b>Visual mitigation</b></p> <ul style="list-style-type: none"> <li>The site needs to have a neat</li> </ul>	<p><b>Dust and noise</b> NEM:AQA, 2004 Regulation 6(1)</p>	Throughout the operational phase

Activities	Phase	Size and scale of disturbance	Mitigation measures	Compliance with standards	Time period for implementation
			<p>appearance and be kept in good condition at all times.</p> <ul style="list-style-type: none"> <li>• Upon closure the site needs to be rehabilitated and sloped to ensure that the visual impact on the aesthetic value of the area is kept to a minimum.</li> </ul> <p><b>Dust handling</b></p> <ul style="list-style-type: none"> <li>• Dust liberation into the surrounding environment must be effectively controlled by the use of, inter alia, water spraying and/or other dust-allaying agents.</li> <li>• The site manager must ensure</li> </ul>	<p><b>Health and safety</b></p> <p>MHSA, 1996 OHSA, 1993 OHSAS 18001</p> <p><b>Fauna and flora</b></p> <p>NEM:BA, 2004</p> <p><b>Waste</b></p> <p>NEMWA, 2008</p> <p><b>Weeds</b></p> <p>CARA, 1983</p>	

Activities	Phase	Size and scale of disturbance	Mitigation measures	Compliance with standards	Time period for implementation
			<p>continuous assessment of all dust suppression equipment to confirm its effectiveness.</p> <ul style="list-style-type: none"> <li>• Speed on the access roads must be limited to 40km/h to prevent the generation of excess dust.</li> <li>• Roads must be sprayed with water or an environmentally friendly dust-allaying agent that contains no PCBs (e.g. DAS products) if dust is generated above acceptable limits.</li> </ul> <p><b>Noise handling</b></p>		

Activities	Phase	Size and scale of disturbance	Mitigation measures	Compliance with standards	Time period for implementation
			<ul style="list-style-type: none"> <li>• The applicant must ensure that staff conduct themselves in an acceptable manner while on site, both during work hours and after hours.</li> <li>• No loud music permitted at the mining area.</li> <li>• All mining vehicles must be equipped with silencers and maintained in a road worthy condition in terms of the Road Transport Act.</li> </ul> <p><b>Management of health and safety risks</b></p> <ul style="list-style-type: none"> <li>• Workers must have access to the correct</li> </ul>		

Activities	Phase	Size and scale of disturbance	Mitigation measures	Compliance with standards	Time period for implementation
			<p>PPE as required by law.</p> <ul style="list-style-type: none"> <li>• All operations must comply with the OHSA.</li> </ul> <p><b>Protection of fauna and flora</b></p> <ul style="list-style-type: none"> <li>• The site manager should ensure that no fauna is caught, killed, harmed, sold or played with.</li> <li>• Workers should be instructed to report any animals that may be trapped in the working area.</li> <li>• No snares may be set, or nests raided for eggs or young.</li> <li>• No plants or trees may be removed</li> </ul>		

Activities	Phase	Size and scale of disturbance	Mitigation measures	Compliance with standards	Time period for implementation
			<p>without the approval of the ECO.</p> <p><b>Waste management</b></p> <ul style="list-style-type: none"> <li>• No processing area or waste pile may be established within 100 m of the edge of any river channel or other water bodies.</li> <li>• Regular vehicle maintenance may only take place within the service bay area of the off-site workshop. If emergency repairs are needed on equipment not able to move to the workshop, drip trays must be present. All waste products must</li> </ul>		

Activities	Phase	Size and scale of disturbance	Mitigation measures	Compliance with standards	Time period for implementation
			<p>be disposed of in a 200 L closed container/bin to be removed from the emergency service area to the workshop in order to ensure proper disposal.</p> <ul style="list-style-type: none"> <li>• Any effluents containing oil, grease or other industrial substances must be collected in a suitable receptacle and removed from site, for resale/ appropriate disposal at a recognized facility.</li> <li>• Spills must be cleaned up</li> </ul>		



Activities	Phase	Size and scale of disturbance	Mitigation measures	Compliance with standards	Time period for implementation
			<p>immediately to the satisfaction of the Regional Manager by removing the spillage and polluted soil and disposing it at a recognized facility. Proof must be filed.</p> <ul style="list-style-type: none"> <li>• Suitable covered receptacles must be available at all times and conveniently placed for waste disposal.</li> <li>• Non-biodegradable refuse such as glass bottles, plastic bags, metal scrap, etc., should be stored in a container with a closable lid at a</li> </ul>		

Activities	Phase	Size and scale of disturbance	Mitigation measures	Compliance with standards	Time period for implementation
			<p>collecting point and collected on a regular basis and disposed of at a recognized landfill site. Specific precautions should be taken to prevent refuse from being dumped on or in the vicinity of the mine area.</p> <ul style="list-style-type: none"> <li>• Biodegradable refuse generated must be handled as indicated above.</li> </ul> <p><b>Management of weed/invader plants</b></p> <ul style="list-style-type: none"> <li>• A weed and invader plant control management plan must be</li> </ul>		

Activities	Phase	Size and scale of disturbance	Mitigation measures	Compliance with standards	Time period for implementation
			<p>implemented at the site to ensure eradication of all listed invader plants in terms of CORA (Act No 43 1983).</p> <ul style="list-style-type: none"> <li>• Management must take responsibility to control declared invader or exotic species on the rehabilitated areas. The following control methods can be used: <ul style="list-style-type: none"> <li>○ The plants can be uprooted, felled or cut off and can be destroyed completely.</li> <li>○ The plants can</li> </ul> </li> </ul>		

Activities	Phase	Size and scale of disturbance	Mitigation measures	Compliance with standards	Time period for implementation
			<p>be treated with an herbicide that is registered for use in connection therewith and in accordance with the directions for the use of such an herbicide.</p> <ul style="list-style-type: none"> <li>○ The temporary topsoil stockpiles need to be kept free of weeds.</li> </ul>		
Crushing	Operational phase	0.05 ha	<p><b>Dust handling</b></p> <ul style="list-style-type: none"> <li>• Dust liberation into the surrounding environment must be effectively controlled by using, inter alia, water spraying</li> </ul>	<p><b>Dust and noise</b> NEMAQA 2004</p> <p><b>Waste</b> NEMWA 2008</p>	Throughout the operational phase

Activities	Phase	Size and scale of disturbance	Mitigation measures	Compliance with standards	Time period for implementation
			<p>and/or other dust-allaying agents.</p> <ul style="list-style-type: none"> <li>• The site manager must ensure continuous assessment of all dust suppression equipment to confirm its effectiveness.</li> <li>• Speed on the access roads must be limited to 40km/h to prevent excess dust generation.</li> <li>• The crusher plant must have operational water sprayers to alleviate dust generation from conveyor belts.</li> </ul> <p>Noise handling</p>		

Activities	Phase	Size and scale of disturbance	Mitigation measures	Compliance with standards	Time period for implementation
			<ul style="list-style-type: none"> <li>• The applicant must ensure that staff conduct themselves in an acceptable manner while on site, during work hours and after hours.</li> <li>• No loud music permitted at the mining area.</li> <li>• All mining vehicles must be equipped with silencers and kept roadworthy in terms of the Road Transport Act. Waste management</li> <li>• No processing area or waste pile may be established within 100 m of the edge of any river channel or</li> </ul>		

Activities	Phase	Size and scale of disturbance	Mitigation measures	Compliance with standards	Time period for implementation
			<p>other water bodies.</p> <ul style="list-style-type: none"> <li>• Regular vehicle maintenance may only take place in the service bay of the off-site workshop. If emergency repairs are needed on equipment not able to move to the workshop, drip trays must be present. All waste products must be disposed of in a 200 l closed container/bin to be removed from the emergency service area to the workshop for proper disposal.</li> <li>• Any effluents containing oil,</li> </ul>		

Activities	Phase	Size and scale of disturbance	Mitigation measures	Compliance with standards	Time period for implementation
			<p>grease or other industrial substances must be collected in a suitable receptacle and removed from site, either for resale or appropriate disposal at a recognized facility.</p> <ul style="list-style-type: none"> <li>• Spills must be cleaned up immediately to the satisfaction of the Regional Manager by removing spillage and polluted soil and by disposing it at a recognized facility. Proof must be filed.</li> <li>• Suitable covered receptacles must be</li> </ul>		



Activities	Phase	Size and scale of disturbance	Mitigation measures	Compliance with standards	Time period for implementation
			<p>available at all times and conveniently placed for the disposal of waste.</p> <ul style="list-style-type: none"> <li>• Non-biodegradable refuse such as glass bottles, plastic bags, metal scrap, etc., should be stored in a container with a closable lid at a collecting point and collected on a regular basis and disposed of at a recognized landfill site. Specific precautions must be taken to prevent refuse from being dumped on or in the vicinity of the mine</li> </ul>		

Activities	Phase	Size and scale of disturbance	Mitigation measures	Compliance with standards	Time period for implementation
			<p>area.</p> <ul style="list-style-type: none"> <li>• Biodegradable refuse generated must be handled as indicated above.</li> </ul>		
Stockpiling and transporting	Operational phase	0.36 ha	<p><b>Visual mitigation</b></p> <ul style="list-style-type: none"> <li>• The site must be neat and be kept in good condition at all times.</li> <li>• Upon closure, the site must be rehabilitated and sloped to ensure that the visual impact on the aesthetic value of the area is minimal.</li> </ul> <p><b>Storm water handling</b></p> <ul style="list-style-type: none"> <li>• Storm water must be diverted around the stockpile areas and access roads to prevent erosion and</li> </ul>	<p><b>Storm water</b> NWA, 1998</p> <p><b>Weeds</b> CARA, 1983</p> <p><b>Dust and noise</b> NEMAQA, 2004 Regulation 6(1)</p> <p><b>Waste</b> NEMWA, 2008</p>	Throughout operational phase

Activities	Phase	Size and scale of disturbance	Mitigation measures	Compliance with standards	Time period for implementation
			<p>material loss.</p> <ul style="list-style-type: none"> <li>• Runoff water must be diverted around the stockpile areas with trenches and contour structures to prevent erosion of work areas.</li> <li>• Mining must be conducted in accordance with the Best Practice Guideline for small scale mining that relates to storm water management, erosion and sediment control and waste management, developed by the DWS, and any other conditions that the</li> </ul>		

Activities	Phase	Size and scale of disturbance	Mitigation measures	Compliance with standards	Time period for implementation
			<p>DWS may impose:</p> <ul style="list-style-type: none"> <li>• Clean water (e.g. rainwater) must be kept clean and be routed to a natural watercourse by a system separate from the dirty water system. Prevent clean water from running or spilling into dirty water systems.</li> <li>• Dirty water must be collected and contained in a system separate from the clean water system.</li> <li>• Dirty water must be prevented from spilling/seeping into clean water systems.</li> </ul>		

Activities	Phase	Size and scale of disturbance	Mitigation measures	Compliance with standards	Time period for implementation
			<ul style="list-style-type: none"> <li>• The storm water management plan must apply for the entire life cycle of the mine and over different hydrological cycles (rainfall patterns).</li> <li>• The statutory requirements of various regulatory agencies and the interests of stakeholders must be considered and incorporated into the storm water management plan.</li> </ul> <p><b>Management of weed/invader plants</b></p> <ul style="list-style-type: none"> <li>• A weed and invader plant control</li> </ul>		

Activities	Phase	Size and scale of disturbance	Mitigation measures	Compliance with standards	Time period for implementation
			<p>management plan must be implemented at the site to ensure eradication of all listed invader plants in terms of CORA (Act No 43 1983).</p> <ul style="list-style-type: none"> <li>• Management must take responsibility to control declared invader or exotic species on the rehabilitated areas. The following control methods can be used: <ul style="list-style-type: none"> <li>○ The plants can be uprooted, felled or cut off and can be destroyed</li> </ul> </li> </ul>		

Activities	Phase	Size and scale of disturbance	Mitigation measures	Compliance with standards	Time period for implementation
			<p>completely.</p> <ul style="list-style-type: none"> <li>○ The plants can be treated with an herbicide that is registered for use in connection therewith and in accordance with the directions for the use of such an herbicide.</li> <li>● The temporary stockpile area must be kept free of weeds.</li> </ul> <p><b>Dust handling</b></p> <ul style="list-style-type: none"> <li>● Dust liberation into the surrounding environment must be effectively controlled</li> </ul>		

Activities	Phase	Size and scale of disturbance	Mitigation measures	Compliance with standards	Time period for implementation
			<p>by the use of, inter alia, water spraying and/or other dust-allaying agents.</p> <ul style="list-style-type: none"> <li>• The site manager must ensure continuous assessment of all dust suppression equipment to confirm its effectiveness.</li> <li>• Speed on the access roads must be limited to 40km/h to prevent excess dust generation.</li> <li>• Roads must be sprayed with water or an environmentally friendly dust-allaying</li> </ul>		



Activities	Phase	Size and scale of disturbance	Mitigation measures	Compliance with standards	Time period for implementation
			<p>agent that contains no PCBs (e.g. DAS products) if dust is generated above acceptable limits.</p> <p>Management of access roads</p> <ul style="list-style-type: none"> <li>• Storm water should be diverted around the access roads to prevent erosion.</li> <li>• Vehicular movement must be restricted to existing access routes to prevent crisscrossing of tracks through undisturbed areas.</li> <li>• Rutting and erosion of the access road caused as a result of the mining activities</li> </ul>		

Activities	Phase	Size and scale of disturbance	Mitigation measures	Compliance with standards	Time period for implementation
			<p>must be repaired by the applicant.</p> <p><b>Noise handling</b></p> <ul style="list-style-type: none"> <li>• The applicant must ensure that staff conduct themselves in an acceptable manner while on site, both during work hours and after hours.</li> <li>• No loud music permitted at the mining area.</li> <li>• All mining vehicles must be equipped with silencers and kept roadworthy in terms of the Road Transport Act.</li> </ul> <p><b>Waste management</b></p> <ul style="list-style-type: none"> <li>• No processing area</li> </ul>		

Activities	Phase	Size and scale of disturbance	Mitigation measures	Compliance with standards	Time period for implementation
			<p>or waste pile may be established within 100 m of the edge of any river channel or other water bodies.</p> <ul style="list-style-type: none"> <li>• Regular vehicle maintenance may only take place in the service bay area of the off-site workshop. If emergency repairs are needed on equipment not able to move to the workshop, drip trays must be present. All waste products must be disposed of in a 200 l closed container/bin to be removed from the</li> </ul>		

Activities	Phase	Size and scale of disturbance	Mitigation measures	Compliance with standards	Time period for implementation
			<p>emergency service area to the workshop for proper disposal.</p> <ul style="list-style-type: none"> <li>• Any effluents containing oil, grease or other industrial substances must be collected in a suitable receptacle and removed from site, for resale or appropriate disposal at a recognized facility.</li> <li>• Spills must be cleaned up immediately to the satisfaction of the Regional Manager by removing the spillage and polluted</li> </ul>		

Activities	Phase	Size and scale of disturbance	Mitigation measures	Compliance with standards	Time period for implementation
			<p>soil and disposing of it at a recognized facility. Proof must be filed.</p> <ul style="list-style-type: none"> <li>• Suitable covered receptacles must be available at all times and conveniently placed for waste disposal.</li> <li>• Non-biodegradable refuse such as glass bottles, plastic bags, metal scrap, etc., should be stored in a container with a closable lid at a collecting point and collected on a regular basis and disposed of at a recognized landfill</li> </ul>		

Activities	Phase	Size and scale of disturbance	Mitigation measures	Compliance with standards	Time period for implementation
			<p>site. Specific precautions should be taken to prevent refuse from being dumped on or in the vicinity of the mine area.</p> <ul style="list-style-type: none"> <li>• Biodegradable refuse generated must be handled as indicated above.</li> </ul>		
Sloping and landscaping during rehabilitation	Decommissioning phase	5 ha	<p><b>Storm water handling</b></p> <ul style="list-style-type: none"> <li>• Storm water must be diverted around the rehabilitated area to prevent erosion and loss of reinstated material.</li> </ul> <p><b>Management of health and safety risks</b></p> <ul style="list-style-type: none"> <li>• Excavations have to be rehabilitated as</li> </ul>	<p><b>Storm water</b> NWA, 1998</p> <p><b>Health and safety</b> MHSA, 1996 OHSA, 1993 OHSAS 18001</p> <p><b>Dust and noise</b> NEMAQA 2004, Regulation 6(1)</p> <p><b>Waste</b> NEMWA 2008</p>	Upon cessation of mining

Activities	Phase	Size and scale of disturbance	Mitigation measures	Compliance with standards	Time period for implementation
			<p>stipulated in the closure plan to ensure the site is safe upon closure.</p> <ul style="list-style-type: none"> <li>• Workers must have access to the correct PPE as required by law.</li> <li>• All operations must comply with the OHSA.</li> </ul> <p><b>Dust handling</b></p> <ul style="list-style-type: none"> <li>• Dust liberation into the surrounding environment must be effectively controlled by the use of, inter alia, water spraying and/or other dust-allaying agents.</li> <li>• The site manager must ensure</li> </ul>		

Activities	Phase	Size and scale of disturbance	Mitigation measures	Compliance with standards	Time period for implementation
			<p>continuous assessment of all dust suppression equipment to confirm its effectiveness.</p> <ul style="list-style-type: none"> <li>• Speed on the access roads must be limited to 40km/h to prevent excess dust generation.</li> <li>• Roads must be sprayed with water or an environmentally friendly dust-allaying agent that contains no PCBs (e.g. DAS products) if dust is generated above acceptable limits.</li> </ul> <p><b>Noise handling</b></p>		



Activities	Phase	Size and scale of disturbance	Mitigation measures	Compliance with standards	Time period for implementation
			<ul style="list-style-type: none"> <li>• The applicant must ensure that staff conduct themselves in an acceptable manner while on site, both during work hours and after hours.</li> <li>• No loud music permitted at the mining area.</li> <li>• All mining vehicles must be equipped with silencers and kept roadworthy in terms of the Road Transport Act.</li> </ul> <p><b>Waste management</b></p> <ul style="list-style-type: none"> <li>• Waste material of any description, including receptacles, scrap,</li> </ul>		

Activities	Phase	Size and scale of disturbance	Mitigation measures	Compliance with standards	Time period for implementation
			<p>rubble and tyres, will be removed entirely from the mining area and disposed of at a recognized landfill facility. It will not be permitted to be buried/burned on site</p> <ul style="list-style-type: none"> <li>• Any effluents containing oil, grease or other industrial substances must be collected in a suitable receptacle and removed from site, for resale/ appropriate disposal at a recognized facility.</li> <li>• Spills must be</li> </ul>		

Activities	Phase	Size and scale of disturbance	Mitigation measures	Compliance with standards	Time period for implementation
			<p>cleaned up immediately to the satisfaction of the Regional Manager by removing the spillage together with the polluted soil and disposing of it at a recognized facility. Proof should be filed.</p> <ul style="list-style-type: none"> <li>• Suitable covered receptacles must be available at all times and conveniently placed for waste disposal.</li> <li>• Non-biodegradable refuse, like glass bottles, plastic bags, metal scrap, etc., should be stored in a container with a</li> </ul>		

Activities	Phase	Size and scale of disturbance	Mitigation measures	Compliance with standards	Time period for implementation
			<p>closable lid at a collecting point and collected on a regular basis and disposed of at a recognized landfill site. Specific precautions should be taken to prevent refuse from being dumped on or in the vicinity of the mine area.</p> <ul style="list-style-type: none"> <li>• Biodegradable refuse generated must be handled as indicated above.</li> </ul>		
Replacing of topsoil and rehabilitation of disturbed area	Decommissioning phase	5 ha	<p><b>Rehabilitation of excavated area</b></p> <ul style="list-style-type: none"> <li>• Rocks and coarse material removed from the excavation</li> </ul>	<p><b>Rehabilitation</b> MPRDA, 2008</p> <p><b>Health and safety</b> MHSA, 1996 OHSA, 1993</p>	Upon cessation of mining

Activities	Phase	Size and scale of disturbance	Mitigation measures	Compliance with standards	Time period for implementation
			<p>must be dumped into the excavation.</p> <ul style="list-style-type: none"> <li>• No waste will be permitted to be deposited in the excavations.</li> <li>• Once overburden, rocks and coarse natural materials have been added to the excavation and were profiled with acceptable contours and erosion control measures, the topsoil previously stored will be returned to its original depth over the area.</li> <li>• The area will be fertilized if necessary to allow vegetation</li> </ul>	<p>OHSAS 18001</p> <p><b>Dust and noise</b> NEMAQA, 2004 Regulation 6(1)</p> <p><b>Weeds</b> CARA, 1983</p> <p><b>Waste</b> NEMWA, 2008</p>	

Activities	Phase	Size and scale of disturbance	Mitigation measures	Compliance with standards	Time period for implementation
			<p>to establish rapidly. The site will be seeded with a local or adapted indigenous seed mix in order to propagate the locally or regionally occurring flora, should natural vegetation not re-establish within 6 months from site closure.</p> <ul style="list-style-type: none"> <li>• If a reasonable assessment indicates that the re-establishment of vegetation is unacceptably slow, the Regional Manager may</li> </ul>		

Activities	Phase	Size and scale of disturbance	Mitigation measures	Compliance with standards	Time period for implementation
			<p>require that the soil be analyzed and any deleterious effects on the soil arising from the mining operation be corrected and the area seeded with a vegetation seed mix to his or her specification.</p> <p><b>Rehabilitation of plant area</b></p> <ul style="list-style-type: none"> <li>• The compacted areas will be ripped, and the topsoil returned over the area.</li> <li>• Coarse natural material used for the construction of ramps will be</li> </ul>		

Activities	Phase	Size and scale of disturbance	Mitigation measures	Compliance with standards	Time period for implementation
			<p>removed and dumped into the excavations.</p> <ul style="list-style-type: none"> <li>• Stockpiles will be removed during the decommissioning phase, the area ripped, and topsoil returned to original depth to provide a growth medium.</li> <li>• On completion of operations, all structures or objects will be dealt with in accordance with Section 44 of the MPRDA 2002 (Act 28 of 2002): <ul style="list-style-type: none"> <li>○ Where sites have been rendered devoid of</li> </ul> </li> </ul>		



Activities	Phase	Size and scale of disturbance	Mitigation measures	Compliance with standards	Time period for implementation
			<p>vegetation/grass or soils have been compacted by traffic, the surface will be scarified or ripped.</p> <ul style="list-style-type: none"> <li>○ The site will be seeded with a vegetation seed mix adapted to reflect the local indigenous flora if natural vegetation does not re-establish within 6 months of site closure.</li> <li>○ Photographs of the mining area and office sites,</li> </ul>		

Activities	Phase	Size and scale of disturbance	Mitigation measures	Compliance with standards	Time period for implementation
			<p>before and during the mining operation and after rehabilitation, will be taken at selected fixed points and kept on record for the information of the Regional Manager.</p> <ul style="list-style-type: none"> <li>○ On completion of mining operations, the surface of these areas, if compacted due to hauling and dumping operations, will</li> </ul>		

Activities	Phase	Size and scale of disturbance	Mitigation measures	Compliance with standards	Time period for implementation
			<p>be scarified to a depth of at least 300 mm and graded to an even surface condition. The previously stored topsoil will be returned to its original depth over the area.</p> <ul style="list-style-type: none"> <li>○ Prior to replacing the topsoil, the overburden material that was removed from these areas will be replaced in the same order as it originally</li> </ul>		

Activities	Phase	Size and scale of disturbance	Mitigation measures	Compliance with standards	Time period for implementation
			<p>occurred.</p> <ul style="list-style-type: none"> <li>○ The area will then be fertilized if necessary to allow vegetation to establish rapidly. The site will be seeded with a local, adapted indigenous seed mix if natural vegetation does not re-establish within 6 months after site closure.</li> <li>○ If a reasonable assessment indicates that the re-establishment of vegetation is</li> </ul>		

Activities	Phase	Size and scale of disturbance	Mitigation measures	Compliance with standards	Time period for implementation
			<p>unacceptably slow, the Regional Manager may require that the soil be analyzed and any deleterious effects on the soil arising from the mining operation be corrected and the area be seeded with a seed mix to their specification.</p> <p><b>Final rehabilitation</b></p> <ul style="list-style-type: none"> <li>• Rehabilitation of the surface area will entail landscaping, levelling, top</li> </ul>		

Activities	Phase	Size and scale of disturbance	Mitigation measures	Compliance with standards	Time period for implementation
			<p>dressing, land preparation, seeding (if required) and maintenance, and weed/alien clearing.</p> <ul style="list-style-type: none"> <li>• All infrastructure, equipment, plant, temporary housing and other items used during the mining period will be removed from the site (section 44 of the MPRDA).</li> <li>• Waste material of any description, including receptacles, scrap, rubble and tyres, will be removed entirely from the mining area and disposed of at a</li> </ul>		

Activities	Phase	Size and scale of disturbance	Mitigation measures	Compliance with standards	Time period for implementation
			<p>recognized landfill facility. It will not be permitted to be buried/burned on site.</p> <ul style="list-style-type: none"> <li>• Weed/alien clearing will be done in a sporadic manner during the life of the mining activities. Species regarded as Category 1 weeds according to CORA, 1983 – Act 43; Regulations 15 &amp; 16 (as amended in March 2001) must be eradicated from the site.</li> <li>• Final rehabilitation will be completed within a period</li> </ul>		

Activities	Phase	Size and scale of disturbance	Mitigation measures	Compliance with standards	Time period for implementation
			specified by the Regional Manager.		



## 5.7 Impact management outcomes

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

Activity	Potential impact	Aspects affected	Phase	Mitigation type	Standard to be achieved
Whether listed or not. E.g. excavations, blasting, stockpiles, discard dumps/dams, loading, hauling, transport, water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc.	E.g. dust, noise, drainage, surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution, etc.		In which impact is anticipated. E.g. construction, commissioning, operational decommissioning, closure and post-closure.	Modify, remedy, control or stop through, e.g. noise control measures, storm water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity, etc.	Impact avoided, noise levels, dust levels, rehabilitation standards, end-use objectives, etc.
<b>Topsoil stripping and stockpiling</b>	Visual intrusion associated with the establishment of the	The visual impact may affect the residents of the	<b>Site establishment/ construction</b>	Control: Implementation of proper	<ul style="list-style-type: none"> <li>Impact on the surrounding environment mitigated until rehabilitation standards can be</li> </ul>

Activity	Potential impact	Aspects affected	Phase	Mitigation type	Standard to be achieved
	mining area.	immediate area.	<b>phase</b>	housekeeping	implemented.
	Dust nuisance caused by soil disturbance.	Dust will be contained within property boundaries and therefore affect only the landowner.		Control: Dust suppression	<ul style="list-style-type: none"> <li>Fallout dust levels has to comply with the acceptable dust fall rate published for non-residential areas in the National Dust Control Regulations 2013 – 600 &lt; Dust Fall &lt; 1 200 mg/m<sup>2</sup>/day.</li> <li>Gravimetric dust levels have to comply with the standard published in the NIOSH guidelines – particulates &gt;1/10<sup>th</sup> of the occupational exposure limit. NEMAQA 2004, Regulation 6(1)</li> </ul>
	Noise nuisance caused by machinery stripping and stockpiling the topsoil.	The noise impact should be contained within property boundaries, but might have a periodic impact on the closest residents of the Witbank community.		Control: Noise control measures	<ul style="list-style-type: none"> <li>Noise levels on the site must be managed and needs to comply with the standards stipulated in NEMAQA, 2004 Regulation 6(1) as well as the noise standards of SANS 10103:2008</li> <li>Employees working in areas with noise levels of more than 82dBA need to be issue with hearing protection.</li> </ul>

Activity	Potential impact	Aspects affected	Phase	Mitigation type	Standard to be achieved
	Infestation of the topsoil heaps by weeds and invader plants	Biodiversity		Control and remedy: Implementation of weed control	<ul style="list-style-type: none"> <li>The impact must be avoided through the eradication of Category 1 weeds/ invader plants in terms of CARA, 1993 as well as the implementation of the mitigation measures in this document.</li> </ul>
	Loss of topsoil due to incorrect storm water management.	Loss of topsoil will affect the rehabilitation of the mining area.		Control: Storm water management	<ul style="list-style-type: none"> <li>The impact must be avoided through the implementation of storm water management.</li> </ul>
	Contamination of area with hydrocarbons or hazardous waste materials.	Contamination may cause surface or ground water contamination if not addressed		Control and remedy: Implementation of waste management	<ul style="list-style-type: none"> <li>The impact must be avoided through the implementation of the mitigation measures stipulated in this document.</li> <li>Should spillage occur, the area needs to be cleaned in accordance with the standards of the NEMWA, 2008.</li> </ul>
<b>Blasting</b>	Health and safety risk posed by blasting activities	Impact might affect the employees working on site.	<b>Operational phase</b>	Control: Health and safety monitoring management	<ul style="list-style-type: none"> <li>Impact must be avoided through compliance with the MHSA, 1996, OHSWA, 1993 and OHSAS 18001</li> <li>Fallout dust levels must comply with the acceptable dust fall rate</li> </ul>

Activity	Potential impact	Aspects affected	Phase	Mitigation type	Standard to be achieved
					published for non-residential areas in the National Dust Control Regulations 2013 – 600 < Dust Fall < 1 200 mg/m <sup>2</sup> /day.
	Dust nuisance caused by blasting activities	Dependent on the blast, the impact might affect the surrounding community. Blasting will only occur twice a year.		Control: Dust suppression	Gravimetric dust levels has to comply with the standard published in the NIOSH guidelines particulates >1/10 <sup>th</sup> of the occupational exposure limit. NEMAQA, 2004 Regulation 6(1)
	Noise nuisance caused by blasting activities	Dependent on the blast, the impact might affect the surrounding community. Blasting will only occur twice a year.		Control: Noise control measure	<ul style="list-style-type: none"> <li>• Noise levels on the site has to be managed and need to comply with the standards stipulated in NEMAQA, 2004 Regulation 6(1) as well as the noise standards of SANS 10103:2008</li> <li>• Employees working in areas with noise levels of more than 82dBA need to be issue with hearing protection.</li> </ul>
<b>Excavation</b>	Visual intrusion associated with the excavation activities	The visual impact may affect the	<b>Operational phase</b>	Control: Implementation of proper	<ul style="list-style-type: none"> <li>• Impact on the surrounding environment mitigated until rehabilitation standards can be</li> </ul>

Activity	Potential impact	Aspects affected	Phase	Mitigation type	Standard to be achieved
		residents of the immediate area.		housekeeping	implemented.
	Dust nuisance due to excavation activities.	Dust will be contained within the property boundaries and will therefore affect only the landowner.		Control: Dust suppression	<ul style="list-style-type: none"> <li>• Fallout dust levels must comply with the acceptable dust fall rate published for non-residential areas, as per National Dust Control</li> <li>• Regulations 2013 – <math>600 &lt; \text{Dust Fall} &lt; 1200 \text{ mg/m}^2/\text{day}</math>.</li> <li>• Gravimetric dust levels must comply with the standard published in the NIOSH guidelines –Particulates <math>&gt;1/10^{\text{th}}</math> of the occupational exposure limit.</li> <li>• NEMAQA, 2004 Regulation 6(1).</li> </ul>
	Noise nuisance generated by excavation equipment	The noise impact must be contained within the boundaries of the property but might have a periodic impact on the closest residents of the Witbank community.		Control: Noise control measures	<ul style="list-style-type: none"> <li>• Noise levels on the site has to be managed and need to comply with the standards stipulated in NEMAQA, 2004 Regulation 6(1) as well as the noise standards of SANS 10103:2008.</li> <li>• Employees working in areas with noise levels of more than 82dBA need to be issue with hearing protection.</li> </ul>

Activity	Potential impact	Aspects affected	Phase	Mitigation type	Standard to be achieved
	Unsafe working conditions for employees.	Impact might affect employees		Control: Health and safety monitoring and management	<ul style="list-style-type: none"> <li>Impact must be avoided through compliance with the MHSa, 1996, OHSa, 1993 and OHSAS 18001</li> </ul>
<b>Excavation</b>	Negative impact on the fauna and flora of the area.	Biodiversity	<b>Operational phase</b>	Control: Protection of fauna and flora through operational phase	<ul style="list-style-type: none"> <li>The impact must be avoided through implementation of the mitigation measures stipulated in this document.</li> <li>NEMBA, 2004.</li> </ul>
	Contamination of area with hydrocarbons or hazardous waste materials.	Contamination may cause surface or ground water contamination if not addressed.		Control: Implementation of waste management	<ul style="list-style-type: none"> <li>The impact should be avoided through the implementation the mitigation measures stipulated in this document.</li> <li>Should spillage however occur the area needs to be cleaned in accordance with the standards of the NEMWA, 2008.</li> </ul>
	Weed and invader plant infestation of the area.	Biodiversity		Control: Implementation of weed control	<ul style="list-style-type: none"> <li>The impact should be avoided through the eradication of Category 1 weeds/invader plants in terms of CARA, 1993 as well as the implementation of the mitigation measures in this document.</li> </ul>

Activity	Potential impact	Aspects affected	Phase	Mitigation type	Standard to be achieved
Crushing	Dust nuisance due to the crushing activities	Dust will be contained within the property boundaries and will therefore affect only the landowner.	Operational phase	Control: Dust suppression	<ul style="list-style-type: none"> <li>Fallout dust levels has to comply with the acceptable dust fall rate published for non-residential areas in the National Dust Control Regulations 2013 – 600 &lt; Dust Fall &lt; 1 200 mg/m<sup>2</sup>/day.</li> <li>Gravimetric dust levels have to comply with the standard published in the NIOSH guidelines – Particulates &gt;1/10<sup>th</sup> of the occupational exposure limit.</li> <li>NEMAQA, 2004 Regulation 6(1).</li> </ul>
	Noise nuisance generated by the crushing activities	The noise impact should be contained within the boundaries of the property, but might have a periodic impact on the closest residents of the Witbank community.		Control: Noise control measures	<ul style="list-style-type: none"> <li>Noise levels on the site has to be managed and need to comply with the standards stipulated in NEMAQA, 2004 Regulation 6(1) as well as the noise standards of SANS 10103:2008.</li> <li>Employees working in areas with noise levels of more than 82dBA need to be issue with hearing protection.</li> </ul>
	Contamination of	Contamination		Control:	<ul style="list-style-type: none"> <li>The impact should be avoided</li> </ul>

Activity	Potential impact	Aspects affected	Phase	Mitigation type	Standard to be achieved
	area with hydrocarbons or hazardous waste materials.	may cause surface or ground water contamination if not addressed.		Implementation of waste management	<p>through the implementation the mitigation measures stipulated in this document.</p> <ul style="list-style-type: none"> <li>• Should spillage however occur the area needs to be cleaned in accordance with the standards of the NEMWA, 2008.</li> </ul>
	Loss of material due to ineffective storm water handling.	Impact will affect income of applicant.		Control: Storm water control measures	<ul style="list-style-type: none"> <li>• The impact should be avoided through the implementation of storm water management.</li> </ul>
	Weed and invader plant infestation of the area due to the disturbance of the soil	Biodiversity		Control and remedy: Implementation of weed control	<ul style="list-style-type: none"> <li>• The impact should be avoided through the eradication of Category 1 weeds/invader plants in terms of CARA, 1993 as well as the implementation of the mitigation measures in this document.</li> </ul>
<b>Stockpiling and transporting</b>	Dust nuisance from stockpiled material and vehicles transporting the material.	Dust will be contained within the property boundaries and will therefore affect only the landowner.	<b>Operational phase</b>	Control: Dust suppression	<ul style="list-style-type: none"> <li>• Fallout dust levels has to comply with the acceptable dust fall rate published for non-residential areas in the National Dust Control Regulations 2013 – <math>600 &lt; \text{Dust Fall} &lt; 1200 \text{ mg/m}^2/\text{day}</math>.</li> <li>• Gravimetric dust levels have to comply with the standard published</li> </ul>



Activity	Potential impact	Aspects affected	Phase	Mitigation type	Standard to be achieved
					<p>in the NIOSH guidelines – Particulates &gt;1/10<sup>th</sup> of the occupational exposure limit.</p> <ul style="list-style-type: none"> <li>• NEMAQA, 2004 Regulation 6(1).</li> </ul>
	Degradation of access roads.	All road users will be affected.		Control and remedy: Road management	<ul style="list-style-type: none"> <li>• The impact should be avoided through the implementation of the mitigation measures proposed in this document.</li> </ul>
	Noise nuisance caused by vehicles.	The noise impact should be contained within the boundaries of the property, but might have a periodic impact on the closest residents of the Witbank community.		Control: Noise management monitoring and management	<ul style="list-style-type: none"> <li>• Noise levels on the site has to be managed and need to comply with the standards stipulated in NEMAQA, 2004 Regulation 6(1) as well as the <i>noise standards of SANS 10103:2008</i>.</li> <li>• Employees working in areas with noise levels of more than 82dBA need to be issue with hearing protection.</li> </ul>
<b>Sloping and landscaping during rehabilitation</b>	Contamination of area with hydrocarbons or hazardous waste materials	Contamination may cause surface or ground water contamination if not addressed.	<b>Decommissioning phase</b>	Control: Implementation of waste management	<ul style="list-style-type: none"> <li>• The impact should be avoided through the implementation the mitigation measures stipulated in this document.</li> <li>• Should spillage however occur the</li> </ul>

Activity	Potential impact	Aspects affected	Phase	Mitigation type	Standard to be achieved
					area needs to be cleaned in accordance with the standards of the NEM:WA, 2008.
	Soil erosion	Biodiversity		Control: Soil management	<ul style="list-style-type: none"> <li>The impact should be avoided through the implementation the mitigation measures stipulated in this document.</li> <li>CARA, 1993</li> </ul>
	Health and safety risk posed by un-sloped areas	Impact will affect employees and residents of the property		Control: Health and safety monitoring and management.	<ul style="list-style-type: none"> <li>The impact should be avoided through compliance with the standards of the MHSA, 1996, OHSA, 1993 and OHSAS 18001</li> </ul>
	Dust nuisance caused during sloping and landscaping activities.	Dust will be contained within the property boundaries and will therefore affect only the landowner.		Control: Dust suppression	<ul style="list-style-type: none"> <li>Fallout dust levels has to comply with the acceptable dust fall rate published for non-residential areas in the National Dust Control Regulations 2013 – 600 &lt; Dust Fall &lt; 1 200 mg/m<sup>2</sup>/day.</li> <li>Gravimetric dust levels have to comply with the standard published in the NIOSH guidelines – Particulates &gt;1/10 of the occupational exposure limit. NEM:AQA, 2004 Regulation 6(1).</li> </ul>
	Noise nuisance	The noise impact		Control: Noise	<ul style="list-style-type: none"> <li>Noise levels on the site has to be</li> </ul>

Activity	Potential impact	Aspects affected	Phase	Mitigation type	Standard to be achieved
	caused by machinery.	should be contained within the boundaries of the property, but might have a periodic impact on the closest residents of the Witbank community.		monitoring	<p>managed and need to comply with the standards stipulated in NEM:AQA, 2004 Regulation 6(1) as well as the noise standards of SANS 10103:2008.</p> <ul style="list-style-type: none"> <li>• Employees working in areas with noise levels of more than 82dBA need to be issue with hearing protection.</li> </ul>
	Contamination of area with hydrocarbons or hazardous waste materials.	Contamination may cause surface or ground water contamination if not addressed.		Control: Waste management	<ul style="list-style-type: none"> <li>• The impact should be avoided through the implementation the mitigation measures stipulated in this document.</li> <li>• Should spillage however occur the area needs to be cleaned in accordance with the standards of the NEM:WA, 2008.</li> </ul>
<b>Replacing of topsoil and rehabilitation of disturbed area</b>	Loss of reinstated topsoil due to the absence of vegetation	Biodiversity and soil management	<b>Decommissioning phase</b>	Control: Soil management	<ul style="list-style-type: none"> <li>• The impact should be avoided through the implementation the mitigation measures stipulated in this document.</li> <li>• CARA, 1993</li> </ul>
	Infestation of the	Biodiversity and soil		Control and	<ul style="list-style-type: none"> <li>• The impact should be avoided</li> </ul>

Activity	Potential impact	Aspects affected	Phase	Mitigation type	Standard to be achieved
	area by weed and invader plants.	management		remedy: Implementation of weed control	through the eradication of Category 1 weeds/invader plants in terms of CARA, 1993 as well as the implementation of the mitigation measures in this document.

## 5.8 Impact management actions

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

Activity	Potential impact	Mitigation type	Time period for implementation	Compliance with standards
Whether listed or not, e.g. excavations, blasting, stockpiles, discard dumps/dams, loading, hauling, transport, water supply dams, boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc.	E.g. dust, noise, drainage, surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution, etc.	Modify, remedy, control or stop through, e.g. noise control measures, storm water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity, etc. E.g. Modify through alternative method, control through noise control, control through management and monitoring, and remedy through rehabilitation.	Describe the time period when the measures in the environmental management programme must be implemented. Measures must be implemented when required. With regard to Rehabilitation specifically this must take place at the earliest opportunity. With regard to Rehabilitation therefore state either – Upon cessation of the individual activity or upon the cessation of mining, bulk sampling or alluvial diamond prospecting as the case may be.	A description of how each of the recommendations in 2.11.6 read with 2.12 and 2.15.2 herein will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities

Activity	Potential impact	Mitigation type	Time period for implementation	Compliance with standards
<b>Topsoil stripping and stockpiling</b>	Visual intrusion associated with the establishment of the mining area.	Control: Implementation of proper housekeeping	To be implemented daily throughout the site establishment / construction phase: <ul style="list-style-type: none"> <li>• Daily compliance monitoring by site management.</li> <li>• Quarterly compliance monitoring of site by an</li> <li>• Environmental Control Officer.</li> </ul>	Impact on the surrounding environment must be mitigated until rehabilitation standards can be implemented in terms of the MRDA.
	Dust nuisance caused by the disturbance of soil.	Control: Dust suppression	To be implemented daily throughout the site establishment / construction phase: <ul style="list-style-type: none"> <li>• Daily compliance monitoring by site management.</li> <li>• Quarterly compliance monitoring of site by an</li> <li>• Environmental Control Officer.</li> </ul>	<ul style="list-style-type: none"> <li>• Fallout dust levels has to comply with the acceptable dust fall rate published for non-residential areas in the National Dust Control Regulations 2013 – 600 &lt; Dust Fall &lt; 1 200 mg/m<sup>2</sup>/day.</li> <li>• Gravimetric dust levels have to comply with the standard published in the NIOSH guidelines – Particulates &gt;1/10<sup>th</sup> of the occupational exposure limit NEMAQA, 2004 Regulation 6(1)</li> </ul>

Activity	Potential impact	Mitigation type	Time period for implementation	Compliance with standards
	Noise nuisance caused by machinery stripping and stockpiling the topsoil.	Control: Noise control measures	To be implemented daily throughout the site establishment / construction phase: <ul style="list-style-type: none"> <li>• Daily compliance monitoring by site management.</li> <li>• Quarterly compliance monitoring of site by an</li> <li>• Environmental Control Officer.</li> </ul>	<ul style="list-style-type: none"> <li>• Noise levels on the site has to be managed and need to comply with the standards stipulated in NEM:AQA, 2004 Regulation 6(1) as well as the <i>noise standards of SANS 10103:2008</i>.</li> <li>• Employees working in areas with noise levels of more than 82dBA need to be issue with hearing protection.</li> </ul>
	Infestation of the topsoil heaps by weeds and invader plants	Control and remedy: Implementation of weed control	To be implemented when necessary throughout the site establishment / construction phase: <ul style="list-style-type: none"> <li>• Daily compliance monitoring by site management.</li> <li>• Quarterly compliance monitoring of site by an</li> <li>• Environmental Control Officer.</li> </ul>	<ul style="list-style-type: none"> <li>• The impact should be avoided through the eradication of Category 1 weeds/invader plants in terms of CARA, 1993 as well as the implementation of the mitigation measures in this document.</li> </ul>
	Loss of topsoil due to incorrect storm water management.	Control: Storm water management	To be implemented daily throughout the site establishment / construction phase:	<ul style="list-style-type: none"> <li>• The impact should be avoided through the implementation of storm water management.</li> </ul>

Activity	Potential impact	Mitigation type	Time period for implementation	Compliance with standards
			<ul style="list-style-type: none"> <li>• Daily compliance monitoring by site management.</li> <li>• Quarterly compliance monitoring of site by an Environmental Control officer</li> </ul>	
	Contamination of area with hydrocarbons or hazardous waste materials	Control and remedy: Implementation of waste management	To be implemented daily throughout the site establishment / construction phase: <ul style="list-style-type: none"> <li>• Daily compliance monitoring by site management.</li> <li>• Quarterly compliance monitoring of site by an</li> <li>• Environmental Control Officer.</li> </ul>	<ul style="list-style-type: none"> <li>• The impact should be avoided through the implementation of the mitigation measures stipulated in this document.</li> <li>• Should spillage however occur the area needs to be cleaned in accordance with the standards of the NEM:WA, 2008.</li> </ul>
<b>Blasting</b>	Health and safety risk posed by blasting activities	Control: Health and safety monitoring and management	To be implemented when necessary throughout the operational phase: <ul style="list-style-type: none"> <li>• Daily compliance monitoring by site management.</li> <li>• Quarterly compliance monitoring of site by an</li> <li>• Environmental Control Officer.</li> </ul>	<ul style="list-style-type: none"> <li>• The impact should be avoided through compliance with the standards of the MHSA, 1996, OHSWA, 1993 and OHSAS 18001</li> </ul>



Activity	Potential impact	Mitigation type	Time period for implementation	Compliance with standards
	Dust nuisance caused by blasting activities	Control: Dust suppression	<p>To be implemented daily throughout the operational phase:</p> <ul style="list-style-type: none"> <li>• Daily compliance monitoring by site management.</li> <li>• Quarterly compliance monitoring of site by an</li> <li>• Environmental Control Officer.</li> </ul>	<ul style="list-style-type: none"> <li>• Fallout dust levels has to comply with the acceptable dust fall rate published for non-residential areas in the National Dust Control Regulations 2013 – <math>600 &lt; \text{Dust Fall} &lt; 1\ 200 \text{ mg/m}^2/\text{day}</math>.</li> <li>• Gravimetric dust levels have to comply with the standard published in the NIOSH guidelines – Particulates <math>&gt;1/10^{\text{th}}</math> of the occupational exposure limit.</li> <li>• NEMAQA, 2004 Regulation 6(1)</li> </ul>
	Noise nuisance caused by blasting activities	Control: Noise control measures	<p>To be implemented daily throughout the operational phase:</p> <ul style="list-style-type: none"> <li>• Daily compliance monitoring by site management.</li> <li>• Quarterly compliance monitoring of site by an</li> <li>• Environmental Control Officer.</li> </ul>	<ul style="list-style-type: none"> <li>• Noise levels on the site has to be managed and need to comply with the standards stipulated in NEM:AQA, 2004 Regulation 6(1) as well as the noise standards of SANS 10103:2008.</li> <li>• Employees working in areas with noise levels of more than 82dBA need to be issue with hearing protection.</li> </ul>

Activity	Potential impact	Mitigation type	Time period for implementation	Compliance with standards
<b>Excavation</b>	Visual intrusion associated with the excavation activities	Control: Implementation of proper housekeeping	To be implemented daily throughout the operational phase: <ul style="list-style-type: none"> <li>• Daily compliance monitoring by site management.</li> <li>• Quarterly compliance monitoring of site by an</li> <li>• Environmental Control Officer.</li> </ul>	<ul style="list-style-type: none"> <li>• Impact on the surrounding environment mitigated until rehabilitation standards can be implemented.</li> </ul>
	Dust nuisance due to excavation activities.	Control: Dust suppression	To be implemented daily throughout the operational phase: <ul style="list-style-type: none"> <li>• Daily compliance monitoring by site management.</li> <li>• Quarterly compliance monitoring of site by an</li> <li>• Environmental Control Officer.</li> </ul>	<ul style="list-style-type: none"> <li>• Fallout dust levels has to comply with the acceptable dust fall rate published for non-residential areas in the National Dust Control Regulations 2013 – 600 &lt; Dust Fall &lt; 1 200 mg/m<sup>2</sup>/day</li> <li>• Gravimetric dust levels have to comply with the standard published in the NIOSH guidelines – Particulates &gt;1/10<sup>th</sup> of the occupational exposure limit.</li> <li>• NEM:AQA, 2004 Regulation 6(1).</li> </ul>

Activity	Potential impact	Mitigation type	Time period for implementation	Compliance with standards
	Noise nuisance generated by excavation equipment.	Control: Noise control measures	To be implemented daily throughout the operational phase: <ul style="list-style-type: none"> <li>• Daily compliance monitoring by site management.</li> <li>• Quarterly compliance monitoring of site by an</li> <li>• Environmental Control Officer.</li> </ul>	<ul style="list-style-type: none"> <li>• Noise levels on the site has to be managed and need to comply with the standards stipulated in NEM:AQA, 2004 Regulation 6(1) as well as the <i>noise standards of SANS 10103:2008</i>.</li> <li>• Employees working in areas with noise levels of more than 82dBA need to be issue with hearing protection.</li> </ul>
	Unsafe working conditions for employees.	Control: Health and safety monitoring and management	To be daily throughout the operational phase: <ul style="list-style-type: none"> <li>• Daily compliance monitoring by site management.</li> <li>• Quarterly compliance monitoring of site by an</li> <li>• Environmental Control Officer.</li> </ul>	<ul style="list-style-type: none"> <li>• The impact should be avoided through compliance with the standards of the MHSA, 1996, OHSA, 1993 and OHSAS 18001</li> </ul>
	Negative impact on the fauna and flora of the area.	Control: Protection of fauna and flora through operational phase	To be daily throughout the operational phase: <ul style="list-style-type: none"> <li>• Daily compliance monitoring by site management.</li> <li>• Quarterly compliance monitoring of site by an</li> </ul>	<ul style="list-style-type: none"> <li>• The impact should be avoided through the implementation of the mitigation measures stipulated in this document.</li> <li>• NEM:BA, 2004.</li> </ul>

Activity	Potential impact	Mitigation type	Time period for implementation	Compliance with standards
			<ul style="list-style-type: none"> <li>• Environmental Control Officer.</li> </ul>	
	Contamination of area with hydrocarbons or hazardous waste materials.	Control: Implementation of waste management	<p>To be implemented daily throughout the operational phase:</p> <ul style="list-style-type: none"> <li>• Daily compliance monitoring by site management.</li> <li>• Quarterly compliance monitoring of site by an</li> <li>• Environmental Control Officer.</li> </ul>	<ul style="list-style-type: none"> <li>• The impact should be avoided through the implementation the mitigation measures stipulated in this document.</li> <li>• Should spillage however occur the area needs to be cleaned in accordance with the standards of the NEM:WA, 2008.</li> </ul>
	Weed and invader plant infestation of the area.	Control: implementation of weed control	<p>To be implemented when necessary throughout the operational phase:</p> <ul style="list-style-type: none"> <li>• Daily compliance monitoring by site management.</li> <li>• Quarterly compliance monitoring of site by an</li> <li>• Environmental Control Officer.</li> </ul>	<ul style="list-style-type: none"> <li>• The impact should be avoided through the eradication of Category 1 weeds/invader plants in terms of CARA, 1993 as well as the implementation of the mitigation measures in this document.</li> </ul>
<b>Crushing</b>	Dust nuisance due to the crushing activities	Control: Dust suppression	<p>To be implemented daily throughout the operational phase:</p> <ul style="list-style-type: none"> <li>• Daily compliance monitoring</li> </ul>	<ul style="list-style-type: none"> <li>• Fallout dust levels has to comply with the acceptable dust fall rate published for non-residential areas in the National Dust</li> </ul>

Activity	Potential impact	Mitigation type	Time period for implementation	Compliance with standards
			by site management. <ul style="list-style-type: none"> <li>• Quarterly compliance monitoring of site by an</li> <li>• Environmental Control Officer.</li> </ul>	Control Regulations 2013 – 600 < Dust Fall < 1 200 mg/m <sup>2</sup> /day. <ul style="list-style-type: none"> <li>• Gravimetric dust levels have to comply with the standard published in the NIOSH guidelines – Particulates &gt;1/10<sup>th</sup> of the occupational exposure limit.</li> <li>• NEM:AQA, 2004 Regulation 6(1).</li> </ul>
	Noise nuisance generated by the crushing activities.	Control: Noise control measures	To be implemented daily throughout the operational phase: <ul style="list-style-type: none"> <li>• Daily compliance monitoring by site management.</li> <li>• Quarterly compliance monitoring of site by an</li> <li>• Environmental Control Officer.</li> </ul>	<ul style="list-style-type: none"> <li>• Noise levels on the site has to be managed and need to comply with the standards stipulated in NEM:AQA, 2004 Regulation 6(1) as well as the noise standards of SANS 10103:2008.</li> <li>• Employees working in areas with noise levels of more than 82dBA need to be issue with hearing protection.</li> </ul>
	Contamination of area with hydrocarbons or hazardous waste materials.	Control: Implementation of waste management	To be implemented daily throughout the operational phase: <ul style="list-style-type: none"> <li>• Daily compliance monitoring by site management.</li> </ul>	<ul style="list-style-type: none"> <li>• The impact should be avoided through the implementation the mitigation measures stipulated in this document.</li> <li>• Should spillage however occur</li> </ul>

Activity	Potential impact	Mitigation type	Time period for implementation	Compliance with standards
			<ul style="list-style-type: none"> <li>• Quarterly compliance monitoring of site by an</li> <li>• Environmental Control Officer.</li> </ul>	the area needs to be cleaned in accordance with the standards of the NEM:WA, 2008.
<b>Stockpiling and transporting</b>	Visual intrusion associated with the stockpiled material and vehicles transporting the material.	Control: Implementation of proper housekeeping	<p>To be implemented daily throughout the operational phase:</p> <ul style="list-style-type: none"> <li>• Daily compliance monitoring by site management.</li> <li>• Quarterly compliance monitoring of site by an</li> <li>• Environmental Control Officer.</li> </ul>	<ul style="list-style-type: none"> <li>• Impact on the surrounding environment mitigated until rehabilitation standards can be implemented.</li> </ul>
	Loss of material due to ineffective storm water handling.	Control: Storm water control measures	<ul style="list-style-type: none"> <li>• To be implemented daily throughout the operational phase:</li> <li>• Daily compliance monitoring by site management.</li> <li>• Quarterly compliance monitoring of site by an Environmental Control Officer.</li> </ul>	<ul style="list-style-type: none"> <li>• The impact should be avoided through the implementation of storm water management</li> </ul>
	Weed and invader plant infestation of	Control and remedy: Implementation of weed	To be implemented when necessary throughout the	<ul style="list-style-type: none"> <li>• The impact should be avoided through the eradication of</li> </ul>

Activity	Potential impact	Mitigation type	Time period for implementation	Compliance with standards
	the area due to the disturbance of the soil	control	operational phase: <ul style="list-style-type: none"> <li>• Daily compliance monitoring by site management.</li> <li>• Quarterly compliance monitoring of site by an</li> <li>• Environmental Control Officer.</li> </ul>	Category 1 weeds/invader plants in terms of CARA, 1993 as well as the implementation of the mitigation measures in this document.
	Dust nuisance from stockpiled material and vehicles transporting the material.	Control: Dust suppression	To be implemented daily throughout the operational phase: <ul style="list-style-type: none"> <li>• Daily compliance monitoring by site management.</li> <li>• Quarterly compliance monitoring of site by an</li> <li>• Environmental Control Officer.</li> </ul>	<ul style="list-style-type: none"> <li>• Fallout dust levels has to comply with the acceptable dust fall rate published for non-residential areas in the National Dust Control Regulations 2013 – 600 &lt; Dust Fall &lt; 1 200 mg/m<sup>2</sup>/day.</li> <li>• Gravimetric dust levels have to comply with the standard published in the NIOSH guidelines – Particulates &gt;1/10<sup>th</sup> of the occupational exposure limit.</li> <li>• NEM:AQA, 2004 Regulation 6(1).</li> </ul>
	Degradation of access roads	Control and remedy: Road management	To be implemented when necessary throughout the operational phase: <ul style="list-style-type: none"> <li>• Daily compliance monitoring</li> </ul>	<ul style="list-style-type: none"> <li>• The impact should be avoided through the implementation of the mitigation measures proposed in this document.</li> </ul>

Activity	Potential impact	Mitigation type	Time period for implementation	Compliance with standards
			by site management. <ul style="list-style-type: none"> <li>• Quarterly compliance monitoring of site by an Environmental Control Officer.</li> </ul>	
	Noise nuisance caused by vehicles.	Control: Noise management monitoring and management	To be implemented daily throughout the operational phase: <ul style="list-style-type: none"> <li>• Daily compliance monitoring by site management.</li> <li>• Quarterly compliance monitoring of site by an</li> <li>• Environmental Control Officer.</li> </ul>	<ul style="list-style-type: none"> <li>• Noise levels on the site has to be managed and need to comply with the standards stipulated in NEM:AQA, 2004 Regulation 6(1) as well as the noise standards of SANS 10103:2008.</li> <li>• Employees working in areas with noise levels of more than 82dBA need to be issue with hearing protection.</li> </ul>
	Contamination of area with hydrocarbons or hazardous waste materials.	Control: Implementation of waste management	To be implemented daily throughout the operational phase: <ul style="list-style-type: none"> <li>• Daily compliance monitoring by site management.</li> <li>• Quarterly compliance monitoring of site by an</li> <li>• Environmental Control Officer.</li> </ul>	<ul style="list-style-type: none"> <li>• The impact should be avoided through the implementation the mitigation measures stipulated in this document.</li> <li>• Should spillage however occur the area needs to be cleaned in accordance with the standards of the NEMWA, 2008.</li> </ul>



Activity	Potential impact	Mitigation type	Time period for implementation	Compliance with standards
<b>Sloping and landscaping during rehabilitation</b>	Soil erosion	Control: Soil management	To be implemented throughout the rehabilitation / closure phase: <ul style="list-style-type: none"> <li>• Daily compliance monitoring by site management.</li> <li>• Compliance monitoring of site by an Environmental Control Officer.</li> </ul>	<ul style="list-style-type: none"> <li>• The impact should be avoided through the implementation the mitigation measures stipulated in this document.</li> <li>• CARA, 1993</li> </ul>
	Health and safety risk posed by un-sloped areas	Control: Health and safety monitoring and management.	To be implemented throughout the rehabilitation / closure phase: <ul style="list-style-type: none"> <li>• Daily compliance monitoring by site management.</li> <li>• Compliance monitoring of site by an Environmental Control Officer.</li> </ul>	<ul style="list-style-type: none"> <li>• The impact should be avoided through compliance with the standards of the MHSA, 1996, OSHA, 1993 and OHSAS 18001</li> </ul>
	Dust nuisance caused during sloping and landscaping activities.	Control: Dust suppression	To be implemented throughout the rehabilitation / closure phase: <ul style="list-style-type: none"> <li>• Daily compliance monitoring by site management.</li> <li>• Compliance monitoring of site by an Environmental Control Officer.</li> </ul>	<ul style="list-style-type: none"> <li>• Fallout dust levels has to comply with the acceptable dust fall rate published for non-residential areas in the National Dust Control Regulations 2013 – 600 &lt; Dust Fall &lt; 1 200 mg/m<sup>2</sup>/day.</li> <li>• Gravimetric dust levels have to comply with the standard</li> </ul>

Activity	Potential impact	Mitigation type	Time period for implementation	Compliance with standards
				<p>published in the NIOSH guidelines – Particulates &gt;1/10<sup>th</sup> of the occupational exposure limit.</p> <ul style="list-style-type: none"> <li>• NEM:AQA, 2004 Regulation 6(1).</li> </ul>
	<p>Noise nuisance caused by machinery.</p>	<p>Control: Noise monitoring</p>	<p>To be implemented throughout the rehabilitation / closure phase:</p> <ul style="list-style-type: none"> <li>• Daily compliance monitoring by site management.</li> <li>• Compliance monitoring of site by an Environmental Control Officer.</li> </ul>	<ul style="list-style-type: none"> <li>• Noise levels on the site has to be managed and need to comply with the standards stipulated in NEM:AQA, 2004 Regulation 6(1) as well as the noise standards of SANS 10103:2008.</li> <li>• Employees working in areas with noise levels of more than 82dBA need to be issue with hearing protection.</li> </ul>
	<p>Contamination of area with hydrocarbons or hazardous waste materials.</p>	<p>Controls: Waste management</p>	<p>To be implemented throughout the rehabilitation / closure phase:</p> <ul style="list-style-type: none"> <li>• Daily compliance monitoring by site management.</li> <li>• Compliance monitoring of site by an Environmental Control Officer.</li> </ul>	<ul style="list-style-type: none"> <li>• The impact must be avoided through implementation of mitigation measures stipulated in this document.</li> <li>• Should spillage however occur the area needs to be cleaned in accordance with the standards of the NEMWA, 2008.</li> </ul>

Activity	Potential impact	Mitigation type	Time period for implementation	Compliance with standards
<b>Replacing of topsoil and rehabilitation of disturbed area</b>	Loss of reinstated topsoil due to the absence of vegetation	Control: Soil management	To be implemented throughout the rehabilitation / closure phase: <ul style="list-style-type: none"> <li>• Daily compliance monitoring by site management.</li> <li>• Compliance monitoring of site by an Environmental Control Officer.</li> </ul>	<ul style="list-style-type: none"> <li>• The impact should be avoided through the implementation the mitigation measures stipulated in this document.</li> <li>• CARA, 1993</li> </ul>
	Infestation of the area by weed and invader plants.	Control and remedy: Implementation of weed control	To be implemented throughout the rehabilitation / closure phase: <ul style="list-style-type: none"> <li>• Daily compliance monitoring by site management.</li> <li>• Compliance monitoring of site by an Environmental Control Officer.</li> </ul>	<ul style="list-style-type: none"> <li>• The impact should be avoided through the eradication of Category 1 weeds/invader plants in terms of CARA, 1993 as well as the implementation of the mitigation measures in this document.</li> </ul>

## **6 Determination of the amount of financial provision**

### **6.1 Closure objectives and the extent to which they have been aligned to the baseline environment described under the Regulation**

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

- Making the area safe, i.e. decommission mining activities to ensure that the environment is safe for people and animals. This entails refilling the excavations.
- Recreating a free draining landform. This entails earthworks infilling, reshaping, levelling, etc. to recreate as close as possible the original topography and to ensure a free draining landscape.
- Re-vegetation. This involves either reseeded or allowing natural succession depending on the area, climate etc.
- Storm water management and erosion control. Management of stormwater and prevention of erosion during rehabilitation (e.g. cut off drains, berms etc. and erosion control where required).

### **6.2 Confirm specifically that the environmental objectives in relation to**

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

The PPP which forms part of the Mining Permit application needs to be managed sensitively and according to best practices in order to ensure and promote:

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

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

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

Landowners and I&APs were consulted and provided an opportunity to comment on the draft Basic Assessment Report, EMPR including all decommissioning, closure and rehabilitation plans. Their comments have been included in this final BAR and EMPR for consideration by the DMRE as part of their decision-making.

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

#### **6.3.1 Integrated Rehabilitation and Closure Plan**

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

The overall rehabilitation objectives for this project are as follows:

Maintain and minimize impacts to the ecosystem within the study area.

- ❖ Re-establishment of the pre-developed land capability to allow for a suitable post-mining land use.
- ❖ Prevent soil, surface water and groundwater contamination.
- ❖ Comply with the relevant local and national regulatory requirements.

- ❖ Maintain and monitor the rehabilitated areas.

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

#### **6.3.1.1 Phase 1: Making Safe**

The Mining activity will result in an opencast. The purpose of rehabilitation will be to ensure the site becomes safe for humans and animals. The opencast will be filled with overburden. The overburden will be loaded, trucked and placed into the proposed mine, and the topography in the area adjacent to the proposed mine shaped to ensure that a free draining topography results.

Once the proposed mine has been backfilled, 300mm thick topsoil or soft overburden in place of soil will be spread on rehabilitated areas. Once placed, the "growth medium" should then be fertilized, ripped and revegetated. A small topsoil stockpile should be left for remedial work.

The following actions are required to meet the objectives of this phase:

- ❖ Remove all the facilities and equipment from the site.
- ❖ Inert waste with a salvage value to individuals such as scrap metal, building materials, etc. will be removed and disposed of at a proper facility.
- ❖ The company contracted to supply fuel will be requested to remove all fuel storage and reticulation facilities.
- ❖ Those sections of haul road where a lot of Coal, Pseudocoal, Torbanite and Aggregate spillage has occurred, will be picked up and the waste material taken back to the discard dump.
- ❖ Remove or control residual hazardous materials. Identify any potential toxic overburden or exposed strata and manage them so as to prevent environmental damage.
- ❖ Access roads around the site should be ripped for all areas except those needed to access the facilities for inspection after closure. Roads that can and will be used by other users post closure should, however, be left provided this is agreed upon by all parties concerned. For the rehabilitation of roads, a cost has been allocated to rip the area, add 300 mm topsoil and vegetate.
- ❖ Negotiations will take place with landowners to establish which sections of haul road they will require. The extra portions not required will be left and the remainder ripped. This would normally mean that the edges or verges are ripped, and the centre portion remains. They will be responsible for maintaining the roads after closure.

### **6.3.1.2 Phase 2: Landform Design, Erosion Control and Revegetation**

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

This requires the following:

- ❖ Deep rip compacted surfaces to encourage infiltration, allow plant root growth and key the topsoil to the subsoil, unless subsurface conditions dictate otherwise.
- ❖ Reinstate natural drainage patterns disrupted by mining wherever possible.
- ❖ Characterize the topsoil and retain it for use in rehabilitation. It is preferable to reuse the topsoil immediately rather than storing it in stockpiles. Only discard if it is physically or chemically undesirable, or if it contains high levels of weed seeds or plant pathogens.
- ❖ If topsoil is unsuitable or absent, identify and test alternative substrates, e.g. overburden that may be a suitable substitute after addition of soil improving substances.
- ❖ Lime and superphosphate are applied to the surface.
- ❖ These ameliorants are then incorporated by deep ripping, which penetrates 100 mm through the soil into the underlying overburden material.
- ❖ Fertilizer is applied as part of seedbed preparation.
- ❖ Consider spreading the cleared vegetation on disturbed areas.
- ❖ Re-vegetate the area with plant species consistent with the post mining land use.
- ❖ The site is then mulched together with an indigenous grass seed mix. This is to stimulate the long term establishment of indigenous vegetation and to reduce erosion during early plant growth.

### **6.3.1.3 Phase 3: Monitoring and Maintenance**

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

Maintenance will specifically focus on annual fertilizing the rehabilitated area (where required), control of all other alien plants and general maintenance, including rehabilitation of cracks, subsidence and erosion gullies. Continuous erosion monitoring of rehabilitated areas and slopes should be undertaken and zones with excessive erosion should be identified. The cause of the

erosion should be identified, and rectified. Zones with erosion will need to be repaired with topsoil.

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

- ❖ Biodiversity monitoring.
- ❖ Re-vegetation of disturbed areas where required.

Provision must be made to monitor any unforeseen impact that may arise as a result of the proposed mining activities and incorporated into post closure monitoring and management. The small-scale mine shall continue to monitor and manage rehabilitation areas until the vegetation is self-sustaining and meets the requirements of the landowner or land manager, until their management can be integrated into the management of the surrounding area.

#### **6.3.1.4 Post-Closure Monitoring and Maintenance**

Prior to decommissioning and rehabilitation activities, a monitoring programme shall be developed and submitted to the relevant authority for approval, as a part of the Final Rehabilitation Plan. The programme is to include proposed monitoring during and after the closure of the trench site and related activities.

It is recommended that the post-closure monitoring include the following:

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

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

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



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

The rehabilitation plan is compatible with the closure objectives in that it seeks to ensure that negative impacts on the receiving environment that could not be prevented or mitigated during mining are rehabilitated. The use of indigenous species during re-vegetation will ensure that ecosystem restoration is initiated and prevent invasion by alien species. The appropriate disposal of waste will ensure that land is usable, in alignment with surrounding land uses and that no hazardous materials are left on-site post-mining.

##### **6.4.1 Rehabilitation of the excavated area**

- Rocks and coarse material removed from the excavation must be dumped into the excavation.
- No waste will be permitted to be deposited in the excavations.
- Once overburden, rocks and coarse natural materials has been added to the excavation and was profiled with acceptable contours and erosion control measures, the topsoil previously stored will be returned to its original depth over the area.
- The area will be fertilised if necessary to allow vegetation to establish rapidly. The site will be seeded with a local or adapted indigenous seed mix in order to propagate the locally or regionally occurring flora, should natural vegetation not re-establish within 6 months from site closure.
- If a reasonable assessment indicates that the re-establishment of vegetation is unacceptably slow, the Regional Manager may require that the soil be analysed and any deleterious effects on the soil arising from the mining operation be corrected and the area be seeded with a vegetation seed mix to their specification.

##### **6.4.2 Rehabilitation of plant area**

- The compacted areas will be ripped, and the topsoil returned over the area.
- Coarse natural material used for the construction of ramps will be removed and dumped into the excavations.
- Stockpiles will be removed during the decommissioning phase, the area ripped, and the topsoil returned to its original depth to provide a growth medium.
- On completion of operations, all structures or objects will be dealt with in accordance with Section 44 of the MPRDA, 2002 (Act 28 of 2002):
  - Where sites have been rendered devoid of vegetation/grass or soils have been compacted owing to traffic, the surface will be scarified or ripped.

- The site will be seeded with a vegetation seed mix adapted to reflect the local indigenous flora if natural vegetation does not re-establish within 6 months of the closure of the site.
- Photographs of the mining area and office sites, before and during the mining operation and after rehabilitation, will be taken at selected fixed points and kept on record for the information of the Regional Manager.
- On completion of mining operations, the surface of these areas, if compacted due to hauling and dumping operations, will be scarified to a depth of at least 300 mm and graded to an even surface condition and the previously stored topsoil will be returned to its original depth over the area.
- Prior to replacing the topsoil, the overburden material that was removed from these areas will be replaced in the same order as it originally occurred.
- The area shall then be fertilised if necessary to allow vegetation to establish rapidly. The site will be seeded with a local, adapted indigenous seed mix if natural vegetation does not re-establish within 6 months after site closure.
- If a reasonable assessment indicates that the re-establishment of vegetation is unacceptably slow, the Regional Manager may require that the soil be analysed and any deleterious effects on the soil arising from the mining operation be corrected and the area be seeded with a seed mix to their specification.

#### **6.4.3 Final rehabilitation**

- Rehabilitation of the surface area will entail landscaping, levelling, top dressing, land preparation, seeding (if required), maintenance, and weed/ alien clearing.
- All infrastructures, equipment, plant, temporary housing and other items used during the mining period will be removed from the site (section 44 of the MPRDA).
- Waste material of any description, including receptacles, scrap, rubble and tyres, will be removed entirely from the mining area and disposed of at a recognised landfill facility. It will not be permitted to be buried/burned on site.
- Weed/alien clearing will be done in a sporadic manner during the life of the mining activities.
- Species considered Category 1 weeds as per CARA, 1983 – Act 43, Regulations 15 & 16 (as amended in March 2001) must be eradicated from site.
- Final rehabilitation will be completed within a period specified by the Regional Manager.

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

The calculation of the quantum for financial provision was according to Section B of the working manual.

