MINING PERMIT APPLICATION OVER THE REMAINING EXTENT OF THE FARM MAKGANYENE NO 667 KURUMAN RD MAGISTERIAL DISTRICT, NORTHERN CAPE PROVINCE

DRAFT BASIC ASSESSMENT REPORT

SEPTEMBER 2021

REFERENCE NUMBER: *NC 30/5/1/3/2/10915 MP*

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EXECUTIVE SUMMARY

Makganyane Resources (Pty) Ltd applied for environmental authorisation and a mining permit to mine iron ore from a 4.9 ha area over the Remaining Extent of the farm Makganyene No 667 in the Kuruman Magisterial District of the Northern Cape Province.

The proposed project triggers listed activities in terms of the National Environmental Management Act, 1998 (Act 107 of 1998) and the Environmental Impact Assessment Regulations 2014 (as amended) and therefore requires an environmental impact assessment (basic assessment process) that assess project specific environmental impacts and alternatives, consider public input, and propose mitigation measures, to ultimately culminate in an environmental management programme that informs the competent authority (Department of Mineral Resources and Energy – Northern Cape) when considering the environmental authorisation. This report, the Draft Basic Assessment Report, forms part of the departmental requirements, and presents the first report of the EIA process.

Should the MP be issued and the mining of iron ore be allowed, the proposed project will comprise of activities that can be divided into three key phases namely the:

(1) *Site establishment/construction phase* which will involve the demarcation of the permitted mining area. Site establishment will also necessitate the clearing of vegetation, the stripping and stockpiling of topsoil, and the introduction of mining machinery and equipment.

(2) *Operational phase* that will entail the mining of the iron ore from the approved footprint area via conventional open cast mining methods. The mining method will make use of blasting in order to loosen the hard rock; upon which the loosened material will be transported to the mobile processing plant where after the iron ore will be stockpiled until it is hauled from the property to the SIOER.

(3) *Decommissioning phase* which entails the rehabilitation of the affected environment prior to the submission of a closure application to the Department of Mineral Resources and Energy (DMRE). The permit holder will further be responsible for the seeding of all rehabilitated areas. Once the full mining area is rehabilitated, the mining permit holder will be required to submit a closure application to the DMRE in accordance with section 43(4) of the MPRDA, 2002. The Closure Application will be submitted in terms of Regulation 62 of the MPRDA, 2002, and Government Notice 940 of NEMA, 1998 (as amended).

Alternatives

Site Alternative 1 was identified as the most practical and only viable site alternative as the proposed mining footprint was chosen over the main core zone of the iron formation, access is simplified, and

the environmental related impacts are acceptable. Moving the permit area to an alternative site will remove it from the optimal iron resource that has been proven to be of very high standard.

No-go Alternative

The no-go alternative was not deemed to be the preferred alternative as:

- the Applicant will not be able to utilize the iron ore deposit available within the proposed mining area, or supply in the demand of the industry;
- the landowner will not receive compensation from the Applicant, and in doing so diversity the income generated from the property;
- the proposed job opportunities, associated with the development of the mine, will be lost to the surrounding community.

Public Participation Process

During the initial public participation process the stakeholders and I&AP's were informed of the project by means of background information documents that were sent directly to the contact persons. An advertisement that was placed in the Noord Kaap Bulletin, and four on-site notices that were placed at conspicuous places. A 30-days commenting period was allowed which expired on 02 August 2021. In accordance with the timeframes stipulated in the EIA Regulations, 2014 (as amended) the Draft Basic Assessment Report was compiled and will be distributed for comment and perusal to the I&AP's and stakeholders listed above. A 30-day commenting period, ending 25 October 2021, will be allowed for perusal of the documentation and submission of comments. The comments received on the DBAR will be incorporated into the Final Basic Assessment Report (FBAR) to be submitted for decision making to DMRE.

Basic Assessment Report

The basic assessment report identifies the potential positive and negative impacts that the proposed activity may have on the environment and the community as well as the aspects that may impact on the socio-economic conditions of directly affected persons, and proposes possible mitigation measure that could be applied to modify / remedy / control / stop the identified impacts.

The key finding of the environmental impact assessment entail the following:

Topography:

- The topography gradually slopes in elevation from the north-western corner towards the south-eastern corner. The excavation will cut into the southern facing slope of the hill that will affect the topography in that a depression will be created with stepped side walls as mining progress. Due to the impracticality of importing large volumes of fill material to restore the excavation to its

original topography, the rehabilitation option is to render the pit safe and leave it as a minor landscape feature.

- The excavation will most likely hold some rainwater upon closure for certain parts of the year, that could be used as an additional water source by the landowner to which the mining footprint will be returned once the closure certificate was issued.

Visual Characteristics

- The viewshed analysis showed that the mining area or at least a portion thereof will mainly be visible to the south-western (±4 km away) and south-eastern (±3.5 km away) residences.
- Based on the fact that as the distance between the proposed development and the observer increases the visual impact will decrease the significance of the visual impact on the surrounding environment is deemed to be of medium significance.

Air and Noise Quality

- The proposed activity does not trigger an air emissions licence.
- Should the Applicant implement the proposed mitigation measures the impact on the air quality of the surrounding environment is deemed to be of low significance.
- Although the proposed activity will have a cumulative impact on the ambient noise levels, the nuisance value is of low significance, as the nearest farmsteads are ±1 km away from the proposed operation.

Geology and Soil

- The drilling programme identified three potential target areas, of which the Doornfontein conglomeratic iron horizon on the western trough flank of Target 2 is the most prospective, and subsequently, the Applicant applied for a mining permit to mine the iron ore from a 4.9 ha area.

Hydrology

- The proposed mining area falls within a NFEPA of conservation importance.
- No wetlands, rivers, drainage lines or other open surface water courses were identified within the proposed mining permit area.
- In conclusion, mining the iron ore from the proposed 4.9 ha will not affect the integrity of the NFEPA; nor will it have an impact on the surface- or groundwater of the footprint area.

Mining and Biodiversity:

- The proposed mining footprint falls outside any areas of conservation importance in terms of the Mining and Biodiversity Guidelines.
- The mining footprint extends over an ESA, but the Screening Report indicates that the plant species sensitivity of the area is of low significance.

- Should the Applicant implement the proposed mitigation measures and obtain the relevant permits (if applicable) the proposed project will not negatively affect the conservation status or objectives of the ESA.

Groundcover:

- The vegetation cover is in a natural to near natural state, representing the Kuruman Mountain Bushveld.
- No endangered and/or otherwise protected plant species were identified within the proposed 4.9 ha footprint.
- A qualified botanist must conduct a plant identification walkthrough prior to commencement of the activity to identify any potential plants that may need a destruction/removal permit.

Fauna

- The fauna will not be impacted by the proposed activities as they will be able to move away or through the site, without being harmed.

Cultural and Heritage Environment

- The HIA concluded that the impact of the proposed project on heritage resources is low, and recommends that the project can commence on the condition that SAHRA approves the proposal and the recommendations of the report are implemented.
- The PIA concluded that no further palaeontological studies are required unless fossils are found once excavations and mining commence. As far as the palaeontology is concerned, this project may be authorised, as long as a Fossil Chance Find Protocol is added to the EMPr.

During the environmental impact assessment process the feasibility of the proposed site was assessed to identify fatal flaws that are deemed as severe as to prevent the activity continuing, or warrant a site- or project alternative. The outcome of the assessment showed that should the mitigation measures and monitoring programmes proposed in this document be implemented, no fatal flaws could be identified that prevents the activity continuing.

Environmental Management Programme (EMPR)

The EMPR provides a description of the impact management outcomes and closure objectives. It presents the impacts to be mitigated in their respective phases as well as stipulates the mitigation measures to be applied on site.

The financial provision 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 R 453 775.41.

LIST OF ABBREVIATIONS

BGIS	Biodiversity GIS
CARA	Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983)
DAERD&LR	Department of Agriculture, Environmental Affairs, Rural Development and Land Reform
DBAR	Draft Basic Assessment Report
DEDT	Department of Economic Development and Tourism
DMRE	Department of Mineral and Resources and Energy
DoL	Department of Labour
DRPW	Department of Roads and Public Works
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EIA Regulations	Environmental Impact Assessment Regulations, 2014 (as amended)
EMPR	Environmental Management Programme
ESA	Ecological Support Area
FBAR	Final Basic Assessment Report
Fe	Iron
FEL	Front-end-loader
GNR	Government Notice
I&AP's	Interested and Affected Parties
MHSA	Mine Health and Safety Act, 1996 (Act No. 29 of 1996)
MP	Mining Permit
MPRDA	Minerals and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002)
MSA	Middle Stone Age
NC-NCA	Northern Cape Nature Conservation Act, 2009 (Act No. 9 of 2009)
NEMA	National Environmental Management Act, 1998 (Act No. 107 of 1998)
NEM:AQA	National Environmental Management: Air Quality Control Act, 2004 (Act No. 39 of 2004)
NEM:BA	National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)
NEM:WA	National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008)
NFA	National Forest Act, 1998 (Act No. 84 of 1998)

NFEPA	National Freshwater Ecosystem Priority Areas
NHRA	National Heritage Resources Act, 1999 (Act No 25 of 1999)
NRTA	National Road Traffic Act, 1996 (Act No. 93 of 1996)
NWA	National Water Act, 1998 (Act No. 36 of 1998)
PCB's	Polychlorinated Biphenyl
PCO	Pest Control Officer
PPE	Personal Protective Equipment
PR	Prospecting Right
PSM	Palaeontological Sensitivity Map
RE	Remaining Extent
SAHRA	South African Heritage Resources Agency
SAHRIS	South African Heritage Resources Information System
SAMBF	South African Mining and Biodiversity Forum
SIOER	Sishen Iron Ore Export Railway Line
SWMA	Sub-Water Management Area
TLM	Tsantsabane Local Municipality
USBM	US Bureau of Mines
WMA	Water Management Area
WULA	Water Use Licence Application
ZFMDM	ZF Mgcawu District Municipality

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mineral resources

Department:
Mineral Resources
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).

NAME OF APPLICANT:	Makganyane Resources (Pty) Ltd
TEL NO:	078 045 0316
FAX NO:	N/A
POSTAL ADDRESS:	Suite 51, Private Bag X3018, Strand, 7139
PHYSICAL ADDRESS:	Suite 2.1 On the Greens, Golf Village, De Beers Avenue, Somerset West.
FILE REFERENCE NUMBER SAMRAD:	NC 30/5/1/3/2/10915 MP

IMPORTANT NOTICE

In terms of the Mineral and Petroleum Resources Development Act (Act 29 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 can be concluded that the said activities will not result in unacceptable pollution, ecological degradation or damage to the environment.

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

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

It is furthermore an instruction that the Environmental Assessment Practitioner must process and interpret his/her research and analysis and use the findings thereof to compile the information required herein. (Unprocessed supporting information may be attached as appendices). The 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:

  (i) the nature, signification, consequence, extent, duration, and probability of the impacts occurring to; and

  (ii) the degree to which these impacts –

    (aa) can be reversed;

    (bb) may cause irreplaceable loss of resources; and

    (cc) can be managed, avoided or mitigated;

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

  (i) identify and motivate a preferred site, activity and technology alternative;

  (ii) identify suitable measures to manage, avoid or mitigate identified impacts; and

  (iii) identify residual risks that need to be managed and monitored.

PART A

SCOPE OF ASSESSMENT AND BASIC ASSESSMENT REPORT

1. CONTACT PERSON AND CORRESPONDENCE ADDRESS

a) Details of: Greenmined Environmental

In terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) the proponent must appoint an independent Environmental Assessment Practitioner (EAP) to undertake the environmental impact assessment (EIA) of any activities regulated in terms of the aforementioned Act. Makganyane Resources (Pty) Ltd appointed Greenmined Environmental (Pty) Ltd to undertake the study needed. Greenmined Environmental (Pty) Ltd has no vested interest in Makganyane Resources (Pty) Ltd or the mining project and declares its independence as required by the Environmental Impact Assessment Regulations, 2014 (as amended) (EIA Regulations).

i) Details of the EAP

Name of the Practitioner:	Ms Christine Fouché (Senior Environmental Specialist)
Tel No.:	021 851 2673 / 082 811 8514
Fax No.:	086 546 0579
E-mail address:	christine.f@greenmined.co.za

ii) Expertise of the EAP.

(1) The qualifications of the EAP
(with evidence).

Ms. Fouché has a Diploma in Nature Conservation and a B.Sc. in Botany and Zoology. Full cirriculum vitae with evidence is attached as Appendix M.

(2) Summary of the EAP's past experience.
(In carrying out the Environmental Impact Assessment Procedure)

Ms Fouché has sixteen years' experience in doing Environmental Impact Assessments and Mining Applications in South Africa. See Appendix M.

b) Location of the overall Activity.

Table 1: Location of the proposed mining area.

Farm Name:	Remaining Extent of the farm Makganyene No 667
Application area (Ha)	4.9 ha
Magisterial district:	Kuruman
Distance and direction from the nearest town	The property lays ±24 km north-west of Postmasburg, and the proposed footprint is situated on the north-eastern part of the Remaining Extent of the farm Makganyene No 667. Exit Postmasburg towards Olifantshoek. Drive ±24 km along the R385 and the site entrance will be on the right hand side of the road.
21 digit Surveyor General Code for each farm portion	C04100000000066700000

c) Locality map

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

The requested map is attached as Appendix B.

Figure 1: Satellite view of the proposed mining area (white polygon) in relation to the Remaining Extent of the farm Makganyene No 667 (image obtained from Google Earth).

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

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

Makganyane Resources (Pty) Ltd (hereinafter referred to as the "Applicant") applied for a mining permit and environmental authorisation to mine iron ore from a portion of the Remaining Extent of the farm Makganyene No 667 in the Kuruman magisterial district of the Northern Cape Province.

The proposed mining footprint will be 4.9 ha and will be developed within an area over which Makganyane Resources (Pty) Ltd holds a prospecting right (NC 30/5/1/1/2/2292 PR). The proposed mining method will make use of blasting in order to loosen the hard rock; the material will then be loaded and hauled to the mobile processing plant after the iron ore is hauled from the property to the Sishen iron ore export railway line (SIOER). The mining related activities will be contained within the approved mining permit boundaries.

The proposed MP project will therefore entail the:

- site establishment and infrastructure development;
- stripping and stockpiling of topsoil from the proposed mining footprint area;
- blasting and excavation of the mining area;
- crushing and screening of the loosened material at the processing plant; and
- stockpiling the product until it is transported from site to the SIOER.

The proposed mine will appoint ±50 employees (including management), and due to the small scale of the operation no permanent infrastructure will be built at the mining area. The Applicant plans to establish the following mobile/temporary infrastructure within the mining footprint:

- Ablution facilities that will drain into a closed septic tank to be serviced by a registered contractor when applicable;
- Crushing and screening plant;
- Containers that will be used as site offices, workshops and storage rooms.

See Appendix C1 and C2 for a copy of the site layout plan, and proposed process flow diagram of the proposed project.

i) Listed and specified activities

Table 2: Listed and specified activities triggered by the proposed mining activities

NAME OF ACTIVITY (E.g. For prospecting – drill site, site camp, ablution facilities, accommodation, equipment storage, sample storage, site office, access route etc... etc... etc E.g. for mining – excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc...etc...etc.)	**Aerial extent of the activity** Ha or m^2	**LISTED ACTIVITY** Mark with an X where applicable or affected	**APPLICABLE LISTING NOTICE** (GNR 324, GNR 325, GNR 326 OR GNR 327)
Demarcation of site with visible beacons.	4.9 ha	N/A	Not listed
Site establishment and infrastructure development.	±0.5 ha	X	GNR 327 LN 1 Activity 21
GNR 327 Listing Notice 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, 2002 (Act No 28 of 2002), 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.*			
Stripping and stockpiling of topsoil and/or overburden.	±4.9 ha	X	GNR 327 LN 1 Activity 21, 27, 28
GNR 327 Listing Notice 1 Activity 27: *The clearance of an area of 1 hectares 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.*			
GNR 327 Listing Notice 1 Activity 28: *Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture, game farming, equestrian purposes or afforestation on or after 01 April 1998 and where such development:* *(i) will occur inside an urban area, where the total land to be developed is bigger than 5 hectares; or* *(ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare;* *excluding where such land has already been developed for residential, mixed, retail, commercial, industrial or institutional purposes.*			
Drilling and blasting.	±3 ha	X	GNR 327 LN 1 Activity 21, 27, 28
Excavation, loading and hauling to processing area.	±3 ha (Excavation) ±0.3 ha (Processing)	X	GNR 327 LN 1 Activity 21

NAME OF ACTIVITY	Aerial extent of the activity	LISTED ACTIVITY	APPLICABLE LISTING NOTICE
Processing, stockpiling and transporting of material.	±1.2 ha (±0.3 ha Processing & ±0.9 ha Stockpiling)	X	GNR 327 LN 1 Activity 21
Sloping and landscaping upon closure of the mining area.	4.9 ha	X	GNR 327 LN 1 Activity 21
Replacing the topsoil and vegetating the disturbed area.	±4.9 ha	N/A	Not listed

ii) Description of the activities to be undertaken

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

BACKGROUND INFORMATION

The Department of Mineral Resources and Energy (DMRE) granted (11 April 2019) Charlton Michael Rex a prospecting right for manganese ore, iron ore and diamonds (general) over Portion 2 (a portion of Portion 1), Remainder Portion, Remainder Portion of Portion 1, and Portion 3 of the farm Makganyene No 667. The prospecting right was ceded to Makganyane Resources (Pty) Ltd on 30 October 2019. The following figure shows the extend of the prospecting right footprint.

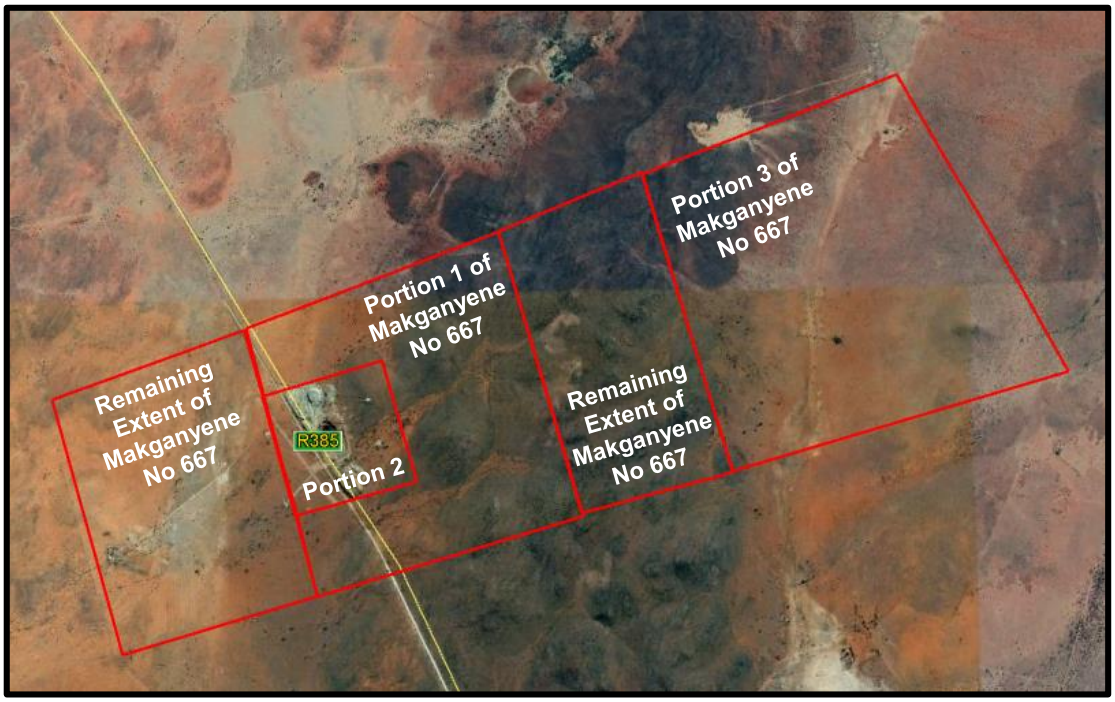

Figure 2: Satellite view of the prospecting area (red polygon) of Makganyane Resources (Pty) Ltd (image obtained from Google Earth).

Following the Phase 1 drilling (prospecting) programme that took place between August – December 2020, three areas of potential i.e. Target 2, Target 3 and Target 5 were identified.

Target 2 was the most prospective and was therefore focussed on during the drilling campaign. It was found that the target consists of a lower Fe mineralised breccia trough that is interpreted to be eroded Manganore Iron Formation that has filled a dolomite depression or sinkhole. The breccia is known as the Blinkklip Breccia. A sheet like robust conglomeratic iron horizon overlies the breccia trough and also occurs at least 200 m away from the trough edges. The material that extends beyond the trough edges is better developed than that which directly overlies the trough. This material represents the lower Doornfontein Member of the Gamagara Formation. It essentially constitutes eroded and concentrated brecciated iron that overlies the Gamagara unconformity (Handley, 2020). Subsequently, it was determined that the most prospective and continuous target is the Doornfontein conglomeratic iron horizon that is developed on the western trough flank of Target 2.

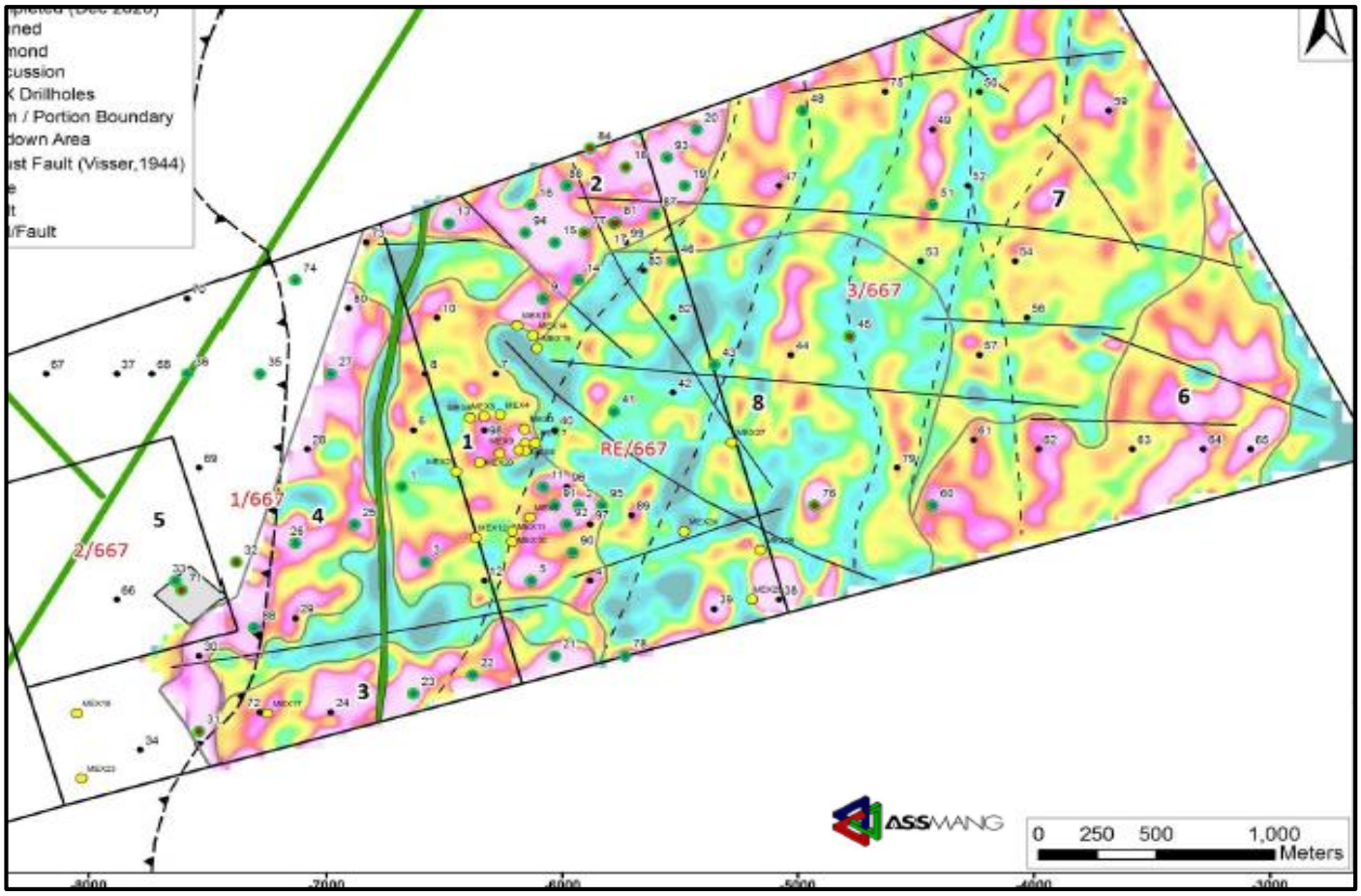

Figure 3: Makganyene target areas 1 to 8 (image obtained from the Phase 1 Geological Exploration Report).

PROJECT PROPOSAL:

In light of the above, the Applicant applied for environmental authorisation and a mining permit over 4.9 ha of the Target 2 area. The following table lists the GPS coordinates of the proposed mining area as shown on the Regulation 2.2 Mine Plan attached as Appendix A.

Table 3: GPS coordinates of the proposed mining footprint.

NUMBER	DEGREES, MINUTES, SECONDS		DECIMAL DEGREES	
	LAT (S)	LONG (E)	LAT (S)	LONG (E)
A	28°08'16.14"	22°56'14.69"	-28.137816°	22.937413°
B	28°08'16.49"	22°56'23.82"	-28.137913°	22.93995°
C	28°08'22.75"	22°56'23.82"	-28.139652°	22.939951°
D	28°08'22.71"	22°56'14.65"	-28.13964°	22.937403°

Figure 4: Satellite view showing the location of the MP application area (white polygon) in relation to the surrounding area (image obtained from Google Earth).

Should the MP be issued and the mining of iron ore be allowed, the proposed project will comprise of activities that can be divided into three key phases (discussed in more detail below) namely the:

(1) *Site establishment/construction phase* which will involve the demarcation of the permitted mining area. Site establishment will also necessitate the clearing of

vegetation, the stripping and stockpiling of topsoil, and the introduction of mining machinery and equipment.

(2) *Operational phase* that will entail the mining of the iron ore from the approved footprint area via conventional open cast mining methods. The mining method will make use of blasting in order to loosen the hard rock; upon which the loosened material will be transported to the mobile processing plant where after the iron ore will be stockpiled until it is hauled from the property to the SIOER.

(3) *Decommissioning phase* which entails the rehabilitation of the affected environment prior to the submission of a closure application to the Department of Mineral Resources and Energy (DMRE). The permit holder will further be responsible for the seeding of all rehabilitated areas. Once the full mining area is rehabilitated, the mining permit holder will be required to submit a closure application to the DMRE in accordance with section 43(4) of the MPRDA, 2002. The Closure Application will be submitted in terms of Regulation 62 of the MPRDA, 2002, and Government Notice 940 of NEMA, 1998 (as amended).

PHASES OF THE PROJECT

1. *Site Establishment Phase:*

Site establishment entails the demarcation of the mining boundaries, clearance of vegetation, and stripping and stockpiling of topsoil to access the mineral as detailed below:

- **Demarcation of Mining Boundaries:**

  Pursuant to receipt of the Environmental Authorisation (EA) and Mining Permit (MP), and prior to site establishment, the boundaries of the mining area will be demarcated with visible beacons.

- **Access Road:**

  The proposed mining area will be reached via existing farm roads. The Applicant proposes to upgrade the roads to allow comfortable movement of mining related equipment and vehicles. Haul roads into the excavation will be extended as mining progresses. The improvement of the access road, and establishment of haul roads will be below the threshold of the NEMA, 1998 EIA

Regulations, 2014 (as amended). See the following figure for an estimation of the farm roads to be used by the mining related traffic.

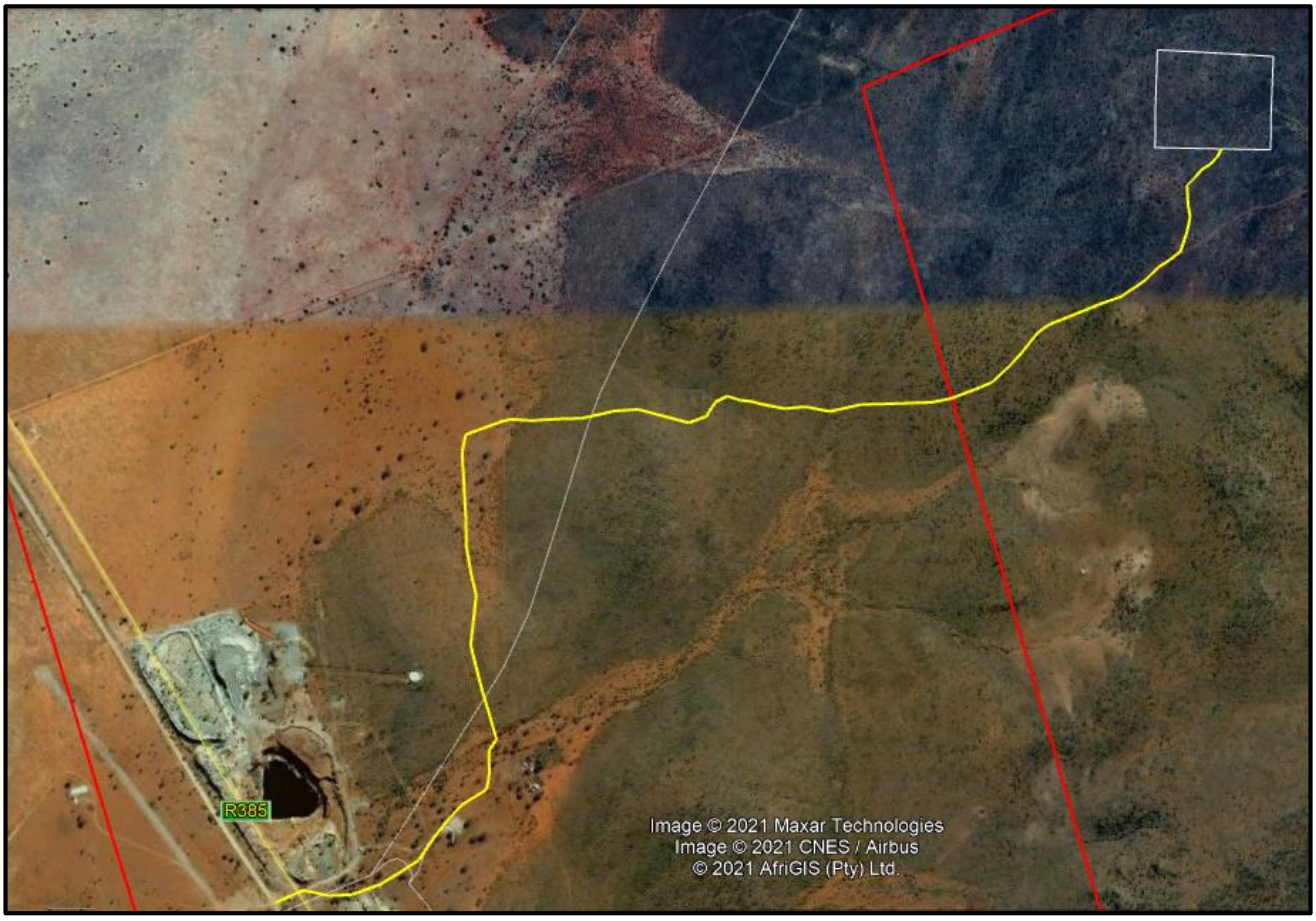

Figure 5: Satellite view showing the probable path (yellow line) to be used to the proposed mining area (white polygon).

- **Clearing of Vegetation:**

  (Also refer to Part A(1)(h)(iv)(c) Description of specific environmental features and infrastructures on the site – Site Specific Terrestrial Biodiversity, Conservation Areas and Groundcover)

  The vegetation types of the earmarked footprint are classified as Kuruman Mountain Bushveld (SVk 10), and the Olifantshoek Plains Thornveld (SVk 13). The vegetation cover of the proposed mining footprint (S1) can be described as natural to near-natural. Although no protected plants were identified within the mining footprint at the time of the inspection, the farm and surroundings are known for the occurrence of Camel Thorn (*Vachellia erioloba*), and Shepherd's Trees (*Boscia albitrunca*).

  In the circumstance, upon receipt of the EA and prior to site establishment/bush clearance, a qualified botanist will conduct a plant identification walkthrough with site management to identify any *Boscia albitrunca, Vachellia erioloba*

and/or other plants in need of a plant removal permit. Bush clearance will only commence upon receipt of the applicable plant permits (if applicable). The environmental control officer (ECO) will assess the compliance of the permit holder with the conditions of said permits.

- **Topsoil Stripping:**

It is proposed that topsoil removal will be restricted to the exact footprint of areas required during the operational phase of the activity. The topsoil will be stockpiled at a designated signposted area within the mining boundary to be replaced during the rehabilitation of the area. It will be part of the obligations of site management to prevent the mixing of topsoil heaps with overburden/other soil heaps. The complete A-horizon (the top 100 – 200 mm of soil which is generally darker coloured due to high organic matter content) will be removed. If it is unclear where the topsoil layer ends the top 300 mm of soil will be stripped. The topsoil berm will measure a maximum of 2 m in height in order to preserve micro-organisms within the topsoil, which can be lost due to compaction and lack of oxygen.

- **Introduction of Mining Machinery and Site Equipment:**

As mentioned earlier, the Applicant plans to establish mobile/temporary infrastructure within the mining footprint. It is proposed that the office and processing area (including offices, workshop, store rooms, ablution, parking area and crushing infrastructure) will occupy ±0.8 ha of the proposed 4.9 ha area. As no permanent infrastructure will be established, the production rate will dictate the layout of the proposed footprint area (refer to preliminary site layout plan attached as Appendix C1).

Presently, the mining infrastructure/equipment is expected to consist of at least:

- Ablution facilities connected to sealed septic tanks;
- ADT trucks;
- Containers used as site offices, workshops and storage rooms;
- Drilling equipment;
- Earthmoving- and excavating equipment (bull dozer, excavators, FEL);
- Generators;
- Mobile crushing and screening plant;
- Tanks for storage of water and diesel (±40 000 l); and a

- Water truck.