**6.5.1 Mine type and saleable mineral by-product**

According to Tables B.12, B.13 and B.14:

Mine type	Coal, Pseudocoal, Torbanite and Aggregate
Saleable mineral by-product	None

**6.5.2 Risk ranking**

According to Tables B.12, B.13 and B.14:

Primary risk ranking (either Table B.12 or B.13)	C (Low risk)
Revised risk ranking (B.14)	N/A

**6.5.3 Environmental sensitivity of the mine area**

According to Table B.4:

Environmental sensitivity of the mine area	Low
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**6.5.4 Level of information**

According to Step 4.2:

Level of information available	Limited
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**6.5.5 Identify closure components**

According to Table B.5 and site-specific conditions:

Component nr	Main description	Applicability of closure components
1	Dismantling of processing plant and related structures (including overland conveyors and power lines)	No
2 (A)	Demolition of steel buildings and structures	No
2 (B)	Demolition of reinforced concrete buildings and structures	No
3	Rehabilitation of access roads	No
4 (A)	Demolition and rehabilitation of electrified railway lines	No
4 (B)	Demolition and rehabilitation of non-electrified railway lines	No

5	Demolition of housing and facilities		No
6	Opencast rehabilitation including final voids and ramps	Yes	
7	Sealing of shafts, adits and inclines		No
8 (A)	Rehabilitation of overburden and spoils	Yes	
8 (B)	Rehabilitation of processing waste deposits and evaporation ponds (basic, salt-producing)		No
8 (C)	Rehabilitation of processing waste deposits and evaporation ponds (acidic, metal-rich)		No
9	Rehabilitation of subsided areas		No
10	General surface rehabilitation, including grassing of all denuded areas	Yes	
11	River diversions		No
12	Fencing		No
13	Water management (Separating clean and dirty water, managing polluted water and managing the impact on groundwater)		No
14	2 to 3 years of maintenance and aftercare	Yes	

### 6.5.6 Calculation of closure costs

		CALCULATION OF THE QUANTUM					
Applicant: 		Ref No.:		MP 30/5/1/1/3/13571 MP			
Evaluator: Singo Consulting (Pty) Ltd		Date:		31/07/2023			
No.	Description	Unit	A Quantity	B Master Rate	C Multiplication factor	D Weighting factor 1	E=A*B*C*D Amount (Rands)
1	Dismantling of processing plant and related structures (including overland conveyors and power lines)	m3	0	19	1	1	0
2 (A)	Demolition of steel buildings and structures	m2	0	271	1	1	0
2(B)	Demolition of reinforced concrete buildings and structures	m2	0	400	1	1	0
3	Rehabilitation of access roads	m2	0,06	49	1	0,01	0,0294
4 (A)	Demolition and rehabilitation of electrified railway lines	m	0	471	1	1	0
4 (A)	Demolition and rehabilitation of non-electrified railway lines	m	0	257	1	1	0
5	Demolition of housing and/or administration facilities	m2	0	542	1	1	0
6	Opencast rehabilitation including final voids and ramps	ha	4,97	284292	0	1	0
7	Sealing of shaft adits and inclines	m3	0	146	1	1	0
8 (A)	Rehabilitation of overburden and spoils	ha	0,29	189528	0	1	0
8 (B)	Rehabilitation of processing waste deposits and evaporation ponds (non-polluting potential)	ha	0	236054	1	1	0
8 (C)	Rehabilitation of processing waste deposits and evaporation ponds (polluting potential)	ha	0	685612	1	1	0
9	Rehabilitation of subsided areas	ha	0	158701	1	0,01	0
10	General surface rehabilitation	ha	4,97	150138	1	1	746185,86
11	River diversions	ha	0	150138	1	1	0
12	Fencing	m	0	171	1	1	0
13	Water management	ha	0,1	57087	1	0,01	57,087
14	2 to 3 years of maintenance and aftercare	ha	4,97	19980	1	1	99300,6
15 (A)	Specialist study	Sum	0			1	0
15 (B)	Specialist study	Sum				1	0
Sub Total 1							845543,5764
1	Preliminary and General		101465,2292	<b>weighting factor 2</b> 1			101465,2292
2	Contingencies			84554,35764			84554,35764
Subtotal 2							1031563,16
Signed							
Date	31/07/2023						
VAT (15%)							154734,47
<b>Grand Total</b>							<b>1186298</b>

The amount that will be necessary for the rehabilitation of damages caused by the operation, both sudden closures during the normal operation of the project and at final, planned closure gives a sum total of **R1, 186, 298**.

**6.6 Confirm that the financial provision will be provided as determined**

The amount will be provided from the operating expenditure.

## 6.7 Mechanisms for compliance monitoring against EMP

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

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

Source activity	Impacts required monitoring programme	Functional requirements for monitoring	Roles and responsibilities for the execution of monitoring programmes	Monitoring and reporting frequency and time periods for implementing impact management actions
<ul style="list-style-type: none"> <li>• Topsoil stripping and stockpiling</li> <li>• Blasting</li> <li>• Excavation</li> <li>• Crushing</li> <li>• Stockpiling and transporting</li> <li>• Sloping and landscaping</li> </ul>	<p><b>Dust monitoring</b></p> <ul style="list-style-type: none"> <li>• The dust generated by the mining activities should be continuously monitored and addressed by the implementation of dust suppression methods.</li> </ul>	<p><b>Dust handling and monitoring</b></p> <ul style="list-style-type: none"> <li>• Dust suppression equipment, like a water car and water dispenser. The applicant already has this equipment available.</li> </ul>	<p><b>Role</b></p> <ul style="list-style-type: none"> <li>• Site Manager to ensure compliance with EMPr guidelines.</li> <li>• Compliance to be monitored by the Environmental Control Officer.</li> </ul> <p><b>Responsibility</b></p> <ul style="list-style-type: none"> <li>• Control dust liberation into surrounding environment by using, e.g., water spraying and/or other dust-allaying agents.</li> <li>• Limit speed on access roads to 40km/h to prevent excess dust generation.</li> </ul>	<p>Throughout construction, operational and decommissioning phase</p> <ul style="list-style-type: none"> <li>• Daily compliance monitoring by site management.</li> <li>• Quarterly compliance monitoring of site by an Environmental Control Officer.</li> </ul>

Source activity	Impacts required monitoring programme	Functional requirements for monitoring	Roles and responsibilities for the execution of monitoring programmes	Monitoring and reporting frequency and time periods for implementing impact management actions
during rehabilitation			<ul style="list-style-type: none"> <li>• Spray roads with water/environmentally friendly dust allaying agent that contains no PCBs (e.g. DAS products) if dust is generated above acceptable limits.</li> <li>• Assess effectiveness of dust suppression equipment.</li> <li>• Re-vegetate all disturbed/exposed areas as soon as possible to prevent any dust source from being created.</li> <li>• Ensure the crusher is equipped with water sprayers.</li> </ul>	
<ul style="list-style-type: none"> <li>• Topsoil stripping and stockpiling</li> <li>• Blasting</li> <li>• Excavation</li> <li>• Crushing</li> <li>• Sloping and landscaping during rehabilitation</li> </ul>	<p><b>Noise monitoring</b></p> <ul style="list-style-type: none"> <li>• The noise generated by the mining activities should be continuously monitored, and any excessive noise should be addressed.</li> </ul>	<p><b>Noise handling and monitoring</b></p> <ul style="list-style-type: none"> <li>• Site manager to ensure that the vehicles are equipped with silencers and kept roadworthy.</li> <li>• Compliance with the appropriate legislation with</li> </ul>	<p><b>Role</b></p> <ul style="list-style-type: none"> <li>• Site Manager to ensure compliance with EMPr guidelines.</li> <li>• Compliance to be monitored by the Environmental Control Officer.</li> </ul> <p><b>Responsibility</b></p> <ul style="list-style-type: none"> <li>• Ensure that staff conduct themselves in an acceptable manner while on site.</li> <li>• No loud music permitted at mining area.</li> <li>• Ensure that all mining vehicles are equipped with silencers and kept roadworthy in terms of the Road</li> </ul>	<p>Throughout construction, operational and decommissioning phase</p> <ul style="list-style-type: none"> <li>• Daily compliance monitoring by site management.</li> <li>• Quarterly compliance monitoring of site by an Environmental Control Officer.</li> </ul>



Source activity	Impacts required monitoring programme	Functional requirements for monitoring	Roles and responsibilities for the execution of monitoring programmes	Monitoring and reporting frequency and time periods for implementing impact management actions
		respect to noise will be mandatory.	Transport Act. <ul style="list-style-type: none"> <li>Plan the type, duration and timing of the blasting procedures with due cognizance of other land users and structures in the vicinity.</li> <li>Notify surrounding landowners in writing prior blasting occasions.</li> <li>Use noise mufflers and/or soft explosives during blasting.</li> </ul>	
<ul style="list-style-type: none"> <li>Topsoil stripping and stockpiling</li> <li>Excavation Stockpiling and transporting</li> </ul>	<b>Management of weed or invader plants</b> <ul style="list-style-type: none"> <li>The presence of weed and/or invader plants should be continuously monitored, and any unwanted plants should be removed.</li> </ul>	<b>Management of weed or invader plants</b> <ul style="list-style-type: none"> <li>Removal of weeds should be manually or by the use of an approved herbicide</li> </ul>	<b>Role</b> <ul style="list-style-type: none"> <li>Site Manager to ensure compliance with EMPr guidelines.</li> <li>Compliance to be monitored by the Environmental Control Officer.</li> </ul> <b>Responsibility</b> <ul style="list-style-type: none"> <li>Implement a weed and invader plant control management plan.</li> <li>Control declared invader or exotic species on the rehabilitated areas.</li> <li>Keep the temporary topsoil stockpiles free of weeds.</li> </ul>	Throughout operational and decommissioning phase <ul style="list-style-type: none"> <li>Daily compliance monitoring by site management.</li> <li>Quarterly compliance monitoring of site by an Environmental Control Officer.</li> </ul>

Source activity	Impacts required monitoring programme	Functional requirements for monitoring	Roles and responsibilities for the execution of monitoring programmes	Monitoring and reporting frequency and time periods for implementing impact management actions
<ul style="list-style-type: none"> <li>• Stockpiling and transporting</li> <li>• Sloping and Landscaping during rehabilitation</li> </ul>	<p><b>Surface and storm water monitoring</b></p> <ul style="list-style-type: none"> <li>• The effectiveness of the storm water infrastructure needs to be continuously monitored.</li> </ul>	<p><b>Surface and storm water handling</b></p> <ul style="list-style-type: none"> <li>• Trenches and contours to be made to direct storm- and runoff water around the stockpile areas.</li> </ul>	<p><b>Role</b></p> <ul style="list-style-type: none"> <li>• Site Manager to ensure compliance with EMPr guidelines. Compliance to be monitored by the Environmental Control Officer.</li> </ul> <p><b>Responsibility</b></p> <ul style="list-style-type: none"> <li>• Divert storm water around topsoil heaps, stockpile areas and access roads to prevent erosion and material loss.</li> <li>• Divert runoff water around the stockpile areas with trenches and contour structures to prevent erosion of the work areas.</li> <li>• Conduct mining in accordance with the Best Practice Guideline for small scale mining that relates to storm water management, erosion and sediment control and waste management, developed by the DWS, and any other conditions the DWS may impose.</li> </ul>	
<ul style="list-style-type: none"> <li>• Blasting</li> <li>• Excavation</li> </ul>	<p><b>Management of health and safety</b></p>	<p><b>Management of health and safety</b></p>	<p><b>Role</b></p> <ul style="list-style-type: none"> <li>• Site Manager to ensure compliance with EMPr</li> </ul>	<p>Throughout construction, operational and</p>

Source activity	Impacts required monitoring programme	Functional requirements for monitoring	Roles and responsibilities for the execution of monitoring programmes	Monitoring and reporting frequency and time periods for implementing impact management actions
<ul style="list-style-type: none"> <li>• Sloping and Landscaping during rehabilitation</li> </ul>	<ul style="list-style-type: none"> <li>• All health and safety aspects need to be monitored on a daily basis.</li> </ul>	<p><b>risks</b></p> <ul style="list-style-type: none"> <li>• Site manager to ensure that workers are equipped with required PPE while operating on site.</li> <li>• The necessary warning signs must be present at the site to inform the public and workers of mining activities.</li> </ul>	<p>guidelines.</p> <ul style="list-style-type: none"> <li>• Compliance to be monitored by the Environmental Control Officer.</li> </ul> <p><b>Responsibility</b></p> <ul style="list-style-type: none"> <li>• Submit an application for approval of access onto the R392 to the Department of Roads and Public Works prior to the commencement of work.</li> <li>• Inform the Traffic Department of each blast. If necessary, arrange for temporary road closure during a blast.</li> <li>• Plan the type, duration and timing of the blasting procedures with due cognizance of other land users and structures in the vicinity.</li> <li>• Inform the surrounding landowners and communities of any blasting event.</li> <li>• Use noise mufflers and/or soft explosives during blasting.</li> <li>• Limit fly rock.</li> <li>• Give audible warning of a pending blast at least 3 minutes before the blast.</li> </ul>	<p>decommissioning phase</p> <ul style="list-style-type: none"> <li>• Daily compliance monitoring by site management.</li> <li>• Quarterly compliance monitoring of site by an Environmental Control Officer</li> </ul>

Source activity	Impacts required monitoring programme	Functional requirements for monitoring	Roles and responsibilities for the execution of monitoring programmes	Monitoring and reporting frequency and time periods for implementing impact management actions
			<ul style="list-style-type: none"> <li>Remove all fly rock (diameter 150mm and larger) which falls beyond working area, together with the rock spill.</li> <li>Ensure that workers have access to the correct PPE as required by law.</li> </ul>	
<ul style="list-style-type: none"> <li>Excavation</li> <li>Crushing stockpiling and transporting</li> <li>Sloping and landscaping during rehabilitation</li> </ul>	<p><b>Waste management</b></p> <ul style="list-style-type: none"> <li>Management of waste should be a daily monitoring activity.</li> <li>Hydrocarbon spills need to be cleaned immediately and the site manager should check compliance daily.</li> </ul>	<p><b>Waste management</b></p> <ul style="list-style-type: none"> <li>Closed containers for the storage of general/hazardous waste until waste is removed to the appropriate landfill site.</li> <li>Hydrocarbon spill kits to enable sufficient clean-up of contaminated areas.</li> <li>Drip trays should</li> </ul>	<p><b>Role</b></p> <ul style="list-style-type: none"> <li>Site Manager to ensure compliance with EMPr guidelines. Compliance to be monitored by the Environmental Control Officer.</li> </ul> <p><b>Responsibility</b></p> <ul style="list-style-type: none"> <li>Ensure that vehicle repairs only take place in the service bay area and all waste products are disposed of in a 200 l closed container/bin inside the emergency service area.</li> <li>Collect any effluents containing oil, grease or other industrial substances in a suitable receptacle and remove from site, for resale or appropriate disposal at a recognized facility.</li> <li>Clean spills immediately to the satisfaction of the</li> </ul>	<p>Throughout construction, operational and decommissioning phase</p> <ul style="list-style-type: none"> <li>Daily compliance monitoring by site management.</li> <li>Quarterly compliance monitoring of site by an</li> <li>Environmental Control Officer.</li> </ul>

Source activity	Impacts required monitoring programme	Functional requirements for monitoring	Roles and responsibilities for the execution of monitoring programmes	Monitoring and reporting frequency and time periods for implementing impact management actions
		<p>be available to place underneath haul vehicles while the vehicles are parked at night.</p> <ul style="list-style-type: none"> <li>• Should a vehicle have a break down, it should be serviced immediately.</li> </ul>	<p>Regional Manager by removing the spillage and polluted soil and by disposing of them at a recognized facility.</p> <ul style="list-style-type: none"> <li>• Ensure availability of suitable covered, conveniently placed receptacles at all times for waste disposal.</li> <li>• Place all used oils, grease or hydraulic fluids therein and remove receptacles from site regularly for disposal at a registered/licensed hazardous disposal facility.</li> <li>• Store non-biodegradable refuse such as glass bottles, plastic bags, metal scrap, etc., in a container with a closable lid at a collecting point. Collection should take place regularly and disposed of at the recognized landfill site at Witbank. Prevent refuse from being dumped on or in the vicinity of the mine area.</li> <li>• Biodegradable refuse to be handled as indicated above.</li> </ul>	

Source activity	Impacts required monitoring programme	Functional requirements for monitoring	Roles and responsibilities for the execution of monitoring programmes	Monitoring and reporting frequency and time periods for implementing impact management actions
Stockpiling and transporting	<p><b>Management of access roads</b></p> <ul style="list-style-type: none"> <li>• Access road conditions must be continuously monitored.</li> <li>• Vehicles carrying materials has to be equipped with adequate tarpaulin type covers to ensure that material being transported will not leave the vehicle during transportation.</li> </ul>	<p><b>Management of access roads</b></p> <ul style="list-style-type: none"> <li>• Dust suppression equipment such as a water car and dispenser.</li> <li>• Trenches and contours to be made to direct storm- and runoff water around the access roads.</li> </ul>	<p><b>Role</b></p> <ul style="list-style-type: none"> <li>• Site Manager to ensure compliance with EMPr guidelines.</li> <li>• Compliance to be monitored by the Environmental Control Officer.</li> </ul> <p><b>Responsibility</b></p> <ul style="list-style-type: none"> <li>• Maintain newly constructed access roads (if applicable) to minimise dust, erosion or undue surface damage.</li> <li>• Divert storm water around access roads to prevent erosion.</li> <li>• Erosion of access road: Restrict vehicular movement to existing access routes to prevent crisscrossing of tracks through undisturbed areas.</li> <li>• Cover vehicles carrying materials with adequate tarpaulin type covers to ensure that material being transported does leave the vehicle during transportation.</li> <li>• Ensure vehicles entering and using the public road system from the site does not exceed the</li> </ul>	<p>Throughout construction, operational and decommissioning phase</p> <ul style="list-style-type: none"> <li>• Daily compliance monitoring by site management.</li> <li>• Quarterly compliance monitoring of site by an</li> <li>• Environmental Control Officer.</li> </ul>

Source activity	Impacts required monitoring programme	Functional requirements for monitoring	Roles and responsibilities for the execution of monitoring programmes	Monitoring and reporting frequency and time periods for implementing impact management actions
			permissible legal limits on gross vehicle mass and individual axle loads as prescribed in terms of the National Road Traffic Act (Act No 93 of 1996).	
Topsoil stripping and stockpiling	<p><b>Topsoil handling</b></p> <ul style="list-style-type: none"> <li>• When topsoil has been removed from any area the topsoil heaps need to be continuously protected against</li> </ul>	<p><b>Topsoil handling</b></p> <ul style="list-style-type: none"> <li>• Excavating equipment to remove the first 300mm of topsoil from the proposed work areas. The</li> </ul>	<p><b>Role</b></p> <ul style="list-style-type: none"> <li>• Site Manager to ensure compliance with EMPr guidelines.</li> <li>• Compliance to be monitored by the Environmental Control Officer.</li> </ul> <p><b>Responsibility</b></p> <ul style="list-style-type: none"> <li>• Remove the first 300mm of topsoil in strips and</li> </ul>	<p>Throughout construction, operational and decommissioning phase</p> <ul style="list-style-type: none"> <li>• Daily compliance monitoring by site management.</li> <li>• Quarterly compliance</li> </ul>

Source activity	Impacts required monitoring programme	Functional requirements for monitoring	Roles and responsibilities for the execution of monitoring programmes	Monitoring and reporting frequency and time periods for implementing impact management actions
	loss of soil due to wind and water erosion.	<p>applicant already has this equipment available.</p> <ul style="list-style-type: none"> <li>• Trenches and contours to be made to direct storm and runoff water around stockpiled topsoil area.</li> </ul>	<p>store at the stockpile area.</p> <ul style="list-style-type: none"> <li>• Keep the temporary topsoil stockpiles free of weeds.</li> <li>• Place topsoil stockpiles on a levelled area and implement measures to safeguard the piles from being washed away in the event of heavy rains/storm water.</li> <li>• Topsoil heaps should not exceed 2 m in order to preserve micro-organisms within the topsoil, which can be lost due to compaction and lack of oxygen.</li> <li>• Divert storm- and runoff water around the stockpile area and access roads to prevent erosion.</li> </ul>	<p>monitoring of site by an</p> <ul style="list-style-type: none"> <li>• Environmental Control Officer.</li> </ul>



**6.8 Indicate frequency of the submission of the performance assessment/ environmental audit report**

The committed time frames for monitoring and reporting are stipulated in the following:

Monitoring aspect	Time frames	Reporting
Dust handling	Throughout construction, operational and decommissioning phase	<ul style="list-style-type: none"> <li>• Daily compliance monitoring by site management</li> <li>• Quarterly compliance monitoring of site by an Environmental Control Officer</li> </ul>
Noise handling		
Management of weed/invaser plants	Throughout operational and decommissioning phase	
Surface and storm water handling		
Management of health and safety risks	Throughout construction, operational and decommissioning phase	
Waste management		
Management of access roads		
Topsoil handling		

It is proposed that the performance assessment/environmental audit report be quarterly submitted to DMRE.

**6.9 Environmental Awareness Plan**

**6.9.1 Manner in which the applicant intends to inform employees of any environmental risk which may result from their work**

Training, as detailed below, will address the specific measures and actions required for specific emergency events. In this way, each employee will be provided the knowledge required for their job to, firstly, prevent impact and secondly identify if an impact is likely to occur and then to report the possibility of risk or impact immediately so as to ensure immediate response. The most likely potential environmental emergencies in this proposed mining operation are fires and explosion, chemical spills/leaks, and flooding. In the case of environmental emergencies, the remedial measures and actions as listed in the Emergency Response Plan should be followed, in addition the following relevant authorities should be contacted:

**Dept. of Water Affairs**

Mr Masala Mulaudzi (Acting Chief Director: Mpumalanga)  
 Private Bag X11259  
 NELSPRUIT  
 1200  
 Tel: (013) 759 7300

Fax: (013) 759 7525

Cell: 082 327 5886

Prorom Building

c/o Brown & Paul Kruger Streets

NELSPRUIT

1200

MulaudziM@dws.gov.za

### **Dept. of Mineral Resources & Energy**

Mpumalanga

Saveways Crescent Centre, Mandela Drive, Emalahleni, 1035

Private Bag X7279, EMALAHLENI, 1035(013) 653 0500 (013) 690 3288

Secretary

Ms L Maphopha

Lydia.Maphopha@dmr.gov.za

### **eMalahleni Fire Department**

WOLTEMADE STREET, EMALAHLENI (WITBANK), 1034

PO BOX 3, EMALAHLENI (WITBANK), 1035

Contact number (s)(013) 690-6360 Fax (013) 690-6380

#### **6.9.1.1 Fire and explosion control measures**

Hazardous waste and dangerous substances can, by the verify definition, be flammable and reactive. As such, special precautionary measures must be taken when handling these substances. On the other hand, veld fires and fires resulting from other sources must be handled with extreme caution. In the event of a fire:

- Fire extinguishers must be placed around the mine at accessible locations and needs to be frequently inspected and maintained in working condition.
- An alarm must be activated to alert all employees and contractors.
- Identify the type of fire and the appropriate extinguishing material. E.g., water for a grass fire and mono ammonium phosphate-based fire extinguisher for chemical and electrical fires
- In the event of a small fire, the fire extinguishers placed around the mine should be used to contain and extinguish the fire.
- In the event of a large fire, the fire department will be notified.
- All staff will receive training in response to a fire emergency on site, including evacuation procedures.
- A Fire Association should be set up with the mine and surrounding landowners (especially

other mining permits and major collieries in close proximity) to facilitate communication during fire events and assist in fighting fires, where necessary. If such an association exists, the mine will join it.

- If possible, surrounding drains, such as storm water drains must be covered and/or protected to prevent any contaminated water from entering the drains.
- In case of a chemical or petroleum fire, run-off from the area must be contained as far as possible using the most appropriate measures, e.g. spill absorbent cushions, sand or a physical barrier.
- Contaminated run-off must be diverted into an oil sump, or cleaned up.

Control measures include:

- Minimizing the storage of flammable liquids on site (e.g. fuel, flammable wastes)
- Using a nitrogen atmosphere for organic waste liquid with a low flashpoint stored in tanks
- Not allowing smoking anywhere on site
- Providing an emergency tipping area for waste loads identified to be on fire or otherwise deemed an immediate risk
- Preparing and annually reviewing a fire risk assessment
- Ensuring all staff are appropriately trained for fire and explosion hazards

Other than explosion incidents related to mining, explosions can occur in the workshop areas when working with gas cylinders and chemicals. These could result in large numbers of employees being injured and requiring medical assistance.

The procedure to be followed includes:

- Devising safe evacuation routes in the event of an uncontrolled explosion and all staff trained on relevant evacuation routes and assembly points.
- Providing first aid to injured parties, once safe to do so for first responders.
- Notifying the DMR of the incident.

#### **6.9.1.2 Chemical spills**

Hydrocarbons such as diesel, petrol, and oil used as fuel for mine machinery will be kept on site, meaning that spillage may occur. As this is a Coal, Pseudocoal, Torbanite and Aggregate mine there is also the possibility of a Coal, Pseudocoal, Torbanite and Aggregate spillage occurring. Any chemicals contained on site, such as those associated with explosives may also be detrimental to the environment if spills occur. In the event of a spillage, procedures must be put into place to ensure that there are minimal impacts to the surrounding environment.

The following procedure applies to a chemical spill:

- The incident must be reported to the SHE officer immediately.
- The SHE officer will assess the situation from the information provided, and set up an investigation team. Included in this team could be the General Mine Manager, SHE Officer, the employee who reported the incident and an individual responsible for the incident.
- When investigating the incident, priority must be given to safety.
- Once the situation has been assessed, the Environmental Coordinator must report back to the Mine Manager.
- The General Mine Manager and the investigation team must make a decision on what measures can be taken to limit the damage caused by the incident, and if possible, any remediation measures that can be taken.
- In the event of a small spillage, the soil must be treated in situ, using Hazmat clean up kits and bioremediation.
- Every precaution must be taken to prevent the spill from entering the surface water environment.
- In the event of a large spillage, adequate emergency equipment for spill containment or collection, such as additional supplies of booms and absorbent materials, will be made available and if required, a specialised clean-up crew will be called in to decontaminate the area. The soil must be removed and treated at a special soil rehabilitation facility.
- Reasonable measures must be taken to stop the spread of spills and secure the area to limit access.

### **6.9.1.3 Flooding**

There is always potential for flooding during the rainy season. This could result in a large volume of water accumulating in a water containment facility, which could cause major damage to equipment and endanger the lives of employees on site. Procedures must be put in place to ensure a quick response to flood events and minimal damage.

The procedure for flooding is as follows:

- During operations, DWS's flood warning system must be reviewed annually.
- The use of emergency pumps must occur if the water floods the proposed mine.
- Mine management must be made aware of any such event so they can take appropriate action to ensure minimal production losses.
- The Pollution Control Dam should have a 0.8m freeboard and an overflow or outlet to ensure that no damage occurs to the facilities.
- All contaminated water must be contained on site, as far as possible and discharges to

the environment must only occur if absolutely necessary in an extreme flood event.

## **7 Manner in which risk will be dealt with to avoid pollution or environmental degradation**

### **7.1 Training (educational needs)**

The Safety, Health and Environment (SHE) Officer must ensure that:

- New employees attend environmental awareness programmes through inductions
- Mine management conducts bi-annual workshops
- Documented training and competency
- Training records be maintained
- Training includes proper management of waste streams, labelling, containers and emergency procedures outlined
- Hazardous waste handlers and their supervisors/managers must complete training or on-the-job instruction relevant to their duties to include hazardous waste management procedures and contingency plan implementation
- Training of all personnel must be completed before duties are assigned and training in terms of handling of hazardous waste must be repeated annually and as and when required

### **7.2 Outsourced specialist skills**

A training department will be established on site during operations. All inductions and workshops will be hosted by this department. This department, in conjunction with the SHE Officer, is responsible for ensuring job-specific training for personnel performing tasks, which can cause significant environmental (e.g. receipt of bulk hazardous chemicals/fuel, hazardous materials handling, responding to emergency situations etc.). The General Mine Manager (GM) with the assistance of the SHE Officer must identify relevant personnel and training courses. Short courses such as First aid training, Level 1 and 2; Fire Fighting Level; safety representative training; etc. should be mandatory and sourced from the training providers,

### **7.3 Review and updating of training manual and course layout**

Before implementing the emergency and response plans and other environmental standard operating procedure, the SHE Coordinator and GM/Supervisors will designate and train a sufficient number of persons to assist in the safe and orderly emergency evacuation of employees.

All training manual and courses must be reviewed with all employees at the following times:

- Initially when the plan is developed,

- Whenever the employee's responsibilities or designated action under the plan change, and whenever the plan or mining processes has changed.
- At least annually employee meetings are to be held to train employees of the contents of the EP&RP and revise the plan as appropriate.
- Drills will be conducted, and full participation encouraged.
- All training must be documented in writing and copies sent to GM.

Effectiveness of the environmental management training will be done by management through task observations and during internal and external audits. All training material for presentation to personnel and contractors will be reviewed annually to ensure consistency with organisational requirements and best practice guidelines. In addition to this, annual monitoring reports, audit results and all incident reports will be reviewed; any shortcomings and non-compliance will be highlighted, and management measures incorporated or improved upon within the training material.

#### **7.4 Records**

The mine will keep records such as waste, water, electricity usage etc. Record of incoming and outgoing waste must be kept and these must include:

- Types and categories of incoming and outgoing waste
- Quantities of each waste type and category
- Transporter details
- Safe disposal certificate must always be returned and filed at waste disposal site
- Training records for all employees working on the hazardous waste facility
- All records must be computerised or legible paper trails and cross-referenced, waste tracking easily accessed
- Records must be kept in a database on site for 3 years or more

Records from the implementation of this EAP will be kept and controlled in accordance with the SHE Management System Control of Records Procedure of the mine, which is required to be implemented so as to provide evidence of conformity and effective operation of the relevant requirements of the SHE management system.

#### **7.5 Environmental awareness notice boards**

The following basic environmental education material will be posted on a monthly basis on accessible notice boards on mine premises, one topic will be selected each month:

## WHAT IS THE ENVIRONMENT?

- Soil
- Water
- Plants
- People
- Animals
- Air we breathe
- Buildings, cars and houses



## WHY MUST WE LOOK AFTER THE ENVIRONMENT?

- It affects us all as well as future generations
- We have a right to a healthy environment
- A contract has been signed
- Disciplinary action (e.g. construction could stop or fines issued)

### ANIMALS

- Do not injure or kill any animals on the site
- Ask your supervisor or Contract's Manager to remove animals found on site



### TREES AND FLOWERS

- Do not damage or cut down any trees or plants without permission
- Do not pick flowers



### SMOKING AND FIRE

- Put cigarette butts in a rubbish bin
- Do not smoke near gas, paints or petrol
- Do not light any fires without permission
- Know the positions of fire fighting equipment
- Report all fires
- Do not burn rubbish or vegetation without permission



### PETROL, OIL AND DIESEL

- Work with petrol, oil & diesel in marked areas
- Report any petrol, oil & diesel leaks or spills to your supervisor
- Use a drip tray under vehicles & machinery
- Empty drip trays after rain & throw away where instructed



### DUST

- Try to avoid producing dust -
- Use water to make ground & soil wet



### NOISE

- Do not make loud noises around the site, especially near schools and homes
- Report or repair noisy vehicles



### TRUCKS AND DRIVING

- Always keep to the speed limit
- Drivers - check & report leaks and vehicles that belch smoke
- Ensure loads are secure & do not spill



### RUBBISH

- Do not litter - put all rubbish (especially cement bags) into the bins provided
- Report full bins to your supervisor
- The responsible person should empty bins regularly



### EATING

- Only eat in demarcated eating areas
- Never eat near a river or stream
- Put packaging & leftover food into rubbish bins



### TOILETS

- Use the toilets provided
- Report full or leaking toilets



## HOW DO WE LOOK AFTER THE ENVIRONMENT?

- Report problems to your supervisor/ foreman
- Team work
- Follow the rules in the EMP



## WORKING AREAS

Workers & equipment must stay inside the site boundaries at all times



## PROBLEMS - WHAT TO DO!

- Report any breaks, floods, fires, leaks and injuries to your supervisor
- Ask questions!



## FINES AND PENALTIES

- Spot fines of between K\$1000 and K\$25000
- Your company may be fined
- Removal from site
- Construction may be stopped



The operations manager must ensure that they understand the EMPr document, its requirements and commitments before any mining takes place. An Environmental Control Officer must ensure compliance of mining activities to the management programmes described in the EMPr. The following list represents the basic steps towards environmental awareness, which all participants in this project must consider whilst carrying out their tasks.

### 7.5.1 Site management

- Stay within site boundaries – do not enter adjacent properties
- Keep tools and material properly stored
- Smoke only in designated areas
- Use toilets provided – report full or leaking toilets

### 7.5.2 Water management and erosion

- Check that rainwater flows around work areas and is not contaminated
- Report any erosion
- Check that dirty water is kept from clean water
- Do not swim in or drink from streams

### 7.5.3 Waste management

- Take care of your own waste
- Keep waste separate into labelled containers – report full bins
- Place waste in containers and always close lid
- Don't burn waste
- Pick-up any litter laying around



#### **7.5.4 Hazardous waste management (petrol, oil, diesel, grease)**

- Never mix general waste with hazardous waste
- Use only sealed, non-leaking containers
- Keep all containers closed and store only in approved areas
- Always put drip trays under vehicles and machinery
- Empty drip trays after rain
- Stop leaks and spills, if safe
- Keep spilled liquids moving away
- Immediately report the spill to the site manager/supervision
- Locate spill kit/supplies and use to clean-up, if safe
- Place spill clean-up wastes in proper containers
- Label containers and move to approved storage area

#### **7.5.5 Discoveries**

- Stop work immediately
- Notify site manager/supervisor
- Includes archaeological finds, cultural artefacts, contaminated water, pipes, containers, tanks and drums, any buried structures

#### **7.5.6 Air quality**

- Wear protection when working in very dusty areas
- Implement dust control measures:
  - Sweep paved roads
  - Water all roads and work areas
  - Minimise handling of material
  - Obey speed limit and cover trucks

#### **7.5.7 Driving and noise**

- Use only approved access roads
- Respect speed limits
- Only use turn-around areas – no crisscrossing through undisturbed areas
- Avoid unnecessary loud noises

- Report or repair noisy vehicles

#### **7.5.8 Vegetation and animal life**

- Do not remove any plants or trees without approval of the site manager
- Do not collect fire wood
- Do not catch, kill, harm, sell or play with any animal, reptile, bird or amphibian on site
- Report any animal trapped in the work area
- Do not set snares or raid nests for eggs or young

#### **7.5.9 Fire management**

- Do not light any fires on site, unless contained in a drum at demarcated area
- Put cigarette butts in a rubbish bin
- Do not smoke near gas, paints or petrol
- Know the position of firefighting equipment
- Report all fires
- Don't burn waste or vegetation

#### **7.6 Specific information required by the Competent Authority**

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

The applicant undertakes to annually review and update the financial provision calculation, upon which it will be submitted to DMRE for review and approved as sufficient to cover the environmental liability at the time and for closure of the mine at that time.

### **8 Conclusion**

The proposed development should have significant negative effects on the natural or social environment. The nature and types of negative impacts do not outweigh the potential benefits of this project, as long as the construction phase's short-term localised impacts are adequately mitigated. An EMPr has been compiled and attached to this report in this regard. External monthly monitoring by an independent Environmental Control Officer (ECO) is recommended to ensure that the EMPr and EA conditions are correctly implemented, thereby ensuring the protection of the surrounding environment during construction.

## **7.1 EAP's Opinion regarding the Project**

The project area falls largely on the Heavily modified area as per the site assessment and Terrestrial biodiversity map produced by a GIS specialist and the proposed project must be granted an Environmental Authorisation with stipulated conditions or requirement. It is the EAP opinion that the proposed project will have negative consequences on the environment. The EAPs believes that the project should be considered for authorization, and that a flora survey is not necessary for decision-making.

## 9 Undertaking

The EAP herewith confirms

- the correctness of the information provided in the reports
- the inclusion of comments and inputs from stakeholders and I&APs
- the inclusion of inputs and recommendations from the specialist reports where relevant
- that the information provided by the EAP to I&APs and any response of the EAP to comments or inputs made by I&APs are correctly reflected herein

---

**Signature of the Environmental Assessment Practitioner**

Singo Consulting (Pty) Limited

---

**Name of company**

---

**Date**

**-END-**

## Appendix 1:DMRE Letter



### mineral resources & energy

Department  
Minerals Resources and Energy  
REPUBLIC OF SOUTH AFRICA

Private Bag X7279, Emalahleni, 1035, Tel: 013 653 0500, Fax 013 690 3288, Saveways Centre, First Floor, Mandela Drive, Emalahleni, 1035, Directorate: Mineral Regulation: Mpumalanga Region, Enquiries: Lucky Mugagadeli Email Address: lucky.mugagadeli@dmre.gov.za Sub-directorate: Mineral Laws, Ref: MP 30/5/1/1/3/13571MP.

#### **BY: Email/Fax**

The Director/s  
**MDZ Fleet Solutins (Pty) Ltd**  
P.O BOX 781327  
**JOHANNESBURG**  
2146

**E-mail Address: aluwani@mdzholdings.co.za**

Gentlemen/Ladies

**ACCEPTANCE OF AN APPLICATION FOR MINING PERMIT IN TERMS OF SECTION 27 OF THE MINERAL AND PETROLEUM DEVELOPMENT ACT, 2002 (ACT 28 OF 2002) [HEREIN AFTER REFERRED TO AS THE ACT] AS AMENDED BY SECTION 23 OF THE MINERALS AND PETROLEUM RESOURCES DEVELOPMENT AMENDMENT ACT, 2008 (ACT 49 OF 2008) [HEREINAFTER REFERRED TO AS THE AMENDMENT ACT].**

1. Please be informed that your application for a mining permit to mine **Coal, Psudocoal, Torbanite and Aggregate on Portion 02 of the farm Blesbokfontein 31 IS; Magisterial District of Middelburg**, is hereby accepted in terms of Section 27 and 9(1) (b) of the Act.
2. Please be advised that there are prior applications accepted for the same mineral on your area of interest. Further, be advised that should the said application be granted and issued, yours will automatically fall away and subsequently be refused.

13571MP

3. **Furthermore note that acceptance of your application does not grant you the right to commence with mining operations. Your application will be evaluated/ processed and a recommendation will be made on either to issue or refuse your application. Any person operating without a mining permit will be in contravention of Section 5(4) of the MPRDA and would be guilty of an offence in terms of the relevant Act.**
  
4. **Should you wish to continue with the application irrespective of the risk associated with Section 9(1)(b) of the Act.** Please take notice that in terms of Section 27(5) of the Act as amended by Section 23(e)(a) and Section 23(e)(b) of the Amendment Act, you are required to:-
  - 4.1. To consult in the prescribed manner with the landowner, lawful occupier and any interested and affected parties and the Land Restitution Commission including and to include the result of such consultation in the relevant environmental reports to be submitted and uploaded on the SAMRAD system.
  
5. **Please take note that failure to adhere to the timeframe stipulated above and to submit any documentation required in terms of this notice will result into non-compliance with the provision of the Act and the Amendment Act and will result in your application being processed for refusal.**

Yours Faithfully:

  
REGIONAL MANAGER

MPUMALANGA REGION

DATE: 31/05/2023

13571MP

## Appendix 2: Proof of Newspaper Advert

# TUT proud of communication skills lecturer

It is no tale or myth, TUT is overflowing with brainy students. Recently Dr Vukosi Maluleke, a communication skills lecturer at the eMalahleni Campus obtained her PhD. She started her journey with TUT in 2020 when she was employed by the TUT Department of Applied Languages, based in Soshanguve. "I lectured Xitsonga at levels two and three students at the school of education. In 2021, I lectured level one applied Tsonga to B-Tech students and practical Tsonga (communication)," she said. As a folklore enthusiast, she wanted to learn more about the teacher and learner perspectives on engaging with English folklore in the English First Additional Language classroom. That became the topic for her thesis.



Dr Vukosi Maluleke.

“She started her journey with TUT in 2020 when she was employed by the TUT”

"My PhD thesis was about teacher and learner perspectives on teaching folklore in grade nine English first additional language classroom." The aim was to investigate the rationale behind the perspectives on folklore in the English classroom to contribute to second language acquisition. "I also wanted to know if folklore could have a greater impact in schools. I chose grade nines because their ages are in the middle of adolescence. My wish for them is that when they reach adulthood, they will be prepared with life skills learned from folklore." She said she chose English folklore over African folklore because she wanted them to practice their English during story time. "I investigated further into this topic to ensure the teacher and learner perspectives on engaging with English folklore." Vukosi started lecturing at the eMalahleni campus in 2022.



Pat May en Susan Largeveldt.



Ronel Mostert en Vanessa Grobler.



Wanda Bilgnaut, Reina Steyl en Vanessa Grobler.

# Nocturne se eie gemmerboere

Die Nocturne-tak het nog 'n suksesvolle en prettige vergadering gehou. Op Donderdag, 29 Junie het die lede 'n karnaval-aand gehou. Daar was verskillende speletjies en gelukkige trekkings met hope en hope prysse. Die dames is ook bederf met heerlike kerrie-errys en karamel-pannekoek vir nagereg. Die tak het ook hul gemmer-kampioen gekroon. In November 2022 het Katy Symms die tak uitgedaag om gemmer te plant. Gemmer was ook die tak se produk van die jaar en 14 lede van die tak het weggespring en

hul eie gemmer geplant wat ses tot sewe maande groot voordat dit geoes kan word. In die afgelepe tyd het die lede gereeld foto's geneem om sodoende die groeiproses te deel. Tyd vir oes het aangebreuk einde Junie en Vikki van der Merwe is as die gemmer-kampioen aangewys met haar 678 gram gemmer wat sy geoes het. Vikki het ook met 'n prys weggestap. Die gemmer-prinses was Leigh Ann Pansgröw wat 530 gram gemmer geoes het. Voorsitter Wilma van Zyl het met trots gesê sy is bevoorreg om deel te wees van 'n wenspan soos Nocturne-tak.

NOTICE OF PUBLIC PARTICIPATION FOR MINING PERMIT AND ENVIRONMENTAL AUTHORISATION APPLICATION	
ISIZULU	ENGLISH
<p>Isolelo Semume Yezinyani: I-MDZ Fleet Solutions (Pty) Ltd ifike isolelo Semume Yezinyani ku-DMRE Ref: MP 30/5/1/13/13571 MP ngobhese yokamba asolile. #Phoswazi, iMantsha kanye ne-Aggregate ngospeyi 2 yefilidi I-Bloekfontein 31 IS, esandawonyanishi yase-eMalahleni eMantshanzweni saseMpumalanga.</p>	<p>Application for a Mining Permit: MDZ Fleet Solutions (Pty) Ltd has lodged an application for a Mining Permit with DMRE Ref:MP 30/5/1/13/13571 MP for the purpose of extracting Gold, Pyroclastical, Tantalum and Aggregate on portion 2 of the Farm Bloekfontein 31 IS, situated in the Magisterial District of eMalahleni in the Mpumalanga Province.</p>
ISIMEMO SOKUPHAWULA NOKUYEZA IMBONDO MVELANA NALE APPLICATION	INVITATION TO COMMENT
<p>Isiziso sikhazwe ngokubhekisa Nkwenkweni Kwemibhwa kanye Nanzalutha (MPDRA) iMantsha kanye ne-Aggregate ngospeyi 2 yefilidi ye-EIA ka-2014, esicelwe ngaphansi kwesiziso Sibusiso No. 982 kuGazethi No. ukhethi I-MDZ Fleet Solutions (Pty) Ltd ifike isolelo Semume Yezinyani yale mineral ezinye ngelitha e-DMRE Ref: MP 30/5/1/13/13571 MP.</p>	<p>Notice is hereby given in terms of the Mineral and Petroleum Resources Development Act (MPDRA) Act 28 of 2002 and DA regulations 2014, published under Government Notice No. 982 in Gazette No. 3822 of 8 December 2014, amended on 7 April 2017 and by GN 517 on 11 June 2021, that MDZ Fleet Solutions (Pty) Ltd has applied for a Mining Permit for the above-mentioned mineral with DMRE Ref: MP 30/5/1/13/13571 MP.</p>
<p>Ukubhalisa Njengabantu Abanentshikalo Nabathintekayo: Ngengonyane yeqobo ye-EIA, ikhululazi inqubo yokubamba iqhaza kumbhalisi kule phoyekthi elingezwaya, Abanentshikalo Nabathintekayo (NABP) bananyenye ukuba balikhalise futhi balumeme ngomona nona yikhalisi utshintsho nona ukubhalizeka ukuba kufunyanwe uMDZ Takalani Rakuamba.</p>	<p>Registration as Interested &amp; Affected Party: As part of the EIA process, more especially the public participation process for this proposed project, Interested and Affected Parties (I&amp;AP) are invited to register and kindly submit any comments or concerns to reach Miss Takalani Rakuamba.</p>
<p>Ukubhalisa nganyanya futhi ukhethi ubayezwe futhi aphonwile ngelitha Dandakala Wotshilala Okuyisolelo (BAR) kanye nombhelo weMvelo Lokuphazwa Kwemvelo (EMP). Ukuba Ine-BAE &amp; EMP. Iizobhalizela ukhethi lubayezwe eMantshanzweni eMalahleni ezinye-30 ngomSombululo zingama-07 Agosti 2023 kanye kubhe ulwazi ngelitha zingama-06 kuSeptemba 2023 ngaphandle Kwamandla Ongqobokhethi. Lo mbhelo utshintsho eLynville Public Library (Vector Road, Lynville, Entabeni, 1034, South Africa) and Emantshani Local Municipality (Mandela Street eMalahleni 1034) futhi neqosha lwabheke, asakhothi e-electronic (inge-inteyili: iindimuni@se-dmre.co.za, i-google drive, i-photos, njl) azobhalizela uma ecelwa kwi-Singo Consulting (Pty) Ltd, kuzobhalelwa indlelaniso yobhalelwa ye-EAP Ntous Takalani Rakuamba ngosazi. Amazwana nge-08AR &amp; EMP kufanele abanyenye ngaphantsi komhla zi-06 kuSeptemba 2023.</p>	<p>The public is also invited to review and comment on the Draft Basic Assessment Report (BAR) and Environmental Management Programme report (EMP). The draft BAR &amp; EMP will be available for review for 30 days ending on Monday the 07th of August 2023 until Wednesday the 06th of September 2023 (Excluding Public Holidays). This report will be available at Lynville Public Library (Vector Road, Lynville, eMalahleni), 1034, South Africa and eMalahleni Local Municipality (Mandela Street, eMalahleni, 1034) and furthermore, electronic copies (via email; Dropbox link; Google drive; WhatsApp, etc.) will be made available upon request from Singo Consulting (Pty) Ltd, using the contact details of the EAP Miss Takalani Rakuamba below. Comments on the BAR &amp; EMP must be submitted no later than 06th September 2023.</p>
EAP DETAILS:	APPLICANT DETAILS:
<p><b>Singo Consulting (Pty) Ltd</b> Physical Address: Office 470, 5 Balakala Street, Tackett Park Ext 2, Witbank, 1040 Contact person: Miss Takalani Rakuamba Cell No.: +27 82 767 4011 Tel No.: +27 13 6920 041 Fax No.: +27 86 5144 108 Email: takalani@singoconsulting.co.za</p>	<p><b>MDZ HOLDINGS</b> Physical address: Unit 147, Fernridge Estate, 1944 Fourways Ext 34 Fourways, 2191 Contact person: Mr. Percy Aluwani Ramabulana Tel No.: +27 10 900 4996 Email: a.wanuwani@mdzholdings.co.za</p>

<p><b>BRITISH INTERNATIONAL DISTANCE COLLEGE</b> CAMBRIDGE International Examinations</p>	<p><b>DISTANCE EDUCATION THAT WORKS!</b></p> <ul style="list-style-type: none"> <li>✓ Checkpoint (11-14yrs)</li> <li>✓ IGCSE (O Levels) (14-16yrs)</li> <li>✓ AS Levels (16-20yrs+)</li> </ul>
<p>CONIACI: 130 Brynston Drive, Brynston 011 706 7775   info@bidc.co.za www.bidc.co.za</p>	<p><b>Best Joburg</b> WINNER</p>

## Appendix 3: BID

### BACKGROUND INFORMATION DOCUMENT

#### APPLICANT:



**Physical address:** Unit 147,  
Fernridge Estate, 1944  
Fourways Ext 34, Fourways, 2191  
**Contact person:** Mr. Percy Aluwani  
Ramabulana  
Tel.: +27 10 900 4996  
**Email:** [enos@mdzholdings.co.za](mailto:enos@mdzholdings.co.za)

DMRE Ref.: MP 30/5/1/1/3/13571 MP



**Singo Consulting (Pty) Ltd**

Office 870, 5 Balalaika Street,  
Tasbet Park Ext 2, Witbank, 1040  
EAP.: Miss Takalani Rakuambo  
Cell No.: +27 82 767 4011  
Tel No.: +27 13 6920 041  
Fax No.: +27 86 5144 103  
Email:  
[takalani@singoconsulting.co.za](mailto:takalani@singoconsulting.co.za)



#### INTRODUCTION AND THE PURPOSE OF THIS DOCUMENT

**Singo Consulting (Pty) Ltd** has been appointed as an independent Environmental Consultant by **MDZ Fleet Solutions (Pty) Ltd** to conduct Environmental Impact Assessment (EIA) through Basic Assessment, compile a Basic Assessment Report (BAR) and Environmental Management Programme report (EMPr) and undertake Public Participation Process (PPP). This is done for processes of acquiring Environmental Authorization for the proposed Mining Permit Application within **Portion 2** of the **Farm Blesbokfontein 31 IS**, situated in the Magisterial District of **Emalahleni in Mpumalanga Province with DMRE Ref: MP 30/5/1/1/3/13571 MP.**

The Purpose of this Background Information Document (BID) is to provide a perfunctory description of the project and outline EIA processes to be followed and contributions from Interested and Affected Parties (I&APs) on the issues related to the project in question, allowing comments and concerns to be raised. Results of the EIA through basic assessment, both negative and positive, will be submitted and made available to the relevant departments such as the Department of Mineral Resources and Energy, and if requested the Department of Forestry, Fisheries and Environment, Department of Water and Sanitation, Landowners, and other interested stakeholders.

This BID therefore requests and invites I&APs to comment on the environmental, physical, social, and economic impacts associated with the proposed mining activities. Be assured that your comments are of great value as they ensure that relevant issues are taken into consideration. Attached at the end of this document is a registration form, kindly complete it and send it back to **Miss Takalani Rakuambo** through given means of communication also attached there.

Notice is hereby given in terms of the Mineral and Petroleum Resources Development Act (MPRDA) (Act 28 of 2002) and EIA regulations 2014, published under Government Notice No. 982 in Gazette No. 3822 of 8 December 2014, amended on 7 April 2017, that **MDZ Fleet Solutions (Pty) Ltd** has an intention to mine Coal, Pseudocoal, Torbanite and Aggregate on the aforementioned portion.



## PROJECT DESCRIPTION

Mining Permit Application has been submitted for the extraction of **Coal, Pseudocoal, Torbanite and Aggregate** resource on the property mentioned above. The Mining Permit area, as seen in figure 1 and figure 2 is situated within Emalahleni approximately 61 km South West of Middelburg, approximately 40,8 km South West of Emalahleni and approximately 32 km South East of Ogies.

Mining activities will be undertaken over a period of two (2) years. This project will entail an open cast method of excavation. The mine design will be developed according to the dimension of the applied mineral deposit within the project area, but overall mining activities will be limited to an area of 5 Ha as per mining permit requirements. The topsoil will be stockpiled elsewhere on site preferably next to the farm boundary and will be used during rehabilitation period. Once a box cut has been made, the overburden and mineral resources where necessary will be loosened by blasting. The loosened material will then be loaded onto trucks by excavators. A haul road will be situated at the side of the open cast, forming a ramp up which trucks can drive, carrying ore and waste rock. Waste rock will be piled up at the surface, near the edge of the open cast (waste dump). The waste dump will be tiered and stepped, to minimize degradation. All the activities will be guided by the project's EMPr such that the project does not impact the environment negatively.

## REGULATORY FRAMEWORK

The EIA process through BAR & EMPR to be undertaken will be conducted in accordance with the National Environmental Management Act (Act 107 of 1998) and Environmental Impact Assessment regulations as amended (April 2017).

The activity is to extract the existence and occurrence of the applied mineral; therefore, this will be conducted in accordance with Mineral and Petroleum Resources Development Act, (Act 28 of 2002). Other regulatory guidelines to be followed include National Water Act, 1998 (Act 36 of 1998), National Air Quality Standards (GN 1210: 2009) and National Dust Control Regulations (GN 827: 2013).

These all will accurately be followed to ensure that identified impacts are assessed and mitigated according to their significance so that the protection of the receiving environment and populations is met.

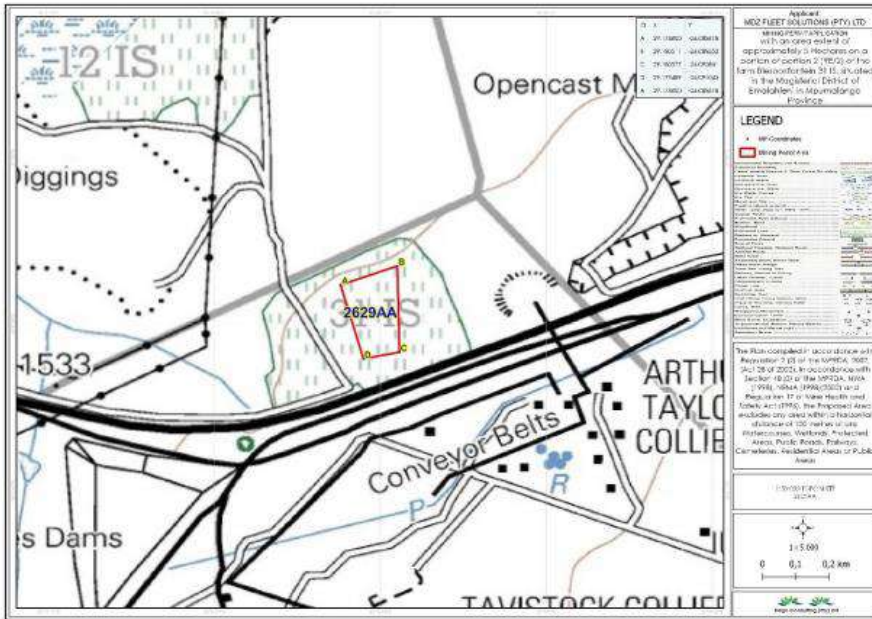


Figure 1: Regulation 2.2 map (A -26.08881, 29.178800)

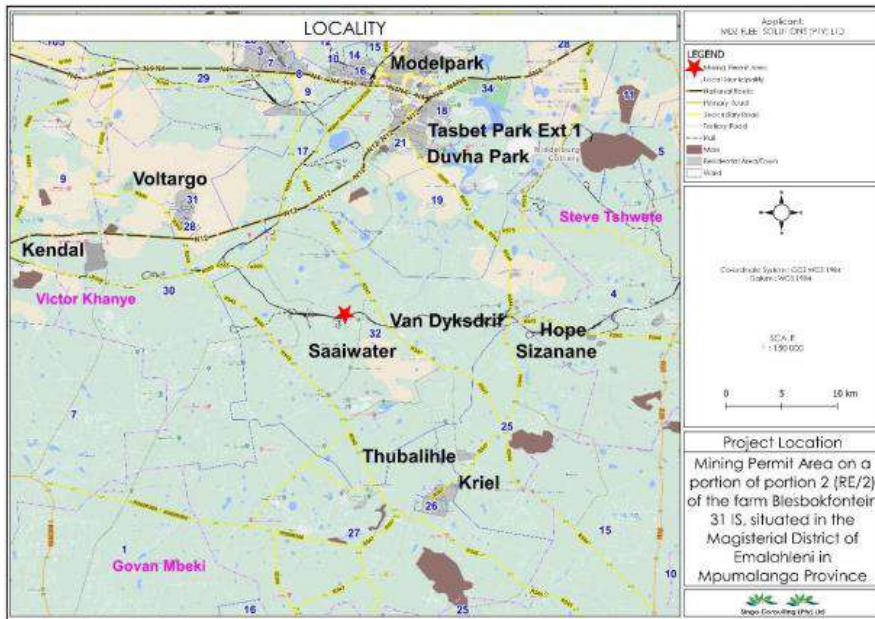


Figure 2: Locality Map

## BASIC AND ENVIRONMENTAL IMPACT ASSESSMENT & PUBLIC PARTICIPATION PROCESS

These are planning and decision-making tools used in identifying potential environmental, economic, and social consequences of a proposed activity prior the commencement of the activity.

These together with the public issues and concerns are to be identified sufficiently early so that they can be assessed and incorporated into the final reports when/if necessary.

These tools are regarded crucial because they are utilized in order to demonstrate to the relevant stakeholders about the potential impacts, which in turn leads to the mining application process being a success or declined.

Public Participation remains a cornerstone of the Environmental Impact Assessment process. It ensures provision of relevant and enough information with openness and transparency. Public Participation Process (PPP) presents to I&APs, an opportunity to understand what the project is about, and affords them an opportunity to make valuable contributions towards the EIA process.

I&AP can be any person, group of persons or organization interested in or affected by the proposed activity, and any organ of state that may have jurisdiction over any aspect of the activity.

Kindly keep the following dates:

- Announcement of the project: **Friday the 07th of July 2023**
- Stakeholder engagement and consultation: **Ongoing Process**
- Review period of the draft BAR & EMPr: **Monday the 07th of August 2023 until Wednesday the 06th of September 2023**

Hard copies of the BAR & EMPr will be available at **Emalahleni Local Municipality (Mandela Street eMalahleni 1034) and Ogies Library (Main Street, Ogies)** and soft copies (via emails) upon request from the EAP's contacts below.

**All comments, concerns and issues raised need to be submitted to the EAP. by no later than the 06th of September 2023 so that they can be addressed and incorporated in the final BAR and EMPr.**



**Singo Consulting (Pty) Ltd**

**Address:** Office 870, 5 Balalaika Street,  
Tasbet Park Ext 2, Witbank  
1040  
**Tel:** +27 13 692 0041  
**Cell:** +27 82 767 4011  
**Email:** [takalani@singoconsulting.co.za/](mailto:takalani@singoconsulting.co.za)  
[admin@singoconsulting.co.za](mailto:admin@singoconsulting.co.za)

**REGISTRATION & COMMENT SHEET- (MINING PERMIT DMRE REF.: MP 30/5/1/1/3/13571 MP)**

Title	Name			Surname
Company				
Designation				
Address				
Tel No.			Fax No.	
E-mail			Cell No.	
I would like to receive my notifications be (mark with "X"):			Post <input type="checkbox"/>	E-mail: <input type="checkbox"/>
			Fax: <input type="checkbox"/>	
<b>Please indicate why you would have an interest in the above-mentioned project.</b>				
<b>Please provide your comments and questions here:</b>				
Please feel free to attach a separate document				
<b>Please add any person you think may be interested and affected parties:</b>				
Full name			Company	
Address				
E-mail			Contact No.	

## Appendix 4: Consultation with Stakeholders

**From:** Takalani, Rakuambo <takalani@singoconsulting.co.za>  
**Sent:** Monday, July 17, 2023 2:29 PM

**Subject:** LANDOWNER INVITATION TO COMMENT ON MINING PERMIT APPLICATION ON PORTION 2 OF THE FARM BLESBOKFONTEIN 31 IS , DMRE REF: MP 30/5/1/1/3/13571 MP.

Good day,

Receive warm greetings from Singo Consulting (Pty) Ltd.

**MDZ Fleet Solutions (Pty) Ltd** has lodged a Mining Permit Application for **Coal, Pseudocoal, Torbanite and Aggregate** on Portion 2 of the Farm **Blesbokfontein 31 IS** situated in the Magisterial District of **Emalaheni**, Mpumalanga Province with DMRE Ref: **MP 30/5/1/1/3/13571 MP**.

A windeed search was conducted to find out the Surface Landowner of **Portion 2** of the Farm **Blesbokfontein 31 IS**, and the outcomes shows that **Glencore Operations (Pty) Ltd** own mentioned property as seen on attached windeed search result, which the Applicant has the interested with.

Please find the attached **Landowner Notification Letter, Windeed Search Result, Regulation 2(2) map, KML** and **Background Information Document (BID)** for brief description of the proposed project and timelines. Kindly forward your comments using contact details below.

The image shows a business card for Singo Consulting (Pty) Ltd. The card is dark blue with green accents. At the top, it says "Singo Consulting (Pty) Ltd" with a logo of two green leaves. Below this, it says "Operation Hi Teka Hinkwaswo". The main contact information is for Takalani, Rakuambo, Environmental Technician, B.Sc. (Hons) Mining & Environmental Geology. Contact details include a phone number +27 82 767 4011 and an email address takalani@singoconsulting.co.za. At the bottom, there are social media icons for LinkedIn, Facebook, WhatsApp, and Instagram, along with the company's office address: Office 870, 5 Balalaika Street, Tasbet Park Ext 2, Witbank, 1040. The card also features a globe icon and a hand holding a globe icon.

**Subject:** RE: LANDOWNER INVITATION TO COMMENT ON MINING PERMIT APPLICATION ON PORTION 2 OF THE FARM BLESBOKFONTEIN 31 IS , DMRE REF: MP 30/5/1/1/3/13571 MP.

Dear Takalani

We acknowledge receipt of your e-mail correspondence with attachments. We have taken instructions from our client, Glencore Operations SA (Pty) Ltd – Coal Division, and will revert with our client's response in due course.

Our client's rights remain reserved.

Yours faithfully

-----

## Takalani Rakuambo

**From:** Takalani Rakuambo <takalani@singoconsulting.co.za>  
**Sent:** Monday, 24 July 2023 15:27

**Subject:** RE: LANDOWNER INVITATION TO COMMENT ON MINING PERMIT APPLICATION ON PORTION 2 OF THE FARM BLESBOKFONTEIN 31 IS , DMRE REF: MP 30/5/1/1/3/13571 MP.

Tracking:	Recipient	Read
	'Melissa Grobbelaar'	
	'Dr Singo, Kenneth'	
	'Rudzani '	
	'Masindi, Nefale'	
	'James Cross'	
	'Dimakatso.Ledwaba@glencore.co.za'	
	'Bernice Mong'	
	Dr Singo, Kenneth	Read: 2023/07/24 15:29
	Masindi, Nefale	Read: 2023/07/24 15:45
	Rudzani, Radebe (RRS)	Read: 2023/07/24 15:46

Good Day,

I hope this email may finds you well.

Please note that you have been registered as interested and affected party. Thank you and looking forward to hearing from you.



Operation Hi Teka Hinkwaswo

**Takalani, Rakuambo**  
Environmental Technician  
B.Sc. (Hons) Mining & Environmental Geology

+27 82 767 4011  
takalani@singoconsulting.co.za

+27 13 692 0041 | +27 86 514 4103 | www.singoconsulting.co.za

**Singo Consulting (Pty) Ltd**  
Protect & manage the best remaining environment

Office 870, 5 Balalaika Street,  
Tasbet Park Ext 2, Witbank,1040

LinkedIn | Facebook | WhatsApp | Instagram

## Takalani, Rakuambo

**From:** Takalani, Rakuambo <takalani@singoconsulting.co.za>  
**Sent:** Saturday, 08 July 2023 06:50

**Cc:** 'kenneth@singoconsulting.co.za'; 'rudzani@singoconsulting.co.za'; 'Masindi, Nefale'  
**Subject:** INVITATION TO REGISTER & COMMENT FOR MDZ FLEET SOLUTIONS (PTY) LTD, MINING PERMIT APPLICATION ON PTN 2 OF THE FARM BLESBOKFONTEIN 31 IS WITH DMRE REF: MP 30/5/1/1/3/13571 MP.

**Attachments:** REG 2.2.pdf; Mining Permit Area.kml; BID.pdf

**Tracking:**

Recipient	Read
'Elly Thulari'	
'kenneth@singoconsulting.co.za'	
'rudzani@singoconsulting.co.za'	
'Masindi, Nefale'	
Dr Singo, Kenneth	Read: 2023/07/08 12:46
Masindi, Nefale	Read: 2023/07/10 00:54
Rudzani	Read: 2023/07/10 10:47

Good day,

Receive warm greetings from Singo Consulting (Pty) Ltd.

**Singo Consulting (Pty) Ltd** has been appointed as an independent Environmental Assessment Practitioner by **MDZ Fleet Solutions (Pty) Ltd** to manage the environmental authorisation process by conducting an Environmental Impact Assessment, Public Participation Process (PPP), and to compile a Basic Assessment Report & Environmental Management Programme report (BAR & EMPr) for the **Mining Permit Application** for the purpose of extracting **Coal, Pseudocoal, Torbanite and Aggregate** on **portion 2** of the Farm **Blesbokfontein 31 IS**, situated under Magisterial District of **Emalaheni** in **Mpumalanga** Province with **DMRE Ref: MP 30/5/1/1/3/13571 MP**.

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Should you need any clarity in relation to this project, please do not hesitate to contact me using the contact details provided below.



Operation Hi Teka Hinkwaswo

**Takalani, Rakuambo**  
Environmental Technician  
B.Sc. (Hons) Mining & Environmental Geology

+27 82 767 4011  
takalani@singoconsulting.co.za

+27 13 692 0041 | +27 86 514 4103 | www.singoconsulting.co.za

**Singo Consulting (Pty) Ltd**  
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Office 870, 5 Balalaika Street,  
Tasbet Park Ext 2, Witbank, 1040

LinkedIn | Facebook | WhatsApp | Instagram



**Sent:** Monday, July 17, 2023 8:19 AM

**To:** Takalani Rakuambo <takalani@singoconsulting.co.za>

**Cc:** admin@singoconsulting.co.za

**Subject:** Registration Form.

Good day

Kindly receive the attached form.

Regards

Directorate: Land and Soil Management

Department of Agriculture, Land Reform and Rural Development



Address: Office 870, 5 Balalaka Street,  
 Tasbet Park Ext 2, Witbank  
 1040  
 Tel: +27 13 692 0041  
 Cell: +27 82 767 4011  
 Email: [takalani@singoconsulting.co.za/](mailto:takalani@singoconsulting.co.za)  
[admin@singoconsulting.co.za](mailto:admin@singoconsulting.co.za)

**REGISTRATION & COMMENT SHEET- (MINING PERMIT DMRE REF.: MP\_30/5/1/1/3/13571.MP)**

Title	Name	Surname
Company	Agriculture, Land Reform and Rural Development	
Designation	Assistant Resource Auditor	
Address		
Tel No.		Fax No.
E-mail		Cell No.
I would like to receive my notifications be (mark with "X"):		Post <input type="checkbox"/> E-mail: <input checked="" type="checkbox"/>
		Fax: <input type="checkbox"/>
<b>Please indicate why you would have an interest in the above-mentioned project.</b>		
<b>Please provide your comments and questions here:</b>		
The departments do not have comments at this stage		
Kindly register the Department of Agriculture, Land Reform and Rural Development as an interested and affected party.		
Please feel free to attach a separate document		
<b>Please add any person you think may be interested and affected parties:</b>		
Full name		Company
Address		
E-mail		Contact No.

## Takalani Rakuambo

---

**From:** Takalani, Rakuambo <takalani@singoconsulting.co.za>  
**Sent:** Monday, 17 July 2023 10:35  
**To:**  
**Cc:** 'Dr Singo, Kenneth'; 'Rudzani '; 'Masindi, Nefale'  
**Subject:** RE: Registration Form.

Good Day

Receive warm greetings from Singo Consulting (Pty) Ltd.

Kindly note that you have been registered as interested and affected party. The BAR and EMPr will be shared during the review period.

The image shows a business card for Singo Consulting (Pty) Ltd. The card is primarily blue and green. At the top left, it says "Operation Hi Teka Hinkwaswo". The main name is "Takalani, Rakuambo" with the title "Environmental Technician" and "B.Sc. (Hons) Mining & Environmental Geology". Contact information includes a phone number "+27 82 767 4011" and an email address "takalani@singoconsulting.co.za". The bottom left corner lists three phone numbers: "+27 13 692 0041", "+27 86 514 4103", and the website "www.singoconsulting.co.za". The bottom right corner shows social media icons for LinkedIn, Facebook, WhatsApp, and Instagram, along with the office address: "Office 870, 5 Balalaika Street, Tasbet Park Ext 2, Witbank, 1040". The Singo Consulting logo is at the top center and right. The card also features a globe icon and a hand holding a globe icon.

## Takalani, Rakuambo

**From:** Takalani, Rakuambo <takalani@singoconsulting.co.za>  
**Sent:** Saturday, 08 July 2023 06:53  
**To:**  
**Cc:** 'kenneth@singoconsulting.co.za'; 'rudzani@singoconsulting.co.za'; 'Masindi, Nefale'  
**Subject:** INVITATION TO REGISTER & COMMENT FOR MDZ FLEET SOLUTIONS (PTY) LTD, MINING PERMIT APPLICATION ON PTN 2 OF THE FARM BLESBOKFONTEIN 31 IS WITH DMRE REF: MP 30/5/1/1/3/13571 MP.  
**Attachments:** REG 2.2.pdf; Mining Permit Area.kml; BID.pdf

Tracking:	Recipient	Read
	'Yuza Chabalala Transnet Freight Rail PTA'	
	'kenneth@singoconsulting.co.za'	
	'rudzani@singoconsulting.co.za'	
	'Masindi, Nefale'	
	Dr Singo, Kenneth	Read: 2023/07/08 12:46
	Masindi, Nefale	Read: 2023/07/10 00:54
	Rudzani	Read: 2023/07/10 10:47

Good day,

Receive warm greetings from Singo Consulting (Pty) Ltd.

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Should you need any clarity in relation to this project, please do not hesitate to contact me using the contact details provided below.



Operation Hi Teka Hinkwaswo

**Takalani, Rakuambo**  
Environmental Technician  
B.Sc. (Hons) Mining & Environmental Geology

+27 82 767 4011  
takalani@singoconsulting.co.za

+27 13 692 0041 | +27 86 514 4103 | www.singoconsulting.co.za

**Singo Consulting (Pty) Ltd**  
Protect & manage the best remaining environment

REGISTRATION NO. 2015/0000000-07 (Pty) Ltd  
MEMBERSHIP NO. 2015/0000000-07 (Pty) Ltd  
REGISTRATION NO. 2015/0000000-07 (Pty) Ltd  
MEMBERSHIP NO. 2015/0000000-07 (Pty) Ltd

Linked in f w i

Office 870, 5 Balalaika Street,  
Tasbet Park Ext 2, Witbank, 1040

## Takalani, Rakuambo

**From:** Takalani, Rakuambo <takalani@singoconsulting.co.za>  
**Sent:** Saturdav, 08 Jul 2023 06:57  
**To:**  
**Cc:** 'kenneth@singoconsulting.co.za'; 'rudzani@singoconsulting.co.za'; 'Masindi, Nefale'  
**Subject:** INVITATION TO REGISTER & COMMENT FOR MDZ FLEET SOLUTIONS (PTY) LTD, MINING PERMIT APPLICATION ON PTN 2 OF THE FARM BLESBOKFONTEIN 31 IS WITH DMRE REF: MP 30/5/1/1/3/13571 MP.  
**Attachments:** REG 2.2.pdf; Mining Permit Area.kml; BID.pdf

Tracking:	Recipient	Read
	'BCAdmin@environment.gov.za'	
	'kenneth@singoconsulting.co.za'	
	'rudzani@singoconsulting.co.za'	
	'Masindi, Nefale'	
	Dr Singo, Kenneth	Read: 2023/07/08 12:46
	Masindi, Nefale	Read: 2023/07/10 00:54
	Rudzani	Read: 2023/07/10 09:17

Good day,

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**Singo Consulting (Pty) Ltd**  
Protect & manage the best remaining environment!

Office 870, 5 Balalaka Street,  
Tasbet Park Ext 2, Witbank, 1040

## Takalani, Rakuambo

**From:** Takalani, Rakuambo <takalani@singoconsulting.co.za>  
**Sent:** Saturday, 08 July 2023 07:09  
**To:**  
**Cc:** 'kenneth@singoconsulting.co.za'; 'rudzani@singoconsulting.co.za'; 'Masindi, Nefale'  
**Subject:** INVITATION TO REGISTER & COMMENT FOR MDZ FLEET SOLUTIONS (PTY) LTD, MINING PERMIT APPLICATION ON PTN 2 OF THE FARM BLESBOKFONTEIN 31 IS WITH DMRE REF: MP 30/5/1/1/3/13571 MP.  
**Attachments:** REG 2.2.pdf; Mining Permit Area.kml; BID.pdf

Tracking:	Recipient	Read
	'riba, malele mo'	
	'kenneth@singoconsulting.co.za'	
	'rudzani@singoconsulting.co.za'	
	'Masindi, Nefale'	
	Dr Singo, Kenneth	Read: 2023/07/08 12:46
	Masindi, Nefale	Read: 2023/07/10 00:54
	Rudzani	Read: 2023/07/10 09:17

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takalani@singoconsulting.co.za

+27 13 692 0041 | +27 86 514 4103 | www.singoconsulting.co.za

**Singo Consulting (Pty) Ltd**  
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Office 870, 5 Balalaika Street, Tsabetsabets Park Ext 2, Witbank, 1040

**From:** Takalani, Rakuambo <[takalani@singoconsulting.co.za](mailto:takalani@singoconsulting.co.za)>  
**Sent:** Saturday, 08 July 2023 06:43

**Cc:** [kenneth@singoconsulting.co.za](mailto:kenneth@singoconsulting.co.za); [rudzani@singoconsulting.co.za](mailto:rudzani@singoconsulting.co.za); 'Masindi, Nefale' <[masindi@singoconsulting.co.za](mailto:masindi@singoconsulting.co.za)>

**Subject:** [CAUTION:EXTERNAL EMAIL] INVITATION TO REGISTER & COMMENT FOR MDZ FLEET SOLUTIONS (PTY) LTD, MINING PERMIT APPLICATION ON PTN 2 OF THE FARM BLESBOKFONTEIN 31 IS WITH DMRE REF: MP 30/5/1/1/3/13571 MP .

Good day,

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Should you need any clarity in relation to this project, please do not hesitate to contact me using the contact details provided below.

The image is a business card for Singo Consulting (Pty) Ltd. It features a blue and green color scheme. At the top, the company logo is displayed. Below it, the name 'Takalani, Rakuambo' is prominently shown, followed by his title 'Environmental Technician' and his qualifications 'B.Sc. (Hons) Mining & Environmental Geology'. Contact details include a phone number '+27 82 767 4011' and an email address 'takalani@singoconsulting.co.za'. The card also lists the company's main contact information: '+27 13 692 0041', '+27 86 514 4103', and 'www.singoconsulting.co.za'. Social media icons for LinkedIn, Facebook, and Instagram are present. The company's address is 'Office 870, 5 Balalaika Street, Tasbet Park Ext 2, Witbank, 1040'. The card includes a small globe icon and a hand holding a globe icon, symbolizing environmental focus.

**Sent:** Wednesday, August 2, 2023 1:00 PM  
**To:** Takalani, Rakuambo <[takalani@singoconsulting.co.za](mailto:takalani@singoconsulting.co.za)>  
**Cc:** [kenneth@singoconsulting.co.za](mailto:kenneth@singoconsulting.co.za); [rudzani@singoconsulting.co.za](mailto:rudzani@singoconsulting.co.za); 'Masindi, Nefale' <[masindi@singoconsulting.co.za](mailto:masindi@singoconsulting.co.za)>  
**Subject:** RE: [CAUTION:EXTERNAL EMAIL] INVITATION TO REGISTER & COMMENT FOR MDZ FLEET SOLUTIONS (PTY) LTD, MINING PERMIT APPLICATION ON PTN 2 OF THE FARM BLESBOKFONTEIN 31 IS WITH DMRE REF: MP 30/5/1/1/3/13571 MP .

good morning

kindly receive response from Eskom Distribution.

Warm regards

**Disclaimer**

NB: This Email and its contents are subject to the Eskom Holdings SOC Ltd EMAIL LEGAL NOTICE which can be viewed at



**Takalani Rakuambo**  
Environmental Technician  
SINGO Consultants  
Office No. 870, 5 Balalaika Street  
Tasbet Park Ext 2  
EMalaheni, 1040  
Email: [takalani@singoconsulting.co.za](mailto:takalani@singoconsulting.co.za)  
Tel: 082 767 4011

Date: 28 July 2023

Our ref: LD-Inv/E/SN/244/2023  
Your ref: MP 30/5/1/1/3/13571 MP

Dear Takalani

**INVITATION TO REGISTER & COMMENT FOR MDZ FLEET SOLUTIONS (PTY) LTD, MINING PERMIT APPLICATION ON PTN 2 OF THE FARM BLESBOKFONTEIN 31 IS WITH DMRE REF: MP 30/5/1/1/3/13571 MP.**

This notice affects the existing Eskom Distribution line, BOSCH-TAVISTOCK 3 NO 2 22kV, BOSCH-TAVISTOCK 3 1 22kV, BOSCH/TAVISTOCK THREE NO 3 22kV, BOSCH-ZAAIWATER TRAC 88kV and 400kV Transmission Line which traverse the proposed areas.

Eskom Distribution will raise no objection to the proposed development, provided Eskom's rights and services are acknowledged and respected at all times.

There is 9 & 15,5 meters building and tree restriction on either side of the Centre lines of the 22kV & 88kV power line which must be adhered to in all future development and or construction. Eskom's rights are protected by servitude.

Further to the above the following conditions must be adhered to and **accepted in writing** before any construction procedures: -

1. Eskom Distribution shall at all times have unobstructed access to and egress from its services.
2. The applicant will adhere to all relevant environmental legislation. Any cost incurred by Eskom Distribution as a result of non-compliance will be charged to the applicant.
3. No construction or excavation work shall be executed within 11 metres from any Eskom power line structure, and/or within 11 metres from any stay wire.
4. If Eskom has to incur any expenditure in order to comply with statutory clearances or other regulations as a result of the applicant's activities or because of the presence of his equipment or installation within the servitude or wayleave area, the applicant shall pay such costs to Eskom on demand.
5. Changes in ground level may not infringe statutory ground to conductor clearances or statutory visibility clearances. After any changes in ground level, the surface shall be rehabilitated and stabilised so as to prevent erosion. The measures taken shall be to Eskom's requirements.

Limlanga Cluster Mpumalanga



6. Eskom Distribution shall not be liable for the death of or injury to any person or for the loss of or damage to any property whether as a result of the encroachment or of the use of the area where Eskom Distribution has its services, by the applicant, his/her agent, contractors, employees, successors in title and assigns.
7. The applicant indemnifies Eskom against loss, claims or damages including claims pertaining to interference with Eskom Distribution services or apparatus or otherwise. The applicant's attention is drawn to section 27(3) of the Electricity Act 1987, as amended in 1994, which stipulates that the applicant can be fined and/or imprisoned as a result of damage to Eskom's apparatus.
8. No mechanical equipment, including mechanical excavators or high lifting machinery, shall be used in the vicinity of Eskom's apparatus and/or services, without prior written permission having been granted by Eskom. If such permission is granted the applicant must give at least seven working days prior notice of the commencement of work The Eskom's authorised area representative for the **Witbank South CNC:**  
This allows time for arrangements to be made for supervision and/or precautionary instructions to be issued.
9. Under no circumstances shall rubble, earth or other material be dumped within the servitude or Way Leave restriction area. The applicant shall maintain the area concerned to Eskom's satisfaction. The applicant shall be liable to Eskom for the cost of any remedial action which has to be carried out by Eskom.
10. The clearances between Eskom's live electrical equipment and the proposed construction work shall be observed as stipulated by Regulation 15 of the Electrical Machinery Regulations of the Occupational Health and Safety Act, 1993 (Act 85 of 1993).
11. Eskom may stipulate any additional requirements to illuminate any possible exposure to Customers or Public to coming into contact or be exposed to any dangers of Eskom plant.
12. Costs incurred by Eskom to comply with statutory requirements in terms of an applicant's (or his contractors) works, equipment or plant in the servitude area, shall be paid to Eskom on demand.
13. If for any reason the structure is required to be moved or dismantled the applicant will be responsible for the removal and/or possible re-location of the attachment.
14. No work may commence unless Eskom has received the applicant's written acceptance of the conditions specified in the letter of consent and/or permit and the approval is valid for a period of 60 days from date of letter.
15. The applicant or his / her contractor on site must at all times be in possession of the letter of consent. Should the site agent or contractor on site not be able to produce the required approval on inspection, all site activities will be stopped.
16. Eskom's rights and duties in the servitude shall be accepted as having prior right at all times and shall not be obstructed or interfered with. **NOTE:** Where and electrical outage is required, at least fourteen workdays is required to arrange same.
17. Eskom Standard gates must be installed in the road reserve fence to ensure access to Eskom's services.
18. Statutory clearances as specified by the Occupational Health and Safety Act, 1993 (Act 85 of 1993), Regulation 15 of the Electrical Machinery Regulations, shall be complied with.

Should the applicant or his contractor damage any of Eskom services during commencement of any work whatsoever, then Eskom's 24-hour Contact Centre Tel: \_\_\_\_\_ must be dialed immediately to report the incident.

Any relocation of Eskom's services, due to this construction, will be for the account of the Applicant. The Applicant will also be responsible for granting Eskom an alternative route for the power line. The Eskom Customer Contact Centre at \_\_\_\_\_ must be contacted in connection with any line deviation and costs.

Attached Annexes D (Letter of consent) and E (Indemnity Form) must be completed and returned to this office before commencement of any operations, maps indicating positions of Eskom Distribution services and Clearance standards.

We thank you and hope you will find the above in order. Should you have technical queries on the Eskom standards and specifications please feel free to phone our Asset Creation, Manager Design Engineering

Yours sincerely

**For  
MANAGER LAND DEVELOPMENT AND ENVIRONMENT**

Cc: Senior Supervisor Witbank South CNC:

## Takalani Rakuambo

**From:** Takalani Rakuambo <takalani@singoconsulting.co.za>  
**Sent:** Wednesday, 02 August 2023 14:31  
**To:**  
**Cc:** 'kenneth@singoconsulting.co.za'; 'rudzani@singoconsulting.co.za'; 'Masindi, Nefale'  
**Subject:** RE: [CAUTION:EXTERNAL EMAIL] INVITATION TO REGISTER & COMMENT FOR MDZ FLEET SOLUTIONS (PTY) LTD, MINING PERMIT APPLICATION ON PTN 2 OF THE FARM BLESBOKFONTEIN 31 IS WITH DMRE REF: MP 30/5/1/1/3/13571 MP .

**Tracking:**

Recipient	Read
'Wayleavesmou'	
'kenneth@singoconsulting.co.za'	
'rudzani@singoconsulting.co.za'	
'Masindi, Nefale'	
Masindi, Nefale	Read: 2023/08/02 14:37

Good day,

Receive warm greetings from Singo Consulting (Pty) Ltd.

Kindly note that your email has been acknowledged, please note that the Consent Letter will be send back to you before commencement of the project.

Operation Hi Teka Hinkwaswo

**Takalani, Rakuambo**  
Environmental Technician  
B.Sc. (Hons) Mining & Environmental Geology

+27 82 767 4011  
takalani@singoconsulting.co.za

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**Singo Consulting (Pty) Ltd**  
Protect & manage the best remaining environment

Office 870, 5 Balalaika Street,  
Tasbet Park Ext 2, Witbank, 1040

Linked in | Facebook | WhatsApp | Instagram

## Takalani, Rakuambo

**From:** Takalani, Rakuambo <takalani@singoconsulting.co.za>  
**Sent:** Monday, 10 July 2023 14:52  
**To:**  
**Cc:** 'Dr Kenneth, Singo'; 'rudzani@singoconsulting.co.za'; 'Masindi, Nefale'  
**Subject:** INVITATION TO REGISTER & COMMENT FOR MDZ FLEET SOLUTIONS (PTY) LTD, MINING PERMIT APPLICATION ON PTN 2 OF THE FARM BLESBOKFONTEIN 31 IS WITH DMRE REF: MP 30/5/1/1/3/13571 MP.  
**Attachments:** REG 2.2.pdf; Mining Permit Area.kml; BID.pdf

Tracking:	Recipient	Read
	'lubambom@dws.gov.za'	
	'Dr Kenneth, Singo'	
	'rudzani@singoconsulting.co.za'	
	'Masindi, Nefale'	
	Dr Singo, Kenneth	Read: 2023/07/10 15:15

Good day,

Receive warm greetings from Singo Consulting (Pty) Ltd.

**Singo Consulting (Pty) Ltd** has been appointed as an independent Environmental Assessment Practitioner by **MDZ Fleet Solutions (Pty) Ltd** to manage the environmental authorisation process by conducting an Environmental Impact Assessment, Public Participation Process (PPP), and to compile a Basic Assessment Report & Environmental Management Programme report (BAR & EMPr) for the **Mining Permit Application** for the purpose of extracting **Coal, Pseudocoal, Torbanite and Aggregate** on **portion 2** of the Farm **Blesbokfontein 31 IS**, situated under Magisterial District of **Emalahleni** in **Mpumalanga** Province with **DMRE Ref: MP 30/5/1/1/3/13571 MP**.

May you kindly find attached **Regulation map 2.2, KML** and **Background Information Document (BID)** for detailed information about the proposed project. A **Registration and Comment Form** is included for you to register as an Interested and Affected Party and raise your comments and concerns. Kindly complete this form so we can address the comments in the **Basic Assessment Report and Environmental Management Programme report** that will be shared with you to review for **30 calendar days** commencing on the **Monday the 07th of August 2023 until Wednesday the 06th of September 2023 (excluding Public Holidays)**, if you know anyone who might be interested or affected by this project, kindly forward this email to that person.

Should you need any clarity in relation to this project, please do not hesitate to contact me using the contact details provided below.



Operation Hi Teka Hinkwaswo

**Takalani, Rakuambo**  
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**Singo Consulting (Pty) Ltd**  
Protect & manage the best remaining environments

Office 870, 5 Balalaika Street,  
Tasbet Park Ext 2, Witbank, 1040

## Takalani, Rakuambo

**From:** Takalani, Rakuambo <takalani@singoconsulting.co.za>  
**Sent:** Monday, 17 July 2023 11:46  
**Cc:** 'Dr Singo, Kenneth'; 'Rudzani '; 'Masindi, Nefale';  
**Subject:** INVITATION TO REGISTER & COMMENT FOR MDZ FLEET SOLUTIONS (PTY) LTD, MINING PERMIT APPLICATION ON PTN 2 OF THE FARM BLESBOKFONTEIN 31 IS WITH DMRE REF: MP 30/5/1/1/3/13571 MP.  
**Attachments:** REG 2.2.pdf; Mining Permit Area.kml; BID.pdf

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## Takalani, Rakuambo

**From:** Takalani, Rakuambo <takalani@singoconsulting.co.za>  
**Sent:** Monday, 17 July 2023 11:38  
**To:**  
**Cc:** 'Dr Singo, Kenneth'; 'Rudzani '; 'Masindi, Nefale'  
**Subject:** INVITATION TO REGISTER & COMMENT FOR MDZ FLEET SOLUTIONS (PTY) LTD, MINING PERMIT APPLICATION ON PTN 2 OF THE FARM BLESBOKFONTEIN 31 IS WITH DMRE REF: MP 30/5/1/1/3/13571 MP.  
**Attachments:** REG 2.2.pdf; Mining Permit Area.kml; BID.pdf

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May you kindly find attached **Regulation map 2.2, KML** and **Background Information Document (BID)** for detailed information about the proposed project. A **Registration and Comment Form** is included for you to register as an Interested and Affected Party and raise your comments and concerns. Kindly complete this form so we can address the comments in the **Basic Assessment Report and Environmental Management Programme report** that will be shared with you to review for **30 calendar days** commencing on the **Monday the 07th of August 2023 until Wednesday the 06th of September 2023 (excluding Public Holidays)**, if you know anyone who might be interested or affected by this project, kindly forward this email to that person.

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**Singo Consulting (Pty) Ltd**  
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Office 870, 5 Balalaika Street,  
Tasbet Park Ext 2, Witbank, 1040

Sent: Tuesday, July 18, 2023 8:28 AM

To: 'Takalani, Rakuambo' <[takalani@singoconsulting.co.za](mailto:takalani@singoconsulting.co.za)>

Subject: RE: INVITATION TO REGISTER & COMMENT FOR MDZ FLEET SOLUTIONS (PTY) LTD, MINING PERMIT APPLICATION ON PTN 2 OF THE FARM BLESBOKFONTEIN 31 IS WITH DMRE REF: MP 30/5/1/1/3/13571 MP.

Dear Takalani

As per telephonic conversation, can you kindly assist with the email address for Glencore for this application.

We can share our experiences regarding this application.

Best Regards

From: Takalani, Rakuambo <[takalani@singoconsulting.co.za](mailto:takalani@singoconsulting.co.za)>

Sent: Tuesday, July 18, 2023 11:41 AM

Cc: 'Dr Singo, Kenneth' <[kenneth@singoconsulting.co.za](mailto:kenneth@singoconsulting.co.za)>; 'Rudzani, Radebe (RRS)'

<[rudzani@singoconsulting.co.za](mailto:rudzani@singoconsulting.co.za)>; 'Masindi, Nefale' <[masindi@singoconsulting.co.za](mailto:masindi@singoconsulting.co.za)>

Subject: RE: INVITATION TO REGISTER & COMMENT FOR MDZ FLEET SOLUTIONS (PTY) LTD, MINING PERMIT APPLICATION ON PTN 2 OF THE FARM BLESBOKFONTEIN 31 IS WITH DMRE REF: MP 30/5/1/1/3/13571 MP.

Good day

As per telecommunication. We have indicated that we did consult the landowner who is Glencore.

Seeing that we are in the same portion for our different application. We assume you also should have consulted the same landowner.

The request made regarding details of the landowner it is beyond the regulations in terms of POPIA, thus we unfortunately can't share the details of the landowner. However we require to have a meeting with you so we can map a way forward seeing that we are overlapping.

Your correspondences will be appreciated.

The image shows a business card for Singo Consulting (Pty) Ltd. The card is dark blue with green accents. At the top left, it says 'Operation Hi Teka Hinkwaswo' next to a small landscape image. The main name 'Takalani, Rakuambo' is in large white font, followed by 'Environmental Technician' and 'B.Sc. (Hons) Mining & Environmental Geology'. Contact information includes a phone number '+27 82 767 4011' and an email address 'takalani@singoconsulting.co.za'. The bottom left corner features three phone numbers: '+27 13 692 0041', '+27 86 514 4103', and the website 'www.singoconsulting.co.za'. The bottom right corner has the Singo Consulting logo, social media icons for LinkedIn, Facebook, and Instagram, and the address 'Office 870, 5 Balaika Street, Tshet Park Ext 2, Witbank, 1040'. A small globe icon is also present.



Sent: Tuesday, July 18, 2023 11:53 AM

To: 'Takalani, Rakuambo' <takalani@singoconsulting.co.za>

Cc: 'Dr Singo, Kenneth' <kenneth@singoconsulting.co.za>; 'Rudzani, Radebe (RRS)' <rudzani@singoconsulting.co.za>; 'Masindi, Nefale' <masindi@singoconsulting.co.za>

Subject: RE: INVITATION TO REGISTER & COMMENT FOR MDZ FLEET SOLUTIONS (PTY) LTD, MINING PERMIT APPLICATION ON PTN 2 OF THE FARM BLESBOKFONTEIN 31 IS WITH DMRE REF: MP 30/5/1/1/3/13571 MP.

Dear Takalani

Not a problem I understand.

We can schedule the meeting for next week.

Best Regards

## Takalani Rakuambo

---

**From:** Takalani, Rakuambo <takalani@singoconsulting.co.za>  
**Sent:** Tuesday, 18 July 2023 16:11  
**To:**  
**Cc:** 'Dr Singo, Kenneth'; 'Rudzani, Radebe (RRS)'; 'Masindi, Nefale'  
**Subject:** RE: INVITATION TO REGISTER & COMMENT FOR MDZ FLEET SOLUTIONS (PTY) LTD, MINING PERMIT APPLICATION ON PTN 2 OF THE FARM BLESBOKFONTEIN 31 WITH DMRE REF: MP 30/5/1/1/3/13571 MP.

Good Day

We appreciate your response and will stay in touch to finalize the time and location of the meeting.

Operation Hi Teka Hinkwaswo

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## Takalani, Rakuambo

**From:** Takalani, Rakuambo <takalani@singoconsulting.co.za>  
**Sent:** Saturday, 08 July 2023 07:39  
**To:**  
**Cc:** 'kenneth@singoconsulting.co.za'; 'rudzani@singoconsulting.co.za'; 'Masindi, Nefale'  
**Subject:** LAND CLAIM ENQUIRY ON PORTION 2 OF THE FARM BLESBOKFONTEIN 31 IS, DMRE REF : MP 30/5/1/1/3/13571 MP  
**Attachments:** REG 2.2.pdf; Mining Permit Area.kml; Windeed Search Results..pdf; BID.pdf

Tracking:	Recipient	Read
	'Lazarus.Masuku@dalrrd.gov.za'	
	'kenneth@singoconsulting.co.za'	
	'rudzani@singoconsulting.co.za'	
	'Masindi, Nefale'	
	Dr Singo, Kenneth	Read: 2023/07/08 12:46
	Masindi, Nefale	Read: 2023/07/10 00:54
	Rudzani	Read: 2023/07/10 09:17

Good day,

Receive warm greetings from Singo Consulting (Pty) Ltd.

You are kindly receiving this email as an enquiry for any possible land claim on **Portion 2 of the Farm Blesbokfontein 31 IS**, situated in the **Magisterial District of Emalahleni** in the **Mpumalanga Province DMRE REF : MP 30/5/1/1/3/13571 MP**.

Kindly review attached **Regulation map 2.2, KML, Windeed results and Background Information Document (BID)** for detailed description of proposed project. This is to ensure that all claimants are properly consulted and are given opportunity to:

- Register as an I&APs and to respond to the environmental compliance process;
- Raise issues of concern and provide suggestions for enhanced benefits;
- Contribute to local knowledge;
- Comment on the Draft Basic Assessment Report (BAR) & Environmental Management Programme report (EMPr); and
- Inform any other person / organization that they may feel should be informed about the project.

Your comments will be highly appreciated as they will assist us in developing a well-informed BAR and EMPr.



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Office 870, 5 Balaika Street,  
Tasbet Park Ext 2, Witbank, 1040

Face-face consultation with some of Saaiwater Community for meeting arrangement



## Appendix 5: Proof of Submission

### DMRE Ref: MP 30/5/1/1/3/13571 MP

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**CaseHeader** **LocationInfo** **Admin**

**Status:** DRAFT

**HeritageAuthority(s):** SAHRA

**Case Type:** Section 38 (1) - Decision from Heritage Authority required

**ProposalDescription:**

Mining Permit Application within Portion 2 of the Farm Blesbokfontein 31 IS, situated in the Magisterial District of Emalaheni in Mpumalanga Province

**Expanded\_Motivation:**

Mining activities will be undertaken over a period of two (2) years. This project will entail an open cast method of excavation. The mine design will be developed according to the dimension of the applied mineral deposit within the project area, but overall mining activities will be limited to an area of 5 Ha as per mining permit requirements. The topsoil will be stockpiled elsewhere on site preferably next to the farm boundary and will be used during rehabilitation period. Once a box cut has been made, the overburden and mineral resources where necessary will be loosened by blasting. The loosened material will then be loaded onto trucks by excavators. A haul road will be situated at the side of the open cast, forming a ramp up which trucks can drive, carrying ore and waste rock. Waste rock will be piled up at the surface, near the edge of the open cast (waste dump). The waste dump will be tiered and stepped, to minimize degradation.

**ApplicationDate:** Thursday, July 20, 2023 - 14:10

**CaseID:** 21930

**Applicants:** A

**Consultants/Experts:** Ramabulana Aluwani Percy

**OtherReferences:**

CaseReference	Department	DeadlineDate
DMRE Ref: MP 30/5/1/1/3/13571 MP	Department of Mineral Resources - Mpumalanga	07/08/2023

**ReferenceList:**

#### AdditionalDocuments

1.  BID.pdf

**Appendix 6: Supporting impact assessment.**

**Environmental impact statement**

Taking the assessment of potential impacts into account, herewith please receive an environmental impact statement that summarises the impact that the proposed activity may have on the environment after the management and mitigation of impacts have been taken into account, with specific reference to types of impact, duration of impacts, likelihood of potential impacts actually occurring and significance of impacts.

Type of impact	Likelihood	Significance
<b>Site establishment/ construction phase</b>	Duration: Planning phase	
<b>Topsoil stripping and stockpiling</b>		
Visual intrusion associated with mining area establishment	Possible	Medium concern
Dust nuisance caused by soil disturbance	Low possibility	Low concern
Noise nuisance caused by machinery stripping and stockpiling topsoil	Low possibility	Low concern
Infestation of topsoil heaps by weeds and invader plants	Low possibility	Low concern
Loss of topsoil due to incorrect storm water management	Low possibility	Low concern
Area contamination with hydrocarbon/hazardous waste	Low possibility	Low concern
<b>Operational phase</b>	Duration: Operational phase; minimum of 3 years	
<b>Blasting</b>		
Health and safety risk posed by blasting activities	Low possibility	Low concern
Dust nuisance caused by blasting activities	Definite	Low-medium concern
Noise nuisance caused by blasting activities	Definite	Low-medium concern
<b>Excavation</b>		
Visual intrusion associated with the excavation activities	Definite	Medium concern
Dust nuisance due to excavation activities	Low possibility	Low concern
Noise nuisance generated by excavation equipment	Low possibility	Low-medium concern

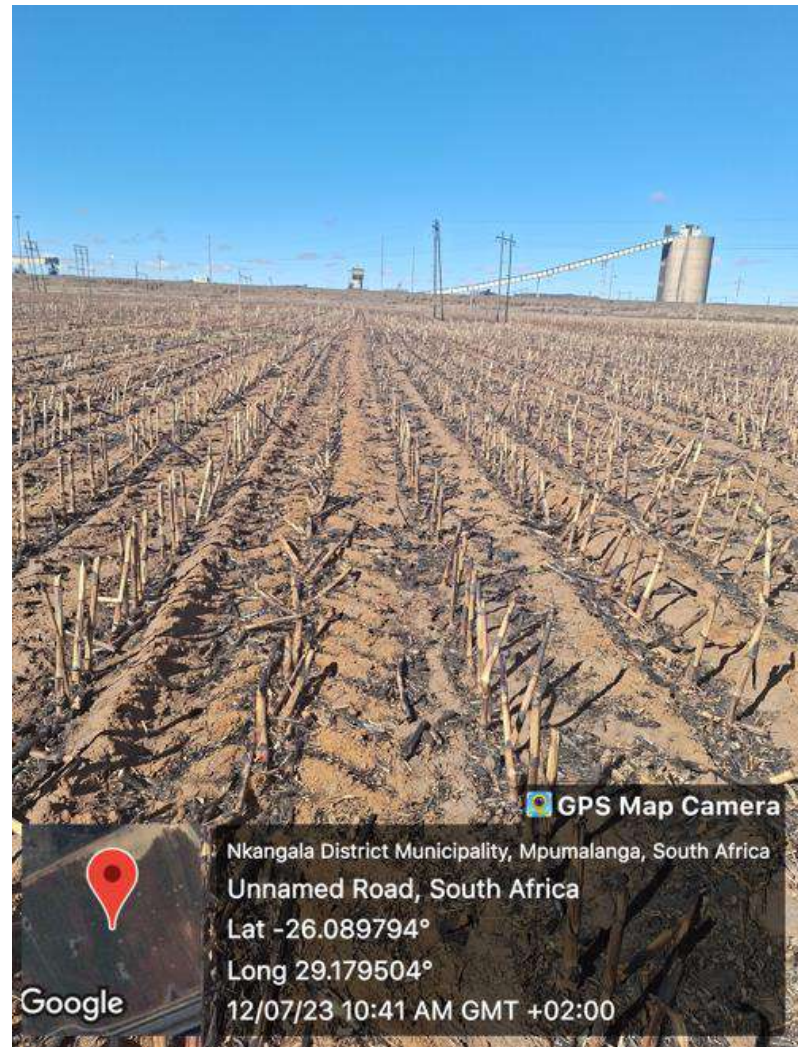
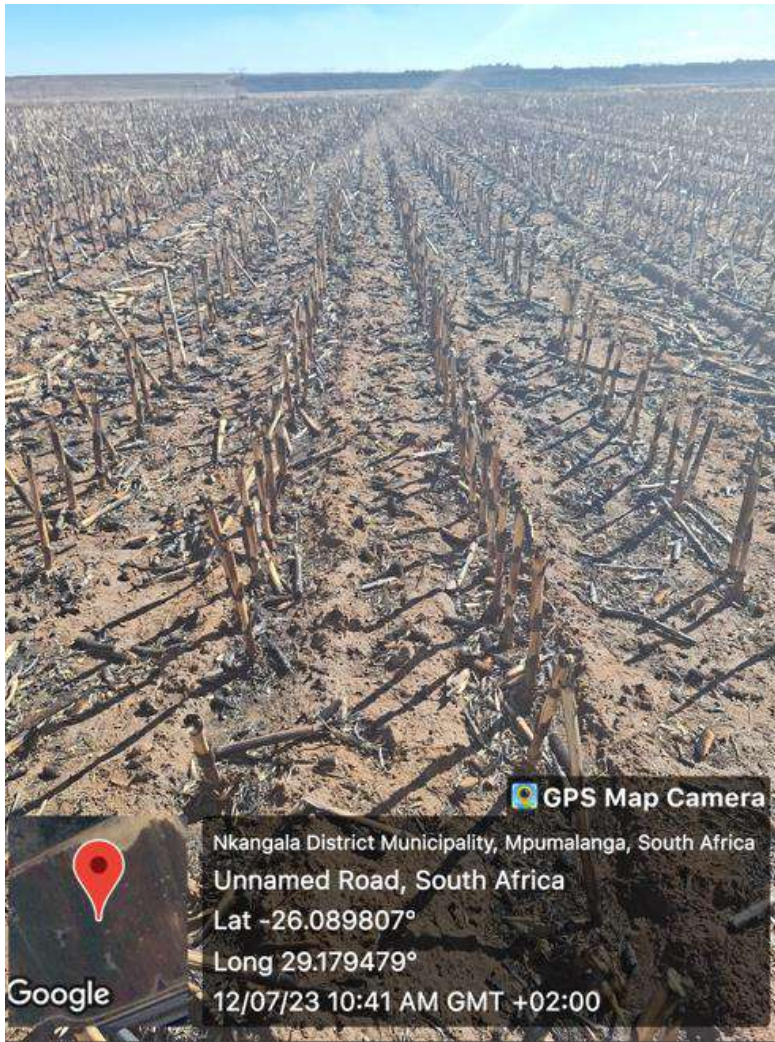
Unsafe working conditions for employees	Low possibility	Low concern
Negative impact on the fauna and flora of the area	Low possibility	Low concern
Area contamination with hydrocarbon/hazardous waste	Low possibility	Low concern
Weed and invader plant infestation of the area	Low possibility	Low concern

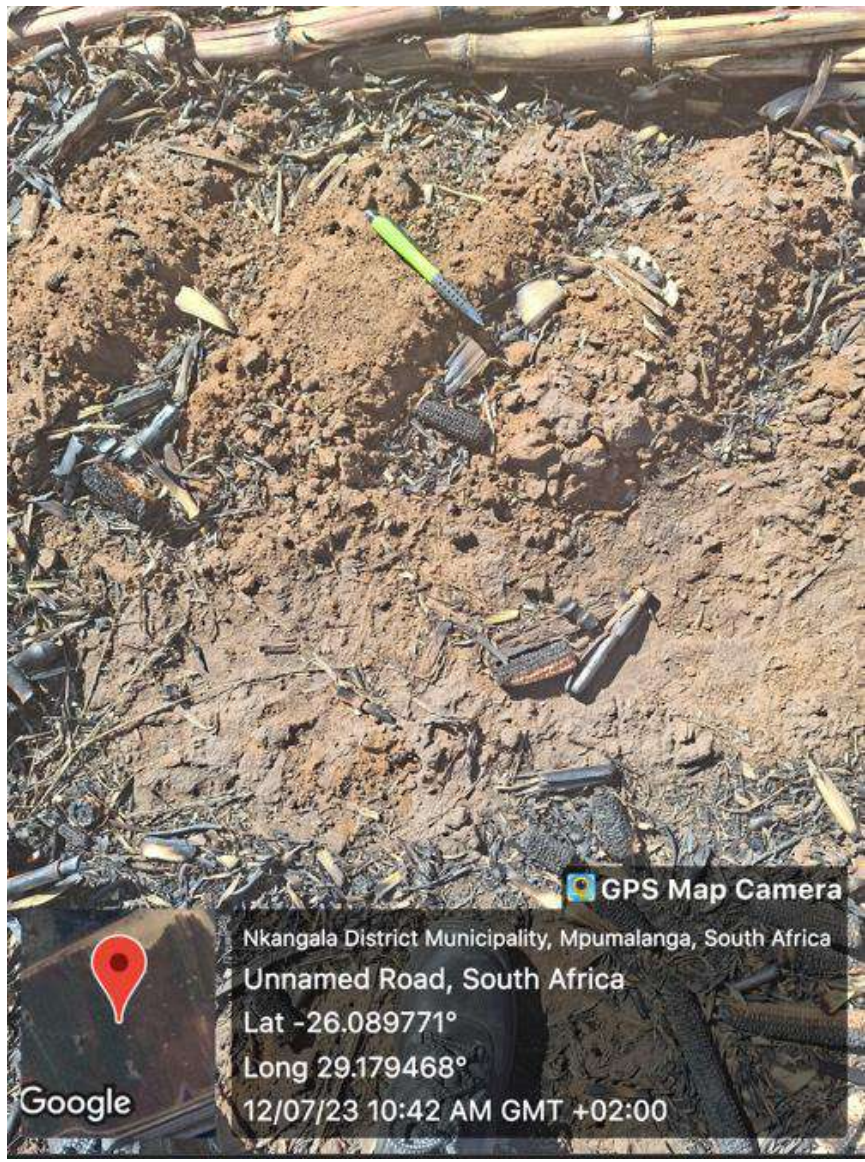
<b>Crushing</b>		
Dust nuisance due to the crushing activities	Possible	Low-medium concern
Noise nuisance generated by the crushing activities	Possible	Low-medium concern
Area contamination with hydrocarbon/hazardous waste	Low possibility	Low-medium concern
<b>Stockpiling and transporting</b>		
Visual intrusion associated with the stockpiled material and vehicles transporting the material	Low possibility	Low-medium concern
Loss of material due to ineffective storm water handling	Low possibility	Low concern
Weed/invader plant infestation of area due to soil disturbance	Low possibility	Low concern
Dust nuisance from stockpiled material and vehicles transporting the material	Low possibility	Low concern
Degradation of access roads	Possible	Low-medium concern
Noise nuisance caused by vehicles	Low possibility	Low concern
Area contamination with hydrocarbon/hazardous waste	Low possibility	Low concern
<b>Decommissioning phase</b>	Duration: Decommissioning phase	
<b>Sloping and landscaping during rehabilitation</b>		
Soil erosion	Low possibility	Low concern
Health and safety risk posed by un-sloped areas	Low possibility	Low concern
Dust nuisance caused by sloping and landscaping	Low possibility	Low concern
Noise nuisance caused by machinery	Low possibility	Low concern
Area contamination with hydrocarbon/hazardous waste	Low possibility	Low concern
<b>Replacing of topsoil and rehabilitation of disturbed area</b>		
Loss of reinstated topsoil due to absence of vegetation	Low possibility	Low concern

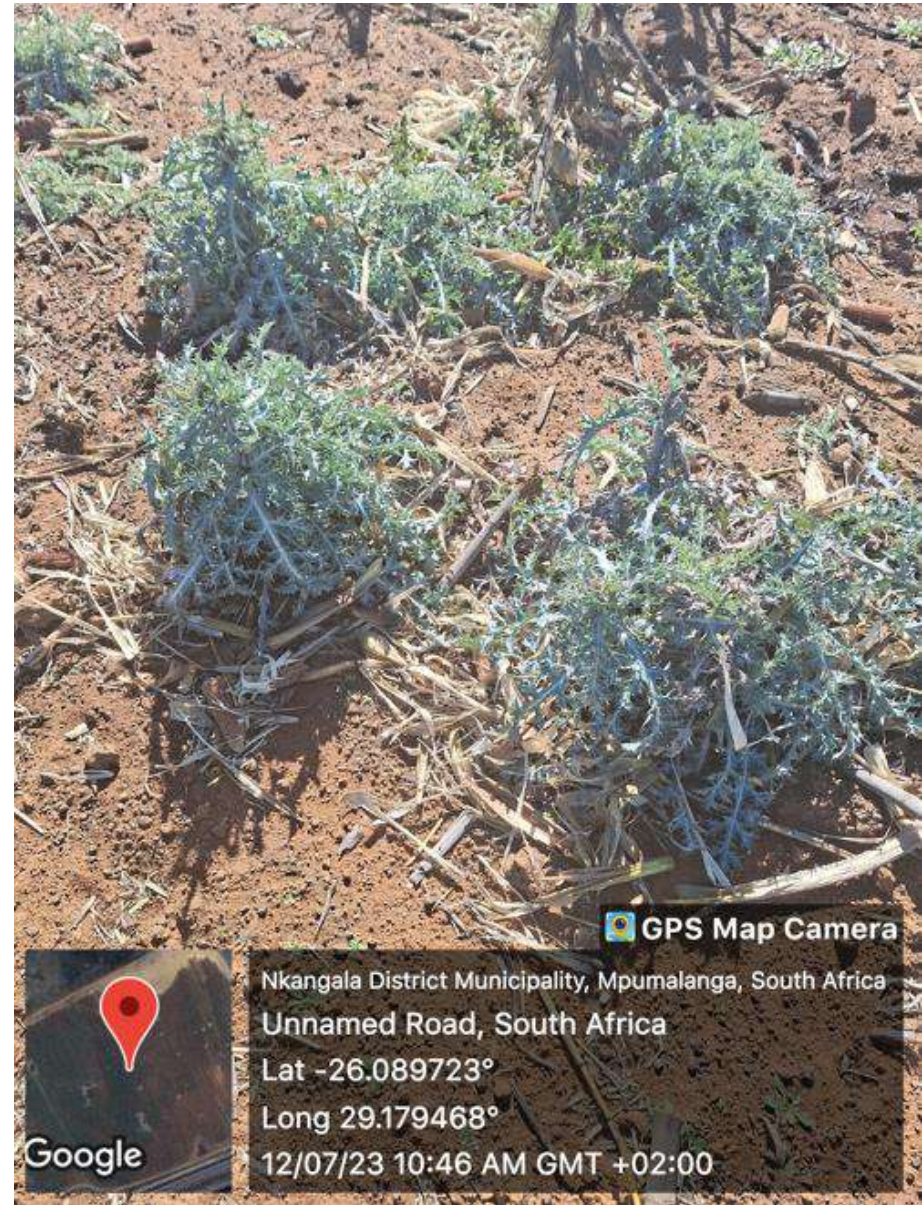
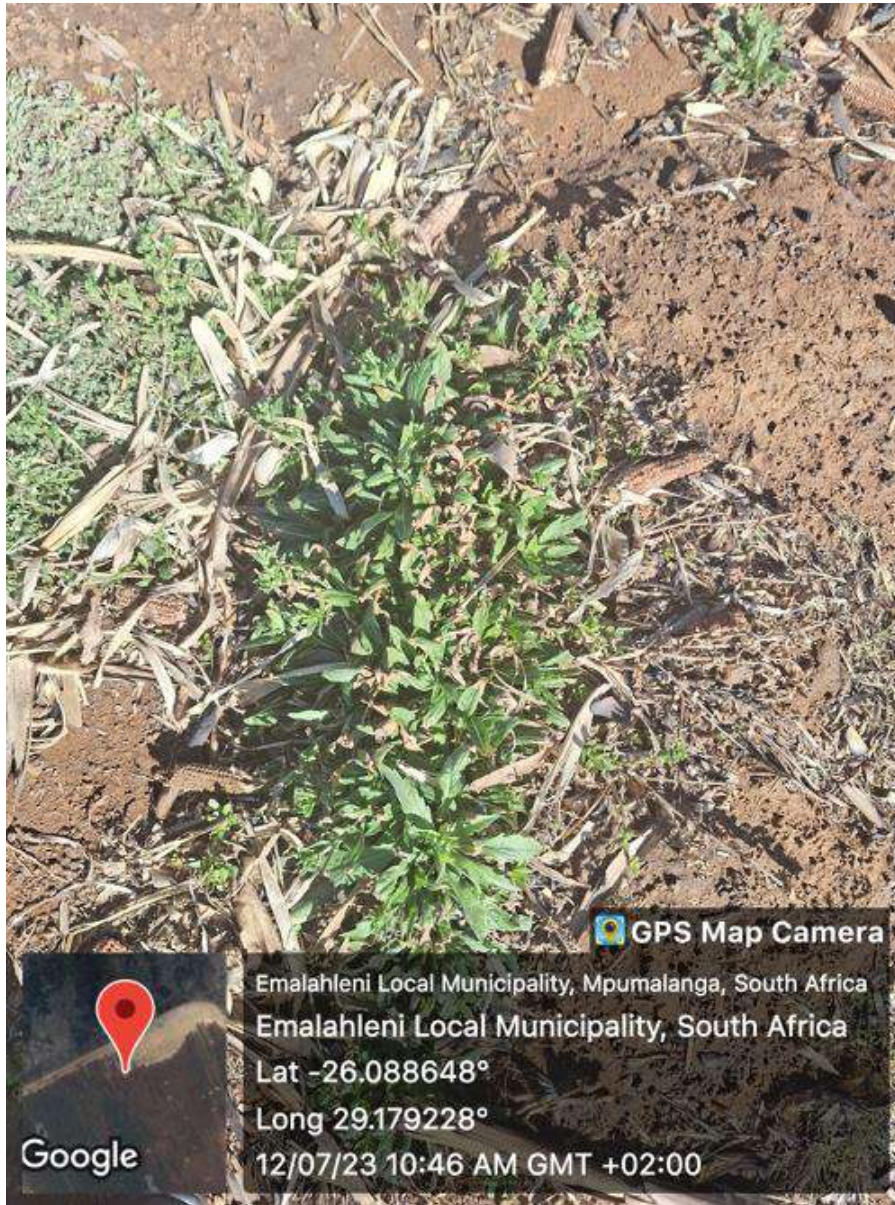
Infestation of the area by weed/invader plants	Low possibility	Low concern
--	-----------------	-------------




**Appendix 7: Site Pictures.**









 **GPS Map Camera**

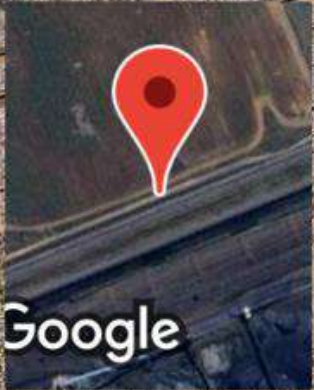
Nkangala District Municipality, Mpumalanga, South Africa

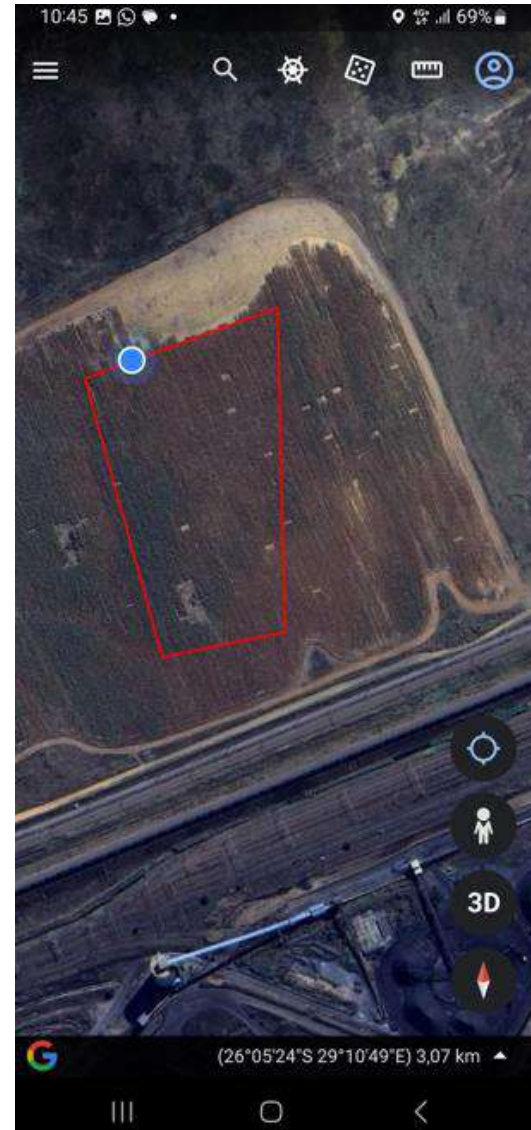
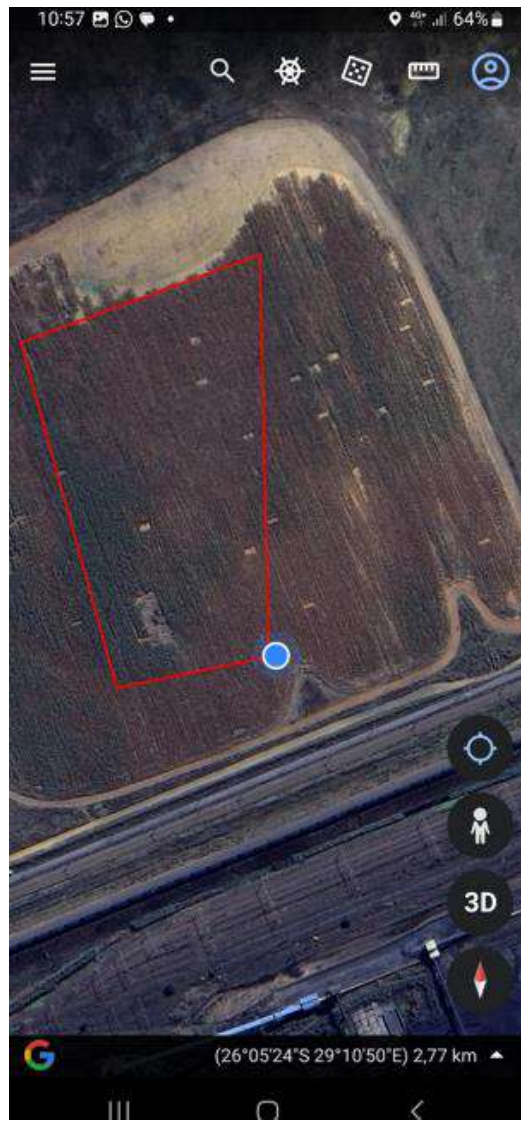
Unnamed Road, South Africa

Lat -26.09144°

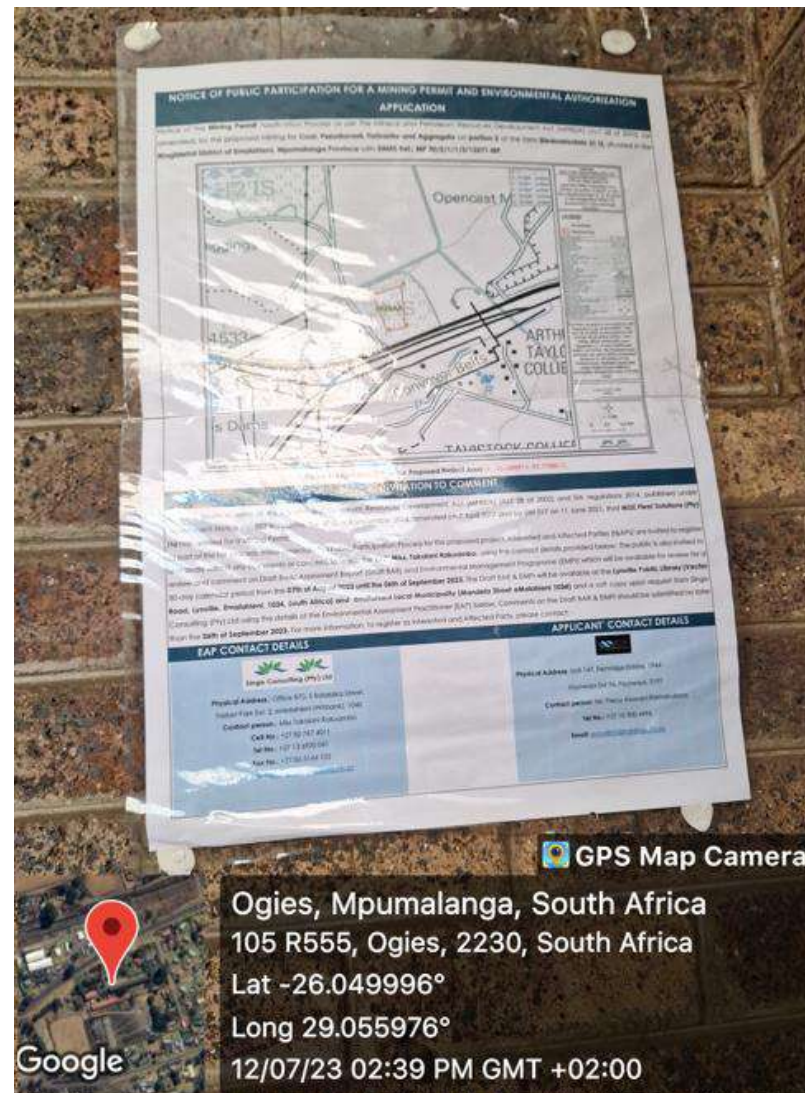
Long 29.180676°

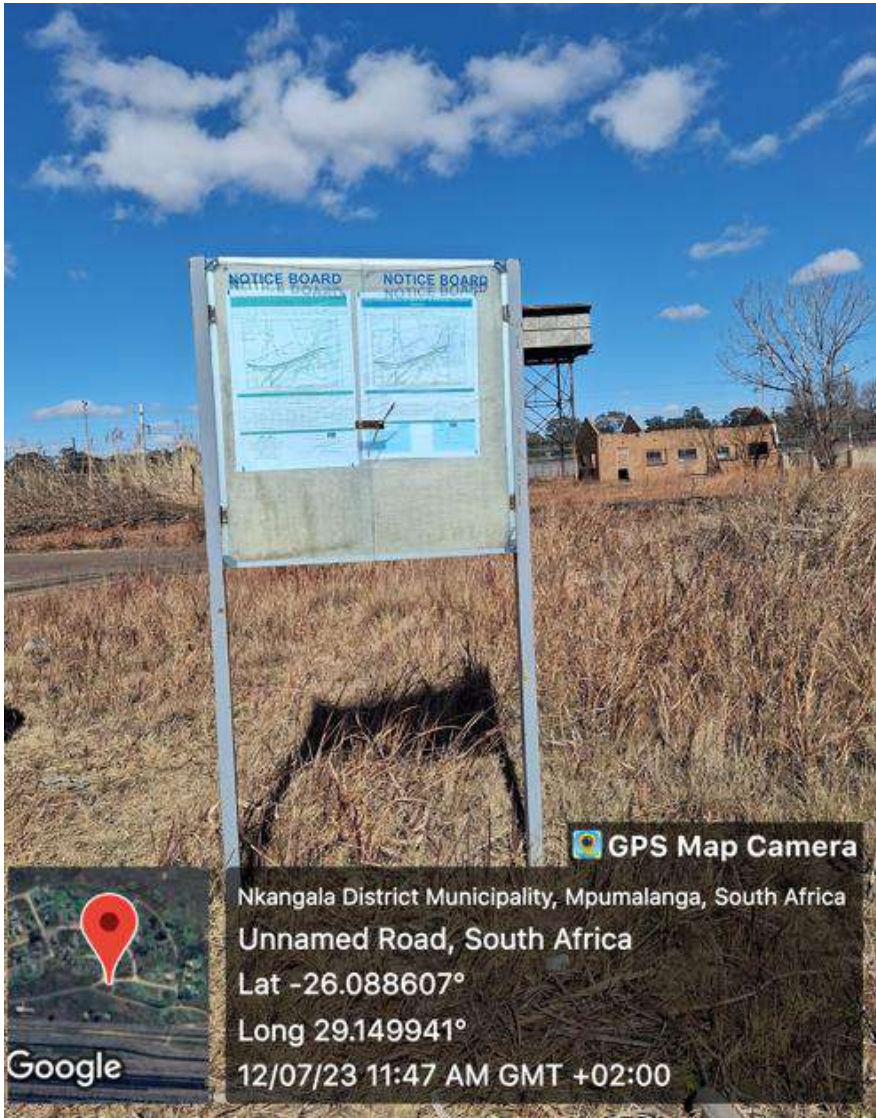
12/07/23 10:59 AM GMT +02:00





## Appendix 8: Site Notices Placement









**Appendix 9: CV of the EAP who prepared and review the Report.**

Due to POPI Act, the CV and qualifications available upon request

## Appendix 10: Special Studies

## Appendix 11: Screening Report

# MINING PERMIT APPLICATION

## HYDROGEOLOGICAL STUDY

Hydrogeological Study for the proposed Mining Permit Application on Portion 2 of the farm Blesbokfontein 31 IS, situated in the Magisterial District of eMalaheni in Mpumalanga Province.



REPORT PREPARED BY:



Address: Office No. 870, 5 Balalaika Street,  
Tasbet Park Ext 2, Witbank, 1035.

Contact Details: Tell No.: 013 692 0041  
Cell No.: 072-081-6682/078-2727-839

Fax No.: 086-514-4103

E-mail:  
[kenneth@singoconsulting.co.za](mailto:kenneth@singoconsulting.co.za)



DMRE REF: (DMRE Ref: MP 30/5/1/1/3 13571 MP

## Report Credentials.

**Disclaimer** The opinion expressed in this and associated reports are based on the information provided by MDZ Fleet Solutions (Pty) Ltd to Singo Consulting (Pty) Ltd ("Singo Consulting") and is specific to the scope of work agreed with MDZ Fleet Solutions (Pty) Ltd. Singo Consulting acts as an advisor to the MDZ Fleet Solutions (Pty) Ltd and exercises all reasonable skill and care in the provision of its professional services in a manner consistent with the level of care and expertise exercised by members of the environmental profession. Except where expressly stated, Singo Consulting has not verified the validity, accuracy or comprehensiveness of any information supplied for its reports. Singo Consulting shall not be held liable for any errors or omissions in the information given or any consequential loss resulting from commercial decisions or acts arising from them. Where site inspections, testing or fieldwork have taken place, the report is based on the information made available by MDZ Fleet Solutions (Pty) Ltd or their nominees during the visit, visual observations and any subsequent discussions with regulatory authorities. The validity and comprehensiveness of supplied information has not been independently verified and, for the purposes of this report, it is assumed that the information provided to Singo Consulting is both complete and accurate. It is further assumed that normal activities were being undertaken at the site on the day of the site visit(s), unless explicitly stated otherwise. These views do not generally refer to circumstances and features that may occur after the date of this study, which were not previously known to Singo Consulting (Pty) Ltd or had the opportunity to assess.

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### Project details

**Report type** Hydrogeological Study for a mining permit application

**Project title** Hydrogeological Study for the proposed mining permit application on Portion 2 of the farm Blesbokfontein 31 IS, situated in the Magisterial District of eMalahleni in Mpumalanga Province, South Africa.

**Mineral (s)** Coal, Pseudocoal, Torbanite and Aggregate

**Client** MDZ Fleet Solutions (Pty) Ltd

**Site location** Portion 2 of the farm Blesbokfontein 31 IS, situated in the Magisterial District of eMalahleni in Mpumalanga Province, South Africa.

**Version** 1

**Date** August 2023

### Electronic signatures

**Compiled by** Khulekani Zwane (Hydrogeologist) Singo Consulting (Pty) Ltd



**Reviewed by** Mutshidzi Munyai (Hydrogeologist) Singo Consulting (Pty) Ltd (Water Resources Science (Professional Natural Scientist), (SACNASP Registration Number 122464)



**Final review and approval** Dr. Kenneth Singo (Principal Consultant of Singo Consulting (Pty) Ltd)




**Table 1: Critical Report Information**

Critical Information incorporated within the Basic Hydrogeological Study:	Relevant section in report
Details of the specialist who prepared the report	Project details, P: 3
The expertise of that person to compile a specialist report including a curriculum vitae	Available upon request
Project Background Information, including the proposed activities description	Project background information, P: 10
An indication of the scope of, and the purpose for which, the report was prepared	Scope of work, P: 11-13
An indication of the quality and age of base data used for the specialist report	Project details, P: 3
A description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change	Hydrogeological impact assessment, P: 48
The duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment	Project details, P: 3
A description of the methodology implemented in preparing the report or carrying out the specialised process comprehensive of equipment and modelling used;	Methodology, P: 16
Details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternative;	N/A
An identification of any areas to be avoided, including buffers	N/A
A map overlaying the proposed activity including the associated infrastructures on the environmental sensitivities of the site including containing buffer zones	N/A
A description of the findings and potential implications of such findings on the impact of the proposed activity or activities	Hydrogeological impact assessment, P: 48
Any mitigation and conditions measures for inclusion in the EMPr	Groundwater management plan, P: 62
Any monitoring requirements for inclusion in the EMPr or environmental authorisation	Groundwater Monitoring plan, P: 70
An analytic opinion as to whether the proposed activity or portions thereof should be Authorised-i.e., specific recommendations	Recommendations, P: 77
Regarding the acceptability of the proposed activity or activities; and	Refer to bar
If the opinion is that the proposed activity or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan	Groundwater management plan, P: 62
A description of any consultation process that was undertaken during carrying out the study	Refer to bar
Any triggered Water Uses according to section 21 of the National Water Act 36, 1998.	
Any other information requested by the competent authority.	N/A





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## 1 INTRODUCTION

### 1.1 Project Background Information

Singo Consulting (Pty) Ltd was appointed by MDZ Fleet Solutions (Pty) Ltd to conduct this hydrogeological study as an independent consulting company. The hydrogeological study is being conducted in support of a mining permit application for coal on Portion 2 of the farm Blesbokfontein 31 IS, situated in the Magisterial District of eMalahleni in Mpumalanga Province (refer to Figure 3).

The proposed activity has a potential to contaminate the groundwater through possible accident of leakage and infiltration to the sub-surface.

Chapter 3 of the National Water Act (Act 36 of 1998) requires that a person who owns, control, occupies, uses the land is responsible for preventing pollution of water resources and is also responsible to remedy (correct) the effects of the pollution. It is with this Act that the hydrogeological report was deemed necessary for the site to gather all relevant information related to groundwater and its related potential impacts.

Facilities on site within the mining permit area include but not limited to:

- Pollution control Dam (PCD)
- Mobile Sanitation
- Mobile crushing and screening unit
- ROM stockpile area
- Overburden stockpile area
- Product Stockpile area
- Topsoil stockpile area

#### **The goal of this study:**

- To assess the quality condition of surface and groundwater within and around the mining permit area, and to draft a water monitoring programme for the project site and provide recommendations.
- Prediction of the environmental impact of the proposed mining activity on the geohydrological regime of the area.
- Forecasting the effects of the activity on the receiving environment.



## 1.2 Proposed Activities

The activities to take place are categorized based on phases of the life of the mine.

Construction phase:

- Clearing of vegetation.
- Hardening surfaces to create roads.
- Installation of mobile machinery such as crusher.

Operational Phase:

- Movement of machinery.
- Stripping of overburden.
- Coal processing which includes but not limited to crushing.

## 1.3 Scope of Work

Description of the baseline groundwater regime:

- Conduct hydrocensus of existing boreholes, including groundwater use type and volume.
- Identification of monitoring boreholes during which hydrogeological data such as depth to water strike and groundwater quality will be monitored.
- Laboratory testing of samples for physical, chemical, and biological parameters.

Environmental impact assessment using 3D numerical flow and contaminant transport modelling to calculate:

- Groundwater inflow volumes into the mining area over the life of mine.
- The cone of dewatering that forms due to mine dewatering and its development over time. This includes the impact on surrounding groundwater users.
- Contaminant transport away from point and diffuse sources within the mining area and the impacts on surrounding aquifers and users using the source-pathway-receptor (SPR) principle.



## Reporting:

- A final hydrogeological report encompassing all work done using the above components was compiled.

## Information Sourcing and Literature review.

To determine the baseline climatic and hydrological parameters of the site and surroundings, research on multiple information sources was conducted:

- A desktop study was completed for the area.
- QGIS was used to identify streams, wetlands.
- Scientific journals and scientific books.
- Department of water affairs for the document on aquifer classification of south Africa.
- Aerial imagery of the world map (Google earth).

## Legislation and policy context:

The following legislation was considered during the compiling of this assessment.

### **The National Water Act (Act 36 of 1998):**

The NWA governs water resource management in South Africa. As guardians of water, the Department of Human Settlements, Water and Sanitation (DHSWS) must guarantee that resources are used, preserved, safeguarded, developed, managed, and controlled in a sustainable manner for the benefits of all people of south Africa and the environment. Key provisions applying to the current study include:

- **Catchment Areas** - Any disturbance to a watercourse, such as the construction and operation of surface mining infrastructure, may require authorisation from DWS.

### **Regulations on the use of Water for Mining and Related Activities:**

Government Notice 704 or GN704 was established to provide regulations on the use of water for mining and related activities aimed at the protection of water resources. The four main regulations of GN704 applicable to this project are:



- Condition 4 – indicates that no person in control of a mine or activity may locate or place any residue deposit, dam, reservoir, together with any structure of another facility within the 1:100-year flood line or within a horizontal distance of 100-metres from any watercourse.
- Regulation 5 - indicates that no residue or substance which causes or is likely to cause pollution of a water resource may be used in the construction of any dams, impoundments or embankments or any other infrastructure which may cause pollution of a water resource.
- Regulation 6 - describes the capacity requirements of clean and dirty water systems. Clean and dirty water systems must be kept separate and must be designed, constructed, maintained, and operated to ensure conveyance of the flows of a 1:50-year recurrence event. Clean and dirty water systems should not spill into each other more frequently than once in 50 years. Any dirty water dams should have a minimum freeboard of 0.8m above full supply level
- Regulation 7 - describes the measures which must be taken to protect water resources. All dirty water or substances which may cause pollution should be prevented from entering a water resource (by spillage, seepage, erosion etc.) and ensure that water used in any process is recycled as far as practicable.





## 2 TERMS OF REFERENCE

The baseline hydrogeological assessment for the project area is mainly constructed by a combination of desktop study and site-specific field study. Most of the information used for this study was compiled with an aid of nearby study sites information and experience from similar geohydrological settings. All collected data will be compiled to construct a conceptual geohydrological model.

### The objective of the study:





- To collect hydrogeological and geochemical baseline information to address the subsequent environmental impact assessment for the coal mining permit.
- To draft management and mitigation measures for identified impacts outlined for the construction, operational, decommissioning, and post-mining phase of the project and associated monitoring programme.

### The following aspects were covered in this hydrogeological study:

Table 2: Hydrogeological aspects in the study

Aspect	Description
<b>Desktop Study</b>	<ul style="list-style-type: none"> <li>➤ Project Initiation and Data Collection</li> <li>➤ Review available site specific hydrogeological and hydrological information to conceptualize the different aquifer systems and their interaction with surface water features in the area.</li> </ul>
<b>Site visits</b>	<ul style="list-style-type: none"> <li>➤ Site visit is the most significant part of the investigation, a site visit was conducted to collect water samples and conducting hydrocensus at the surrounding farms (within 2kms) of the project area.</li> </ul>
<b>Groundwater levels</b>	<ul style="list-style-type: none"> <li>➤ A water level meter was used to measure the water level at all the boreholes within the study site</li> </ul>
<b>Aquifer classification</b>	<ul style="list-style-type: none"> <li>➤ Aquifers will be classified into either minor or major aquifer types and dominant water source will be identified</li> </ul>



<b>Hydrogeological Modelling</b>	<ul style="list-style-type: none"> <li>➤ Interpret geochemical analyses of water samples conducted by Regen waters Lab.</li> <li>➤ Numerical Groundwater Flow and Transport Model <ul style="list-style-type: none"> <li> Model inputs</li> <li> Model Calibration</li> <li> Scenario Modelling</li> <li> Hydrogeological Impact Assessment</li> </ul> </li> </ul>
<b>Reporting</b>	<p>Writing a comprehensive geohydrological report outlining all the findings and existing environment of the proposed project area. This groundwater specialist report compiles all methodologies, findings, quantitative analysis (geochemical assessment and modelling outcomes), impact assessments, recommendations (proposed monitoring programme and recommended mitigation measures for predicted impacts) and conclusions. Appendices to the specialist report will include laboratory results.</p>



### 3 METHODOLOGY

#### 3.1 Hydrocensus

Hydrocensus' literally means, 'water census'. A hydrocensus is a task that involves gathering information on water features, water supply sources and sources of potential water pollution in a particular site or area (Alana, Kerry, and Irene, 2004).

#### **A hydrocensus aims to:**

- Identify details of water-related features (e.g., storm water channels, erosion gullies, weirs, diversion embankments), and disused or abandoned boreholes and wells.
- Identify features where water could collect in rainy periods (quarries, borrow pits, seasonal puddles, etc.).
- Identify potential sources of contamination (latrines, waste disposal sites, animal kraals, defecation sites, animal watering points, soak-away pits, and drains, etc.).
- Identify visible features and symptoms (e.g., borehole casing rusted away at the surface, presence of algal blooms in stagnant water) that indicate the potential for water contamination.
- Identify water sources and, where possible, indicate the flow rate and the quality.

#### 3.2 Sampling and chemical analysis

The data was collected using a variety of equipment, including a water level meter, a handheld GPS, a measuring tape, and a bailer. On site, these tools were employed on a variety of boreholes. For each borehole that was being monitored, the hand GPS was utilized to determine the longitudinal, latitude, and elevation. The measuring tape was used to take all collar height measurements of the boreholes after recording the GPS coordinates. The water levels were measured using a level meter and a measuring tape.

##### 3.2.1 Surface water sampling

- **Sampling using sampling Vessels**

Before sampling, the sampler must thoroughly clean the sampling vessel on site by rinsing it with water three to four times. Care must be taken to avoid contaminating the water used for sampling during rinsing. Gently submerge the collecting vessel, fill it with the water sample, and securely close it. If the obtained water sample can be frozen, leave some room for expansion equal to around 10% of the sampling vessel (Singh, 2015).



### 3.2.2 Groundwater sampling

- **Bailer**

A bailer is a hollow tube used to collect samples of groundwater from wells for monitoring. Bailers are tied to and lowered into the water column by a piece of rope or a piece of wire. When lowered, the bailer uses a simple ball check valve to seal a sample of the groundwater table at the bottom to raise it up. The bailers are made of polyethylene, PVC, FEP or stainless steel and can be disposable or reusable (Singh, 2015).

Bailers are easy and relatively inexpensive devices to use. In addition, bailers can be lowered to any depth although the depth of the well is sharply limited by pumps. Aeration of the water when the sample is collected, which could release volatile organic compounds that need to be tested, is the main downside to using bailers. This can also conflict with the proper seating of the ball check valve if there is a high volume of sediment or turbidity (Singh, 2015).

### 3.3 Groundwater modelling

The chosen software is MODFLOW. During model setup, the conceptual model is translated into a numerical model. This stage entails selecting the model domain, defining the model boundary conditions, discretizing the data spatially and over time, defining the initial conditions, selecting the aquifer type, and preparing the model input data. The above conditions together with the input data are used to simulate the groundwater flow in the model domain for pre steady state conditions.

#### **Conceptual model**

A conceptual model is a simplification of the complex real system down to familiar aspects that can easily be solved. This conceptual model is just a step prior to a solution model which can either be analytical or numerical.

#### **Numerical model**

Numerical groundwater modelling consists of flow and transport modelling types. Groundwater flow modelling can be represented by finite difference method or finite element. In this project finite difference method is used.



### 3.4 Groundwater availability assessment

#### Fractured Aquifer System of the Vryheid Formation

Groundwater flow within the fractured aquifer is linked to the fracture zones and joints present within the aquifer, and with the interconnectivity of the pore spaces within this aquifer (double porosity aquifer type). Local dolerite intrusions can cause the formation of aquifer compartments, where these intrusions act as groundwater flow barriers, within the fractured aquifer. Contacts between the coal seams and country rock can form preferential groundwater flow paths along these contacts. Groundwater level data from the monitoring boreholes (between 2016 and 2012) indicated that average water level depths below surface within boreholes of the fractured aquifer ranged between 0.47 m – 3.40 m, with an average of approximately 1.94 m

All groundwater movement in this study area occurs along secondary structures such as fractures, cracks, and joints in the rock. These structures are best developed in intruded bedrocks where cracks are formed hence the better water yielding properties.

Dolerite sills and dykes are generally impermeable to water movement, except in the weathered state. In terms of water quality, the fractured aquifer always contains higher salt loads than the upper weathered aquifer. The higher salt concentrations are attributed to a longer contact time between the water and rock (IGS, 2008).

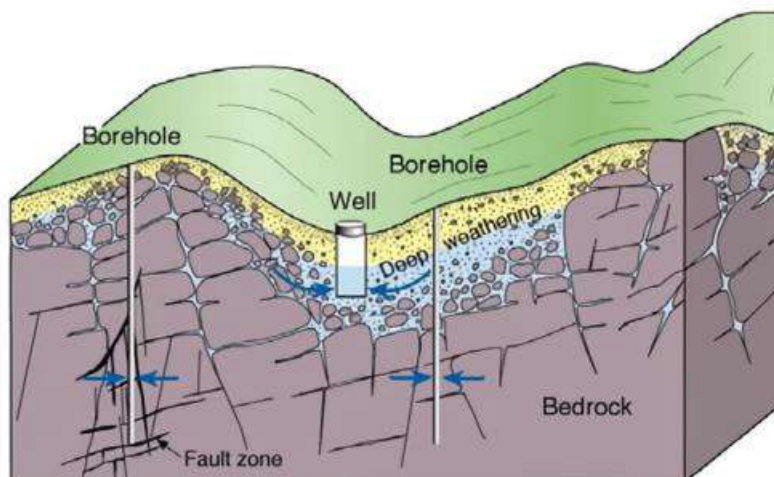


Figure 1: Fractured aquifer regime in the study area (Source: (Akhtar, et al., 2020)).



## Shallow Weathered Zone Aquifer

The shallow weathered zone aquifer is located within the weathering zone of the Vryheid Formation lithologies with an aquifer thickness that is associated with the local limit of weathering depths. Groundwater level data from the monitoring boreholes (between 2016 and 2012) indicated that average water level depths below surface within the shallow weathered aquifer ranged between 0.66 m – 22.75 m, with an average of approximately 6.68 m.

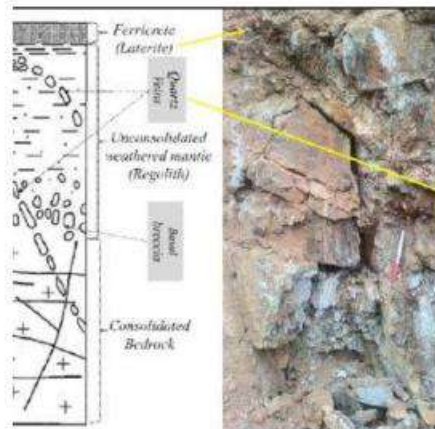


Figure 2: Weathered aquifer system

### 3.5 Groundwater recharge calculations

#### Chloride Mass Balance (CMB)

The method compares total chloride deposition (through precipitation) at the surface with chloride concentrations in groundwater as measured in samples from wells/boreholes. Chloride in the precipitation originates from sea salt. Chloride inputs from atmospheric deposition are conserved in the soil zone and concentrated due to loss of moisture by evapotranspiration.

Chloride ion is often used as a tracer for the investigation of water and solute movement in the unsaturated zone and aquifers. Tracers should be conservative behaviour, i.e., the tracer movement is not slowed or decreased in concentration by interaction with the solid phase and that it is not produced in the soil nor introduced by external sources.



### Assumptions:

- All chloride in ground water is derived from precipitation, no other sources.
- Chloride is concentrated by evaporation prior to recharge.
- Chloride is conservative in the system.
- Runoff after precipitation is negligible (most of the precipitation that reaches the ground recharges infiltrates into the unsaturated zone contributing to recharge).

### Basic equation for chloride mass balance method (Wood and Sanford, 1995)

$$q = P \frac{Cl_{wap}}{Cl_{gw}}$$

Where: q is the flux recharge (units of precipitation); P is the average annual precipitation; Cl<sub>wap</sub> - is the weight-average chloride concentration in precipitation (a conservative value of 1 mg/l is often assumed) and Cl<sub>gw</sub> – chloride concentration in the groundwater. **Recharge** is often expressed as % of rainfall.

### 3.6 Aquifer Testing

#### Purpose of aquifer testing

- To determine whether the groundwater available is sufficient for the proposed use.
- To determine the difference between the water level at rest and the pumping level, which is called the drawdown of a borehole. (The higher the aquifer yielding capacity, the smaller the drawdown for a given flow rate and the faster the recovery of the water level after pumping has stopped)
- To obtain information on the depth of groundwater and how it varies in response to pumping the borehole of interest, and borehole water level differs seasonally.

## 4 PHYSIOGRAPHICAL AND GEOLOGICAL SETTING

### 4.1 Project Location

The proposed project is located on Portion 2 of the farm Hartbeestpruit 281 JS, within the Magisterial District of eMalahleni in Mpumalanga Province, South Africa. The mining permit area is situated approximately 13 km South-East of Ogies. The area is located within quaternary catchment B11F of the Olifants Water Management Area (DWS, 2016) refer to Figure 3.