2. *Operational Phase:*

The Applicant intends to loosen the hard rock at the excavation by blasting, upon which it will be mechanically recovered with drilling-, excavating- and earthmoving equipment. The rock will then be delivered to the crushing and screening plant where it will be processed. The screened material will be stockpiled until it is transported from the site and delivered to the SIOER by means of trucks. Refer to Appendix C2 for a copy of the proposed Process Flow Diagram. The proposed mine will appoint ±50 employees (including management) that will mainly be sourced from the surrounding area and daily be transported to site.

Water Use:

Any water required for the implementation of the project will be bought and transported to the mining area (in a water truck) where it will be stored in tanks until used. Water will mainly be used for dust suppression purposes on denuded areas, the processing plant, and access road (when needed).

Dust generation will, as far as possible, be managed through alternative dust suppression methods to restrict water use to the absolute minimum. These measures will include a combination of the following:

- The speed of all mining equipment/vehicles will be restricted to 40 km/h on the internal farm roads to minimize dust generation;
- Site management will attempt to lessen denuded areas (dust source) to the absolute minimum;
- Strips of used conveyor belts can be attached to the drop end of the crusher plant where crushed material falls onto the stockpiles. This lessens the blowing of fines from the minerals;
- Compacted dust will weekly be cleaned of the crusher plant to eliminate it as a dust source.

Under very windy/dusty conditions the permit holder might have to substitute the above mentioned dust suppression methods with the spraying of water, in which case a water truck will moisten the problem areas, and sprayers at the processing plant will moisten the material to alleviate dust generation at the conveyor belts. The water truck driver will receive proper training to ensure effective use of the water on problem areas preventing water wastage. It is

proposed that approximately 96 000 litres of water will be needed per day during the dry months (amount to decrease during the rainy season).

- **Electricity Use:**

  The proposed project will make use of diesel generators to power the mining infrastructure. All generators will have secondary containment in the form of a bund wall/drip tray that can contain 110% of the generator's maximum capacity.

- **Servicing and Maintenance:**

  A temporary workshop will be established on site where minor servicing and emergency repairs of mining related equipment/machinery will take place. No wash water will be allowed to drain into the surrounding environment. No bulk storing of fuel (>45 000 l) will take place on site, and any chemicals needed at the workshop will be stored in accordance with the product specific safety data sheet specifications in temporary containers/secured cages.

- **Waste Handling:**

  Solid (general) waste, generated during the operational phase, will be contained in sealable refuse bins that will be placed at the office area until the waste is transported to a recognised general waste landfill site. A recognized contractor will service the septic tank when applicable.

  Due to the nature of the project very little generation of hazardous waste is expected, and will mainly be the result of accidental spillages or breakdowns. Such contaminated areas will be cleaned up immediately (within two hours of the occurrence) and the contaminated soil will be contained in designated hazardous waste containers that will be kept in a bunded area with impermeable surface until it is removed from site by a registered hazardous waste handling contractor to an approved facility.

3. *Decommissioning Phase:*

The decommissioning phase will entail the reinstatement of the processing area by removing the stockpiled material, site infrastructure/equipment and landscaping the disturbed footprints. Due to the impracticality of importing large volumes of fill

to restore the excavation to its original topography, the rehabilitation option is to develop the pit into a minor landscape feature. This will entail creating a series of irregular benches along the excavation faces, the top edges of each face being blasted away to form scree slopes on the benches below, thereby reducing the overall face angle. The benches will be top-dressed with topsoil and vegetated with an appropriate grass mix if vegetation does not naturally establish in the area within six months of the replacement of the topsoil (see Appendix J for the Closure Plan).

The decommissioning activities will therefore consist of the following:

- Sloping and landscaping the excavation;
- Removing all stockpiled material;
- Removing all mining machinery and equipment from site;
- Landscaping all disturbed areas and replacing the topsoil;
- Vegetating the reinstated area; and
- Controlling/monitoring the invasive plant species.

The future land use of the proposed area will be agriculture. Upon replacement of the topsoil, the area around the excavation will once again be available for grazing purposes, and the planting of the cover crop (to protect the topsoil) will tie in with the proposed land use.

The Applicant will comply with the minimum closure objectives as prescribed by the DMRE and detailed below:

- <u>Rehabilitation of the excavated area:</u>

  The excavated area must serve as a final depositing area for the placement of overburden. Rocks and coarse material removed from the excavation must be dumped into the excavation.

  No waste may be permitted to be deposited in the excavations.

  Once overburden, rocks and coarse natural materials has been added to the excavation and it was profiled with acceptable contours and erosion control measures, the topsoil previously stored must be returned to its original depth over the area.

  The area must be fertilized if necessary to allow vegetation to establish rapidly. The site shall 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 closure of the site.

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 his or her specification.

- Rehabilitation of plant, office and service areas:

Coarse natural material used for the construction of ramps must be removed and dumped into the excavations.

Stockpiles must 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 shall be dealt with in accordance with section 44 of the Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002):

- Where sites have been rendered devoid of vegetation/grass or where soils have been compacted owing to traffic, the surface shall be scarified or ripped.
- Areas containing French drains shall be compacted and covered with a final layer of topsoil to a height of 10 cm above the surrounding ground surface.
- The site shall be seeded with a vegetation seed mix adapted to reflect the local indigenous flora.

Photographs of the camp and office sites, before and during the mining operation and after rehabilitation, shall be taken at selected fixed points and kept on record for the information of the DMRE Regional Manager. _

On completion of mining operations, the surface of these areas, if compacted due to hauling and dumping operations, shall be scarified to a depth of at least 200mm and graded to an even surface condition. Where applicable/possible topsoil needs to be returned to its original depth over the area.

The area shall then be fertilized if necessary to allow vegetation to establish rapidly. The site shall be seeded with a local, adapted indigenous seed mix.

If a reasonable assessment indicates that the re-establishment of vegetation is unacceptably slow, the DMRE 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 his or her specification.

- Final rehabilitation:

Rehabilitation of the surface area shall entail landscaping, levelling, top dressing, land preparation, seeding (if required) and maintenance, and invasive plant species clearing.

All mining equipment, and other items used during the mining period must be removed from the site (section 44 of the MPRDA).

Waste material of any description, including receptacles, scrap, rubble and tyres, must be removed entirely from the mining area and disposed of at a recognized landfill facility. It will not be permitted to be buried or burned on the site.

The management of invasive plant species must be done in a sporadic manner during the life of the mining activities. Species regarded as Category 1a and 1b invasive species in terms of NEM:BA (National Environmental Management: Biodiversity Act 10 of 2004 and regulations applicable thereto) will be eradicated from the site.

Final rehabilitation shall be completed within a period specified by the Regional Manager.

Once the mining area was rehabilitated the permit holder is required to submit a closure application to the Department of Mineral Resources and Energy in accordance with section 43(4) of the MPRDA, 2002 that states: "*An application for a closure certificate must be made to the Regional Manager in whose region the land in question is situated within 180 days of the occurrence of the lapsing, abandonment, cancellation, cessation, relinquishment or completion contemplated in subsection (3) and must be accompanied by the prescribed environmental risk*

report". The Closure Application will be submitted in terms of Regulation 62 of the MPRDA, 2002, and Government Notice 940 of NEMA, 1998 (as amended).

e) Policy and Legislative Context

Table 4: Policy and Legislative Context.

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT (a description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process)	**REFERENCE WHERE APPLIED**	**HOW DOES THIS DEVELOPMENT COMPLY AND RESPOND TO THE LEGISLATION AND POLICY CONTEXT.** (E.g. in terms of the National Water Act a Water Use License has/has not been applied for)
Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983).	Part A(1)(h)(iv)(1)(a) Type of environment affected by the proposed activity: *Physical Environment – Geology and Soil.* Part A(1)(h)(viii) The possible mitigation measures that could be applied on the level of risk – *Management of invader plant species*.	The mitigation measures proposed for the site includes specifications of the CARA, 1983.
Integrated Environmental Management Guideline: Guideline on Need and Desirability (2017).	Part A(1)(f) Need and desirability of the proposed activity.	The need and desirability of the proposed project was assessed in terms of this guideline.
Mine Health and Safety Act, 1996 (Act No 29 of 1996) read together with applicable amendments and regulations thereto including relevant OHSA regulations.	Part A(1)(h)(viii) The possible mitigation measures that could be applied on the level of risk – *Management of Health and Safety Risks.*	The mitigation measures proposed for the site includes specifications of the MHSA, 1996
Mineral and Petroleum Resources Development Act, 2002, (Act No. 28 of 2002) read together with applicable amendments and regulations thereto. • Section 27.	Part A(1)(d) Description of the scope of the proposed overall activity.	Application for a mining permit sumitted to DMRE-NC. Ref No: NC 30/5/1/3/2/10915 MP.
National Environmental Management Act,1998 (Act No. 107 of 1998) and the Environmental Impact Assessment Regulations, 2014 (as amended) • GNR 327 Listing Notice 1 Acitvity 21 • GNR 327 Listing Notice 1 Activity 27 • GNR 327 Listing Notice 1 Activity 28	Part A1(d)(i) Listing and specified activities.	Application for environmental authorisation submitted to DMRE-NC. Ref No: NC 30/5/1/3/2/10915 MP.
National Environmental Management: Air Quality Control Act, 2004 (Act No 39 of 2004) read together with applicable amendments and regulations thereto	Part A(1)(h)(iv)(1)(a) Type of environment affected by the	The mitigation measures proposed for the site take into account the

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT	REFERENCE WHERE APPLIED	HOW DOES THIS DEVELOPMENT COMPLY AND RESPOND TO THE LEGISLATION AND POLICY CONTEXT.
specifically the National Dust Control Regulations, GN No R827	proposed activity – *Air and Noise Quality.* Part A(1)(h)(viii) The possible mitigation measures that could be applied on the level of risk – *Fugitive Dust Emission Mitigation Measures.*	NEM:AQA, 2004 and the National Dust Control Regulations.
National Environmental Management Act: Biodiversity Act, 2004 (Act No. 10 of 2004) read together with applicable amendments and regulations thereto.	Part A(1)(h)(iv)(1)(a) Type of environment affected by the proposed activity - *Biological Environment* Part A(1)(h)(viii) The possible mitigation measures that could be applied on the level of risk – *Management of Vegetation Removal & Management of invader plant species*.	The mitigation measures proposed for the site includes specifications of the NEM:BA, 2004.
National Environmental Management: Waste Act, 2008 (Act No 59 of 2008) read together with applicable amendments and regulations thereto. NEM:WA, 2008: National norms and standards for the storage of waste (GN 926)	Part A(1)(d)(ii) Description of the activities to be undertaken. Part A(1)(h)(viii) The possible mitigation measures that could be applied on the level of risk – *Waste Management*.	The mitigation measures proposed for the site take into account the NEM:WA.
National Forest Act, 1998 (Act No 84 of 1998)	Part A(1)(h)(iv)(1)(a) Type of environment affected by the proposed activity - *Biological Environment* Part A(1)(h)(viii) The possible mitigation measures that could be applied on the level of risk – *Management of Vegetation Removal.*	The mitigation measures proposed for the site take into account the NFA, 1998.
National Heritage Resources Act. 1999 (Act No 25 of 1999).	Part A(1)(h)(iv)(1)(a) Type of environment affected by the proposed activity – *Human Environment* Part A(1)(h)(viii) The possible mitigation measures that could be applied on the level of risk –	The mitigation measures proposed for the site includes specifications of the NHRA, 1999.

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT	REFERENCE WHERE APPLIED	HOW DOES THIS DEVELOPMENT COMPLY AND RESPOND TO THE LEGISLATION AND POLICY CONTEXT.
	Archaeological, Heritage and Palaeontological Aspects. Part A(1)(t)(i)(2) Impact on any national estate referred to in section 3(2) of the National Heritage Resources Act.	
National Water Act, 1998 (Act No 36 of 1998) read together with applicable amendments and regulations thereto.	Part A(1)(h)(iv)(1)(a) Type of environment affected by the proposed activity – *Hydrology.* Part A(1)(h)(viii) The possible mitigation measures that could be applied on the level of risk. Part B(1)(d)(iii) Has a water use licence been applied for?	The proposed activity does not require an application for a water use authorisation in terms of Section 39 of the NWA, 1998. The mitigation measures proposed for the site includes specifications of the NWA, 1998.
Northern Cape Nature Conservation Act, 2009 (Act No 9 of 2009)	Part A(1)(h)(iv)(1)(a) Type of environment affected by the proposed activity - *Biological Environment* Part A(1)(h)(viii) The possible mitigation measures that could be applied on the level of risk – *Management of Vegetation Removal.*	The mitigation measures proposed for the site take into account the NC-NCA, 2009.
Public Participation Guideline in terms of the NEMA EIA Regulations	Part A(1)(h)(ii) Details of the Public Participation Process Followed	Public participation was conducted in accordance with the guidelines published in terms of the NEMA EIA Regulations
ZF Mgcawu District Municipality Draft Integrated Development Plan 2017-2022 – Annual Review 2018/2019.	Part A(1)(h)(iv)(1)(a) Type of environment affected by the proposed activity – *Socio-Economic Environment.*	The information of the IDP was used to inform this report.

f) Need and desirability of the proposed activities.

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

Of all the metals that make modern life possible, steel is the most widely used, and iron ore is its main ingredient. Higher iron ore grades are needed in improving auto markets, construction and other demanding types of specialised infrastructure. This is a prime

reason for the great demand from maturing economies such as China, Japan and Europe, and now increasingly in the Middle East and India. Export sales to China accounted for 61% of the company's total exports. Exports to the rest of Asia remained at around 19% of the total, while Europe is at 12%. Iron ore is also used in medicine, cosmetics, engineering, construction, paint and a whole range of other products we use in our daily lives.

As explained earlier, the prospecting programme on the earmarked property identified the area where the proposed mining footprint was mapped as the most prospective and continuous target of the Doornfontein conglomeratic iron horizon. In light thereof, the Applicant identified the need to mine the earmarked area for iron ore. This decision was further augmented by the record high prices for iron ore cargoes reached during May 2021 supported by strong demand, declining stockpiles and concerns over supply. According to Trading Economics the stockpiles of imported iron ore at Chinese ports declined for four consecutive weeks to 123.95 Mt as of 25 June 2021, the lowest level in eight months. Difficulties at Brazilian mines and disappointing shipments from Australia further contributed to the current supply concerns.

The need and desirability of the proposed project was assessed in terms of the National Department of Environmental Affairs' Guideline on Need and Desirability (first version published in terms of section 24J of the NEMA in 2014, and second version in 2017)). The following table shows the questions that were considered in this regard.

Table 5: Need and desirability determination.

1. SECURING ECOLOGICAL SUSTAINABLE DEVELOPMENT AND USE OF NATURAL RESOURCES		
How will this development impact on the ecological integrity of the area?		
Question	**Response**	**Level of Desirability**
How were ecological integrity considerations taken into account? How will this development disturb or enhance ecosystems and/or result in the loss or protection of biological diversity?	As discussed under Part A(1)(g)(iv)(1)(a) *Type of environment affected by the proposed activity*, the Mining and Biodiversity Map confirms that the application area does not extend over an area of biodiversity importance. The screening tool shows the Plant Species Sensitivity of the area to be of Low significance, although the proposed footprint extends across an Ecological Support Area (ESA). The vegetation type of the proposed footprint is classified as the Kuruman Mountain Bushveld (SVk 10) as verified during the site assessment. This vegetation type is classified as Least Threatened. Should the Applicant implement the mitigation measures proposed in this document and obtain the relevant permits for any protected plant species that may need to be removed prior to bush clearance (if applicable), it is believed that the proposed mining of 4.9 ha within the larger extent of the farm will not negatively affect the conservation status or objectives of the ESA. Also refer to: ❖ Part A(1)(d)(ii) Description of the activities to be undertaken – Clearing of Vegetation; ❖ Part A(1)(h)(iv)(1)(a) Type of environment affected by the proposed activity – Mining and Biodiversity; ❖ Part A(1)(h)(iv)(1)(a) Type of environment affected by the proposed activity – Biodiversity Conservation Areas; ❖ Part A(1)(h)(iv)(1)(a) Type of environment affected by the proposed activity – Groundcover; ❖ Part A(1)(h)(iv)(1)(c) Description of specific environmental features and infrastructure on the site – Site Specific Terrestrial Biodiversity, Conservation Areas and Groundcover, ❖ Part A(1)(h)(viii) The possible mitigation measures that could be applied and the level of risk.	Desirable
How will this development pollute and/or degrade the biophysical environment?	Due of the nature of the proposed activity, it is inevitable that the present vegetation cover of the earmarked footprint will eventually be removed to allow access to the iron ore resource, only to be replaced (to some extend) during the rehabilitation phase. Taking the above mentioned into consideration, the EIA concluded that the proposed mine will have a relatively small impact on the vegetation and fauna around it provided that the mitigation measures are adhered to. Therefore, should the	Desirable

1. SECURING ECOLOGICAL SUSTAINABLE DEVELOPMENT AND USE OF NATURAL RESOURCES		
How will this development impact on the ecological integrity of the area?		
Question	**Response**	**Level of Desirability**
	permit holder adhere to the conditions of the EA (to be issued) as well as the mitigation measures proposed in this report it is believed that the impact on the biophysical environment is of acceptable significance.	
What waste will be generated by this development?	The general waste to be generated at the mine will mainly consist of paper, plastic, tin, and/or glass from the office, workshop and processing area. All general waste will be contained in sealable refuse bins that will be placed at the office area until it is transported to a recognised general waste landfill site. A recognized contractor will service the septic tank (when applicable) and be responsible for the removal of the content to a registered sewerage handling facility. As mentioned earlier, hazardous waste may result from accidental spillages/breakdowns. Such contaminated areas will immediately (within two hours of occurrence) be cleaned and the contaminated soil will be contained in a designated hazardous waste container that will be kept in a bunded area with impermeable surface until it is removed from site by a registered hazardous waste handling contractor to an approved facility. No waste will be disposed of, buried, burned or treated on the site.	Highly Desirable
How will this development disturb or enhance landscapes and/or sites that constitute the nation's cultural heritage?	The earmarked mining footprint extends across an area historically used for grazing purposes. The Heritage Impact Assessment compiled by Beyond Heritage, 2021 (Appendix G1) notes that the impact of the proposed project on heritage resources are low. The study area is indicated as of moderate paleontological sensitivity, however the study conducted by Prof Bamford concluded that there is a very small chance of fossils being disturbed. No other heritage features (archaeological, built environment or graves) of significance were recorded during the survey.	Highly Desirable
How will this development use and/or impact on non-renewable natural resources?	If approved the Applicant will mine the iron ore resource identified on the Remaining Extent of the farm Makganyene No 667. Presently, it is believed that the mineable area (4.9 ha) may have an inferred iron ore reserve of >1 026 000 ton. Based on the proposed production rate, the resource shows a potential life of mine of ±2 years.	-

1. SECURING ECOLOGICAL SUSTAINABLE DEVELOPMENT AND USE OF NATURAL RESOURCES		
How will this development impact on the ecological integrity of the area?		
Question	**Response**	**Level of Desirability**
How will this development use and/or impact on renewable natural resources and the ecosystem of which they are part?	It is proposed that approximately 96 000 litres of water will be needed per day during the dry months (amount to decrease during the rainy season) to manage dust emissions from the proposed operation. As mentioned earlier, the contractor will strive to manage dust generation through alternative suppression methods to restrict water use to the absolute minimum. Presently, it is proposed that water will be bought and transported to site where it will be stored in plastic tanks. The Applicant will strive to use non-potable water for mining related activities. The use of solar power could also be considered as an alternative power source to the offices and/or workshops.	Desirable
How were a risk-averse and cautious approach applied in terms of ecological impacts?	It is proposed that prior to site establishment/bush clearance, a qualified botanist will conduct a plant identification walkthrough with site management to identify any Camel Thorn (*Vachellia erioloba*), Shepherd's Trees (*Boscia albitrunca*) and/or other plants in need of a plant removal permit. Bush clearance will only commence upon receipt of the applicable plant permits (if applicable). The ECO will assess the compliance of the permit holder with the conditions of said permits.	Highly Desirable
How will the ecological impacts resulting from this development impact on people's environmental right?	The mine will be managed in accordance to the specifications of the lease agreement with the landowner, and should the mitigation measures proposed in this document be implemented the potential visual-, dust-, and noise impacts associated with the proposed mining operation will be of low-medium significance. If the monitoring programs, proposed in this document, be implemented it is believed that no environmental rights of the surrounding residents/public will be affected by the ecological impacts associated with the proposed activity.	Highly Desirable
Describe the linkages and dependencies between human wellbeing, livelihoods and ecosystem services applicable to the area in question and how the development's ecological impacts will result in socio-economic impacts.	If approved, the proposed operation will create at least forty (40) new work opportunities to local residents, and will also contributed an additional source of income (compensation) to the landowner. It is proposed that the mine will contribute to the local economy of the area, both directly and through the multiplier effect that its presence will create. Equipment and supplies will be purchased locally, and wages will be spent at local businesses, generating both jobs and income in the area. The mining of the iron ore from the proposed site will benefit the larger economy in that it will contribute to the export of South Africa.	Highly Desirable

1. SECURING ECOLOGICAL SUSTAINABLE DEVELOPMENT AND USE OF NATURAL RESOURCES		
How will this development impact on the ecological integrity of the area?		
Question	**Response**	**Level of Desirability**
Based on all of the above, how will this development positively or negatively impact on ecological integrity objectives/targets/considerations of the area? Considering the need to secure ecological integrity and a healthy biophysical environment, describe how the alternatives identified, resulted in the selection of the "best practicable environmental option" in terms of ecological considerations	If the mitigation measures proposed in this document are adhered to, S1 entails the mining of the 4.9 ha area without permanently influencing the status of the ecosystem type or red data species. Also refer to: ❖ Part A(1)(d)(ii) Description of the activities to be undertaken – Clearing of Vegetation; ❖ Part A(1)(h)(i) Details of the development footprint alternatives considered; ❖ Part A(1)(h)(iv)(1)(a) Type of environment affected by the proposed activity – Mining and Biodiversity; ❖ Part A(1)(h)(iv)(1)(a) Type of environment affected by the proposed activity – Biodiversity Conservation Areas; ❖ Part A(1)(h)(iv)(1)(a) Type of environment affected by the proposed activity – Groundcover; ❖ Part A(1)(h)(iv)(1)(c) Description of specific environmental features and infrastructure on the site – Site Specific Terrestrial Biodiversity, Conservation Areas and Groundcover.	Desirable

2. PROMOTING JUSTIFIABLE ECONOMIC AND SOCIAL DEVELOPMENT		
What is the socio-economic context of the area?		
Question	**Response**	**Level of Desirability**
What is the socio-economic context of the area?	Please refer to Part A(1)(h)(iv)(1)(a) Type of environment affected by the proposed activity – Socio-Economic Environment.	Highly Desirable
Considering the socio-economic context, what will the socio-economic impacts be of the development, and specifically also on the socio-economic objectives of the area?	If approved, the proposed mine will create at least forty (40) new work opportunities to local residents, and will also contributed an additional source of income (compensation) to the landowner. It is proposed that the mine will contribute to the local economy of the area, both directly and through the multiplier effect that its presence will create. Equipment and supplies will be purchased locally, and wages will be spent at local businesses, generating both jobs and income in the area. The mining of the iron ore from the proposed site will benefit the larger economy in that it will contribute to the export of South Africa.	
How will this development address the specific physical, psychological, developmental, cultural and social needs and interests of the relevant communities?		
Will the development result in equitable impact distribution, in the short- and long-term?	The proposed mine will be operated in a socially and economically sustainable manner during both the short- and long term. Makganyane Resources (Pty) Ltd is a predominantly black owned entity, with the focus on Historically Disadvantaged South Africans, especially women, empowerment. The procurement progression plan of the company entails the support of local enterprises, of which preference will be given to HDSA & women owned local suppliers. Makganyane Resources' employment equity is also in line with the provisions of the Mining Charter 2018, as well as the provisions of the Employment Equity Act, 1998 (as amended).	Highly Desirable
In terms of location, describe how the placement of the proposed development will contribute to the area.	Mining the iron source on the property will contribute to the area in that the landowner will receive compensation, the project will create employment opportunities, and the sales of the material will directly and indirectly promote the economy of the area as mentioned earlier. The product will also contribute to the iron ore export of South Africa.	Highly Desirable

2. PROMOTING JUSTIFIABLE ECONOMIC AND SOCIAL DEVELOPMENT		
What is the socio-economic context of the area?		
Question	**Response**	**Level of Desirability**
How were a risk-averse and cautious approach applied in terms of socio-economic impacts?	No negative socio-economic impacts could, at this stage, be identified that cannot be managed through the implementation of mitigation measures included in this report.	Highly Desirable
How will the socio-economic impacts resulting from this development impact on people's environmental right?	As mentioned in Part A(1)(t)(i)(1) Impact on the socio-economic conditions of any directly affected person, the activity may have an impact on the visual characteristics of the surrounding environment, and may affect air quality and the noise ambiance of the study area. However, the mine will be managed in accordance to the specifications of the lease agreement with the landowner, and should the mitigation measures proposed in this document be implemented the potential visual-, dust-, and noise impacts associated with the proposed mining operation will be of low-medium significance. If the monitoring programs, proposed in this document, be implemented it is believed that no environmental rights of the surrounding residents/public will be affected by the ecological impacts associated with the proposed activity.	Highly Desirable
Considering the linkages and dependencies between human wellbeing, livelihoods and ecosystem services, describe the linkages and dependencies applicable to the area in question and how the development's socio-economic impacts will result in ecological impacts?	If approved, the proposed mine will create at least forty (40) new work opportunities to local residents, and will also contributed an additional source of income (compensation) to the landowner. It is proposed that the mine will contribute to the local economy of the area, both directly and through the multiplier effect that its presence will create. Equipment and supplies will be purchased locally, and wages will be spent at local businesses, generating both jobs and income in the area. The mining of the iron ore from the proposed site will benefit the larger economy in that it will contribute to the export of South Africa.	Highly Desirable
What measures were taken to pursue the selection of the "best practicable environmental option" in terms of socio-economic considerations?	If the mitigation measures proposed in this document is adhered to, S1 entails the mining of the 4.9 ha area without permanently influencing the status of the ecosystem type or red data species. Should the permit application be approved, the project will directly contribute to the socio-economic status of the receiving environment through the employment of at least forty local residents, and support of the local- and national economy.	Highly Desirable

2. PROMOTING JUSTIFIABLE ECONOMIC AND SOCIAL DEVELOPMENT		
What is the socio-economic context of the area?		
Question	**Response**	**Level of Desirability**
What measures were taken to pursue environmental justice so that adverse environmental impacts shall not be distributed in such a manner as to unfairly discriminate against any person, particularly vulnerable and disadvantaged persons?	Also refer to: ❖ Part A(1)(h)(vii) The positive and negative impacts that the proposed activity and alternatives will have on the environmental and the community that may be affected.	
What measures were taken to pursue equitable access to environmental resources, benefits and services to meet basic human needs and ensure human wellbeing, and what special measures were taken to ensure access thereto by categories of persons disadvantaged by unfair discrimination? What measures were taken to ensure that the responsibility for the environmental health and safety consequences of the development has been addressed throughout the development's life cycle?	The mine will operate in accordance with, amongst others, the following: ❖ CARA, 1983 – to ensure agriculture related compliance; ❖ Financial Provision Regulations, 2015 – to ensure compliance in terms of rehabilitation; ❖ Mine Health and Safety Act, 1996 (as amended) – to ensure employee safety; ❖ MPRDA, 2002 (as amended) – to ensure mining related compliance; ❖ NEM:AQA, 2004 – to ensure air quality related compliance; ❖ NEM:BA, 2004 – to ensure biodiversity related compliance; ❖ NEM:WA, 2008 – to ensure waste related compliance; ❖ NEMA, 1998 (as amended) – to ensure environmental related compliance; As mentioned earlier, Makganyane Resources (Pty) Ltd is a predominantly black owned entity, with the focus on Historically Disadvantaged South Africans, especially women, empowerment. The procurement progression plan of the company entails the support of local enterprises, of which preference will be given to HDSA & women owned local suppliers. Makganyane Resources' employment equity is also in line with the provisions of the Mining Charter 2018, as well as the provisions of the Employment Equity Act, 1998 (as amended).	Highly Desirable

2. PROMOTING JUSTIFIABLE ECONOMIC AND SOCIAL DEVELOPMENT		
What is the socio-economic context of the area?		
Question	**Response**	**Level of Desirability**
Considering the interests, needs and values of all the interested and affected parties, describe how the development will allow for opportunities for all the segments of the community that is consistent with the priority needs of the local area.	Presently, it is proposed that the mine will create a minimum of forty (40) employment opportunities to local residents. In a municipal area with an unemployment rate of ±26.1%, new job opportunities are of high significance. Further to this, and as mentioned earlier, the procurement progression plan of the Applicant supports local enterprises, of which preferences are given to HDSA & women owned local suppliers (where possible).	Highly Desirable
What measures have been taken to ensure that current and/or future workers will be informed of work that potentially might be harmful to human health or the environment or of dangers associated with the work, and what measures have been taken to ensure that the right of workers to refuse such work will be respected and protected.	The mine will operate in accordance with the specifications of the Mine Health and Safety Act, 1996 as well as the Occupational Health and Safety Act, 1993. Site management will arrange regular toolbox talks with the site personnel regarding the work to be performed and the environment in which the work will take place. Grievances/concerns can be lodged during the toolbox sessions and site meetings.	Highly Desirable
Describe how the development will impact on job creation in terms of, amongst other aspects?	As mentioned earlier, the proposed mine will appoint ±50 employees (including management), of which at least forty will be from the surrounding area.	Highly Desirable
What measures were taken to ensure that the environment will be held in public trust for the people, that the beneficial use of environmental resources will serve the public interest, and that the environment will be protected as the people's common heritage.	The proposed mine will operate under a valid environmental authorisation and mining permit to be issued by the DMRE-NC. Compliance of the site with the approved EMPR and EA conditions will be reported on as per departmental specifications. In light of this, the proposed activity will take place in an environmental sustainable manner with the least possible impact on the receiving environment.	Highly Desirable

2. PROMOTING JUSTIFIABLE ECONOMIC AND SOCIAL DEVELOPMENT		
What is the socio-economic context of the area?		
Question	**Response**	**Level of Desirability**
Are the mitigation measures proposed realistic and what long-term environmental legacy and managed burden will be left.	It is believed that the mitigation measures proposed in this document are realistic and can be implemented (when applicable) by the mine. As mentioned earlier, due to the impracticality of importing large volumes of fill to restore the excavation to its original topography, the rehabilitation option is to develop the pit into a minor landscape feature that will be rendered safe upon final site closure. The benches will be top-dressed with topsoil and vegetated with an appropriate grass mix and the area will be returned to agricultural use. If the disturbed areas are successfully rehabilitated no long-term management burden will be left behind.	Highly Desirable
What measures were taken to ensure that the costs of remedying pollution, environmental degradation and consequent adverse health effects and of preventing, controlling or minimising further pollution environmental damage or adverse health effects will be paid for by those responsible for harming the environment.	In terms of Section 41 of the MPRDA, 2002 a mining permit holder must submit a financial provision to the DMRE that is sufficient to rehabilitate or manage the negative environmental impacts related to the mining activity. Upon approval of this application, Makganyane Resources (Pty) Ltd will lodge a financial guarantee with the DMRE that will be deemed sufficient to cover the financial provision amount needed to rehabilitate the mining footprint. The environmental liability of the operation will annually be reviewed and if a shortfall is indicated, the guarantee will be accordingly adjusted.	Highly Desirable
Considering the need to secure ecological integrity and a healthy bio-physical environment, describe how the alternatives identified, resulted in the selection of the best practicable environmental option in terms of socio-economic considerations	If the mitigation measures proposed in this document are adhered to, S1 entails the mining of the 4.9 ha area without permanent influencing the status of the ecosystem type or red data species. Also refer to: ❖ Part A(1)(h)(vii) The positive and negative impacts that the proposed activity and alternatives will have on the environmental and the community that may be affected.	Highly Desirable

2. PROMOTING JUSTIFIABLE ECONOMIC AND SOCIAL DEVELOPMENT		
What is the socio-economic context of the area?		
Question	**Response**	**Level of Desirability**
Describe the positive and negative cumulative socio-economic impacts bearing in mind the size, scale, scope and nature of the project in relation to its location and other planned developments in the area.	The proposed mining area was identified through the prospecting of the earmarked property as the most prospective and continuous target of the Doornfontein conglomeratic iron horizon and is therefore planned over a proven source. As mentioned earlier, although the farm Makganyene is situated in a rural setting, the greater area is known as an important mining district. Presently, apart from mining, no other developments are planned in the vicinity of the proposed mining area. Apart from the employment opportunities to be created by the mine and the positive contributions to the local economy both directly and through the multiplier effect, the mining of the iron ore from the proposed site will also benefit the larger economy in that it will contribute to the export of South Africa. It is proposed that the excavation upon closure will most likely hold some rainwater for certain parts of the year. In this arid climate the potential of an additional water source can be of high importance to the landowner to which the mining footprint will be returned once the closure certificate was issued by the DMRE. In light of this, even though the proposed activity will have a residual impact on the topography of the footprint area, the significance of the impact is believed to be of low concern based on the benefits to be gained from it. As mentioned earlier, the activity may have an impact on the visual characteristics of the surrounding environment, and may affect air quality and the noise ambiance of the study area. However, the mine will be managed in accordance to the specifications of the lease agreement with the landowner, and should the mitigation measures proposed in this document be implemented the potential visual-, dust-, and noise impacts associated with the proposed mining operation will be of low-medium significance. If the monitoring programs, proposed in this document, be implemented it is believed that no environmental rights of the surrounding residents/public will be affected by the ecological impacts associated with the proposed activity.	Highly Desirable

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

Site Alternative 1 was identified as the preferred and only viable site alternative based on the following:

- Although Target 2 (identified as the most prospective area) currently extends across an area of 12.5 ha, the proposed mining footprint (4.9 ha) was chosen over the main core zone of the iron formation in collaboration with the geologist of the Applicant. Therefore, moving the permit area to an alternative site will remove it from the optimal iron resource.
- Presently, neither Target 3 or 5 has enough drillhole information to perform geological modelling, and even though the exploration of the five remaining targets may identify a number of smaller targets comparable to that defined in Target 2, this information is not yet available and therefore siting the proposed mining footprint over a proven resource (Target 2) is more sensible.
- The grade of iron ore in the proposed footprint was proven to be of very high standard.
- The existing farm roads can be used to access the proposed mining area, and even though the roads will require some upgrade/maintenance, no new roads have to be constructed.
- No drainage lines or other watercourses within 100 m, or wetlands within 500 m of the proposed mining footprint could be identified.