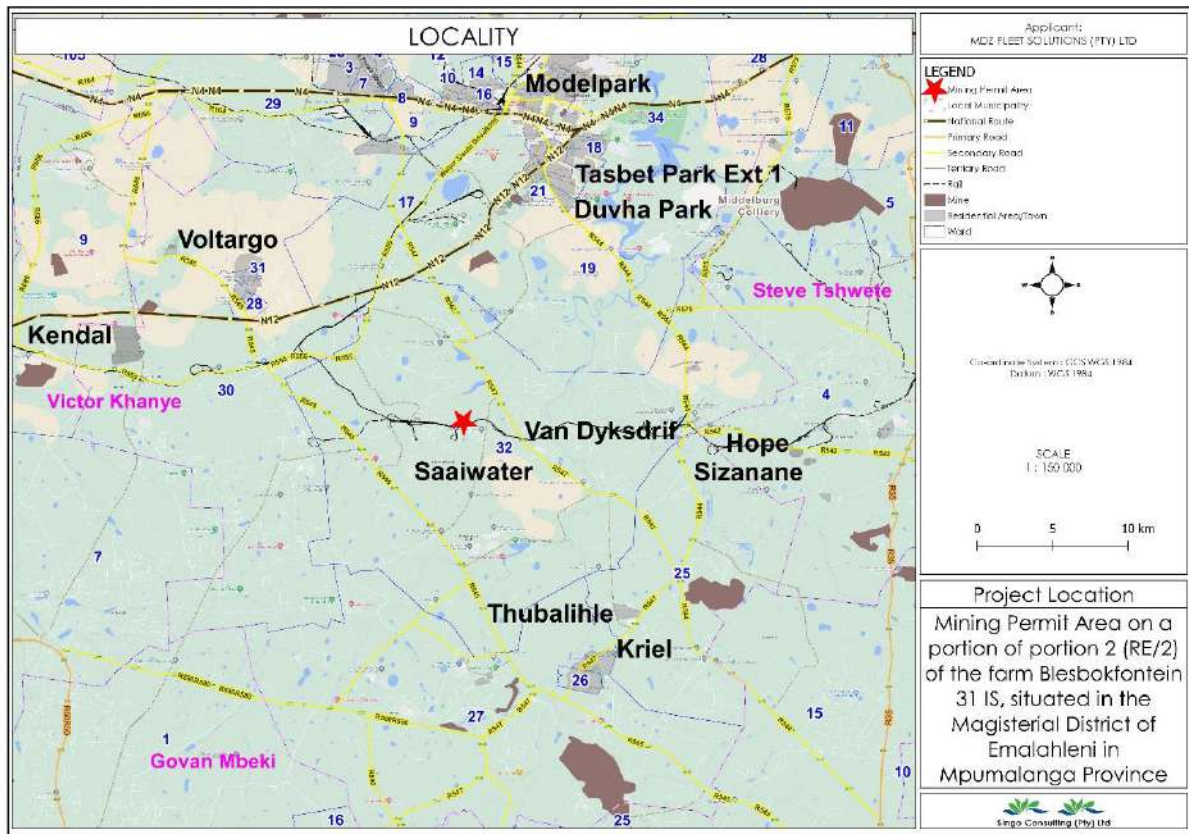


Figure 3: Locality map of the study area

#### 4.2 Climate

Climate, amongst other factors, influences soil-water processes and water availability in open to air systems in a water balance. The most influential climatic parameter is rainfall and evaporation. Rainfall intensity, duration, evaporative demand, and runoff were considered in this study to indicate rainfall partitioning within the project area.

#### Temperature

In eMalahleni, the average yearly temperature (refer to Figure 4 ) for the project area varies over the course of the year, it ranges from -4°celsius to 14°celsius (Low) and 18°celsius to 27°celsius (High). The Köppen Climate Classification suggests that the site is situated in a humid subtropical climate that receives rainfall in the summer months (Kottek, et al., 2006).





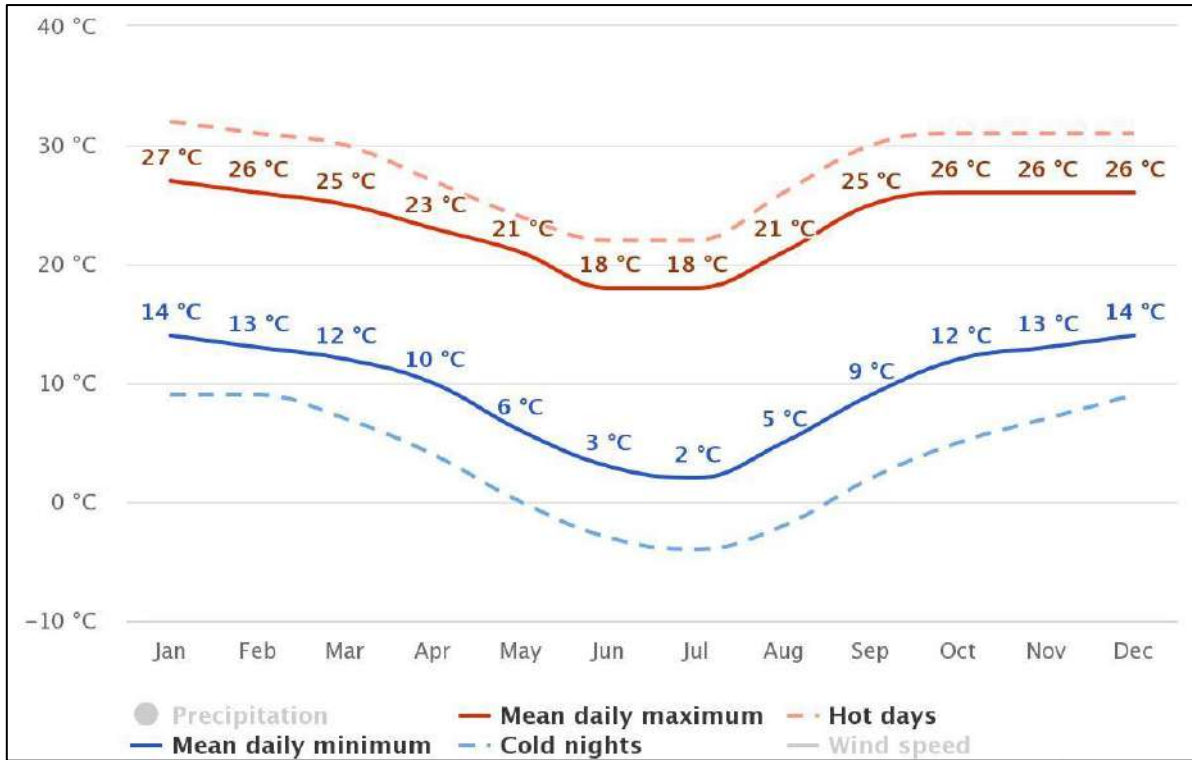


Figure 4: Average yearly temperatures (Meteoblue, 2023)

### Rainfall

Monthly rainfall is likely to be distributed as shown in Figure 5 below. As stated above, the area is located within quaternary catchment B11F, and the average mean annual precipitation (MAP) is in the order of 601 - 800 mm/annum) refer to Figure 6.



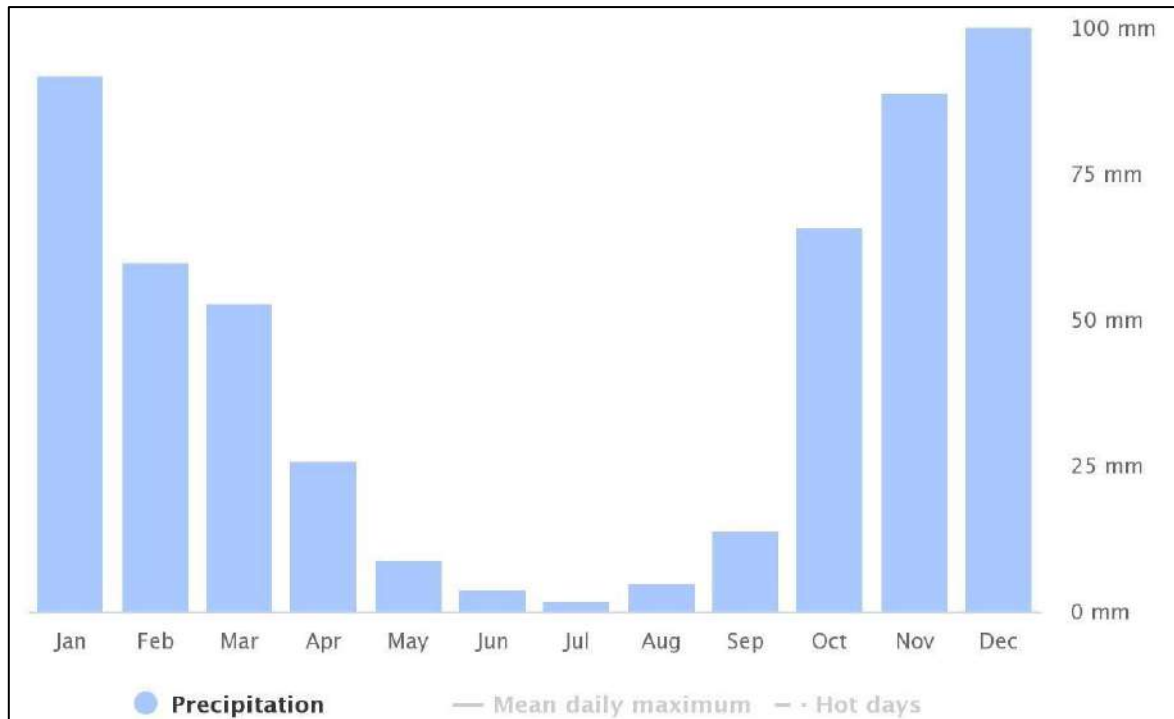


Figure 5: Mean monthly rainfall of the study area (Meteoblue, 2023)



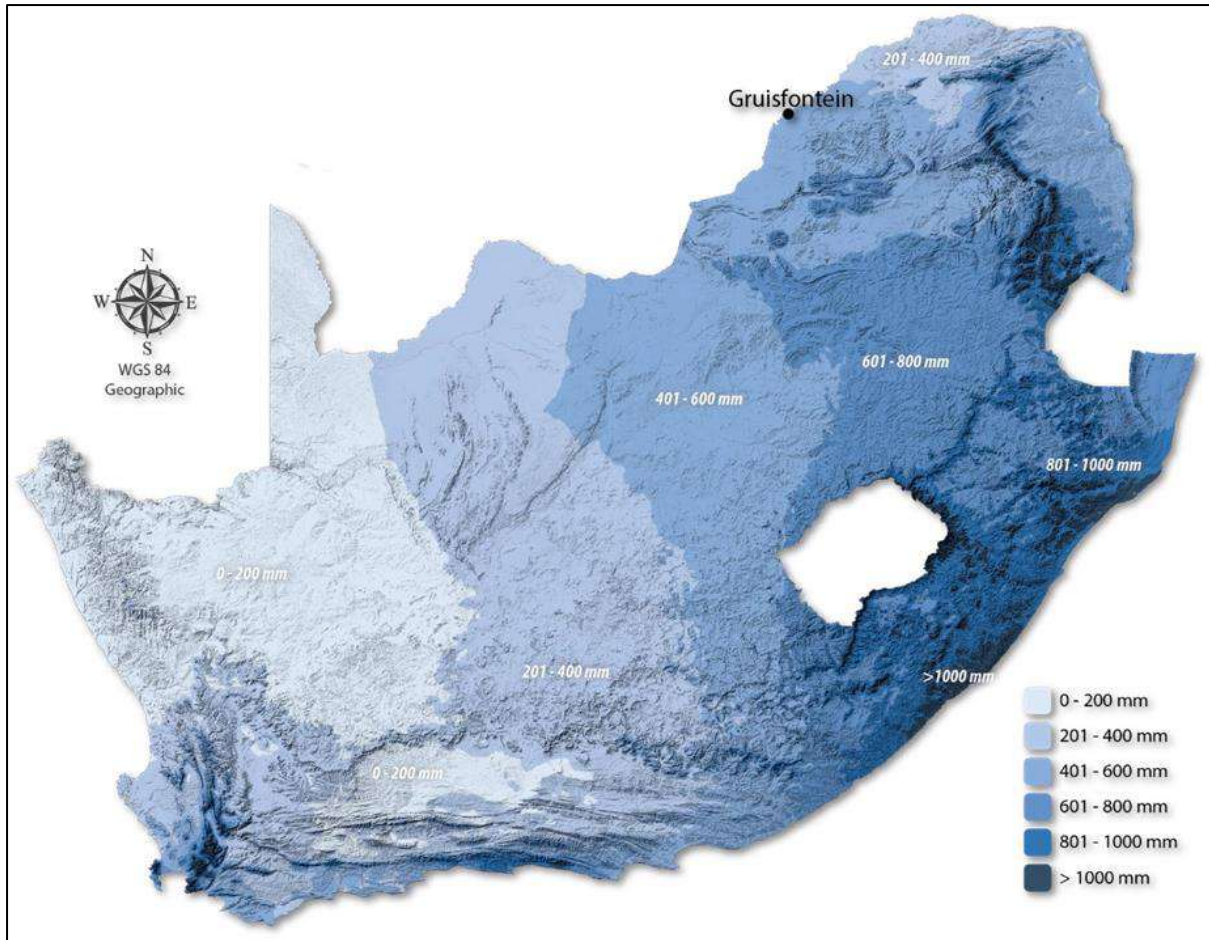


Figure 6: Mean Annual Rainfall map of South Africa

### 4.3 Drainage and Topography

The topographical map of the study area is depicted as shown on Figure 7 below which shows the elevation changes and landforms. Elevation is represented by contour lines and a contour interval of 5 m was used. In this environmental project, topography is used to determine how surface water flows during rainy seasons or how it would flow during the existence of the project. In this study area contours are widely spaced, when contour lines are widely spaced, it means that the terrain is relatively flat or gentle.

The topography of the proposed mining permit has approximately a minimum and maximum elevation of 1539 mamsl and 1542 mamsl respectively with an average slope of 1.9%.



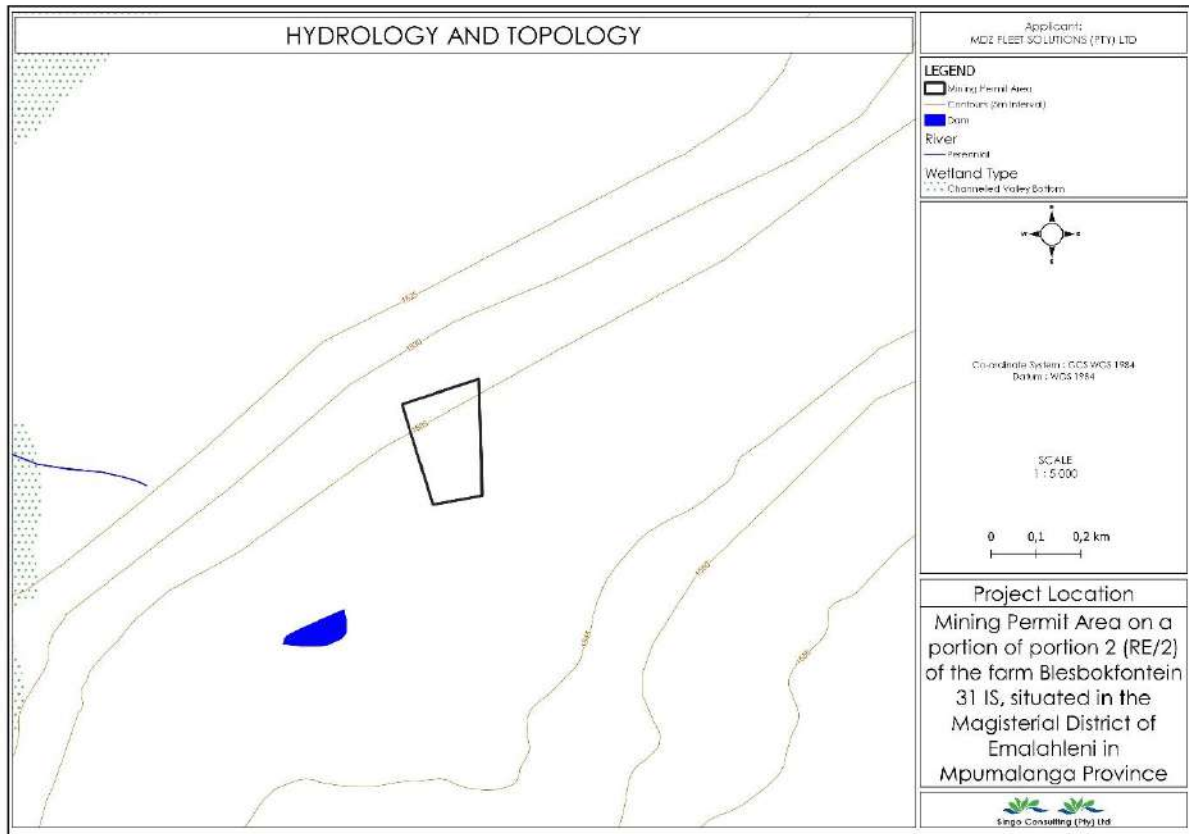


Figure 7: Hydrology and Topology map

#### 4.4 Catchment Information

South Africa's water resources are divided into quaternary catchments, which are the country's primary water management units (DWA 2011). In a hierarchical classification system, a quaternary catchment is a fourth order catchment below the primary catchments. The primary drainages are further classified as Water Management Areas (WMA) and Catchment Management Agencies (CMA). In accordance with Section 5 subsection 5(1) of the National Water Act, 1998, the Department of Water and Sanitation (DWS) has established nine WMAs and nine CMAs as outlined in the National Water Resource Strategy 2 (2013). (Act No. 36 of 1998). The purpose of establishing these WMAs and CMAs is to improve water governance in various regions of the country, ensuring a fair and equal distribution of the Nation's water resources while ensuring resource quality is maintained.

The proposed project area falls within the Olifants Water Management Area (WMA). The quaternary catchment is B11F. The WRC 2012 study, presents hydrological parameters for each



quaternary catchment including area, mean annual precipitation (MAP) and mean annual runoff (MAR).

Table 3: Quaternary Information data

Quaternary Catchment	Water Management Area	Catchment Area (km <sup>2</sup> )	S-Pan Evaporation		Rainfall	
			Evaporation Zone	MAE (mm)	Rainfall Zone	MAP (mm)
B11F	Olifants	428	4A	1600	B1C (ZB1CB)	692

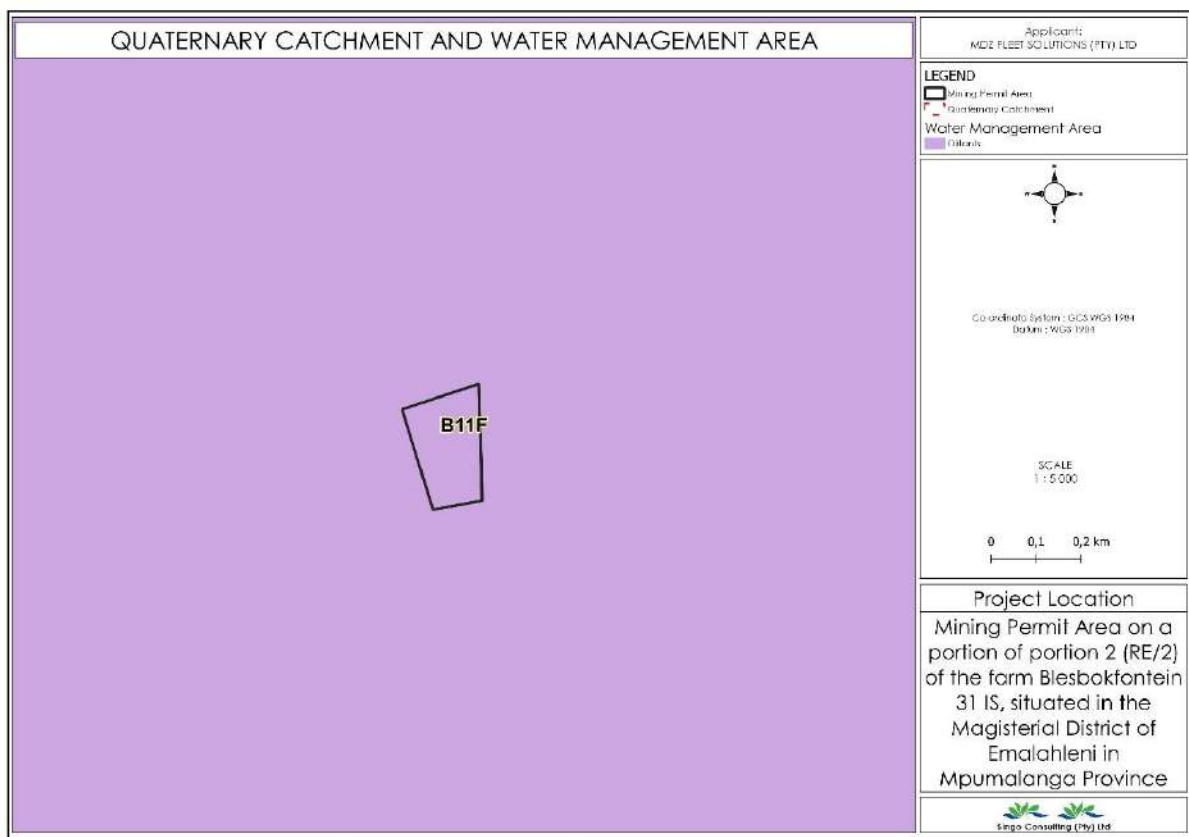


Figure 8: Quaternary Catchment and Water Management Area Map

4.5 Geology

**Regional Geology:**

**Karoo Supergroup**



In general, the coal deposits in South Africa are hosted in the Karoo Supergroup. The main Karoo Supergroup basin covers over 50% of South Africa's surface and consists of five age-based groups, which show a change of depositional environment in time. These groups are the Dwyka (glacial), Ecca (shallow marine and coastal plain), Beaufort (non-marine fluvial), Stormberg (aeolian) and the volcanic Lebombo or Drakensberg groups (Johnson et al., 2006). The proposed project area falls within the Ermelo coalfield. Sediments of Vryheid and Dwyka formations underlay the area which was deposited on a glaciated Pre-Karoo basement consisting of Rooiberg felsites. The Vryheid formation is essentially an interbedded succession of sandstone with lesser gritstone, siltstone, and mudstone, which contains five coal seams of the Ermelo coalfield.

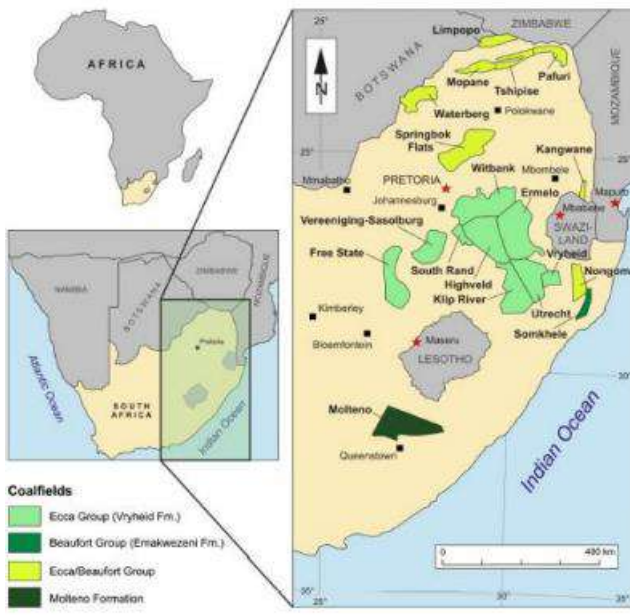


Figure 9: Coal field of South Africa (adopted from Hancox and Gotz, 2014)

### Dwyka Group

At the commencement of the deposition of the Dwyka Group, it is thought that the development of the Karoo supergroup foreplay system had begun approximately 30 million years prior. The foreland system was caused by crustal uplift that had previously begun to take course due to the subduction of the Paleo-pacific plate beneath the Gondwana plate (Bejnar, 2012). The rocks of the Dwyka Group in South Africa are amongst the most important glaciogenic deposits from Gondwana. This Group is named for exposures along the Dwyka River east of Laingsburg and forms the basal succession of the Karoo Supergroup. Dwyka



Group strata are mostly contained within bedrock valleys incised into Archean to lower Palaeozoic bedrock (Visser, 1990; Visser and Kingsley, 1982; Von Brunn, 1996).

The lithologies in the areas underlying the coalfields of South Africa consist of a heterolithic arrangement of massive and stratified polymictic diamictites, conglomerates, sandstones, and dropstone-bearing varved mudstones. The easily identifiable lithologies form a good marker below the coal bearing Eccca Group. In the distal sector of the MKB these sedimentary strata accumulated largely as ground moraine associated with continental ice sheets and is generally composed of basal lodgement and supraglacial tills. These deposits are generally massive, but crude horizontal bedding occurs in places towards the top (Tankard et al., 1982).

### **Ecca Group**

In the 1970s a number of studies (Cadle, 1974; Hobday, 1973, 1978; Mathew, 1974; Van Vuuren and Cole, 1979) showed that the Eccca Group could be subdivided into several informal units based on the cyclic nature of the sedimentary fills. In 1980 the South African Committee for Stratigraphy (SACS, 1980) introduced a formal lithostratigraphic nomenclature for the Eccca Group in the northern, distal sector of the MKB, which replaced the previously used informal Lower, Middle, and Upper subdivisions with the Pietermaritzburg Shale Formation, the Vryheid Formation, and the Volksrust Shale Formation.

### **Local Geology**

#### **Vryheid Formation**

The study area is underlain by sediments of the Vryheid Formation, of the Eccca Group of the Karoo Supergroup. Moreover, intrusive dolerite sill and dyke structures are known to occur in the region. The Vryheid Formation consists mainly of sandstone and shale with some subordinate coal seams associated with it (SACS, 1980). The sediments of the Vryheid Formation probably represent alluvial plain, upper and lower delta plain deposits with associated shallow lagoon and coastal swamps (Jerny and Bell, 1990). This formation has been subdivided into three different lithofacies arrangements. They are dominated by fine-grained mudstone, carbonaceous shale with alternating layers of bituminous coal seams, and coarse-grained, bioturbated immature sandstones respectively. The rock sediments are predominantly arranged in upward-coarsening cycles, although some fining-upward cycles are found in this formation's easternmost deposits. The alternating rock types observed in the Vryheid Formation indicate seasonal variations of storms and fairer weather in a pro-delta



setting. The carbonaceous shales were formed below the water surface in anoxic conditions and the coal formed from compacted plant matter deposited at the bottom of peat swamps. These swamps formed on abandoned alluvial plains where stagnant water accumulated. The Vryheid Formation reaches a maximum of 1030m in Nongoma, KwaZulu-Natal, within the Nongoma Graben.

Diverse Glossopteris fossil coal floras are known from the Vryheid Formation, including their fertile organs and fruitifications, lycopods, rare ferns such as *Asterotheca hammanskraalensis*, horsetail species such as *Annularia*, cordaitales, conifers, ginkgoales, rare fossil wood, and diverse palynomorphs. Abundant, low diversity trace fossils, namely of *Skolithos*, *Diplocraterion*, *Helminthopsis* and planolites, rare insects, possible conchostracans, non-marine bivalves, and fish scales. The coal seams themselves are classified as compaction fossils. The majority of the economically extracted coal in South Africa occurs in rocks of the Vryheid Formation, which ranges in thickness in the MKB from less than 70.0 m to over 500.0 m. It is thickest to the south of the towns of Newcastle and Vryheid, where maximum subsidence took place (Du Toit, 1918; Cadle, 1975; Whateley, 1980a; Stavrakis, 1989; Cadle et al., 1982) and where the basin was the deepest.





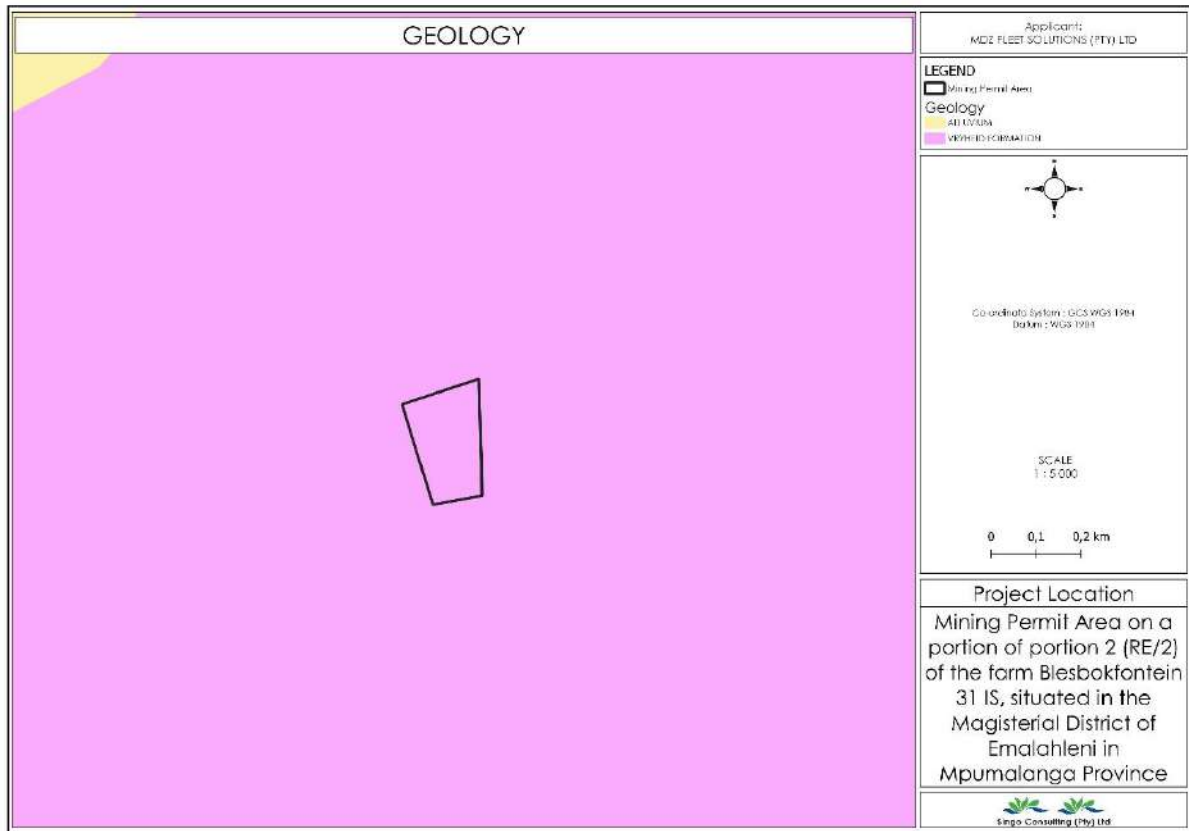


Figure 10: Geology map of the study area

## 5 GROUNDWATER INVESTIGATION


### 5.1 Fieldwork

Fieldwork involves physical observation of the study area, for the purpose of the study area it involved taking hydrocensus of the available water bodies and sampling within and around the study area, to clearly gather baseline information before the commencement of the mining operations.

Table 4 Site pictures taken on site.

Aspects/ Activity	Site Pictures
-------------------	---------------



<p><b>Topography onsite</b></p>	
<p><b>Site Notices</b></p>	

## 5.2 Hydrogeology

### Vryheid formation

The Vryheid formation is described by SACS (1980) as “consisting essentially of sandstone, shale, and subordinate coal beds, and has maximum thickness of 500 m<sup>2</sup>. It consists of thick beds of yellow to white, cross bedded sandstone and grit, alternating with beds of soft, dark grey, sandy shale and coal seams. Flakes of muscovite may be contained in the rock matrix. Plant fossils and trace fossils are plentiful in the Vryheid formation (Geel, 2014). As previously stated, the Vryheid is made up of sandstones, these sandstones are the ones that act as water storages in the area.



The groundwater potential of the Karoo formations located in the study area is limited in their pristine state due to low permeability and storage capacity. Secondary processes, such as weathering, fracturing, etc., are required to enhance the groundwater potential. Based on regional data, the hydrogeological resource maps, the following hydrogeological information is available for the formations within the study area:

- Vryheid Formation:
  - Lower Ecca
  - Intergranular and fractured aquifers
  - Borehole yields 0.1 to 0.5 l/s Groundwater

The sandstones of the Vryheid Formation of the Ecca Group can be massive and dense and have limited permeability and storage. It thus offers only moderate groundwater yield, especially in the absence of dolerite intrusions. Contacts between different rock lithologies and bedding planes within the sediments often yield groundwater. The contact zone between the dolerites and the sandstone lithologies can be high yielding. Fractured fault zones, especially if related to tensional stresses, are potentially rich targets for groundwater development. Groundwater occurs within the joints, bedding planes, and along dolerite contacts within the sediments.



## 6 AQUIFER CHARACTERIZATION

### 6.1 Groundwater vulnerability

Vulnerability of groundwater is a relative, non-measurable, dimensionless property (IAH, 1994). It is based on the concept that "some land areas are more vulnerable to groundwater contamination than others" (Vrba and Zaporozec 1994).

The main concerns in terms of possible groundwater contamination from the proposed mining activity are as follows:

- During the construction phase, Total Petroleum Hydrocarbon (TPH) contamination is possible due to the presence of heavy machinery on site. Spillages may occur which may impact both the soil and groundwater environment.
- During the operational phase, potential contamination may arise due to possible erosion which might lead to contamination of nearby water resources.

Because of the ensuing possibility of possible groundwater contamination from the sources or risks mentioned above, the aquifer's vulnerability is analysed. The following evaluation methodologies were used to establish the aquifer's vulnerability to various pollution sources:

**Method 1:** Aquifer Vulnerability Rating (DRASTIC Method).

Method: 1 evaluates and rates seven key parameters within the hydrogeological setting to determine a final aquifer vulnerability rating.

The DRASTIC (Depth to groundwater, Recharge, Aquifer type, Soil media, Topography, Impact on vadose zone and aquifer Conductivity) methodology (refer to Figure 4 1) developed by the Environmental Protection Agency (EPA) was applied to evaluate the aquifer vulnerability (Aller, 2004). The DRASTIC model was used to inform the geohydrological risk assessment.

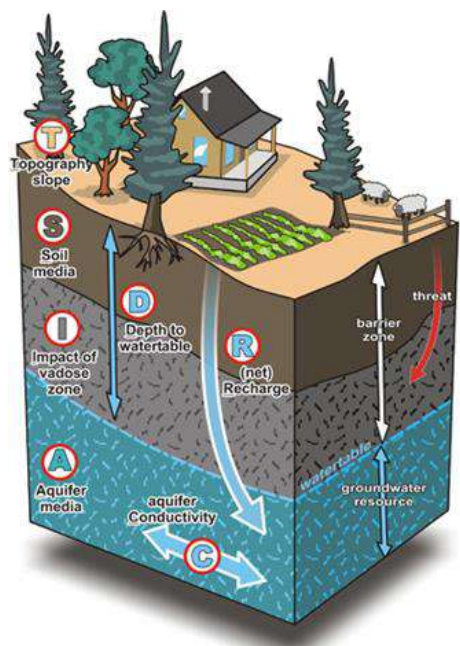


Figure 11: DRASTIC concept (Aller, 2004)

### Aquifer Vulnerability Rating (Drastic Method)

In the DRASTIC method, aquifer vulnerability is determined within hydrogeological settings by evaluating seven parameters denoted by the acronym:

- Depth to groundwater – Determined from DWA, GRA2 data, confirmed with a hydrocensus,
- Recharge – Obtained from DWA, GRA2 data.
- Aquifer media – Determined from geological maps and test pit profiles.
- Soil media – Determined from test pit profiles.
- Topography – Determined by digital elevation data.
- Impact on vadose zone – Determined from geological maps and test pit profiles.
- Hydraulic Conductivity – Protocol to Manage the Potential of Groundwater Contamination form on-site Sanitation (DWA, 1997).

Each of the parameters is weighted according to its relative importance. The DRASTIC Index is determined by rating each parameter according to a set of tables, multiplying the assigned rating by the parameter weighting and summing the resulting products. The higher the DRASTIC Index; the higher the vulnerability to contamination.



Table 5: DRASTIC model table rating for the aquifer underlying the study area.

Parameter	Effect	Rating										Weight	Site rating	Score
		1	2	3	4	5	6	7	8	9	10			
Depth to Water	Increasing depth to water increases time for natural attenuation or remediation of contaminant	> 33m	25 - 33m	17 - 25m		10 - 17m		5 - 10m		2 - 5m	0 - 2m	5	5	25
Recharge	Increasing recharge leads to faster movement of contaminant	0 - 10m/a	10 - 25mm/a	25 - 37mm/a		37 - 50mm/a	50 - 75mm/a	75 - 110mm/a	110 - 160mm/a	160 - 200mm/a	>200mm/a	4	8	32
Aquifer Media	Increasing porosity increases movement of		Compact sedimentary rocks with	Igneous and/or crystalline metamorphic	Igneous and/or crystalline metamorphic	Compact sedimentary rocks: fracture		Compact sedimentary rocks: weather	Massive dolomite / limestone.		Fractured dolomite / limestone with	3	4	12

	contami nants		widely spaced fractur es	rocks: fracture d	rocks: fracture d and weather ed	s directly below ground water level		ed and fracture d	Sand and Gravel		solution chann els			
Soil media (Draina ge)	increasin g soil drainage decreas es time for natural attenuati on or remediat ion		Clay loam and silty clay	Silty clay loam, sandy clay and silty loam	Sandy clay loam and loam	Sandy loam	Sandy loam	Shrinkin g and/or aggreg ate clay. Loamy sand	Sand. Shrinki ng and/or aggre gate clay	Sand	Sand	2	4	8
Topogr aphy (%Slope )	increasin g slope promote s runoff and decreas es downwa rd contami nant	> 18		12 to 18		6 to 12				2 to 7	0 - 2	1	10	10



	movement													
Impact of the Vadose Zone	Increasing vadose zone conductivity decreases time for natural attenuation or remediation of contamination		Mainly compact tillite	Mainly compact tillite and shale. Lava and Intrusive	Mainly compact tillite, shale and sandstone. Assemblage of compact sedimentary strata, and extrusive and intrusive rocks	Compact sedimentary strata	Compact, dominantly arenaceous strata	Consolidated porous to compact sedimentary strata		Porous unconsolidated to semi-consolidated sedimentary strata	Dolomite, chert, subordinate limestone	5	5	25
Hydraulic Conductivity	Increasing vadose zone conductivity	0.03 - 0.69 m	0.69 - 1.35m	1.35 - 2.02m	2.02 - 2.68m	2.68 - 3.34m	3.34 - 10m				>10m	2	10	20





	decreases time for natural attenuation or remediation of contamination													
Final Score														132



The vulnerability index score (DRASTIC index) for the site is 132. According to the DRASTIC screening of the project area, the area is situated in an area classified as a Medium aquifer vulnerability. In context, this means that the aquifer is considered to be at a medium to marginal risk with regards to the existing and proposed activities. Below is a classification table indicating the class description for the index range.

Table 6: Aquifer vulnerability table of the aquifer at eMalahleni

Index Range	Class name
≤ 89	Very Low
90 – 105	Low
106 – 140	Medium
141 – 186	High
187 – 210	Very High
≥ 211	Extremely High

The aquifer vulnerability from possible pollution sources is classed as “Moderate”. A moderate potential or likelihood for possible contaminated fluids originating from the site to reach the groundwater table exists. A medium aquifer protection level is therefore recommended.

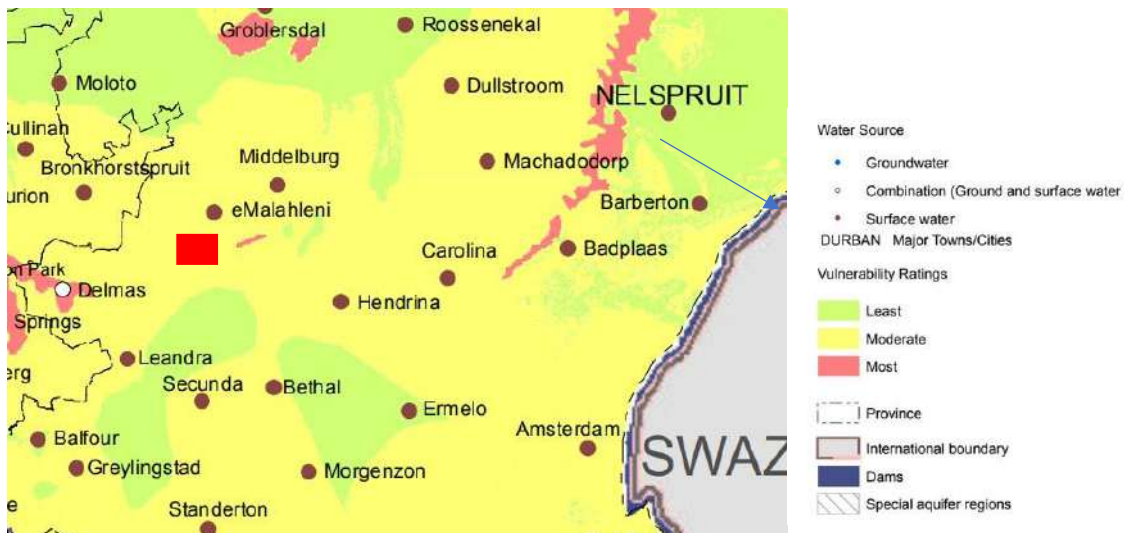


Figure 12: Aquifer Vulnerability of the study area

### 6.2 Aquifer classification

The classification of aquifers was done using the Aquifer classification Map of south Africa (Matoti, Conrad and Jones, 1999) and 2526 Johannesburg – 1:500 000 Hydrogeological map series (Barnard, 1999) **Error! Reference source not found..** The Map provides an overview of a

quifer that exist within an area, this information helps the decisionmakers to fully understand how over abstraction from the aquifer could affect those in the area.

The map details the dominant source water in the area, Surface water. The aquifer classification, Poor, Minor and Major aquifers. According to the aquifer classification map, the study area in the Magisterial District of eMalaheni in Mpumalanga Province is underlain by minor aquifer which implies that the aquifer is moderately yielding and of variable water quantity and the dominant source of water is surface water.

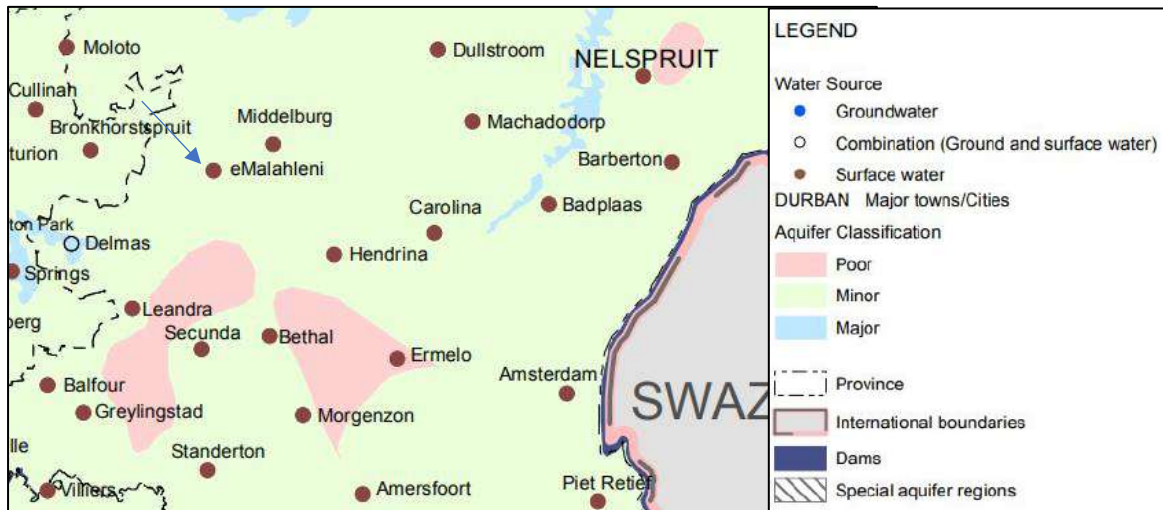


Figure 13: Aquifer Classification of the study area (Source: (Vegter & Seymour, 2012)).

Table 7: Aquifer characterization

<b>Sole aquifer</b>	<b>source</b>	An aquifer used to supply 50% or more of urban domestic water for a given area, for which there are no reasonably available alternative sources should this aquifer be impacted upon or depleted.
<b>Major region</b>	<b>aquifer</b>	High-yielding aquifer of acceptable quality water.
<b>Minor region</b>	<b>aquifer</b>	Moderately yielding aquifer of acceptable quality or high yielding aquifer of poor-quality water.
<b>Poor region</b>	<b>aquifer</b>	Insignificantly yielding aquifer of good quality or moderately yielding aquifer of poor quality, or aquifer that will never be utilised for water supply and that will not contaminate other aquifers.



## 7 GROUNDWATER MODELLING

### 7.1 Software model choice

MODFLOW software is the chosen software to model groundwater flow and contaminant transport in this situation. The finite difference numerical model was created using the US Department of Defence Groundwater Modelling System (GMS9.2) as Graphical User Interface (GUI) for the well-established MODFLOW and MT3DMS numerical codes.

MODFLOW is a 3D, cell-centred, finite difference, saturated flow model developed by the United States Geological Survey. MODFLOW can perform both steady state and transient analyses and has a wide variety of boundary conditions and input options. It was developed by McDonald and Harbaugh of the US Geological Survey in 1984 and underwent eight overall updates since. The latest update (MODFLOW-NWT) incorporates several improvements extending its capabilities considerably, the most important being the introduction of the Newton formulation of MODFLOW. This dramatically improved the handling of dry cells that has been a problematic issue in MODFLOW in the past.

MT3DMS is a 3-D model for the simulation of advection, dispersion, and chemical reactions of dissolved constituents in groundwater systems. MT3DMS uses a modular structure similar to the structure utilized by MODFLOW and is used in conjunction with MODFLOW in a two-step flow and transport simulation. Heads are computed by MODFLOW during the flow simulation and utilized by MT3DMS as the flow field for the transport portion of the simulation.

Elevation data is crucial for developing a credible numerical model, as the groundwater table in its natural state tends to follow topography. The best currently available elevation data is derived from the SRTM (Shuttle Radar Tomography Mission) DEM (Digital Elevation Model) data. The SRTM consisted of a specially modified radar system that flew on board the Space Shuttle Endeavour during an 11-day mission in February of 2000, during which elevation data was obtained on a near-global scale to generate the most complete high-resolution digital topographic database of Earth. Data is available on a grid of 30 meters in the USA and 90 meters in all other areas.

### 7.2 Model set-up and boundaries

During model setup, the conceptual model is translated into a numerical model. This stage entails selecting the model domain, defining the model boundary conditions, discretizing the data spatially and over time, defining the initial conditions, selecting the aquifer type, and



preparing the model input data. The above conditions together with the input data are used to simulate the groundwater flow in the model domain for pre steady state conditions.

### 7.3 Groundwater sources and sinks

The conceptual model was transformed into a numerical model following the characterization of the aquifers, contaminant sources and groundwater receptors, so that the groundwater flow conditions, and mass transport can be solved numerically. A conceptual model is a simplified, but representative description of the groundwater system that illustrates the interaction of the sources, pathways, and receptors at the site.

A logical and holistic approach was adopted to evaluate the study area. The Best Practice Guidelines for Impact Prediction (Department of Water Affairs and Forestry [DWAF], 2008), was considered to define and understand the three fundamental components of the hydrogeological risk associated (also referred to as "SPR") with the site activities:

The SPR conceptual model was first used in the field of environmental engineering in the late 1970's to describe the flow of environmental pollutants from a source, through different pathways to potential receptors (Holdgate, 1979). Since then, the model has been used in several environmental risk assessments (e.g., Environment Agency, 2004, Scottish Government, 2010, Sneddon et al., 2009).

**Source** - The origin of a hazard (i.e., operational risk associated with the activities at the site, for example, Construction phase, operational phase, Decommissioning phase, and post closure phase).

**Pathway** – It is the pathway along which the risk propagates or a route that a hazard takes to reach Receptors. A pathway must exist for a Hazard to be realized (i.e., percolation to the groundwater aquifer or overland runoff).

**Receptor** – It is the target that experiences the risk (i.e., water bodies or groundwater users). Receptor refers to the entity that may be harmed (a person, property, habitat etc.). For example, in the event of construction (the source) TPH may propagate through the soil (the pathway) and reach groundwater (the receptor) that may suffer degrade its quality.

The approach was used to assess:



1. How the existing/proposed mining activities have/could impact groundwater Quality; and
2. How the existing/proposed mining activities have/could affect the groundwater Quantity

The figure below outlines the sources, pathways, and receptors of the proposed development throughout its phases, ranging from construction to operational phase.



Figure 14: SPR Model for the proposed mining activity



## 8 HYDROGEOLOGICAL IMPACT ASSESSMENT

The impacts to groundwater quantity and quality for the development of the mining permit can be discussed according to the different phases. These phases include construction, operational and decommissioning phases.

### 8.1 Construction phase

#### 8.1.1 Impacts on groundwater quantity

- The establishment of the opencast areas is expected to have a negative effect on the surrounding aquifers within the immediate area which can cause lowering of water levels on neighbouring boreholes.
- Dewatering of groundwater in certain areas during the construction phase also leads to reduction in groundwater quantity in the area.
- Substantial amount of groundwater will be used during construction phase of tailings dam, and other infrastructures such as buildings.
- Streams may need to be diverted, to create way or to prevent pollution. Surface water recharges groundwater, their absence in an area also decreases the quantity of groundwater.
- The establishment of hard paved areas during infrastructure construction and haul road construction reduces the recharge of aquifers due to increased runoff.

#### 8.1.2 Impacts on groundwater quality

- During Construction phase, trucks and other vehicles on site will have to be fuelled, leaks during such process has the potential for causing contamination of surface water and groundwater.
- The operation of offices, ablutions and maintenance workshops has the potential for the contamination of groundwater due to incorrect disposal of domestic and hazardous wastes, incorrect handling of workshop effluent spills and leaks.
- The use of nitrate-based explosives during blasting for the establishment of the opencast areas has the potential to cause surface water pollution due to the addition of nitrates to water.
- Blasting has the potential to contaminate water as well in the sense that the vibrations caused could fracture the neighbouring aquifers, and cause migration of wastewater to mix with freshwater.



- During the construction phase, a lot of metals is used which often results, metal scraps when exposed to water and oxygen could lead to iron oxide, which could infiltrate into soils and ultimately contaminate groundwater and surface water. And disposal of other wastes is high, which could end up in river streams, and contaminate groundwater.

### 8.1.3 Groundwater management

- Frequent monitoring of spills, which include petrol, diesel, and oils, to quickly clean up.
- Proper management of stormwater drainage infrastructure should be ensured.
- Vehicle repairs on site should be minimized, and when done, it should be on a hard standing surface.
- Regular monitoring of groundwater, for quantity and quality with the use of boreholes as per the WUL and approved monitoring programme.
- Spill kits will be made available in areas of likely spillage.
- All hydrocarbon storage containers will be stored within a bunded areas which are watertight and able to contain 110% of the stored volume.
- All around the site, there should be availability of metal industrial bins, which should be frequently emptied, to avoid overflow of waste.

## 8.2 Operational phase

### 8.2.1 Impacts on Groundwater quantity

- The constant movement of trucks, this hardens the surface, which in turn decreases the amount of infiltration and increase run-off in that area.
- There will be regular inflow into the pit through the rock fractures and other geologic features, this water will be pumped out of the pit and discharged somewhere it wasn't.
- The exploitation of the resource still requires the use of blasting, this could still impact the groundwater quantity by creating fissures and migration of groundwater from one area to the other.
- The processing method of coal uses a lot of water as well, such as cooling at the plant and dust suppression at the site uses an extensive amount of groundwater, this is seen by decrease in hydraulic head at the surrounding boreholes.
- Coal washing also will be a huge factor with groundwater reduction in quantity.
- Dust suppression requires a significant amount of water.





### 8.2.2 Impacts on groundwater quality

- The operation of the fuel and lubricants storage facility has the potential for causing contamination of groundwater due to either an infrastructure failure (emergency) or spillages during normal operation.
- The spillage of ammonium nitrate-based explosives during charging of holes, misfires and incomplete combustion of explosives may lead to an increase in nitrate levels in groundwater.
- Included in normal operation is the potential for the incorrect disposal of spill absorbing material.
- AMD formation from spoil piles, exposed shale and backfilled spoils and discard in rehabilitated areas will affect groundwater quality through the acidification of groundwater and the leaching of salts and heavy metals from rock.
- Depending on the buffering capacity of the host rock, AMD will either result in the formation of low pH, high dissolved salt, and heavy metal content water (insufficient buffering capacity) or the formation of neutral pH, high salt (including sodium) water, if high buffering capacity exists.
- During the operation stage, mining of coal is associated with sulphur, the reaction of sulphur with water and oxygen lead to acid rock drainage, also called yellow boy

### 8.2.3 Impacts on surface water

- Impact on water quality and erosion because of the pipeline breaking and spillage to the nearby wetland and perennial river.
- Pump failure will result in dirty water accumulation in the pit, leading to uncontrolled dirty water management and associated pollution.
- Impact on water quality and availability as a result in ineffective dirty water separation, and dirty water entering the wetland.
- High rate of ground water ingress causing flooding of the pit.
- The rainfall water within the designated dirty water area of the pit area that forms part of the MAR to the local water courses will be removed from the catchment. This will result in a lower intensity potential on the local surface water resource.
- Increase in volume of contaminated water that needs to be managed within the footprint.
- Erosion of stream banks because of crossings and diversions leading to siltation of the streams.



- Impacts on surface water resources quality because of incorrect waste management practices and pollution.
- During the operation of the mine, waste within the mining permit area is likely to increase, contributing to land pollution, which will end up in the streams contaminating the water.

#### 8.2.4 Groundwater management

- All spillages will need to be cleaned up as soon as practically possible.
- Proper management of stormwater drainage infrastructure should be ensured.
- Maintain construction vehicles and encourage contractors to report, react and manage all spills and leaks so that action can be taken to immediately minimise contamination to the groundwater.
- Groundwater monitoring of boreholes should continue as per the WUL and approved monitoring programme.
- Spill kits will be made available in areas of likely spillage.
- All equipment utilising hydrocarbons will be stored on a hard standing surface.
- Grouting and capping of boreholes located within the footprint of construction camps be required prior to construction activities.
- Treat the water emanating for the opencasts to increase the decant water quality.
- Dust suppression should be done using already used water, but not polluted water that could lead to groundwater contamination.

#### 8.3 Decommissioning phase

The mining permit area is 5 ha at most, the potential contaminants are relatively low but can have a long-term adverse effect on the environment. The quality of groundwater will be impacted upon the ceasing of the mining operations, the following impacts are envisioned with respect to coal mining:

- Erosion of the exposed material, such material could end up in the nearing river, this could degrade the water quality of groundwater through infiltration and surface water.
- The mining area might produce a seepage zone or decant as the recharge to opencast workings have increased by the disturbance of the strata.
- Infrastructures no longer maintained, this could lead to rusting of the metals, which could hinder the quality of water resources.



- Acid Rock Drainage, coal sand mining is associated with the exposing of sulphur, the reaction of water, sulphur and oxygen leads to ARD which contaminates the water resources.

### Mitigation Measures

- As soon as mining ceases, the mined-out areas should be rehabilitated to avoid the risk of ARD
- Legislations pertaining to mining, Water, and environment should be abided by.
- Frequent monitoring should be applied.

## 8.4 post-mining phase

### 8.4.1 Groundwater quality

Once the operation of mining stop, the area now in most cases and as instructed by the relevant legislations, will be rehabilitated to an acceptable state. The following impacts are envisioned:

- AMD, upon mining, the area will no longer be maintained, rainfall will fill the open areas if there are any, and exposed or harmful minerals will be dissolved, which will contaminate surface and groundwater and the resulting wastewater is called Acid Mine Drainage.
- ARD, this is usually associated with coal mining since coal contains sulphur. Exposed sulphur reacts with water and oxygen. In most mines, overburden is not returned to where it was, this could expose sulphur to oxygen and water.
- Metal structures no longer in good condition, the metals are likely to rust, which will contaminate the soil and the water resources (Groundwater and surface water).
- The ablution facilities will no longer be maintained, rainfall is likely to wash the waste to the nearby streams or rusting of the sewage pipes.

### 8.4.2 Cumulative impacts

A cumulative impact is the impact on the environment that results from the incremental impact of the action when added to the other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions (Nas Whidbey, 2018). The cumulative impacts due to the proposed development



activity could be of a quantitative and qualitative nature. The current land cover and land use in the area of interest includes plantation, bare land and natural vegetation.

### **Groundwater Quality**

The qualitative nature of groundwater or surface water is threatened due to the proposed activity. The construction and operational phase if not properly managed, all will have a detrimental effect of the groundwater quality. The proposed activity will be surrounded by the various land use activities which include but not limited to mining operations and plantation.

### **Groundwater Quantity**

The quantitative nature of the groundwater in the area, there is likely to be an increase in the demand of groundwater in the area which will decrease the groundwater level. The quantity of groundwater in the area is threatened by the proposed project, this is due to the fact that currently there is no borehole or any mechanism of abstracting groundwater, and the quantity of water which the people use from the dam is severely small compared to the amount that will be used by the mine for its activities, if they choose to use water from the Dam.



## 8.5 Impact assessment and mitigation measures table

Table 8: Impact assessment and mitigation table

Severity of impact	RATING	Spatial scope of impact	RATING	Duration of Impact	RATING	Frequency of Activity	RATING	Frequency of Impact	RATING	
<b>Insignificant/ non-harmful</b>	1	Activity specific	1	1 day to 1 month	1	Annually or less/ low	6	1	Almost never/ almost impossible	1
<b>Small / potential harmful</b>	2	Mine specific (within the mine boundary)	2	1 month to 1 year	2	Monthly/temporary		2	Very seldom/ highly unlikely	2
<b>Significant/ Slightly harmful</b>	3	Local area (Within 5km of the mine boundary)	3	1 year to 10 years	3	Monthly/ Infrequent		3	Infrequent/ unlikely/ seldom	3
<b>harmful</b>	4	Regional	4	Operational life	4	Weekly/life operation/regularly/likely	of	4	Often/ regularly/ likely/ possible	4
<b>extremely harmful</b>	5	National	5	Post-closure/ Permanent	5	Daily/ permanent/high		5	Daily/ highly likely/ definitely	5

**The Environmental Significance is derived from the below mentioned variables:**

Severity (Magnitude) Of Impact (M)

Spatial Scope (S)

Duration of Impact (D)

Frequency of Activity (Fa)

Frequency of Impact (Fi)

**Environmental Significance** = (Severity of Impact + Spatial Scope + Duration of Scope) X (Frequency of Activity + Frequency Of impact)

### 8.6 Significance Rating Matrix

Table 9: Significance rating matrix

		(Severity(M) + Spatial scope(S) + Duration(D))															
Frequency Of Activity(Fa) + Frequency Of Impact(Fi)	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>	<u>10</u>		<u>11</u>	<u>12</u>	<u>13</u>	<u>14</u>	<u>15</u>	
	<u>2</u>	<u>4</u>	<u>6</u>	<u>8</u>	<u>10</u>	<u>12</u>	<u>14</u>	<u>16</u>	<u>18</u>	<u>20</u>			<u>22</u>	<u>24</u>	<u>26</u>	<u>28</u>	<u>30</u>
	<u>3</u>	<u>6</u>	<u>9</u>	<u>12</u>	<u>15</u>	<u>18</u>	<u>21</u>	<u>24</u>	<u>27</u>	<u>30</u>			<u>33</u>	<u>36</u>	<u>39</u>	<u>42</u>	<u>45</u>
	<u>4</u>	<u>8</u>	<u>12</u>	<u>16</u>	<u>20</u>	<u>24</u>	<u>28</u>	<u>32</u>	<u>36</u>	<u>40</u>			<u>44</u>	<u>48</u>	<u>52</u>	<u>56</u>	<u>60</u>
	<u>5</u>	<u>10</u>	<u>15</u>	<u>20</u>	<u>25</u>	<u>30</u>	<u>35</u>	<u>40</u>	<u>45</u>	<u>50</u>			<u>55</u>	<u>60</u>	<u>65</u>	<u>70</u>	<u>75</u>
	<u>6</u>	<u>12</u>	<u>18</u>	<u>24</u>	<u>30</u>	<u>36</u>	<u>42</u>	<u>48</u>	<u>54</u>	<u>60</u>			<u>66</u>	<u>72</u>	<u>78</u>	<u>84</u>	<u>90</u>
	<u>7</u>	<u>14</u>	<u>21</u>	<u>28</u>	<u>35</u>	<u>42</u>	<u>49</u>	<u>56</u>	<u>63</u>	<u>70</u>			<u>77</u>	<u>84</u>	<u>91</u>	<u>98</u>	<u>105</u>
	<u>8</u>	<u>16</u>	<u>24</u>	<u>32</u>	<u>40</u>	<u>48</u>	<u>56</u>	<u>64</u>	<u>72</u>	<u>80</u>			<u>88</u>	<u>96</u>	<u>104</u>	<u>112</u>	<u>120</u>
	<u>9</u>	<u>18</u>	<u>27</u>	<u>36</u>	<u>45</u>	<u>54</u>	<u>63</u>	<u>72</u>	<u>81</u>	<u>90</u>			<u>99</u>	<u>108</u>	<u>117</u>	<u>126</u>	<u>135</u>
	<u>10</u>	<u>20</u>	<u>30</u>	<u>40</u>	<u>50</u>	<u>60</u>	<u>70</u>	<u>80</u>	<u>90</u>	<u>100</u>			<u>110</u>	<u>120</u>	<u>130</u>	<u>140</u>	<u>150</u>



Table 10: Significance rating matrix

OPERATIONAL PHASE	Potential environmental impact	Environmental significance before mitigation						Recommended measures/remarks for mitigation	Environmental significance after mitigation						
		M	S	D	F a	F i	t o t a l		M	S	D	F a	F i	t o t a l	S P
OPERATIONAL PHASE	Increased groundwater contamination potential due to overburdened stockpiles.							1. Use lining system before stockpiling the overburden, as recommended by the waste classification study of the project area (for e.g geomembrane lining)	1	2	3	4	2	3	6
		4	2	3	4	4	7 2	2. Lined Dirty Water Trenches will be erected around the stockpiling area, directing to the pollution control dam	1	2	2	1	2	1	5



								3. Monthly Environmental audits will be conducted (to monitor the compaction, life of the soil, alien invasion and erosion)	1	2	2	4	2	3	0
Fuel & hydrocarbon spills from cars can lead to contamination of groundwater	4	2	4	4	4	8	0	Have spill trays and absorbent spill kits. Workshops and diesel bays should be lined with clay/ concrete slab. An emergency response contingency plan should be put in place to address clean-up measures should a spill/ leak occur.	2	2	3	4	2	4	2
Borehole / aquifer reduction outcomes from pit dewatering	3	3	4	4	4	8	0	Avoid pumping/ dewatering amounts of water higher than the regulated accepted amount to prevent cone of depression. Increase groundwater recharge by having vegetation, avoiding steep slopes and excess runoff. Authorising all production boreholes within the mine in terms of section 21, of the NWA 36, 1998.	2	2	4	3	2	4	0





<p>Open cast mining will result in pit inflows which can result in flooding within the mine workings</p>	4	2	2	4	4	6 4	<p>Conduct pitwater dewatering frequently to the pollution control dam. Use this water to conduct dust suppression within the mine.</p>	2	2	2	4	2	3 6	
<p>Surface and groundwater quality may be impacted by acid mine drainage potential</p>	5	3	5	4	4	1 0 4	<p>Dams to regulate pollution must be lined and intended to meet the requirements of NEMA and NWA (Act 36 of 1998). Manage any leaks and spills to avoid contamination of groundwater. Monitor groundwater to detect contamination of groundwater. Neutralize water stored in the PCD with lime before using for dust suppression. Conduct AMD treatment either using passive or active methods.</p>	3	2	3	4	3	5 6	
<p>Ablution facilities leakages</p>	4	3	4	4	4	8 8	<p>Mobile ablution facilities will be utilized, and will be serviced twice weekly by a service provider</p>	2	2	1	4	2	3 0	



POST-CLOSURE IMPACTS	<p>Diversion of water resources during mining. (e.g stream diversion/impeding)</p>	4	4	5	5	4	1 1 7	<p>Apply for a water use licence, as section 21 c and l of the NWA, 36 1998, is triggered.</p>	3	2	5	5	4	9 0	
	<p>Contribution of salt load towards the closest river</p>	4	3	5	5	3	9 6	<p>1.NaCl concentration monitoring in both surface and groundwater to detect increase of this concentration in time. Ensure proper rehabilitation of materials after mining</p>	2	3	5	1	3	4 0	
	<p>Mine Decanting, potential decant points will be identified within the mine boundaries.</p>	5	3	5	5	5	1 3 0	<p>Ensure proper rehabilitation of the mine especially the identified decant point. Monitor decant points regularly. Ensure the Artesian wells, if any are well cased and capped.</p>	2	2	5	3	2	4 5	
	<p>Aquifer contamination due to backfill</p>	4	3	5	3	2	6 0	<p>Monitor the rehabilitated area post-closure. Ensure the mine pits are lined and backfilled with materials that are declared not acidic.</p>	2	2	5	2	2	3 6	



## 8.7 Mine Decant

A major environmental problem relating to mining in many parts of the world is uncontrolled discharge of contaminated water (or decant) from abandoned mines (Banks et al., 1997, Pulles et al., 2005). Commonly known as acid mine drainage (AMD), there is wide acceptance that this phenomenon is responsible for costly environmental and socio-economic impacts.

Surface sources of AMD that present the greatest threat to the environment are coal discard dumps and slurry dams, gold tailings/slimes dams and waste rock dumps, and uranium slimes dams. Subsurface impacts are generally associated with water ingress (flooding) into underground mine workings, with the attendant threat of dewatering the source (and often pristine) groundwater regime and, in the post mining phase, providing a source of acid mine water for potential migration into the groundwater environment during rewatering (Banister et al., 2002).



Figure 15: Example of AMD Decant of an abandoned mine

### **Possible sources of Mine decant:**

- Exposed diggings/ mine working which could collect water during rainy seasons.
- Non-maintained sewage systems of which leaks could mix with freshwater bodies.
- Created voids during mining which act as a preferential flow for groundwater towards the surface.

### **Mitigation measures of mine decant:**

- Once an area has been mined out, methods such as resistivity or seismic methods should be used to clearly identify fracture, voids, or openings, of which such opening can be closed.
- Post mining, there should be monitoring of the groundwater using software to clearly understand future water volumes, direction, and possible paths.

## 9 GROUNDWATER MANAGEMENT PLAN

### 9.1 Proposed Actions

#### 9.1.1 Operational Phase

- All spillages will need to be cleaned up as soon as practically possible.
- Proper management of stormwater drainage infrastructure should be ensured.
- Maintain construction vehicles and encourage contractors to report, react and manage all spills and leaks so that action can be taken to immediately minimise contamination to the groundwater.
- Groundwater monitoring of boreholes should continue as per the WUL and approved monitoring programme.
- Spill kits will be made available in areas of likely spillage.
- All equipment utilising hydrocarbons will be stored on a hard standing surface.
- Grouting and capping of boreholes located within the footprint of construction camps be required prior to construction activities.
- Treat the water emanating for the opencasts to increase the decant water quality.
- Dust suppression should be done using already used water, but not polluted water that could lead to groundwater contamination.

#### 9.1.2 Post-Closure Phase

- Post mining, there should be rehabilitation which includes but not limited to vegetation and removal of hard standing surfaces.
- There should be frequent monitoring until such time the cumulative impacts of the mining activity are no longer visible
- The stockpile or overburden post mining phase, it should be disposed of from that area or used to fill the voids used by the mining activities.
- The wastewater should be treated and then returned to the environment in the best quality as practically possible.

### 9.2 AMD Treatment Plan

Acid mine drainage (AMD) forms when sulphide minerals are exposed to oxidizing conditions in coal and sand metal mining, highway construction, and other large-scale excavations. There are many types of sulphide minerals. Iron sulphides common in coal regions are predominately pyrite and marcasite ( $\text{FeS}_2$ ).



### 9.2.1 Risk-Based AMD Assessment

To ascertain which factors may impact on environmentally sensitive receptors and which may require on-going management. A risk assessment was undertaken in accordance with the Risk Management Standard. The hierarchy of risk controls considered are:

- **Elimination:** stop using the equipment or stop undertaking the procedure/activity causing the risk (e.g., comprehensive surface /ground water management plan).
- **Substitution:** use an alternative substance, equipment or process which poses less risk (e.g., implement different more technologically driven excavations to recover resources and differentiate PAF materials).
- **Isolation:** separate receivers from the source of the risk (e.g., implement compaction and ground sealing activities to prevent surface water percolation).
- **Engineering controls:** reduce exposure to the risk by making physical changes to equipment, procedures, or the work environment (e.g., installing equipment in areas with low risk of acidity and/or alkalinity).
- **Change work practices:** adopt work procedures which minimise exposure to the risk (e.g., where feasible zone and preserve areas with high PAF risk).



Table 11: Risk Likelihood Classification (Hendry Alison, 2016)

Level	Likelihood	Description	Criteria
A	Rare	Practically impossible, will only occur in exceptional circumstances. Has never occurred in the industry.	0-1%
B	Unlikely	Could occur at some time but highly unlikely. Has occurred in the industry previously.	1-10%
C	moderate	Might occur at some time. Has occurred in associated companies previously.	11-50%
D	Likely	Known to occur or will probably occur in most circumstances. Has occurred several times/year in associated companies.	51-90%
E	Almost certain	Common or repeating occurrence. Is expected to occur several times/year in any associated business.	91-100%

Table 12: Risk Consequence Classification (Hendry Alison, 2016)

Level	Consequence	Description
1	Insignificant	No measurable impact on the environment. No injuries. Low financial loss.
2	Minor	Minor, temporary environmental impact. No publicity likely and no stakeholder concerns. First aid treatment required. Medium-low financial loss.
3	Moderate	Substantial temporary or permanent minor localized environmental damage. Stakeholder enquires (this may include government, unions or public). Medical attention required. High-medium financial loss.

4	Major	<p>Substantial or permanent environmental damage.</p> <p>Prosecution possible.</p> <p>Loss of company credibility and high stakeholder interest.</p> <p>Permanent injuries.</p> <p>High financial loss.</p>
5	Catastrophic	<p>Widespread severe and permanent environmental damage.</p> <p>Major stakeholder and media interest.</p> <p>Prosecution likely.</p> <p>Permanent injury or death.</p> <p>Extreme financial loss</p>



Table 13: Risk assessment matrix for the AMD assessment (Hendry Alison, 2016).

Likelihood		consequences				
		1	2	3	4	5
		Insignificant	Minor	Moderate	Major	Catastrophic
E	Almost Certain	11	16	20	23	25
D	Likely	7	12	17	21	24
C	Probable	4	8	13	18	22
B	Unlikely	2	5	9	14	19
A	Rare	1	3	6	10	15
		Extreme risk, intolerable				
		High risk, intolerable				
		Medium risk, intolerable				
		Low risk, acceptable				





### 9.2.3 Prevention

- Sealing or flooding of mine workings
- Reclamation of contaminated land by adding lime or other alkaline materials to neutralize the acidity, and adding uncontaminated topsoil, planting vegetation, and modifying slopes to stabilize the soil and reduce infiltration of surface water into underlying contaminated material.
- Soil removal to relocate contaminated material to new sites where it can be monitored and treated.
- Direct treatment of the contaminated water, either through treatment plants (where lime or other neutralizing materials are added to reduce the acidity, which causes metals to precipitate out of the contaminated water) or artificial wetlands (which help sequester contaminated material in place, and where microbial action produces oxygen-free conditions to help prevent further sulfuric acid formation).
- Filling in abandoned mines with materials that will prevent the formation of AMD. This can include flooding the mines with water to remove the oxygen necessary to form AMD or filling in mines with alkaline materials to prevent the formation of acidic water.
- Relocation and isolation of mine waste that may produce AMD if allowed to react with water. This often involves isolating the waste from interaction with groundwater by moving the waste above the water table, treating it, and covering it with a layer of impermeable material to keep out surface water.
- Bacteria control – certain common bacteria substantially speed up the formation of AMD. Some efforts to prevent AMD involve the use of bactericides to kill these bacteria, or the addition of organic waste to provide an alternative energy source for some of these bacteria and produce oxygen-free conditions that prevent the formation of sulfuric acid.
- Diverting water from the mine site to prevent it from running through AMD-forming materials.
- Disposing mine waste underwater to prevent exposure to oxygen.

### 9.2.4 Treatment

Treatment Methods AMD treatment are classified as “passive” or “active,” both potentially combining physical, chemical, and biological approaches. Active treatment methods are more reliable and are typically less costly than passive systems, but they require more maintenance and capital-intensive operations.

### **pH Control**

pH control is a commonly used AMD treatment method. It increases the pH level to prevent the leaching of most metals. This method can also reduce the solubility of most metals by precipitation.

### **De-Carbonation**

The de-carbonation process is the first step in the flowsheet preparation of acid mine drainage systems. It involves removing CO<sub>2</sub> from the waste stream. Aerators are commonly used to reduce CO<sub>2</sub>. They work by agitating the water below the tank, which results in the release of oxygen or nitrogen. A high concentration of CO<sub>2</sub> can cause aerators to retain hydraulics for a long time, which can help remove the CO<sub>2</sub>.

### **Iron-Reaction Aeration**

The flow exiting the de-carbonation tank splits through two troughs. It continues through the other side of the de-carbonation tank. The final step in the iron-reaction process is the distribution of the chemical. As iron goes from being in the reaction tank to being in the ferric hydroxide, it changes state. The blue/green water in the left tank is the de-carbonation stage. This water then travels to the reaction tanks and displays the different states of iron.

### **High-Density Sludge Process**

The water then flows back into the iron-reaction tanks through the recirculation of the thickener. This process, known as the high-density sludge, is different from the traditional method. The underflow solids contain lime. By recirculating them, the recirculating particles can get more time to react with the lime, allowing the whole process to use all the lime. Also, by introducing the lime, the recirculating particles can coat the outside of the tank, making the iron particles larger and denser. reduce the solubility of most metals by precipitation.

## 9.2.5 AMD Management Plan

### **AMD Monitoring**

AMD monitoring provides feedback to confirm that the design and operational controls are effective for their stated aim. In that regard, the following will be monitored:



- Tailings and waste rock (including ore) to validate the existing geochemical classifications and to provide an historic inventory for site archives and legacy management.
- Sources and use of construction materials; and
- Water (surface water and groundwater).

### **Geochemical Monitoring**

Visual Methods, the Site Manager or delegate will undertake weekly inspections of waste rock/ore management and water management structures to ensure their integrity. The site Manager or delegate will also inspect to ensure that no PAF material has been won from the engineered landforms for use in construction.

Records will be kept and photographic evidence of any management inconsistencies and structural integrity failing captured, with the Mine Manager notified for action. Examples include evidence of erosion and sediment transport downslope after a storm event, poorly maintained sediment traps, or a ruptured run-on bund. This is applicable to historic and future mineral waste and water management structures.

### **Laboratory Analysis**

Following visual inspection, a subset of the development waste and tailings samples will be forwarded to a SANS accredited laboratory to be analysed for:

- Acid base accounting.
- Metals.

Further details of this laboratory based analytical program will be provided in a supplemental geochemical sampling and analysis procedure.



## 10 GROUNDWATER MONITORING PLAN

Groundwater management strategies for most mining activities are limited, and emphasis is mostly on pollution prevention rather than on treatment. Early detection of contamination is the key to react and effectively manage any possible sources of pollution. This will assist in identifying potential future impacts from mining operations on the groundwater environment.

### 10.1 Groundwater monitoring system

#### 10.1.1. System response monitoring network

##### **Groundwater contamination**

Groundwater levels and quality may be recorded on monthly basis. Water levels can be measured using an electrical contact tape or pressure transducer to detect any changes or trends in groundwater flow direction. Contamination from the coal stockpile and other surface infrastructure (pollution control dams, water balancing dams, etc) can contaminate the underlying aquifers. To prevent contaminants from seeping into the underlying aquifers, surface infrastructures such as pollution control dams must be fully sized and lined according to the engineering designs and normal practices. The proposed monitoring boreholes should be constructed to monitor groundwater levels and quality changes close to the pollution control dams, opencast pit, discard dump, and plant area, and around the mining area where the contamination plume is flowing to.

### 10.2 Sampling Methods and Preservation

#### **Required apparatus:**

- Plastic bottles (1L)
- Glass bottles
- Dip meter
- Steel bailer
- Cooler box
- EC and Ph meter
- Marking pens



## Methods and preservation

One litre plastic bottle with unlined plastic caps is required for most sampling exercises; however, in cases where organic constituents are to be tested for, glass bottles are required. Sample bottles must be marked clearly with the borehole name, date of sampling, water level depth and the sampler's name. Water levels (mbgl) should be measured prior to taking the sample, using a dip meter. Purging must be done on each borehole that needs to be sampled, this is to ensure sampling of the aquifer and not stagnant water in the casing. Purging is done using a submersible pump or a clean disposable polyethylene bailer in the event of a small diameter borehole. During purging and continuous water quality monitoring, at least three borehole volumes of water should be removed until the electrical conductivity value stabilizes. Metal samples must be filtered in the field to remove clay suspensions. The pH and EC meter used for field measurements should be calibrated daily using standard solutions obtained from the instrument supplier. Samples should be kept cool in a cooler box in the field and kept cool prior to being submitted to the laboratory to maintain proper preservation thereof.

## Sampling Locations

The main objectives in positioning the monitoring boreholes are to:

- Monitoring of groundwater migrating away from the pit area and
- Monitoring the lowering of the water table and the radius of influence

### 10.3 Data Management

Good hydrogeological decisions require sound information developed from raw data. The production of good, relevant, and timely information is the key to achieving qualified long-term and short-term plans. It is necessary to utilize all relevant groundwater data to minimize groundwater contamination. Monitoring results will be captured in an electronic database as soon as results become available, which allows for:

- Data presentation in tabular format,
- Time-series graphs with comparison abilities,
- Graphical presentation of statistics,
- Presentation of data, statistics and performance on diagrams and maps,
- Comparison and compliance to legal and best practice water quality standards.



#### 10.4 Monitoring frequency

Drastic changes in groundwater composition are not normally detected within days, as groundwater is a slow-moving medium; therefore, groundwater monitoring should be conducted monthly. Samples should be collected by an independent groundwater consultant, using the stipulated best practice guidelines, and should be analysed by a SANAS accredited laboratory. Groundwater levels must be recorded within an accuracy of 0.1m on a quarterly basis, using an electrical contact tape, float mechanism or pressure transducer to detect any changes or trends in the groundwater levels.



## 10.5 Monitoring parameters

Table 14: Monitoring parameters

<b>Class</b>	<b>Parameter</b>	<b>Frequency</b>	<b>Motivation</b>
<b>Physical</b>	Static groundwater levels	Monthly	Time dependent data is required for transient calibration of numerical flow models. Changes in static water levels may give early warnings of dewatering in the area.
	Rainfall	Daily	Recharge to the saturated zone is an important parameter for assessing groundwater vulnerability. Time dependent data is required for transient calibration of numerical flow models.
	Groundwater abstraction rates (if present)	Monthly	Response of groundwater levels to abstraction rates can be used to calculate aquifer storativity, which is important for groundwater management.

<b>Chemical</b>	Major chemical parameters: Ca, Mg, Na, K, NO <sub>3</sub> , SO <sub>4</sub> , Cl, Fe, Alkalinity, pH, EC TPH (Total Petroleum Hydrocarbons)	Monthly	Background information is crucial to assess impacts during and after operations. Changes in chemical composition may indicate areas of groundwater contamination and can be used as an early warning system to implement management/remedial actions.  Legal requirement.  Groundwater chemistry forms an integral part of the development of conceptual models.
	Minor chemical constituents Full scan of trace metals	Monthly	Changes in chemical composition may indicate areas of groundwater contamination and can be used as an early warning system to implement management/remedial actions.  Legal requirement
	Other Stable isotopes	Ad-hoc basis	The monitoring program should allow for research and refinement of the conceptual geohydrological model. This may, from time to time, require special analyses like stable isotopes (O <sup>18</sup> /O <sup>16</sup> , H)





## 10.6 Reporting

Based on the recorded water quality data, the data management functions will be carried out and reported to the mine management monthly. The contents of the report should include the monthly water monitoring results and trends at surface points, as well as comments on the effectiveness of the mitigation measures and monitoring program. Reporting to the authorities should be as specified in the permitting/licensing conditions, and any accidental release of pollutants or possible polluting substances should be reported to the relevant authorities as specified in the mining permit conditions.

## 11 CONCLUSION AND RECOMMENDATIONS

### 11.1 Conclusion and Summary

The environment is degrading at an alarming rate ranging from air quality due to air pollutants, land pollution which includes but not limited to soil contamination and groundwater contamination. The document outlines all the envisioned impacts which the mining activity will have on the environment, and how such impacts will be mitigated, to preserve the quality and quantity of water resources.

The study area is situated under the Vryheid formation, with a moderate aquifer vulnerability. The study area is underlain by minor aquifer which implies that the aquifer is moderately yielding and of variable water quantity and the dominant source of water is surface water.

The primary concern of groundwater contamination is during the following phases of the mining project:

- Construction Phase
  - Clearing of vegetation.
  - Pavements and hardening of surface due to movement of machinery.
  - Total Petroleum Hydrocarbon (TPH) due to heavy machinery on site.
- Operational Phase:
  - Extended blasting which likely create fissures in the neighbouring lithologies
  - Acid Mine Drainage during mining
  - TPH due to heavy machinery onsite
  - Possible leakage of sewage due to low or no maintenance of ablution
- Decommissioning Phase:
  - Possible leakage of sewage waste
  - TPH contamination due to heavy machinery undertaking the rehabilitation process
- Post Mining Phase:
  - Mine decant.
  - ARD – Acid Rock Drainage.



## 11.2 Recommendations

### **The following mitigation measures are recommended in the Construction Phase:**

- Construction should preferably take place in the dry season, as surface water runoff is minimal.
- Additional storm water concentration must be contained.
- Latrines should be kept away from sensitive drainage areas. Temporary latrines used during construction must be connected to the bulk sewerage lines if possible. Alternatively portable latrines should be sealed units that can be cleaned by truck and the waste must be taken to a suitable sewage facility for treatment. They should be well maintained and regularly cleaned, and sewage should not be allowed to directly access the groundwater. Latrines must be used as a priority. "Go to the bush" must be prohibited.
- No uncontrolled discharges from the construction camp should be permitted.
- All vehicles shall be properly maintained and serviced so that no oil leaks occur on site.
- Any stockpiled soil and rock should have storm water management measures implemented.
- The large roof structures to be implemented may enhance storm water volumes that need to be managed.
- The storm water canal dumping storm water directly on the site must be rerouted.
- A storm water plan must be available and used during all the phases of construction.
- Vehicles and machines on site must be maintained properly to ensure that oil spillages are kept at a minimum.
- Spill trays must be provided for refuelling of plant vehicles
- The designing of PCDs, Stormwater management areas, should consider the water bodies, slope and climate of the area, to effectively prevent pollution or contamination.
- The designing of the infrastructures should take into consideration the gentle slope around the mining permit to effectively manage water.
- The area falls on weathered aquifer, wastewater should be properly diverted from seepage, as the aquifer is weathered, and contamination is highly likely.
- Proper stormwater management is recommended to prevent the risk of water resources contamination.



**The following mitigation measures are recommended in the operation phase:**

- The study area falls on a fractured aquifer system, the mine planning should take into consideration the fracture zones in the Vryheid formation, drilling activities should not contact the fractures as that is where most groundwater in the area is found and to prevent possible groundwater pollution from residual explosive material used.
- It is recommended that there should be regular testing or monitoring of surrounding soil, water resources to detect any change in chemistry so that remedial measures are implemented in time.
- The monitoring process throughout the existence of the project, the chemical and physical parameters of the water samples should be tested and compared with the SANS 241: 2015.
- There should be soil, water resources and land pollution mitigation measures on site.
- Wastewater source should be identified, and mitigation measures put in place to prevent groundwater contamination.
- The stockpile, there should be regular monitoring of any heavy metal which could be exposed, as such could result in leaching during rainfall.
- Proper and competent structure of the tailings dam should be built, to contain liquid, or solid waste and to prevent such waste from entering the outside environment.
- According to section 21 (S21) of the National Water Act 36 of 1998, if a proposed project triggers any of the listed S21 activities, a water use license must be applied for. For this project, there will be activities which includes abstraction of water from groundwater, mining activities from the water courses dust suppression, dewatering, and ROM stockpiles. It is therefore recommended that a water use license be applied for.
- It is recommended that compliance of relevant legislations be ensured, NEMA Act 107 of 1998, NWA Act 36 of 1998, NEM: waste Management Act 59 of 2008.
- it is recommended that during the existence of the project there should also be regular maintenance of the mobile ablutions, to avoid leakage of waste into the ground.
- There should be boreholes in and around the mining permit area, to monitor the groundwater quality and quantity.



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## APPENDICES

Appendix A: Specialist's qualifications

Available upon request





# MINING PERMIT APPLICATION

## HYDROLOGICAL STUDY

Hydrological study for the proposed Mining Permit Application on portion 2 of the farm Blesbokfontein 31 IS, situated in the Magisterial District of eMalaheni in Mpumalanga Province.



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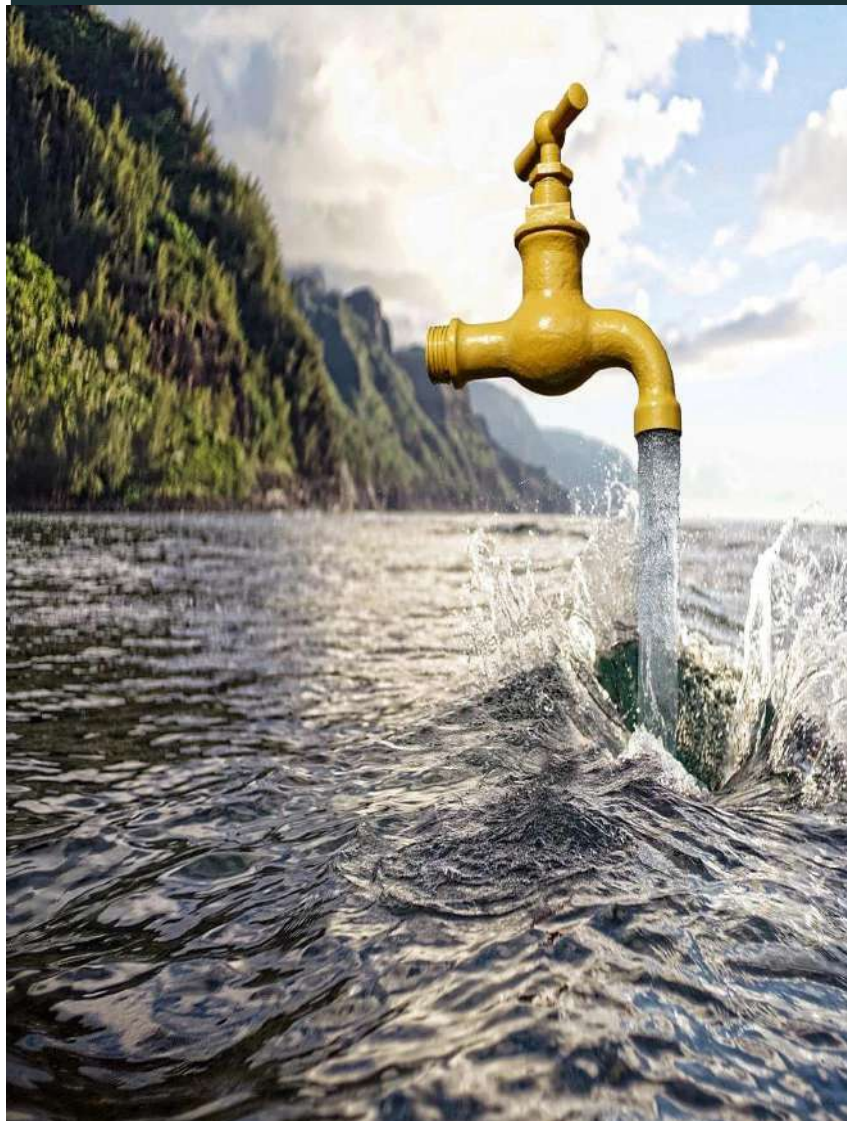


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DMRE REF: MP 30/5/1/1/3/ 13571 MP

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## Project details

**Report type** Hydrological Study for a mining permit application

**Project title** Hydrological Study for the proposed mining permit application on Portion 2 of the farm Blesbokfontein 31 IS, situated in the magisterial district of eMalahleni in Mpumalanga Province.

**Mineral (s)** Coal, Pseudocoal, Torbanite, and Aggregate

**Client** MDZ Fleet Solutions (Pty) Ltd

**Site location** On Portion 2 of the farm Blesbokfontein 31 IS, situated in the magisterial district of eMalahleni in Mpumalanga Province.

**Version** 1

**Date** August 2023

### Electronic signatures

**Compiled by** Khulekani Zwane (Hydrogeologists) Singo Consulting (Pty) Ltd



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**Final review and approval** Dr. Kenneth Singo (Principal Consultant of Singo Consulting (Pty) Ltd)




**Table 1: Critical Report Information**

Critical Information incorporated within the Hydrological Study:	Relevant section in report
Details of the specialist who prepared the report	Project details, P: 3
The expertise of that person to compile a specialist report including a curriculum vitae	Appendix A, P: 46
Project Background Information, including the proposed activities description	Project background information, P: 10
An indication of the scope of, and the purpose for which, the report was prepared	Scope of work, P: 11
An indication of the quality and age of base data used for the specialist report	Project details, P: 3
A description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change	Surface water impact assessment, P: 35
The duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment	Project details, P: 3
A description of the methodology implemented in preparing the report or carrying out the specialised process comprehensive of equipment and modelling used;	Methodology and data sources, P: 33
Details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternative;	N/A
An identification of any areas to be avoided, including buffers	Buffer zone, P: 25
A map overlaying the proposed activity including the associated infrastructures on the environmental sensitivities of the site including containing buffer zones	Buffer zone, P: 25
A description of the findings and potential implications of such findings on the impact of the proposed activity or activities	Site assessment, P: 31
Any mitigation and conditions measures for inclusion in the EMPr	Stormwater management plan, P: 38
Any monitoring requirements for inclusion in the EMPr or environmental authorisation	Monitoring plans, P: 41
An analytic opinion as to whether the proposed activity or portions thereof should be Authorised-i.e. specific recommendations	Recommendations, P: 43
Regarding the acceptability of the proposed activity or activities; and	Refer to bar
If the opinion is that the proposed activity or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan	Stormwater management plan, P: 38
A description of any consultation process that was undertaken during carrying out the study	Refer to the bar
Any triggered Water Uses according to section 21 of the National Water Act 36, 1998.	Legal framework, P: 13
Any other information requested by the competent authority.	N/A



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## 1 INTRODUCTION

According to the recent World Health Organization (WHO) report, the countries which still have limited access to water for drinking purposes are mainly those in the Sub-Saharan region (Verlicchi and Grillini, 2020). It is with this knowledge that the protection of surface water sources is ensured. According to WHO (2004), Surface water is any body of water that is above ground which includes but not limited to streams, lakes, dams, and wetlands.

### 1.1 Project Background Information

Singo Consulting was (Pty) Ltd was appointed by MDZ Fleet Solutions (Pty) Ltd to carry out a specialist surface water study and compilation of a specialist surface water report, providing the surface water information required for the mine to fully comply with environmental authorization stipulated conditions.

Chapter 3 of the National Water Act (Act 36 of 1998) requires that a person who owns, control, occupies, uses the land is responsible for preventing pollution of water resources and is also responsible to remedy (correct) the effects of the pollution. It is with this Act that the hydrological report was deemed necessary for the site to gather all relevant information related to surface water and its related potential impacts.

The goal of this study:

- To assess the quality condition of surface water within and around the mining permit area, and to draft a water monitoring programme for the project site and provide recommendations.
- Prediction of the environmental impact of the proposed mining activity on the hydrological regime of the area.
- Forecasting the effects of the activity on the receiving environment.

### 1.2 Proposed Activities

Mining activities will be undertaken over a period of two (2) years, and this project will entail an open cast method of excavation. The mine design will be developed according to the dimension of the applied mineral deposit within the project area, but overall mining activities will be limited to an area of 5 Ha as per mining permit requirements.



- The topsoil will be stockpiled elsewhere on site preferably next to the farm boundary and will be used during rehabilitation period.
- Once a box cut has been made, the overburden and mineral resources where necessary will be loosened by blasting.
- The loosened material will then be loaded onto trucks by excavators
- A haul road will be situated at the side of the open cast, forming a ramp up which trucks can drive, carrying ore and waste rock.
- Waste rock will be piled up at the surface, near the edge of the open cast (waste dump).
- The waste dump will be tiered and stepped, to minimize degradation

The outlined activities are the activities which have the potential of negatively and or positively influencing the surface water.

- Clearing of vegetation
- Hardening surfaces to create roads
- Installation of mobile machinery such as crusher.
- Movement of machinery
- Stripping of overburden
- Coal processing which includes but not limited to crushing
- Blasting to remove overburden material

### 1.3 Scope of Work

The Hydrology Evaluation Scope of Work (SoW) is summarized as follows:

#### Phase 1:

- Information sourcing / literature review (Desktop Study).
- Collection and revision of relevant information.

#### Phase 2:

- Site Visit
  - Site assessment (better understanding of site) and sampling.
- Update catchment hydrology with newly available data



- Catchment characteristics and delineation.
- Meteorological analysis (including MAP).
- Average runoff analyses.
- Peak flow analyses for 1:50.
- Analyses of water quality samples.

### 1.4 Project Location

The locality map created by the QGIS illustrates the location of the proposed area, the study area is situated on Portion 2 of the farm Blesbokfontein 31 IS, situated in the magisterial district of eMalahleni in Mpumalanga Province. As seen on Figure 1 below, the project area is situated approximately 13 km South-East of Ogies. The mining permit area has an extent of approximately 5 hectares.

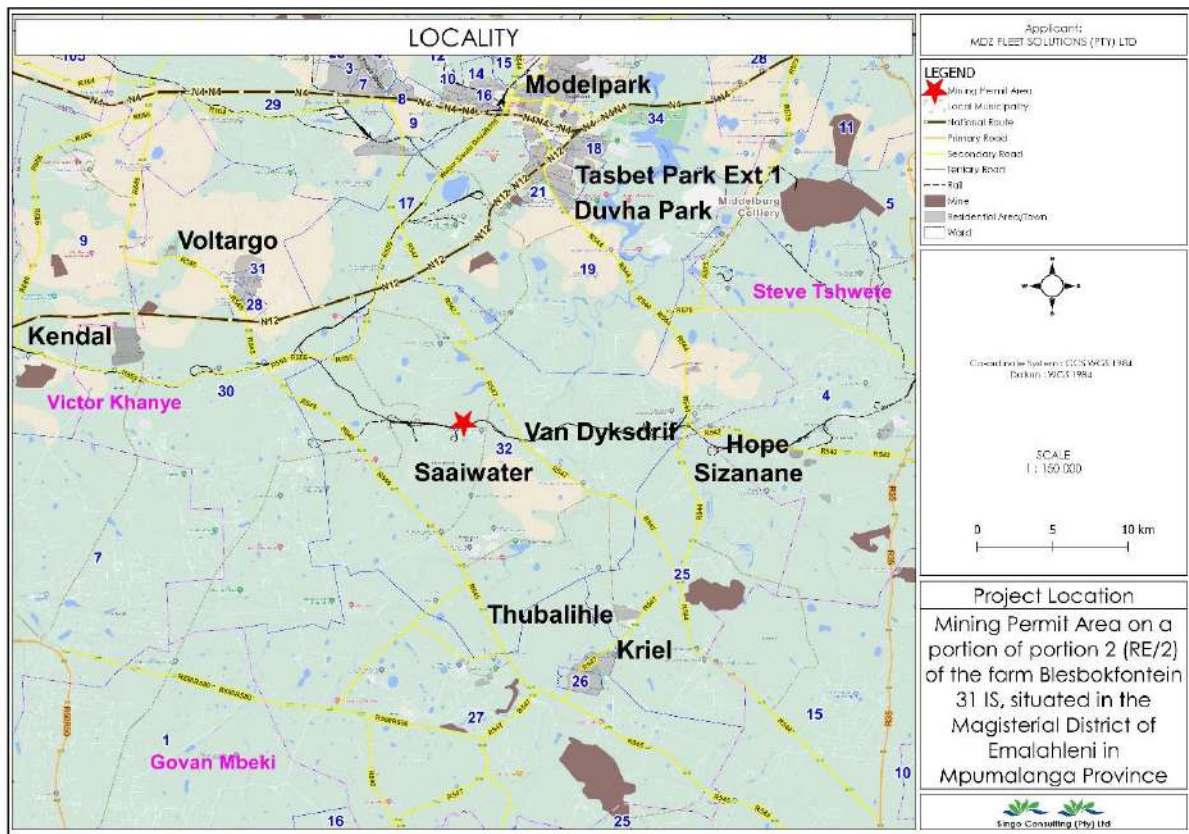


Figure 1: Locality map



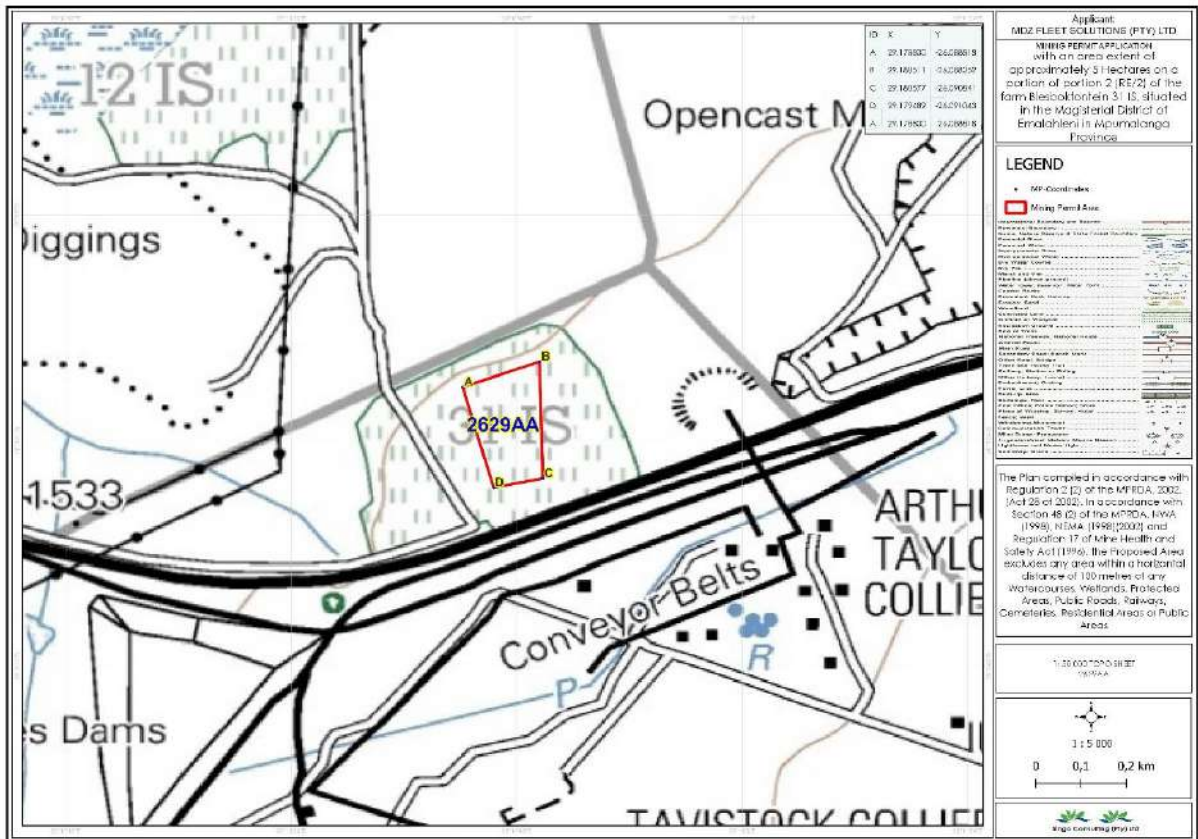


Figure 2: Regulation map 2.2



## 2 LEGAL FRAMEWORK

Government Notice 704 (Government Gazette 20118 of June 1999) (hereafter referred to as GN 704), was established to provide regulations on the use of water for mining and related activities aimed at the protection of water resources.

- **Condition 4** - which defines the area in which, mine workings or associated structures may be located, with reference to a watercourse and associated flooding. Any residue deposit, dam, reservoir together with any associated structure or any other facility should be situated outside the 1:100-year flood-line. Any underground or opencast mining, prospecting or any other operation or activity should be situated or undertaken outside of the 1:50 year flood-line. Where the flood-line is less than 100 metres away from the watercourse, then a minimum watercourse buffer distance of 100 metres is required for infrastructure and activities.
- **Condition 5** - which indicates that no residue or substance which causes or is likely to cause pollution of a water resource may be used in the construction of any dams, impoundments or embankments or any other infrastructure which may cause pollution of a water resource.
- **Regulation 6** - describes the capacity requirements of clean and dirty water systems. Clean and dirty water systems must be kept separate and must be designed, constructed, maintained, and operated to ensure conveyance of the flows of a 1:50-year recurrence event. Clean and dirty water systems should not spill into each other more frequently than once in 50 years. Any dirty water dams should have a minimum freeboard of 0.8m above full supply level.
- **Condition 7** - which describes the measures which must be taken to protect water resources. All dirty water or substances which may cause pollution should be prevented from entering a water resource (by spillage, seepage, erosion etc) and ensure that water used in any process is recycled as far as practicable.
- **Condition 10** - which describes the requirements for operations involving extraction of material from the channel of a watercourse. Measures should be taken to prevent impacts on the stability of the watercourse, prevent scour and erosion resulting from operations, prevent damage to in-stream habitat through erosion, sedimentation, alteration of vegetation and flow characteristics, construct treatment facilities to treat water before returning it to the watercourse, and implement control measures to prevent pollution by oil, grease, fuel, and chemicals.



## The National Water Act (Act 36 of 1998)

The NWA governs water resource management in South Africa. As guardians of water, the Department of Human Settlements, Water and Sanitation (DHSWS) must guarantee that resources are used, preserved, safeguarded, developed, managed, and controlled in a sustainable manner for the benefits of all people of south Africa and the environment. Key provisions applying to the current study include:

- **Catchment Areas** - Any disturbance to a watercourse, such as the construction and operation of surface mining infrastructure, may require authorisation from DWS.



### 3 HYDROLOGICAL SETTING AND BASELINE HYDROLOGY

#### 3.1 Climate

Climate, amongst other factors, influences soil-water processes and water availability in open to air systems in a water balance. The most influential climatic parameter is rainfall and evaporation. Rainfall intensity, duration, evaporative demand, and runoff were considered in this study to indicate rainfall partitioning within the project area.

#### Temperature

In eMalahleni, the average yearly temperature (refer to Figure 3) for the project area varies over the course of the year, it ranges from -4°Celsius to 14°Celsius (Low) and 18°Celsius to 27°Celsius (High). The Köppen Climate Classification suggests that the site is situated in a humid subtropical climate that receives rainfall in the summer months (Kottke, et al., 2006).

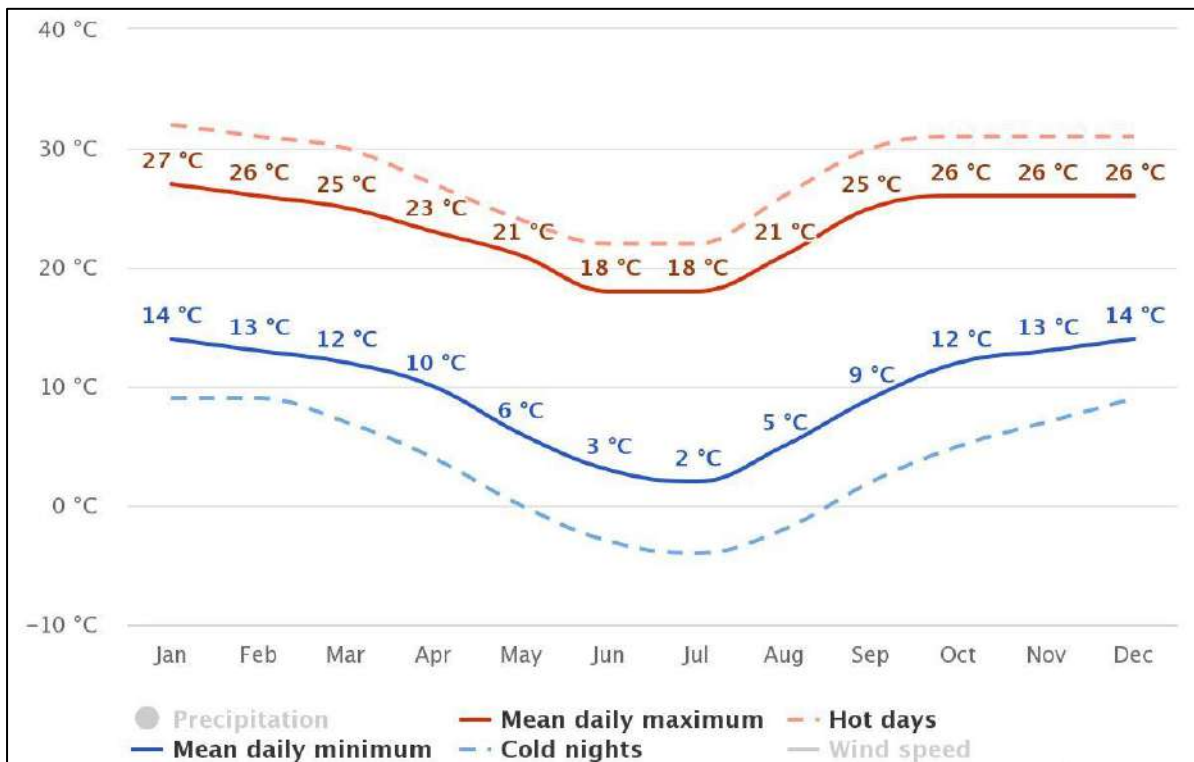


Figure 3: Average yearly temperatures (Meteoblue, 2023)



## Rainfall

Monthly rainfall is likely to be distributed as shown in Figure 4 below. As stated above, the area is located within quaternary catchment B11F, and the average mean annual precipitation (MAP) is in the order of 601 - 800 mm/annum) refer to Figure 5.

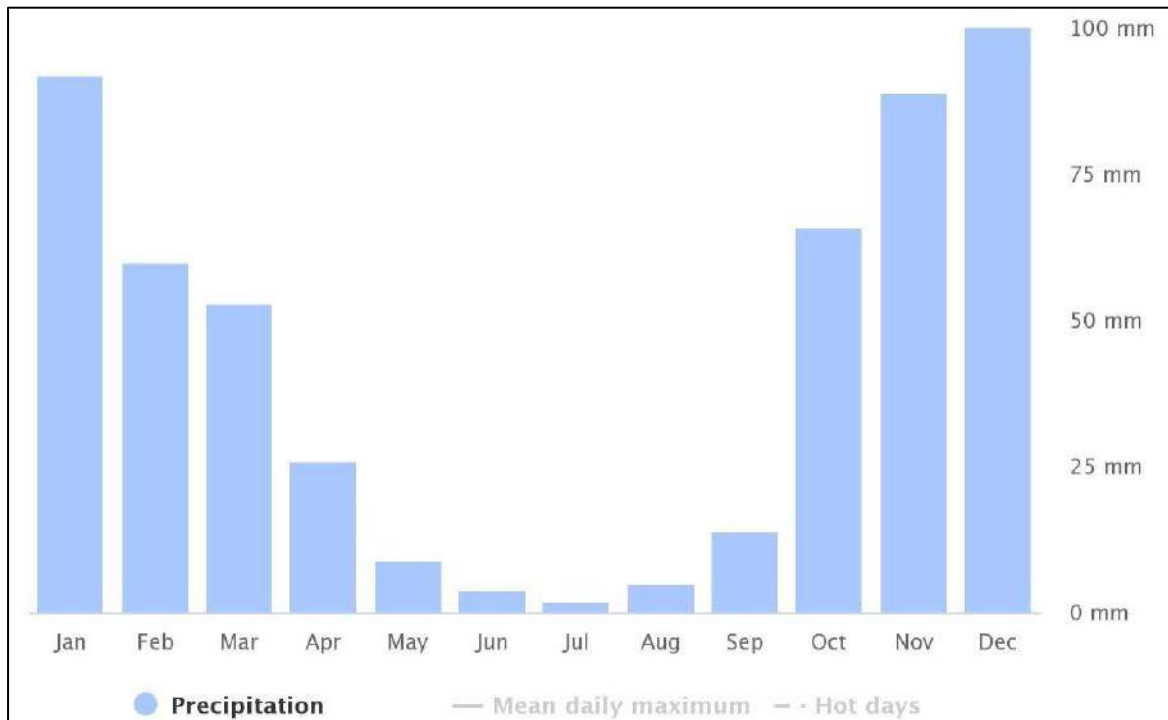


Figure 4: Mean monthly rainfall of the study area (Meteoblue, 2023)





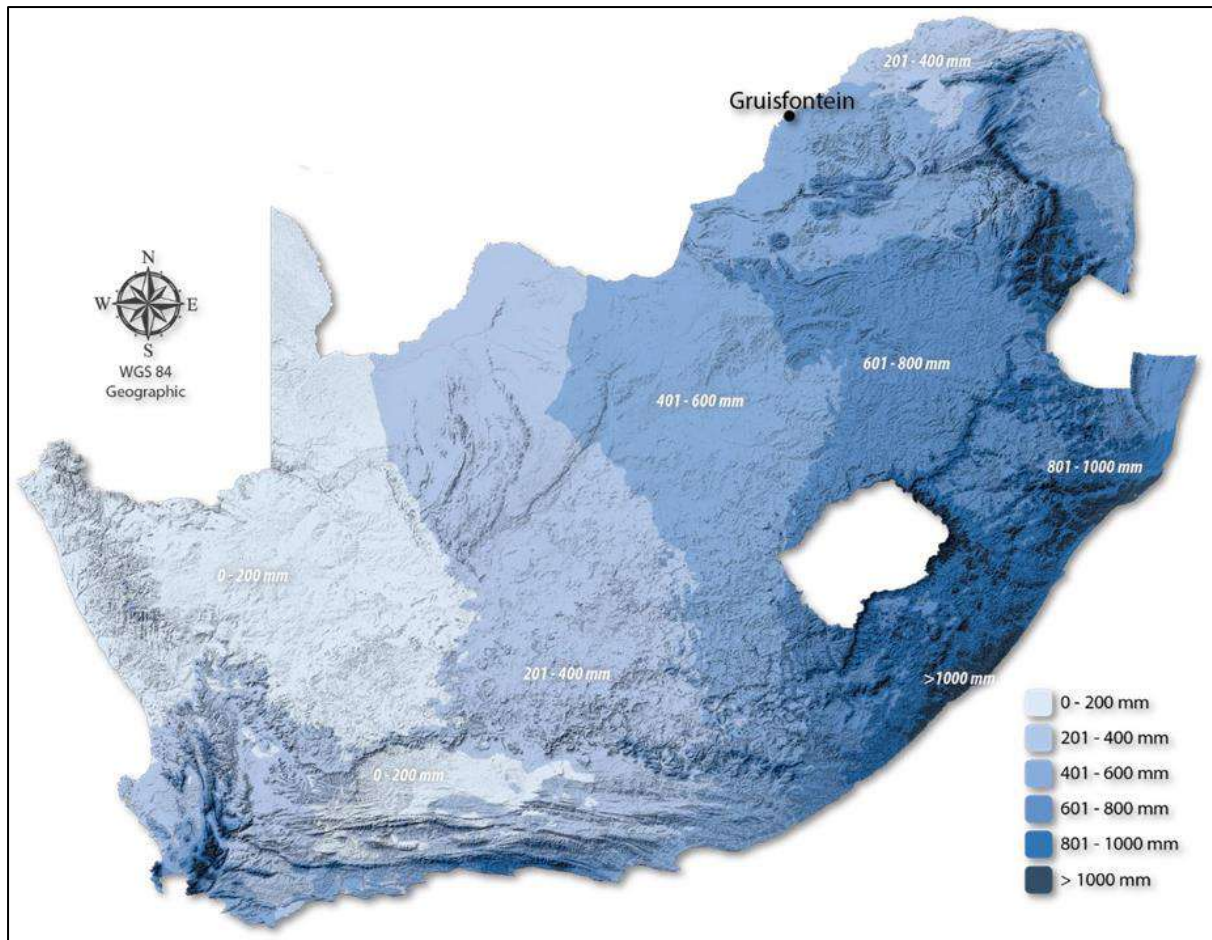


Figure 5: Mean annual rainfall map

### 3.2 Drainage and Topography

A Topographic map is a map which indicates, to scale, the natural features of the Earth's surface, as well as human features, with features at the correct relationship to each other (Oxford Dictionary; 2020). The topography map other than showing landform features, rivers, and associated water resources, it also shows the height above sea level with the use of contour lines. Contour lines are an Imaginary line on the ground surface joining the points of equal elevation.

In this environmental project, topography is used to determine how surface water flows during rainy seasons or how it would flow during the existence of the project. The topography also influences groundwater vulnerability, as topography also influences run-off and infiltration rate by means of residence time. The slope of the study area is gentle, this is seen by the contours



being widely spread, and the contour elevation is decreasing away from the mining permit area. The Figure 6: Hydrology and Topology Map, illustrates a 5m contour interval of the study area.

The project area has a flat topography, and no waterbodies within the project site, however a channelled as shown on a map, a dam exist in approximately 0.2 km south-west of the mining permit and a perennial river is observed situated on west direction of the mining permit area.

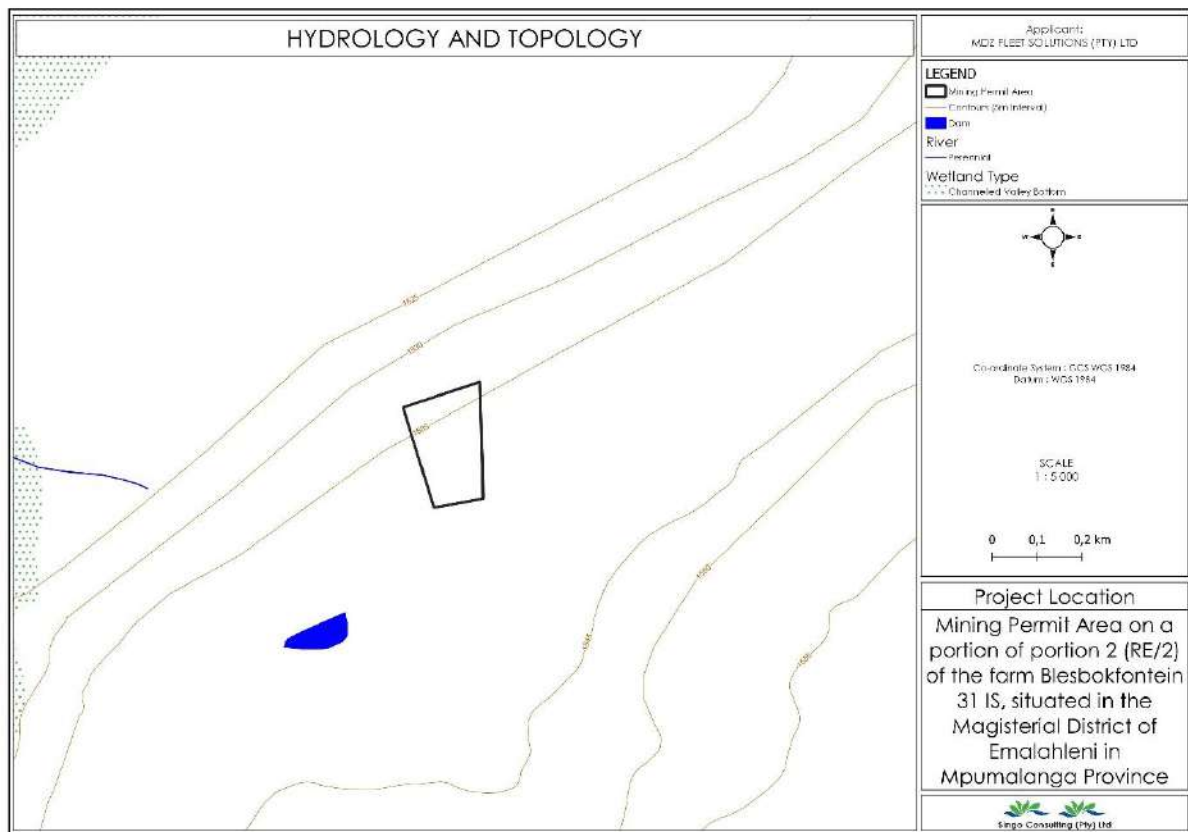


Figure 6: Hydrology and Topology Map

### 3.3 Catchment Description

South Africa's water resources are divided into quaternary catchments, which are the country's primary water management units (DWAf 2011). In a hierarchical classification system, a quaternary catchment is a fourth order catchment below the primary catchments. The primary drainages are further classified as Water Management Areas (WMA) and Catchment Management Agencies (CMA). In accordance with Section 5 subsection 5(1) of the National Water Act, 1998, the Department of Water and Sanitation (DWS) has established nine WMAs



and nine CMAs as outlined in the National Water Resource Strategy 2 (2013). (Act No. 36 of 1998). The purpose of establishing these WMAs and CMAs is to improve water governance in various regions of the country, ensuring a fair and equal distribution of the Nation's water resources while ensuring resource quality is maintained.

The mining permit area falls within the Olifants Water Management Area (WMA). The quaternary catchment is the B11F. The WRC 2012 study, presents hydrological parameters for each quaternary catchment including area, mean annual precipitation (MAP) and mean annual runoff (MAR).

Table 2: Quaternary Information Data

Quaternary Catchment	Water Management Area	S-Pan Evaporation		Rainfall		Catchment Area
		Evaporation Zone	MAE (mm)	Rainfall Zone	MAP (mm)	
B11F	Olifants	4A	1600	B1C(ZB1CB)	692	428



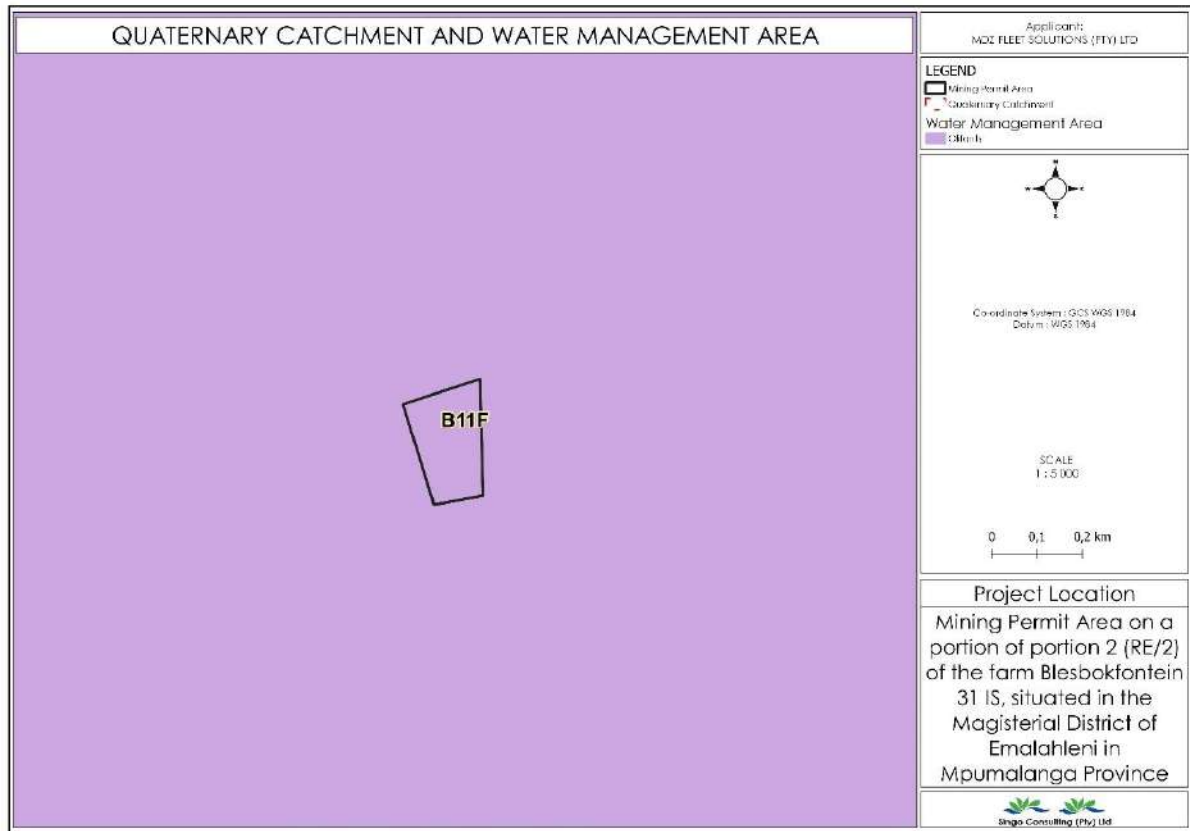


Figure 7: Quaternary Catchment and Water Management Area Map

### 3.4 Wetlands Delineation

According to National water Act 36 of 1998, a wetland is defined as “Land which is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is periodically covered with shallow water, and which land in normal circumstances supports or would support vegetation typically adapted to life in saturated soil”.

Wetland delineation is the process of identifying outer edge of the temporary zone of the wetland. Whilst the identification of a wetland is useful, normally the requirement (specifically for EIA and WULA applications) is for the wetland to be delineated – for its boundaries to be precisely determined so that it can be mapped out and indicated as a sensitive area. This edge marks the boundary between the wetland (water resource) and the adjacent terrestrial areas. This process is aided by using the various indicators which are used to identify a wetland, the indicators are as follows:



- The **position in the landscape**, which will help identify those parts of the landscape where wetlands are more likely to occur.
- The **type of soil form** (i.e., the type of soil according to a standard soil classification system), since wetlands are associated with certain soil types.
- The presence of wetland **vegetation species**.
- The presence of **redoxymorphic soil features**, which are morphological signatures that appear in soils with prolonged periods of saturation (due to the anaerobic conditions which result).

To this study, redoxymorphic indicator will be used to delineate a wetland, this is because it is the most reliable, diagnostic indicator of wetland. These features develop due to prolonged saturation (and associated anaerobic conditions) and can be used to indicate zones of a permanently, seasonally, or temporarily high-water table, as described in the characteristics of the permanent, seasonal, and temporary wetland zones in the national water Act 36 of 1998.

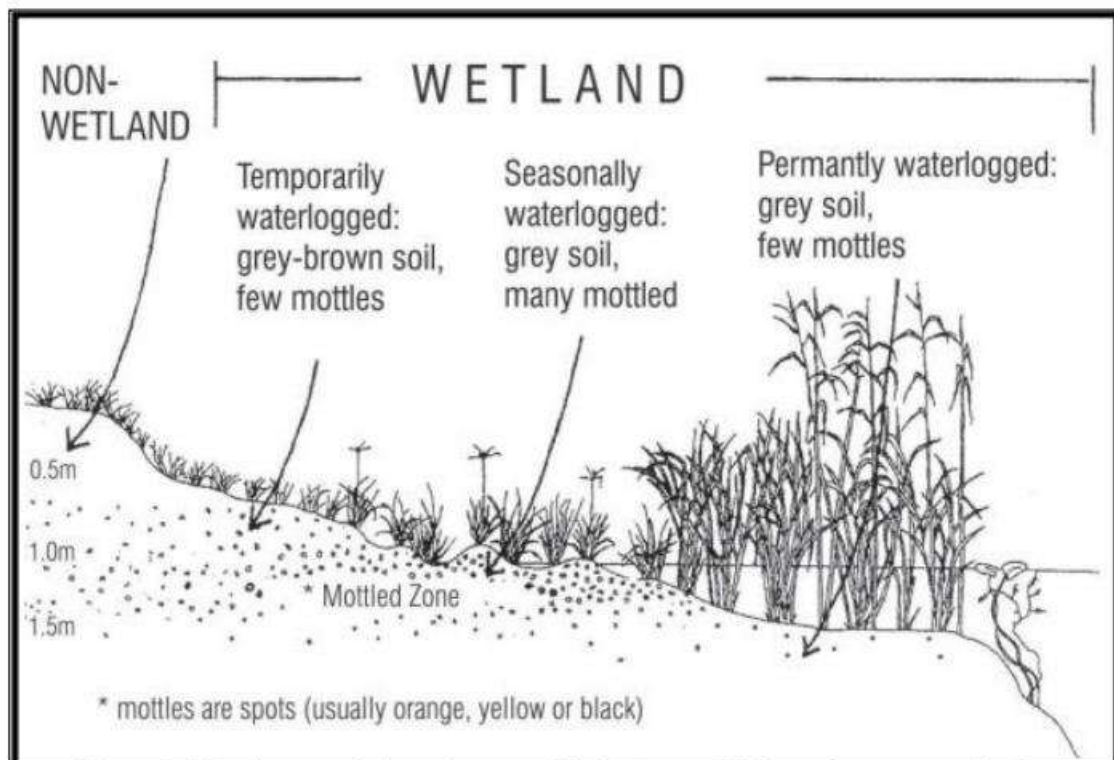


Figure 8: The characteristics of redoxymorphic indicator (DWAf, 2008)

### **Redoxymorphic features as an indicator of a wetland presence:**



Water is the most important criterion for defining land as a wetland, with "the water table at or near the surface, or the ground is occasionally covered with shallow water" being the most important. Unfortunately, due to southern Africa's very fluctuating climate, the water table may not always remain at or near the surface in a consistent, predictable manner year after year, or even seasonally predictable. The existence of the water table (or the extent of flooding) will not always be a highly useful criteria for detecting wetlands due to intra- and inter-annual fluctuations in the extent of saturation/inundation of wetlands. As a result, the fundamental wetlands classification criterion – a high water table and/or frequent flooding – cannot be accurately measured.

Roots and microorganisms eventually deplete the oxygen contained in pore spaces in soil that has been saturated for an extended period. The oxygen consumed in this fashion would be replaced by diffusion from the air at the soil surface in an unsaturated soil. However, because oxygen diffuses 10 000 times slower via water than it does through air, restoring depleted soil oxygen in a saturated soil takes much longer. As a result, once the oxygen in a saturated soil is gone, the soil becomes practically anaerobic. Long-term anaerobic soil conditions cause changes in the chemical properties of the soil's mineral constituents, which are visible as colour changes in the soil. As a result, even a high-water table. Although the frequency of flooding cannot be directly assessed, it is possible to analyse soil parameters for signs of saturation by looking for redoxymorphic traits that come from prolonged anaerobic conditions. The two important redoxymorphic features are mottling and gleying Figure 9; both features caused by prolonged saturated conditions in the soil and the subsequent development of anaerobic conditions.

**Gleying** is characterised by the development of grey or blueish-grey colours in the mineral soil component. Certain soil components, such as iron and manganese, are insoluble under aerobic conditions. Iron is one of the most abundant elements in soils, and the iron oxide (rust) coatings over soil particles is responsible for the red and brown colours of many soils. However, under prolonged anaerobic conditions iron becomes soluble and can thus be dissolved out of the soil profile. Once most of the iron has been dissolved out of a soil, the soil matrix is left a greyish, greenish, or bluish colour, and is said to be Gleyed.

**Mottling** follows the same initial process as gleying, in that the iron becomes soluble and dissolved under anaerobic conditions. A fluctuating water table, common in wetlands that are seasonally or temporarily saturated, results in alternation between aerobic and anaerobic conditions in the soil. Lowering of the water table results in a switch from anaerobic to aerobic



soil conditions, causing dissolved iron to return to an insoluble state and be deposited in the form of patches, or mottles, in the soil. Recurrence of this cycle of wetting and drying over many decades concentrates these bright (orange or red) insoluble iron compounds. Thus, soil that is Gleyed but has many mottles may be interpreted as indicating a zone that is seasonally or temporarily saturated.



Figure 9: Identification of mottles (Source: [redoxymorphic feature Mottling - Bing images](#))



Figure 10: Identification of greying (Source: [redoxymorphic feature Mottling - Bing images](#))

### **Using redoxymorphic features to identify a wetland.**



The outer edge of the temporary zone of the wetland should be determined. This should be done using a transect-based approach in the field.

Starting from the wettest (central or lowest lying) part of the wetland, move perpendicularly upslope towards the surrounding terrestrial areas, sampling (with the aid of an auger or through other excavation means) the soil to a depth of at least 50cm. Note the presence of any gleying or mottling (Rountree et al., 2008). Ensure that the indicators observed meet the requirements prescribed for the redoxymorphic indicators of wetland soils. Continue moving outwards from the wetland until the redoxymorphic indicators of wetland soils can no longer be found within the top 50cm of the soil. This will be the outer edge of the temporary wetland zone. At this stage the boundary indicated by redoxymorphic features should be verified using the vegetation indicators.





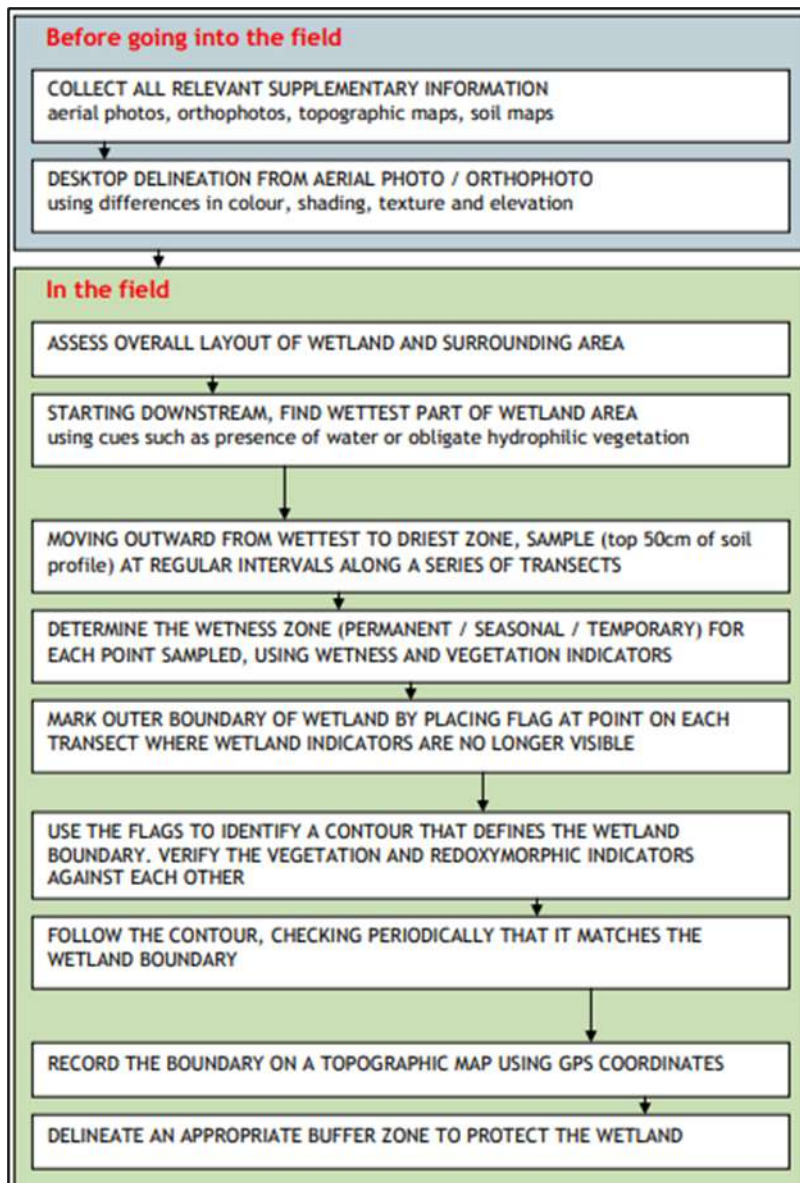


Figure 11: Wetland delineation process (DWAF, 2008)

### 3.5 Buffer Zone

According to the National Environmental Management: Protected area Act of 2003 no 57, Buffers are areas peripheral to a specific protected area, where restrictions on resource use and special development measures are undertaken to enhance the conservation value of the protected area. Mining activities will not be operated within or nearby waterbodies, no buffering will be implemented.



### 3.6 Vegetation and Soil

#### 3.6.1 Vegetation

The study area is located within the Moist Sandy Highveld Grassland

Table 3: Vegetation observed on site.



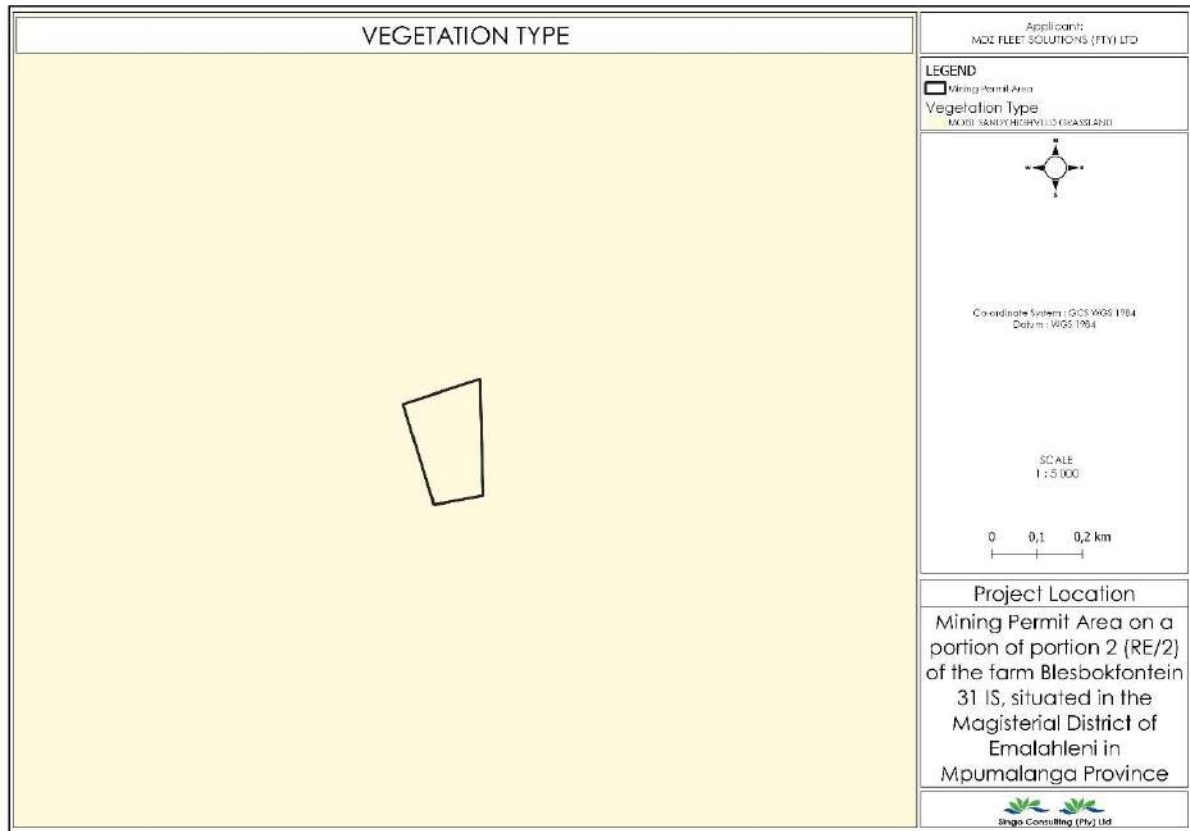


Figure 12: Vegetation type map

### 3.6.2 Soil

The soil classes map in Figure 13 below shows that the mining permit area is covered by the Red or Yellow structureless soils with a plinthic horizon.

#### Soil depth

Depth of the soil profile is from the top to the parent material or bedrock. This type of soil can be classified as a restricted soil depth. A restricted soil depth is a nearly continuous layer that has one or more physical, chemical, or thermal properties.

#### Soil drainage

Soil drainage is a natural process by which water moves across, through, and out of the soil because of the force of gravity. The soils in the proposed area have an excessive drainage due to the soils having very coarse texture. Their typical water table is less than 150.



## Erodibility

Erodibility is the inherent yielding or non-resistance of soils and rocks to erosion. The freely drained structureless soils have high erodibility. A high erodibility implies that the same amount of work exerted by the erosion processes lead to a larger removal of material.

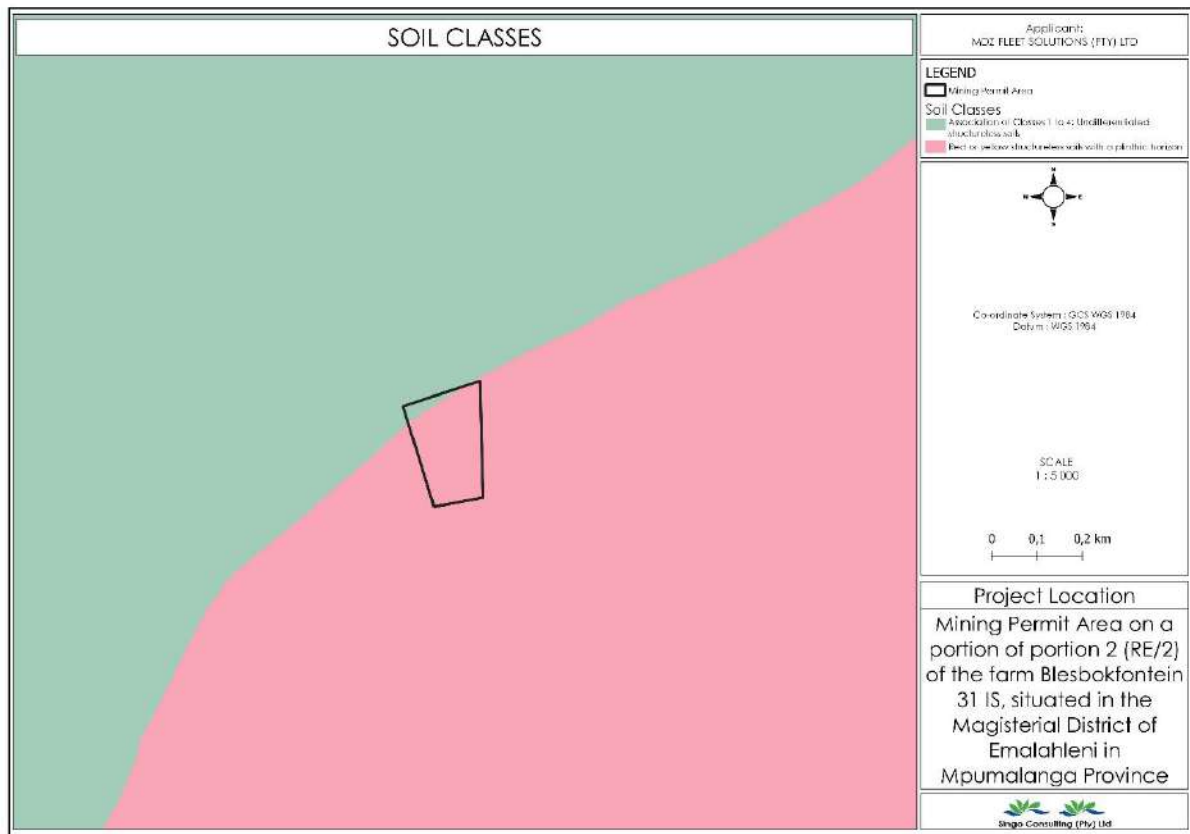


Figure 13: Soil classes map

### 3.7 Geological Setting

#### Regional Geology

#### Karoo Super Group

The Karoo Supergroup is a thick sequence of sedimentary rocks deposited between 300 and 180 million years ago. The main Karoo Supergroup basin covers over 50% of South Africa's surface and consists of five age-based groups, which show a change of depositional environment in time. These groups are the Dwyka (glacial), Ecca (shallow marine and coastal plain), Beaufort (non-marine fluvial), Stormberg (aeolian) and the volcanic Lebombo or



Drakensberg groups (SACS, 1980; Veevers et al., 1994; Johnson et al., 1996; Johnson et al., 2006).

The Dwyka group is overlain by the Eccca group which is an Early to Late Permian (~260 Ma) sequence composed of sandstone, siltstone, mudstone, and large deposits of coal seams deposited in a terrestrial basin on a gently subsiding shelf platform. In the surrounding Witbank Coalfield areas, the Eccca Group is overlain by the Beaufort Group, which is Early Triassic (~260 to 210 Ma), comprising multi-coloured mudstone and sandstone with only minor coal accumulation, and was deposited in a fluvial environment.

The Molteno Formation rests unconformably on the Beaufort Group and comprises Late Triassic (~210 Ma) coarse, immature sandstone with minor argillaceous layers derived from braided streams. This in turn is overlain by the Elliot Formation consisting of red mudstone and sandstone and the Clarens Formation comprising Aeolian sandstone. At the top of the Karoo Supergroup stratigraphy is the Drakensberg Group, which comprises Early to Middle Jurassic (~180 Ma) flood basalts.

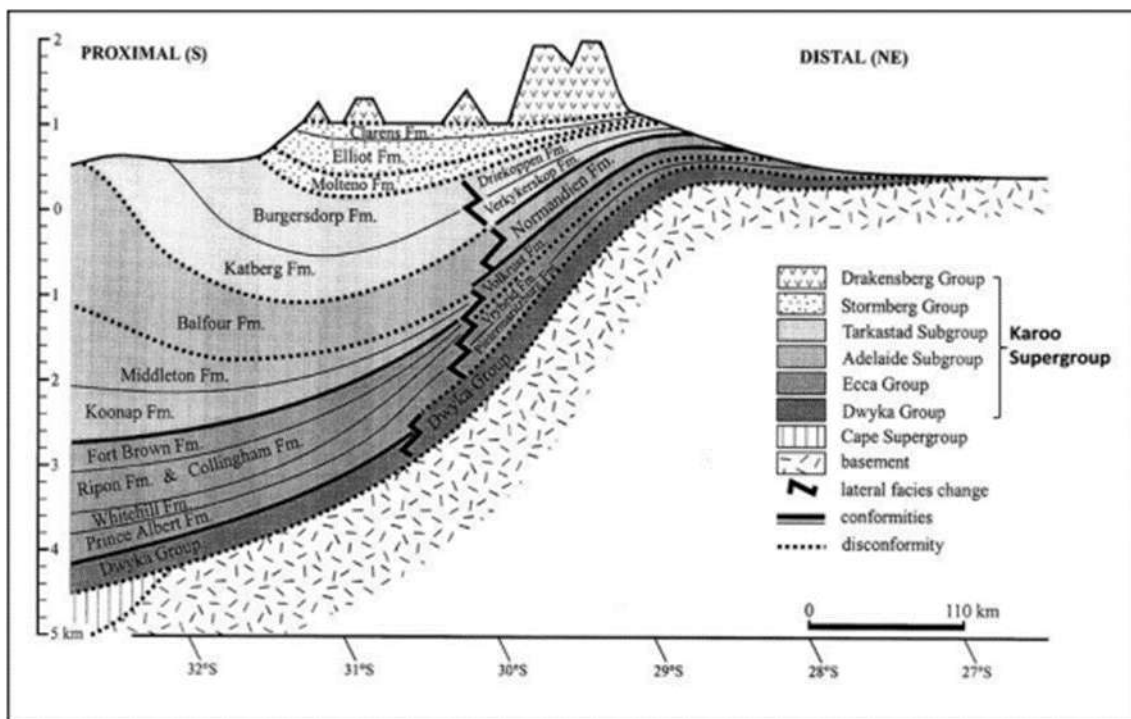


Figure 14: Karoo supergroup in sequences

**Local Geology**



## **Vryheid formation**

The Vryheid Formation consists mainly of sandstone and shale with some subordinate coal seams associated with it (SACS, 1980). The sediments of the Vryheid Formation probably represent alluvial plain, upper and lower delta plain deposits with associated shallow lagoon and coastal swamps (Jeremy and Bell, 1990). The change from stable margin to subsiding foreland basin confined the Vryheid Formation and the shales of the succession to "pinch-out" to the north. This "pinching-out" results in a gradation of a fluvial valley-fill sequence into sediments of deltaic origin (Van Vuuren, 1981). According to Cadle et al. (1990) the sandstones become interfingered with the deeper water shales, a so-called "shale-out", approximately 500 km from the present northern basin margin. They state that this is due to rapid basin ward facies migration down the southerly dipping paleo slope.

The Formation attains a maximum thickness of 500 m in the deeper part of the basin (SACS, 1980), but in the area of the Eastern Transvaal Coalfield only attains a maximum thickness of 170 m (Greenshields, 1986) and thins to about 80 m in thickness in the proximal basin settings (Cadle et al., 1990). The Vryheid Formation contains 5 major coal seams, with locally developed partings and splits in the coal seams increasing the number to 8, within an 85 m thick stratigraphic horizon (Greenshields, 1986) although this horizon can attain thicknesses up to 160 m in the deeper parts of the basin (Cadle et al., 1990). According to Cidle et al. (1990) all five major seams are still present in the thinnest and most proximal parts of the formation.

Although the five major coal seams, and their associated overlying and underlying sedimentary packages, can be correlated between coalfields (Cadle et al., 1990), they have different names in different coalfields (Greenshields, 1986). Greenshields (1986) states that the mining potential of the seams varies throughout the area but that the C seam has the biggest potential, although the B and E, and occasionally the D, seams attain mineable thicknesses over limited areas. The general distribution of the upper seams is often restricted by present day topography, while the development of the lower seams is controlled by the pre-Karoo topography. Structurally the seams are flat lying with a gentle south-westerly dip (Greenshields, 1986). The Dundas, Gus and Alfred seams are present in the Majuba Colliery mining area, but only the Gus seam is exploited by the colliery (Lear and Hill, 1989).