The use of temporary infrastructure and mobile equipment is deemed to be the most viable and preferred project alternative based on the following:

- Temporary infrastructure and mobile equipment enable the applicant to move the infrastructure within the boundaries of the mining area as mining of the mineral progresses.
- The equipment (such as the mobile crusher) can move out of the mining area, staying on the existing road, during a blast to prevent potential flyrock damage.
- The decommissioning phase is facilitated as the removal of infrastructure and mobile equipment from the mining area is easy, of low cost and highly effective.

During the environmental impact assessment process the feasibility of the proposed site- and project alternatives were assessed to identify fatal flaws that are deemed as severe as to prevent the activity continuing, or warrant another site- or project alternative. The outcome of the assessment showed that should the mitigation measures and monitoring programmes proposed in this document be implemented, no fatal flaws could be identified that prevents the activity continuing. In light of the above, the mining proposal was updated

to incorporate the project related mitigation measures and monitoring programmes identified during the assessment process. The preferred development footprint was subsequently finalized and is depicted on the attached site layout plan (Appendix C1).

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

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

i) Details of the development footprint alternatives considered.

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

(a) the property on which or location where it is proposed to undertake the activity;
(b) the type of activity to be undertaken;
(c) the design or layout of the activity;
(d) the technology to be used in the activity;
(e) the operational aspects of the activity; and
(f) the option of not implementing the activity.

Site Alternative 1 (S1) (Preferred and Only Site Alternative): Site Alternative 1 entails the development of the proposed iron ore mine within the GPS coordinates as listed in the table below and depicted in Figure 4 above.

Table 6: GPS Coordinates of Site Alternative 1 (preferred and only site alternative)

NUMBER	DEGREES, MINUTES, SECONDS		DECIMAL DEGREES	
	LAT (S)	LONG (E)	LAT (S)	LONG (E)
A	28°08'16.14"	22°56'14.69"	-28.137816°	22.937413°
B	28°08'16.49"	22°56'23.82"	-28.137913°	22.93995°
C	28°08'22.75"	22°56'23.82"	-28.139652°	22.939951°
D	28°08'22.71"	22°56'14.65"	-28.13964°	22.937403°

Site Alternative 1 was identified during the assessment phase of the prospecting campaign and the environmental impact assessment for the proposed mining operation, by the Applicant and project team, as the **preferred and only site alternative** due to the following:

- Although Target 2 (identified as the most prospective area) currently extends across an area of 12.5 ha, the proposed mining footprint (4.9 ha) was chosen over the main core zone of the iron formation in collaboration with the geologist of the Applicant. Therefore, moving the permit area to an alternative site will remove it from the optimal iron resource.

- Presently, neither Target 3 or 5 has enough drillhole information to perform geological modelling, and even though the exploration of the five remaining targets may identify a number of smaller targets comparable to that defined in Target 2,

this information is not yet available and therefore siting the proposed mining footprint over a proven resource (Target 2) is more sensible.

- The grade of iron ore in the proposed footprint was proven to be of very high standard.

- The existing farm roads can be used to access the proposed mining area, and even though the roads will require some upgrade/maintenance, no new roads have to be constructed.

- No drainage lines or other watercourses within 100 m, or wetlands within 500 m of the proposed mining footprint could be identified.

- Siting the mining footprint along the southern rise of the hill will screen the area towards the northern and north-eastern sides thereby reducing the visual impact of the proposed operation on the surrounding environment. It is highly unlikely that the mining area will be visible from the residences of the surrounding neighbours.

In light of the above mentioned, S1 is believed to be the most practical and only viable site alternative as the iron ore resource has already been proven to be present and of good grade, access is simplified, and the environmental related impacts are acceptable.

Project Alternative: The use of temporary infrastructure and mobile equipment (Preferred Alternative) was compared to the use of permanent infrastructure and fixed equipment, at the mining footprint, for the operational phase of the project.

- Temporary infrastructure/equipment entails the use of infrastructure and/or machinery that is either track-based or can be removed without difficulty. The positive aspects associated with the use of temporary infrastructure and mobile equipment firstly enable the applicant to move the infrastructure within the boundaries of the mining area as mining of the mineral progresses. Secondly the equipment (such as the mobile crusher) can move out of the mining area, staying on the existing road, during a blast to prevent potential flyrock damage. Thirdly the decommissioning phase is facilitated as the removal of infrastructure and mobile equipment from the mining area is easy, of low cost and highly effective.

- In contrast to the above, the use of permanent infrastructure and fixed equipment will increase the impact of the proposed project on the environment as it will entail the establishment of more structures, lengthen the period required for rehabilitation

as well as increase the rehabilitation cost as the permanent structures will either have to be decommissioned or be maintained after the closure of the site. Due to the small size of the mining area, fixed equipment may also be exposed to flyrock damage during blasting events.

In light of the above, the use of mobile/temporary infrastructure/equipment at the proposed mining operation is deemed to be the most viable and preferred project alternative.

***Status Quo* / No-go Alternative:**

The no-go alternative entails no change to the *status quo* and is therefore a real alternative that must be considered. The iron ore to be mined will be exported and sold to the local iron market of South Africa. If, the no-go alternative is implemented the Applicant will not be able to exploit the mineral resource on the property.

The no-go alternative was not deemed to be the preferred alternative as:

- the Applicant will not be able to utilize the iron ore deposit available within the proposed mining area, or supply in the demand of the industry;
- the landowner will not receive compensation from the Applicant, and in doing so diversity the income generated from the property;
- the proposed job opportunities, associated with the development of the mine, will be lost to the surrounding community.

ii) Details of the Public Participation Process Followed

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

During the initial public participation process the stakeholders and I&AP's were informed of the project by means of background information documents that were sent directly to the contact persons. A 30-days commenting period was allowed which expired on 02 August 2021. The following I&AP's and stakeholders were informed of the project:

Table 7: List of I&AP's and stakeholders that were notified of the mining permit application.

STAKEHOLDERS		
Department of Agriculture, Environmental Affairs, Rural Development, and Land Reform;		
Department of Economic Development and Tourism;		
Department of Labour;		
Department of Roads and Public Works;		
Department of Water and Sanitation;		
South African Heritage Resources Agency;		
Tsantsabane Local Municipality;		
Tsantsabane Local Municipality: Ward Councillor; and		
ZF Mgcawu District Municipality.		
LANDOWNERS, SURROUNDING LANDOWNERS & INTERESTED AND AFFECTED PARTIES		
Mr JC Wessels	-	Makganyene No 667/RE, 1, 2 (Landowner)
Mr JL Claassens	-	Makganyene No 667/3
Kouwater Boerdery (Pty) Ltd	-	Metseatsididi 666/RE, 2
CC Claassens Trust	-	Vlakfontein 433/RE

An advertisement was placed in the Noord Kaap Bulletin on 01 July 2021 and on-site notices were placed on 22 June 2021 at the entrance to the farm, the Tsantsabane municipal offices and the entrance to the Postmasburg Library. The advertisement, background information document (BID) and on-site notices invited the recipients to register/comment on the project on/before 02 August 2021.

In accordance with the timeframes stipulated in the EIA Regulations, 2014 (as amended) the Draft Basic Assessment Report (DBAR) was compiled and will be distributed for comment and perusal to the I&AP's and stakeholders listed above. A 30-day commenting period, ending 25 October 2021, will be allowed for perusal of the documentation and submission of comments. The comments received on the DBAR will be incorporated into the Final Basic Assessment Report (FBAR) to be submitted for decision making to DMRE.

iii) Summary of issues raised by I&APs

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

Table 8: Summary of issues raised by IAPs

Interested and Affected Parties **List the name of persons consulted in this column, and** **Mark with an X where those who must be consulted were in fact consulted**		**Date Comments Received**	**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.**
AFFECTED PARTIES	**X**	-	-	-	-
Landowner/s		-	-	-	-
Mr JC Wessels Makganyene No 667/1, 2, RE	X	Any comments received from the landowner (on the DBAR and EMPR) will be incorporated into the final BAR and EMPR.			
Lawful occupier/s of the land	-	-	-	-	-
N/A	-	N/A	N/A	N/A	-
Landowners or lawful occupiers on adjacent properties	**X**	-	-	-	-
Mr JL Claassens Makganyene No 667/3	X	Any comments received from Mr Claassens (on the DBAR and EMPR) will be incorporated into the final BAR and EMPR.			
Kouwater Boerdery (Pty) Ltd Metseatsididi No 666/RE, 2	X	Any comments received from Kouwater Boerdery (Pty) Ltd (on the DBAR and EMPR) will be incorporated into the final BAR and EMPR.			
CC Claassens Trust Vlakfontein No 433/RE	X	Any comments received from the CC Claassens Trust (on the DBAR and EMPR) will be incorporated into the final BAR and EMPR.			
Municipal councillor	**-**	-	-	-	-
Tsantsabane Local Municipality: Ward Councillor	X	Any comments received from the ward councillor (on the DBAR and EMPR) will be incorporated into the final BAR and EMPR.			
Municipality	**-**	-	-	-	-
Tsantsabane Local Municipality (TLM)	X	Any comments received from the TLM (on the DBAR and EMPR) will be incorporated into the final BAR and EMPR.			

Interested and Affected Parties List the name of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted		Date Comments Received	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.
Organs of state (Responsible for infrastructure that may be affected Roads Department, Eskom, Telkom, DWA e	-	-	-	-	-
Department of Roads and Public Works (DRPW)	X	Any comments received from the DRPW (on the DBAR and EMPR) will be incorporated into the final BAR and EMPR.			
Department of Water and Sanitation (DWS)	X	Any comments received from the DWS (on the DBAR and EMPR) will be incorporated into the final BAR and EMPR.			
Communities	No community were identified within the study area.				
Dept. Land Affairs	Any comments received from the Department of Land Affairs (on the DBAR and EMPR) will be incorporated into the final BAR and EMPR.				
Traditional Leaders	N/A	N/A	N/A	N/A	N/A
-	-	-	-	-	-
Dept. Environmental Affairs					
Department of Agriculture, Environmental Affairs, Rural Development and Land Reform (DAERD&LR)	X	Any comments received from the DAERD&LR (on the DBAR and EMPR) will be incorporated into the final BAR and EMPR.			
Other Competent Authorities affected					
Department of Economic Development and Tourism (DEDT)	X	Any comments received from the DEDT (on the DBAR and EMPR) will be incorporated into the final BAR and EMPR.			
Department of Labour (DoL)		Any comments received from the DoL (on the DBAR and EMPR) will be incorporated into the final BAR and EMPR.			

Interested and Affected Parties List the name of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted		Date Comments Received	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.
	X				
ZF Mgcawu District Municipality (ZFMDM)	X	Any comments received from the SFMDM (on the DBAR and EMPR) will be incorporated into the final BAR and EMPR.			
South African Heritage Resources Agency (SAHRA)	X	30 July 2021	SAHRA requested that an application specific Heritage Impact Assessment (HIA) be done that includes an archaeological component, palaeontological component and any other applicable heritage components.	Beyond Heritage was appointed to assess the study area and compile the HIA. Prof Marion Bamford conducted a desktop palaeontological impact assessment of the proposed study area. The findings of the specialists were incorporated into this report, the DBAR, that will be distributed for comments to SAHRA as well as the other stakeholders and I&AP's.	Part A(1)(h)(iv)(1)(c) Description of specific environmental features and infrastructure on the site – Site Specific Cultural and Heritage Environment. Part A(1)(k) Summary of Specialist Reports. Part A(1)(t)(i)(2) Impact on any national estate referred to in section 3(2) of the NHRA. Appendix G1 & G2
N/A					
INTERESTED PARTIES					
N/A					

iv) The Environmental attributes associated with the alternatives.

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

(1) Baseline Environment

(a) Type of environment affected by the proposed activity.

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

This section describes the biophysical, cultural and socio-economic environment that may be affected and the baseline conditions, which are likely to be affected by the proposed mining operation.

PHYSICAL ENVIRONMENT

CLIMATE

According to the saexplorer website, Postmasburg normally receives about 241 mm of rain per year, with most rainfall occurring mainly during summer. The chart below (lower left) shows the average rainfall values for Postmasburg per month. It receives the lowest rainfall (0 mm) in July and the highest (57 mm) in March. The monthly distribution of average daily maximum temperatures (centre chart below) shows that the average midday temperatures for Postmasburg range from 17°C in June to 32°C in January. The region is the coldest during July when the mercury drops to 0°C on average during the night. Consult the chart below (lower right) for an indication of the monthly variation of average minimum daily temperatures.

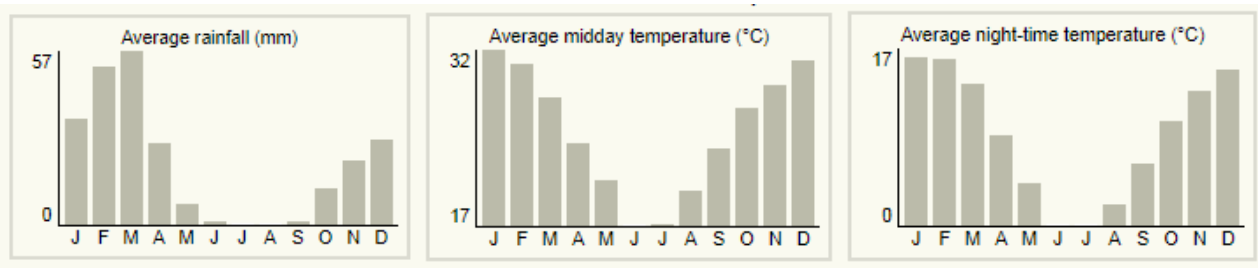

Figure 6: Statistical representation of the average rainfall, midday temperatures and night-time temperatures for the Postmasburg region (Chart obtained from saexplorer).

The dominant wind direction of Postmasburg is fairly constant ranging from a north to west-north-western wind, with the average wind speed being ±6 knots (11.11 km/h) as shown in the figure below.

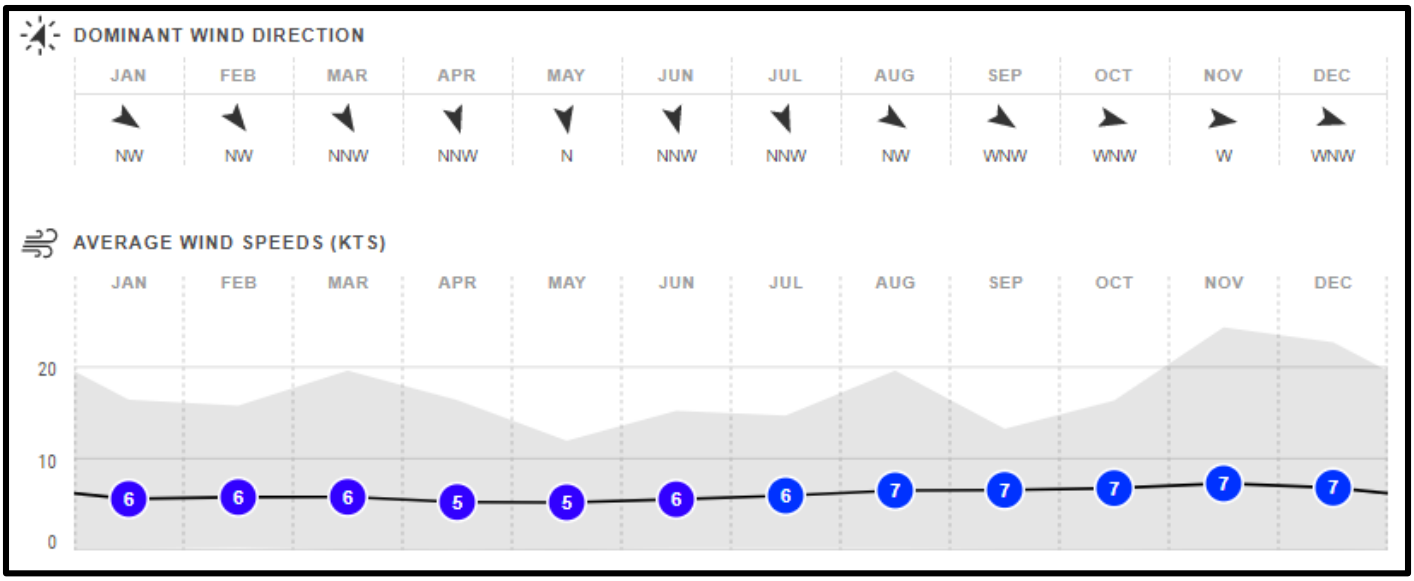

Figure 7: Image showing the dominant wind direction and average wind speed over a 12 month period for the Postmasburg area. (Image obtained from www.windfinder.com/windstatistics/postmasburg)

TOPOGRAPHY

(Information extracted from the Geological & Preliminary Exploration Report for Makganyane Resources, 2019)

The topography of the greater Postmasburg – Olifantshoek area is shown in the figure below. The area forms part of the inland plateau of South Africa with elevations generally at about 1 400 amsl. The topography is of the inselberg type, displaying rounded or sharp crested peaks and ridges projecting through sand or calcrete covered flats.

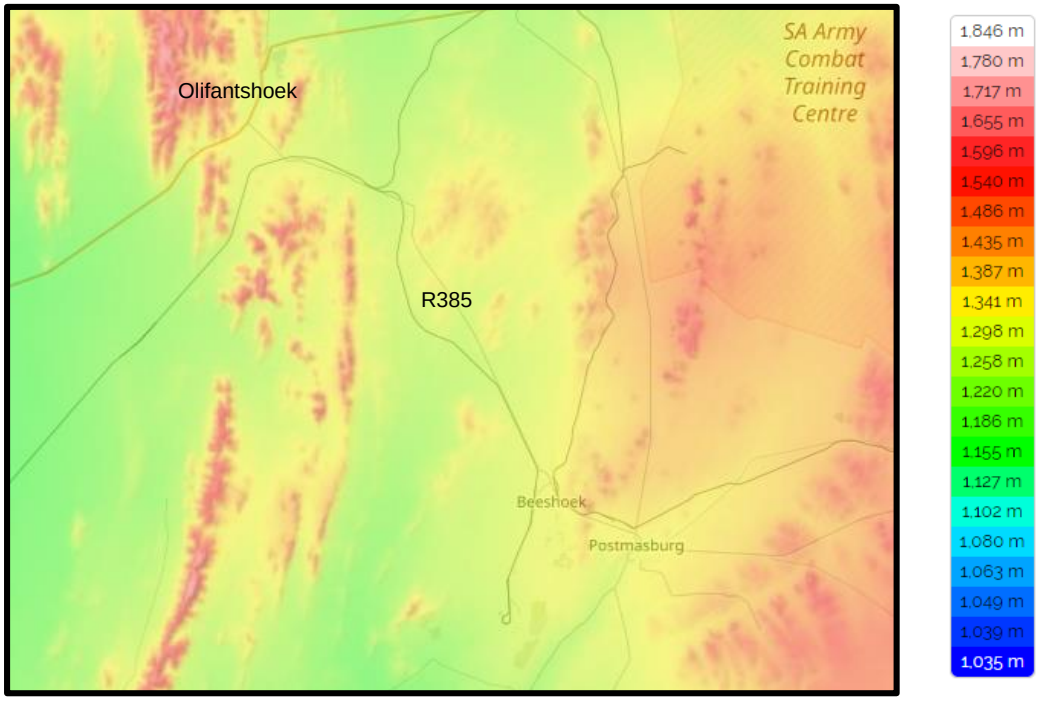

Figure 8: Map showing the topography of the greater Postmasburg – Olifantshoek area (image obtained from www.en-za.topographic-map.com/maps/7136/Postmasburg/).

Also refer to *Part A(1)(h)(iv)(c) Description of specific environmental features and infrastructure on the site – Site Specific Topography.*

VISUAL CHARACTERISTICS

The visual character of the greater study area mainly comprises of an agricultural setting intersected by mining, road-, railway- and electricity infrastructure. Through the years the area has become known for its manganese and iron ore potential and mines such as Kumba Iron Ore, Beeshoek-, Heuningkranz-, and Kolomela Mine were established. The towns of both Olifantshoek and Postmasburg have a low aesthetic value.

The immediate surrounding land uses, adjacent of the mining area, include: agricultural activities (grazing) and mining (Kumba Heuningkranz). A diamond mine (Metseatsididi) operates along the northern boundary of the farm, and the historic diamond mine on the Makganyene farm was never rehabilitated and remains as a landscape feature. The Applicant also holds a prospecting right over the property. In light of this, the aesthetic ambiance of the region is that of a rural area with natural landscapes altered, in some areas, by mining/prospecting.

Also refer to *Part A(1)(h)(iv)(c) Description of specific environmental features and infrastructure on the site – Site Specific Visual Characteristics.*

AIR AND NOISE QUALITY

Due to the low rainfall, the air quality of the study area is characterised as being dry, arid and dusty. Dust is the most important pollutant given the area's rural character predominantly affected by the agriculture and mining. The noise ambiance of the study area is classified as ambient rural or pastoral with noise levels mainly affected by traffic along the R385, railway traffic, farming equipment and mining/prospecting related operations.

Also refer to *Part A(1)(h)(iv)(c) Description of specific environmental features and infrastructure on the site – Site Specific Air and Noise Quality.*

GEOLOGY AND SOIL

(Information extracted from the Geological & Preliminary Exploration Report for Makganyane Resources, 2019)

1. REGIONAL GEOLOGY

The regional geology of the study area forms part of the Transvaal Super Group. The Transvaal Super Group was deposited in two structurally controlled basins i.e. Transvaal and Griqualand West.

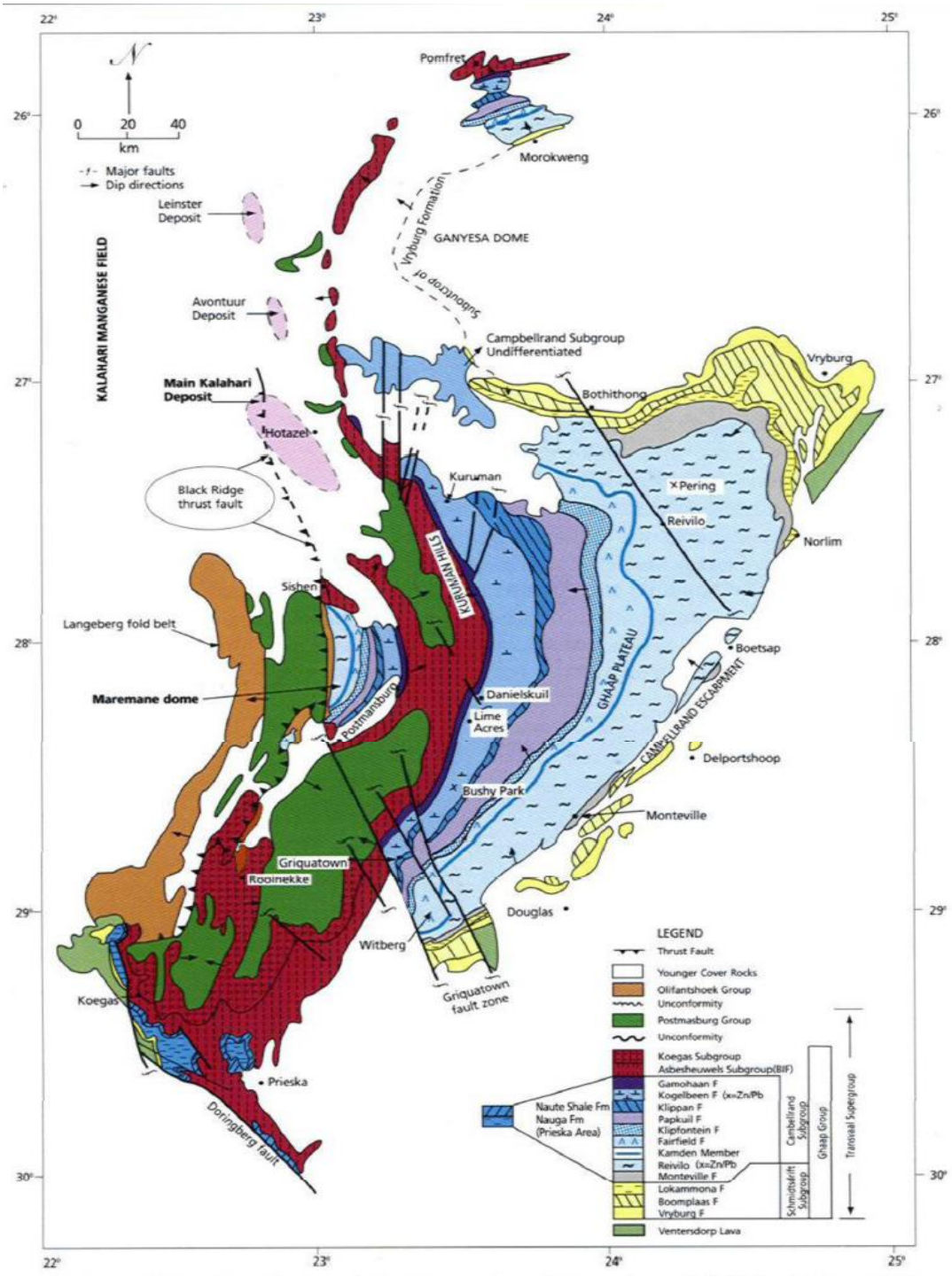

Figure 9: Geological map of Griqualand West (modified from Beukes 1986) (image obtained from Gamagara Resources (Pty) Ltd 2019).

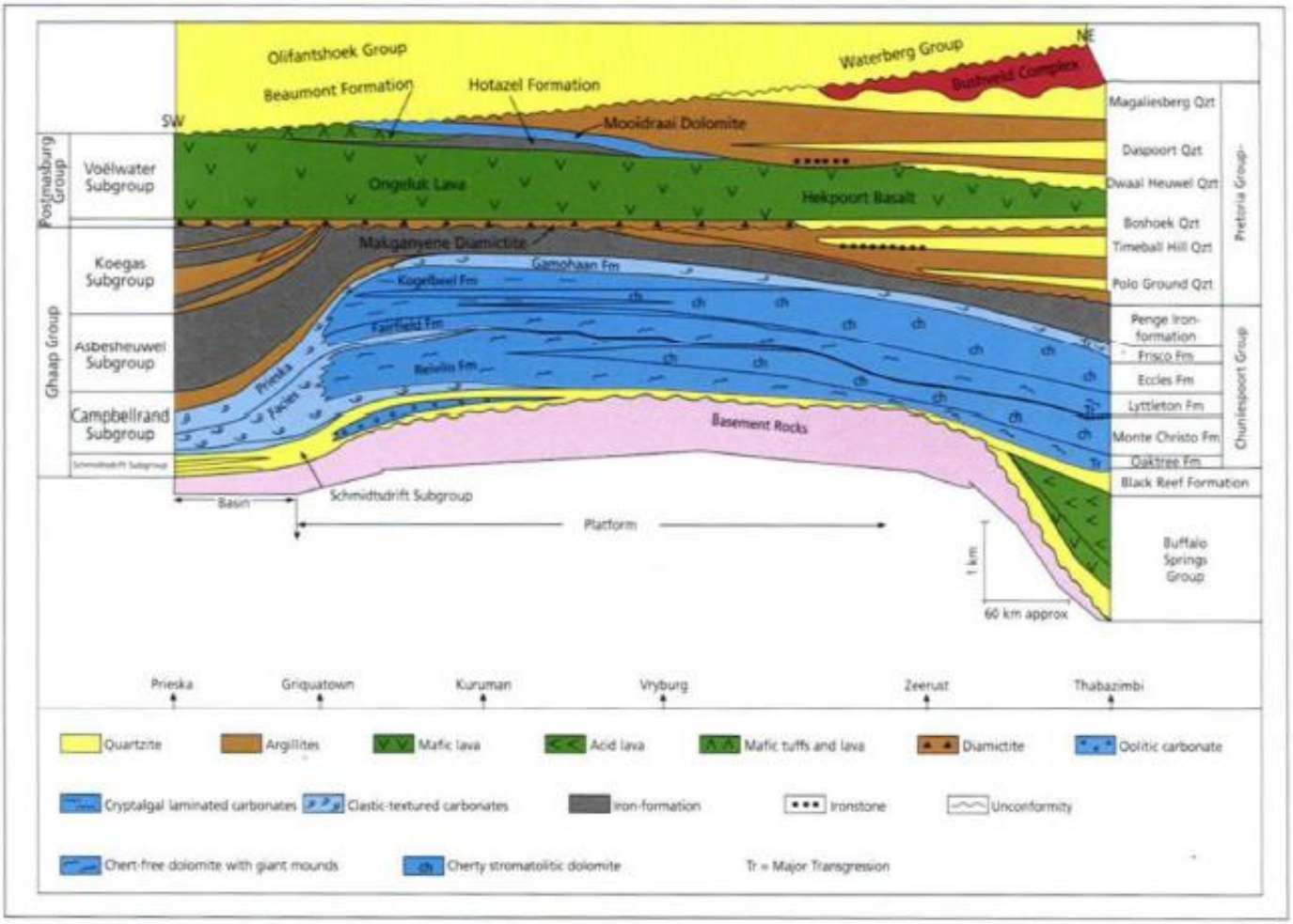

Figure 10: A southwest-northeast 600 km cross-section showing the simplified geology of the Transvaal Supergroup and the distribution of other important geological features (modified from Beukes 1983) (image obtained from Gamagara Resources (Pty) Ltd 2019).

The rock stratigraphy within the Griqualand West depository, forms part of the early Proterozoic-Transvaal Supergroup sequence. The Postmasburg Manganese Field is located along the western margin of the Kaapvaal Craton and on the eastern limb of the Maremane Dome.

In Griqualand West the succession can be broadly subdivided into a basal, chemical sedimentary unit, referred to as the Ghaap Group, which is overlain by a mixed volcanic-clastic-chemical sequence, known as the Postmasburg Group. The Ghaap and Postmasburg Groups represent two separate, major unconformity-bounded sequences (Cheney and Winter, 1995).

2. GHAAP GROUP

The Ghaap Group is subdivided, from the base upward, into the Schmidtsdrif Subgroup (interbedded siliclastics and carbonates), the Campbellrand Subgroup (carbonates), the Asbesheuwel Subgroup (iron formation) and the Koegas Subgroup (interbedded siliclastics and iron formations).

2.1 Schmidtsdrif Subgroup

The basal Schmitsdrif Subgroup comprises fluvially deposited feldspatic quartz arenites, shallow marine and intertidal quartz arenites as well as a platformal carbonate sequence (Beukes, 1979).

2.2 Campbellrand Subgroup

The Campbellrand Subgroup consists of stromaolitic dolomite and limestone platform facies, which interfingers down slope with carbonate turbidites. The turbidites have been ankerized and silicified to form banded ferruginous chert. Toward the south the turbidites interfinger with carbonaceous shale (Prieska facies), which, according to Beukes, relates to deposition within a euxinic basin, in front of the carbonate platform.

2.3 Asbesheuwel Subgroup

Shallow water carbonate deposition was terminated during a major transgression, which drowned the shelf, resulting in a fairly sudden transition from carbonates through cherts and into the banded iron formation of the Asbesheuwel Subgroup. Beukes, 1978 subdivided the Asbesheuwel Subgroup into the Kuruman Iron Formation at the base followed by the Griquatown Iron Formation at the top. According to Beukes the Kuruman Iron Formation was deposited within a deep shelf setting over the entire Kaapvaal Craton. It comprises an upward-shallowing sequence consisting of carbonaceous shale deposited in an euxinic basin, ankerite-banded chert, representing distal carbonate turbidites which was deposited in a transition zone, between the euxinic basin and the open shelf. Magnetite-hematite-chert micro banded rhythmite macrocycles containing interbedded stilpnomelane band- lutites, were deposited on the deep open shelf, while greenalite-siderite rhythmites mark the toe-of-slope and slope areas of a shallow water platform. The Ouplaas Member, which marks the top of the Kuruman Iron Formation, represents a clastic-textured shallow-water platform deposit.

The Griquatown Iron Formation overlies the Kuruman Iron Formation and consists of upward coarsening megacycles, deposited in environments that vary from low energy, subtidal to high energy, intertidal and lagoonal settings.

2.4 Koegas Subgroup

The Koegas Subgroup was only deposited down slope and within the deeper part of the basin toward the south (Prieska area) and is absent toward the north (Sishen). The Koegas Subgroup was deposited during a transgressional phase and comprises a quartz-chlorite-mudstone unit at the base followed upward by iron formations with

interbedded quartz-wackes, with more iron formations, containing interbedded carbonates toward the top. The Koegas Subgroup was subdivided by Beukes; (1978), from the base upward into the following formations:

- Pannetjie Formation: Quartz-chloritic mudstone.
- Dorasdale Formation: Iron-lutites.
- Kwakwas Formation: Greenalite-lutites and interbedded quartzwackes.
- Naragas Formation: Mudstones and carbonates.
- Rooinekke Formation: Iron band-lutites
- Nelani Formation: Mudstones with interbedded limestone, chert and grit beds

3. POSTMASBURG GROUP

Uplift and erosion of the platform strata took place prior to the deposition of the Makganyene Diamictite Formation at the base of the Postmasburg Group (Beukes, 1983, 1984). Visser (1971) and de Villiers and Visser (1977) considered the diamictite to be of glacial origin. The Postmasburg Group has been subdivided, from the base upward, into the following formations:

- Makganyene Formation (glacial diamictites).
- Ongeluk Formation (basaltic lavas).
- Hotazel Iron Formation (Banded iron stones, host to manganese deposits within the Kalahari Manganese Basin).
- Mooidraai Formation (dolomites).