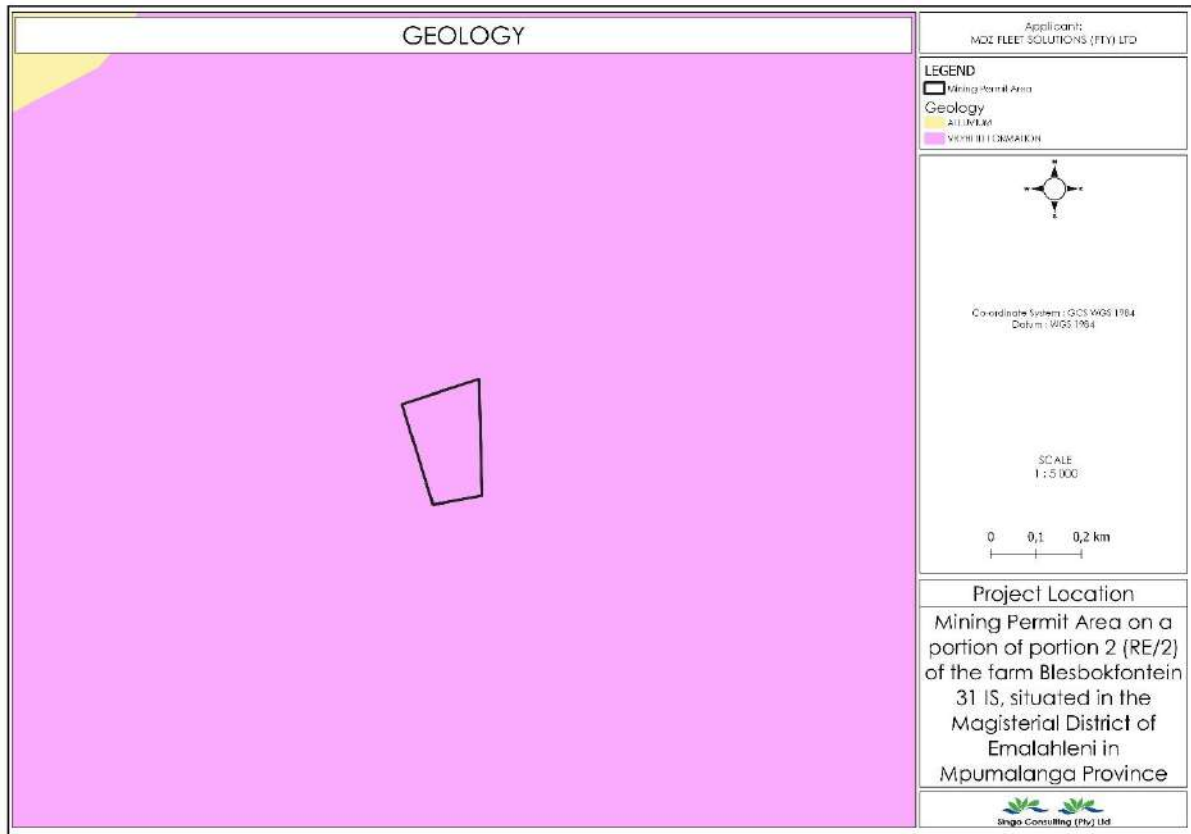


Figure 15: Geology map of the study area



## 4 SITE ASSESSMENT

Site assessment is most probably the most important aspect in any form of study, this is because through site assessment visual observations are made, and proper mitigation measures are ensured.

### 4.1 Water Sampling

Before sampling, sample bottles will be rinsed with sample water three (3) times to avoid prior sample container contamination influencing sample integrity. Each sample container's lids will also be rinsed with sample water three (3) times

Until a meniscus was created, samples will be filled to the top of the bottleneck. This guarantees that all air is excluded from the samples, preventing sample oxidation that may cause iron to precipitate. It can also stop other dissolved gases from being removed from the solution. The samples will be put in a cooler box with ice blocks once obtained and transported to the laboratory of Regen Water Laboratory.

### 4.2 Current Activities

The mining permit area is situated on a cultivated land:

**Cultivated Land:** Is an arable land that can be used for ploughing, sowing, and raising crops. The surrounding land is covered by Built-up area, Mine, Bare land, Wetlands, Natural Vegetation and Plantation

**Plantation:** is a large-scale estate, generally centred on a plantation house, meant for farming that specializes in cash crops. The crops that are grown include cotton, coffee, tea, cocoa, sugar cane, opium, sisal, oil seeds, oil palms, fruits, rubber trees and forest trees.

**Natural Vegetation:** refers to a plant community, which has grown naturally without human aid and has been left undisturbed by humans for a long time.

Table 4: Land use and Land cover







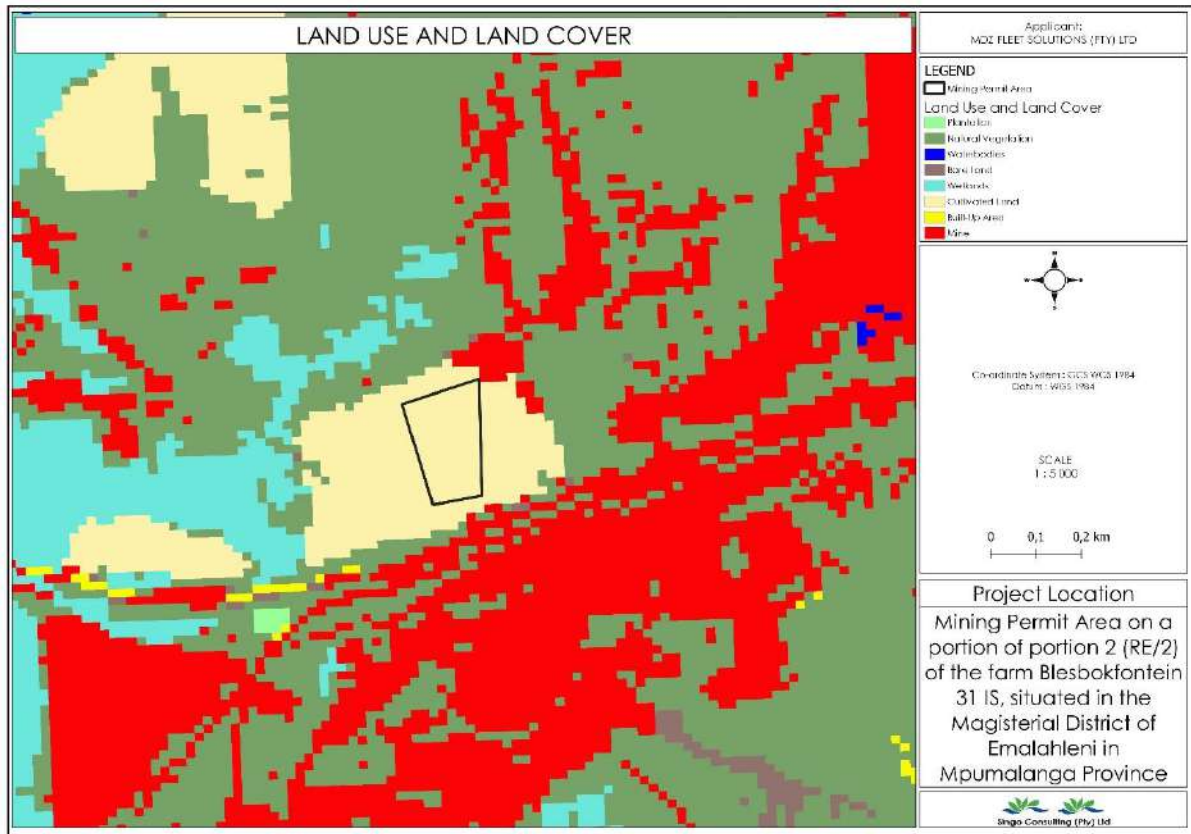


Figure 16: Land use and Land Cover Map



## 5 FLOODLINE DETERMINATION

Flood risk and flood line determination are an important part of development planning for a wide range of potential developments. For commercial, housing and mining developments, no development may occur within areas that are potentially prone to becoming inundated with water because of floods. The need for determination is frequently legislated or included in regulations. Typical examples would be regulations contained in: General notice 704 of the south African national Water Act (Act 36 of 1998), which stipulates that no mining activities may take place within or below a defined 1: 100- year flood line.

### 5.1 Methodology and Data Sources

#### 5.1.1 Elevation Data

Elevation data in the form of 5 m contour intervals covering the project area was created by the GIS specialist at Singo Consulting (Pty) Ltd. The contours were used to generate a 5 m spatial resolution Digital Terrain Model (DTM). The DTM was used to extract the longitudinal and cross-sectional stream and floodplain elevations. The DTM was further used in the post processing to undertake the floodplain delineations.

#### 5.1.2 Manning's Roughness Coefficients

The Manning's roughness coefficients are values that represent the channel and adjacent floodplains resistance to flow.

#### 5.1.3 Peak Flows

Peak flows are the most important flood parameter which relatively reflects the highest level and potential destructive power of a flood. Understanding peak flow changes can effectively capture a flood characteristic and is essential for developing flood control strategies.

#### 5.1.4 Software

The following software's were used:

- QGIS is a GIS software programme used to view, edit, create and analyse geospatial data.



## 5.2 Catchments

South Africa's water resources are divided into quaternary catchments, which are the country's primary water management units (DWA 2011). In a hierarchical classification system, a quaternary catchment is a fourth order catchment below the primary catchments. The primary drainages are further classified as Water Management Areas (WMA) and Catchment Management Agencies (CMA). In accordance with Section 5 subsection 5(1) of the National Water Act, 1998, the Department of Water and Sanitation (DWS) has established nine WMAs and nine CMAs as outlined in the National Water Resource Strategy 2 (2013). (Act No. 36 of 1998). The purpose of establishing these WMAs and CMAs is to improve water governance in various regions of the country, ensuring a fair and equal distribution of the Nation's water resources while ensuring resource quality is maintained.

The mining permit area falls within the Olifants Water Management Area (WMA). The quaternary catchment is B11F. The WRC 2012 study, presents hydrological parameters for each quaternary catchment including area, mean annual precipitation (MAP) and mean annual runoff (MAR).



## 6 SURFACE WATER IMPACT ASSESSMENT

This section evaluates the potential impact of the proposed development on watercourses present within and around the mining site. Watercourse is a term used in the National Water Act (Act No. 36 of 1998) (NWA) that includes various water resources, such as different types of wetlands (both natural and artificial), rivers, riparian habitat, dams and drainage lines (e.g., natural channels in which water flows regularly or intermittently). Results and discussions of delineated watercourses are used as part of the impact assessment that considers both corridor alternatives separately.

Expected watercourse impacts associated with the proposed development is assessed in detail for the construction and operational phases of the project using the approach provided in the Impact Assessment methodology Section below, which includes the provision of recommended mitigation measures. An impact can be defined as any change in the physical-chemical, biological, cultural and/or socio-economic environmental system that can be attributed to human activities related to alternatives under study for meeting a project need.

### 6.1 Methodology

#### 6.1.1 Impact Status

The impacts are assessed as either having a:

- Negative effect (i.e., at a `cost' to the environment)
- Positive effect (i.e., a `benefit' to the environment)
- Neutral effect on the environment.

#### 6.1.2 Impact Extent

Extent of the Impact

- Site (site only)
- Local (site boundary and immediate surrounds)
- Regional
- National
- International



### 6.1.3 Impact Duration

#### Duration of the Impact

The length that the impact will last for is described as either:

- Immediate (<1 year)
- Short term (1-5 years)
- Medium term (5-15 years)
- Long term (ceases after the operational life span of the project),
- Permanent

### 6.1.4 Impact Probability

#### Probability of Occurrence

The likelihood of the impact actually taking place is indicated as either:

- None (the impact will not occur)
- Improbable (probability very low due to design or experience)
- Low probability (unlikely to occur)
- Medium probability (distinct probability that the impact will occur)
- High probability (most likely to occur)
- Definite

### 6.1.5 Impact Intensity

#### Magnitude of the Impact

The intensity or severity of the impacts is indicated as either:

- None
- Minor
- (4) Low
- (6) Moderate (environmental functions altered but continue)
- (8) High (environmental functions temporarily cease)
- (10) Very high / unsure (environmental functions permanently cease)



### 6.1.6 Impact Significance

Based on the information contained in the points above, the potential impacts are assigned a significance rating (S). This rating is formulated by adding the sum of the numbers assigned to extent (E), duration (D) and magnitude (M) and multiplying this sum by the probability (P) of the impact.

$$S = (E + D + M) P$$

The significance ratings are given below:

- **(<30) Low** (i.e., where this impact would not have a direct influence on the decision to develop in the area),
- **(<30-60) Medium** i.e., where the impact could influence the decision to develop in the area unless it is effectively mitigated),
- **(>60) High** (i.e., where the impact must have an influence on the decision process to develop in the area)

### 6.2 Impact Assessment Ratings and Mitigation Measures

The mining project consists of various phases, which include construction phase and operational phase, which all have the potential to affect surface water regime.

#### **CONSTRUCTION PHASE.**

The construction phase consists of the following activities:

- Footprint area clearance.
- The construction of the total clean water and dirty water diversion trenches; and
- Handling of truck fuel and oil spills.

#### **Surface water contamination.**

Truck oils and fuel could leak and spill to water resources. All oils and fuels must be stored in banded areas and any spillages must be managed immediately in accordance with the Emergency Response plan. The emergency response plan must be provided by contractors. This will reduce the risks from High to Medium.



## 7 STORMWATER MANAGEMENT PLAN

### 7.1 Terminology

Stormwater management involves the control of that surface runoff. The volume and rate of runoff both substantially increase as land development occurs. Construction of impervious surfaces, such as roads in the context of the study, and the installation of storm sewer pipes which efficiently collect and discharge runoff, prevent the infiltration of rainfall into the soil. Management of stormwater runoff is necessary to compensate for possible impacts of impervious surfaces such as decreased groundwater recharge, increased frequency of flooding, stream channel instability, concentration of flow on adjacent properties, and damage to transportation and utility infrastructure.

- **Activity:** Any mining related process on the mine including the operation of washing plants, mineral processing facilities, mineral refineries and extraction plants; the operation and the use of mineral loading and off-loading zones, transport facilities and mineral storage yards, whether situated at the mine or not.
- **Clean area:** This refers to any area at or near a mine or activity, which is not impacted by mining activities, but has the potential to become contaminated if not managed appropriately.
- **Clean water system:** This includes any dam, other form of impoundment, canal, works, pipeline and any other structure or facility constructed for the retention or conveyance of clean unpolluted water.
- **Dam:** This includes any return water dam, settling dam, tailings dam, evaporation dam, catchment or barrier dam and any other form of impoundment used for the storage of unpolluted water or water containing waste.
- **Dirty area:** This refers to any area at a mine or activity which causes, has caused or is likely to cause pollution of a water resource (i.e., generate contaminated water as a result of mining activities).
- **Partially dirty area:** These are areas that are unlikely to produce contaminated runoff other than elevated suspended solids.
- **Dirty water system:** This includes any dam, other form of impoundment, canal, works, pipeline, residue deposit and any other structure or facility constructed for the retention or conveyance of water containing waste; and
- **Watercourse:** This is defined in the NWA as:
  - A river or spring





- A natural channel in which water flows regularly or intermittently
- A wetland, lake or dam into which, or from which, water flows; and

## 7.2 Stormwater Management Principles

The following principles for stormwater management shall guide the planning, design, and implementation of stormwater management (Centre for watershed, 2010).

- The ecosystems to be protected and a target ecological state should be explicitly identified.
- The post development balance of evapotranspiration, stream flow, and infiltration should mimic the predevelopment balance, which typically requires keeping significant runoff volume from reaching the stream.
- Stormwater control measures (SCMs) should deliver flow regimes that mimic the predevelopment regime in quality and quantity.
- SCMs should have capacity to store rain events for all storms that would not have produced widespread surface runoff in a predevelopment state, thereby avoiding increased frequency of disturbance to biota.
- SCMs should be applied to all impervious surfaces in the catchment of the target stream.

## 7.3 Current Stormwater Management

- The drainage areas or rivers as identified by the map.
- The topography of the area, this promotes run-off and channels stormwater to an area of lower elevation such as a river or a valley.

## 7.4 Proposed Stormwater Measures

- Berms around the stockpile and waste material should be made.
- Trenches should be created, to effectively channel water and treat it if contaminated.
- There should be PCD to store wastewater, and catchment to drain stormwater.
- The infrastructure should be created in a way that is able to harvest stormwater, this will decrease the amount of stormwater within the area on the ground which could potentially cause water pollution.



### 7.4.1 ROM Stockpile Consolidation

- Trenches around the stockpile, which will collect dirty water which was in contact with the stockpile.
- Impermeable pavement will be constructed around the stockpile.

### 7.4.2 Open Cast Area

- Pump on standby to quickly dewater the mining area, this will reduce the residence time of the water and decrease the infiltration in the mining area.
- The haul roads should be compacted, this will reduce infiltration.
- Around the mining area, the area should never be flat, so that the stormwater could be directed to a channel and quickly collected.
- The roads within the mine, should be hard surface, and the runoff should be collected.

### 7.4.3 Water Management Infrastructure

#### **DETENTION BASINS**

Detention basins are the optimal control solution to regulate stormwater flow into the pump stations. These large concrete tanks store stormwater temporarily and drain slowly when the system is ready to pump water to a treatment plant.

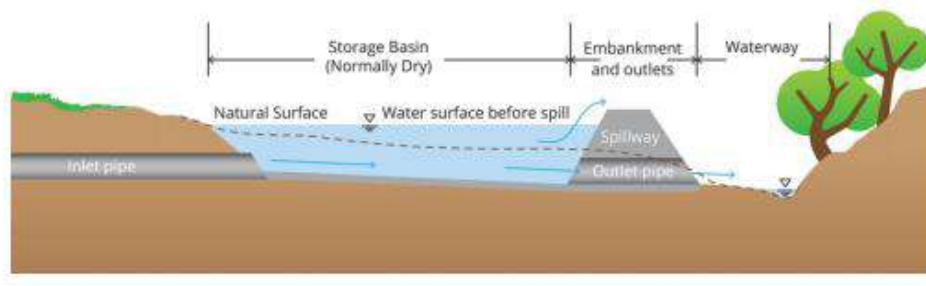


Figure 17: Detention basin

#### **INFILTRATION TANKS**

These underground storage tanks are commonly made of plastic modules that infiltrate collected rainwater. Their modular system makes infiltration tanks cheaper and faster to construct than concrete detention basins, but they do not have the same capacity for storing and handling large volumes of runoff in short periods of time.



## 8 MONITORING PLANS

The goal of the surface water management and monitoring measures to minimise the effect on surface water-based structures to be maintained from disruption within and adjacent to regulated sites; to preserve hydrological regimes of surface water so that the environmental values are preserved and, to ensure compliance with license requirements and for reporting purposes.

Water dependent systems are parts of the environment in which species composition and natural ecological processes are determined by the permanent or temporary presence of surface water or groundwater flowing or standing. The in-stream areas of rivers, riparian vegetation, springs, wetlands, floodplains, groundwater-dependent terrestrial vegetation are all examples of water dependent systems (Department of Water, January 2013). The objectives of these systems will be achieved if the in-stream and downstream fitness for use criteria is not affected.

### 8.1 Surface Water Quality

During the Construction and Operational Phases of the mine project water body adjacent to the mining permit area should be sampled on a monthly basis (the site should have a borehole).

Monitoring during the Decommissioning Phase will be based on the Operational Phase monitoring, adapted to suit the final works to be implemented during this phase. However, in terms of surface water this will be primarily downstream of the area as for the Operational Phase.

Monitoring during the Post Closure Phase will be undertaken only where required to prove the sustainability of the site. In terms of surface water, this relates primarily to managing the surface topography (monitoring for settlements), and water quality and levels within the mined-out area.

Any infrastructure (PCDs) that will remain on site, post closure, will continue to be included in the surface water monitoring programme and should be monitored in terms of water quality and water levels monthly.



## 8.2 Stormwater Infrastructure

Stormwater infrastructure should be monitored together with water quality. It is necessary to monitor these infrastructures because overtime they lose their integrity and or ability to perform their ultimate purpose. It should be based on monthly monitoring which will involve taking notes of the structure and providing recommendations on a monthly basis.



## 9 CONCLUSIONS AND RECOMMENDATIONS

### 9.1 Conclusion and Summary

The site layout and project infrastructure has been reviewed in the context of the baseline hydrology and a series of mitigation measures developed for the project to minimise impacts and ensure compliance with GN 704

It is not expected that the proposed mining activities will have a significant impact on the water resources mostly due to the fact that the activities are located more than 800 m from the nearest water resource.

Based on the WR2012 study, the project area falls within the quaternary catchment B11K under the Olifants water management area. The topography of the study area is flat, this is seen by the contours being widely spread.

### 9.2 Recommendations

- Drilling of well-constructed boreholes which will be monitored monthly, during the projects construction and operational phases.
- An independent ECO is to be appointed during construction. The mine's internal Environmental officers will be conversant with best practices in accordance with rehabilitation during decommissioning and an audit is to be performed before and after rehabilitation.
- Where mining infrastructure, such as haul roads, are required across natural watercourses, new storm water infrastructure, such as pipes and culverts could replace the hydraulic function currently offered by the natural water courses. This infrastructure should be designed for both hydraulic performance and environmental functionality.
- Around operating areas, temporary erosion control measures (e.g., sediment nets, berms, etc.) must be used.
- No dirty water should be released into the ecosystem. Excess water in the mine water circuit must be dealt with properly in accordance with the DWS



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## APPENDICES

Appendix A: Specialist's qualifications

Available upon request



# MINING PERMIT APPLICATION

## REHABILITATION AND CLOSURE PLAN

Rehabilitation and Closure Plan for the proposed Mining Permit application for MDZ Fleet Solutions (Pty) Ltd within Portion 2 of the Farm Blesbokfontein 31 IS, situated in the Magisterial District of Emalaheni in Mpumalanga Province.

REPORT PREPARED BY:

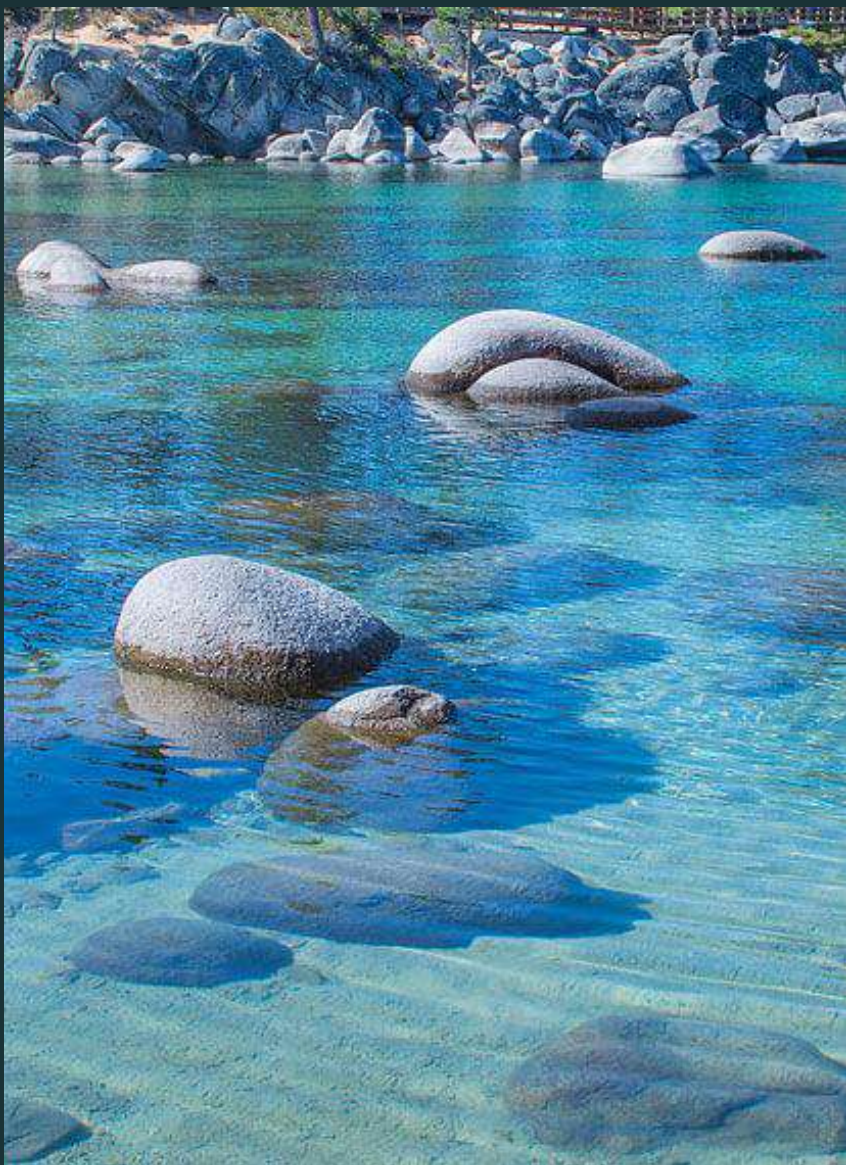


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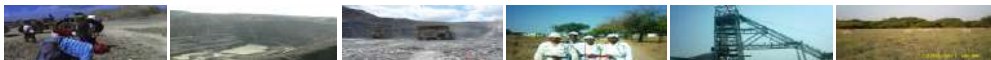




## Report Credentials.

**Disclaimer** The opinion expressed in this and associated reports are based on the information provided by MDZ Fleet Solutions (Pty) Ltd to Singo Consulting (Pty) Ltd ("Singo Consulting") and is specific to the scope of work agreed with MDZ Fleet Solutions (Pty) Ltd. Singo Consulting acts as an advisor to the MDZ Fleet Solutions (Pty) Ltd and exercises all reasonable skill and care in the provision of its professional services in a manner consistent with the level of care and expertise exercised by members of the environmental profession. Except where expressly stated, Singo Consulting has not verified the validity, accuracy or comprehensiveness of any information supplied for its reports. Singo Consulting shall not be held liable for any errors or omissions in the information given or any consequential loss resulting from commercial decisions or acts arising from them. Where site inspections, testing or fieldwork have taken place, the report is based on the information made available by MDZ Fleet Solutions (Pty) Ltd or their nominees during the visit, visual observations and any subsequent discussions with regulatory authorities. The validity and comprehensiveness of supplied information has not been independently verified and, for the purposes of this report, it is assumed that the information provided to Singo Consulting is both complete and accurate. It is further assumed that normal activities were being undertaken at the site on the day of the site visit(s), unless explicitly stated otherwise. These views do not generally refer to circumstances and features that may occur after the date of this study, which were not previously known to Singo Consulting (Pty) Ltd or had the opportunity to assess.

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**Project details**

**Report type**    **Rehabilitation Plan for a Mining Permit application**

**Project title**    Rehabilitation Plan for Mining Permit application for MDZ Fleet Solutions (Pty) Ltd of Coal, Pseudocoal, Torbanite and Aggregate on Portion 2 of the Farm Blesbokfontein 31 IS, situated in the Magisterial District of Emalahleni in Mpumalanga Province.

**Mineral (s)**    Coal, Pseudocoal, Torbanite and Aggregate

**Client**    MDZ Fleet Solutions (Pty) Ltd

**Site location**    The Portion 2 of the Farm Blesbokfontein 31 IS, situated in the Magisterial District of Emalahleni in Mpumalanga Province.

**Version**    01

**Date**    20 July 2023

**Electronic signatures**

**Compiled by**    Mutali Guduvheni (Hydrogeologist) Singo Consulting (Pty) Ltd, South African Council for Natural Scientific Professions (SACNASP: Earth Science (Candidate Natural Scientist) Reg. No: 141174)



**Reviewed by**    Mutshidzi Munyai (Hydrogeologist) Singo Consulting (Pty) Ltd (Water Resources Science (Candidate Natural Scientist), Environment Science (South African Council for Natural Scientific Professions) (SACNASP Registration Number 122464)



**Final review and approval**    Dr. Kenneth Singo (Principal Consultant of Singo Consulting (Pty) Ltd)




## EXECUTIVE SUMMARY

Singo Consulting Pty Ltd has been requested by **MDZ Fleet Solutions (Pty) Ltd** to compile a Rehabilitation and Closure Plan, as well as financial provision for mining operation which will involve opencast mining within Portion 2 of the Farm Blesbokfontein 31 IS, situated in the Magisterial District of Emalahleni in Mpumalanga Province in South Africa to support the Environmental Authorisation Process.

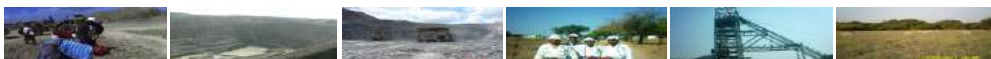
The document supplies the Department of Mineral Resources & Energy (DMRE) with information pertaining to closure planning for the mining activities as required in terms of the National Environmental Management Act 107 of 1998 (NEMA) and the Mineral and Petroleum Resources Development Act 28 of 2002. The contents of this Rehabilitation and Closure Plan have been prepared as per the requirements of Appendix 5 of the NEMA EIA Regulations of 2014 (GNR 517) and as stipulated under Appendix 4 of GNR 1147.

### The Mining activities would be conducted in phases:

Site Preparation	Topsoil, subsoil, overburden, discard and ROM stockpiles
Opencast mining	Hauling and transportation
Invasive Drilling	Integrated discard
Blasting	Final decommissioning and Rehabilitation and closure

### DESCRIPTION OF THE SCOPE OF THE OVERALL ACTIVITY

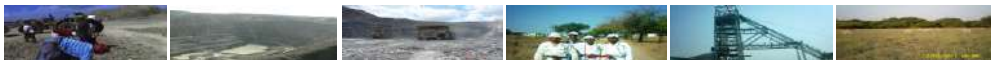
The method of mining preferred for this proposed mining permit is the opencast method, which involves removal of ore from seam relatively near the surface by means of open cast. Open cast method is a surface mining technique of extracting rock or minerals from the earth by their removal of rock from an Open cast or borrow. Open-cast mines are typically enlarged until either the mineral resource is exhausted, or an increasing ratio of overburden to ore makes further mining uneconomic. The pit at the site will be worked by cutting a bench which will be progressed further north-easterly direction. The mining method will make use of blasting and will make use of ripper since it is close to the surface by means of explosives to loosen the hard rock (overburden) when necessary; the material (i.e. overburden) will then be loaded by excavators and hauled to the area designated for overburden stockpile on site. Coal, Pseudocoal, Torbanite and Aggregate will be loaded and hauled to a mobile crushing and screening plant that will be established within the boundaries of the mining area or elsewhere out of the mining area. Once crushed and screened the Coal, Pseudocoal, Torbanite and



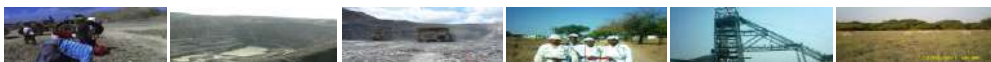
Aggregate will be then stockpiled and transported to clients via trucks and trailers. All activities will be contained within the boundaries of the mining site of the mining permit.

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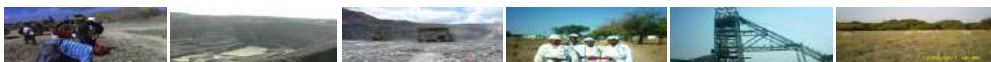
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## 1 INTRODUCTION

South Africa's legislation unambiguously places the responsibility of mitigating environmental damage as a result of mining operations on mining companies. The liability exists throughout the life of the mine, and beyond in terms of residual impacts. It includes commitments for remediation and/or rehabilitation. There now have been full police from the department of mineral which encourage to pay rehabilitation before mining activities commence, where the South African mining industry and mining companies now fully accept the concept and responsibility of mine site rehabilitation and decommissioning.

According to the Chamber of Mines Guidelines for the rehabilitation of mined land 'effective rehabilitation', is defined as "rehabilitation that will be sustainable, in the long term, under normal land management practices" (Chamber of Mines, 2007; Department of Minerals and Energy, 2008). Mine rehabilitation therefore must be considered as an on-going process aimed at restoring the physical, chemical and biological quality or potential of air, land and water regimes disturbed by mining to a state acceptable to the regulators and to post mining land users (Whitehorse Mining Initiative, 1994).





**Singo Consulting Pty Ltd** has been tasked by **MDZ Fleet Solutions (Pty) Ltd** to compile a Rehabilitation and Closure Plan, as well as financial provision for its mining activities in support of the Environmental Authorisation Process. Contained herein is the conceptual rehabilitation plan, which is one of the specialist studies that have been compiled for the project. The objective of the rehabilitation plan is to ensure activities associated with mine construction, operation and closure will be designed to prevent, minimise or mitigate adverse long-term environmental and social impacts and create a self-sustaining ecosystem.

The conceptual rehabilitation plan should be used to guide construction, operation and decommissioning phases of the project and guide the final rehabilitation of the project area. The report must be updated with the mine plan as often as needed to ensure that it is fully applicable to the activities associated with the operations. Rehabilitation report aims to provide standardized guidance for setting corporate standards and policies, and site-specific land rehabilitation plans. It will also provide technically sound, simple, and practical approaches for implementation by all levels of land rehabilitation practitioners, mine planning teams, and administrating regulators; all of whom are responsible for mining-related land.

## 2. ASSUMPTIONS AND LIMITATIONS

For the compilation of the rehabilitation plan, it is assumed that:



-  All relevant information will be made available, including designs for the waste rock facilities and tailings facility.
-  All maps for the area will be made available, including the most up to date mine.
-  All engineering inputs appointed contractor's responsibility and are thus not included in this report
-  The rehabilitation guidelines and plan are dependent on the specialist studies done for the area and the full mine plan for the project

### 3 STUDY AREA AND DESCRIPTION

#### 3.1 Project Area

<b>Farm name</b>	within Portion 2 of the Farm Blesbokfontein 31 IS, situated in the Magisterial District of Emalahleni in Mpumalanga Province
<b>Application area (ha)</b>	5 hectares
<b>Magisterial district</b>	Emalahleni
<b>Distance and direction from nearest town</b>	The proposed project site is situated approximately 61 km Southwest of Middelburg, approximately 40,8 km Southwest of Emalahleni and approximately 32 km South East of Ogies.

The Coal, Pseudocoal, Torbanite and Aggregate mining permit application within Portion 2 of the Farm Blesbokfontein 31 IS, situated in the Magisterial District of Emalahleni in Mpumalanga Province, South Africa. The surrounding land use on the proposed project area are associated with cultivation. The project area is approximately 61 km Southwest of Middelburg, approximately 40,8 km Southwest of Emalahleni and approximately 32 km South East of Ogies. The project site covers an area approximately 5 hectares.





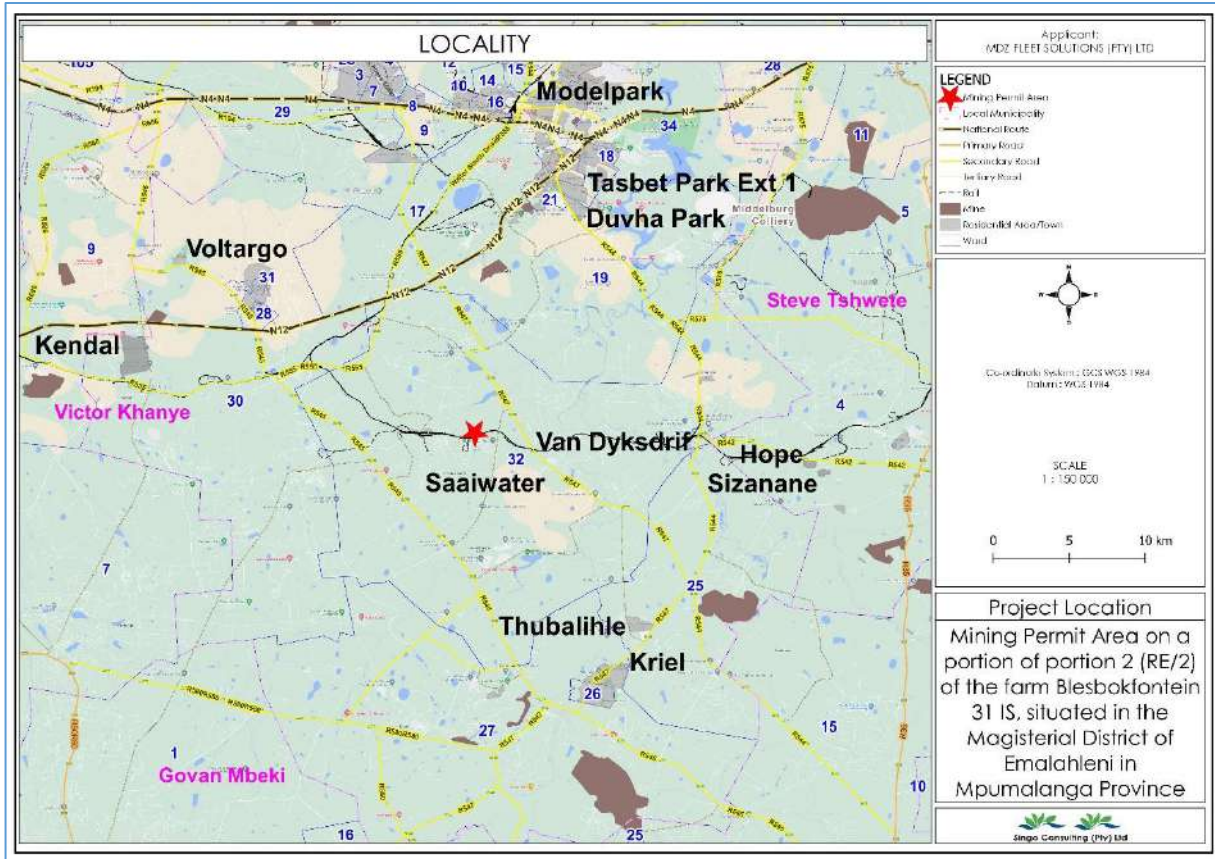














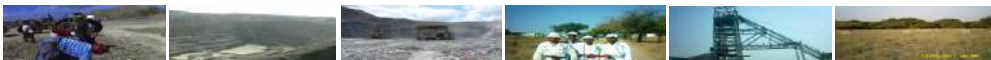
Figure 1: Locality map of the proposed mining area.

Anticipated Infrastructure relating to the mine include but not limited to the following:

-  Temporary offices
-  Earth moving equipment.
-  Drainage systems and PCD
-  Roads
-  Excavating equipment ROM stockpiling
-  Mobile crushing plant
-  Fencing
-  Parking area
-  Workshops
-  Chemical mobile toilets (Males and Females)
-  Dirty Water Trench
-  Clean Water Trench

### 3.3 Description of The Scope of the Overall Activity




The method of mining preferred for this proposed mining permit by MDZ Fleet Solutions (Pty) Ltd Open cast method, which involves removal of ore from seam relatively near the surface by means of Open cast. Open cast method is a surface mining technique of extracting rock or









minerals from the earth by their removal of rock from an Open cast or borrow. Open-cast mines are typically enlarged until either the mineral resource is exhausted, or an increasing ratio of overburden to ore makes further mining uneconomic. The open cast at the site will be worked by digging from topsoil to the until our reaching productive material from top layer. The mining method will make use of blasting and make use of ripper since it is close to the surface by means of explosives to loosen the hard rock (overburden) when necessary; the material (i.e. overburden) will then be loaded by excavators and hauled to the area designated for overburden stockpile on site while Coal, Pseudocoal, Torbanite and Aggregate will be loaded and hauled to a mobile crushing and screening plant that will be established within the boundaries of the mining area or elsewhere out of the mining area. Once crushed and screened the Coal, Pseudocoal, Torbanite and Aggregate will be then stockpiled and transported to clients via trucks and trailers. All activities will be contained within the boundaries of the mining site of the mining permit.

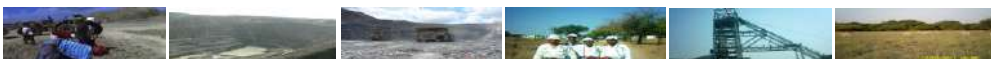
#### 4 REHABILITATION OBJECTIVES

The scope and objectives of this report aims to ensure the Department of Mineral Resources & Energy (DMRE) is presented with a document that addresses all the legal requirements. As per Annexure 4 of the GNR 1147 regulations, "The minimum content of a final rehabilitation, decommissioning and mine closure plan", the objective of the final rehabilitation, decommissioning and mine closure plan, which must be measurable and auditable, is to identify a post-mining land use that is feasible. Internationally and in the South African context, the broad rehabilitation objectives include, explained below:

-  Restoration of previous land capability and land use
-  No net loss of biodiversity
-  What the affected community wants, the affected community gets.

Rehabilitation objectives need to be tailored to the project at hand and be aligned with the Environmental Management Programme (EMPr) and Mine Closure Plan. And thus, the overall rehabilitation objectives for the project are as follows:

-  Re-establishment of the pre-mining land capability to allow for a suitable post mining land use
-  Maintain and minimise impacts to the functioning wetlands and water bodies within the area
-  Implement progressive rehabilitation measures where possible
-  Prevent soil, surface water and groundwater contamination
-  Comply with the relevant local and national regulatory requirements; and
-  Maintain and monitor the rehabilitated areas



## 5 BASELINE ENVIRONMENT

### 5.1 Soils and Land Capability

Land capability is the ability of land to support a given land use without causing damage. It depends on soil capability in combination with climate. The land capability depends on soil depth which was determined at soil survey positions. Survey positions were recorded as waypoints using a handheld (Global Positioning System (GPS)).

### 5.2 Soil profiles Interpretation

The soil classes map in Figure 2 below, shows that the mining permit area is largely covered with Red or yellow structureless soils with a plinthic horizon. The soils are Red to yellow sandy soils of the Ba and Bb land types found on shales and sandstones of the Madzaringwe Formation (Karoo Supergroup).

Soil class	Favourable properties	Limitations
Red or yellow structureless soils with a plinthic horizon	Favourable water-holding properties	Imperfect drainage unfavourable in high rainfall areas

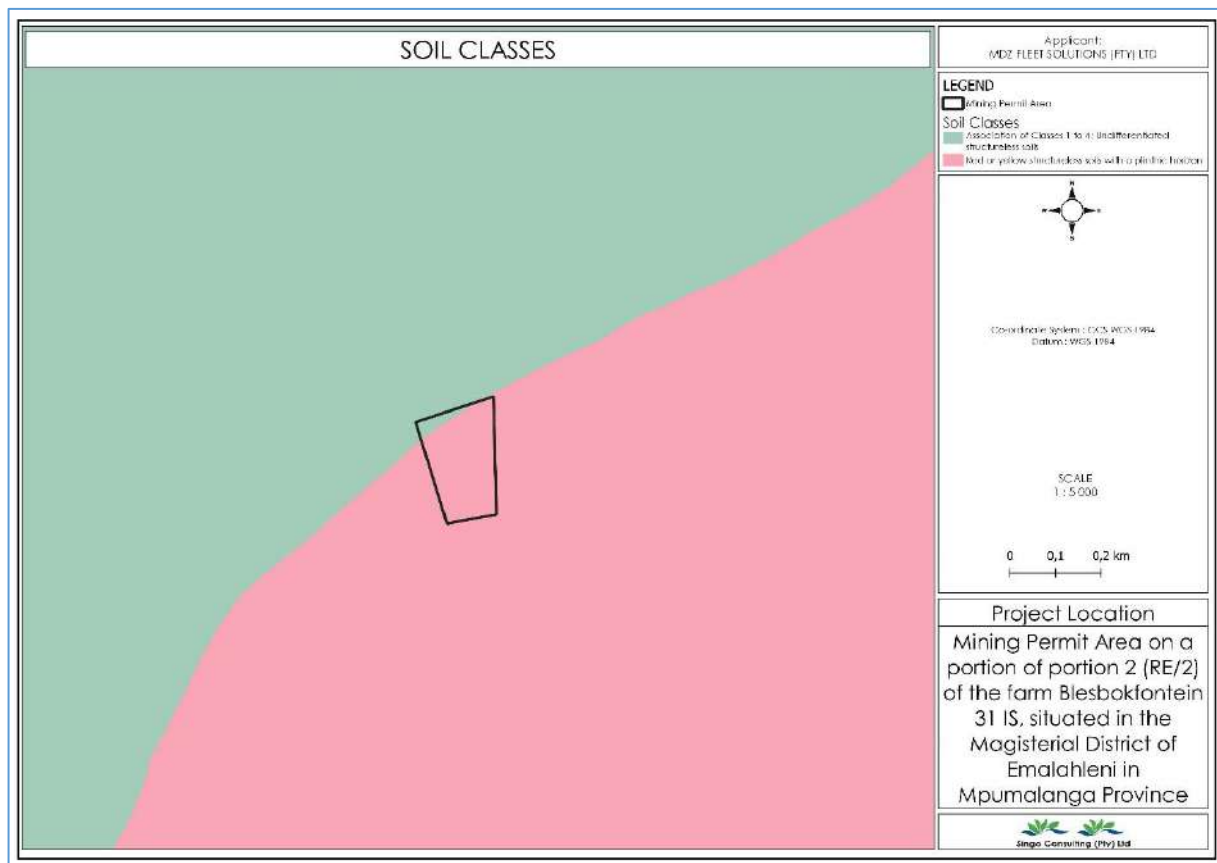
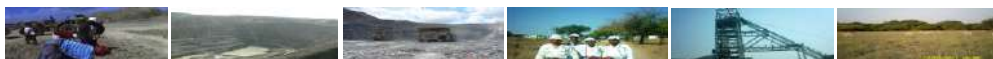


Figure 2: soil class map of the project area.



### 5.4 Land Capability and Land Use

The proposed project area is an arable land this type of land it is the land that is ploughed or tilled regularly.

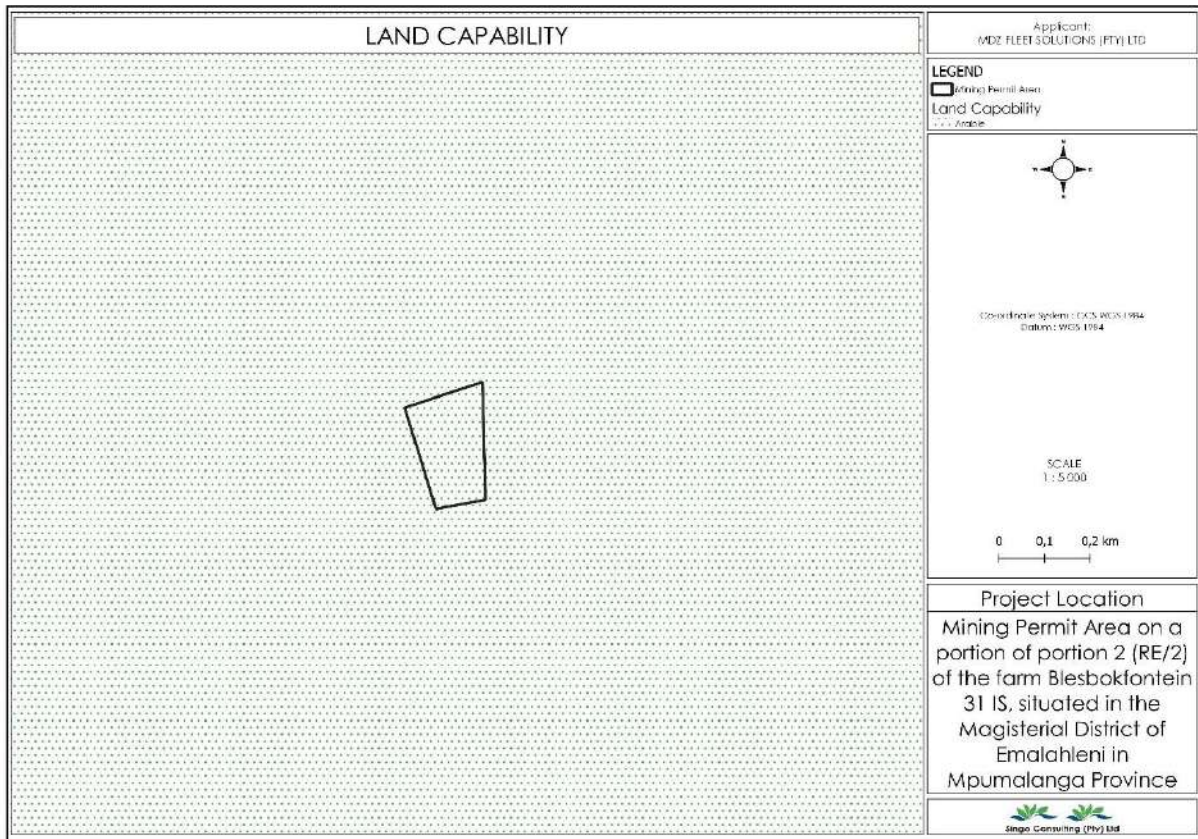
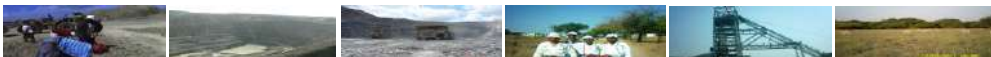


Figure 3: Land capability map of the area



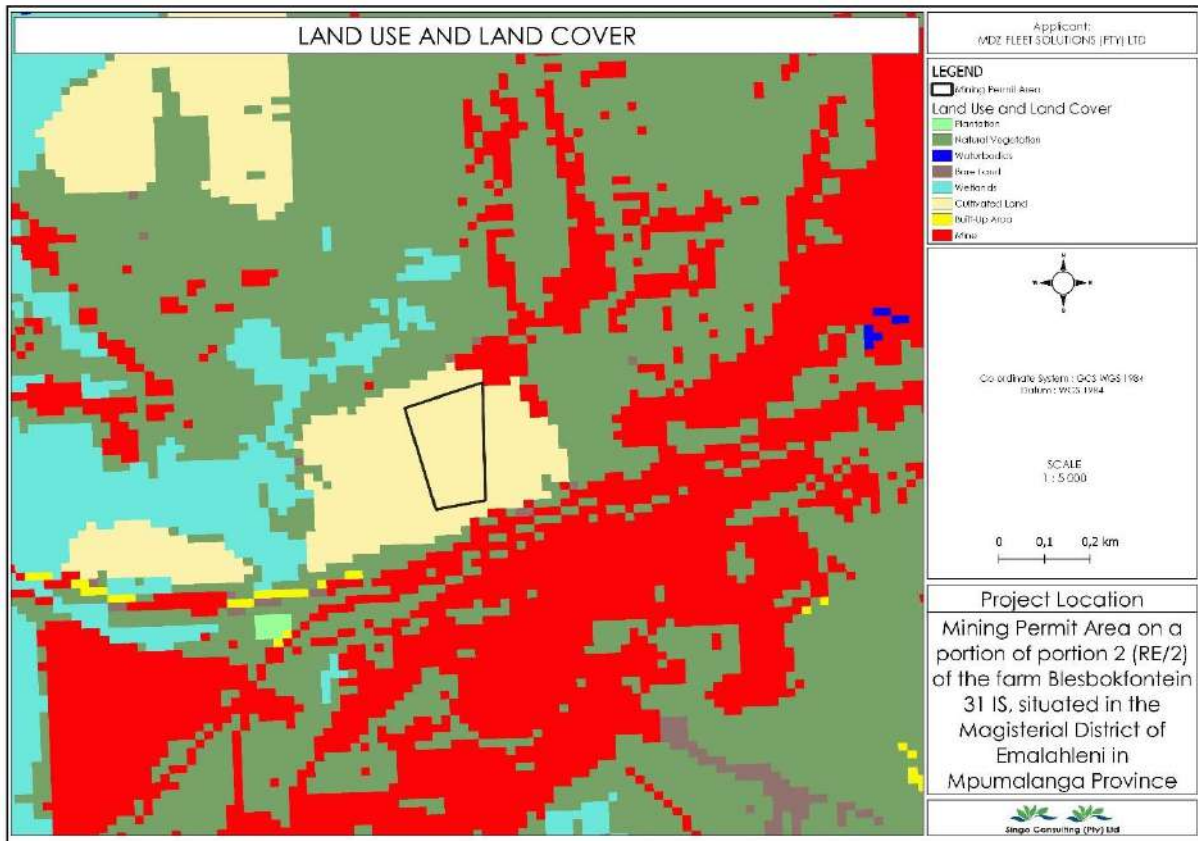


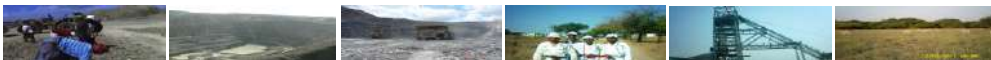
Figure 4: Land use map

## 5.5 Fauna and Flora

### 5.4.1 Flora

The Vegetation & Landscape Features of the project areas is Slightly to moderately undulating plains, including some low hills and pan depressions. The vegetation is short dense grassland dominated by the usual highveld grass composition (*Aristida*, *Digitaria*, *Eragrostis*, *Themeda*, *Tristachya* etc.) with small, scattered rocky outcrops with wiry, sour grasses and some woody species (*Acacia caffra*, *Celtis africana*, *Diospyros lycioides* subsp *lycioides*, *Parinari capensis*, *Protea caffra*, *P. welwitschii* and *Rhus magalismsontanum*).

The Important Taxa Graminoids: *Aristida aequiglumis* (d), *A. congesta* (d), *A. junciformis* subsp. *galpinii* (d), *Brachiaria serrata* (d), *Cynodon dactylon* (d), *Digitaria monodactyla* (d), *D. tricholaenoides* (d), *Elionurus muticus* (d), *Eragrostis chloromelas* (d), *E. curvula* (d), *E. plana* (d), *E. racemosa* (d), *E. sclerantha* (d), *Heteropogon contortus* (d), *Loudetia simplex* (d), *Microchloa caffra* (d), *Monocymbium cerasiiforme* (d), *Setaria sphacelata* (d), *Sporobolus africanus* (d), *S. pectinatus* (d), *Themeda triandra* (d), *Trachypogon spicatus* (d), *Tristachya leucothrix* (d), *T. rehmannii* (d), *Alloteropsis semialata* subsp. *eckloniana*, *Andropogon appendiculatus*, *A. schirensis*, *Bewsia biflora*, *Ctenium concinnum*, *Diheteropogon amplectens*, *Eragrostis capensis*, *E. gummiflua*, *E. patentissima*, *Harpochloa falx*, *Panicum natalense*, *Rendlia altera*, *Schizachyrium sanguineum*, *Setaria nigrirostris*, *Urelytrum agropyroides*. Herbs: *Berkheya setifera*



(d), *Haplocarpha scaposa* (d), *Justicia anagalloides* (d), *Pelargonium luridum* (d), *Acalypha angustata*, *Chamaecrista mimosoides*, *Dicoma anomala*, *Euryops gilfillanii*, *E. transvaalensis* subsp. *setilobus*, *Helichrysum aureonitens*, *H. caespititium*, *H. callicomum*, *H. oreophilum*, *H. rugulosum*, *Ipomoea crassipes*, *Pentanisia prunelloides* subsp. *latifolia*, *Selago densiflora*, *Senecio coronatus*, *Vernonia oligocephala*, *Wahlenbergia undulata*. Geophytic Herbs: *Gladiolus crassifolius*, *Haemanthus humilis* subsp. *hirsutus*, *Hypoxis rigidula* var. *pilosissima*, *Ledebouria ovatifolia*. Succulent Herb: *Aloe ecklonis*. Low Shrubs: *Anthospermum rigidum* subsp. *pumilum*, *Stoebe plumosa*.

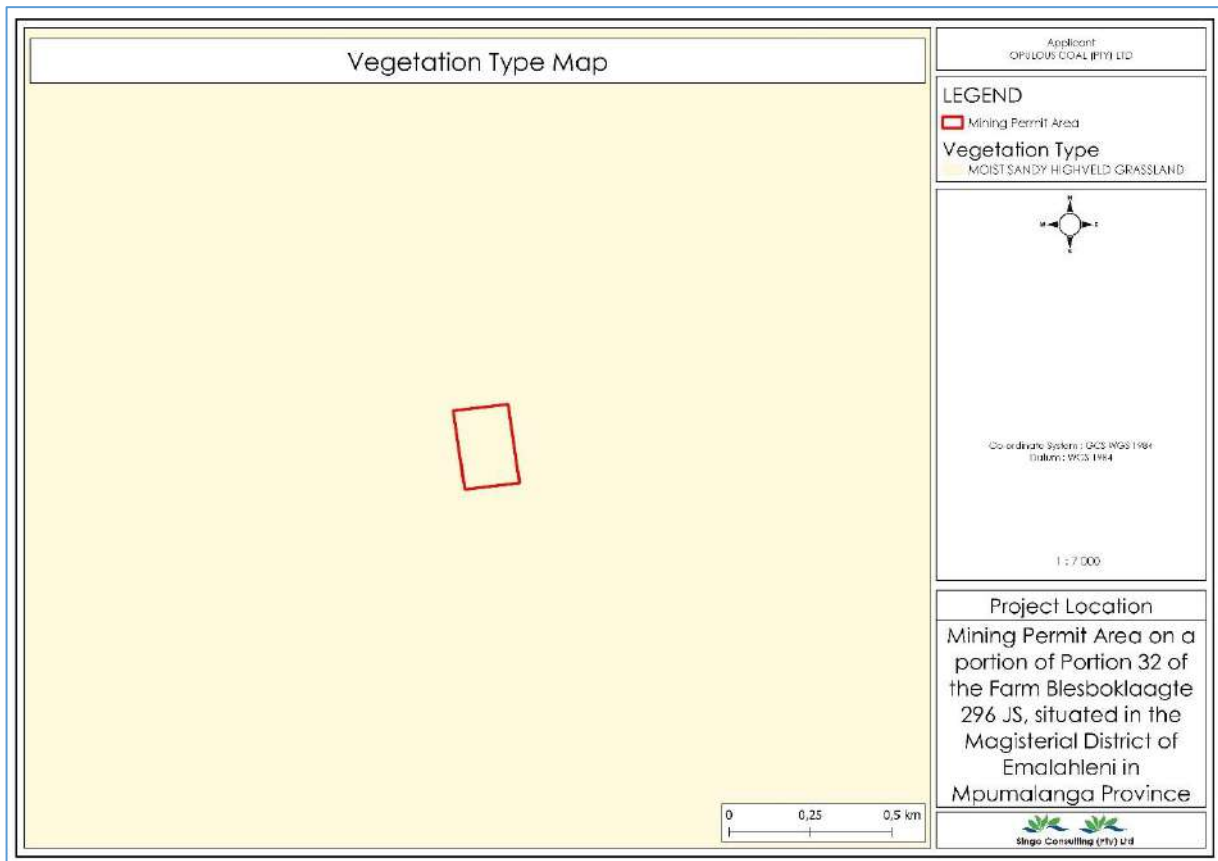
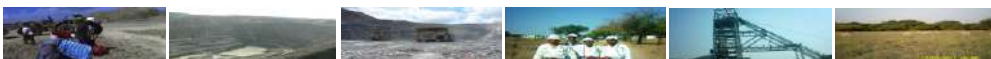


Figure 5: Vegetation map of the mine area

The Grassland Biome has an extremely high biodiversity, second only to the Fynbos Biome. At the 1000 m<sup>2</sup> scale, the average species richness of the Grassland Biome is even higher than that of most Fynbos communities (Cowling et al., 1997; van Wyk, 2002), being surpassed only by the Renosterveld. Given that most rare and threatened plant species in South Africa's summer rainfall region are restricted to high-rainfall grasslands, this type of vegetation is in the most urgent need of protection (60% destroyed and only 2.2% conserved).



### 5.4.2 Fauna

The biome of Grassland is characterized by a high diversity of fauna (animals), including many endangered taxa. The following fauna is likely to occur in the proposed mining permit area: -

- Mammals
- Birds
- Reptiles and,
- Amphibians

**Mammals:** No Species of Conservation Concern (SCC) were observed during site assessment. However, there are three SCC known to frequent the area from time to time.

**Birds:** Habitats are typically associated with grasslands, but the loss of habitat has affected diversity due to site clearing (historical and current). The proposed mining permit area showed intermediate diversity of bird species which included seed eaters and insectivores.

**Reptiles:** Reptile faunal environment is called intermediate, reptiles are naturally adaptable, and can live in different environments. The inhabitant suits both the reptiles and their prey. No SCC were observed in the project site. The likelihood of SCC to occur in the area may be low due to the high level of human activity in the area.

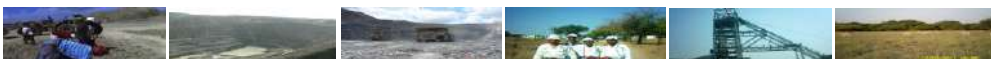
No common reptile species were observed during field assessment. This may be due to the season in which the assessment was done.

**Amphibians:** Because of extreme salinization of the freshwater environment, the general habitat vulnerability for amphibians is considered relatively poor. There were no SCC observed during site assessment.

### 5.6 Surface and Ground Water

The fractured aquifer consists of the various lithologies of siltstone, shale, sandstone and the Coal, Pseudocoal, Torbanite and Aggregate seams. The pores of the geological units are generally well cemented, and the principle flow mechanism is fractured flow along secondary structures e.g. faults, bedding plane fractures etc. The intrusion of the fractured aquifer by dolerite dykes and sills has led to the formation of preferential flow paths along the contacts of these lithologies due to the formation of cooling joints. The dykes may act as permeable or semi-permeable features to impede flow across the dykes.

The flow mechanism is fracture flow as can be expected from the crystalline nature of the shale rocks. The water quality is generally characterized by high fluoride levels which limits exploitation of this aquifer in combination with the general low yields, deep (expensive) drilling and the low recharge (Grobbelaar et al, 2004). Mining of the coal seams has resulted in the



introduction of an artificial aquifer system which generally dominates the groundwater flow on a local and regional scale.

Below is a cross sectional figure of a typical fractured aquifer. Water exists in fractures in Karoo weathered aquifers. Two important characterizations that exist in the study area is the upper weathered aquifer system and the lower fractured aquifer system. If the purpose of drilling boreholes is for the supply of water, drillers will usually be directed to drill targeting the fault zones, however in the present study where the boreholes to be drilled are for Coal, Pseudocoal, Torbanite and Aggregate exploration, fault zones and contacts should be avoided at all costs, to minimize the impact to groundwater. The boreholes drilled must be cased to avoid clogging and contamination.

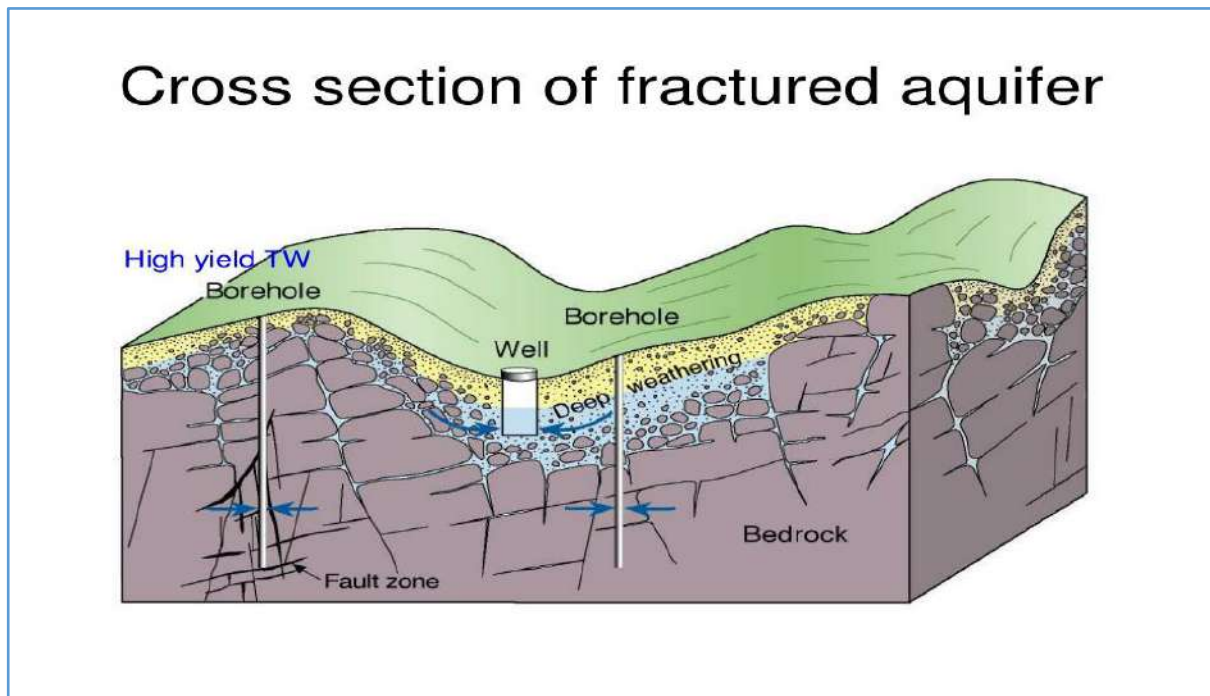
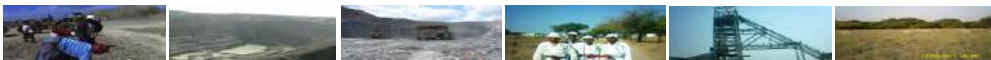


Figure 6: Cross section of a fractured aquifer





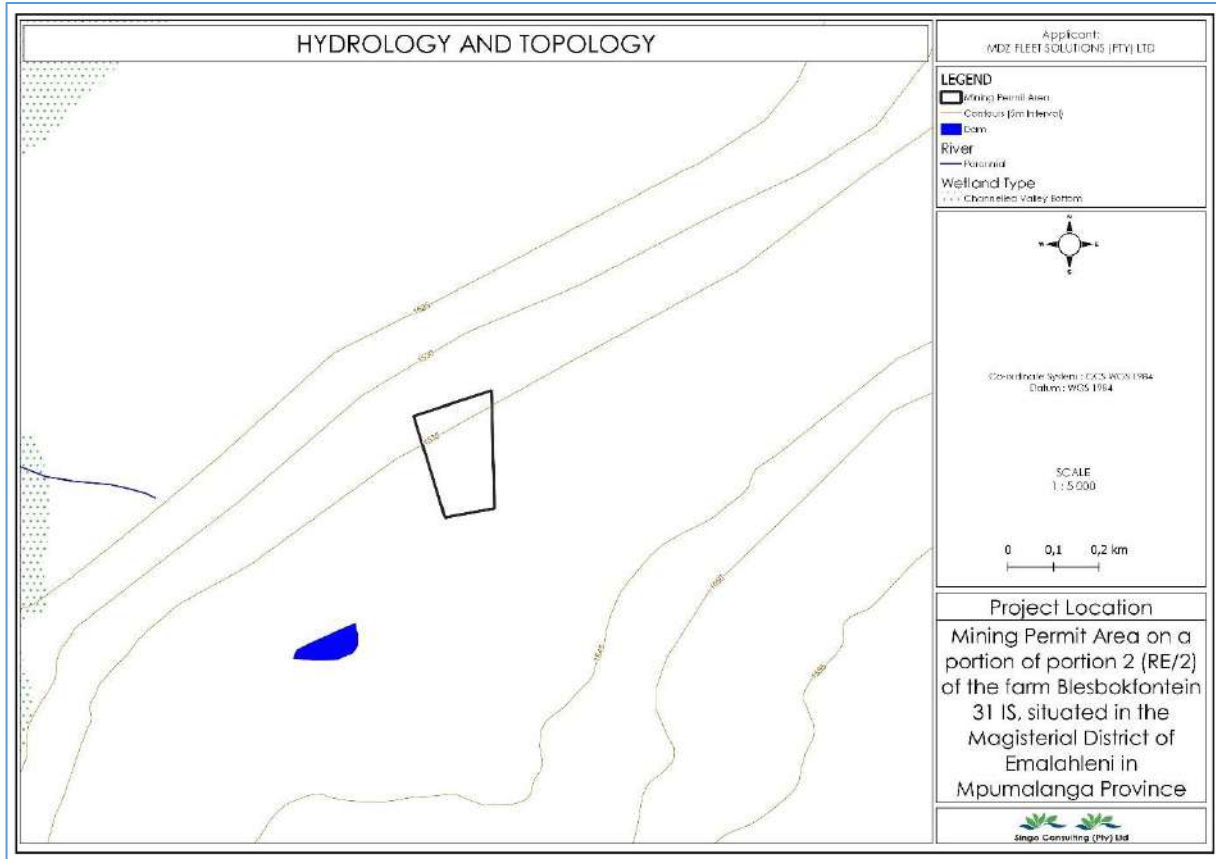


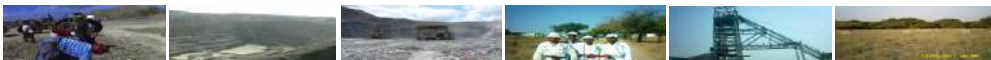
Figure 7: Hydrological map of the study area








## 7 LEGISLATIVE REQUIREMENTS

South Africa's legislation unambiguously places the responsibility of mitigating environmental damage as a result of mining operations on mining companies. The liability exists throughout the life of the mine, and beyond in terms of residual impacts. It includes commitments for remediation and/or rehabilitation.

The key legislation governing the requirements for legislation for rehabilitation is contained in the following acts:

-  The Constitution of the Republic of South Africa (Act 108 of 1996) ("The Constitution")
-  The National Environmental Management Act (Act 107 of 1998, NEMA)
-  The Mineral and Petroleum Resources Development Act (Act 28 of 2002, MPRDA)
-  The National Water Act (Act of 1998, NWA)
-  The National Environmental Management: Biodiversity Act (Act No. 10 of 2004, NEMBA)
-  Conservation of Agricultural Resources Act (Act 43 of 1983, CARA)
-  National Forests Act (Act 84 of 1998, NFA)
-  Mine Health and Safety Act (Act 29 of 1996)
-  National Heritage Resources Act (Act 25 of 1999)



-  Occupational Health and Safety Act of 1994
-  Atmospheric Pollution Prevention Act (Act 45 of 1965)
-  Hazardous Substances Act (Act 15 of 1973)
-  National Environmental Management: Air Quality (Act 39 of 2004, NEM: AQA)
-  National Environmental Management: Waste Management (Act 50 of 2008);
-  National Veld and Forest Fire Act (Act 101 of 1998)
-  Promotion of Access to Information Act (Act 2 of 2000)

## 7.1 The Constitution

The Constitution, whilst it does not contain specific provisions for rehabilitation, does enshrine the right of every citizen to an environment that is not harmful to health or wellbeing (Section 24). The inclusion of environmental rights as part of fundamental human rights ensures that environmental considerations are recognised and respected during the administrative and legal processes implemented during the closure and rehabilitation of mined land.

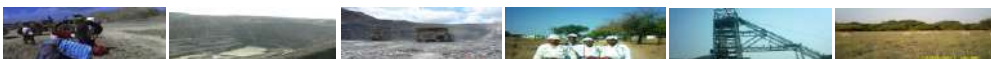
The Bill of Rights, which is an aspect of the Constitution, also provides for rights pertaining to administrative justice, capacity or standing to institute legal proceedings and access to information. These all become relevant within the context of protection and management of the environment during all stages of the mine's life cycle.

## 7.2 The National Environmental Management Act (Act 107 of 1998)

NEMA aims to establish overarching general guidelines and principles to facilitate environmental management. It promotes Integrated Environmental Management (IEM) (Sections 23 and 24), which aims to integrate environmental management with development.





The concept of rehabilitation has become an imperative part of South African environmental law. Section 28 of NEMA imposes a duty of care to prevent, or where authorised, to minimise environmental degradation. It also provides examples of steps that should be taken to prevent environmental degradation, including the provision for rehabilitation in Section 28 (3) (f), which states that the measures may include measures to “remedy the effects of pollution and degradation. Section 2 of the Act lists a set of principles, with which environmental management must comply and to which Section 37 (1) of the MPRDA refers directly as follows: “The principles set out in Section 2 of the National Environmental Management Act, 1998 (Act No.107 of 1998)

- (a) apply to all prospecting and mining operations, as the case may be, and any matter relating to such operation; and
- (b) serve as guidelines for the interpretation, administration and implementation of the environmental requirements of this Act.



Section 2 (b) of NEMA states that they “serve as the general framework within which environmental management and implementation plans must be formulated.

The principles of Section 2 of NEMA that are particularly applicable to rehabilitation are:

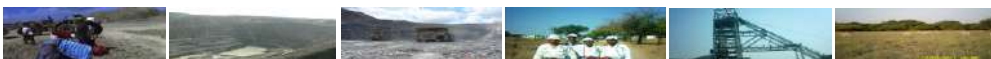
-  The precautionary principle (2 (4) (a) (vii)), which lays the onus on the developer or operator to take a risk averse and cautious approach during decision making, that recognised the “limits of current knowledge about the consequences of decisions and actions”. Where uncertainty exists action must be taken to limit the risk.
-  The cradle-to-grave (or lifecycle responsibility) principle (2 (4) (e)) states that “responsibility for the environmental health and safety consequences of a policy, programme, project, product, process, service or activity exists throughout its life cycle
-  The project must comply with the requirements for sustainable development (2 (3)), which requires consideration of all relevant factors (2 (4) (a)). A holistic, integrated approach must be followed and the “best practicable environmental option (defined as being “the option that provides the most benefit or causes the least damage to the environment as a whole, at a cost acceptable to society, in the long term as well as in the short term”) must be selected.
-  The polluter-pays principle (2 (4) (p)) is generally regarded as an important guiding principle for environmental management. The White Paper A Minerals and Mining Policy for South Africa October 1998 state that mining must internalise its external costs. In Paragraph 4.4 (ii) it states that “The mining entrepreneur will be responsible for all costs pertaining to the impact of the operation on the environment.