The different formations within the Postmasburg Group, conformably follows on top of one another. During post Postmasburg times, the Postmasburg Group was exposed to intense weathering. The erosional unconformity progressively cuts down the Stratigraphy, moving from the north (Hotazel area) toward the south (Postmasburg area), truncating gradually the Mooidraai, the Hotazel, Ongeluk, Makganyene and Asbesheuwel Formations to finally rest on dolomites of the Campbellrand Subgroup on the Maremane Dome near Postmasburg.

4. OLIFANTSHOEK GROUP

The unconformity is overlain by the Olifantshoek Group, which comprises shales at the base (Mapedi Formation) followed by quartzites of the Lucknow Formation. In the Sishen-Postmasburg area the Olifantshoek Group, is referred to as the Gamagara Formation. The unconformity is marked by a hematitepebble conglomerate and shale unit. The Olifantshoek unconformity is of utmost economic importance within the area. Where it rests on the Asbesheuwel Subgroup, hematite iron ore was formed (Iscor and

Beeshoek), where it truncates the Campbellrand dolomites, manganese mineralization is developed (Postmasburg Manganese Field).

Also refer to *Part A(1)(h)(iv)(c) Description of specific environmental features and infrastructure on the site – Site Specific Geology and Soil.*

HYDROLOGY

(Information extracted from the Lower Vaal Water Management Area: Internal Strategic Perspective, October 2004)

The mining area falls within the Molopo Sub-Water Management Area (SWMA) which is managed as part of the Lower Vaal Water Management Area (WMA ID 20). Although the Molopo SWMA forms part of the Lower Vaal WMA, it does not form part of the model for the Vaal River System as drainage of surface water from the Molopo SWMA occurs in the direction of the Orange River and not the Vaal River. The Molopo SWMA is considered to be an endoeric area as flows from the Molopo River have not reached the Orange River in recorded history.

The bulk of the water used in this sub-catchment is from groundwater. The groundwater quality from most of the boreholes in the study area is fit for human and domestic animal use. Borehole yields in the calcrete aquifer generally vary from 0.2 to ±2 l/s. In the Heuningkranz area (adjacent to the Makganyane farm) two aquifer types have been identified. The first aquifer is described as "*a shallow, double porosity, unconfined or semi-confined aquifer within the upper 2 – 20 m of the geological profile*". The second aquifer is deeper occurring at depths exceeding 20 m. The aquifer is semi-confined to confined in some areas. (EXM Advisory Services (Pty) Ltd, 2018)

According to the National Freshwater Ecosystem Priority Areas (NFEPA) map as presented by SANBI, a NFEPA of conservation importance extends over the study area (see figure below). Two ephemeral drainage lines passes through the greater study area as shown in the figure below. The eastern drainage line feeds a small pan to the south, while the western drainage line feeds an extensive wetland area so the south-west of Postmasburg.

Also refer to *Part A(1)(h)(iv)(c) Description of specific environmental features and infrastructure on the site – Site Specific Hydrology.*

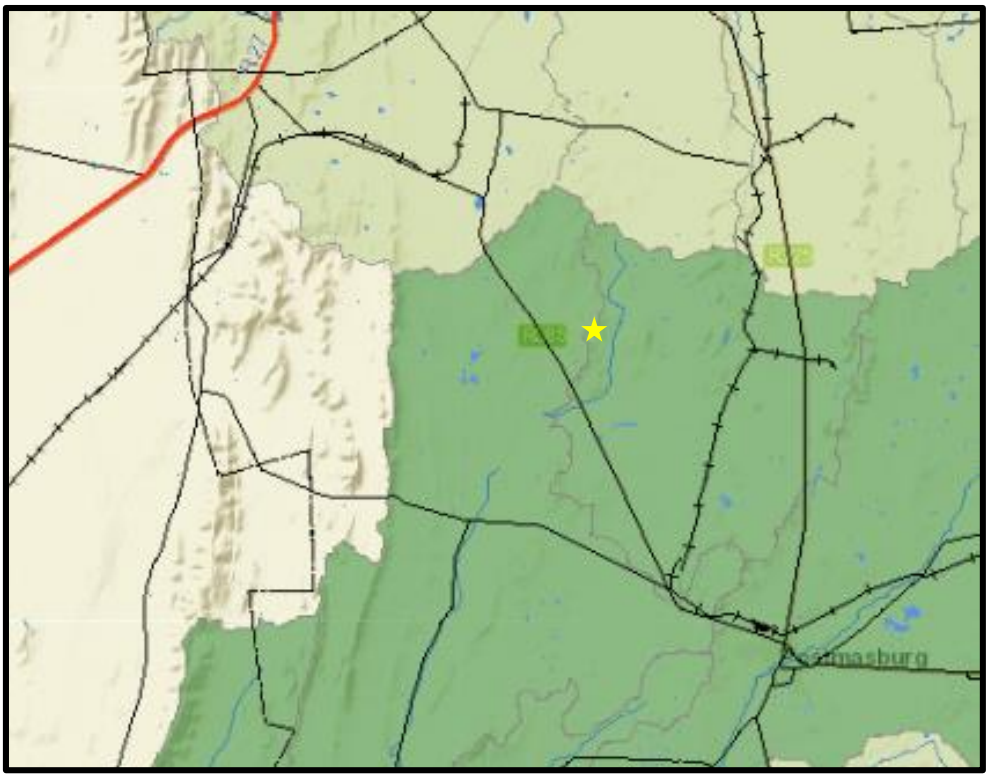

Figure 11: Map showing the position of the NFEPA (dark green polygon). The lighter green represents an Upstream FEPA and the yellow star shows the application area. (Image obtained from the BGIS Map Viewer – National Wetlands and NFEPA)

Figure 12: Satellite view of the two ephemeral drainage lines (blue lines) that passes to the east, and west of the study area, where the red polygon indicates the farm boundaries and the white polygon shows the mining permit application area (image obtained from Google Earth).

BIOLOGICAL ENVIRONMENT

MINING AND BIODIVERSITY

(Information extracted from the Mining and Biodiversity Guideline: Mainstreaming Biodiversity into the Mining Sector, Department of Environmental Affairs, Department of Mineral Resources, Chamber of Mines, 2013)

The Mining and Biodiversity Guideline, compiled by the South African Mining and Biodiversity Forum (SAMBF) provides the mining sector with a practical, user-friendly manual for integrating biodiversity considerations into planning processes and managing biodiversity during the developmental and operational phases of a mine area, from exploration through to closure.

When the study area is layered over the Mining and Biodiversity Map, the south-eastern corner of the Remaining Extent of the farm Makganyene No 667, as well as Portion 3 of the farm Makganyene No 667 falls over and area of highest biodiversity importance with a corresponding rating of highest risk for mining. The application area (red star in the figure below) does however not extend over an area of biodiversity importance according to the Mining and Biodiversity Map.

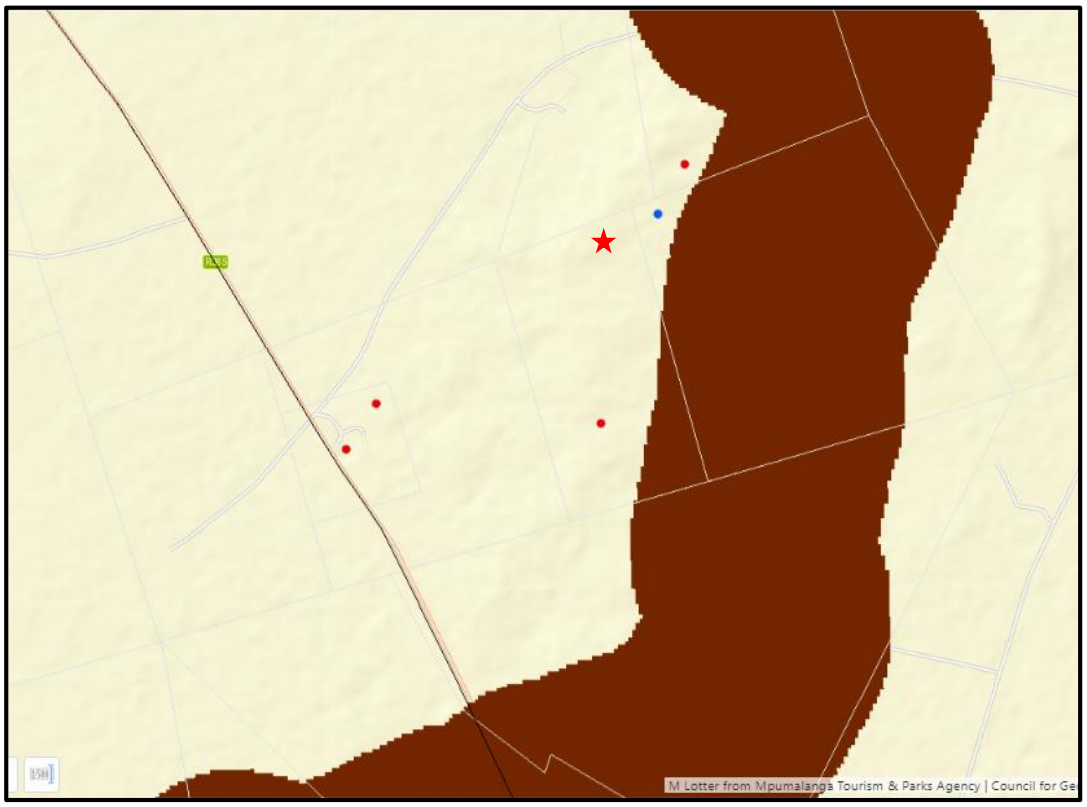

Figure 13: The Mining and Biodiversity importance map showing the mining application area (red star) in relation to the surrounding area, where the dark brown polygon shows an area of highest biodiversity importance with highest risk for mining that extends across the south-eastern corner of the Remaining Extent of the farm Makganyene No 667 as well as Portion 3 of the same farm (image obtained from the BGIS Map Viewer – Mining Guidelines).

Also refer to *Part A(1)(h)(iv)(c) Description of specific environmental features and infrastructure on the site – Site Specific Mining and Biodiversity Conservation Areas.*

BIODIVERSITY CONSERVATION AREAS

According to the Screening Report for Environmental Authorizations as required by the 2014 EIA Regulations (hereafter referred to as the "Screening Report"), the plant species sensitivity of the area is deemed to be of low significance, while the Terrestrial Biodiversity Sensitivity is indicated as Very High due to the area being classified as an Ecological Support Area (ESA).

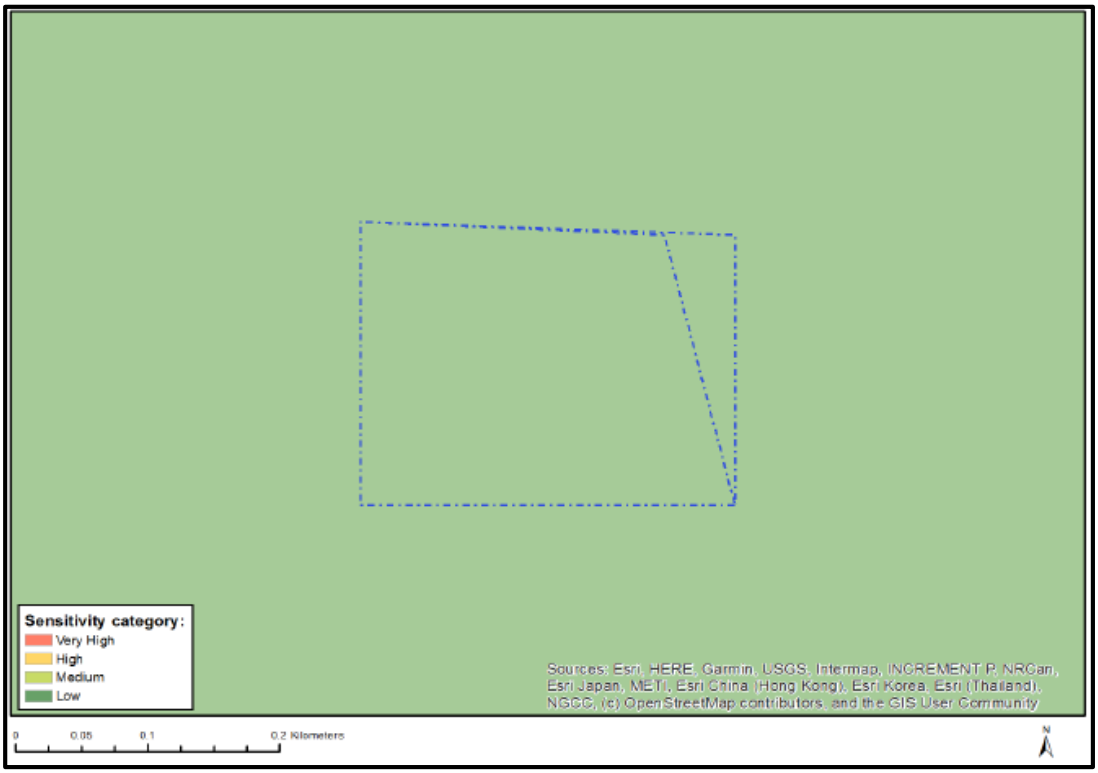

Figure 14: Screenshot of the Plant Species Theme of the Screening Tool showing the mining footprint (blue block) within an area of Low sensitivity. (Image obtained from the National Screening Tool).

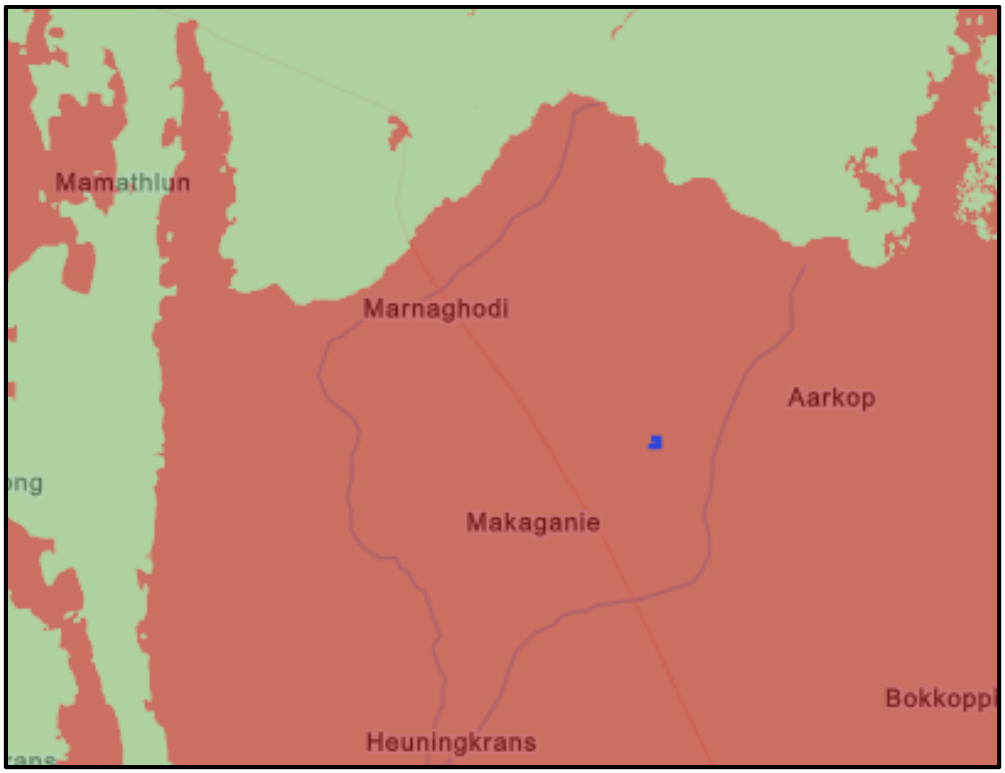

Figure 15: Screenshot of the Terrestrial Biodiversity Theme of the Screening Tool showing the study area (blue block) within an Ecological Support Area (red shaded part). (Image obtained from the National Screening Tool).

The Lexicon of Biodiversity Planning in South Africa provides the following definition for an ESA:

- Ecological Support Area (ESA)*: "an area that must be maintained in at least fair ecological condition (semi-natural/moderately modified state) in order to support the ecological functioning of a CBA or protected area, or to generate or deliver ecosystem services, or to meet remaining biodiversity targets for ecosystem types or species when it is not possible or not necessary to meet them in natural or near-natural areas."*

Also refer to *Part A(1)(h)(iv)(c) Description of specific environmental features and infrastructure on the site – Site Specific Mining and Biodiversity Conservation Areas.*

GROUNDCOVER

According to Mucina and Rutherford (2012) two vegetation types extends into the relevant portion of the earmarked property i.e. the Kuruman Mountain Bushveld (SVk 10), and the Olifantshoek Plains Thornveld (SVk 13).

Figure 16: National vegetation cover map showing the distribution of the Kuruman Mountain Bushveld (light sandy colour), and the Olifantshoek Plains Thornveld (light grey-brown colour) that extends across the relevant section of the earmarked property (red polygon). The mining area is shown by the yellow star. (Image obtained from BGIS Map Viewer – National Vegetation Map).

1. KURUMAN MOUNTAIN BUSHVELD (SVK 10)

The Kuruman Mountain Bushveld is characterized by rolling hills with generally gentle to moderate slopes and hill pediment areas with an open shrubveld with *Lebeckia macrantha* prominent in places.

Some of the important taxa found in this vegetation type include Se*arsia lancea, S. pyroides, Diospyros austro-africana, Euclea crispa, E. undulate, Olea earopaea, Tarchonanthus camphoratus, Amphiglossa triflora, Anthospermum rigidum, Helichrysum zeyheri;* Grammnoids*: Andropogon chinensis, Anthephora pubescens, Aristida congesta, Digitaria eriantha, Themeda triandra.* Biogeographically Important Taxa: *Lebeckia macrantha* (Griqualand West endemics), *Tarchonanthus obovatus, Euphorbia wilmaniae, E. planiceps, Digitaria polyphylla, Sutera griquensis.*

The vegetation type is classified as Least Threatened and according to Mucina and Rutherford (2012) none of it is conserved in statutory or private conservation areas. A conservation target of 16% was set for the vegetation type.

2. OLIFANTSHOEK PLAINS THORNVELD (SVK 13)

The Olifantshoek Plains Thornveld is a very wide and diverse unit on plains with usually open tree and shrub layers with for example *Vachellia luederitzii, Boscia albitrunca* and *Searsia tenuinervis*, and with a usually sparse grass layer.

Some of the important taxa found in this vegetation type include *Vachellia erioloba, V. mellifera, Boscia albitrunca, Terminalia sericea, Lycium hirsutum, Rhigozum obovatum, Searsia tridactyla, Tarchonanthus camphoratus, Aptosimum procumbens, Grewia retinervis, Solanum tomentosum.* Grammnoids*: Schmidtia papophoroides, Stipagrostis uniplumis, Aristida congesta, Digitaria eriantha.* Biogeographically Important Taxa: *Vachellia luederitzii, Lebeckia macrantha, Hermannia burchelli, Justicia puberula, Tarchonanthus obovatus.*

The vegetation type is classified as Least Threatened and according to Mucina and Rutherford (2012) only 0.3% is statutorily conserved in the Witsand Nature Reserve. Approximately 1% of the vegetation type has been transformed and the occurrence of erosion is very low. A conservation target of 16% was set for the vegetation type.

Also refer to *Part A(1)(h)(iv)(c) Description of specific environmental features and infrastructure on the site – Site Specific Groundcover*.

FAUNA

The study area is mainly used for stock grazing. Apart from the domestic animals and game, the indigenous faunal action of the area is high and shows a rich diversity with various protected species still present. The following faunal species are known to occur in/around the study area (non-exhaustive list):

Mammals:

- Aardvark (*Orycteropus afer*)
- Bat-eared Fox (*Otocyon megalotis*)
- Black-footed Cat (*Felis nigripes*) (VU)
- Bushveld Gerbil (*Gerbilliscus leucogaster*)
- Cape Fox (*Vulpes chama*)
- Cape Porcupine (*Hystrix africaeaustralis*)
- Desert Pygmy Mouse (*Mus indutus*)
- Ground Squirrel (*Xerus inauris*)
- Horses (*Equus* spp.)
- Kudu (*Tragelaphus strepsiceros*)
- Namaqua Rock Mouse (*Aethomys namaquensis*)

- Slender Mongoose (*Galerella sanguinea*)
- Smith's Red Rock Hare (*Pronolagus rupestris*)
- Southern Multimamate Mouse (*Mastomys coucha*)
- Springbok (*Antidorcas marsupialus*)
- Springhare (*Pedetes capensis*)
- Steenbok (*Raphicerus campestris*)
- Yellow Mongoose (*Cynictis penicillata*)
- Warthog (*Phacochoerus africanus*)

Birds:

- African March-harrier *(Circus ranivorus)*
- Black Stork *(Ciconia nigra)*
- Chestnut-banded Plover *(Charadrius pallidus)*
- Kori Bustard (*Ardeotis kori*) (NT)
- Lanner Falcon *(Falco biarmicus)*
- Lesser Kestrel *(Falco naumanni)*
- Martial Eagle *(Polemaetus bellicosus)* (VU)
- Ostrich (*Struthio camelus*)
- Secretary Bird (*Saggittarius sepentarius*) (VU)
- Tawny Eagle *(Aquila rapax)*
- Yellow-billed Stork *(Mycteria ibis)*

Invertebrates:

- Baboon Spiders
- Boomslang (*Dispholidus typus typus*)
- Burrowing Scorpions
- Namaqua Plated Lizard (*Gerrhosaurus typicus*)
- Namaqua Sand Lizzard (*Pedioplanis namaquensis*)
- Striped Skaapsteker (*Psammophylax tritaeniatus*)

According to the Screening Report for Environmental Authorizations as required by the 2014 EIA Regulations, the animal species sensitivity of the area is deemed to be of low significance as shown in the figure below.

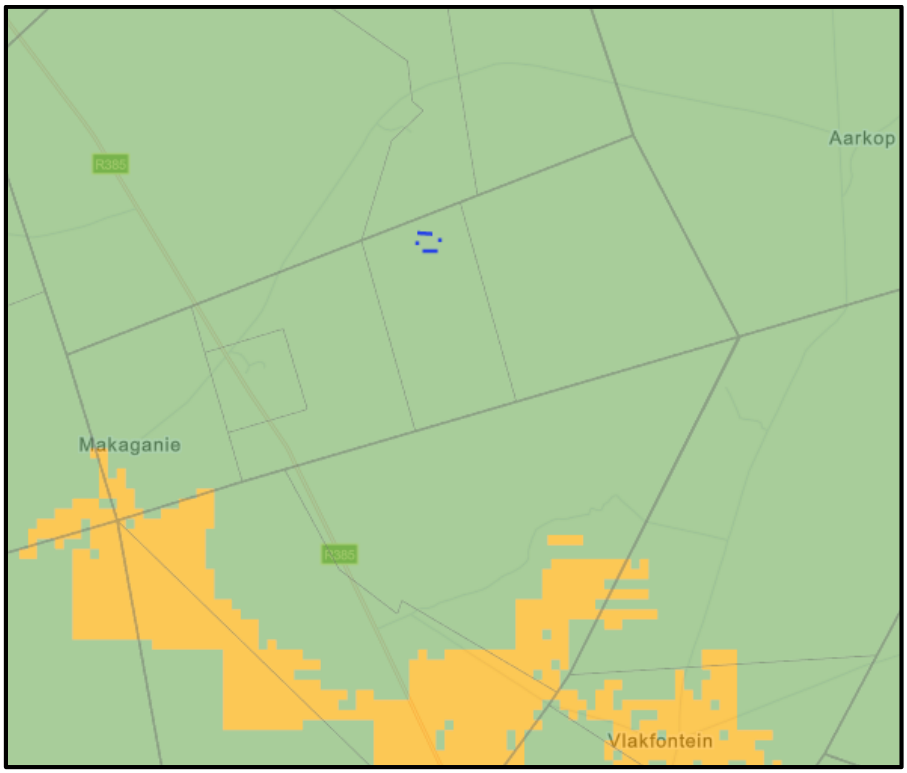

Figure 17: Screenshot of the Animal Species Theme of the Screening Tool showing the study area (blue block) within an area of Low significance (green shaded part). (Image obtained from the National Screening Tool).

Also refer to *Part A(1)(h)(iv)(c) Description of specific environmental features and infrastructure on the site – Site Specific Fauna.*

HUMAN ENVIRONMENT:

CULTURAL AND HERITAGE ENVIRONMENT

(Information extracted from the Heritage Impact Assessment for the Proposed Makganyane Mining Permit, Northern Cape Province, 2021 – Appendix G1 as well as the Palaeontological Impact Assessment for the Mining Rights Application for Farm Makganyene 667, Kuruman District, Northern Cape Province – Appendix G2)

The archaeological record for the greater study area consists of the Stone Age and Iron Age.

Stone Age:

South Africa has a long and complex Stone Age sequence of more than 2 million years. The broad sequence includes the Later Stone Age, the Middle Stone Age and the Earlier Stone Age. The larger study area has a wealth of pre-colonial archaeological sites (Morris & Beaumont 2004). Famous sites in the region include the world renowned Wonderwerk Cave to the north of the study area. Closer to Kuruman two shelters on the northern and southern faces of GaMohaan (in the Kuruman Hills north west of the town) contain Later Stone Age remains and rock

paintings. Rock art is known to occur at Danielskuil to the north east and on Carter Block (Morris 2008). Middle Stone Age material is on record around the study area.

According to Morris (2005) in the immediate area to the north of the study area, the Earlier Stone Age is represented by eleven known sites (Bruce, Kathu, Uitkoms, Sishen, Demaneng, Lylyveld and Mashwening); the Middle Stone Age by five sites (all in the vicinity of Kathu); and the Later Stone Age by ten sites (one on King, one at Mashwening and eight at Kathu). Rock engravings have been identified from Sishen and Bruce (the Bruce site was salvaged and recorded by Fock & Fock 1984), as well as Beeshoek, to the east of the study area (Fock & Fock 1984; Morris 1992; Beaumont 1998). Specularite sources are known on Demaneng and Lylyveld, and were mined in Stone Age times at a site on Doornfontein to the east of the study area (Beaumont 1973; Beaumont & Boshier 1974) and at Tsantsabane to the east of Postmasburg (Beaumont 1973; Thackeray et al. 1983): numerous other specularite workings have also been recorded (Beaumont 1973).

Iron Age:

Iron Age expansion southwards past Kuruman into the Ghaap plato and towards Postmasburg dates to the 1600's (Humphreys, 1976 and Thackeray, 1983). Definite dates for Tswana presence in the Postmasburg area are around 1805 when Lichtenstein visited the area and noted the mining activities of the Tswana (probably the Thlaping) tribes in the area. The Thlaro and Thlaping settled the area from Campbell in the east to Postmasburg and towards the Langeberg close to Olifantshoek in the north west before 1770 (Snyman, 1988). The Korana expansion after 1770 started to drive the Thlaro and Thlaping further north towards Kuruman (Shillington, 1985); Morris (2005) indicated that three Iron Age sites close to the study area are on record (Demaneng, Lylyveld and Kathu).

Historical Information:

Rock paintings in the area serve as evidence that the hunter gatherer Bushmen had inhabited Griqualand West for centuries. In the 1770s, the Korana (people of Nama ancestry) moved into the Postmasburg area and disrupted the Bushmen's way of life. The Korana regularly visited a primitive mine in the Blinkklipkop, which today forms part of the town of Postmasburg, to exploit shimmering substances, namely hematite and specularite, which were mixed with fat and applied to the skin to give a sought-after shiny red appearance. With the later arrival of the Tswana, Korana, Griqua and Europeans the Bushmen gradually emigrated to the Kalahari, Botswana and Namibia. (Snyman 1983: Foreword, 1-3).

The Tswana (Western Sotho) invaded the Northern Cape about 500 years ago, but the later Hay district in which Postmasburg was located was only occupied in the early 1800s. Long before settling in this area the Tswana also undertook journeys to Blinkklipkop to mine for the cosmetic substance that they called sibilo.

In the 1820s the Griqua leader Andries Waterboer was able to expel his enemies, the Bergenaars of the Langeberge, from Blinkklip, as the area was called at the time. This became a permanent outpost of the Griqua tribe. By the 1830s the Blinkklip population had grown to the extent that missionary of the London Mission Society, John Baillie, was stationed there for a time. Nikolaas Waterboer succeeded his father in 1853, and after this the tribe's authority in the area started to wane. Waterboer and his tribe became British subjects in 1871 after the British annexed Griqualand West. The discovery of diamonds further paved the way for white settlement in this district. (Snyman 1983: 4-5; Breutz 1963: 8)

Farms were surveyed by the British in the Griekwastad district in the 1870s, and between 1876 and 1878 the first farms owned by Europeans were purchased in this area. It was only in 1891 that 82 town plots were surveyed around the existing police station at Blinkklip. In the same year members of the church petitioned the Commissioner of Crown Lands to rename this town Postmasburg, in remembrance of Professor Dirk Postma, a minister of the Dutch Reformed Church in South Africa. This name change was affected in April 1892. (Snyman 1983: 10).

The manganese fields in the Postmasburg area were opened for prospecting in 1922, and this greatly boosted the development of the town and caused an influx of new residents. The economic depression of the 1930 adversely affected mining in the area, but the town economy could still rely on the agricultural sector. Postmasburg became a municipality in 1936. (Snyman 1983: 12)

Cultural Landscape:

Historical land use and the cultural landscape are linked since the cultural landscape is shaped to some extent by the history of the area. The farm is used for the farming of livestock in recent years, evident by fences and watering holes. Historical maps indicate older mining activities in the surrounding area with no developments in the project area.

Palaeontology:

The South African Heritage Resources Agency (SAHRA) compiled the Palaeontological (fossil) Sensitivity Map (PSM) to guide developers, heritage officers

and practitioners in screening palaeontologically sensitive areas at the onset of a project. When the footprint of the proposed mining area is placed on the PSM, it shows the study area to extend over an area of moderate (green) concern as presented in the figure below.

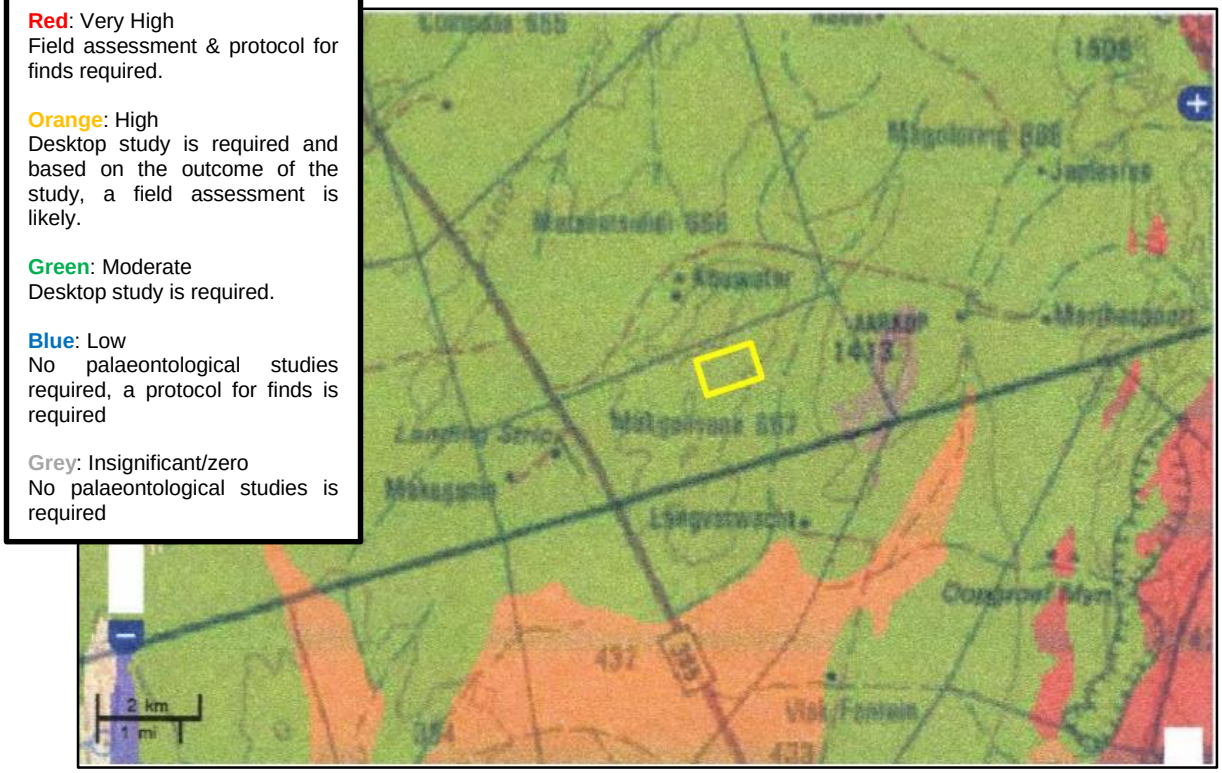

Figure 18: The SAHRA palaeontological sensitivity map shows the mining footprint (yellow block) falls in an area of moderate (green) concern (image obtained from the PIA).

Also refer to *Part A(1)(h)(iv)(c) Description of specific environmental features and infrastructure on the site – Site Specific Cultural and Heritage Environment.*

SOCIO-ECONOMIC ENVIRONMENT

(Information extracted from the ZF Mgcawu District Municipality Draft Integrated Development Plan 2017- 2022 – Annual Review 2018/2019)

The study area is located within ward 6 of the Tsantsabane Local Municipality (TLM). The TLM is one of six local municipalities within the ZF Mgcawu District Municipality (ZFMDM) that is classified as a Category C municipality of the Northern Cape Province. The seat of the TLM is in Postmasburg with the municipal area including the towns/settlements of Boichoko, Postdene, New Town, Stasie, Groen Water, Skyfontein, Jean Heaven, Marenane, and Beeshoek.