### **7.3 The Minerals and Petroleum Resources Development Act (Act 28 of 2002)**

The MPRDA is the principal legislation governing the mining industry and along with its regulations (GN R.517) has several provisions relating to rehabilitation. The objectives of the act in terms of rehabilitation are to give effect to environmental rights as outlined in the constitution. The cradle-to-grave principle (described above) is applied by means of the above-mentioned provisions, which cover the various stages of the project that apply from the period prior to mining through the construction, operation to closure and beyond.

### **7.4 Integrated Environmental Management and Responsibility to Remedy (Sections 38 and 39, Regulations 51 and 55 of GN R527)**

The mining permit holder must give effect to the principles of IEM as laid down in Chapter 5 of NEMA. An annual review for financial provision and a biennial review (or as stipulated in the EMP, or as agreed to in writing by the Minister of Minerals and Energy) for auditing to ensure that the requirements of IEM are being met, are required (Regulation 55 (2) of GN R.517).



#### **7.4.1 Rehabilitation**

Furthermore, Section 38 (1) (d) states that the environment that has been affected by prospecting or mining operations must be rehabilitated to its natural or predetermined state or land use according to the principle of sustainable development (cf. Sections 2 (3) and 2 (4) (a) of NEMA as discussed above as well as Regulation 56, GN R.527 of the MPRDA).

#### **7.4.2 Responsibility for and Management of Adverse Impacts**

Section 38 (1) (e) of the MPRDA states that the holder of the mining permit is responsible for any adverse environmental impact resulting from the mining operations, "which may occur inside and outside the boundaries of the area to which such right, permit or permission relates." In addition, section 39 (3) (d) provides for a description in the EMP of the manner whereby remediation of adverse environmental impacts and compliance with prescribed waste management standards are to be implemented.

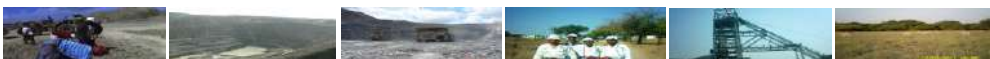
This along with the provisions in Section 28 (1) of NEMA regarding care of duty and Regulation 56 of GN R527, which also provides for the land being rehabilitated, as far as is practicable, to its natural state, or to a predetermined and agreed standard of land use which conforms with the concept of sustainable development means that the land used by applicant as the permit holder must be restored to its previous state where appropriate, pending stakeholder approval.

#### **7.5 Financial Provision (Sections 23 and 41 and Regulations 10, 52 – 54 of GN R527)**

The applicant for a mining permit must make financial provision for the prevention, management or rehabilitation of adverse environmental impacts before mining commences. In terms of Section 23, a mining permit is granted only if a number of conditions are met including the requirement that mining will not result in unacceptable pollution, ecological degradation or damage to the environment. Regulation 10 requires that detailed documentary proof must be submitted to show that the applicant for a mining permit has the technical ability or access thereto to conduct the mining activities and to mitigate and rehabilitate relevant environmental impacts.

Section 41 stipulates that approval of an EMP can only be granted once financial provision for rehabilitation or management of negative environmental impacts has been made.

The obligation for financial provision encompasses the entire life cycle of the mining operation from the stage prior to prospecting and/or mining operations through the various phases to closure and beyond as per the cradle-to-grave principle of NEMA. It remains in force until the Minister issues a closure certificate in terms of Section 43. Once the closure certificate has been issued the Minister "may" return the remaining portion of the financial provision. In the event that rehabilitation and closure are not done properly, the Minister may seize assets of the



mineral rights holder to defray costs. In the event that this cannot be done then the cost of fixing the problem has to be paid from the Government fund. As a result, this is why there is such a strong focus on rehabilitation and closure plans and the financial provision for closure.

Regulation 54 deals with the quantum of financial provision and stipulates that it must be updated and reviewed annually. It must include, amongst others, a detailed breakdown of the cost required for post-closure management of residual and latent environmental impacts.

## 8.6 Financial Provision of the Project

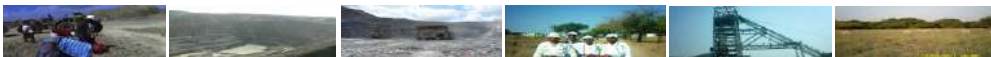
Applicant: Evaluator:		CALCULATION OF THE QUANTUM					Ref No.:	MP 30/5/1/1/3/13571 MP
Singo Consulting (Pty) Ltd							Date:	31/07/2023
No.	Description	Unit	A Quantity	B Master Rate	C Multiplication factor	D Weighting factor 1	E=A*B*C*D Amount (Rands)	
1	Dismantling of processing plant and related structures (including overland conveyors and powerlines)	m3	0	19	1	1	0	
2 (A)	Demolition of steel buildings and structures	m2	0	271	1	1	0	
2(B)	Demolition of reinforced concrete buildings and structures	m2	0	400	1	1	0	
3	Rehabilitation of access roads	m2	0,06	49	1	0,01	0,0294	
4 (A)	Demolition and rehabilitation of electrified railway lines	m	0	471	1	1	0	
4 (A)	Demolition and rehabilitation of non-electrified railway lines	m	0	257	1	1	0	
5	Demolition of housing and/or administration facilities	m2	0	542	1	1	0	
6	Opencast rehabilitation including final voids and ramps	ha	4,97	284292	0	1	0	
7	Sealing of shafts adits and inclines	m3	0	146	1	1	0	
8 (A)	Rehabilitation of overburden and spoils	ha	0,29	189528	0	1	0	
8 (B)	Rehabilitation of processing waste deposits and evaporation ponds (non-polluting potential)	ha	0	236054	1	1	0	
8 (C)	Rehabilitation of processing waste deposits and evaporation ponds (polluting potential)	ha	0	685612	1	1	0	
9	Rehabilitation of subsided areas	ha	0	158701	1	0,01	0	
10	General surface rehabilitation	ha	4,97	150138	1	1	746185,86	
11	River diversions	ha	0	150138	1	1	0	
12	Fencing	m	0	171	1	1	0	
13	Water management	ha	0,1	57087	1	0,01	57,087	
14	2 to 3 years of maintenance and aftercare	ha	4,97	19980	1	1	99300,6	
15 (A)	Specialist study	Sum	0			1	0	
15 (B)	Specialist study	Sum				1	0	
Sub Total 1							845543,5764	
1	Preliminary and General		101465,2292	weighting factor 2 1			101465,2292	
2	Contingencies			84554,35764			84554,35764	
Subtotal 2							1031563,16	
Signed Date	31/07/2023						VAT (15%)	154734,47
<b>Grand Total</b>							<b>1186298</b>	



The amount of **R 1186298** for financial provision was calculated for the mining application. Financial provision was made in the form of a bank guarantee upon the successful granting of the mining permit.

## 8 Mine Closure

### 8.1 Principles of Mine Closure

Regulation 56 of the Regulations provides that the holder of a prospecting right, mining permit, retention permit or mining permit must ensure (amongst others) that:



-  The land is rehabilitated, as far as is practicable, to its natural state, or to a predetermined and agreed standard of land use which conforms with the concept of sustainable development; and
-  Prospecting or mining operations are closed efficiently and cost effectively.

## **8.2 The National Water Act (Act 36 of 1998)**

The NWA aims to regulate the protection, use, development, conservation, integrated management and control of water resources in the Republic of South Africa in an equitable, sustainable and efficient manner (a full description is given in Section 2 of the Act). An important principle of the Act is that water belongs to the state, which holds it in trust for the nation.

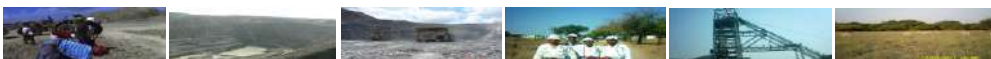
Section 19 of the NWA which imposes a duty of care on the holder of the mining permit in a similar way to Section 28 of NEMA, states that “An owner of land, a person in control of land or a person who occupies or uses the land on which any activity or process is or was performed or undertaken; or any other situation exists, which causes, has caused or is likely to cause pollution of a water resource, must take all reasonable measures to prevent any such pollution from occurring, continuing or recurring.”. This implies that before any mining or related activity is opened, or closed, whether temporarily or permanently, the necessary pollution control measures should be in place.

The regulations contained in GN R704 published in terms of the NWA consist of regulations on the “use of water for mining and related activities” and are “aimed at the protection of water resources”. GN R704 acknowledges the principle of co-operative governance and the respective roles for the DMRE, the Department of Environmental Affairs (DEA) and the DWA in regulating pollution from mining activities.

Regulation 9 of GN R704 promulgated in terms of the NWA, which deals with temporary or permanent mine closure, provides that any person in control of a mine or related activity must at the cessation of mining operations and its related activities, ensure that all pollution control measures have been designed, modified, constructed and maintained so as to comply with the regulations contained in GN R 704. Furthermore, the in-stream and riparian habitat of any water resource, which may have been affected or altered by the mine or activity, must be rehabilitated in accordance with the regulations contained in GN R. 704. Further applicable regulations in terms of GN 704 are discussed in Regulation 5 and Regulation 7.

### **Regulation 5 – Restrictions on Use of Material**

The regulation provides that material that could potentially impact on a water resource should not be used for the construction of any feature. Consideration should also be given to the influence on pollution potential by the manner in which certain materials are used. The person



in control of the mining activity will be responsible for proving that material used will have no impact.

### **Regulation 7 – Protection of Water Resources**

Regulation 7 (b) applies to the prevention of pollution of any water resource by residue deposits near a water body (such as a pan) or a water course and the provision in Regulation 10(2) (b) provides that stockpiles or sand dumps established on the bank of any watercourse or estuary must be stockpiled or dumped outside of the 1:50 year flood-line or more than a horizontal distance of 100 metres from any watercourse or estuary.

Regulation 7 (f) states that: “Every person in control of a mine or activity must take reasonable measures to- ensure that water used in any process at a mine or activity is recycled as far as practicable, and any facility, sump, pumping installation, catchment dam or other impoundment used for recycling water, is of adequate design and capacity to prevent the spillage, seepage or release of water containing waste at any time.

### **8.3 CONCEPTUAL REHABILITATION PLAN**

The rehabilitation of the MDZ Fleet Solutions (Pty) Ltd project area is simultaneously a continuous and timeframe operation. In order to gain the best possible rehabilitation outcomes from the mining processes in the relatively sensitive area, different actions are required to occur at different times within the life of mining (expected to be two years) to closure. Similarly, there are management and monitoring actions that will be required throughout the life of the mine project and for years after the project has been closed.

Traditional mining phases include Construction, Operational and Closure phases. Prior to construction and preparation of the land for mining, best practices need to be implemented and compliance to legislation needs to be adhered to. The rehabilitation for MDZ Fleet Solutions (Pty) Ltd project area after completion of the project, the project area will be used for tourism purpose for the benefit of the community.

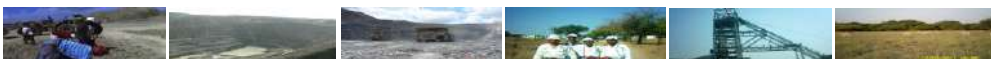
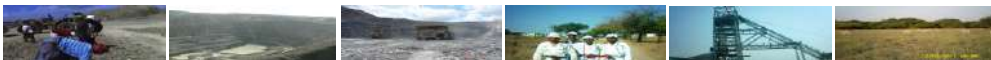




Figure 8: Typical example of open cast mining









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The following points on the table below should be considered during the construction phase of the project:

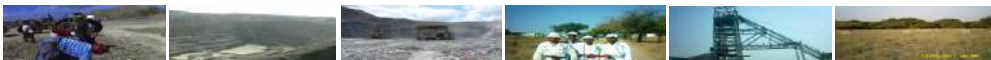
**Table 1: Highlighted points that should be considered during construction phase**

Activity	Recommended Control Measures
Mine Planning	 Mine planning should minimise the area to be occupied by mine infrastructure. The affected area should be kept as small as practically possible and should be clearly defined and demarcated.
Sensitive Landscapes	 Care should be taken around sensitive landscapes e.g. wetlands to ensure that impacts to them are none to minimal and that the buffer zones around these sensitive landscapes are considered.
Construction	 Construction crews should restrict their activities to planned areas. Clear instructions and control systems should be in place and compliance to the instructions should be policed.
Stockpiles	 All stockpiles should be located in areas where they will not have to be removed prior to final placement. Materials should thus be placed in their final closure location or as close as practicable to it.
	 All stockpiles should be clearly and permanently demarcated and located in defined no-go areas, re-vegetated and monitored on an annual basis.
Infrastructure	 Infrastructure should be designed with closure in mind. Infrastructure should either have a clearly defined dual purpose or should be easy to demolish. This aspect of rehabilitation should be considered if changes in the mine design are made.
Soil Stripping	 Soil stripping is a very important process which determines rehabilitation effectiveness. It should be done in strict compliance with the soil stripping guidelines, which should define the soil horizons to be removed.
Rock quarry/burrow pit	 If rock quarries or borrow pits are required include them into the environmental plans, however it is suggested that other material could be utilised to avoid further impacts to soil.

## 8.5 Soil Management Plan

### 9.5.1 Soil Stripping

This section explains the correct measures that should be followed during the stripping of soil. This is a key rehabilitation activity as soils lost cannot be regenerated in the lifetime of the mine. Correct stripping of soils will firstly ensure that enough soils are available for rehabilitation and secondly, that the soils are of adequate quality to support vegetation growth and thus ensure successful rehabilitation.



Confirmed sites within the project area that require soil stripping in preparation for mining activity included the infrastructure areas, the landfill area and the TSF area. All these areas constitute a dominant soil type, namely Red apedal and Yellow apedal soil with plinthic horizon.









The soil depth to be stripped where the Red apedal and Yellow apedal soil occurs is generally 1 m or deeper. This depth includes both the topsoil (depth where plant roots are most active) and the subsoil. It is recommended that a 1.5m soil layer is stripped and stored in a stockpile with slopes of 1:5 to 1:7 (mainly for erosion protection).

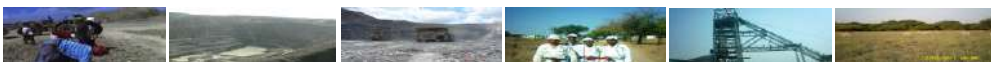
The positions of the soil stockpiles should be indicated on a map and the soil stockpiles should be protected using a fence because soil loss due to unauthorized use can and will occur. The topsoil stockpile should be re-vegetated to protect the soil from water and wind erosion.



Restrictive stockpile heights are usually recommended because soil quality is affected negatively by anaerobic conditions occurring in large stockpiles. The stockpile height in the case of the **MDZ Fleet Solutions (Pty) Ltd** Project can be adjusted according to the space needed because the soil will be stored for a long time before used for rehabilitation purposes.

The remainder of material excavated deeper than 1.5 meter should be stored in a separate stockpile for later use such as to fill up the borrow pit.

**The steps that should be taken during soil stripping are as follows:**

-  Soil should be stripped making use of the mining area soil plan.
-  Removal of hydromorphic soil should be avoided where possible. In the event wetlands have to be impacted upon, then hydromorphic soil should be stripped to a depth defined by the pre-mining soil survey. Typically, 0.3 m to 0.5 m of usable soil material can be stripped from wetland areas
-  Well-drained soil should be stripped to a depth of 1.5 m
-  Demarcate the boundaries of the different soil types
-  Define the cut-off horizons in simple terms that they are clear to the stripping operator (avoid mixing of different horizons and try to ensure horizons and soil types are stockpiled separately)
-  Stripping should be supervised to ensure that the various soils are not mixed
-  Soil should only be stripped when the moisture content will minimise the compaction risk (i.e. when they are dry)
-  The subsoil clay layers which can be found under certain hydromorphic soil need to be stripped and stockpiled separately. This clay material can be used as a compacted clay cap over rehabilitated areas that will become wetlands post-rehabilitation (stripping of wetland soils should be avoided, however if stripping does occur the above is recommended for stripping and stockpiling)



-  Where possible, minimise soil handling, i.e. soil should only be handled once instead of moving it around two or more times. However, it is paramount that the correct soil types are replaced at the correct locations in the post-mining topography and accordingly there will always be a need to stockpile some soil; and
-  Truck and shovel should preferably be used as a means of moving soil, instead of bowl scrapers.

## 8.6 Soil Plan




A soil assessment was conducted during the EIA phase of the project. The information from the soils report was used to provide information regarding the recommended depth of soil stripping. This plan should be used to map and peg out the various soil types prior to the commencement of construction activities.

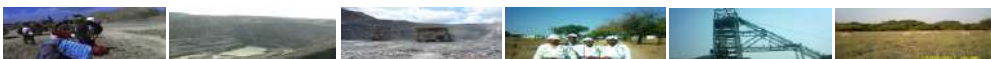
The soil, land use and land capability assessment report by Singo Consulting (Pty) Ltd describes the baseline soil conditions, the physical and chemical characteristics, land capability and current land uses of the mining area. This report should be consulted before areas are cleared in preparation for the placement of infrastructure.







### 8.6.1 Soil Stripping Guidelines

The soil survey that was conducted for the project must be utilized to generate the soil stripping guideline. The boundaries of the different soil types should be demarcated, and each soil horizon (within each soil type's suitability for rehabilitation) should be defined. If possible, the stripped soils should be replaced immediately in a similar location in the topographical slope to their natural location (for the project soil will be stripped and used to construct a berm and the unused balance stockpiled. After vegetation has been stripped, soil types need to be pegged out accurately (pegging out soils types ahead of stripping). The topsoil and subsoil should also be removed from the areas associated with the mine infrastructure and dumps. Table below provides measures that should be considered during the stripping of soil during the construction phase of the project.

**Table 2: Soil stripping measures during construction and operation**

Soil Stripping measures during construction and operation	
<b>Construction (Including Site Preparation)</b>	 Plan site clearance and alteration activities for the dry season (May to October)
	 Minimise the period of exposure of soil surfaces through dedicated planning
	 Stripping operations should only be executed when soil moisture content is low as this will minimise the risk of compaction (during dry season)



	 During stockpiling, preferably use the 'end-tipping' method to keep the stockpiled soils loose
	 Ensure stockpiles are placed on a free draining location to limit waterlogging; and
	 Limit stockpile height – a safe height can be regarded as the height at which material can be placed without repeated traffic over already placed material.
<b>Operation</b>	 Preserve looseness of stockpiled soil by executing Fertilisation and seeding operations by hand
	 Soil stockpiles should be monitored for fertility via sampling and testing
	 Monitoring of the condition of all unpaved roads is necessary due to the high rainfall and potential water runoff. Water runoff from compacted road surfaces may cause erosion of road shoulders degrading the road surface. Weekly inspections need to be carried out of all unpaved roads especially during the rainy season.

### 8.6.2 Supervision

A particularly important aspect is the supervision and monitoring during the stripping process. Close supervision will ensure that soil being stripped from the correct areas and to the correct depths and placed on the correct stockpiles with a minimum of compaction. Monitoring requires an assessment of the depth of the soil, the degree of mixing of soil materials and the volumes of soil that are being replaced directly or being placed on stockpiles. Contracts for the stripping of soils should not only be awarded on the volumes being stripped but also on the capability to strip and place soil accurately.

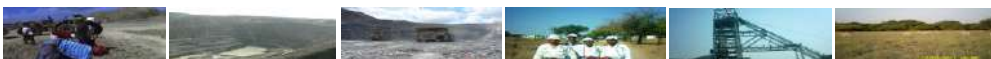
A soil balance sheet needs to be developed to record all soil types and stripping volumes transported to the stockpiles. This soil balance sheet will aid in the management of the soil stockpiles in addition to keeping record of available soil volumes for rehabilitation.

### 8.6.3 Moisture Content

Soil is most susceptible to compaction when the moisture content is high. The dry winter months (April - August) are thus more suitable for the stripping and replacement of soils. If soils have to be moved during wet months, then special care should be taken to adopt methods that cause minimum compaction.

### 8.6.4 Stripping Method








Soil should be stripped and replaced using the truck and shovel method as far as possible. This method will limit the compaction of soils. If bowl scrapers are used, then the soils must be dry during stripping to minimise compaction (it is recommended that bowl scrapers are not used).



### 8.6.5 Stockpiling




This section explains the correct measures to be followed during the stockpiling of soil. Stockpiling should be minimised as far as possible since it increases compaction and decreases the viability of the seed bank.

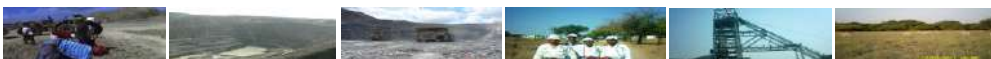
**The steps that should be taken during soil stockpiling are as follows:**

-  Mark stockpile locations accurately on a plan to ensure that re-handling is minimised (i.e. soils will not have to be moved a second or third time).
-  Ensure that the location is free draining to minimise erosion loss and waterlogging.
-  Minimise compaction during stockpile formation. The soils should be kept loose by, preferably, tipping at the edge of the stockpile not driving over the stockpile (avoid end tipping as this causes compaction).
-  The positions of the soil stockpiles should be indicated on a map and the soil stockpiles should be protected by means of a fence because soil loss due to unauthorized use can and will occur.
-  Restrictive stockpile heights are usually recommended because soil quality is affected negatively by anaerobic conditions occurring in large stockpiles. The stockpile height in the case of the mining project can be adjusted according to the space needed because the soil will be stored for a long time before used for rehabilitation purposes. Limit the stockpile height so as to prevent internal compaction (soil stockpiles should be <2 m in height)
-  Re-vegetate with a seed mixture similar to the final rehabilitation seed mixture
-  Ensure that the stockpiled soil is only used for the intended purposes.

### 8.6.6 Stockpile Location

The materials that will be removed from the areas where infrastructure will be placed should be placed as close as possible to where it will be placed in the final landscape. Appropriate mitigation measures for the management of topsoil stockpiles needs to be implemented to ensure that wetlands and drainage paths are not affected and that the loss of topsoil is mitigated against. Progressive monitoring of stockpiles and replacing of topsoil will ensure successful post-mining land and soil reclamation. Assessing post-mining soil characteristics and associated land capability and land uses is necessary to ensure that the end land uses goals can be met. The following information needs to be recorded when stripping and stockpiling of soils:

-  Location of same soil types can be stripped and stockpiled together
-  Stripping depths of different soil types
-  The location, dimensions and volume of planned stockpiles for different soil types



Soil stripped from the tailings facility will be stored near the facility. Soil stripped from the remaining infrastructure areas will need to be stockpiled for use during rehabilitation. This includes soil that will be removed to construct the access shafts and vents. It is envisaged that a berm (screening berm) will be constructed around the plant area. This berm will be constructed from waste material removed from the underground workings. Once the berm has been constructed, soil will be placed on the berm and vegetated. It is envisaged that the berm will remain post closure. It has been assumed that an additional stockpile will be required for the excess topsoil that will not be placed on the berm. This area will be 200 m by 200 m and should not exceed 2 m in height.

### 8.6.7 Free Draining Locations

Soil should normally be replaced in the landscape positions it was stripped from. Well drained soil should therefore be replaced in high landscape positions while the wet soil is replaced in lower lying landscape positions.





The locations of the soil stockpiles should be on a topographical crest to ensure free drainage in all directions. If this is not possible then an alternative is a side-slope location with suitable cut-off berms constructed upslope.

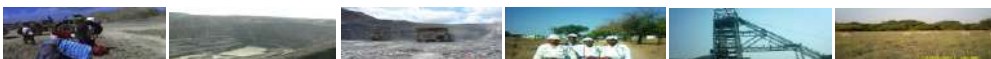
Stockpiles that are placed in drainage lines result in soils becoming waterlogged and a loss of desirable physical and chemical characteristics. Such situations also result in a loss of soils due to erosion. If stockpiles need to be placed in drainage lines, hydromorphic soils should be stockpiled in the wetter sections.

### 8.6.8 Soil Reclamation

Rehabilitation and soil reclamation of the property affected by the placement of infrastructure; mining should take into consideration that during stockpiling soil's natural carbon content deteriorates over time.

The following should be reserved:

-  The stripping and stockpiling of topsoil should be handled in a responsible way. Organic material should be retained in the topsoil by stripping and stockpiling the topsoil with the vegetation.
-  Shallow rooted vegetation will not pose any problem but deeper-rooted vegetation like shrubs and trees should be chipped first then incorporated into the topsoil through the stripping and stockpiling process.
-  Rehabilitated land should be reconstructed to pre-mining arable land capabilities within the areas where the initial surface infrastructure will be.
-  The topsoil and subsoil materials should not be mixed during stockpiling or reclamation.



- Compaction by vehicle traffic should be avoided when reclamation takes place. Soil physical problems are of real concern as impacts, such as compaction, on reclaimed vegetation are severe due to restricted root growth, low water penetration and low water holding capacity.
- Soil fertility and acidity status should be established through representative soil sampling and analyses to ensure optimal post reclamation vegetative growth. Any nutritional problems should be corrected prior to any vegetation establishment on reclaimed soil.

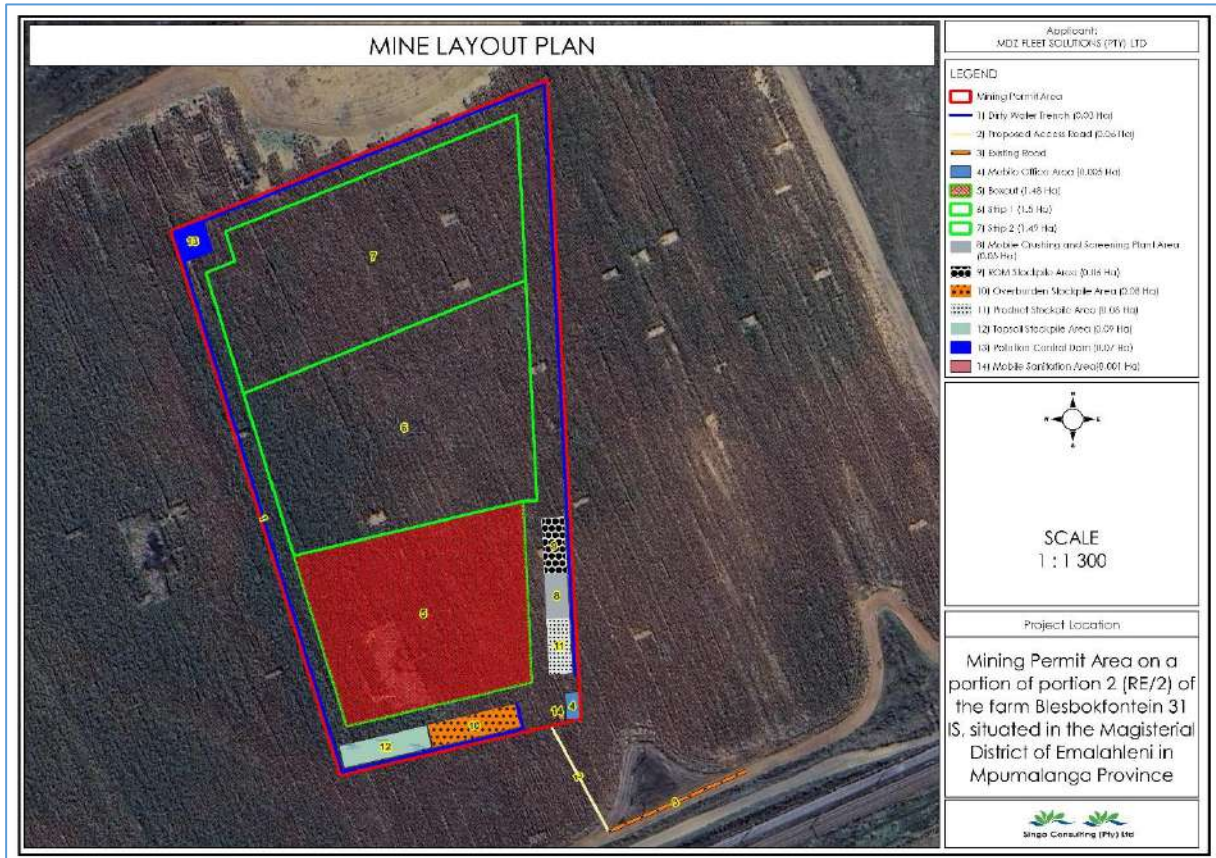
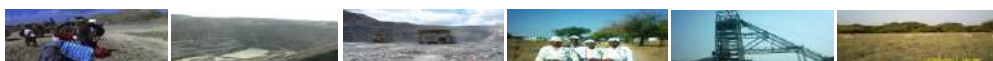


Figure 9: Mine Layout plan according to the proposed activities.

### 8.6.9 Compaction

Pertaining to Compaction:

- Soils should be stockpiled loosely. Achieving this will depend on the equipment being used during the stripping and stockpiling process.
- Soils should be dumped in a single lift if truck and shovel methods are used. If the dumps are too low, then the height could be increased by using a dozer blade or back actor bucket to raise the materials.
- The use of heavy machinery should be avoided as it results in the compaction of soils and destruction of the soil structure. It is not recommended that a bowl scraper or



grader be used to level and shape the stockpiles. If heavy machinery must be used, then compaction can be reduced by stripping and dumping as thick a cut as possible. Deposition of soils in a single track line may also reduce the compaction of the dumped or replaced soil.

#### **8.6.10 Stockpile Management**

Established stockpiles should be managed to ensure that soil losses are minimised and that additional damage to the physical, chemical or biotic content is minimised. Stockpile soil health, volume and biotic integrity can potentially be harmed by factors including erosion, 'borrowing' for other purposes, contamination and water logging.

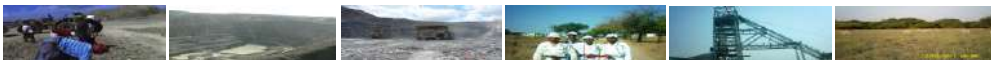
Stockpiles should be re-vegetated to avoid soil loss due to erosion and weed colonisation if stockpiles remain in the same location for more than one growing season and have not revegetated naturally. A similar seed mixture to the final mixture recommended for rehabilitation should be used. The looseness of the soil in stockpiles should be preserved (assuming stripping and construction of the stockpiles are done correctly) by fertilising and seeding by hand, hydroseeding (is the norm in the industry) or seeding aerially to minimise the introduction of compaction. If stockpiles are already compacted, standard agricultural equipment can be used to establish grass cover. Weed infestation should also be controlled on the stockpiles by approved methods and herbicides (e.g. Roundup).

It is important that soil only used for the intended purposes. The dumping of waste materials next to or on stockpiles and the pumping out of contaminated water from infrastructure areas are hazards to stockpiles. Employees must be made aware of these hazards and a detailed management and monitoring programme should be put in place.

#### **8.6.11 Compaction and Equipment**

Compaction limits the effectiveness of replaced soils. The equipment used during the replacement of the soils has a major impact on the compaction levels. Ideally heavy machinery should not be used to spread and level soils during replacement. The truck and shovel method should be used since it causes less compaction than, for example, a bowl scraper.

When using trucks to deposit soils, the full thickness of the soil required can be placed in one lift. This does, however, require careful management to ensure that the correct volumes of soil are replaced. The soil piles deposited by the trucks will have to be smoothed before re-vegetating the area.





### 8.6.12 Compaction and Soil Moisture






The soil moisture content is a determining factor in the degree to which the soils are subject to compaction. Each soil type has a moisture content at which the compactability is maximized. The aim during the replacement (and removal) of soils should be to avoid the moisture content of maximum compaction when moving soils. The best time for stripping and replacement of soils is thus when soil moisture content is lowest which will be during the dry season.

### 8.6.14 Smoothing Equipment

The soils that are deposited with trucks need to be smoothed before re-vegetation can take place. A dozer (rather than a grader) should preferably be used to smooth the soils since it exerts a lower bearing pressure and thus compacts less than wheeled systems. If the top- and sub-soils have been mixed during the stripping process, then the seed-bank has been diluted excessively and the creation of a seed-bed for planting purposes will be required. For stockpiles that have stood for several years will need to be seeded and thus the preparation of the seed bed is important to the success of re-vegetation.

## 8.7 Amelioration

The steps that should be taken during the improvement of soils are as follows:

-  The deposited soils must be ripped to ensure reduced compaction
-  An acceptable seed bed should be produced by surface tillage
-  Restore soil fertility (if top and sub-soils have been mixed) using the soil analytical data as a guideline
-  Incorporate the immobile fertilisers into the plant rooting zone before ripping
-  Apply maintenance dressing of fertilisers on an annual basis until the soil fertility cycle has been restored.

### 8.7.1 Soil Ripping

Deep ripping should be applied to loosen compacted soils (if they occur), preferably done in areas where hard compaction has occurred, to a depth of at least 1 m (this should be limited to sections occurring out of the wetlands, for example along haul roads).

The soil moisture content for maximum disturbance and the desired spacing between the rip lines must be established before ripping starts. In general terms, ripping effectiveness is greatest when soils are slightly moist throughout, and not too wet or dry. The ripping process normally requires the use of a dozer with one or two (maximum) ripper tines that operate to a depth of at least 1 m. The desired rip pattern will be determined by the breakout pattern of the disturbance caused by each ripper tine. Usually, this breakout pattern is at 45 degrees to the tine tip, so if spacing between lines is 1 m, then shattering effect between tines is only to 500












mm. Note that standard agricultural equipment has proved to be ineffective for this task. Soil bulk density should be measured to establish the degree of compaction in the rehabilitation areas, and ripping should be carried out accordingly.

## 8.8 Infrastructure Removal

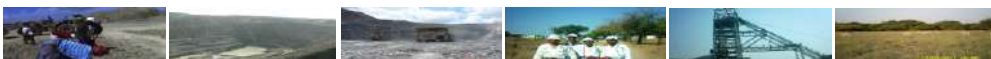
After mining has stopped the processing facilities, administration, mining, transport and storage facilities should be removed in order to meet the requirements of the post closure land use (Cultivation). In some cases, portions of the existing infrastructure can be used by land users after closure. These structures should be identified and protected prior to commencement of decommissioning. Attention should be paid to managing safety risks during the removal of infrastructure since it is a dangerous occupation.

### The following steps should be followed during infrastructure removal:

-  Identify infrastructure items that may be of use to the future land users
-  In association with those users and the authorities, define what could be left, how it would be used and how sustainable that use would be
-  The remaining infrastructure should be assessed for its suitability for reuse/recycling
-  The re-usable items should be removed from the site
-  Hazardous material locations and deposits require specialised assessment and analysis to determine how these materials should be decontaminated and to ensure that all residual hazardous materials are deposited in officially-sanctioned hazardous waste deposit sites
-  Mining infrastructure that will be left on site must be rendered safe
-  Remaining structures should be demolished and the demolition rubble removed
-  The final landform agreed for the infrastructure areas should be created
-  Soil should be replaced on the disturbed area and revegetated

### 8.8.1 Infrastructure for Future Use

All the structures on site should be assessed in conjunction with the ultimate land users, and the authorities, to determine which items could be used in future. Care should be taken when this assessment is undertaken to ensure that the infrastructure left behind will not become abandoned due to unsuccessful enterprises. In cases where the retention of services (e.g. roads, electricity supply, and sewage plants) is requested, the ability of the land users to maintain the various structures should be assessed.



### **8.8.2 Decontamination of Hazardous Material Locations**

The storage and use of hazardous materials such as degreasers and hydrocarbons could result in the contamination of the environment during the life of the operation. During the life of the mine these substances will be off loaded and stored in bunded concrete lined facilities with oil/water traps for storm water management. Care should always be taken when handling and storing hazardous materials and spillages should be cleaned up and remediated immediately. During closure, the mine site should be assessed for contaminated areas. These areas should then be cleaned up by removing the contaminated soil and overburden materials and disposing of it in an officially registered hazardous waste site.

In the event that large areas have become contaminated, the required Authorisation and permit must be obtained for the disposal of this waste as a registered/authorised landfill site. Cognisance must be taken that the decommissioning of hazardous storage areas (such as the Hydrocarbon Storage Areas).

### **8.8.3 Removal of Infrastructure**

Infrastructure that will be demolished should be assessed for its suitability to be re-used or recycled. Items such as cladding, roofing, electrical components and equipment should be removed from the site before demolition of the structures starts. All foundations should be removed to a depth of 1 m. The hard surfaces of roads should also be ripped to a depth of 1 m. Concrete structures contaminated with hazardous materials should be isolated and disposed of at hazardous waste disposal sites. All other inert material can be disposed of in the shafts during the decommissioning phase of the project.

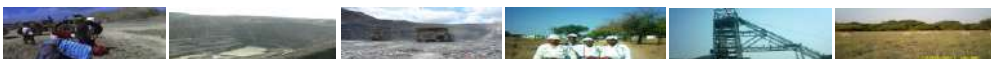
### **8.8.4 Final Landform**

Once the mine site has been cleared of all infrastructure and rubble the exposed underlying materials should be reshaped to create a gently sloping, free-draining topography. The topsoil that was removed during the construction phase should be replaced, fertilized and ripped.

In cases where the foundations of the structures are impractical to remove, the foundations should be covered with a combination of soft overburden or B horizon material topped with a layer of topsoil. This layer should be at least 1 m thick. After these tasks have been completed the infrastructure sites can be included in the rehabilitation process for the rest of the mining area for re-vegetation, monitoring and maintenance.

### **8.8.5 Reshaping**

During the reshaping of the disturbed areas the overburden (waste rock) material, which is being replaced should be compacted by the action of the trucks running repeatedly over the



replaced materials. This will compact the surface to a certain degree. The soft overburden material should be placed on top of the overburden material to a depth of at least 1 m and shaped to produce the final landform. Compaction that will occur during the placement of this soft material will be sufficient. Compaction of the topsoil layer (or top- and sub- soils, where soil is stripped in layers) should be avoided by using the truck and shovel method. The slopes, where present, should be designed to minimise erosion potential.

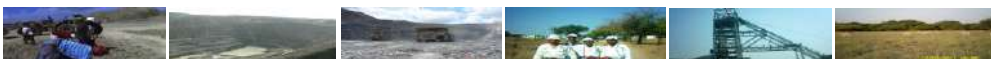
### **8.8.7 Landform Design**

Areas where specific land capabilities need to be achieved should be considered when the final landform is designed. The topography and soils are two of the most important factors which will determine the land capability classification. The final land capability should be in accordance with the commitments made in the approved EMPr. The maximum ideal slope to achieve grazing should be between 1:5 or 1:7 if grazing is the pre-determined end land use. When determining the final slope factors such as regional rainfall intensity and soil type should be considered since they will affect the erodibility rate. Excessively steep slopes will also reduce the land capability class. A general rule of thumb is not to have diagonal slopes of more than 5 m. Contour drains or log pegging can be used to break erosional force of runoff water.

### **8.8.12 Drainage Channel Designs**

The construction of erosion management channels on the rehabilitated areas should be avoided as so much as possible. This could be done if reshaping and soil replacement are done throughout the dry months, the slopes are short and helpful vegetation cover establishes in the first rains. In areas wherever surface water drainage systems are unavoidable, care should be taken that these structures do not create erosion worse.

The consolidation of mine spoils takes many years to complete and once mining stops the water table re-establishes and also the wetting-up of the overburden materials could end in any settlement. This could be countered by constructing slopes within the contour banks that are significantly steeper than their equivalents on un-mined land and by ensuring that the batters are higher. The steeper slopes would possibly result in scouring within the channel however the risk of contour banks or drains breaking are greatly reduced. All evacuation channels, if needed, ought to be designed by a "competent person" (usually an engineer), who has experience in planning such structures on rehabilitated ground.



## 9. Vegetation and Fertiliser Management Plan




### 9.1 Vegetation Management

#### 9.1.1 Vegetation Establishment






This section explains the procedure that should be followed during the re-vegetation of rehabilitated areas.

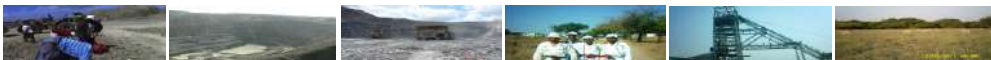
The common ways that used to establish vegetation include seeding and hydroseeding. Flat areas should be seeded using tractor implements and slopes too steep for tractors should be hydroseeded. among the event where soils are stripped and came back directly (i.e. no stockpiling) and therefore the areas stripped have good vegetation cover with applicable species present, natural re-colonisation would possibly occur and there'll be no need for re-seeding. during this case, it should be best to easily replace the stripped soils, gently level and rip thoroughly, and leave for one season to assess the extent and quality of the natural re-vegetation, however, this methodology isn't appropriate for any areas previously troubled with alien trespasser species like wattle.








The objectives for the re-vegetation of reshaped and top-soiled land are to:

-  Prevent erosion
-  Re-establish eco-system processes to ensure that a sustainable land use can be established without requiring fertilizer additions
-  Restore the biodiversity of the area as far as possible.

#### 9.1.2 Re-vegetation Steps

-  Ensure that the soils have been replaced correctly according to the soil replacement guideline
-  All soils are to be ripped to full potential rooting depth to correct compaction induced by the soil replacement activity
-  Analysed the topsoil to determine the lime and fertilizers requirements
-  Prepare the soil by adding lime and fertilizer and ploughing the area, followed by tillage to prepare the seed bed
-  Plant a grass seed mixture consisting of a range of indigenous or non-invasive naturalised species. For wetland areas, *Imperata cylindrica* (Cotton Wool Grass) can be hand planted and hydrophilic species can be worked into the seed mix. Recommendations regarding the seed mixtures for both grassland areas and wetland areas is provided further on in the report (Where good quality grazing land or wilderness land soil is replaced by direct transfer – this will be avoiding the need to plant grass mixtures. The majority of plant species present in the un-mined areas will re-establish naturally, provided the soils are replaced correctly and the tillage is done correctly



-  Inspect the area after a good rainfall event
-  Control and remove weeds where necessary
-  Repeat the procedure for the next growing season
-  Application of fertilisers is crop and site specific, analysis of the soils and stockpiles should be undertaken to determine the appropriate fertilisers to be used, if required
-  Define and establish the long-term land management system (grass needs regular defoliation if it is to be sustainable)
-  Leave pasture to allow natural grasses to become re-established
-  Conduct annual monitoring (repeatable demarcated transect surveys).

### 9.1.3 Species Selection

Some of the criteria that should be considered during the selection of the appropriate species for rehabilitation include:

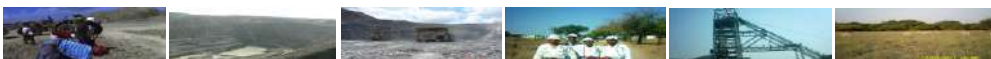
- (i) Use species which are perennial and adapted to the area
- (ii) The species should be tolerant of adverse soil conditions
- (iii) Species should have a large biomass and prolific root system
- (iv) As areas of rehabilitation expand, maintenance costs increase, so species selected should be those with minimal maintenance cost, or with production and financial returns that exceed the cost.

### 9.1.4 Re-vegetation Methods

The common ways in which used to establish vegetation include seeding and hydroseeding. Flat areas should be seeded using tractor implements and slopes too steep for tractors should be hydroseeded. within the event where soils are stripped and came back directly (i.e. no stockpiling) and therefore the areas stripped have good vegetation cover with appropriate species present, natural re-colonisation might occur and there will be no want for re-seeding. during this case, it's attending to be best to simply replace the stripped soils, gently level and rip completely, and leave for one season to assess the extent and suitability of the natural re-vegetation, however, this methodology isn't suitable for any areas previously infested with alien invader species like wattle.

### 9.1.5 Climatic Condition for Plantation

The most successful plantation is done after the first rains and freshly prepared fine tilled seedbeds. Water seed zone will stimulate germination and can be supported by the application of light vegetation.



### 9.1.6 Vegetation Maintenance and Conservation

Once the plants are planted, they need regular maintenance. If the growth medium consists of low fertility soils (i.e. dirt and dirt mixed) and overburden material, then regular application of plant nutrients is required until the natural fertility cycle has been restored. Annual fertilizer application should continue for three to five years.

Grasses should be defoliate initially through grazing for the first three years so mowing to prevent it from becoming moribund which may increase soil erosion risk. Some ecosystems may have fire at strictly outlined intervals for their propagation and perpetuation. Mowing typically desires less supervision than grazing but this results in giant quantities of plant nutrient (especially potassium) being removed through the hay (this will only occur if the hay is removed, then the nutrients are lost). Larger dressing of fertilizer will need to be applied to maintain the soil fertility establishment. Grazing desires, a lot of management but it ensures nutrient recycling which organic matter returns to the soil. Close superintendence is required for land that is used out to make sure that overgrazing doesn't manifest itself. Management and management of alien vegetation will contribute to the conservation of the natural vegetation. The alien species ought to, therefore, be removed from site and management measures should be implemented to form certain spreading of these species does not occur to alternative elements of the project area or the encompassing lands.

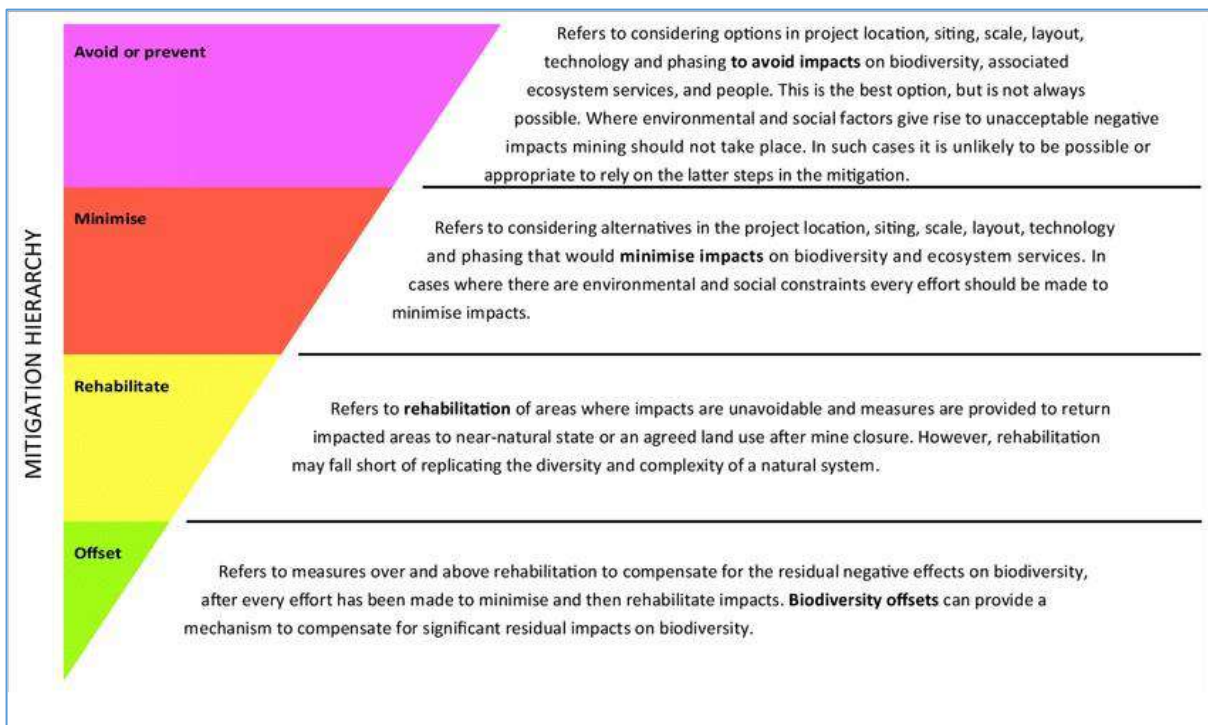
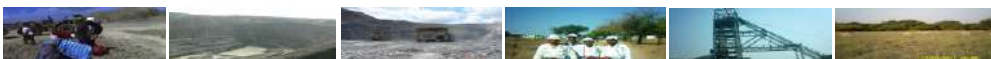


Figure 10: The mitigation hierarchy for dealing with negative impacts on biodiversity



## 9.2 Fertiliser Management

### 9.2.1 Soil Fertilisation




Deterioration of the fertility regime of soils may well be minimised if the surface soils are stripped separately from the sub-soils and have been replaced at the surface throughout the replacement method, however, once topsoil has been mixed with sub-soil in the removal and replacement method, the end product could be a soil with low fertility. Topsoil fertility should be reinstated in order to determine and maintain good plant growth. The soil should be sampled throughout mining closure and analysed to work out the soil nutrient content as this varies from site to site. Fertilizer should then be applied to boost the soil nutrient content to the required levels if it's recommended to do so by the specialist.

The fertiliser mixture can need to be determined throughout rehabilitation and should vary from site to site. It's recommended that soil analysis is conducted to work out the acceptable application of fertilisers. Normally once fertilisers are applied, the first couple of years sensible vegetation cover will be established as a result of the high fertility, but as time passes there's the chance that the grass cover starts to deteriorate due to misdirection and lack of nutrients.




## 10 Weed Control

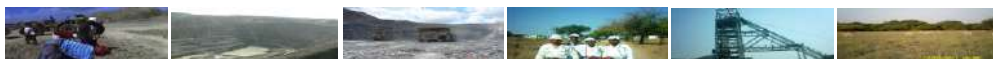
Alien invasive species tend out-compete the indigenous vegetation; this is due to the fact that they are energetic growers that are adaptable and able to invade a wide range of ecological niches (Bromilow, 1995). They are tough, can withstand unfavorable conditions and are easily spread. Alien species in South Africa are categorised according to CARA and NEMBA.

Declared alien and invasive species have been divided according to Conservation of Agriculture Resources Act 1983 (Act 43 of 1983) 198 Invasive Alien Plants (IAPs) are legislated in three categories:

-  **Category 1:** Declared weeds that are prohibited on any land or water surface in South Africa. These species must be controlled, or eradicated where possible
-  **Category 2:** Declared invader species that are only allowed in demarcated areas under controlled conditions and prohibited within 30m of the 1:50 year flood line of any watercourse or wetland
-  **Category 3:** Declared invader species that may remain but must be prevented from spreading. No further planting of these species is allowed.

The draft NEMBA categories for invasive species according to Section 21 are as follows:

-  **Category 1a:** Species requiring compulsory control
-  **Category 1b:** Invasive species controlled by an invasive species management programme
-  **Category 2:** Invasive species controlled by area





 **Category 3:** Invasive species controlled by activity.

### 10.1 Alien Invasive Control Plan

Alien invasive species tend to out-compete the indigenous vegetation. Invasive alien plants are a major threat to biodiversity in catchment areas, potentially disrupting the delicate natural balance in ecosystems. As we depend on biodiversity for water, food, wood, clean air, medicine and much more, it is vitally important that we protect this resource.

### 10.2 Alien Species Control

Invasive alien plant species are problematic to control. Methods should be used that are appropriate for the species concerned, as well as to the ecosystem in which they occur. When controlling weeds and invaders, damage to the environment must be limited to a minimum.

There are four basic methods by which encroachers or weeds are controlled: Physical (mechanical), Chemical and Soil treatment.









### 10.3 Integrated Control Strategies

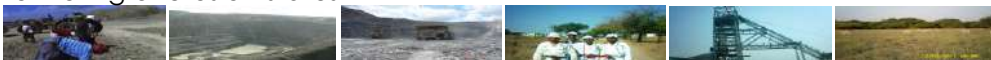
The satisfactory management of weeds and alternative invasive species is usually only achieved when several complementary strategies, together with biological management, improved land management practices, herbicides and mechanical strategies, are carefully integrated. Before beginning new management operations on new infestations, all needed follow-up management and rehabilitation work should be completed in areas that are originally prioritized for clearing and rehabilitation.

## 11 Monitoring and Maintenance

The main purpose of monitoring is to make sure that the objectives of rehabilitation are met and that the rehabilitation process is followed. The physical aspects of rehabilitation should be carefully monitored as well as during the progress of establishment of desired final ecosystems.

**The following items should be monitored continuously:**

-  Vegetation basal cover and vegetation species diversity
-  Fauna species recolonized
-  Groundwater quality at agreed locations
-  Surface drainage systems and surface water quality
-  Chemical, physical and biological status of replaced soil
-  Depth of topsoil stripped and placed
-  Final topography alignment to agreed planned landform
-  Monitoring of erosion status



### **11.1 Vegetation basal cover and vegetation species diversity**

Basal cover refers to the proportion of ground at root level which is covered by vegetation and by the rooting portion of the cover plants. The line-transect (or the quadrat bridge) method can be used to establish sampling positions. A target of 15% basal cover should be set for fully established vegetation. Biodiversity assessments and surveys should be undertaken by external experts to establish the full range of plants that have become established. Summer and winter samplings should be done during these assessments.

### **11.2 Fauna species recolonized**

The growth and recolonization of fauna on rehabilitated land should be recorded in relation to climatic conditions. This should be done in order to gather evidence of the relative capability of the new profile to support the pastures in relation to unmined conditions. This can be done by recording the number of grazing days, hay bales produced.

### **11.3 Groundwater & Surface Water**

The groundwater levels and quality should be measured and monitored in a similar way to the surface water to determine the impact of the mining activities on the groundwater resources. A hydrogeologist, together with the relevant authorities, should determine the locations of the monitoring boreholes. The monitoring frequency will be determined by the regulator.

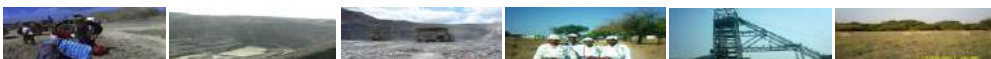
### **11.4 Surface Water**

The functionality of the surface water drainage systems should be assessed on an annual basis. This could preferably be done when the first major rains of the season so after any major storm. An assessment of those structures can ensure that the drainage on the recreated profile matches the rehabilitation plan as well on find early on when any drainage structures are not functioning efficiently. These will then be repaired or replaced before it causes vital erosion harm.

The quality of all water departure the property should be monitored on a daily basis (as per the EMP) to ensure compliance of the various constituents with the standards approved by the DWA. Extra monitoring should include aquatic biomonitoring (invertebrates, habitat, water quality and fish) on a bi-annual basis (high and low flow) to determine the ecological functioning and health of the rivers and streams, in and around the restored areas. The ecological functioning of the wetlands ought to similarly be assessed on an annual basis.

### **11.5 Chemical, Physical and Biological Status of Replaced Soils**







Assess the depth of the replaced soils using a soil auger in a very regular grid pattern. The standard spacing of auger holes is 100 m by 100 m which results in one hole per hectare. Make sure that every auger hole is geo-referenced and that the results are plotted. The auger points



are used to identify compact soil layers, the degree of disturbance of the soil and also the plant rooting pattern. Undertake soil fertility sampling independently of the auger survey. The land should be split into logical land use units and should not be bigger than 100 ha. These assessments should be conducted pre-establishment to ensure that immobile nutrients are applied and incorporated deep into the plant rooting zone throughout the initial tillage process.

### 11.6 Depth of Topsoil Stripped and Replaced

The recovery and effective use of the usable topsoil available is extremely important. It's also important to undertake regular reconciliation of the volumes stripped, stockpiled and returned to the rehabilitated areas. A topsoil balance can be used to keep track of soil resources on the mine. A final post-mining rehabilitation performance assessment should be done and information should be adequate for closure applications that involve:

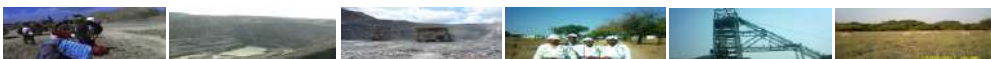
-  Assessment of rehabilitated soil thickness and soil characteristics by means of auger observations using a detailed grid
-  A post-mining land capability map based on soil thickness and characteristics
-  A post-mining land use map
-  Erosion occurrences
-  Fertility analysis and soil analysis
-  Representative bulk density analysis

### 11.7 Final Topography

The topography that is achieved during rehabilitation should be monitored and compared to the planned topography. The final profile achieved should be acceptable in terms of the surface water drainage requirements and also the end land use objectives. The survey department should do an assessment of the reshaping applied on the site and signoff should be obtained from the rehabilitation specialist before the topsoil is replaced.








### 11.8 Monitoring of Erosion

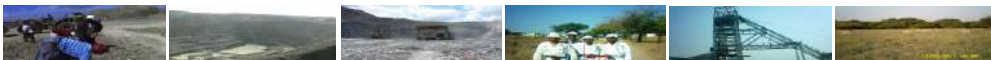
If there is any sign of erosion known during operation monitoring should be implemented to avoid more erosion to the site. Continuous erosion monitoring of rehabilitated areas should be undertaken and zones with excessive erosion should be identified. Erosion will either be quantified or the occurrence there-of simply recorded for the particular location.



## 12 CONCLUSION AND RECOMMENDATIONS







### 12.1 Conclusion

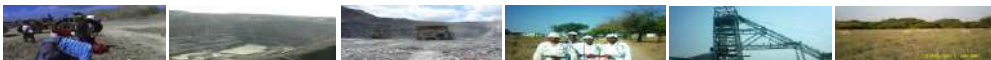
-  Life of the mine is expected to last a period of two years
-  Topsoil needs to be stripped and stockpiled for later use in mine site rehabilitation particularly from the stockyards, laydown.
-  The use of stripped stockpiled soil for rehabilitation purposes has to include detailed post rehabilitation however pre-vegetation soil analysis as well as detailed liming and fertilizer recommendations based on the soil analytical results, as well as the type of vegetation to be established.
-  The surrounding land uses are associated with plantation, waterbodies and mining activities.
-  These planned project activities that may be implemented within the applied land will change the land capability for the lifetime of mine, whereas land use is modified from wild to mining among the mine sites.
-  Be that as it may, rehabilitation and mitigation will change the land capability at the best back to cultivation.
-  This pre-assessment of the soil condition before mining is more important when post-closure analysis will be conducted in the future, to know exactly how much the mine has impacted the area.

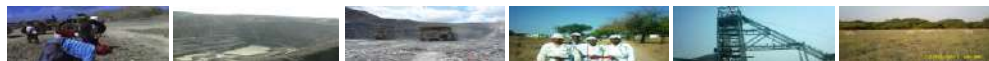
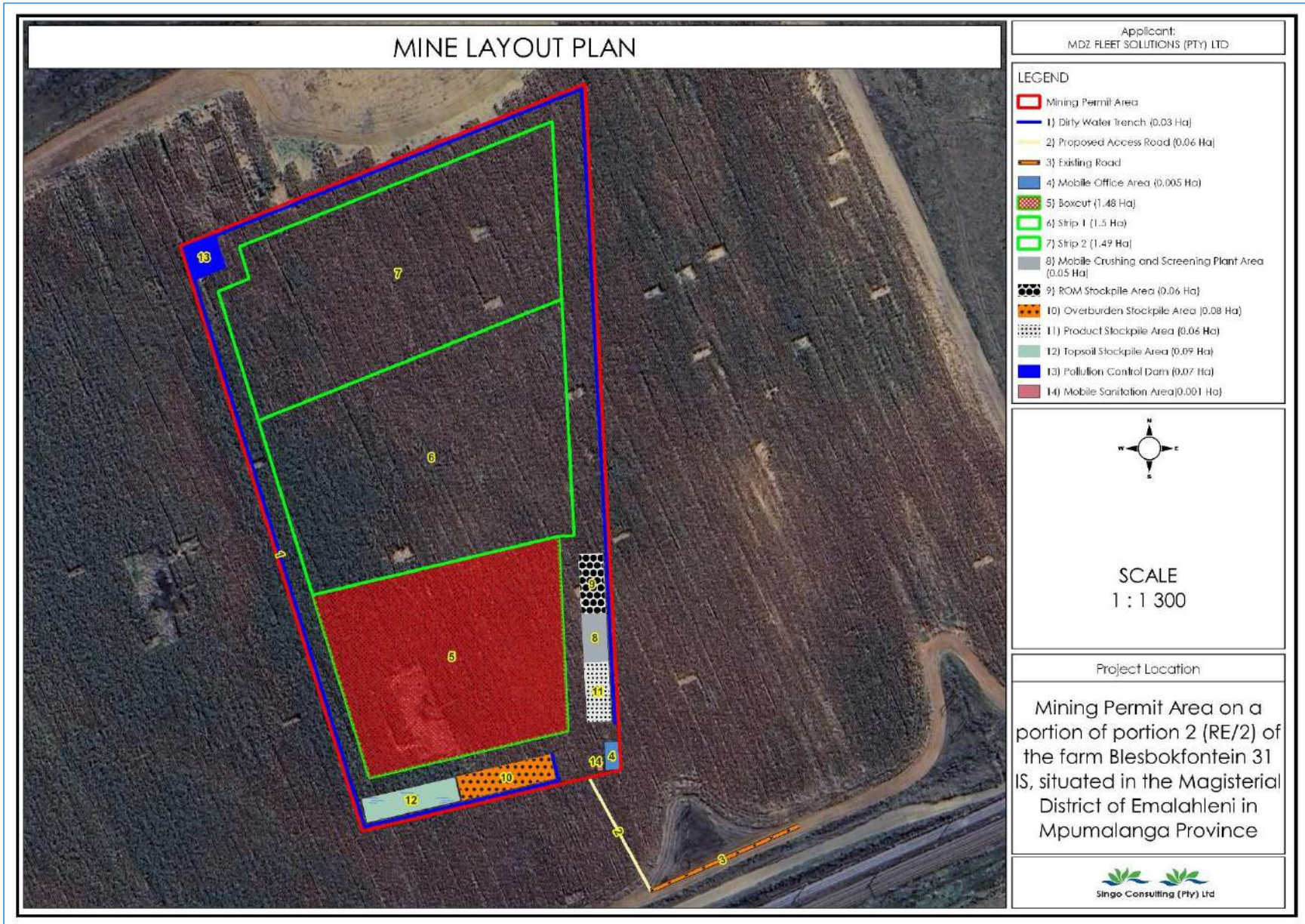


## 12.2 Recommendations

The following recommendations regarding rehabilitation of the mine site are applicable:

-  It is recommended that the financial provision for closure and rehabilitation be annually updated as per the requirements of the MPRDA
-  Surface water monitoring of the pans and associated wetlands surrounding the project area is to be undertaken to determine the impacts associated with operations of the mine
-  Regular audits should be undertaken by a soil scientist during the soil stripping process. This will guarantee that soil is stripped and stockpiled correctly
-  Regular audits should be undertaken to monitor the progress of areas that have been rehabilitated
-  Long term management of the rehabilitated areas will be required via contractual agreements with landowners in the area and rehabilitation should also be undertaken to best practice
-  An independent Environmental Assessment Practitioner shall be appointed to ensure compliance with requirements of the Final Rehabilitation, decommissioning and Closure Plan





# MINING PERMIT APPLICATION

## SOIL, LAND USE AND LAND CAPABILITY STUDY

Soil, Land Use and Land Capability Study for the proposed Mining Permit Application for MDZ Fleet Solutions (Pty) Ltd on Portion 2 of the Farm Blesbokfontein 31 IS, under the magisterial district of Nkangala, Mpumalanga Province.

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DMRE REF: MP 30/5/1/1/3/13571 MP

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### Project details

**Report type** Soil, Land Use and Land Capability Study for a mining right application

**Project title** Soil, Land Use and Land Capability Study for the proposed mining permit application on Portion 2 of the Farm Blesbokfontein 31 IS, under the magisterial district of Nkangala, Mpumalanga Province.

**Mineral (s)** Coal, Pseudocoal, Torbanite and Aggregate resources

**Client** MDZ Fleet Solutions (Pty) Ltd

**Site location** Portion 2 of the Farm Blesbokfontein 31 IS, under the magisterial district of Nkangala, Mpumalanga Province, South Africa.

**Version** 1

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**Table 1: Critical Report Information**

Critical Information incorporated within the Basic Soil, Land Use and Land Capability Study:	Relevant section in report
Details of the specialist who prepared the report	Project details, P: 3
The expertise of that person to compile a specialist report including a curriculum vitae	Appendix A, 46
Project Background Information, including the proposed activities description	Project background information, P: 10
An indication of the scope of, and the purpose for which, the report was prepared	Scope of work, P: 11-12
An indication of the quality and age of base data used for the specialist report	Project details, P: 3
A description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change	N/A
The duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment	
A description of the methodology implemented in preparing the report or carrying out the specialised process comprehensive of equipment and modelling used;	Methodology, P: 14
Details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternative;	N/A
An identification of any areas to be avoided, including buffers	N/A
A map overlaying the proposed activity including the associated infrastructures on the environmental sensitivities of the site including containing buffer zones	N/A
A description of the findings and potential implications of such findings on the impact of the proposed activity or activities	Impact assessment, P: 29
Any mitigation and conditions measures for inclusion in the EMPr	Soil management plan, P: 31
Any monitoring requirements for inclusion in the EMPr or environmental authorisation	Monitoring, P: 39
An analytic opinion as to whether the proposed activity or portions thereof should be Authorised-i.e. specific recommendations	Recommendations, P: 41
Regarding the acceptability of the proposed activity or activities; and	Refer to bar
If the opinion is that the proposed activity or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan	Soil management during the operational phase, P: 33
A description of any consultation process that was undertaken during carrying out the study	Refer to the bar
Any other information requested by the competent authority.	N/A



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## 1 INTRODUCTION

### 1.1 Project Background Information

MDZ Fleet Solutions (Pty) Ltd has appointed Singo Consulting (Pty) Ltd as an independent consulting company to conduct a specialist soil, land use and land capability study. The soil, land use and land capability study are being conducted in support of a mining permit application for Coal, Pseudocoal, Torbanite and Aggregate on Portion 2 of the Farm Blesbokfontein 31 IS, under the magisterial district of Nkangala, Mpumalanga Province.

This document is a soil study incorporating soil classification and agricultural potential prepared for the MDZ Fleet Solutions (Pty) Ltd. The main aim of conducting this study is to find information with regards to the soil potential, land use as well as land capability.

### 1.2 Proposed Activities

The activities to take place are categorized based on phases of the life of the mine. The outlined activities have the potential of negatively or positively affecting the soil regime in the area.

#### **Construction phase:**

- Clearing of vegetation.
- Hardening surfaces to create roads.
- Installation of mobile machinery such as crusher and screening unit.

#### **Operational Phase:**

- Movement of machinery.
- Drilling, blasting, and hauling of material.
- Gravel, Aggregate and Sand processing which include but not limited to crushing.

The following infrastructure are required for the establishment of the opencast mining operations:

- Pit access ramps
- Haul roads



- Waste dump areas for topsoil, soft overburden, and hard overburden (includes inter burden)
- ROM stockpiles for each of the four seams
- Clean water cut-off canals around the: ROM stockpile area, including crushing,
- Contractor's laydown area, along the haul roads, Around the waste dumps and Dirty water catchment drains.
- In-pit sumps for water management
- Pollution control dam (PCD)
- Piping system for water management

The construction of all infrastructure associated with the project will be within the mine project boundary. This report describes the soil types and properties present thereby giving a detailed baseline soil assessment of the undisturbed areas. The major soil types of presents are the Red or yellow structureless soils with a plinthic horizon.

### 1.3 Scope of Work

Singo Consulting (Pty) Ltd was appointed by MDZ Fleet Solutions (Pty) Ltd to conduct a detailed soil study for the mining permit application on Portion 2 of the Farm Blesbokfontein 31 IS, in the magisterial district of Nkangala, Mpumalanga Province.

Singo Consulting (Pty) Ltd was tasked to collect soil samples to test for soil chemistry and the soil fraction percentages within the project area. The soil samples will be collected within the mining permit area.

The mining permit method will be an open cast mining and will be operating for over 2 years lifespan. During site establishment, the applicant must demarcate the site boundaries and clear the topsoil. Thereafter, softs will be removed and stored at the designated material stockpiles.

- The topsoil will be stockpiled elsewhere on site preferably next to the farm boundary and will be used during rehabilitation period.
- Once a box cut has been made, the overburden and mineral resources where necessary will be loosened by blasting.
- The loosened material will then be loaded onto trucks by excavators.
- A haul road will be situated at the side of the open cast, forming a ramp up which trucks can drive, carrying ore and waste rock.





- Waste rock will be piled up at the surface, near the edge of the open cast (waste dump).
- The waste dump will be tiered and stepped, to minimize degradation.



## 2 TERMS OF REFERENCE

- Conduct a detailed soil assessment of the proposed opencast mining areas and infrastructure areas.
- Classify and map soil forms according to the South African Taxonomic Soil Classification System, 1991.
- Derive and map land capability based on soil properties.
- Map all pre-mining and current land uses.
- Determine all possible impacts by the proposed operations and provide associated mitigation measures.



### 3 METHODOLOGY

#### 3.1 Desktop study and literature review

This allows soil surveyors to enter and study colour, texture, structure, and other soil properties as well to differentiate between horizons. This allows for classification. Chemical tests can be carried out in the field (e.g., pH, test for carbonates and test for Mn oxides). Classification is done at this stage, which provides information on the chemical, physical and mineralogical characterization of the soil. Soil scientists that map the area, familiarize themselves with soils they expect to find and use characteristics to distinguish them from other soils in the area by doing desktop study.

#### **Delineating soil boundaries**

Pits cannot be dug randomly, usually a map of the area is taken and a grid is made on the map to determine where samples will be taken from. An efficient soil mapper looks at changes in vegetation, topography, and soil colour. A bare soil map can also be looked at to see where changes in colour occur indicating differences in soil. Once sites are established, soil samples are taken with a soil auger. Soil auguring is the principal method used but intrusive and labour intensive.

#### 3.2 Site Assessment

Site inspection will be conducted on Portion 2 of the Farm Blesbokfontein 31 IS, under the magisterial district of Nkangala, Mpumalanga Province. The holes were drilled up to 30 cm below the ground level. The soil was described and classified according to the South African Taxonomic Soil Classification System.

The following procedure was followed to record soil properties and classify soils accordingly:

- Identification of applicable diagnostic horizons by stating the physical properties such as:
  - Effective depth (depth of soil suitable for root development),
  - Colour (in accordance with Munsell colour chart),
  - Texture (refers to the particle size distribution),
  - Structure (aggregation of soil particles into structural units),
  - Mottling (alterations due to continued exposure to wetness),



- Concretions (cohesion of minerals into hard fragments), Leaching (removal of soluble constituents by percolating water),
  - Gleying (reduction of ferric oxides under anaerobic conditions resulting in grey, low soil colours), and
  - Illuviation of colloidal mater from one horizon to another resulting in the development of grey sandy E-horizons and grey clay G-horizon.
- Determine according to above properties the appropriate soil form and soil family

### 3.3 Analysis of samples at soil laboratory

Equipment's used during the soil sampling includes the GPS, camera, spade, auger, and sampling bags. A soil field form was completed during the sampling procedure, recording the moisture, colour, texture, and origin the soil origin. The soil is uniform within the project area.

Soil samples were collected from portion of portion 2 of the Farm Driehoek 273 IS, within ward 9 under the Magisterial District of Ermelo, where the mining activities will be taking place. The collected soil samples were submitted to ARC-Soil Climate and Water in Pretoria lab to test for soil chemistry and the soil fraction percentages within the project area.

### 3.4 Land capability classification

The Land capability classification is one of several interpretation groups that was made for agricultural purposes. As with all the interpretation groups, the land capability classification starts with one soil-mapping unit, which is the building block of the system.

The land capability is classified into grazing, arable and wilderness. In this classification the arable soils are grouped according to their potentialities and limitations for sustained production of the common cultivated crops that do not require specialized site conditioning or site treatment. Nonarable soils (soils unsuitable for long time sustained use for cultivated crops) are grouped according to their potentialities and limitations to produce permanent vegetation and according to their risks of soil damage if mismanaged.



## 4 PHYSIOGRAPHICAL AND SOIL SETTING

### 4.1 Project Location

The locality map created by the QGIS illustrates the location of the mining permit area. The project area is situated on Portion 2 of the Farm Blesbokfontein 31 IS, under the magisterial district of Nkangala, Mpumalanga Province. The study area is situated approximately 61 km Southwest of Middelburg, approximately 40,8 km Southwest of Emalahleni and approximately 32 km South East of Ogies.