According to the revised population estimates based on the 2011 (Statistics South Africa, 2011), the TLM has a population of 35 093 (compared to the 2001 Census estimate of 27 082). This population accounts for 12% of the total population residing

in the ZF Mgcawu District, making it the third most populated local municipality in the district following the //Khara Hais Local Municipality and the Kai Garib Local Municipality. The TLM has a population growth rate of 2.59%, compared to the 17.8% growth rate of the ZFMDM. South Africa as a whole is estimated to have an average annual growth rate of 1.4% which is less than that of TLM's growth rate.

Gender Profile

The Pie Chart below indicates that gender ratio in TLM is comprised of 52.3% males and 47.7% females (StatsSA). The age/sex distribution of the TLM shows the highest number of people in the TLM area between the age of 0 – 29 years of age.

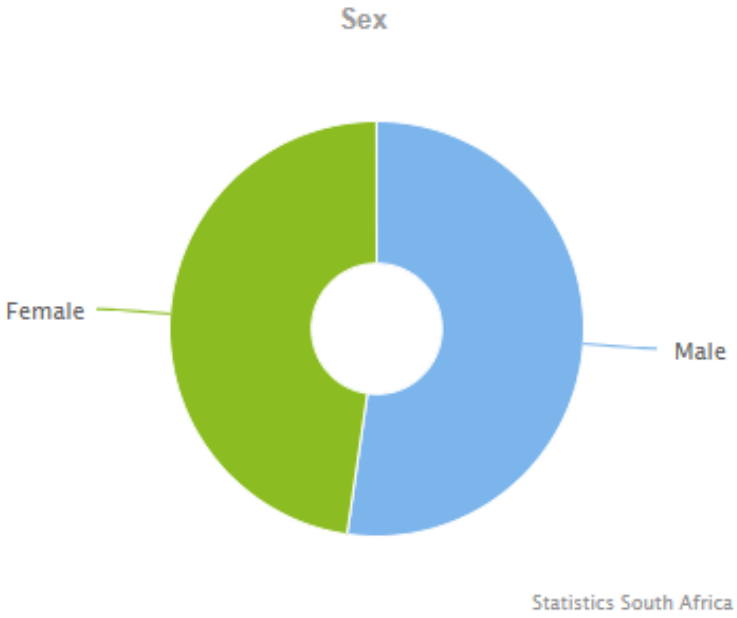

Figure 19: Gender profile (image obtained from Statistics South Africa).

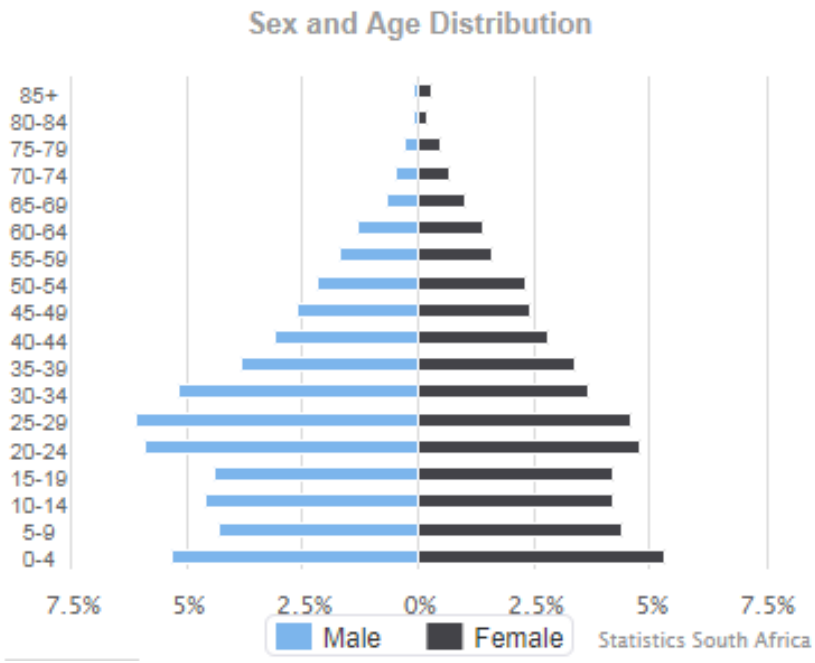

Figure 20: Gender and age distribution profile (image obtained from Statistics South Africa).

Population Profile

Below is a pie chart which indicates the total black African population of TLM at 52.8%, Coloured at 37.6%, Asian/Indian at 0.6% and White population at 8.4%. The Indian/Asian and others form the lowest proportions of the population with the former accounting for 0.6% and the latter 0.6%.

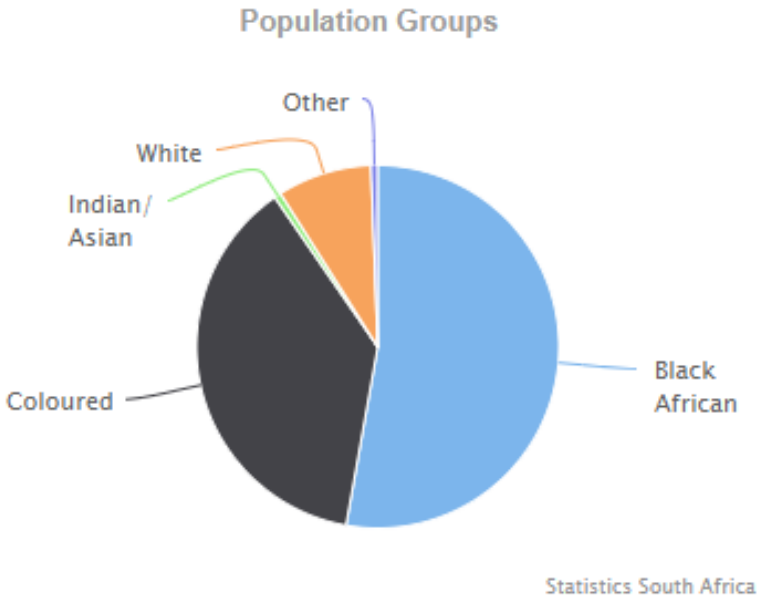

Figure 21: Population profile of the Tsantsabane municipal area (image obtained from Statistics South Africa).

Economic Profile

The TLM is well known for being rich in minerals, and for its mining, agriculture, manufacturing and farming sectors. The construction of the Anglo American Kumba Iron Ore's Kolomela mine has bought an implosion of development to the area. Eighteen point five percent of the average household income of the TLM range between R 19 601 – R 38 200, followed by an average income of R 38 201 – R 76 400 at 16.5%, while 14.2% of the households registered an income of R 74 401 – R 153 800 as shown below.

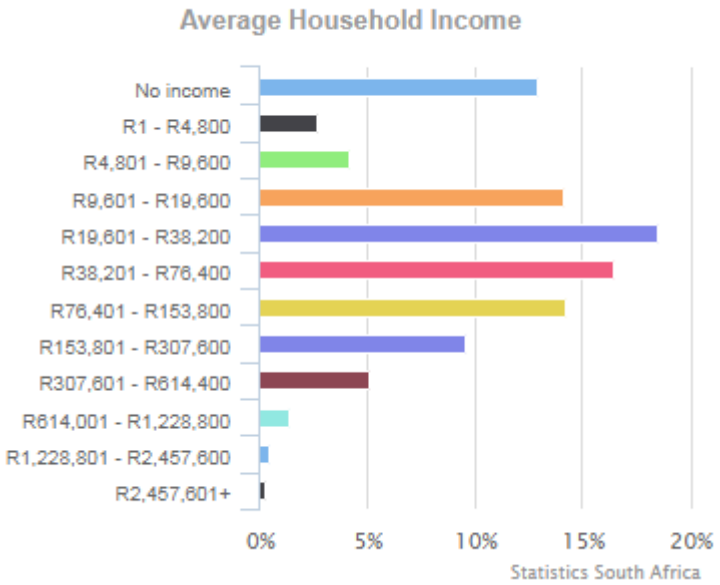

Figure 22: Average Household Income profile of the Tsantsabane municipal area (image obtained from Statistics South Africa).

The 2011 statistics showed a considerable decrease in the youth unemployment rate of the municipality from 43.1%, in 2001, to 32.3%. The average unemployment rate of the TLM decreased from 33.9% (2001) to 26.1% in 2011.

The ZFMDM accounts for 30% of the Northern Cape economy. As mentioned earlier, the economic activities of the TLM comprise of Agriculture, Livestock Farming, Irrigation Farming, Tourism & Heritage, Eco-adventures and Safaris, and Mining. The main agriculture related activity is livestock farming that occurs mainly on large farms, as a result of the low carrying capacity, where farming is extensive and mainly privately owned. The tourism industry is noted as the fastest growing component of the economy of the ZFMDM (2012 – 2017). Mining is one of the major sectors in the ZFMDM and is found in all municipalities. Within the TLM limestone, asbestos, iron, manganese, and gemstones (diamonds) are mined.

Education Levels

Thirteen point seven percent of the population above the age of 20 has no schooling, 25.3% has obtained matric and 6.3% obtained higher education. The matric rate increased from 16.7% in 2001 to 25.3% in 2011, the no schooling rate decreased from 24.2% to 13.7% and the Higher Education increased from 4.1% to 6.3%.

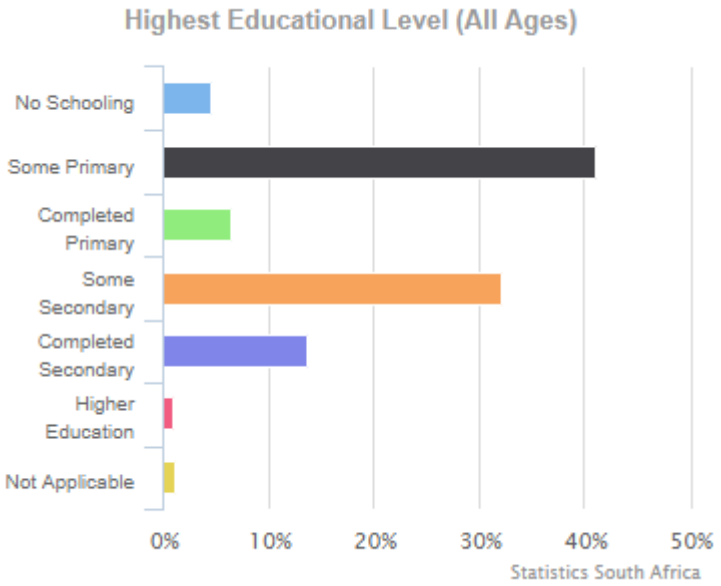

Figure 23: Average Household Income profile of the Tsantsabane municipal area (image obtained from Statistics South Africa).

(b) Description of the current land uses

The farm Makganyene No 667 is situated in a rural setting. The open cast pit on Portion 2 (a portion of Portion 1) of Makganyene No 667 serves as a landmark of the intermittent diamond mining that took place over a period of 69 years from the 1920's. The R385 provincial road crosses through Portions 1 and 2 of Makganyene No 667. The land use of the property mainly comprises of livestock and game farming.

Economic deposits (past and present) of the greater study area comprises of the following:

- Iron (Postmasburg and Sishen);
- Manganese (Kalahari Manganese Basin and the Postmasburg Manganese Field);
- Crocidolite (Asbesheuwel Subgroup);
- Zinc/Lead (Pering and Bushy Park);
- Diamonds (Finch and Postmasburg); and
- Limestone deposits (Lime Acres and Danielskuil).

The immediate surrounding land uses, adjacent of the proposed mining area, include: agricultural activities (grazing) with the occasional hunting of the owner's game. A

diamond mine (Metseatsididi) operates north-east of the mining footprint. The following table provides a description of the land uses and/or prominent features that occur within a 500 m radius of the mining footprint:

Table 9: Land uses and/or prominent features that occur within/within 500 m radius of proposed mining area.

LAND USE CHARACTER	YES	NO	DESCRIPTION
Natural area	**YES**	-	The study area is surrounded by natural areas used for agricultural purposes.
Low density residential	-	**NO**	-
Medium density residential	-	**NO**	-
High density residential	-	**NO**	-
Informal residential	-	**NO**	-
Retail commercial & warehousing	-	**NO**	-
Light industrial	-	**NO**	-
Medium industrial	-	**NO**	-
Heavy industrial	-	**NO**	-
Power station	-	**NO**	-
High voltage power line	-	**NO**	-
Office/consulting room	-	**NO**	-
Military or police base / station / compound	-	**NO**	-
Spoil heap or slimes dam	-	**NO**	-
Quarry, sand or borrow pit	-	**NO**	**-**
Dam or reservoir	-	**NO**	**-**
Hospital/medical centre	-	**NO**	-
School/ crèche	-	**NO**	-
Tertiary education facility	-	**NO**	-
Church	-	**NO**	-
Old age home	-	**NO**	-
Sewage treatment plant	-	**NO**	-
Train station or shunting yard	-	**NO**	-
Railway line	-	**NO**	**-**
Major road (4 lanes or more)	-	**NO**	The R385 provincial gravel road crosses the Makganyene farm.
Airport	-	**NO**	-
Harbour	-	**NO**	-
Sport facilities	-	**NO**	-
Golf course	-	**NO**	-
Polo fields	-	**NO**	-
Filling station	-	**NO**	-
Landfill or waste treatment site	-	**NO**	-
Plantation	-	**NO**	-
Agriculture	**YES**	-	The mining area forms part of an active farm.
River, stream or wetland	-	**NO**	-
Nature conservation area	-	**NO**	-
Mountain, hill or ridge	**YES**	-	The mining area is situated on one of the outcrops on the farm.
Museum	-	**NO**	-
Historical building	-	**NO**	-
Protected Area	-	**NO**	-
Graveyard	-	**NO**	**-**
Archaeological site	-	**NO**	**-**
Other land uses (describe)	-	**NO**	-

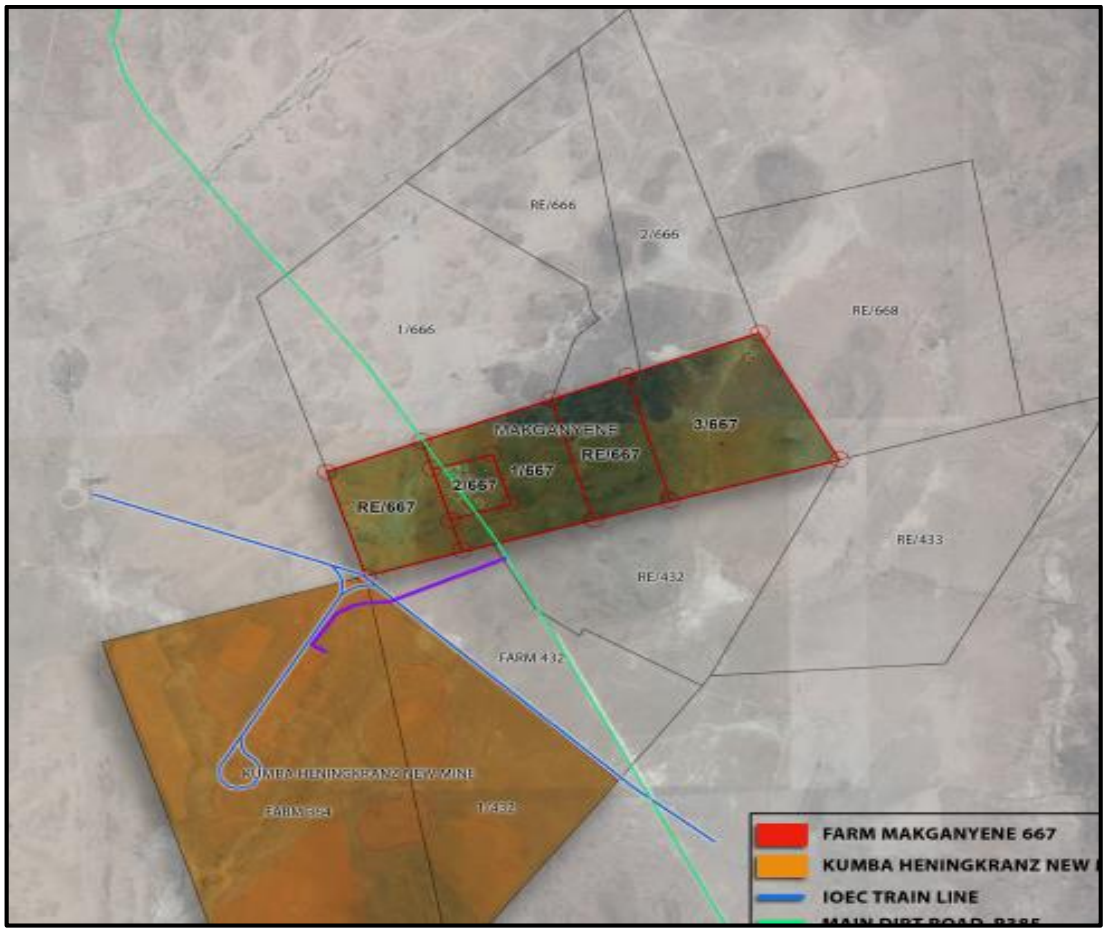

Figure 24: Map showing the position of the Heuningkranz mine in relation to the Makganyane property.

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

SPECIFIC ENVIRONMENTAL FEATURES

SITE SPECIFIC TOPOGRAPHY

The topography of the proposed mining area gradually slopes in elevation from the north-western corner towards the south-eastern corner as shown in the figure below.

The mean elevation of the study area ranges from 1 361 amsl (highest point) in the north-west to 1 332 amsl (lowest point) at the south-eastern corner. The figure below shows an elevation loss of -29.7 m across the 325 m distance (north-western to south-eastern corner), a maximum slope of -17.7% with an average slope of -9.0%.

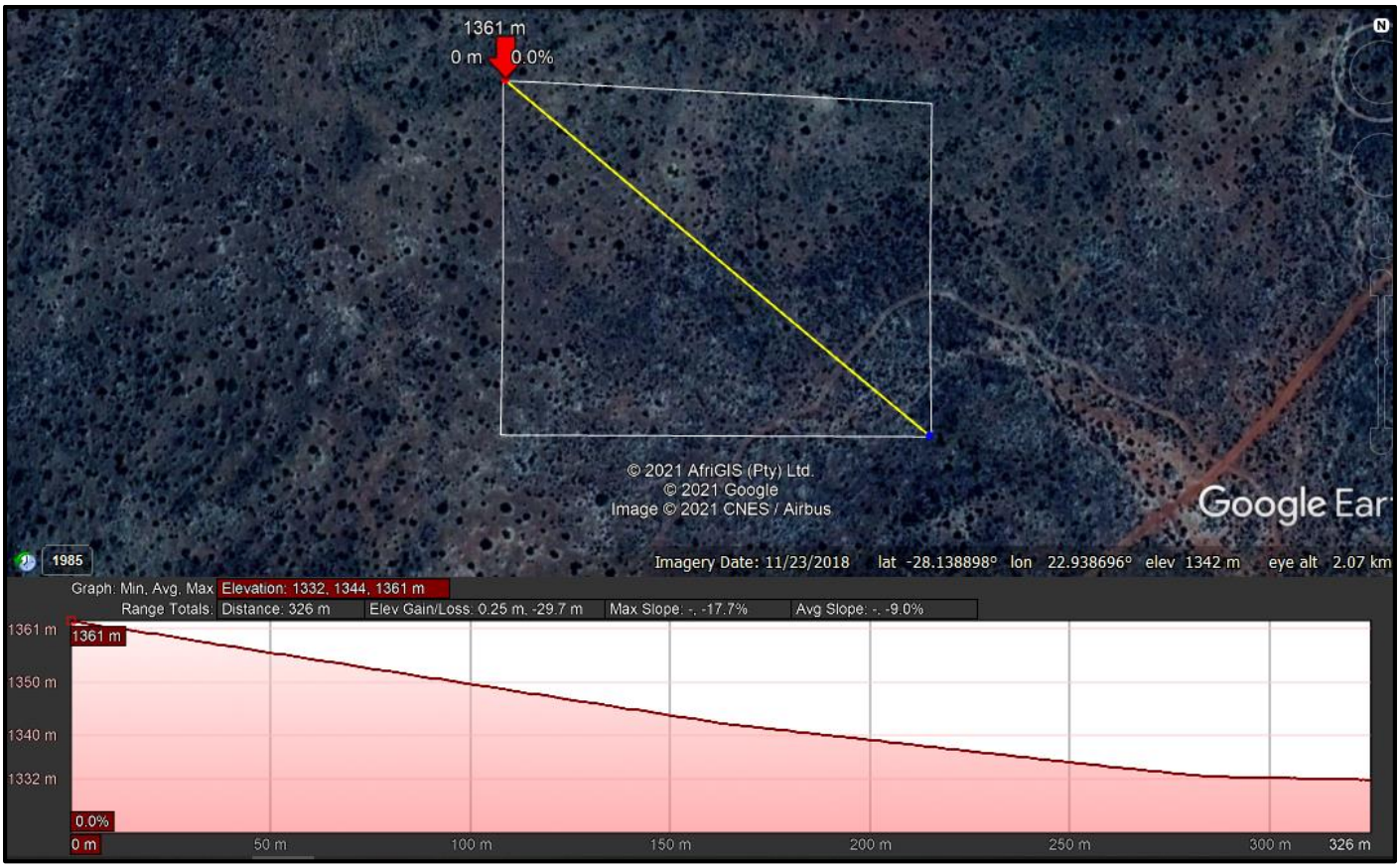

Figure 25: Elevation profile of the proposed mining footprint (image obtained from Google Earth).

Should the proposed project be approved, the excavation will cut into the southern facing slope of the hill that will affect the topography in that a depression will be created with stepped side walls as mining progress. Due to the impracticality of importing large volumes of fill material to restore the excavation to its original topography, the rehabilitation option (upon closure) is to render the pit safe and leave it as a minor landscape feature.

Based on similar scenarios in the larger study area, and the abandoned diamond mine excavation on Portion 2 (a portion of Portion 1) of Makganyene No 667, it is proposed that the excavation will most likely hold some rainwater upon closure for certain parts of the year. In this arid climate the potential of an additional water source can be of high importance to the landowner to which the mining footprint will be returned once the closure certificate was issued by the DMRE. In light of this, even though the proposed activity will have a residual impact on the topography of the footprint area, the significance of the impact is believed to be of low concern.

SITE SPECIFIC VISUAL CHARACTERISTICS

The following figures show the viewshed analysis for the earmarked footprint within a ±10 km radius around the study area. The green shaded areas indicate the positions from where the mining area will be visible. The viewshed analysis was drawn for the

highest corner (north-west) of the mining footprint, as well as a centre position of the proposed 4.9 ha area. From the following figures, it is clear that the north-western portion of the mining area will have a higher visual impact that gradually lessens as the elevation drops towards the lower parts.

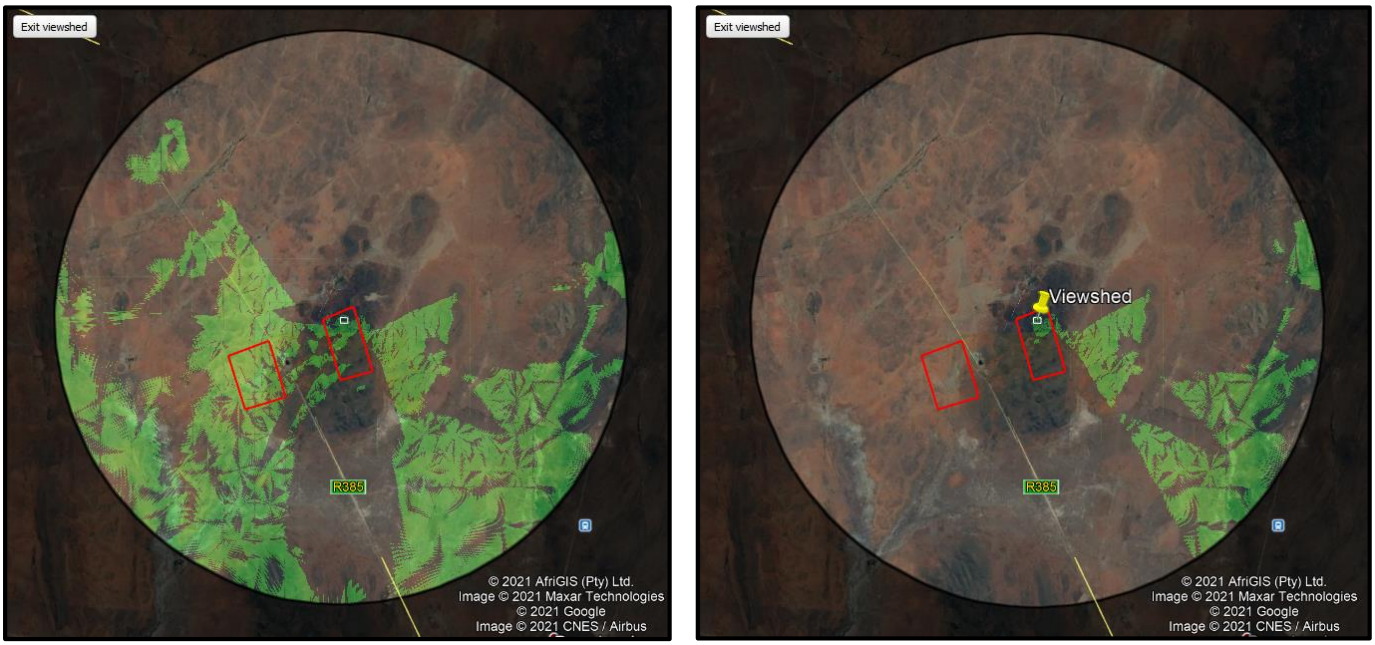

Figure 26: Figure showing the viewshed analysis of the highest corner (first frame), and the centre of the mining footprint (second frame) respectively (image obtained from Google Earth).

When the viewshed analysis of the highest corner of the mining footprint is layered over the most prominent residences in the surrounding area (as presented in the following figure), it is clear that the mining area or at least a portion thereof will mainly be visible to the south-western and south-eastern residences. The nearest residences (Residences 5 & 6) within viewing distance to the proposed mining footprint are ±3.5 km to the south-east, while the residence of the landowner is ±4 km to the south-west. The remaining residences within viewing distance of the mining footprint are all more than 7 km away. In light of this, and based on the fact that as the distance between the proposed development and the observer increases the visual impact will decrease the significance of the visual impact on the surrounding environment is deemed to be of medium significance.

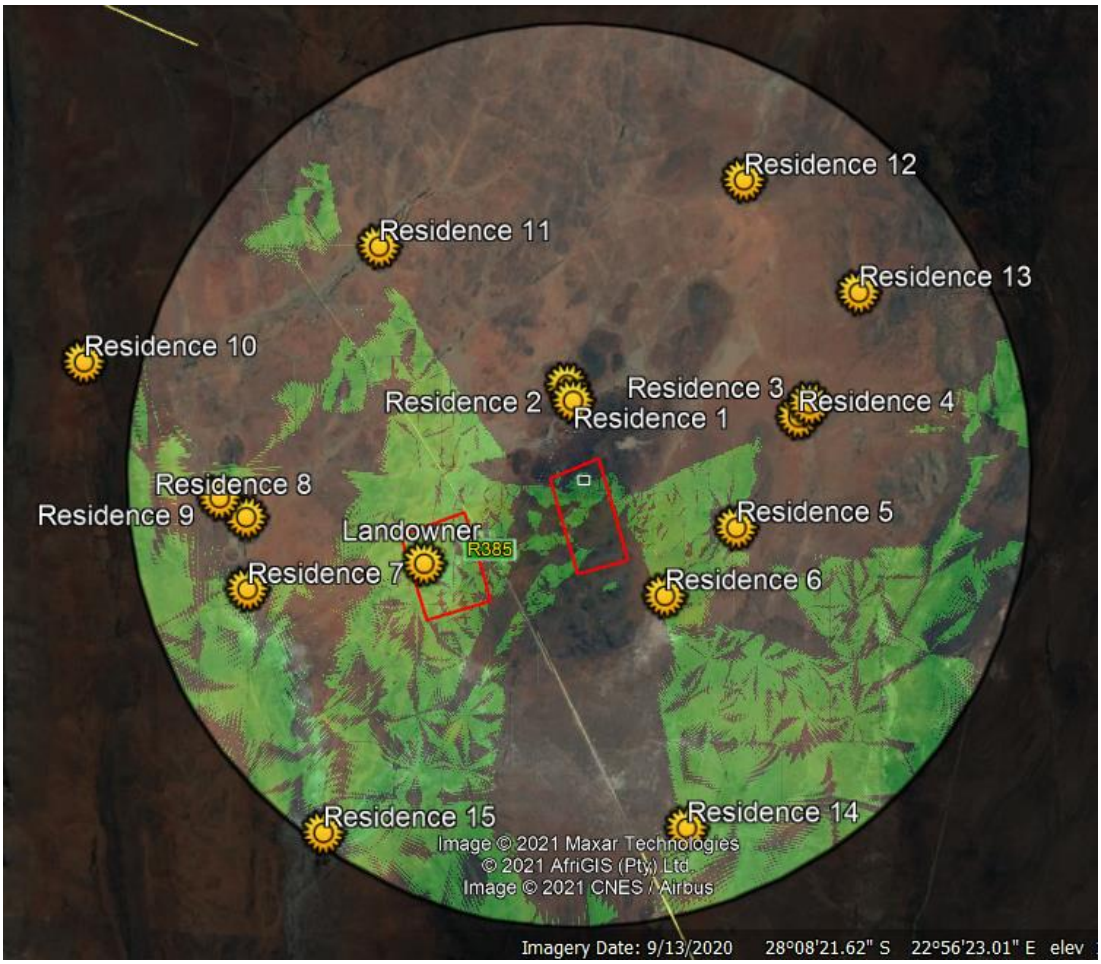

Figure 27: Viewshed analysis layered over the most prominent residences in the surrounding area (image obtained from Google Earth).

SITE SPECIFIC AIR AND NOISE QUALITY

The figure below shows the position of the nearest surrounding residences/infrastructure to the proposed mining footprint.

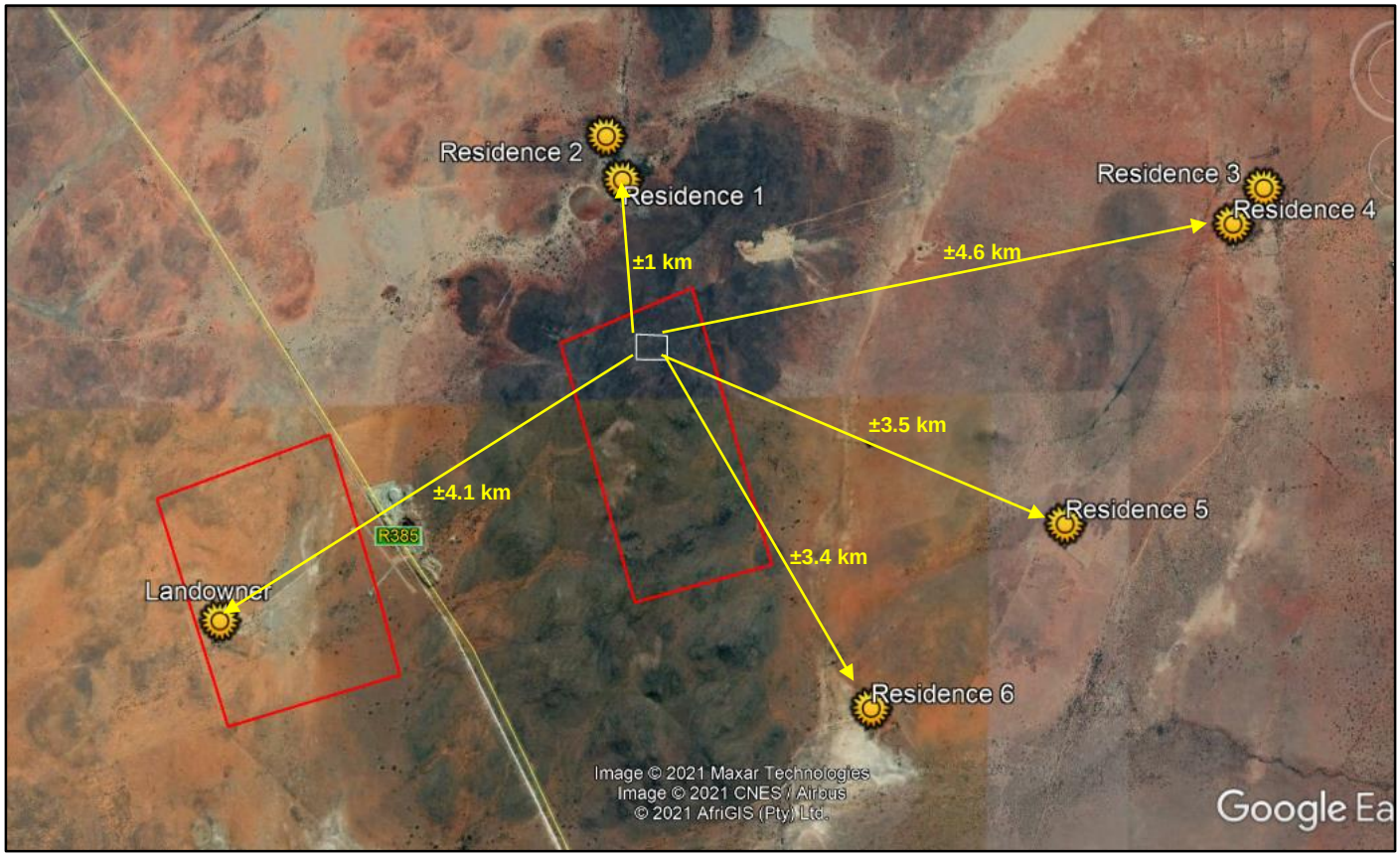

Figure 28: Satellite view showing the distance between the proposed mining footprint (white polygon) and the surrounding residences (image obtained from Google Earth).

Presently, the air quality of the study area is mainly impacted on by traffic along the R385, mining/prospecting activities in the surroundings, and dust generated from dry denuded areas. Emission into the atmosphere is controlled by the National Environmental Management: Air Quality Act, 2004. The proposed mining activity does not trigger an application in terms of the said act. Emissions to be generated at the mine is expected to mainly consist of dust generated due to the displacement of soil, blasting, crushing and screening of hard rock, and the transport of material on gravel roads.

As the prevalent wind direction is mostly in a south to east-south-eastern direction dust generated at the proposed mine will blow away from the nearest residences (Residence 1 & 2) north of the earmarked footprint. Excessive dust generation may potentially reach the residences to the south-east. However, based on the fact that the residences are more than 3 km away, and should the Applicant implement the mitigation measures proposed in this document and the EMPR the impact on the air quality of the surrounding environment is deemed to be of low significance.

As mentioned earlier, the noise ambiance of the study area is classified as ambient rural or pastoral with noise levels mainly affected by traffic along the R385, railway traffic, farming equipment and mining/prospecting related operations. The noise to be

generated at the proposed mine will contribute to these daily noise levels. The proposed activity will contribute noise generated as a result of blasting, as well as the crushing, screening and transporting of material. The nuisance value of noise generated by heavy earthmoving equipment, to the surrounding residences is deemed to be of low significance, as the nearest farmsteads are ±1 km away from the proposed operation. The noise caused by blasting will be instantaneous and of short duration.

Although the proposed activity will have a cumulative impact on the ambient noise levels, it is believed that the significance of the impact can be mitigated with the implementation of the measures proposed in this document.

SITE SPECIFIC GEOLOGY AND SOIL

(Information extracted from the Makganyene: Phase 1 Geological Exploration Report August – December 2020)

According to the Phase 1 Geological Exploration Report (2020) the stratigraphy of Makganyene (following table) is based on the early mapping by the Geological Survey (1937-1975) as well as recent mapping and drilling performed by Van der Merwe (2020).

Table 10: Postulated Makganyene stratigraphic column (Handley, 2020).

Supergroup	Group	Subgroup	Formation	Member	Major lithology	Thickness (m)
Traansvaal	Posmasburg		Ongeluk		Andesite lava	> 180
			Makganyene		Diamictite, cherty carbonate	< 10
		Major Unconformity				
	Ghaap	Koegas	Nelani		Silicate lutite, grainstone	< 40
			Rooinekke		Iron-formation, 'upper dolomite'	0 - 130
		Major thrust				
Keis	Elim		Gamagara	Paling	Shale	20-80
				Marthaspoort	Quartzite with intermittent conglomerates	
				Sishen	Shale	
				Doornfontein	Basal iron rich conglomerate	
		Major Unconformity				
			Manganore	Blinkklip	Iron/chert breccia	0 - 100
					Iron-fomation and iron ore	
			Wolhaarkop		Siliceous chert breccia	0 - 30
	Ghaap	Campbellrand			Dolomite	

According to the report (Handley, 2020) the central portions of the farm are characterised by outcrops of the Nelani and Rooinekke formations of the Koegas Subgroup. Nelani rock types include banded hematite and or magnetite / chert iron formations. Lithologies within the Rooinekke Formation are typically ferruginous siltstones and mudstones intercalated with chert layers (Banded Iron Formations). The presence of jasper differentiates the Rooinekke Formation from the overlying Nelani Formation. The iron rich units within the Rooinekke Formation frequently show black

staining characteristic of manganese. The ‘Upper Dolomite’ occurs at the base of the Rooinekke Formation in areas away from the central dome area and may be up to 130 m in thickness.

The Koegas rocks have been thrusted over the younger Gamagara Formation rocks. Thrusting is part of the Blackridge thrust system which daylights to the east of the property on the Gamagara ridge. Thrusting has resulted in the formation of a domal structure within the central part of the farm known as the Makganyene Dome. Erosion of the dome has led to exposure of the Marthaspoort Quartzite Member rocks of the Gamagara Formation (lower thrust block) with Koegas rocks (upper thrust block) flanking these exposures. The outcropping Marthaspoort rocks therefore mark the position of the Makganyene Dome. Flanking Koegas rocks dip shallowly outwards away from the dome. Dips do not exceed 20°.

The report further states that the Koegas rocks are overlain by the Makganyene Formation of the Postmasburg Group. The Makganyene is comprised of interbedded diamictites and chert layers. The diamictite typically has a characteristic fine grained, muddy matrix with angular clasts and sandstone grains. Large pebbles may contain striations. On the earmarked farm thin slivers of Makganyene diamictite overly the Rooinekke Iron Formation in outcrop in the eastern portion of the farm.

The Makganyene tillite is sandwiched conformably between the thick mass of Koegas rocks below massive andesite lavas of the Ongeluk Formation above. The tillite zone is remarkably persistent and serves as a useful marker horizon or interpreting structure.

On Mkaganyene, the Ongeluk rocks fill the north-south trending valleys to the west and east of the Makganyene hills. A thick wedge of Ongeluk lava occurs on the west side of the property. A similar wedge of lava occurs on the east side of the control Koegas outcrops, filling the Balkfontein Syncline between the Gamagara Rand and the Makganyene hills. This area is associated with thick diabase sills. Flat dipping lava and diabase outcrop as conical hills in the far eastern portion of the property.

A NNE-SSW structure trend is evident in the Koegas rocks throughout Makganyene. Evidence of local small scale isoclinal fold structure is prevalent in the Koegas rocks.

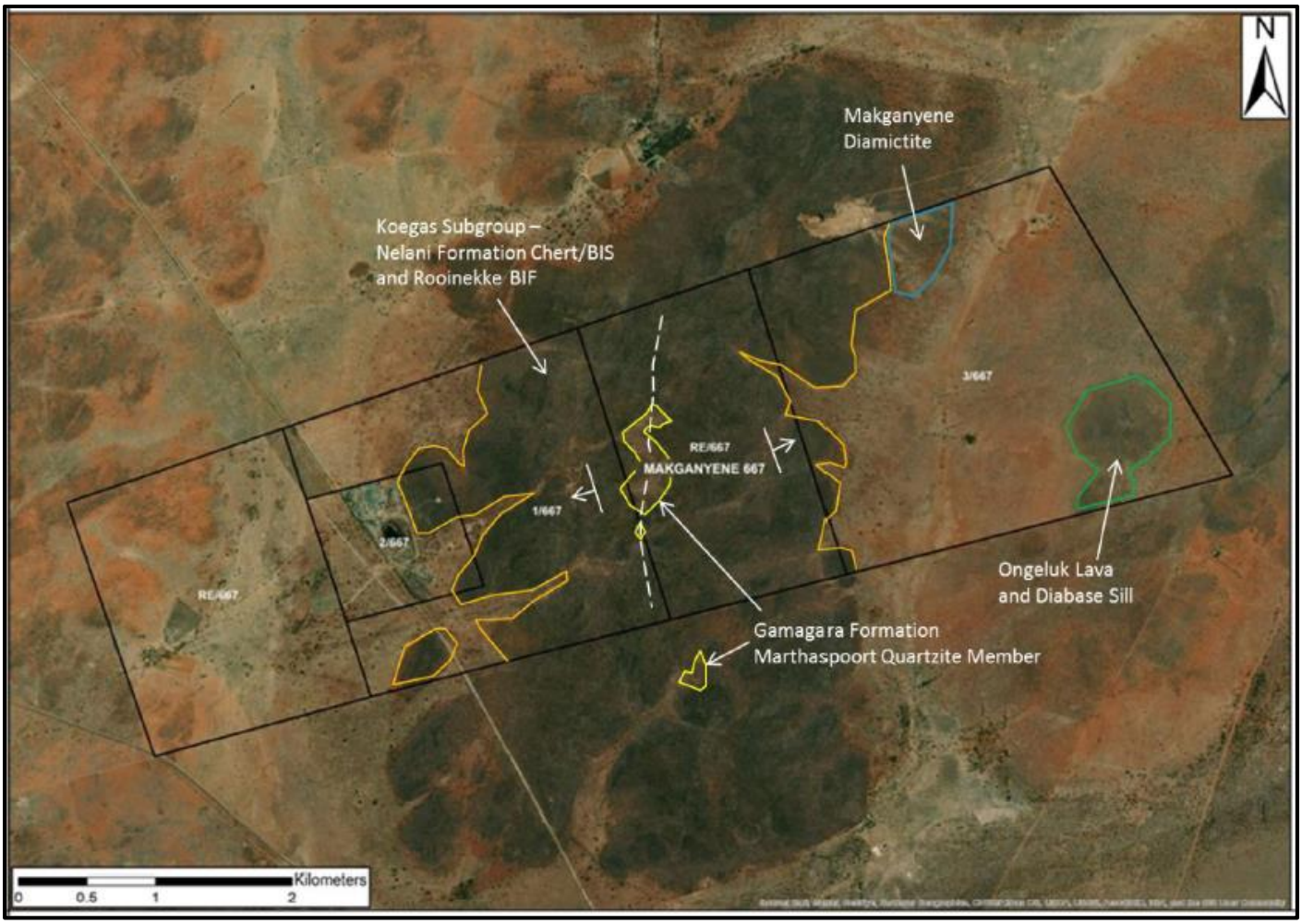

Figure 29: Makganyene local geological setting where the white stippled line indicates the dome apex (image obtained from the Phase 1 Geological Report, Handley, 2020)

Technical Studies – Gravity Survey:

A gravity survey was conducted on the farm (Mouton, 2019) to define potential iron ore occurrences as well as any geological features that may control such existence. The results of the study are depicted in the following figure.

The study identified a number of positive gravity anomalies (Area A-H), possible representing iron ore targets based on the first vertical derivative gravity map (following figure). Target area A shows the most promising anomalous area, and subsequently the proposed mining permit footprint was chosen in this area.

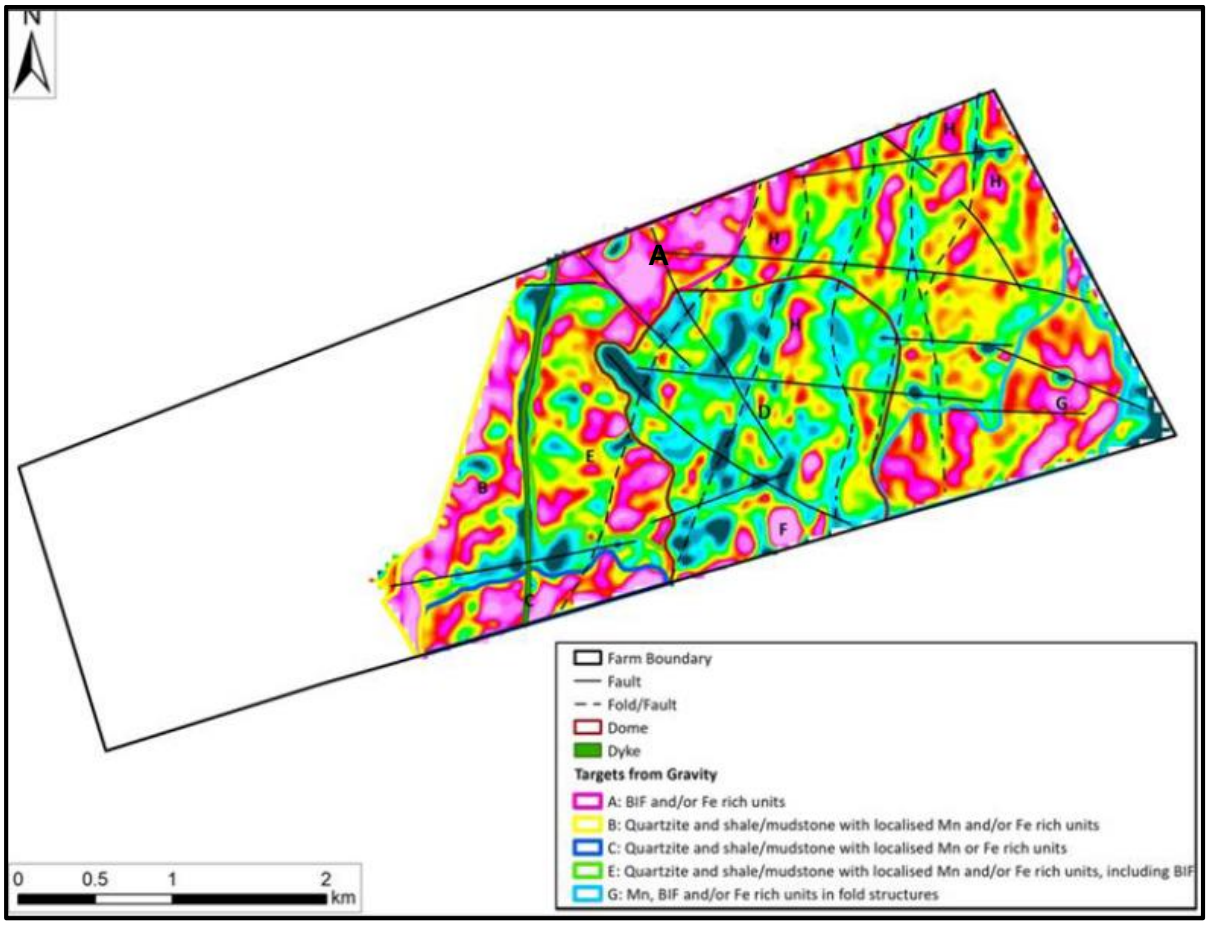

Figure 30: First derivative map of the gravity data, detailing potential iron ore targets (image obtained from the Phase 1 Geological Report, Handley, 2020).

Technical Studies – Geological Mapping:

Geological mapping was performed by Van der Merwe (2020) over the entire Makganyene farm. The following figure shows the completed geological map.

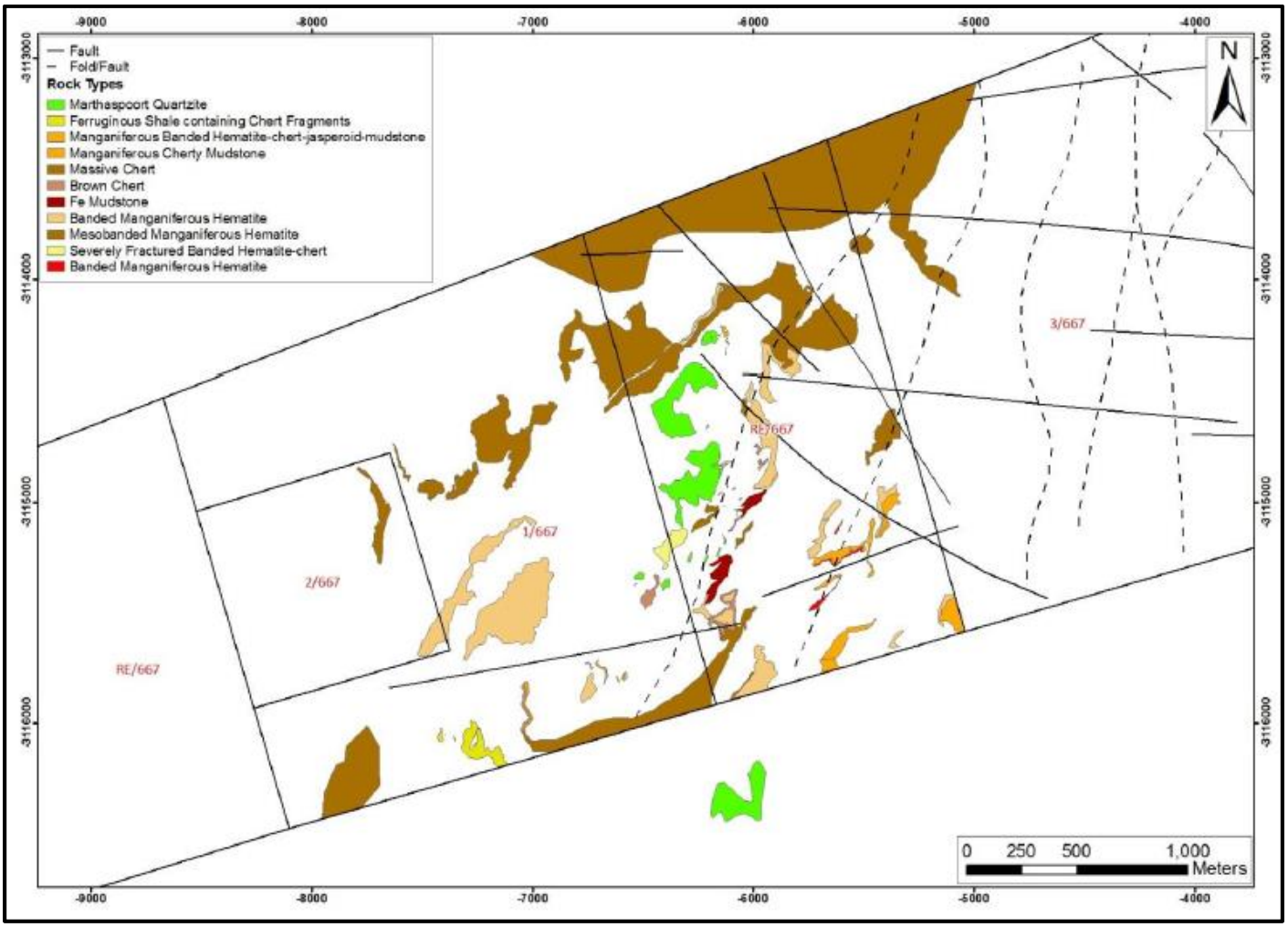

Figure 31: Geological mapping (Van der Merwe, 2020) (image obtained from the Phase 1 Geological Report, Handley, 2020).

As discussed earlier, the first phase drilling programme identified three potential target areas, of which the Doornfontein conglomeratic iron horizon on the western trough flank of Target 2 is the most prospective (refer to Figure 3). The western block of Target 2 is currently about 500 m x 250 m in extent, occurring at depths of between 58 m – 120 m. The average thickness of the zone is about 14 m, with the thickest area being 24 m. The main core zone exhibits average grades of 62% - 66% Fe. Grades drop off to around 52% Fe on the thinner edges of the mineralised areas. Subsequently, the Applicant applied for a mining permit to mine iron ore from 4.9 ha of the western block of Target 2 area.

Also refer to *Part A(1)(d)(ii) Description of the activities to be undertaken – Background information*.

SITE SPECIFIC HYDROLOGY

(Information extracted from the Makganyene: Phase 1 Geological Exploration Report August – December 2020)

As mentioned earlier, the proposed mining area falls within a NFEPA of conservation importance. The NFEPA status of the area indicates that it is currently in a good condition to contribute to the biodiversity goals of the country. Although the NFEPA status applies to the actual river reach (Orange River in this case), the shading (dark green in below figure) of the whole sub-quaternary catchment indicates that the surrounding land and smaller stream network needs to be managed in a way that maintains the good condition of the river reach.

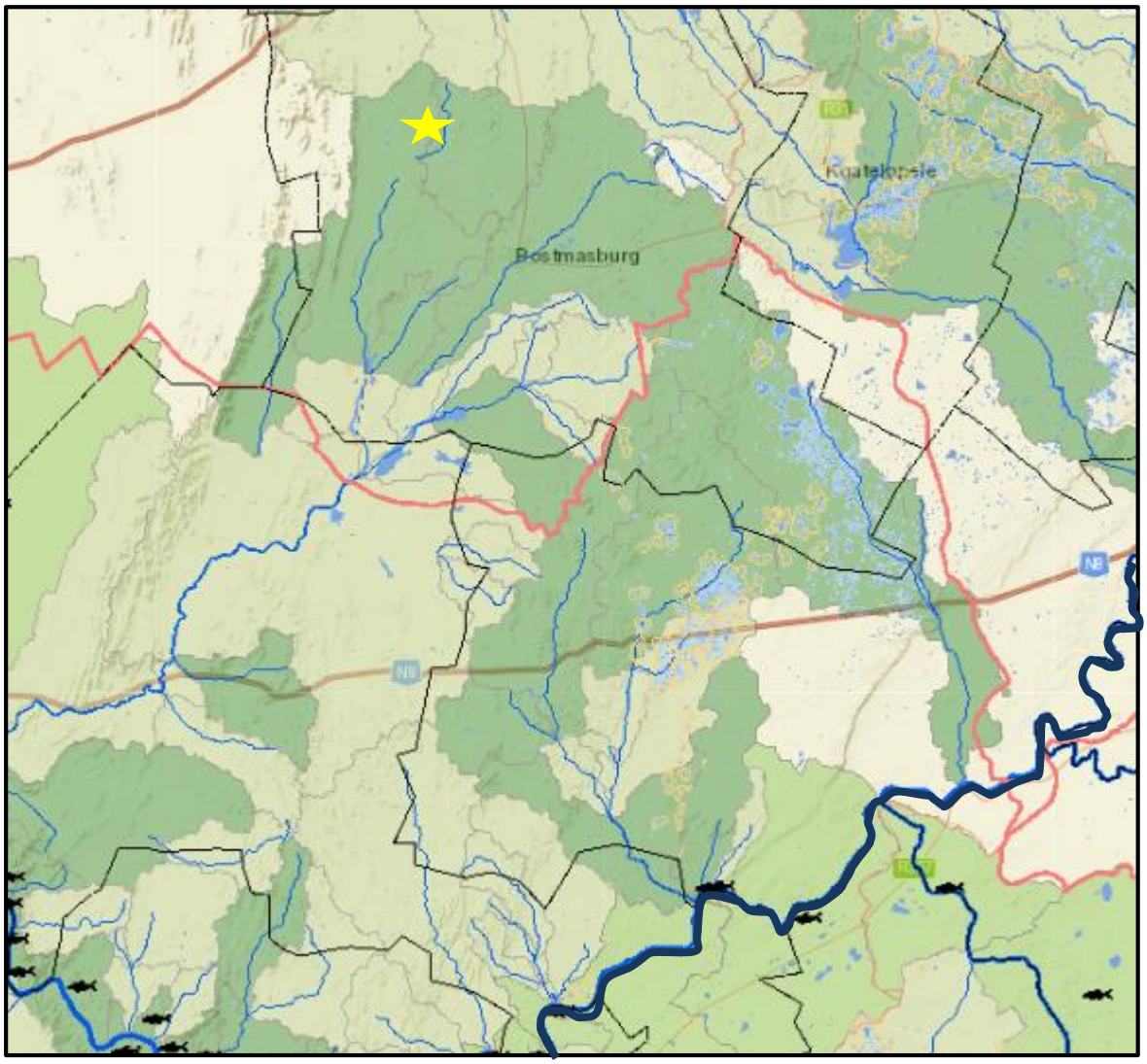

Figure 32: Map showing the sub-quaternary catchment (dark green) associated with the Orange River (dark blue line) in which the proposed mining area (yellow star) falls. (Image obtained from the BGIS Map Viewer – National Wetlands and NFEPA)

As shown in Figure 12, no wetlands, rivers, drainage lines or other open surface water courses were identified within the proposed mining permit area, and the potential impact of the proposed activity on surface water resources is therefore deemed to be

of low significance should the Applicant implement the mitigation measures proposed in this report.

Groundwater intersections were recorded during the drilling programme conducted as part of the prospecting of the greater study area, and subsequently, a water intercept map detailing depth and estimated flow rate was compiled by Handley (2020) as presented in the following figure.

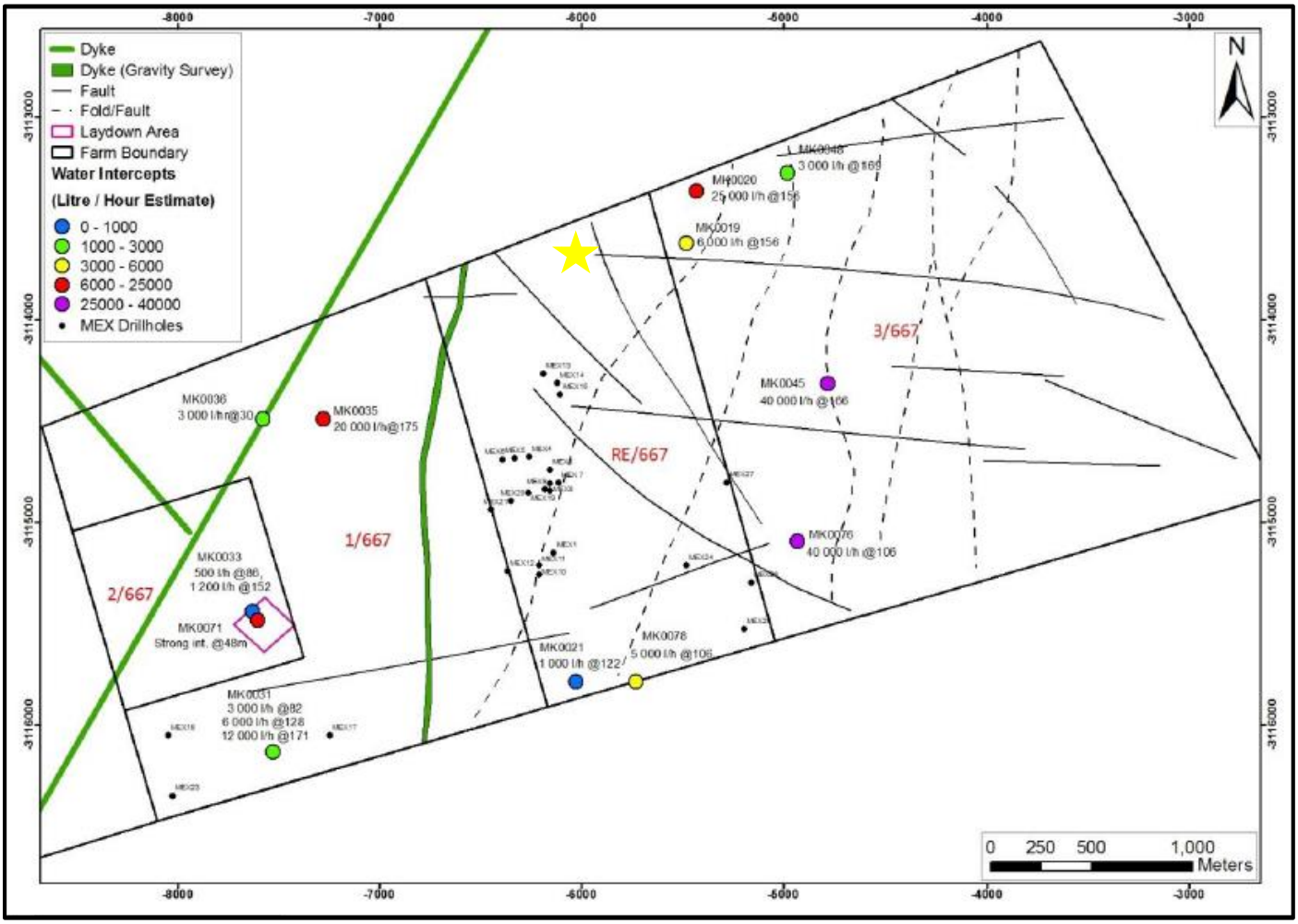

Figure 33: Makganyene water intercept map detailing water intersection depth and estimated flow rate. The yellow star shows the approximate position of the proposed mining permit footprint (image obtained from the Phase 1 Geological Report, Handley, 2020).

From the above figure it can be seen that no water interception points were logged within the immediate vicinity of the proposed mining footprint. East of the earmarked area, drilling holes MK0019 and MK0020 intercepted water at 156 m while MK0048 intercepted water at 169 m. To the west MK0035 intercepted water at 175 m.

Based on the geological data of the earmarked area, the Applicant intends to mine the iron ore to an approximate depth of 120 – 130 m. In light of this, it is unlikely that the proposed activity will intercept the groundwater table and the significance of the impact is therefore deemed to be low.

In conclusion, mining the iron ore from the proposed 4.9 ha will not affect the integrity of the NFEPA; nor will it have an impact on the surface- or groundwater of the footprint area.

SITE SPECIFIC MINING AND BIODIVERSITY CONSERVATION AREAS

As mentioned earlier, when the study area is layered over the Mining and Biodiversity Map, the south-eastern corner of the Remaining Extent of the farm Makganyene No 667, as well as Portion 3 of the farm Makganyene No 667 falls over and area of highest biodiversity importance with a corresponding rating of highest risk for mining (see Figure 13). The proposed mining footprint however falls outside the area of conservation importance in terms of these guidelines.

Further to this, the mining footprint extends over an ESA, but the Screening Report indicates that the plant species sensitivity of the area is of low significance (Figure 14). The vegetation type of the proposed footprint is classified as the Kuruman Mountain Bushveld (SVk 10) as verified during the site assessment. This vegetation type is classified as Least Threatened.

In light of the above, should the Applicant implement the mitigation measures proposed in this document and obtain the relevant permits for any protected plant species that may need to be removed prior to bush clearance, it is believed that the proposed mining of 4.9 ha within the larger extent of the farm will not negatively affect the conservation status or objectives of the ESA.

SITE SPECIFIC GROUNDCOVER

Ground truthing showed the vegetation cover of the proposed footprint to be in a natural to near natural state, representing the Kuruman Mountain Bushveld as shown in the following pictures.

Figure 34: Photographs of the vegetation cover on the Remainder of Makganyene No 667.

As noted earlier, the Screening Report shows the plant species sensitivity of the area to be of low significance, and does not list any sensitivity features with regard to specific plant species. The site investigation also did not identify the presence of any endangered and/or otherwise protected plant species within the proposed 4.9 ha footprint. However, it is known that there are specimens of *Boscia albitrunca* (Shepherd's Tree) and *Vachellia erioloba* (Camel Thorn Tree) within the greater boundaries of the property. Both these species are protected in terms of the National Forest Act, 1998 (Act No 84 of 1998), while *B. albitrunca* is also protected in terms of the Northern Cape Nature Conservation Act, 2009 (Act No 9 of 2009).

It is therefore proposed that a qualified botanist conduct a plant identification walkthrough with site management prior to commencement of the activity to identify any potential plants that may need a destruction/removal permit. Bush clearance must be delayed until the relevant plant permits (if applicable) have been obtained, and the recommendations of the botanist (if any) have been implemented.

At the time of the inspection, invasive plant species such as Mesquite (*Prosopis* spp), Seringa (*Melia azedarach*), and Wild Tobacco (*Nicotiana glauca*) were noted in the disturbed areas of the greater property. Should any of these species germinate within the mining footprint, the Applicant will be responsible to clear the problem plants from the site (refer to Appendix K for the Invasive Plant Species Management Plan).

SITE SPECIFIC FAUNA

The terrestrial site specific fauna of the study area represents the fauna of the surrounding environment. The fauna within the MP footprint will not be impacted by the proposed activity as they will be able to move away or through the site, without being harmed. Workers must be educated and managed to ensure that no fauna of the site is harmed.

SITE SPECIFIC CULTURAL AND HERITAGE ENVIRONMENT

(Information extracted from the Heritage Impact Assessment for the Proposed Makganyane Mining Permit, Northern Cape Province, 2021 – Appendix G1 as well as the Palaeontological Impact Assessment for the Mining Rights Application for Farm Makganyene 667, Kuruman District, Northern Cape Province – Appendix G2)

Beyond Heritage was appointed to conduct a HIA (Heritage Impact Assessment) for the proposed mining permit area. The aim of the study was to survey the proposed development footprint to identify cultural heritage sites, document, and assess their importance within local, provincial and national context.

The archaeological survey found that the terrain is predominantly rocky, situated on the slopes of a small valley between two ridges. The Iron Ore is located close to the surface but covered with a gravel infill. A Background scatter of isolated MSA (Middle Stone Age) artefacts were recorded, possibly washed down from higher up on the ridge. The artefacts are all made from the abundance of raw material (Chert and Quartzite) originating from the Banded Iron Stone formation characteristic of the area and include cores, blades and flakes with faceted striking platforms characteristic of the MSA. The stone tools are isolated, out of context and scattered too sparsely to be of significance apart from mentioning them in this report and is given a field rating of GP C (Van der Walt, 2021) that indicates a low significance and associated recommended mitigation of destruction. This is in line with studies by Beaumont (2007) and Van der Walt (2019) on the same farm currently assessed that recorded isolated artefacts and concluded that the study area is of low archaeological significance.

The HIA concludes that the significance of the impact of the proposed project on heritage resources is low, and recommends that the project can commence on the condition that SAHRA approves the proposal and the recommendations of the report (refer to *Part A(1)(k) Summary of specialist reports*) are implemented.

Palaeontological Heritage:

The site for mining is on the ancient Makganyene Formation and on much younger Kalahari aeolian sands. Polteau et al (2006) studied the stratigraphy and geochemistry of the glaciogenic Makganyene Formation, in order to constrain its palaeoenvironmental settings. Geochemical investigations of glacial strata of the Makganyene Formation demonstrated that underlying banded iron formations of the Transvaal Supergroup acted as the main clastic source for the diamictite detritus. Given the age of the Makganyene Formation, around 2430 Ma (Zeh et al., 2020), which is older than the evolution of any body fossils (Plumstead, 1968), the only living organisms were microbes such as algae and bacteria. Given the environmental conditions with icehouse conditions and glacial icesheets (Polteau et al., 2006), the chances of any microbial presence or traces is unlikely. There are some stromatolitic bioherms, however, that are manganese-rich, carbonaceous, layered, dome-like structures formed by algal colonies, in this formation. While aeolian and dune sands do not preserve fossils, they might have included transported, and therefore, very small or fragmentary fossils. Palaeo-pans and palaeo-springs are much better sites for preserving fossils because burial, water and some kind of cementing medium (calcrete, silcrete or ferricrete) are required to preserve organisms and form fossils. No such features are visible in the satellite imagery (Bamford, 2021).

The PIA (Palaeontological Impact Assessment) concluded that based on experience and the lack of any previously recorded fossils from the area, it is extremely unlikely that any fossils would be preserved in the aeolian sands of the Quaternary and there are no palaeo-pans or palaeo-springs visible in the satellite imagery. Stromatolitic bioherms are trace fossils and of limited interest to palaeontologists. Since there is a very small chance of fossils being disturbed in the Quaternary sands, a Fossil Chance Find Protocol should be added to the EMPr. Based on this information it is recommended that no further palaeontological impact assessment is required unless fossils are found once excavations and mining commence. As far as the palaeontology is concerned, this project may be authorised.

SITE SPECIFIC INFRASTRUCTURE

No infrastructure exists in the 4.9 ha footprint as this is a greenfield site. As mentioned earlier, the study area is within the boundaries of a farm used for agricultural- and prospecting purposes. Infrastructure within close proximity (±150 m) to the proposed footprint include existing gravel farm roads to be upgraded and used by the mining contractor, and the northern boundary fence of the property. Should the mitigation measures proposed in this document be implemented the existing infrastructure on the farm will be safeguarded against mining related impacts.