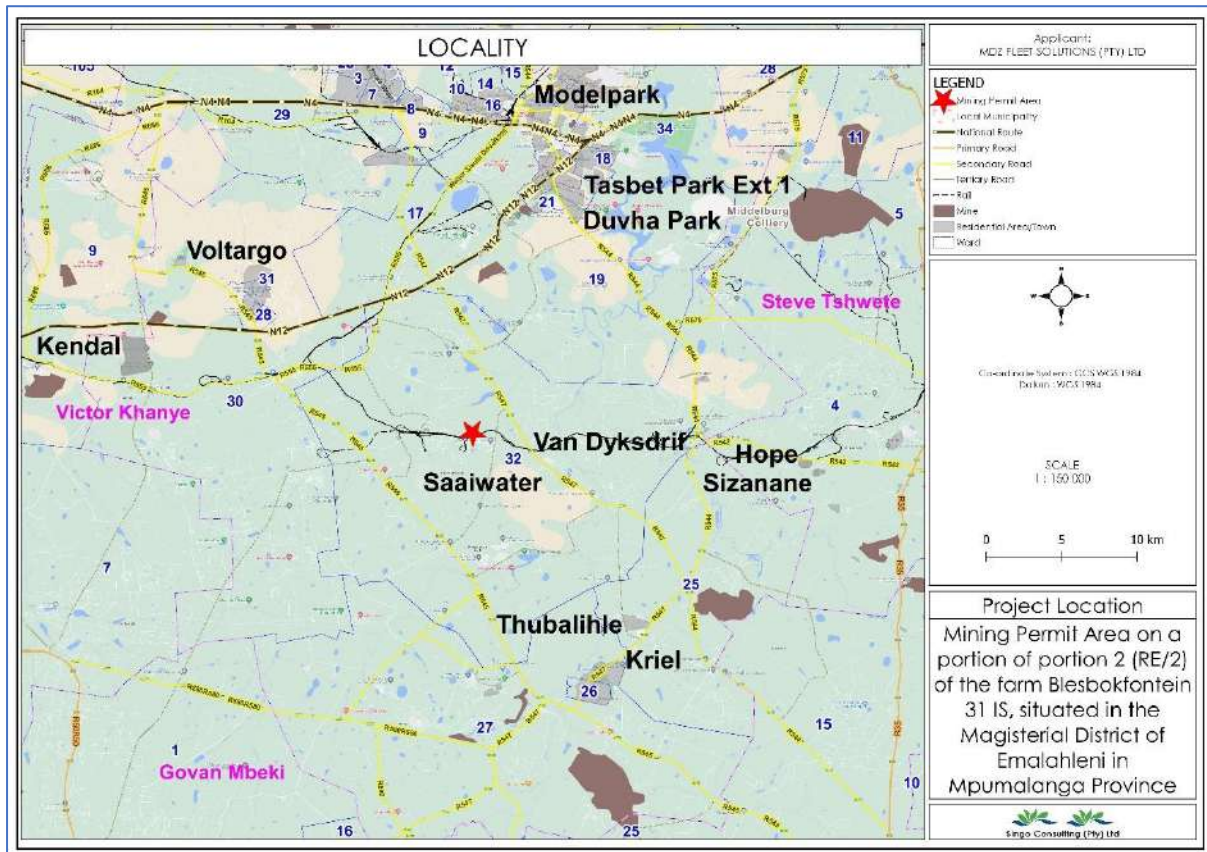


Figure 1: Locality map of the study area

### 4.2 Climate

In eMalahleni, temperate highland tropical climate with dry winters climate. The summers here have a good deal of rainfall, while the winters have very little. The Köppen-Geiger climate classification is Cwb. The district's yearly temperature is 22.52°C and it is 1.3% higher than South Africa's averages. In a year, the mean annual rainfall is 600-800 m. The driest month is July. Most of the precipitation here falls in December, averaging 172 mm.



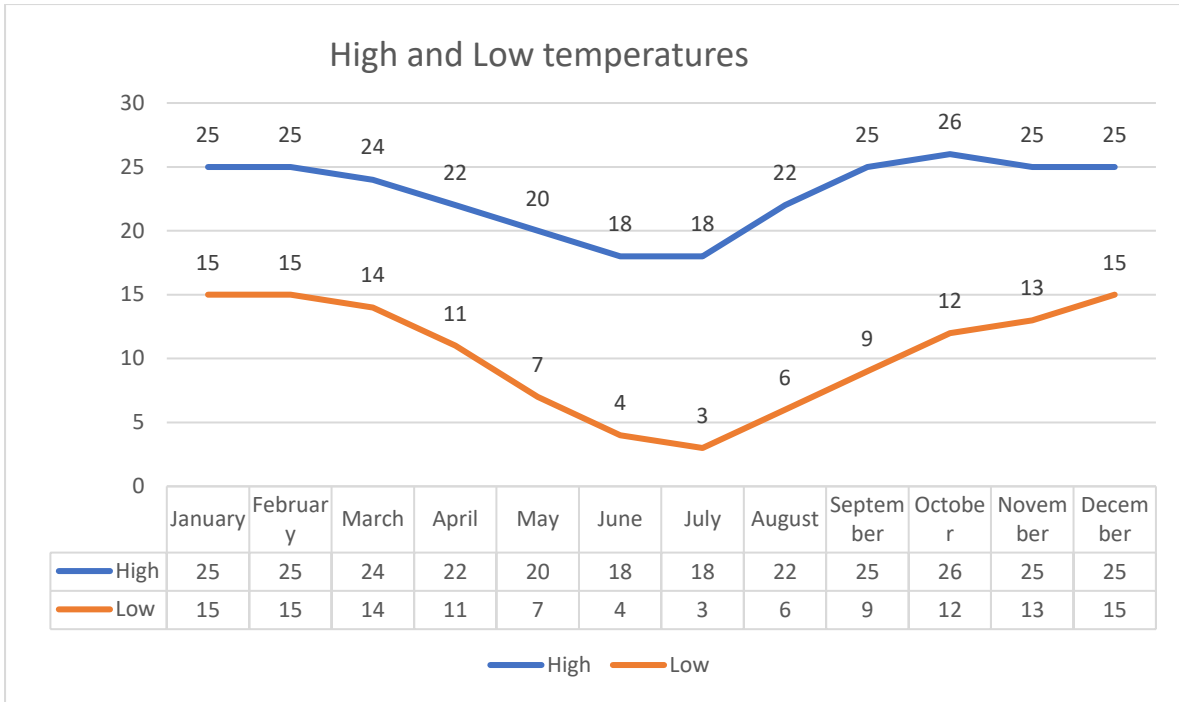


Figure 2: High and Low temperature map

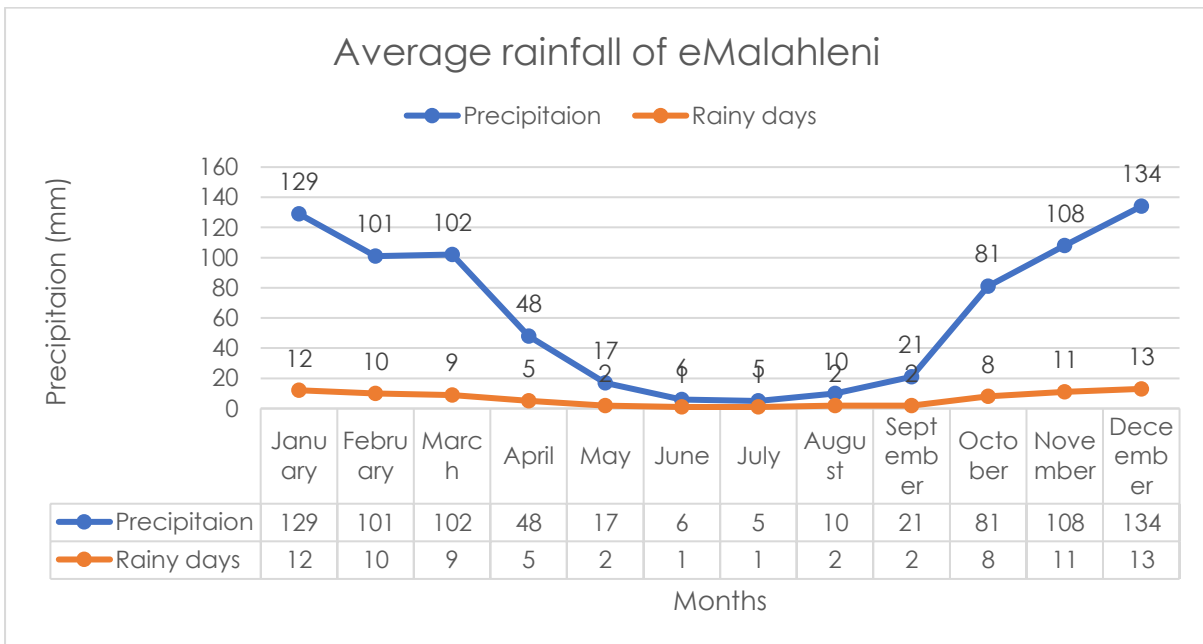


Figure 3: Average rainfall and rainy days in eMalahleni



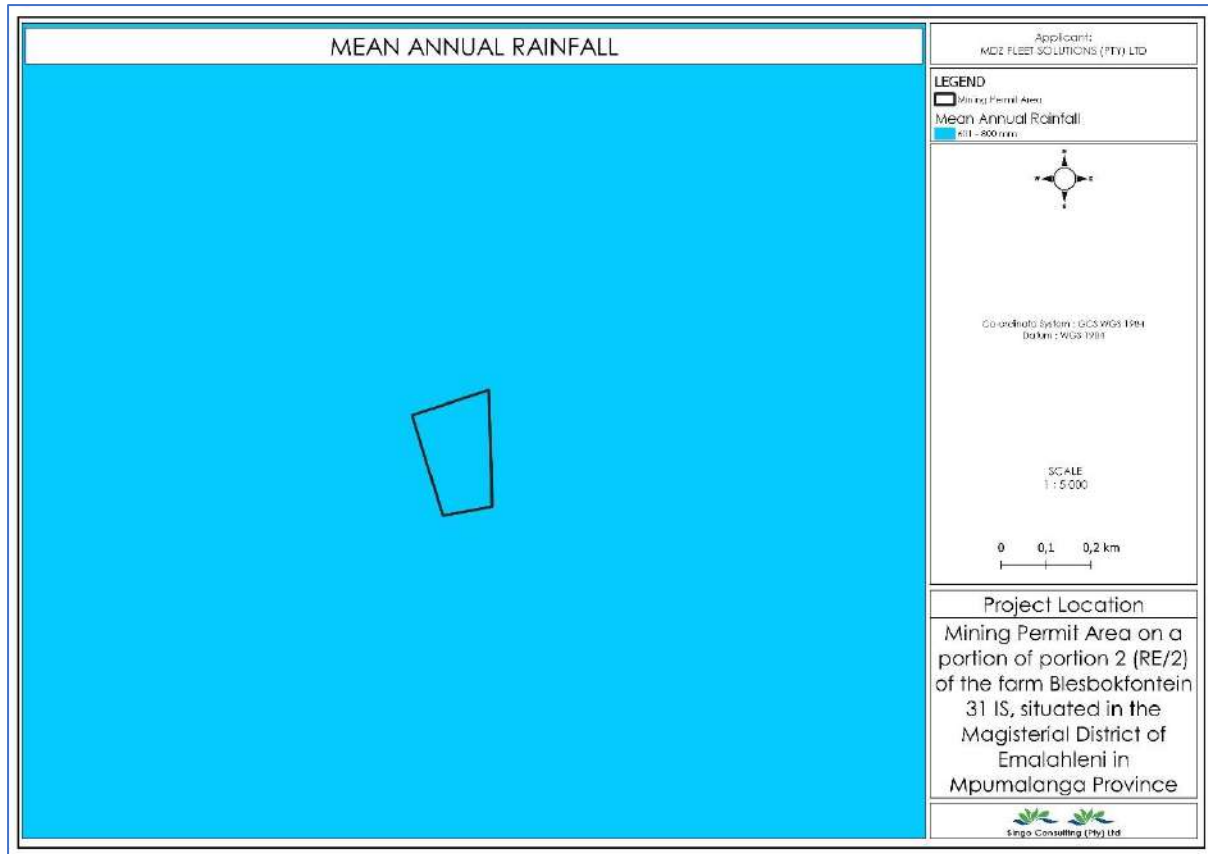


Figure 4: Mean annual rainfall map



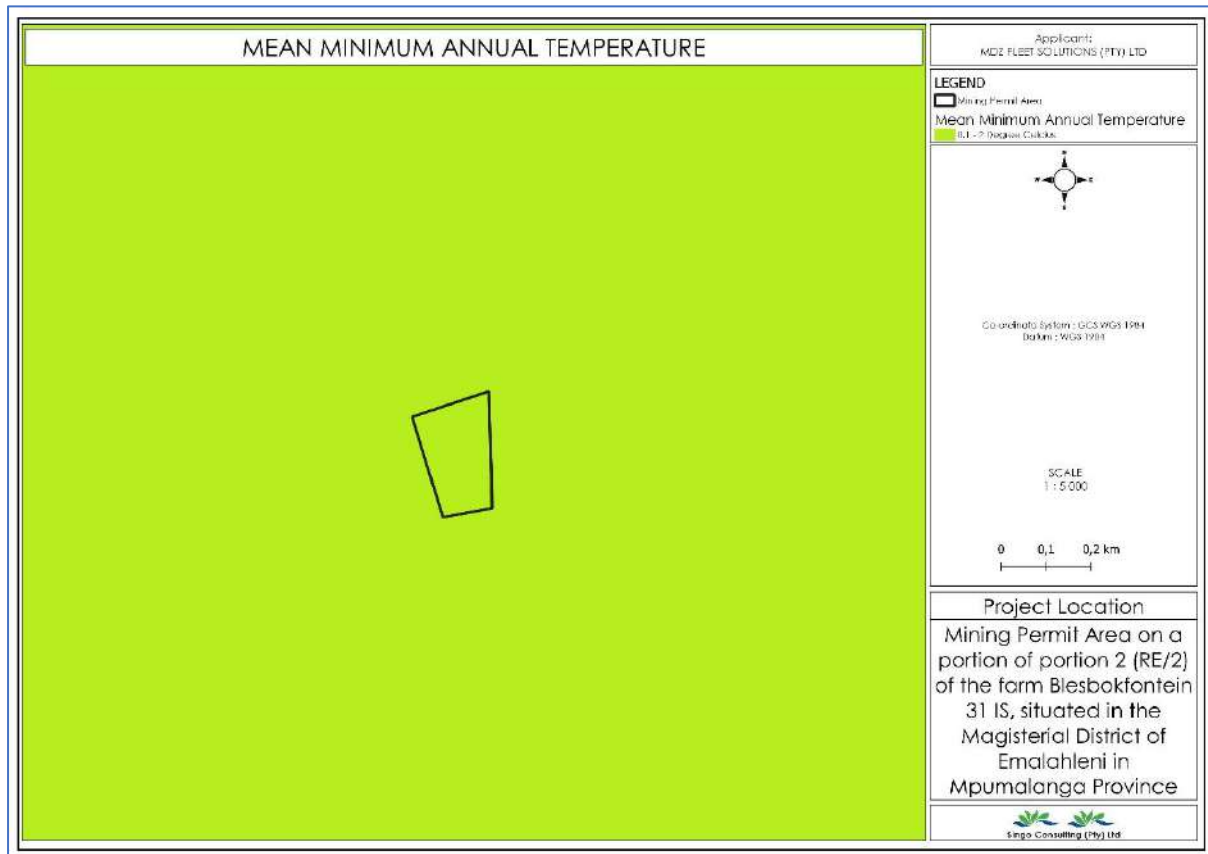


Figure 5: Mean minimum annual temperature map.

#### 4.3 Soil forms present in the study area

The soil classes map in Figure 6 below, shows that the mining permit area is largely covered with Red or yellow structureless soils with a plinthic horizon. The soils are Red to yellow sandy soils of the Ba and Bb land types found on shales and sandstones of the Madzaringwe Formation (Karoo Supergroup).

Soil class	Favourable properties	Limitations
Red or yellow structureless soils with a plinthic horizon	Favourable water-holding properties	Imperfect drainage unfavourable in high rainfall areas





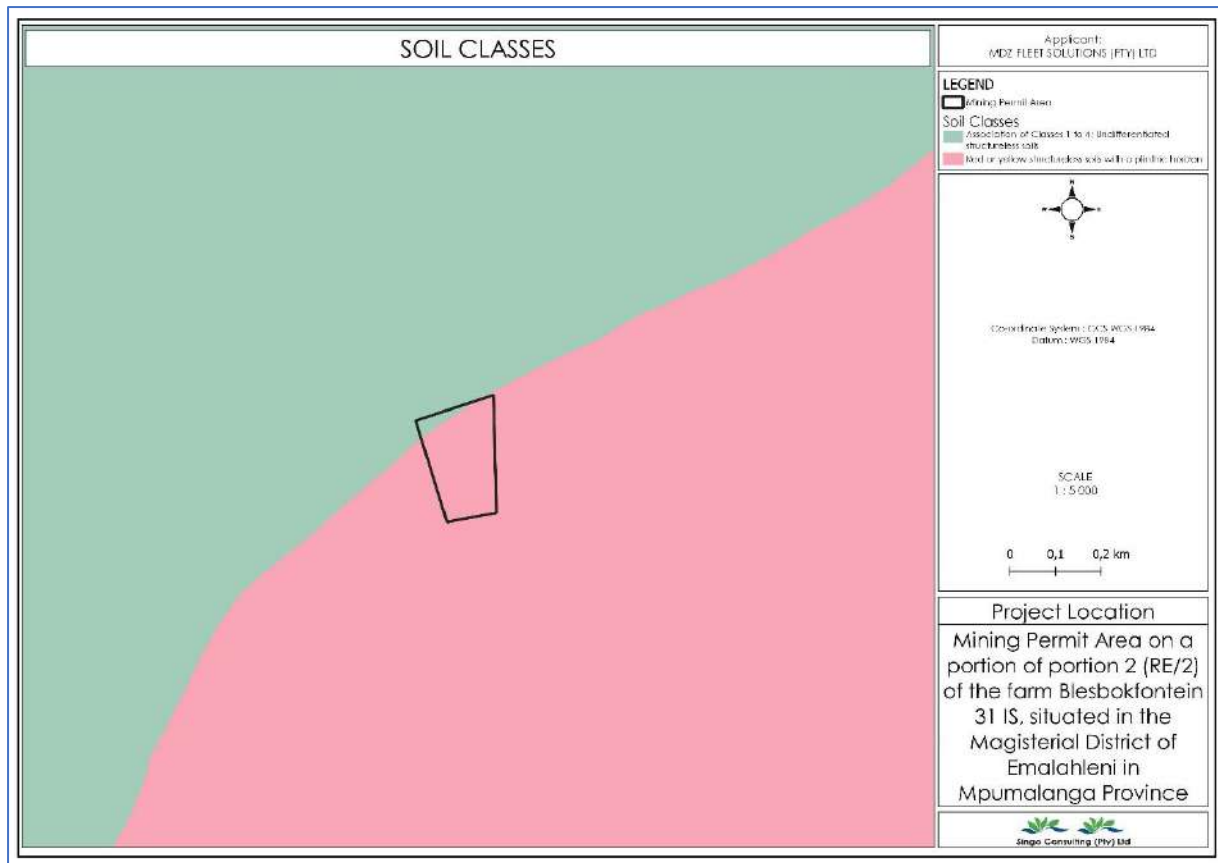


Figure 6: soil class map of the project area.


#### 4.4 Soil chemical conditions of the study area

The main aim for soil sampling is to identify the soil moisture, colour, consistency, structure, soil type and origin (MCCSSO) of the soil.

Table 2: Site pictures and description

Site pictures and equipment's	Description
<p>The equipment's used included:</p> <ul style="list-style-type: none"> <li>• Auger/TLB</li> <li>• plastics,</li> <li>• shovel,</li> <li>• GPS,</li> <li>• Buff tags,</li> </ul>	<p>Operation of soil Sampling</p> <p>Selecting an acceptable sampling location, then collecting a soil sample with an Auger/ TLB while identifying the different layers of soil in the area are all part of the method. The soil samples are stored in various plastics and recorded before being sent to the lab for analysis. Some of the types of analyses undertaken include pH (alkalinity and</p>



<ul style="list-style-type: none"> <li>• Sampling forms.</li> <li>• Cable ties</li> </ul>	acidity), Soil Texture Composition, and Chemical Compositions.
	The Auger was used to remove ground samples and capture the many different strata found underground. Soil samples were collected to determine chemical composition, soil texture, pH level, and soil nutrients.

#### 4.5 Agricultural potential

The study area consists of arable land capability class. Arable land is any land capable of being ploughed and used to grow crops. Arable land is the land that is being worked regularly, generally under a system of crop rotation.

Table 3: Land capability classification (Scotney et al., 1987)

Land Capability Group	Limitations
<b>Arable Land</b>	This land group can be grouped into: <ul style="list-style-type: none"> <li>• <b>No or Few limitations:</b> Very high arable potential and very low erosion hazard.</li> <li>• <b>Slightly Limitations:</b> High arable potential, with low erosion hazard.</li> <li>• <b>Severe Limitations:</b> Low arable potential and high erosion hazard.</li> </ul>

#### 4.6 Land use

The proposed area is covered by Cultivated land.



**Cultivated land** - arable land that is worked by plowing and sowing and raising crops ploughland, plowland, tillage, tilled land, tilth, farmland fallow - cultivated land that is not seeded for one or more growing seasons.

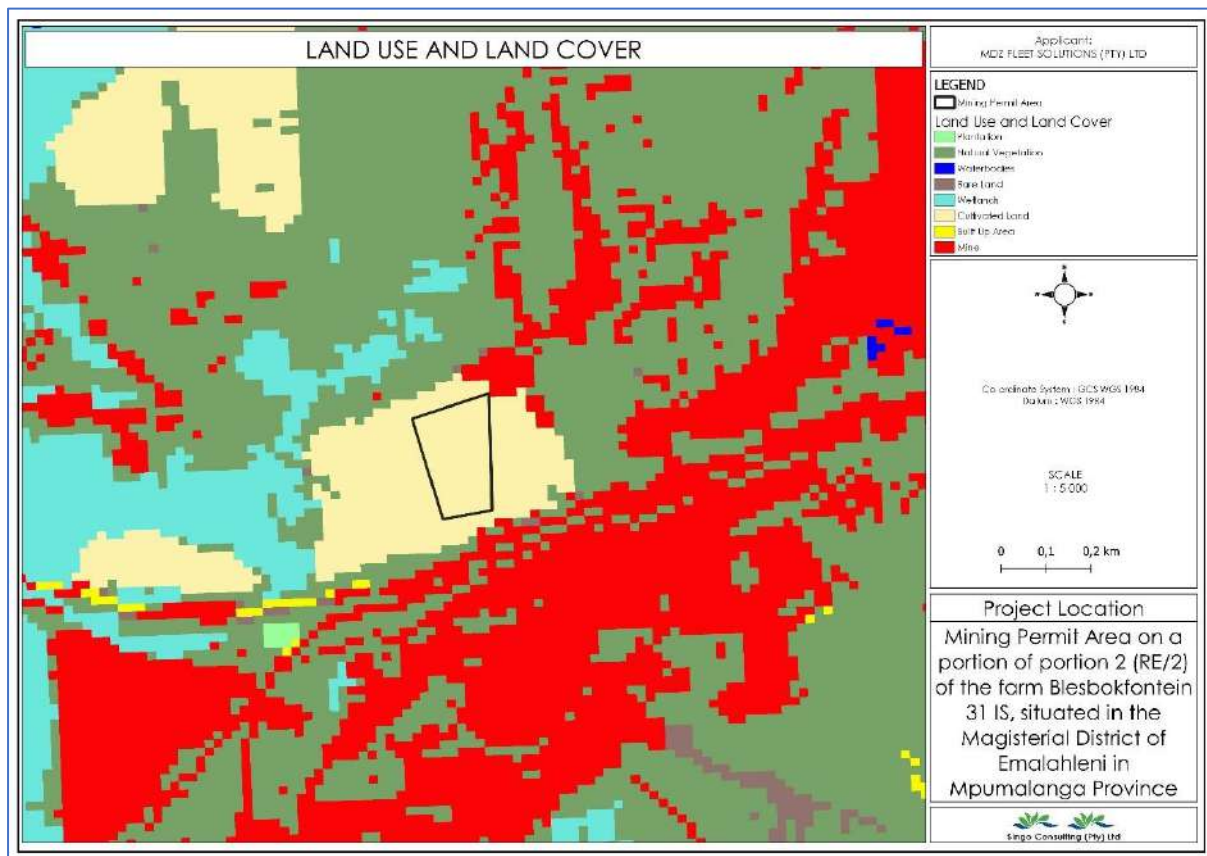


Figure 7: Land use and Land cover map

#### 4.7 Land capability

The Land capability classification is one of several interpretation groups that was made for agricultural purposes. As with all the interpretation groups, the land capability classification starts with one soil-mapping unit, which is the building block of the system.

The land capability is classified into grazing, arable and wilderness. In this classification the arable soils are grouped according to their potentialities and limitations for sustained production of the common cultivated crops that do not require specialized site conditioning or site treatment. Nonarable soils (soils unsuitable for long time sustained use for cultivated crops) are grouped according to their potentialities and limitations to produce permanent vegetation and according to their risks of soil damage if mismanaged. The land capability of



the proposed area is classified as an arable land and grazing. Arable land is any land capable of being ploughed and used to grow crops.

The mining permit area is situated within the arable land capability group.

The capability grouping of soils is designed:

0. To help landowners and others use and interpret the soil maps,
1. To introduce users to the detail of the soil map itself, and
2. To make possible broad generalizations based on soil potentialities, limitations in use, and management problems'

The capability classification provides three major categories of soil groupings:

0. Capability unit,
1. Capability subclass, and
2. Capability class.

The first category, capability unit, is a grouping of soils that have about the same responses to systems of management of common cultivated crops and pasture plants. Soils in any one capability unit are adapted to the same kinds of common cultivated and pasture plants and require similar alternative systems of management for these crops. Long-time estimated yields of adapted crops for individual soils within the unit under comparable management do not vary more than about 25 percent.

The second category, the subclass, is a grouping of capability units having similar kinds of limitations and hazards. Four general kinds of limitations or hazards are recognized: (1) Erosion hazard, (2) wetness, (3) rooting zone limitations, and (4) climate.

The third and broadest category in the capability classification places all the soils in eight capability classes. The risks of soil damage or limitations in use become progressively greater from class I to class VIII. Soils in the first four classes under good management can produce adapted plants, such as forest trees or range plants, and the common cultivated field crops  $\wedge$  and pasture plants. Soils in classes V, VI, and VII are suited to the use of adapted native plants. Some soils in classes V and VI are also capable of producing specialized crops, such as certain fruits and ornamentals, and even field and vegetable crops under highly intensive management involving elaborate practices for soil and water conservation. Soils in class VIII



do not return on-site benefits for inputs of management for crops, grasses, or trees without major reclamation.

The grouping of soils into capability units, subclasses, and classes is done primarily based on their capability to produce common cultivated crops and pasture plants without deterioration over a long period of time. To express suitability of the soils for range and woodland use, the soil mapping units are grouped into range sites and woodland-suitability group.



Table 4: Relationship of soil-mapping unit to capability classification (Source: Kellogg, 1961)

Soil-mapping unit	Capability unit	Capability subclass	Capability class
<p>A soil mapping unit is the part of the landscape' that has the same qualities and characteristics and whose limits are static by accurate definitions. Within the cartographic limitations and considering the purpose for which the map is made, the soil mapping unit is the unit at which the highest number of accurate statements and predictions can be done.</p> <p>The soil mapping units gives more information about the details of soils. The basis for all the interpretation is the basic mapping units. They provide the information required for the</p>	<p>A group of one or more individual soil mapping units having similar potentials and continuing limitations or hazards is termed as capability unit. The soils in a capability unit are sufficiently uniform to (1) produce similar kinds of cultivated crops and pasture plants with similar management practices, (2) require similar conservation treatment and management under the same kind and condition of vegetative cover, (3) have comparable potential productivity.</p> <p>The capability unit condenses and simplifies soils information for planning individual tracts of land,</p>	<p>are the groupings of capability units that have the same major conservation problem are called Subclasses. The problems include—</p> <ol style="list-style-type: none"> <li>1.E&gt;Erosion and runoff.</li> <li>2. W&gt;Excess water.</li> <li>3.S&gt;Root-zone limitations.</li> <li>4.C&gt;Climatic limitations.</li> </ol> <p>The information about the involved limitations and the kind of problems related to conservation are provided by capability Subclass.</p> <p>The information about the map user relating to the limitation degree and the kind of problems involved in</p>	<p>Capability classes are groups of capability subclasses or capability units that have the same relative degree of hazard or limitation. The limitation and risks of soil damage in use become more from class I to class VIII.</p> <p>The capability classes are useful as a means of introducing the map user to the more detailed information on the soil map. The classes show the location, amount, and general suitability of the soils for agricultural use. Only information concerning general agricultural limitations in soil use are obtained at the capability class level.</p>

<p>development of capability units, forest site groups, crop suitability groups, range site groups, engineering groups, and other interpretation groups. The most specific management ways and estimated yields relates to the individual mapping unit.</p>	<p>field by field. Capability units with the class and subclass furnish information about the degree of limitation, kind of conservation problems and the management practices needed.</p>	<p>broad program planning, conservation need studies, and similar purposes are provided by the class and sub class.</p>	
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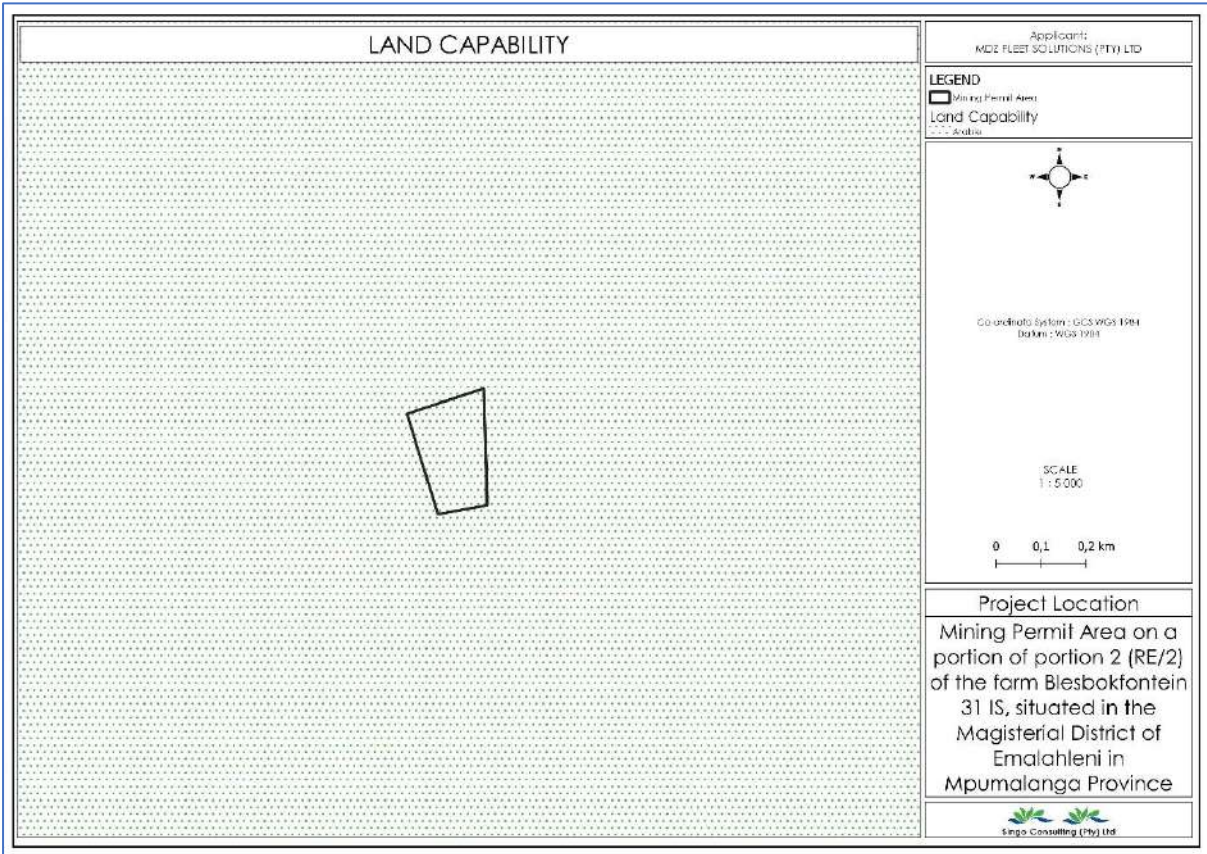


Figure 8: Land capability map of the study area



## 5 IMPACT ASSESSMENT

### 5.1 Assessment methodology

Pits cannot be dug randomly, usually a Soil map of the area is taken and a grid is made on the map to determine where samples will be taken from. An efficient soil mapper looks at changes in vegetation, topography, and soil colour. A bare soil map can also be looked at to see where changes in colour occur indicating differences in soil. Once sites are established, soil samples are taken with a soil auger. Soil auguring is the principal method used but intrusive and labour intensive.

### 5.2 Impact assessment per project phase

#### 5.2.1 Construction phase

During the construction phase of the above listed mining activities, the work carried out will mainly be the construction of the beneficiation plants and associated infrastructure, and expansion of stock yard and stockpiles.

This will entail the clearing of areas and the disturbance of the topsoil through excavations as well as the construction of a soil stockpile. The topography and natural drainage lines may also be disturbed. The overall impact will be loss of topsoil because of erosion and possible contamination of the soil by gravel, aggregate and sand dust, fuel, and oils (hydrocarbons) as a result of general construction activities. Soil compaction caused by heavy vehicles and machinery may also be a problem.

Construction activities will change the land use from uncategorised to mining, beneficiation plants and associated infrastructure, conveyors, power line, new roads and expansion of stock yard and stockpile sites, there will be no substantial change to the land use within these areas. Areas that have been categorised as uncategorised land use will change and will be unsuitable for any further farming or game farming use during the life of the project.

#### 5.2.2 Operational phase

Soil erosion through wind and storm water run-off and soil pollution by means of hydrocarbon contamination and potentially gravel, aggregate and sand dust may be encountered during the operational phase. Water runoff from roads and plant areas must be controlled and managed by means of proper storm water management facilities in order to prevent soil erosion. Diesel and oil spills are common at mine sites due to the large volumes of diesel and



oil consumed by construction vehicles. Pollution may however be localized. Small pockets of localized pollution may be cleared up easily using commercially available hydrocarbon emergency clean-up kits.

An additional impact that could occur is when soils are stripped and stockpiled as the natural sequence of the soil horizons is lost when stripping and stockpiling is undertaken. An associated impact could be compaction of soil stockpiles, if they are repeatedly driven over, which would result in compaction of soil stockpiles if the appropriate dumping techniques were not adopted. This can be mitigated against by demarcating soil stockpiles and minimise or prevent driving over stockpiles should be avoided were possible to avoid compaction. End tipping as a method of creating stockpiles can be adopted to avoid unnecessary compaction.

### 5.2.3 Decommissioning and rehabilitation phase

Mining infrastructure must be removed during the deconstruction phase. All foundation excavations must be backfilled and then covered with subsoil material and topsoil on the top layer, fertilised and re-vegetated. Backfilling of soil will impact on the land capability by restoring the land capability because vegetation can be supported and therefore returned to its original land use. As open cast mining progresses and enough space is available concurrent rehabilitation should be undertaken, this would include backfilling, contouring, re-vegetation of impacted areas and this would typically be done during the operational phase, as concurrent rehabilitation, and during the decommissioning phase.



## 6. SOIL MANAGEMENT PLAN

### 6.1 Soil management during the construction phase

#### 6.1.1 Minimise mining infrastructure footprint

- The footprint of the proposed infrastructure area should be clearly demarcated to restrict vegetation clearing activities within the infrastructure footprint.
- The construction of all infrastructure associated with the project will be within the mine project boundary.

#### 6.1.2 Management and supervision of construction teams

On both large and small construction sites, supervision is critical in preventing accidents. Planning and distributing work, making decisions, monitoring performance and compliance, giving leadership and teamwork, and ensuring staff involvement are all typical supervisory duties. As a result, supervision plays a significant role in the success of a typical construction project, particularly in terms of ensuring that health and safety is successfully managed.

#### 6.1.3 Location of stockpiles

- Ensure stockpiles are placed on a free draining location to limit erosion loss

#### 6.1.4 Topsoil stripping

- Soils will be stripped according to the soil types and recommended depths.
- strip the topsoil from all areas that will be disturbed by construction activities or driven over by vehicles.
- The topsoil will be stripped and loaded onto dump trucks.
- Topsoil is to be stripped when the soil is dry (as far as practical possible), as to reduce compaction; and
- To be stripped according to the stripping guideline and management plan, contained within this report and further recommendations contained within the rehabilitation plan, and stockpiled accordingly.

#### 6.1.5 Stockpiling of topsoil

- Stockpiles are to be maintained in a fertile and erosion free state by sampling them annually for macro nutrients and pH.
- Prevent unauthorised borrowing of stockpiled soil.



#### 6.1.6 Demarcation of topsoil stockpiles

- Berms should be placed around stockpiled soil to prevent soil loss due to erosion.
- The stockpiles area should be clearly demarcated.

#### 6.1.7 Prevention of stockpile contamination

- The handling of the stripped topsoil will be minimized to ensure the soil's structure does not deteriorate.
- Prevent any spills from occurring.
- If a spill occurs, it is to be cleaned up immediately and reported to the appropriate authorities.

#### 6.1.8 Terrain stability to minimise erosion potential

- Stockpiles are to be maintained in a fertile and erosion free state by sampling them annually for macro nutrients and pH.
- Berms should be placed around stockpiled soil to prevent soil loss due to erosion.
- The stockpiles will be vegetated where the natural establishment of vegetation by the natural occurring seed bank is not sufficient (details contained in rehabilitation plan) in order to reduce the risk of erosion, prevent weed growth and to reinstitute the ecological processes within the soil.

#### 6.1.9 Management of access and haulage roads

- strict access control practiced preventing vehicles driving on the stockpile.
- Compaction of the removed topsoil should be avoided by prohibiting traffic on stockpiles.

#### 6.1.10 Prevention of soil contamination

- Landfilling, sometimes known as "dig and haul," is the most basic method of soil restoration. This method involves removing contaminated soil from its original location and transporting it to a secure landfill, which is a constructed structure with impermeable liners, leachate drains, and dike enclosures. Landfilling is a well-known method of cleaning up hazardous waste sites.
- Soil washing refers to the size separation, gravity separation, or attrition scrubbing of pollutants absorbed to disperse soil particles in an aqueous solution. Soil washing relies on the ionic strength, soil acidity, redox potential, and complexation of washing



solutions to mobilize heavy metals. An ideal washing solution would boost the solubility and mobility of heavy metal pollutants while interacting only weakly with soil constituents and being biodegradable and harmless.

## 6.2 Soil management during the operational phase

### 6.2.1 Managing potential soil contamination during the operational phase

- Prevent any spills from occurring.
- If a spill occurs, it is to be cleaned up immediately and reported to the appropriate authorities.
- All storage areas (for fuels and lubricants) will be compacted and have bunded containers to prevent soil pollution and appropriate oil separators installed.
- Water runoff traps should be constructed at the vehicle service sites to prevent polluted water runoff into areas that are not impacted upon.
- All vehicles are to be serviced regularly in a correctly bunded area.
- Hydrocarbon management procedure to contain details of emergency clean-up procedures and
- Leaking vehicles will have drip trays place under them where the leak is occurring.
- Pipelines conveying waste material must be monitored for leaks on a regular basis.



Table 5: Soil management during operational phase

OPERATIONAL PHASE								
Impact		Management	Severity	Duration	Spatial Scale	Consequence	Probability	Significance
<b>Activity</b>	Establishment of the open cast pit areas							
<ul style="list-style-type: none"> <li>Operation of the open cast pit will highly likely result in a loss of soil depth and volume since the ore material will be transported off-site and sold as product.</li> </ul>		Unmanaged	H	H	M	H	H	H
		Managed	M	L	L	L	L	L
<ul style="list-style-type: none"> <li>Potential leakages of hydrocarbons resulting from machinery / construction vehicles, and spillage of other heavy metals leading to soil contamination</li> </ul>		Unmanaged	M	M	L	M	H	M
		Managed	M	L	L	L	L	L
<ul style="list-style-type: none"> <li>Movement of heavy machinery / construction vehicles off existing/demarcated roads, leading to soil compaction</li> </ul>		Unmanaged	M	M	L	M	H	M
		Managed	M	L	L	L	L	L
<b>Activity</b>	Development of waste facilities (i.e., Waste Rock Dump)							

<p>*Stockpiling on Waste Rock Dump (WRD) areas alongside the open cast pit area. Waste rock will potentially result in soil compaction of underlying soil material.</p>	Unmanaged	M	M	L	M	H	M
	Managed	M	L	L	L	L	L
<p><b>Mitigation Measures</b></p>	<ul style="list-style-type: none"> <li>• An emergency response contingency plan should be put in place to address clean-up measures should a spill and/or a leak occur.</li> <li>• The footprint areas of the ore stockpiles as well waste rock dumps should be lined to prevent seepage of contaminants. The footprint areas should also be rehabilitated post closure to a manner that will allow for land use such as housing or industrial development.</li> <li>• Stockpiles should be revegetated to establish a vegetation cover as an erosion control measure. These stockpiles should also be always kept alien vegetation free to prevent loss of soil quality; and</li> <li>• Compacted soil associated footprint areas can be lightly ripped to at least 25 cm below ground surface to alleviate compaction prior to re-vegetation.</li> </ul>						



### 6.3 Soil management during the decommissioning and rehabilitation phase

#### 6.3.1 Management and supervision of decommissioning teams

#### 6.3.2 Infrastructure removal

- During the decommissioning phase the footprint should be thoroughly cleaned, and all building material should be removed to a suitable disposal facility.
- Remove buildings to foundation level.
- All rubble to be relocated to a specified approved rubble dump.
- Rip all roads.

#### 6.3.3 Site preparation

- Backfill foundations using stockpiled soil material.
- Rip all roads.

#### 6.3.4 Seeding and re-vegetation

- Undertake inspection of rehabilitated area to ascertain level of success of rehabilitation efforts and effectiveness (vegetation growth, erosion monitoring);
- Additional top soiling and revegetation of affected areas should be undertaken if required.
- Re-vegetate the entire site.

#### 6.3.5 Prevention of soil contamination

Toxic chemical compounds, salts, radioactive agents, toxins, and other waste contribute to soil contamination/pollution, and these results in severe negative impact on plant and animal health.

### 6.4 Soil management during the closure phase



Table 6: Soil management during closure phase

Closure phase								
Impact		Management	Severity	Duration	Spatial Scale	Consequence	Probability	Significance
<b>Activity</b>	Backfilling of the open cast pit areas							
<ul style="list-style-type: none"> <li>Demolition of structures and ripping of soil and hard surfaces, leading to further soil disturbances leading to compaction</li> </ul>		Unmanaged	M	L	L	L	L	L
		Managed	M	L	L	L	L	L
<ul style="list-style-type: none"> <li>Restoration of natural topography and revegetation leading to further soil erosion, compaction, and contamination. Resurfacing may lead to water ponding if not done properly</li> </ul>		Unmanaged	M	M	L	M	H	M
		Managed	M	L	L	L	L	L
<b>Mitigation Measures</b>	<ul style="list-style-type: none"> <li>The landscape should be backfilled and re-profiled to mimic the natural topography (if possible) for potential post mining activities including housing and industrial development.</li> <li>Soil amelioration should be done according to soil analyses as recommended by a soil specialist, to correct the pH and nutrition status before revegetation.</li> <li>The footprint should be re-vegetated with a grass seed mixture as soon as possible, preferably in spring and early summer to stabilize the soil and prevent soil loss during the rainy season.</li> </ul>							

	<ul style="list-style-type: none"><li>• The footprint should be ripped to alleviate compaction post closure before revegetation;</li></ul>
--	--



## 7 MONITORING

### 7.1 Monitoring Locations

- Monitoring of backfilled sites should be undertaken to ensure that the landscape is free draining to prevent water logging condition.
- Undertake inspection of rehabilitated area to ascertain level of success of rehabilitation efforts and effectiveness (vegetation growth, erosion monitoring)
- The topsoil should be ameliorated according to soil chemical analysis and monitoring data.
- Monitoring of erosion must take place throughout the life of mine, in order to prevent the formation of erosion gullies as a result of altered flow paths, and the possible sedimentation of the freshwater resources.
- Soil monitoring should be undertaken to ensure that the natural chemical status of the soil is re-instated.

### 7.2 Monitoring Methodology

Soil monitoring is essential for preserving soil quality. Monitoring is done using indicators (also known as soil characteristics) of soil condition at various stages over time. It includes studying the soil through soil testing and field observations, as well as observing how the soil changes following intervention. Following the implementation of an intervention plan, soil changes must be monitored using indicators. This necessitates soil sampling and analysis on a seasonal/yearly basis.

### 7.3 Monitoring Records

For maintaining soil quality, soil monitoring is critical. It includes studying the soil through soil testing and field observations, as well as monitoring how the soil responds to intervention. It is vital to monitor the change in the soil by measuring indicators once an intervention plan has been implemented.

### 7.4 Analytical Parameters

Physical, chemical, and biological components exist in soil. Indicators derived from these elements should be quantitative, straightforward, and sensitive enough to be managed using interventions aimed at bringing an indicator or a collection of indicators to an acceptable level. Many soil quality indicators are critical to the system's successful operation. For the system to perform successfully, all indicators of soil quality must be at optimal levels. For sandy, silty, and clayey soils, the ideal bulk density levels are 0.92, 0.81, and 0.64 oz/in<sup>3</sup>, respectively (Table 1). Any value that is higher (than) the reference or standard value is regarded as undesirable.

The use of an indicator to determine soil quality necessitates a thorough understanding of the indication. Some measured variables have optimum values, and any value higher or lower than that is unsatisfactory. Several field crops, for example, tolerate pH values between 5.8 and 7.2. Organic carbon (C) and total nitrogen (N) levels in the soil should be high, but sodium (Na) adsorption ratio (SAR) values should be low.

### 7.5 Reporting

A soil test is used to determine the position and shape of a hidden mineralised structure, as well as to identify any better grade areas within the structure. This information is important for establishing soil fertility levels and making good nutrient management decisions.



## 8 CONCLUSION AND RECOMMENDATIONS

### 8.1 Conclusion and Summary

A specialist from Singo Consulting (Pty) Ltd was appointed to conduct a soil, land use, land capability and agricultural potential assessment as part of the Environmental Impact Assessment process for the proposed mining permit application.

Based on observations during the site assessment and scrutiny of satellite imagery, the area is overlain by the Red or yellow structureless soils with a plinthic horizon.

The land capability map of the study area shows that the area is situated on arable land and is suitable for being ploughed and used to grow crops.

### 8.2 Recommendations

- The proposed mining land should be returned to its origin as before mining activities and the rehabilitation performance assessment in the proposed land must be done progressively (annually) during the operational phase by a soil specialist
- Final surface rehabilitation of all disturbed areas during mining activities. Rehabilitation of unnecessary water management facilities once appropriate to do so.
- Specialists should be used to evaluate the erosion and other possible impacts during the entire mining process
- Limit impacts to the footprints to keep physical impacts as small as possible. Areas for road, site lay-out should be minimized, dust generation.
- Ensure all stockpiles (especially topsoil) are clearly and permanently demarcated and located in defined no-go areas.
- Stockpile height should be restricted, A maximum height of 2-3 m is therefore proposed.
- Stockpiles should also be always kept free of alien vegetation to prevent loss of soil quality.
- The recovered soils should be re-used to rehabilitate the mine footprint following mine closure.



## 9 REFERENCES

- Schoeman, J.L., van der Walt, M., Monnik, K.A., Thackrah, A., Malherbe, J. and le Roux, R.E., 2000. The development and application of a land capability classification system for South Africa. ARC-ISCW Report No GW/A/2000/57, ARC-Institute for Soil, Climate and Water, Pretoria.
- Soil Classification Working Group, 1991. Soil Classification – a taxonomic system for South Africa. ARC-Institute for Soil, Climate and Water, Pretoria
- Land Type Survey Staff. 1972 – 2006. Land Types of South Africa: Digital map (1:250 000 scale) and soil inventory databases. ARC-Institute for Soil, Climate and Water, Pretoria



## APPENDICES

Appendix A: Specialist's qualifications

Available upon request



**SCREENING REPORT FOR AN ENVIRONMENTAL AUTHORIZATION AS  
REQUIRED BY THE 2014 EIA REGULATIONS – PROPOSED SITE  
ENVIRONMENTAL SENSITIVITY**

**EIA Reference number:** 13571 MP

**Project name:** Mining Permit on Portion 2 of the Farm Blesbokfotein 31 IS

**Project title:** Mining Permit on Portion 2 of the Farm Blesbokfotein 31 IS

**Date screening report generated:** 03/08/2023 08:48:59

**Applicant:** MDZ Fleet Solutions (Pty) Ltd.

**Compiler:** Singo Consulting (Pty) Ltd

**Compiler signature:**  
.....

**Application Category:** Mining|Mining Permit



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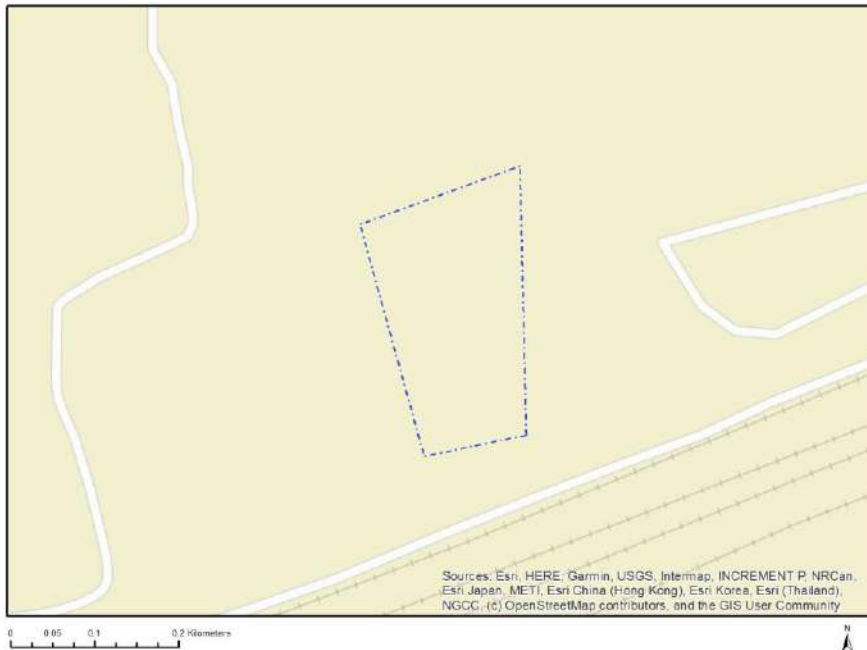
# Proposed Project Location

## Orientation map 1: General location

**General Orientation: Mining Permit on Portion 2 of the Farm Blesbokfotein 31 IS**



## Map of proposed site and relevant area(s)



## Cadastral details of the proposed site

Property details:

No	Farm Name	Farm/ Erf No	Portion	Latitude	Longitude	Property Type
1	BLESBOKFONTEIN	31	0	26°6'47.58S	29°9'51.06E	Farm
2	BLESBOKFONTEIN	31	2	26°5'24.47S	29°10'43.17E	Farm Portion

Development footprint<sup>1</sup> vertices:  
No development footprint(s) specified.

## Wind and Solar developments with an approved Environmental Authorisation or applications under consideration within 30 km of the proposed area

No	EIA Reference No	Classification	Status of application	Distance from proposed area (km)
1	14/12/16/3/3/2/759	Solar PV	Approved	22.1

<sup>1</sup> “development footprint”, means the area within the site on which the development will take place and includes all ancillary developments for example roads, power lines, boundary walls, paving etc. which require vegetation clearance or which will be disturbed and for which the application has been submitted.

## Environmental Management Frameworks relevant to the application



Environmental Management Framework	LINK
Olifants EMF	<a href="https://screening.environment.gov.za/ScreeningDownloads/EMF/Zone_4_6,_67,_78,_80,_92,_103,_122,_129.pdf">https://screening.environment.gov.za/ScreeningDownloads/EMF/Zone_4_6, 67, 78, 80, 92, 103, 122, 129.pdf</a>

## Environmental screening results and assessment outcomes

The following sections contain a summary of any development incentives, restrictions, exclusions or prohibitions that apply to the proposed development site as well as the most environmental sensitive features on the site based on the site sensitivity screening results for the application classification that was selected. The application classification selected for this report is:

**Mining | Mining Permit.**

### Relevant development incentives, restrictions, exclusions or prohibitions

The following development incentives, restrictions, exclusions or prohibitions and their implications that apply to this site are indicated below.

Incentive, restriction or prohibition	Implication
Strategic Transmission Corridor-International	<a href="https://screening.environment.gov.za/ScreeningDownloads/Developmen">https://screening.environment.gov.za/ScreeningDownloads/Developmen</a>

corridor	<a href="#">tZones/Combined_EGI.pdf</a>
Air Quality-Highveld Priority Area	<a href="https://screening.environment.gov.za/ScreeningDownloads/DevelopmentZones/HIGHVELD_PRIORITY_AREA_AQMP.pdf">https://screening.environment.gov.za/ScreeningDownloads/DevelopmentZones/HIGHVELD_PRIORITY_AREA_AQMP.pdf</a>
Renewable energy development zones 9-Emalahleni	<a href="https://screening.environment.gov.za/ScreeningDownloads/DevelopmentZones/Combined_REDZ.pdf">https://screening.environment.gov.za/ScreeningDownloads/DevelopmentZones/Combined_REDZ.pdf</a>
Strategic Gas Pipeline Corridors-Phase 8: Rompco Pipeline Corridor	<a href="https://screening.environment.gov.za/ScreeningDownloads/DevelopmentZones/Combined_GAS.pdf">https://screening.environment.gov.za/ScreeningDownloads/DevelopmentZones/Combined_GAS.pdf</a>

### Proposed Development Area Environmental Sensitivity

The following summary of the development site environmental sensitivities is identified. Only the highest environmental sensitivity is indicated. The footprint environmental sensitivities for the proposed development footprint as identified, are indicative only and must be verified on site by a suitably qualified person before the specialist assessments identified below can be confirmed.

Theme	Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
Agriculture Theme		X		
Animal Species Theme			X	
Aquatic Biodiversity Theme				X
Archaeological and Cultural Heritage Theme				X
Civil Aviation Theme			X	
Defence Theme				X
Paleontology Theme	X			
Plant Species Theme				X
Terrestrial Biodiversity Theme	X			

### Specialist assessments identified

Based on the selected classification, and the known impacts associated with the proposed development, the following list of specialist assessments have been identified for inclusion in the assessment report. It is the responsibility of the EAP to confirm this list and to motivate in the assessment report, the reason for not including any of the identified specialist study including the provision of photographic evidence of the site situation.

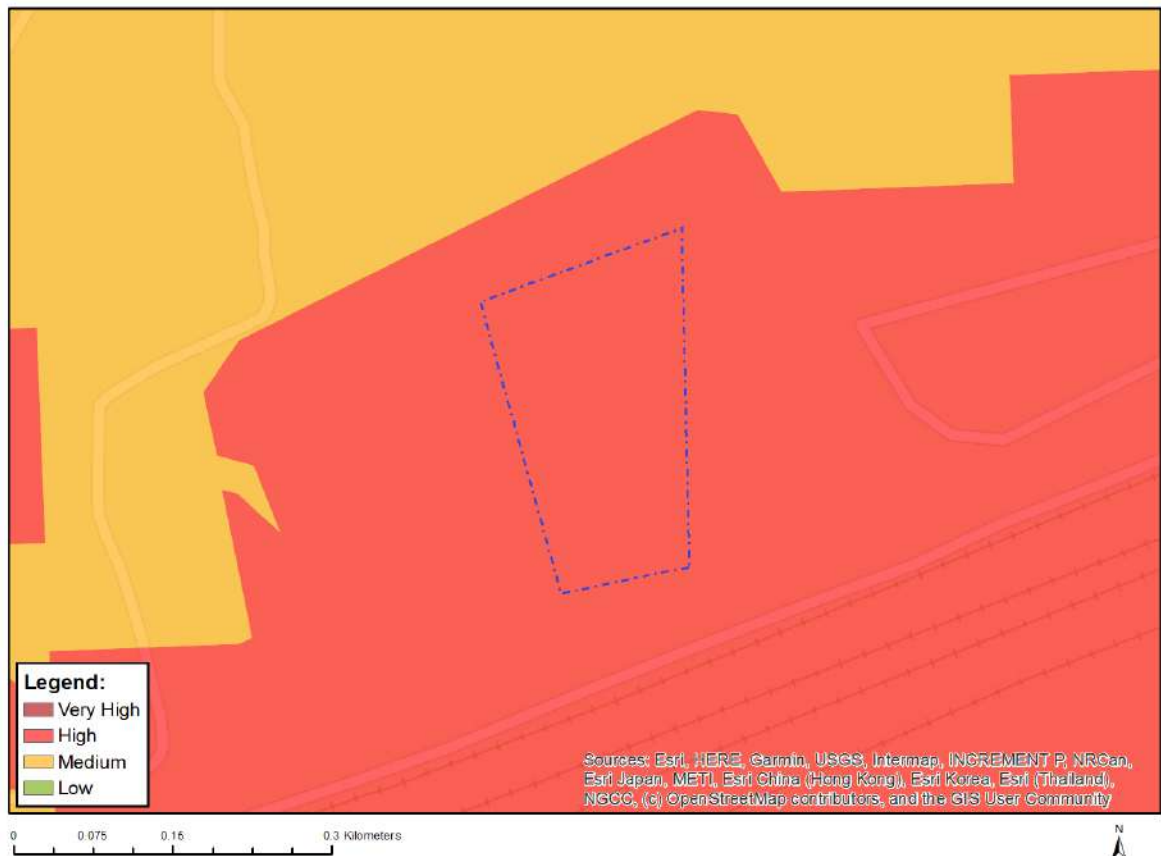
No	Specialist assessment	Assessment Protocol
1	Agricultural Impact Assessment	<a href="https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/Gazetted_General_Agriculture_Assessment_Protocols.pdf">https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/Gazetted_General_Agriculture_Assessment_Protocols.pdf</a>
2	Archaeological and Cultural Heritage Impact Assessment	<a href="https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/Gazetted_General_Requirement_Assessment_Protocols.pdf">https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/Gazetted_General_Requirement_Assessment_Protocols.pdf</a>
3	Palaeontology Impact Assessment	<a href="https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/Gazetted_General_Requirement_Assessment_Protocols.pdf">https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/Gazetted_General_Requirement_Assessment_Protocols.pdf</a>
4	Terrestrial Biodiversity Impact Assessment	<a href="https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/Gazetted_Terrestrial_Biodiversity_Assessment_Protocols.pdf">https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/Gazetted_Terrestrial_Biodiversity_Assessment_Protocols.pdf</a>

5	Aquatic Biodiversity Impact Assessment	<a href="https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/Gazetted_Aquatic_Biodiversity_Assessment_Protocols.pdf">https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/Gazetted_Aquatic_Biodiversity_Assessment_Protocols.pdf</a>
6	Hydrology Assessment	<a href="https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/Gazetted_General_Requirement_Assessment_Protocols.pdf">https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/Gazetted_General_Requirement_Assessment_Protocols.pdf</a>
7	Noise Impact Assessment	<a href="https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/Gazetted_Noise_Impacts_Assessment_Protocol.pdf">https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/Gazetted_Noise_Impacts_Assessment_Protocol.pdf</a>
8	Radioactivity Impact Assessment	<a href="https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/Gazetted_General_Requirement_Assessment_Protocols.pdf">https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/Gazetted_General_Requirement_Assessment_Protocols.pdf</a>
9	Traffic Impact Assessment	<a href="https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/Gazetted_General_Requirement_Assessment_Protocols.pdf">https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/Gazetted_General_Requirement_Assessment_Protocols.pdf</a>
10	Geotechnical Assessment	<a href="https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/Gazetted_General_Requirement_Assessment_Protocols.pdf">https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/Gazetted_General_Requirement_Assessment_Protocols.pdf</a>
11	Socio-Economic Assessment	<a href="https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/Gazetted_General_Requirement_Assessment_Protocols.pdf">https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/Gazetted_General_Requirement_Assessment_Protocols.pdf</a>
12	Plant Species Assessment	<a href="https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/Gazetted_Plant_Species_Assessment_Protocols.pdf">https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/Gazetted_Plant_Species_Assessment_Protocols.pdf</a>
13	Animal Species Assessment	<a href="https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/Gazetted_Animal_Species_Assessment_Protocols.pdf">https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/Gazetted_Animal_Species_Assessment_Protocols.pdf</a>

## Results of the environmental sensitivity of the proposed area.

The following section represents the results of the screening for environmental sensitivity of the proposed site for relevant environmental themes associated with the project classification. It is the duty of the EAP to ensure that the environmental themes provided by the screening tool are comprehensive and complete for the project. Refer to the disclaimer.

### MAP OF RELATIVE AGRICULTURE THEME SENSITIVITY

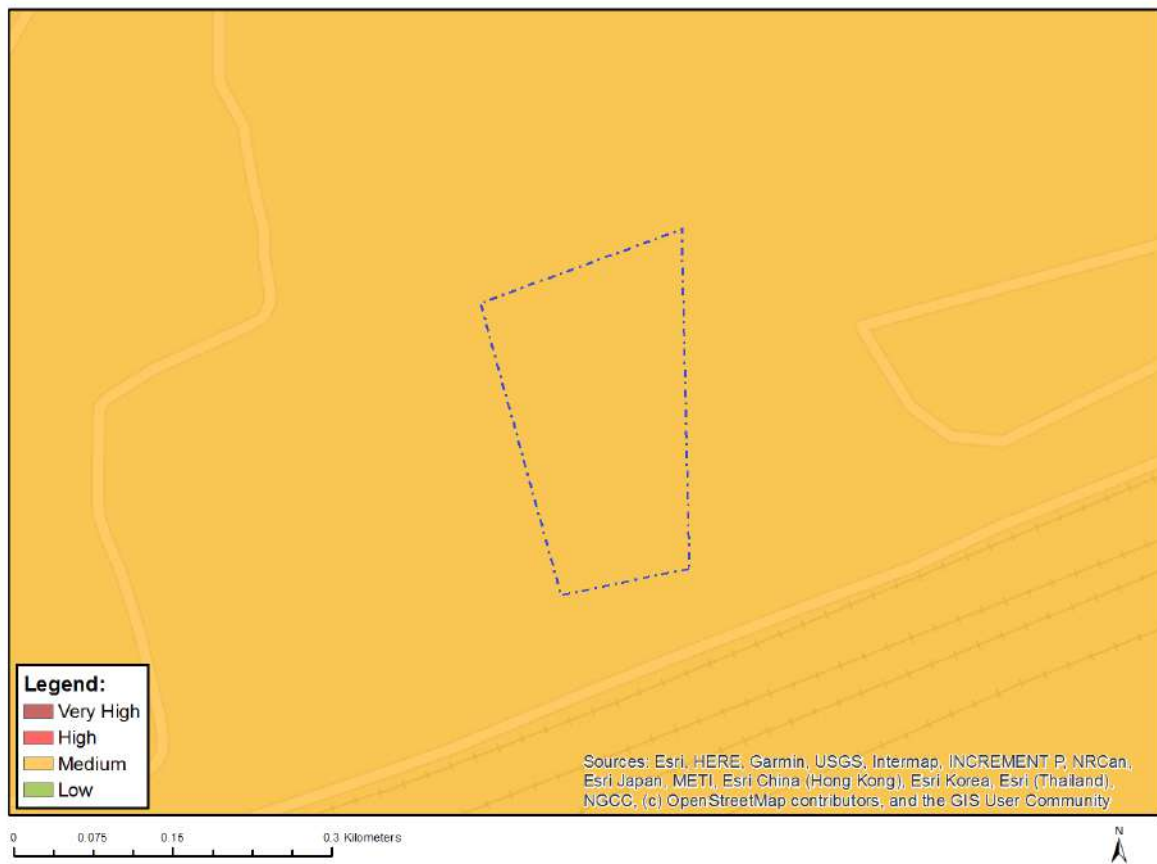


Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
	X		

#### Sensitivity Features:

Sensitivity	Feature(s)
High	Annual Crop Cultivation / Planted Pastures Rotation; Land capability; 09. Moderate-High/10. Moderate-High
High	Annual Crop Cultivation / Planted Pastures Rotation; Land capability; 06. Low-Moderate/07. Low-Moderate/08. Moderate

## MAP OF RELATIVE ANIMAL SPECIES THEME SENSITIVITY



Where only a sensitive plant unique number or sensitive animal unique number is provided in the screening report and an assessment is required, the environmental assessment practitioner (EAP) or specialist is required to email SANBI at [eiadatarequests@sanbi.org.za](mailto:eiadatarequests@sanbi.org.za) listing all sensitive species with their unique identifiers for which information is required. The name has been withheld as the species may be prone to illegal harvesting and must be protected. SANBI will release the actual species name after the details of the EAP or specialist have been documented.

Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
		X	

### Sensitivity Features:

Sensitivity	Feature(s)
Medium	Mammalia-Chrysospalax villosus
Medium	Mammalia-Crocidura maquassiensis
Medium	Mammalia-Dasymys robertsii
Medium	Mammalia-Hydrictis maculicollis



## MAP OF RELATIVE AQUATIC BIODIVERSITY THEME SENSITIVITY



Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
			X

### Sensitivity Features:

Sensitivity	Feature(s)
Low	Low sensitivity

# MAP OF RELATIVE ARCHAEOLOGICAL AND CULTURAL HERITAGE THEME SENSITIVITY

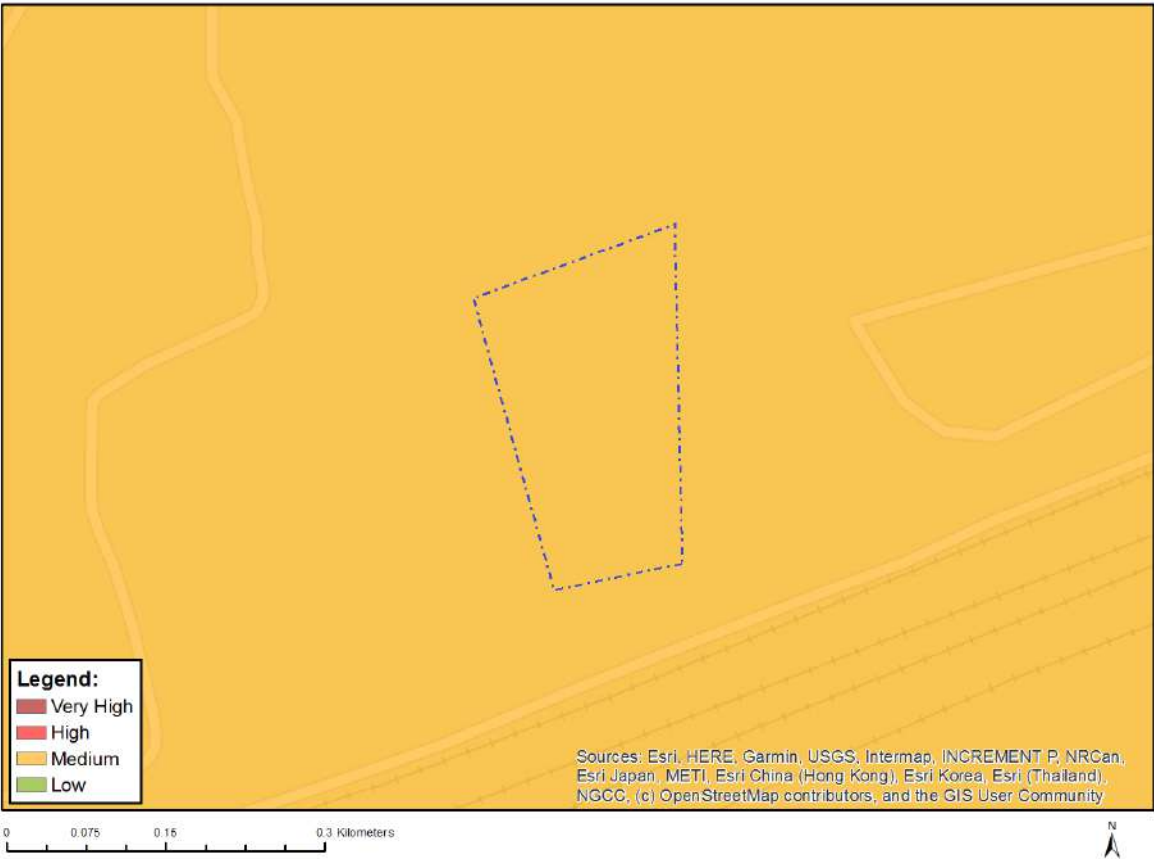


Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
			X

**Sensitivity Features:**

Sensitivity	Feature(s)
Low	Low sensitivity

MAP OF RELATIVE CIVIL AVIATION THEME SENSITIVITY



Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
		X	

Sensitivity Features:

Sensitivity	Feature(s)
Medium	Between 8 and 15 km of other civil aviation aerodrome

MAP OF RELATIVE DEFENCE THEME SENSITIVITY



Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
			X

Sensitivity Features:

Sensitivity	Feature(s)
Low	Low Sensitivity

## MAP OF RELATIVE PALEONTOLOGY THEME SENSITIVITY

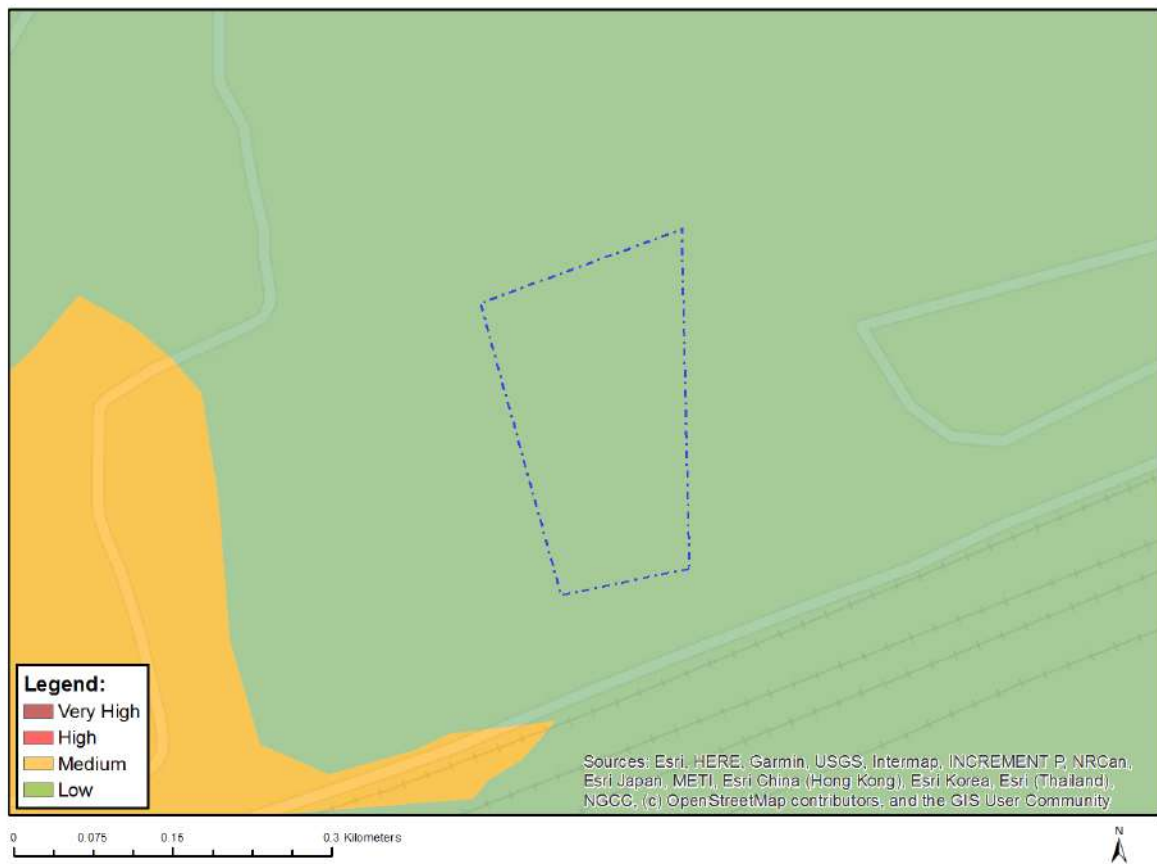


Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
X			

### Sensitivity Features:

Sensitivity	Feature(s)
Medium	Features with a Medium paleontological sensitivity
Very High	Features with a Very High paleontological sensitivity

## MAP OF RELATIVE PLANT SPECIES THEME SENSITIVITY



Where only a sensitive plant unique number or sensitive animal unique number is provided in the screening report and an assessment is required, the environmental assessment practitioner (EAP) or specialist is required to email SANBI at [eiadatarequests@sanbi.org.za](mailto:eiadatarequests@sanbi.org.za) listing all sensitive species with their unique identifiers for which information is required. The name has been withheld as the species may be prone to illegal harvesting and must be protected. SANBI will release the actual species name after the details of the EAP or specialist have been documented.

Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
			X

### Sensitivity Features:

Sensitivity	Feature(s)
Low	Low Sensitivity

MAP OF RELATIVE TERRESTRIAL BIODIVERSITY THEME SENSITIVITY



Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
X			

Sensitivity Features:

Sensitivity	Feature(s)
Very High	EN_Eastern Highveld Grassland