(d) Environmental and current land use map.

(Show all environmental and current land use features)

The environmental and current land use map is attached as Appendix D.

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

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

The following potential impacts were identified of each main activity in each phase of the project. The significance rating was determined using the methodology as explained under *vi) Methodology Used in Determining and Ranking the Significance*. 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.

SITE ESTABLISHMENT & INFRASTRUCTURE DEVELOPMENT:

Alteration of the agricultural sense of place

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium					**Degree of Mitigation: None**		
2	4	1	2.3	4	5	4.5	**10.4**

Loss of agricultural land for duration of mining

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium					**Degree of Mitigation: None**		
2	4	1	2.3	5	5	5	**11.5**

Visual intrusion as a result of site establishment

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium					**Degree of Mitigation: Partial**		
2	4	2	2.6	5	5	5	**13**

Potential impact on the ESA objectives

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium					**Degree of Mitigation: Full**		
4	4	4	4	3	1	2	**8**

Potential impact on vegetation and listed and/or protected plant species

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium					**Degree of Mitigation: Full**		
3	4	4	3.6	4	2	3	**10.8**

Potential impact on fauna within the footprint area

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium					**Degree of Mitigation: Full**		
3	3	1	2.6	4	3	3.5	**9.1**

Potential impact on archaeological artefacts

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low					**Degree of Mitigation: Full**		
4	5	5	4.6	1	1	1	**4.6**

Potential impact on surface- or ground water

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium				**Degree of Mitigation: Full**			
4	4	4	4	3	2	2.5	**10**

New job opportunities as a result of the mining operation (Positive Impact)

			Consequence			Likelihood	**Significance (+)**
Severity (+)	Duration	Extent		Probability	Frequency		
Rating: High (+)				**Degree of Mitigation: N/A**			
4	4	5	4.6	5	5	5	**23**

STRIPPING AND STOCKPILING OF TOPSOIL AND/OR OVERBURDEN:

Visual intrusion caused by mining activities

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium				**Degree of Mitigation: Partial**			
2	4	1	2.3	4	5	4.5	**10.4**

Loss of stockpiled topsoil during mining and stockpiling

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium				**Degree of Mitigation: Full**			
3	4	1	2.6	4	3	3.5	**9.1**

Dust nuisance as a result of the disturbance of soil

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium				**Degree of Mitigation: Full**			
2	3	2	2.3	4	4	4	**9.2**

Noise nuisance generated by earthmoving machinery

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium				**Degree of Mitigation: Partial**			
2	3	2	2.3	3	5	4	**9.2**

Infestation of the topsoil heaps and mining area with weeds or invader plant species

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium				**Degree of Mitigation: Full**			
3	4	2	3	5	2	3.5	**10.5**

Potential impact on local fauna due to disturbance and loss of available habitat

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium				**Degree of Mitigation: Full**			
2	4	1	2.3	4	4	4	**9.2**

Potential erosion of denuded areas

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium				**Degree of Mitigation: Full**			
3	3	1	2.3	4	2	3	**6.9**

Potential contamination of footprint area and surface runoff as a result of hydrocarbon spillages

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium				**Degree of Mitigation: Full**			
3	3	1	2.3	4	4	4	**9.2**

DRILLING AND BLASTING:

Health and safety risk posed by blasting activities

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium				**Degree of Mitigation: Full**			
4	4	1	3	4	3	3.5	**10.5**

Dust nuisance caused by blasting activities

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium				**Degree of Mitigation: None**			
2	4	2	2.6	4	3	3.5	**9.1**

Noise nuisance as a result of blasting

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium				**Degree of Mitigation: Partial**			
2	4	2	2.6	4	3	3.5	**9.1**

EXCAVATION, LOADING AND HAULING TO THE PROCESSING AREA

Dust nuisance due to excavation and from loading and vehicles transporting the material

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium				**Degree of Mitigation: Full**			
2	4	2	2.6	4	5	4.5	**11.7**

Noise nuisance as a result of the mining activities

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium					**Degree of Mitigation: Partial**		
2	4	2	2.6	4	5	4.5	**11.7**

Unsafe working environment for employees

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium					**Degree of Mitigation: Full**		
4	4	1	3	4	5	4.5	**13.5**

Soil contamination from hydrocarbon spills and/or littering

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium					**Degree of Mitigation: Full**		
3	4	1	2.6	4	5	4.5	**11.7**

Potential impact on areas of palaeontological concern

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**Site Alternative 1**		**Degree of Mitigation: Full**		
4	4	5	4.3	1	1	1	**4.3**

Facilitation of erosion due to mining activities

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium					**Degree of Mitigation: Full**		
3	4	1	2.6	4	3	3.5	**9.1**

PROCESSING, STOCKPILING AND TRANSPORTING OF MATERIAL:

Dust nuisance generated at the processing plant

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium					**Degree of Mitigation: Full**		
2	4	2	2.6	5	5	5	**13**

Noise nuisance stemming from operation of the processing plant

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium					**Degree of Mitigation: Partial**		
2	4	2	2.6	4	5	4.5	**11.7**

Potential contamination of environment due to improper waste management

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium				**Degree of Mitigation: Full**			
3	4	1	2.6	4	4	4	**10.4**

Overloading of trucks impacting road infrastructure

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium-High				**Degree of Mitigation: Full**			
3	4	5	4	4	5	4.5	**18**

Degradation of the access road

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium				**Degree of Mitigation: Full**			
3	4	2	3	4	5	4.5	**13.5**

SLOPING AND LANDSCAPING DURING REHABILITATION:

Safety risk posed by un-sloped areas

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium				**Degree of Mitigation: Full**			
3	5	1	3	4	5	4.5	**13.5**

Erosion of returned topsoil after rehabilitation

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium				**Degree of Mitigation: Full**			
3	5	1	3	4	3	3.5	**10.5**

Infestation of the reinstated areas by weeds and invader plant species

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium				**Degree of Mitigation: Full**			
3	5	2	3.3	4	5	4.5	**14.9**

Potential impact associated with litter/waste left at the mining area

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium				**Degree of Mitigation: Full**			
3	5	1	3	4	5	4.5	**10.5**

Return of the mining area to agricultural use upon closure (Positive Impact)

Severity (+)	Duration	Extent	Consequence	Probability	Frequency	Likelihood	**Significance (+)**
Rating: Medium-High					**Degree of Mitigation: N/A**		
3	5	1	3	5	5	5	**15**

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

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

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

DEFINITIONS AND CONCEPTS:

Environmental significance:

The concept of significance is at the core of impact identification, evaluation and decision-making. The concept remains largely undefined and there is no international consensus on a single definition. The following common elements are recognised from the various interpretations:

- Environmental significance is a value judgement
- The degree of environmental significance depends on the nature of the impact
- The importance is rated in terms of both biophysical and socio-economic values
- Determining significance involves the amount of change to the environment perceived to be acceptable to affected communities.

Significance can be differentiated into impact magnitude and impact significance. Impact magnitude is the measurable change (i.e. intensity, duration and likelihood). Impact significance is the value placed on the change by different affected parties (i.e. level of acceptability) (DEAT (2002) Impact Significance, Integrated Environmental Management, Information Series 5).

The concept of risk has two dimensions, namely the consequence of an event or set of circumstances, and the likelihood of particular consequences being realised (Environment Australia (1999) Environmental Risk Management).

Impact

The positive or negative effects on human well-being and / or the environment.

Consequence

The intermediate or final outcome of an event or situation OR it is the result, on the environment, of an event.

Likelihood

A qualitative term covering both probability and frequency.

Frequency

The number of occurrences of a defined event in a given time or rate.

Probability

The likelihood of a specific outcome measured by the ratio of a specific outcome to the total number of possible outcomes.

Environment

Surroundings in which an organisation operates, including air, water, land, natural resources, flora, fauna, humans and their interrelation (ISO 14004, 1996).

Methodology that will be used

The environmental significance assessment methodology is based on the following determination:

Environmental Significance = Overall Consequence X Overall Likelihood

Determination of Overall Consequence

Consequence analysis is a mixture of quantitative and qualitative information and the outcome can be positive or negative. Several factors can be used to determine consequence. For the purpose of determining the environmental significance in terms of consequence, the following factors were chosen: ***Severity/Intensity, Duration and Extent/Spatial Scale***. Each factor is assigned a rating of 1 to 5, as described in the tables below.

Determination of Severity / Intensity

Severity relates to the nature of the event, aspect or impact to the environment and describes how severe the aspects impact on the biophysical and socio-economic environment.

The table below will be used to obtain an overall rating for severity, taking into consideration the various criteria.

Table 11: Table to be used to obtain an overall rating of severity, taking into consideration the various criteria.

Type of criteria	Rating				
	1	2	3	4	5
Quantitative	0-20%	21-40%	41-60%	61-80%	81-100%
Qualitative	Insignificant / Non-harmful	Small / Potentially harmful	Significant/ Harmful	Great/ Very harmful	Disastrous Extremely harmful
Social/ Community response	Acceptable / I&AP satisfied	Slightly tolerable / Possible objections	Intolerable/ Sporadic complaints	Unacceptable / Widespread complaints	Totally unacceptable / Possible legal action
Irreversibility	Very low cost to mitigate/ High potential to mitigate impacts to level of insignificance/ Easily reversible	Low cost to mitigate	Substantial cost to mitigate/ Potential to mitigate impacts/ Potential to reverse impact	High cost to mitigate	Prohibitive cost to mitigate/ Little or no mechanism to mitigate impact Irreversible
Biophysical (Air quality, water quantity and quality, waste production, fauna and flora)	Insignificant change / deterioration or disturbance	Moderate change / deterioration or disturbance	Significant change / deterioration or disturbance	Very significant change / deterioration or disturbance	Disastrous change / deterioration or disturbance

Determination of Duration

Duration refers to the amount of time that the environment will be affected by the event, risk or impact, if no intervention e.g. remedial action takes place.

Table 12: Criteria for the rating of duration.

Rating	Description
1	Up to ONE MONTH
2	ONE MONTH to THREE MONTHS (QUARTER)
3	THREE MONTHS to ONE YEAR
4	ONE to TEN YEARS
5	Beyond TEN YEARS

Determination of Extent/Spatial Scale

Extent or spatial scale is the area affected by the event, aspect or impact.

Table 13: Criteria for the rating of extent / spatial scale.

Rating	Description
1	Immediate, fully contained area
2	Surrounding area
3	Within Business Unit area of responsibility
4	Within the farm/neighbouring farm area
5	Regional, National, International

Determination of Overall Consequence

Overall consequence is determined by adding the factors determined above and summarized below, and then dividing the sum by 3.

Table 14: Example of calculating overall consequence.

Consequence	Rating
Severity	Example 4
Duration	Example 2
Extent	Example 4
SUBTOTAL	**10**
TOTAL CONSEQUENCE: (Subtotal divided by 3)	**3.3**

Determination of Likelihood:

The determination of likelihood is a combination of Frequency and Probability. Each factor is assigned a rating of 1 to 5, as described below and in tables 6 and 7.

Determination of Frequency

Frequency refers to how often the specific activity, related to the event, aspect or impact, is undertaken.

Table 15: Criteria for the rating of frequency.

Rating	Description
1	Once a year or once/more during operation
2	Once/more in 6 Months
3	Once/more a Month
4	Once/more a Week
5	Daily

Determination of Probability

Probability refers to how often the activity or aspect has an impact on the environment.

Table 16: Criteria for the rating of probability.

Rating	Description
1	Almost never / almost impossible
2	Very seldom / highly unlikely
3	Infrequent / unlikely / seldom
4	Often / regularly / likely / possible
5	Daily / highly likely / definitely

Overall Likelihood

Overall likelihood is calculated by adding the factors determined above and summarised below, and then dividing the sum by 2.

Table 17: Example of calculating overall likelihood.

Consequence	Rating
Frequency	Example 4
Probability	Example 2
SUBTOTAL	**6**
TOTAL LIKELIHOOD (Subtotal divided by 2)	**3**

Determination of Overall Environmental Significance:

The multiplication of overall consequence with overall likelihood will provide the environmental significance, which is a number that will then fall into a range of **LOW**, **LOW-MEDIUM**, **MEDIUM**, **MEDIUM-HIGH** or **HIGH**, as shown in the table below.

Table 18: Determination of overall environmental significance.

Significance or Risk	Low	Low-Medium	Medium	Medium-High	High
Overall Consequence X Overall Likelihood	1 – 4.9	5 – 9.9	10 – 14.9	15 – 19.9	20 – 25

Qualitative description or magnitude of Environmental Significance

This description is qualitative and is an indication of the nature or magnitude of the Environmental Significance. It also guides the prioritisations and decision making process associated with this event, aspect or impact.

Table 19: Description of environmental significance and related action required.

Significance	Low	Low-Medium	Medium	Medium-High	High
Impact Magnitude	Impact is of very low order and therefore likely to have very little real effect. Acceptable.	Impact is of low order and therefore likely to have little real effect. Acceptable.	Impact is real, and potentially substantial in relation to other impacts. Can pose a risk to company	Impact is real and substantial in relation to other impacts. Pose a risk to the company. Unacceptable	Impact is of the highest order possible. Unacceptable. Fatal flaw.
Action Required	Maintain current management measures. Where possible improve.	Maintain current management measures. Implement monitoring and evaluate to determine potential increase in risk. Where possible improve	Implement monitoring. Investigate mitigation measures and improve management measures to reduce risk, where possible.	Improve management measures to reduce risk.	Implement significant mitigation measures or implement alternatives.

Based on the above, the significance rating scale has been determined as follows:

High Of the highest order possible within the bounds of impacts which could occur. In the case of negative impacts, there would be no possible mitigation

	and / or remedial activity to offset the impact at the spatial or time scale for which it was predicted. In the case of positive impacts, there is no real alternative to achieving the benefit.
Medium-High	Impacts of a substantial order. In the case of negative impacts, mitigation and / or remedial activity would be feasible but difficult, expensive, time-consuming or some combination of these. In the case of positive impacts, other means of achieving this benefit would be feasible, but these would be more difficult, expensive, time-consuming or some combination of these.
Medium	Impact would be real but not substantial within the bounds of those, which could occur. In the case of negative impacts, mitigation and / or remedial activity would be both feasible and fairly easily possible, In case of positive impacts; other means of achieving these benefits would be about equal in time, cost and effort.
Low-Medium	Impact would be of a low order and with little real effect. In the case of negative impacts, mitigation and / or remedial activity would be either easily achieved of little would be required, or both. In case of positive impacts alternative means for achieving this benefit would likely be easier, cheaper, more effective, less time-consuming, or some combination of these.
Low	Impact would be negligible. In the case of negative impacts, almost no mitigation and or remedial activity would be needed, and any minor steps, which might be needed, would be easy, cheap and simple. In the case of positive impacts, alternative means would almost all likely be better, in one or a number of ways, than this means of achieving the benefit
Insignificant	There would be a no impact at all – not even a very low impact on the system or any of its parts.

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

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

The preferred and only site alternative identified by the Applicant and project team (called Site Alternative 1 (S1) in this document) entails the development of the proposed iron ore mine within the GPS coordinates as listed in Table 6 above. S1 was identified as the preferred and only viable site alternative based on the following:

- Although Target 2 (identified as the most prospective area) currently extends across an area of 12.5 ha, the proposed mining footprint (4.9 ha) was chosen over the main core zone of the iron formation in collaboration with the geologist of the Applicant. Therefore, moving the permit area to an alternative site will remove it from the optimal iron resource.

- Presently, neither Target 3 or 5 has enough drillhole information to perform geological modelling, and even though the exploration of the five remaining targets may identify a number of smaller targets comparable to that defined in Target 2, this information is not yet available and therefore siting the proposed mining footprint over a proven resource (Target 2) is more sensible.

- The grade of iron ore in the proposed footprint was proven to be of very high standard.

- The existing farm roads can be used to access the proposed mining area, and even though the roads will require some upgrade/maintenance, no new roads have to be constructed.

- No drainage lines or other watercourses within 100 m, or wetlands within 500 m of the proposed mining footprint could be identified.

- Siting the mining footprint along the southern rise of the hill will screen the area towards the northern and north-eastern sides thereby reducing the visual impact of the proposed operation on the surrounding environment. It is highly unlikely that the mining area will be visible from the residences of the surrounding neighbours.

POSITIVE IMPACTS ASSOCIATED WITH THE PROPOSED ACTIVITY:

- The Applicant will be able to exploit the iron ore resource on the property;
- The landowner will be able to further diversify the income generation from the property;
- At least forty (40) new job opportunities to local residents will be created by the proposed activity;
- The presence of the proposed operation will contribute (directly & indirectly) to the local economy with preference give to HDSA & women owned local suppliers;
- Upon closure, the area will be returned to the landowner for continued agricultural use.

POTENTIAL NEGATIVE IMPACTS ASSOCIATED WITH PROPOSED ACTIVITY:

Site establishment & infrastructure development

- Alteration of the agricultural sense of place;
- Loss of agricultural land for duration of mining;
- Visual intrusion as a result of site establishment;
- Potential impact on the ESA objectives;
- Potential impact on vegetation and listed and/or protected plant species;
- Potential impact on fauna within the footprint area;
- Potential impact on archaeological/palaeontological artefacts;
- Potential impact on surface- or ground water;

Stripping and stockpiling of topsoil and/or overburden:

- Visual intrusion caused by mining activities;
- Loss of stockpiled topsoil during mining and stockpiling;
- Dust nuisance as a result of the disturbance of soil;
- Noise nuisance generated by earthmoving machinery;
- Infestation of the topsoil heaps and mining area with weeds or invader plant species;
- Potential impact on local fauna due to disturbance and loss of available habitat;
- Potential erosion of denuded areas;
- Potential contamination of footprint area and surface runoff as a result of hydrocarbon spillages;

Drilling and blasting:

- Health and safety risk posed by blasting activities;
- Dust nuisance caused by blasting activities;
- Noise nuisance as a result of blasting;

Excavation, loading and hauling to the processing area:

- Dust nuisance due to excavation and from loading and vehicles transporting the material;
- Noise nuisance as a result of the mining activities;
- Unsafe working environment for employees;
- Soil contamination from hydrocarbon spills and/or littering;
- Potential impact on areas of palaeontological concern;
- Facilitation of erosion due to mining activities;

Processing, stockpiling and transporting of material:

- Dust nuisance generated at the processing plant;
- Noise nuisance stemming from operation of the processing plant;
- Potential contamination of environment due to improper waste management;
- Overloading of trucks impacting road infrastructure;
- Degradation of the access road;

Sloping and landscaping during rehabilitation:

- Safety risk posed by un-sloped areas;
- Erosion of returned topsoil after rehabilitation;
- Infestation of the reinstated areas by weeds and invader plant species;
- Potential impact associated with litter/waste left at the mining area.

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

(With regard to the issues and concerns raised by affected parties provide a list of the issues raised and an assessment/discussion of the 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)

The following mitigation measures are proposed to address/minimize the impact of the proposed mining on the receiving/surrounding environment:

TOPOGRAPHY

Rehabilitating/Landscaping of Mining Area:

- The excavated area must serve as a final depositing area for the placement of overburden.
- Rocks and coarse material removed from the excavation must be dumped into the excavation.
- Coarse natural material used for the construction of ramps must be removed and dumped into the excavations.
- Stockpiles must be removed during the decommissioning phase, the area ripped and the topsoil returned to its original depth to provide a growth medium.
- No waste may be permitted to be deposited in the excavations.
- Once overburden, rocks and coarse natural materials have been added to the excavation and it was profiled with acceptable contours and erosion control measures, the topsoil previously stored must be returned to its original depth over the area.
- The area must be fertilized if necessary to allow vegetation to establish rapidly. The site shall 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 six months from closure of the site.
- 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 his or her specification.
- On completion of operations, all structures or objects shall be dealt with in accordance with section 44 of the Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002).
- On completion of mining operations, the surface of all plant-, stockpiling-, and/or office areas, if compacted due to hauling and dumping operations, shall be scarified to a depth of at least 200 mm and graded to an even surface condition. Where applicable/possible topsoil needs to be returned to its original depth over the area.

VISUAL CHARACTERISTICS

Visual Mitigation:

- The site must have a neat appearance and be kept in good condition at all times.
- Mining equipment must be stored neatly in dedicated areas when not in use.
- The permit holder must limit vegetation removal, and stripping of topsoil may only be done immediately prior to the mining/use of a specific area.
- The excavation must be contained within the approved footprint of the permitted area.
- Upon closure the site must be rehabilitated to ensure that the visual impact on the aesthetic value of the area is reduced to the minimum.

AIR AND NOISE QUALITY

Fugitive Dust Emission Mitigation Measures:

- The liberation of dust into the surrounding environment must be effectively controlled by the use of, inter alia, straw, water spraying and/or environmentally friendly dust-allaying agents that contains no PCB's (e.g. DAS products).
- The site manager must ensure continuous assessment of all dust suppression equipment to confirm its effectiveness in addressing dust suppression.
- Speed on the haul roads must be limited to 20 km/h and 40 km/h on the access road to prevent the generation of excess dust.
- Areas devoid of vegetation, which could act as a dust source, must be minimized and vegetation removal may only be done immediately prior to mining.
- The crusher plant must have operational water sprayers to alleviate dust generation from the conveyor belts.
- Fines, blowing from the drop end of the crusher plant, can be minimized by attaching strips of used conveyor belts to the conveyor's end.
- Compacted dust must weekly be removed from the crusher plant to eliminate the dust source.
- Loads must be flattened to prevent spillage during transportation on public roads.
- Weather conditions must be taken into consideration upon commencement of daily operations. Limiting operations during very windy periods would reduce airborne dust and resulting impacts.
- All dust generating activities shall comply with the National Dust Control Regulations, GN No R827 promulgated in terms of NEM:AQA (Act 39 of 2004) and ASTM D1739 (SANS 1137:2012).
- Best practice measures shall be implemented during the stripping of topsoil, excavation, and transporting of material from site to minimize potential dust impacts.

Noise Handling:

- The permit holder must ensure that employees and staff conduct themselves in an acceptable manner while on site.
- No loud music may be permitted at the mining area.
- All mining vehicles must be equipped with silencers and maintained in a road worthy condition in terms of the National Road Traffic Act, 1996 (Act No 93 of 1996).
- 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 each blasting occasion.
- A qualified occupational hygienist must be contracted to quarterly monitor and report on the personal noise exposure of the employees working at the mine. The monitoring must be done in accordance with the SANS 10083:2004 (Edition 5) sampling method as well as NEM:AQA, 2004, SANS 10103:2008.
- Best practice measures shall be implemented in order to minimize potential noise impacts.

GEOLOGY AND SOIL

Topsoil Management:

- The upper 300 mm of the soil must be stripped and stockpiled before mining.
- Topsoil is a valuable and essential resource for rehabilitation and it must therefore be managed carefully to conserve and maintain it throughout the stockpiling and rehabilitation processes.
- Topsoil stripping, stockpiling and re-spreading must be done in a systematic way. The mining plan have to be such that topsoil is stockpiled for the minimum possible time.
- The topsoil must be placed on a levelled area, within the mining footprint. No topsoil may be stockpiled in undisturbed areas.
- Topsoil stockpiles must be protected against losses by water- and wind erosion. Stockpiles must be positioned so as not to be vulnerable to erosion by wind and water. The establishment of plants (weeds or a cover crop) on the stockpiles will help to prevent erosion.
- Topsoil heaps may not exceed 2 m in order to preserve micro-organisms within the topsoil, which can be lost due to compaction and lack of oxygen.
- The temporary topsoil stockpiles must be kept free of invasive plant species.
- Topsoil heaps to be stored longer than a period of 6 months needs to be vegetated with an indigenous grass seed mix if vegetation does not naturally germinate within the first growth season.
- Storm- and runoff water must be diverted around the stockpile area to prevent erosion.

- The stockpiled topsoil must be evenly spread, to a depth of 300 mm, over the rehabilitated area upon closure of the site.
- The permit holder must strive to re-instate topsoil at a time of year when vegetation cover can be established as quickly as possible afterwards, so that erosion of returned topsoil by both rain and wind, before vegetation is established, is minimized. The best time of year is at the end of the rainy season, when there is moisture in the soil for vegetation establishment and the risk of heavy rainfall events is minimal.
- A cover crop must be planted and established immediately after spreading of topsoil, to stabilize the soil and protect it from erosion. The cover crop must be fertilized for optimum biomass production. It is important that rehabilitation be taken up to the point of cover crop stabilization. Rehabilitation cannot be considered complete until the first cover crop is well established.
- Run-off water must be controlled via temporary berms, where necessary, on the slopes to ensure that accumulation of run-off does not cause down-slope erosion.
- The rehabilitated area must be monitored for erosion, and appropriately stabilized if any erosion occurs for at least 12 months after reinstatement.

HYDROLOGY

Erosion Control and Storm Water Management:

- Clearing of vegetation must be limited to the proposed mining footprint and associated infrastructure. No clearing outside of the minimum required footprint to take place.
- Stormwater must be diverted around the topsoil heaps and mining areas to prevent erosion.
- Stockpiles must be protected from erosion, stored on flat areas where possible, and be surrounded by appropriate berms.
- When mining within steep slopes, it must be ensured that adequate slope protection is provided.
- During mining, the outflow of run-off water from the mining excavation must be controlled to prevent down-slope erosion. This must be done by way of the construction of temporary banks and ditches that will direct run-off water (if needed). These must be in place at any points where overflow out of the excavation might occur.
- Roads and other disturbed areas within the project area must be regularly monitored for erosion and problem areas must receive follow-up monitoring to assess the success of the remediation.
- Any erosion problems within the mining area as a result of the mining activities observed must be rectified immediately (within 48 hours) and monitored thereafter to ensure that it does not re-occur.

- Mining must be conducted only 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:
  - 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. You must prevent clean water 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 or seeping into clean water systems.
  - A storm water management plan must apply for the entire life cycle of the mining activity 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 a storm water management plan.
- Polluting activities including storage of mining fleet, equipment wash down facilities and vehicle maintenance yards must be restricted to the workshop areas and must be undertaken on impermeable hard standing surfaces, which are formally drained to a dirty water drainage system at the site.
- All fuels and chemicals stored or used on site must be contained within fit for purpose containers and stored within designated storage areas. In order to prevent pollution of the surrounding environment during an accidental spillage, the designated storage areas must be situated on an impermeable surface and must feature a perimeter bund and a drainage sump. The volume of the bund and sump must be sized to contain at least 110% of the total volume of the fuel and chemicals being stored within the designated storage area. The storage areas must feature a roof to prevent inflow of rainwater, which would require the sump to be emptied more frequently.

TERRESTRIAL BIODIVERSITY, CONSERVATION AREAS AND GROUNDCOVER

Management of Vegetation Removal:

- The mining boundaries must be clearly demarcated and all operations must be contained to the approved mining area. The area outside the mining boundaries must be declared a no-go area, and all staff must be educated accordingly.
- A pre-commencement walk-through of the final mining footprint, must be done by a suitably qualified botanist to identify species of conservation concern that need to be removed/relocated prior to bush clearance. The findings (if any) of the botanist must be culminated into a Plant Rescue Plan to be implemented on site. A copy of the Plant Rescue Plan (if applicable) must be available on site.

- Permits for the removal of protected plant species (if required) must be obtained from DAERD&LR and kept on-site in the possession (at all times) of the flora search and rescue team.
- A pre-commencement environmental induction for all site staff must be provided to ensure that basic environmental principles are adhered to. This includes awareness of no littering, appropriate handling of pollution and chemical spills, avoiding fire hazards, minimising wildlife interactions, remaining within demarcated construction areas, etc.
- Bush-clearance may only commence once the recommendations of the specialist (pre-commencement walkthrough) have been implemented.
- Cleared vegetation to be retained at any time may not be burned, but can be mulched and stockpiled. Ideally the heaps can be covered with stockpiled topsoil and the material be retained for future site rehabilitation purposes.
- The on-site ECO must provide supervision and oversight of vegetation clearing activities and other activities which may cause damage to the environment, especially during the site establishment phase, when the majority of vegetation clearing is taking place.
- All vehicles must remain on demarcated roads and no unnecessary driving in the veld outside these areas may be allowed.
- No plants may be translocated or otherwise uprooted or disturbed for rehabilitation or other purposes without express permission from the ECO and without the relevant permits.
- No fires must be allowed on-site.

Management of Invasive Plant Species:

- An invasive plant species management plan (Appendix K) must be implemented at the site to ensure the management and control of all species regarded as Category 1a and 1b invasive species in terms of NEM:BA (National Environmental Management: Biodiversity Act 10 of 2004 and regulations applicable thereto). Weed/alien clearing must be done on an ongoing basis throughout the life of the mining activities.
- No planting or importing of any alien species to the site for landscaping, rehabilitation or any other purpose may be allowed.
- All stockpiles (topsoil & overburden) must be kept free of invasive plant species.
- 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 can be destroyed completely.
  - The plants can be treated chemically by a registered pest control officer (PCO) through the use of an herbicide recommended for use by the PCO in accordance with the directions for the use of such an herbicide.

FAUNA

Protection of Fauna:

- The site manager must ensure no fauna is caught, killed, harmed, sold or played with.
- Any fauna directly threatened by the operational activities must be removed to a safe location by the ECO or other suitably qualified person.
- All personnel must undergo environmental induction regarding fauna management and in particular awareness about not harming or collecting species such as snakes, tortoises and owls which are often persecuted out of superstition. 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.
- All vehicles must adhere to a low speed limit to avoid collisions with susceptible species such as snakes and tortoises.
- No litter, food or other foreign material may be thrown or left around the site. Such items must be kept in the site vehicles and daily removed to the site camp.

CULTURAL AND HERITAGE ENVIRONMENT

Archaeological, Heritage and Palaeontological Aspects:

- All mining must be confined to the development footprint area.
- Heritage Chance Find Procedures:
  - If during the pre-construction phase, construction, operations or closure phases of this project, any person employed by the developer, one of its subsidiaries, contractors and subcontractors, or service provider, finds any artefact of cultural significance or heritage site, this person must cease work at the site of the find and report this find to their immediate supervisor, and through their supervisor to the senior on-site manager.
  - It is the responsibility of the senior on-site Manager to make an initial assessment of the extent of the find, and confirm the extent of the work stoppage in that area.
  - The senior on-site Manager must inform the ECO of the chance find and its immediate impact on operations. The ECO must then contact a professional archaeologist for an assessment of the finds who must notify the SAHRA.
  - Work may only continue once the go-ahead was issued by SAHRA.
- Fossil Chance Find Protocol:
  - When excavations begin the rocks must be given a cursory inspection by the environmental officer or designated person. Any fossiliferous material (plants, insects, bone, stromatolites) must be put aside in a suitably protected place. This way the project activities will not be interrupted.

- Photographs of similar fossils must be provided to the developer to assist in recognizing the fossil plants, vertebrates, invertebrates or trace fossils in the shales and mudstones (see Appendix G2).
- Photographs of the putative fossils can be sent to the palaeontologist for a preliminary assessment.
- If there is any possible fossil material found by the developer/environmental officer/miners then the qualified palaeontologist sub-contracted for this project, must visit the site to inspect the selected material and check the dumps where feasible.
- Fossil plants or vertebrates that are considered to be of good quality or scientific interest by the palaeontologist must be removed, catalogued and housed in a suitable institution where they can be made available for further study. Before the fossils are removed from the site a SAHRA permit must be obtained. Annual reports must be submitted to SAHRA as required by the relevant permits.
- If no good fossil material is recovered, then no site inspections by the palaeontologist will be necessary. A final report by the palaeontologist must be sent to SAHRA once the project has been completed and only if there are fossils.
- If no fossils are found and the excavations have finished, then no further monitoring is required.

LAND USE

Loss of agricultural land for duration of mining:

- The Applicant signed a lease agreement with the landowner to compensate for the loss of agricultural land for the duration of the mining period. If needed, mined-out/rehabilitated areas could revert back to agricultural use once the cover crop stabilised.

EXISTING INFRASTRUCTURE

Management of the Access Road:

- Storm water must be diverted around the access road to prevent erosion.
- Vehicular movement must be restricted to the existing access road and crisscrossing of tracks through undisturbed areas must be prohibited.
- Rutting and erosion of the access road caused as a direct result of the mining activities must be repaired by the permit holder.
- Overloading of the trucks must be prevented and proof of load weights must be filed and be available for auditing by relevant officials.
- The speed of all mining equipment/vehicles must be restricted to 40 km/h on the access roads.

GENERAL

Waste Management:

- Regular vehicle maintenance, repairs and services may only take place at the workshop and service area. 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 closed container/bin to be removed from the emergency service area (same day) to the workshop in order to ensure proper disposal. This waste must be treated as hazardous waste and must be disposed of at a registered hazardous waste handling facility, alternatively collected by a registered hazardous waste handling contractor. The safe disposal certificates must be filed for auditing purposes.
- If a diesel bowser is used on site, it must be equipped with a drip tray at all times. Drip trays must be used during each and every refuelling event. The nozzle of the bowser needs to rest in a sleeve to prevent dripping after refuelling.
- Site management must ensure drip trays are cleaned after each use. No dirty drip trays may be used on site. The dirty rags used to clean the drip trays must be disposed as hazardous waste into a designated bin at the workshop, where it is incorporated into the hazardous waste removal system.
- 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 recognized facility. Proof of safe disposal must be filed for auditing purposes.
- An oil spill kit must be obtained, and the employees must be trained in the emergency procedures to follow when a spill occurs as well as the application of the spill kit.
- Spills must be cleaned up immediately, within two hours of occurrence, to the satisfaction of the Regional Manager (DMRE) by removing the spillage together with the polluted soil and containing it in a designated hazardous waste bin until it is disposed of at a recognised facility. Proof must be filed.
- Suitable covered receptacles must be available at all times and conveniently placed for the disposal of general waste.
- 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 to be collected at least once a month 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. Proof of disposal must be available for auditing purposes.
- Biodegradable refuse must be handled as indicated above.
- Re-use or recycling of waste products must be encouraged on site.
- No waste may be buried or burned on the site.

- All employees must have access to proper ablution facilities that are either connected to an operational septic tank, or have a chemical drum system. Chemical toilets must be anchored (to prevent blowing/falling over) and shall be serviced at least once a week for the duration of the mining activities by a registered liquid waste handling contractor. The safe disposal certificates must be filed for auditing purposes.
- The use of any temporary, chemical toilet facilities must not cause any pollution to water sources or pose a health hazard. In addition, no form of secondary pollution should arise from the disposal of refuse or sewage from the temporary, chemical toilets. Any pollution problems arising from the above are to be addressed immediately by the permit holder.
- When small volumes of wastewater are generated during the life of the mine the following is applicable:
  - Water containing waste must not be discharged into the natural environment.
  - Measures to contain the waste water and safely dispose thereof must be implemented.
- It is important that any significant spillage of chemicals, fuels etc. during the lifespan of the mining activities is reported to the Department of Water and Sanitation and other relevant authorities.
- Site management must implement the use of waste registers to keep record of the waste generated and removed from the mining area.

Storage/Handling of Hazardous Substances/Chemicals:

- Chemical storage areas must be placed on level ground to prevent offsite migration of any spilled product.
- The floor of the storage area must be impermeable to prevent seepage of spilled products into the ground or ground water.
- Access to the chemicals/substances must be controlled and require prior notification of an appropriate staff member.
- The storage area must be out of the 1:100 year floodline or further than 100 m from the edge of a watercourse, whichever is greatest.
- A Hazardous Substances Register must be maintained, and Safety Data Sheets (SDS) must be kept current for all chemicals used on site.
- Any fuel/used oil tanks must have secondary containment in the form of an impermeable bund wall and base within which the tanks sits, raised above the floor, on plinths. The bund capacity must be sufficient to contain 110% of the tank's maximum capacity. The distance and height of the bund wall relative to that of the tank must also be taken into consideration to ensure that any spillage does not result in hydrocarbons/other substances spouting beyond the confines of the bund.
- The site manager must establish a formal inspection routine to check all equipment in the bund area, as well as the bund area itself for malfunctions or leakages. The bund

area must be inspected at least weekly and any accumulated rainwater removed and handled as contaminated water. All valves and outlets must be checked to ensure that its intact and closed securely.

- The bund base must slope towards an oil sump of sufficient size. Contaminated water may not be allowed to mix with clean water, and must be contained until it is collected by a registered hazardous waste handling contractor or disposed of at a registered hazardous waste handling facility.
- Drip trays must be used underneath all stationary equipment or vehicles. Used drip trays must be placed within a bunded area and are not be stored on bare soil. The waste water originating from the cleaning of drip trays must be discarded into the oil sump.

Management of health and safety risks:

- Workers must have access to the correct personal protection equipment (PPE) as required by law.
- Sanitary facilities must be located within 100 m from any point of work.
- All operations must comply with the Mine Health and Safety Act, 1996 (Act No 29 of 1996).
- The type, duration and timing of the blasting procedures must be planned with due cognizance of other land users and structures in the vicinity.
- The surrounding landowners must be informed in writing ahead of each blasting event.
- The compliance of ground vibration and airblast levels must be monitored to USBM standards with each blasting event.
- A vibro recorder must be used to record all blasts.
- Audible warning of a pending blast must be given at least 3 minutes in advance of the blast.
- Measures to limit flyrock must be taken. All flyrock (of diameter 150 mm and larger) which falls beyond the working area, together with the rock spill must be collected and removed.

ix) Motivation where no alternative sites were considered.

Site Alternative 1 was identified as the most practical and only viable site alternative as the proposed mining footprint was chosen over the main core zone of the iron formation, access is simplified, and the environmental related impacts are acceptable. Moving the permit area to an alternative site will remove it from the optimal iron resource that has been proven to be of very high standard.

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

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

The preferred and only site alternative entails the development of the proposed iron ore mine within the GPS coordinates as listed in Table 6 above. The proposed site was identified based on the following:

- Although Target 2 (identified as the most prospective area) currently extends across an area of 12.5 ha, the proposed mining footprint (4.9 ha) was chosen over the main core zone of the iron formation in collaboration with the geologist of the Applicant. Therefore, moving the permit area to an alternative site will remove it from the optimal iron resource.
- Presently, neither Target 3 or 5 has enough drillhole information to perform geological modelling, and even though the exploration of the five remaining targets may identify a number of smaller targets comparable to that defined in Target 2, this information is not yet available and therefore siting the proposed mining footprint over a proven resource (Target 2) is more sensible.
- The grade of iron ore in the proposed footprint was proven to be of very high standard.
- The existing farm roads can be used to access the proposed mining area, and even though the roads will require some upgrade/maintenance, no new roads have to be constructed.
- No drainage lines or other watercourses within 100 m, or wetlands within 500 m of the proposed mining footprint could be identified.
- Siting the mining footprint along the southern rise of the hill will screen the area towards the northern and north-eastern sides thereby reducing the visual impact of the proposed operation on the surrounding environment. It is highly unlikely that the mining area will be visible from the residences of the surrounding neighbours.

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

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

During the impact assessment process the following potential impacts were identified of each main activity in each phase. An initial significance rating (listed under *v) Impacts and Risks Identified*) was determined for each potential impact should the mitigation measures proposed in this document not be implemented on-site. The impact assessment process then continued in

identifying mitigation measures to address the impact that the proposed mining activity may have on the surrounding environment.

The significance rating was again determined for each impact using the methodology as explained under *vi) Methodology Used in Determining and Ranking the Significance*. The impact ratings listed below was determined for each impact **after** bringing the proposed mitigation measures into consideration and therefore represents the final layout/activity proposal.

SITE ESTABLISHMENT & INFRASTRUCTURE DEVELOPMENT:

Alteration of the agricultural sense of place

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium					**Degree of Mitigation: None**		
2	4	1	2.3	4	5	4.5	**10.4**

Loss of agricultural land for duration of mining

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium					**Degree of Mitigation: None**		
2	4	1	2.3	5	5	5	**11.5**

Visual intrusion as a result of site establishment

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium					**Degree of Mitigation: Partial**		
2	4	2	2.6	5	5	5	**13**

Potential impact on the ESA objectives

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low					**Degree of Mitigation: Full**		
2	4	4	3.3	2	1	1.5	**4.9**

Potential impact on vegetation and listed and/or protected plant species

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low					**Degree of Mitigation: Full**		
3	1	1	1.6	2	1	1.5	**2.4**

Potential impact on fauna within the footprint area

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low					**Degree of Mitigation: Full**		
3	2	1	2	2	1	1.5	**3**

Potential impact on archaeological artefacts

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low					**Degree of Mitigation: Full**		
4	5	5	4.6	1	1	1	**4.6**

Potential impact on surface- or ground water

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low					**Degree of Mitigation: Full**		
2	1	1	1.3	2	1	1.5	**2**

New job opportunities as a result of the mining operation (Positive Impact)

			Consequence			Likelihood	**Significance (+)**
Severity (+)	Duration	Extent		Probability	Frequency		
Rating: High (+)					**Degree of Mitigation: N/A**		
4	4	5	4.6	5	5	5	**23**

STRIPPING AND STOCKPILING OF TOPSOIL AND/OR OVERBURDEN:

Visual intrusion caused by mining activities

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium					**Degree of Mitigation: Partial**		
2	4	1	2.3	4	5	4.5	**10.4**

Loss of stockpiled topsoil during mining and stockpiling

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low					**Degree of Mitigation: Full**		
2	4	1	2.3	2	2	2	**4.6**

Dust nuisance as a result of the disturbance of soil

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low					**Degree of Mitigation: Full**		
2	3	1	2	2	2	2	**4**

Noise nuisance generated by earthmoving machinery

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low					**Degree of Mitigation: Partial**		
1	3	1	1.6	2	4	3	**4.8**

Infestation of the topsoil heaps and mining area with weeds or invader plant species

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low					**Degree of Mitigation: Full**		
2	2	1	1.6	2	2	2	**3.2**

Potential impact on local fauna due to disturbance and loss of available habitat

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low					**Degree of Mitigation: Full**		
2	2	1	1.6	2	2	2	**3.2**

Potential erosion of denuded areas

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low					**Degree of Mitigation: Full**		
2	2	1	1.6	2	2	2	**3.2**

Potential contamination of footprint area and surface runoff as a result of hydrocarbon spillages

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low					**Degree of Mitigation: Full**		
2	2	1	1.6	2	2	2	**3.2**

DRILLING AND BLASTING:

Health and safety risk posed by blasting activities

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low					**Degree of Mitigation: Full**		
4	4	1	3	2	1	1.5	**4.5**

Dust nuisance caused by blasting activities

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium					**Degree of Mitigation: None**		
2	4	2	2.6	4	3	3.5	**9.1**

Noise nuisance as a result of blasting

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium					**Degree of Mitigation: Partial**		
2	4	2	2.6	4	3	3.5	**9.1**

EXCAVATION, LOADING AND HAULING TO THE PROCESSING AREA

Dust nuisance due to excavation and from loading and vehicles transporting the material

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low					**Degree of Mitigation: Full**		
2	4	1	2.3	2	2	2	**4.6**

Noise nuisance as a result of the mining activities

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium					**Degree of Mitigation: Partial**		
2	4	1	2.3	2	5	3.5	**8**

Unsafe working environment for employees

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low					**Degree of Mitigation: Full**		
2	4	1	2.6	2	1	1.5	**3.5**

Soil contamination from hydrocarbon spills and/or littering

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low					**Degree of Mitigation: Full**		
2	4	1	2.3	2	2	2	**4.6**

Potential impact on areas of palaeontological concern

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**Site Alternative 1**		**Degree of Mitigation: Full**		
4	4	5	4.3	1	1	1	**4.3**

Facilitation of erosion due to mining activities

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low					**Degree of Mitigation: Full**		
2	4	1	2.3	2	2	2	**4.6**

PROCESSING, STOCKPILING AND TRANSPORTING OF MATERIAL:

Dust nuisance generated at the processing plant

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low					**Degree of Mitigation: Full**		
1	4	2	2.3	2	2	2	**4.6**

Noise nuisance stemming from operation of the processing plant

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium					**Degree of Mitigation: Partial**		
2	4	2	2.6	3	4	3.5	**9.1**

Potential contamination of environment due to improper waste management

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low					**Degree of Mitigation: Full**		
2	4	1	2.3	2	2	2	**4.6**

Overloading of trucks impacting road infrastructure

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low					**Degree of Mitigation: Full**		
2	3	5	3.3	2	1	1.5	**4.9**

Degradation of the access road

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low					**Degree of Mitigation: Full**		
2	4	2	2.6	2	2	2	**4.6**

SLOPING AND LANDSCAPING DURING REHABILITATION:

Safety risk posed by un-sloped areas

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low					**Degree of Mitigation: Full**		
2	5	1	2.6	2	1	1.5	**3.9**

Erosion of returned topsoil after rehabilitation

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low					**Degree of Mitigation: Full**		
2	5	1	2.6	2	1	1.5	**3.9**

Infestation of the reinstated areas by weeds and invader plant species

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low					**Degree of Mitigation: Full**		
2	5	1	2.6	2	1	1.5	**3.9**

Potential impact associated with litter/waste left at the mining area

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low					**Degree of Mitigation: Full**		
2	2	1	1.6	2	1	1.5	**2.4**

Return of the mining area to agricultural use upon closure (Positive Impact)

			Consequence			Likelihood	**Significance (+)**
Severity (+)	Duration	Extent		Probability	Frequency		
Rating: Medium-High					**Degree of Mitigation: N/A**		
3	5	1	3	5	5	5	**15**

j) Assessment of each identified potentially significant impact and risk

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

Table 20: Assessment of each identified potentially significant impact and risk

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE	MITIGATION TYPE	SIGNIFICANCE
Whether listed or not listed. (E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.)	(E.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, air pollution, etc…etc…etc.)		In which impact is anticipated. (E.g. Construction, commissioning, operational Decommissioning closure, post closure.)	If not mitigated.	(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 etc) E.g. Modify through alternative method Control through noise control Control through management and monitoring through rehabilitation.	If not mitigated.
Demarcation of site with visible beacons.	No impact could be identified other than the beacons being outside the boundaries of the approved mining area.	N/A	Site Establishment phase	N/A	Control through management and monitoring.	N/A
Site establishment and infrastructure development**.**	Alteration of the agricultural sense of place.	The impact may affect the agricultural opportunities of the property.	Site Establishment & Operational Phase	Medium	The study area does not have a high agritourism-, or cultivation potential and the proposed mining operation will have a low visibility. The impact must be controlled through proper management.	Medium
Site establishment and infrastructure development**.**	Loss of agricultural land for duration of mining.	The impact may affect the agricultural	Site Establishment &	Medium	Should the proposed project be approved, the operation will temporarily interrupt the agricultural	Medium

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE	MITIGATION TYPE	SIGNIFICANCE
		opportunities of the property.	Operational Phase		activities of the footprint area, only to be reversed upon the closure of the mine. The impact could be controlled through progressive rehabilitation.	
• Site establishment and infrastructure development. • Stripping and stockpiling of topsoil and overburden.	• Visual intrusion as a result of site establishment. • Visual intrusion caused by mining activities.	The visual impact may affect the aesthetics of the landscape.	Site Establishment & Operational Phase	• Medium • Medium	<u>Control:</u> Implementing proper housekeeping.	• Medium • Medium
• Site establishment and infrastructure development. • Cumulative Impacts	• Potential impact on the ESA objectives.	This will impact on the biodiversity of the receiving environment.	Site Establishment & Operational Phase	• Low-Medium	<u>Control:</u> Implementing proper housekeeping.	• Low
• Site establishment and infrastructure development.	• Potential impact on vegetation and listed and/or protected plant species.	This will impact on the biodiversity of the receiving environment.	Site Establishment phase	• Medium	<u>Control & Stop:</u> Implementing good management practices and adhering to the recommendations of the botanist.	• Low-Medium
• Site establishment and infrastructure development. • Stripping and stockpiling of topsoil and overburden.	• Potential impact on fauna within the footprint area. • Potential impact on local fauna due to distrubance and loss of available habitat.	This will impact on the biodiversity of the receiving environment.	Site Establishment & Operational Phase	• Low-Medium	<u>Control & Stop:</u> Implementing good management practices.	• Low
• Site establishment and infrastructure development. • Excavation, loading and hauling to the processing plant.	• Potential impact on archaeological artefacts. • Potential impact on areas of palaeontological concerns.	This could impact on the cultural and heritage legacy of the receiving environment.	Site Establishment, & Operational Phase.	• Low • Low	<u>Control & Stop:</u> Implementing good management practices.	• Low • Low

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE	MITIGATION TYPE	SIGNIFICANCE
• Site establishment and infrastructure development.	• Potential impact on surface- or ground water.	This could impact the hydrology of the receiving environment.	Site Establishment, & Operational Phase.	• Medium	Control: Implementing the mitigation measures and rehabiltiation plan.	• Low
• Site establishment and infrastructure development.	• New job opportunities as a result of the mining operation (+)	Contribution to the socio-economic status of the area.	Site Establishment, & Operational Phase.	• High+	N/A	• High+
• Stripping and stockpiling of topsoil and overburden. • Excavation, loading and hauling to the processing plant. • Sloping and landscaping during rehabilitation.	• Loss of stockpiled topsoil during mining and stockpiling. • Potential erosion of denuded areas. • Facilitation of erosion due to mining activities. • Erosion of returned topsoil after rehabilitation.	The loss/contamination of topsoil and erosion of the footprint will affect the rehabilitation of the excavation upon closure of the site.	Site Establishment-, Operational and Decommissioning Phase	• Low-Medium • Low-Medium • Low-Medium • Medium	Control & Remedy: Proper housekeeping and storm water management.	• Low • Low • Low • Low
• Stripping and stockpiling of topsoil and/or overburden. • Drilling and blasting. • Excavation, loading and hauling to the processing plant. • Processing, stockpiling and transporting of material.	• Dust nuisance caused as a result of the disturbance of soil. • Dust nuisance caused by blasting activities. • Dust nuisance due to excavation and from loading and vehicles transporting the material. • Dust nuisance due generated at the processing plant.	Increased dust generation will impact on the air quality of the receiving environment.	Site Establishment-, Operational-, and Decommissioning Phase	• Low-Medium • Low-Medium • Medium • Medium	Control: Dust suppression methods and proper housekeeping.	• Low • Low-Medium • Low • Low
• Stripping and stockpiling of topsoil and/or overburden.	• Noise nuisance generated by earthmoving machinery.	Should noise levels become excessive it may have an impact on	Site Establishment-, Operational-, and	• Low-Medium • Low-Medium	Control: Noise suppression methods and proper housekeeping.	• Low • Low-Medium

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE	MITIGATION TYPE	SIGNIFICANCE
• Drilling and blasting. • Excavation, loading and hauling to the processing plant. • Processing, stockpiling and transporting of material.	• Noise nuisance as a result of blasting. • Noise nuisance as a result of the mining activities. • Noise nuisance stemming from operation of the processing plant.	the noise ambiance of the receiving environment.	Decommissioning Phase	• Medium • Medium		• Low-Medium • Low-Medium
• Stripping and stockpiling of topsoil and/or overburden. • Sloping and landscaping during rehabilitation phase.	• Infestation of the topsoil heaps and mining area with weeds or invader plant species. • Infestation of the reinstated areas by weeds and invader plant species.	Infestation of the footprint by invader plant species may affect the biodiversity of the receiving environment.	Site Establishment-, Operational, and Decommissioning Phase	• Medium • Medium	<u>Control & Remedy:</u> Implementation of an invasive plant species management plan.	• Low • Low
• Stripping and stockpiling of topsoil and/or overburden. • Excavation, loading and hauling to the processing plant. • Processing, stockpiling and transporting of material. • Sloping and landscaping during rehabilitation phase.	• Potential contamination of footprint area and surface runoff as a result of hydrocarbon spillages. • Soil contamination from hydrocarbon spills and/or littering. • Potential contamination of environment due to improper waste management. • Potential impact associated with litter/waste left at the mining area.	Contamination of the footprint area will negatively impact the soil, surface runoff and potentially the groundwater. It will also incur additional costs to the permit holder.	Site Establishment-, Operational-, and Decommissioning Phase	• Low-Medium • Medium • Medium • Medium	<u>Control & Remedy:</u> Proper housekeeping and implementation of an emergency response plan and waste management plan.	• Low • Low • Low • Low
• Drilling and blasting. • Excavation, loading and hauling to the processing plant.	• Health and safety risk posed by blasting activities. • Unsafe working environment for employees. • Safety risk posed by un-sloped areas.	An unsafe working environment affects the labour force, as well as pose a threat to animals and humans that may	Operational-, and Decommissioning Phase	• Medium • Medium • Medium	<u>Stop & Control:</u> Adherance to the blasting rules and regulations, demarcation of the mining area and proper housekeeping.	• Low • Low • Low

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE	MITIGATION TYPE	SIGNIFICANCE
• Sloping and landscaping during rehabilitation phase.		enter the mining footprint.				
• Processing, stockpiling and transporting of material.	• Overloading of trucks impacting road infrastructure. • Degradation of the access road.	Collapse of the internal road infrastructure will affect the landowner and lawful occupiers negatively. If the mine negatively affect public traffic it may incur additional costs and complaints from the public.	Operational phase	• Medium-High • Medium	<u>Control & Remedy:</u> Maintaining the access road for the duration of the operational phase, as well as leaving it in a representative or better condition than prior to mining.	• Low • Low
• Sloping and landscaping during rehabilitation	• Return of the mining area to agricultural use upon closure (+)	The area will be returned to the landowner for future use.	Decommissioning Phase	• Medium-High+	N/A	• Medium-High+

The supporting impact assessment conducted by the EAP must be attached as an appendix, marked Appendix H.

k) Summary of specialist reports.

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

Table 21: Summary of specialist reports

LIST OF STUDIES UNDERTAKEN	RECOMMENDATIONS OF SPECIALIST REPORTS	SPECIALIST RECOMMENDATIONS THAT HAVE BEEN INCLUDED IN THE EIA REPORT (Mark with X if applicable)	REFERENCE TO APPLICABLE SECTION OF REPORT WHERE SPECIALIST RECOMMENDATIONS HAVE BEEN INCLUDED
Heritage Impact Assessment For the proposed Makganyane Mining Permit, Northern Cape Province. *(See Appendix G1 for a full copy of the document)*	**Recommendations:** The impact of the proposed project on heritage resources low and it is recommended that the proposed project can commence on the condition that the following recommendations are implemented as part of the EMPr and based on approval from SAHRA: The possibility of the occurrence of subsurface finds cannot be excluded. Therefore, if during construction any possible finds such as stone tool scatters, artefacts or bone and fossil remains are made, the operations must be stopped, and a qualified archaeologist must be contacted for an assessment of the find and therefor chance find procedures should be put in place as part of the EMP. <u>Chance Find Procedure:</u> This procedure applies to the developer's permanent employees, its subsidiaries, contractors and subcontractors, and service providers. The aim of this procedure is to establish monitoring and reporting procedures to ensure compliance with this policy and its associated procedures. Construction crews must be properly inducted to ensure they are fully aware of the procedures regarding chance finds as discussed below. • If during the pre-construction phase, construction, operations or closure phases of this project, any person employed by the developer, one of its subsidiaries, contractors and subcontractors, or service provider, finds any artefact of cultural significance or heritage	This report supports all the recommendations proposed by the specialist.	Part A(1)(h)(viii) The possible mitigation measures that could be applied and the level of risk – Archaeological, Heritage and Palaeontological Aspects.

LIST OF STUDIES UNDERTAKEN	RECOMMENDATIONS OF SPECIALIST REPORTS	SPECIALIST RECOMMENDATIONS THAT HAVE BEEN INCLUDED IN THE EIA REPORT (Mark with X if applicable)	REFERENCE TO APPLICABLE SECTION OF REPORT WHERE SPECIALIST RECOMMENDATIONS HAVE BEEN INCLUDED
	site, this person must cease work at the site of the find and report this find to their immediate supervisor, and through their supervisor to the senior on-site manager. - It is the responsibility of the senior on-site Manager to make an initial assessment of the extent of the find, and confirm the extent of the work stoppage in that area. - The senior on-site Manager will inform the ECO of the chance find and its immediate impact on operations. The ECO will then contact a professional archaeologist for an assessment of the finds who will notify the SAHRA.		
Palaeontological Impact Assessment For the Mining Rights Application for Farm Makganyene 667, Kuruman District, Northern Cape Province. *(See Appendix G2 for a full copy of the document)*	**Recommendations:** Based on experience and the lack of any previously recorded fossils from the area, it is extremely unlikely that any fossils would be preserved in the aeolian sands of the Quaternary and there are no palaeo-pans or palaeo-springs visible in the satellite imagery. Stromatolitic bioherms are trace fossils and of limited interest to palaeontologists. Nonetheless, since there is a very small chance that fossils may occur in the sands that will be removed and the rocks that will be mined, a Fossil Chance Find Protocol should be added to the EMPr. If fossils are found once clearing and mining has commenced by the environmental officer or other responsible person, then they should be rescued and a palaeontologist called to assess and collect a representative sample. <u>Chance Find Procedure:</u> - The following procedure is only required if fossils are seen on the surface and when drilling/excavations/mining commence. - When excavations begin the rocks and must be given a cursory inspection by the environmental officer or designated person. Any fossiliferous material (plants, insects, bone, stromatolites) should be	This report supports all the recommendations proposed by the specialist.	Part A(1)(h)(viii) The possible mitigation measures that could be applied and the level of risk – Archaeological, Heritage and Palaeontological Aspects.

LIST OF STUDIES UNDERTAKEN	RECOMMENDATIONS OF SPECIALIST REPORTS	SPECIALIST RECOMMENDATIONS THAT HAVE BEEN INCLUDED IN THE EIA REPORT (Mark with X if applicable)	REFERENCE TO APPLICABLE SECTION OF REPORT WHERE SPECIALIST RECOMMENDATIONS HAVE BEEN INCLUDED
	put aside in a suitably protected place. This way the project activities will not be interrupted. - Photographs of similar fossils must be provided to the developer to assist in recognizing the fossil plants, vertebrates, invertebrates or trace fossils in the shales and mudstones (Appendix G2). - Photographs of the putative fossils can be sent to the palaeontologist for a preliminary assessment. - If there is any possible fossil material found by the developer/environmental officer/miners then the qualified palaeontologist sub-contracted for this project, should visit the site to inspect the selected material and check the dumps where feasible. - Fossil plants or vertebrates that are considered to be of good quality or scientific interest by the palaeontologist must be removed, catalogued and housed in a suitable institution where they can be made available for further study. Before the fossils are removed from the site a SAHRA permit must be obtained. Annual reports must be submitted to SAHRA as required by the relevant permits. - If no good fossil material is recovered then no site inspections by the palaeontologist will be necessary. A final report by the palaeontologist must be sent to SAHRA once the project has been completed and only if there are fossils. - If no fossils are found and the excavations have finished then no further monitoring is required.		

l) Environmental impact statement

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

The key findings of the environmental impact assessment entail the following:

Project Proposal

- Makganyane Resources (Pty) Ltd applied for environmental authorisation and a mining permit to mine iron ore from 4.9 ha of the Remaining Extent of the farm Makganyene No 667. The iron ore will be mined through conventional opencast mining methods and hauled from the property to the SIOER. The proposed operation will appoint ±50 employees (including management), and make use of temporary/mobile infrastructure.

Topography

- The topography of the proposed mining area gradually slopes in elevation from the north-western corner towards the south-eastern corner. The excavation will cut into the southern facing slope of the hill that will affect the topography in that a depression will be created with stepped side walls as mining progress. Due to the impracticality of importing large volumes of fill material to restore the excavation to its original topography, the rehabilitation option is to render the pit safe and leave it as a minor landscape feature.
- The excavation will most likely hold some rainwater upon closure for certain parts of the year, that could be used as an additional water source by the landowner to which the mining footprint will be returned once the closure certificate was issued.

Visual Characteristics

- The viewshed analysis showed that the mining area or at least a portion thereof will mainly be visible to the south-western (±4 km away) and south-eastern (±3.5 km away) residences.
- Based on the fact that as the distance between the proposed development and the observer increases the visual impact will decrease the significance of the visual impact on the surrounding environment is deemed to be of medium significance.

Air and Noise Quality

- The proposed activity does not trigger an air emissions licence.
- Should the Applicant implement the proposed mitigation measures the impact on the air quality of the surrounding environment is deemed to be of low significance.
- Although the proposed activity will have a cumulative impact on the ambient noise levels, the nuisance value is of low significance, as the nearest farmsteads are ±1 km away from the proposed operation.

Geology and Soil

- The drilling programme identified three potential target areas, of which the Doornfontein conglomeratic iron horizon on the western trough flank of Target 2 is the most prospective, and subsequently, the Applicant applied for a mining permit to mine the iron ore from a 4.9 ha area.

Hydrology

- The proposed mining area falls within a NFEPA of conservation importance.
- No wetlands, rivers, drainage lines or other open surface water courses were identified within the proposed mining permit area.
- The potential impact of the proposed activity on surface water resources is of low significance should the Applicant implement the proposed mitigation measures.
- It is unlikely that the proposed activity will intercept the groundwater table and the significance of the impact is deemed to be low.
- In conclusion, mining the iron ore from the proposed 4.9 ha will not affect the integrity of the NFEPA; nor will it have an impact on the surface- or groundwater of the footprint area.

Mining and Biodiversity:

- The proposed mining footprint falls outside any areas of conservation importance in terms of the Mining and Biodiversity Guidelines.
- The mining footprint extends over an ESA, but the Screening Report indicates that the plant species sensitivity of the area is of low significance.
- Should the Applicant implement the proposed mitigation measures and obtain the relevant permits (if applicable) the proposed project will not negatively affect the conservation status or objectives of the ESA.

Groundcover:

- The vegetation cover is in a natural to near natural state, representing the Kuruman Mountain Bushveld.
- No endangered and/or otherwise protected plant species were identified within the proposed 4.9 ha footprint.
- A qualified botanist must conduct a plant identification walkthrough prior to commencement of the activity to identify any potential plants that may need a destruction/removal permit.

Fauna

- The fauna will not be impacted by the proposed activities as they will be able to move away or through the site, without being harmed.

Cultural and Heritage Environment

- The HIA concluded that the impact of the proposed project on heritage resources is low, and recommends that the project can commence on the condition that SAHRA approves the proposal and the recommendations of the report are implemented.
- The PIA concluded that no further palaeontological studies are required unless fossils are found once excavations and mining commence. As far as the palaeontology is concerned, this project may be authorised, as long as a Fossil Chance Find Protocol is added to the EMPr.

ii) 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 any areas that should be avoided, including buffers. Attach as Appendix.

See the proposed Site Layout Plan attached as Appendix C1.

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

The positive impacts associated with the project include:

- The Applicant will be able to exploit the iron ore resource on the property;
- The landowner will be able to further diversify the income generation from the property;
- At least forty (40) new job opportunities to local residents will be created by the proposed activity;

- The presence of the proposed operation will contribute (directly & indirectly) to the local economy with preference give to HDSA & women owned local suppliers;
- Upon closure, the area will be returned to the landowner for continued agricultural use.

The potential negative impacts associated with the project that was deemed to have a Low-Medium or higher significance include:

Alteration of the agricultural sense of place	Medium
Loss of agricultural land for duration of mining	Medium
Visual intrusion as a result of the mining activities	Medium
Dust nuisance caused by mining activities	Low-Medium
Noise nuisance due to mining activities	Low-Medium

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

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

Table 22: Proposed impact management objectives and the impact management outcomes for inclusion in the EMPR

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTION	MANAGEMENT OUTCOME
TOPOGRAPHY Landscaping of Mining Area	Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. Compliance to be monitored by the Environmental Control Officer.	• Use the excavated area for the final depositing of overburden. • Dump rocks and coarse material removed from the excavation into the excavation. • Remove coarse natural material used for the construction of ramps and dump it into the excavations. • Remove stockpiles during the decommissioning phase, rip the area and return the topsoil to its original depth to provide a growth medium. • Do not permit any waste to be deposited into the excavations. • Return the previously stored topsoil to its original depth, once overburden, rocks and coarse natural materials have been added to the excavation and it was profiled with acceptable contours and erosion control measures. • If necessary, fertilize the area to allow vegetation to establish rapidly. Seed the site 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 six months from closure of the site. • If required by the Regional Manager (DMRE) the soil must be analysed and any deleterious effects on the soil arising from the mining operation must be corrected and the area be seeded with a vegetation seed mix to his/her specification. • On completion of operations, deal with all structures or objects in accordance with section 44 of the Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002).	• Effectively restoring the mined area to allow the return of land use to agricultural purposes.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTION	MANAGEMENT OUTCOME
		• On completion of mining operations, scarify the surface of all plant-, stockpiling-, and/or office areas, if compacted due to hauling and dumping operations, to a depth of at least 200mm and graded it to an even surface condition. Where applicable/possible return topsoil to its original depth over the area.	
VISUAL CHARACTERISTICS Visual mitigation	Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. Compliance to be monitored by the Environmental Control Officer.	• Ensure that the site have a neat appearance and is kept in good condition at all times. • Store mining equipment in a dedicated area when not in use. • Limit vegetation removal, and only strip topsoil immediately prior to the mining/use of a specific area. • Contain excavations to the approved footprint of the permitted area. • Upon closure, rehabilitate the site to ensure that the visual impact on the aesthetic value of the area is reduced to the minimum.	• Minimise the impact of the mining operations on the visual characteristics of the receiving environment during the operational phase, and minimise the residual impact after closure.
AIR AND NOISE QUALITY Dust Mitigation	Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. Compliance to be monitored by the Environmental Control Officer.	• Control the liberation of dust into the surrounding environment by the use of; inter alia, water spraying and/or other dust-allaying agents. • Ensure continuous assessment of all dust suppression equipment to confirm its effectiveness in addressing dust suppression. • Limit speed on the haul roads to 20 km/h and 40 km/h on the access road to prevent the generation of excess dust. • Minimise areas devoid of vegetation, and only remove vegetation immediately prior to mining. • Install water sprayers at the crusher plant to alleviate dust generation from the conveyor belts. • Minimise fines, blowing from the drop end of the crusher plant by attaching strips of used conveyor belts to the conveyor's end. • Weekly remove compacted dust from the crusher plant to eliminate the dust source.	• Dust prevention measures are applied to minimise the impact.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTION	MANAGEMENT OUTCOME
		• Flatten loads to prevent spillage during transportation on public roads. • Consider weather conditions upon commencement of daily operations. Limit operations during very windy periods to reduce airborne dust and resulting impacts. • Ensure dust generating activities comply with the National Dust Control Regulations, GN No R827 promulgated in terms of NEM:AQA, 2004 and ASTM D1739 (SANS 1137:2012). • Implement best practice measures during the stripping of topsoil, excavation, and transporting of material from site to minimize potential dust impacts.	
AIR AND NOISE QUALITY Noise Mitigation	Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. Compliance to be monitored by the Environmental Control Officer.	• Ensure that employees and staff conduct themselves in an acceptable manner while on site. • No loud music may be permitted at the mining area. • Ensure that all project related vehicles are equipped with silencers and maintained in a road worthy condition in terms of the National Road Traffic Act, 1996. • Plan the type, duration and timing of the blasting procedures with due cognizance of other land users and structures in the vicinity. Notify the surrounding land owners in writing prior to each blasting occasion. • Contract a qualified occupational hygienist to quarterly monitor and report on the personal noise exposure of the employees working at the mine. Monitoring must be in accordance with SANS 10083:2004 (Edition 5) sampling method as well as NEM:AQA 2004, SANS 10103:2008. • Implement best practice measures to minimise potential noise impacts.	• Prevent unnecessary noise to the environment by ensuring that noise from development activity is mitigated.
GEOLOGY AND SOIL Topsoil Handling	Site Manager to ensure compliance with the guidelines as stipulated in the EMPR.	• Strip and stockpile the upper 300 mm of the soil before mining. • Carefully manage and conserve the topsoil throughout the stockpiling and rehabilitation process.	• Adequate fertile topsoil is available to rehabilitate the mined area.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTION	MANAGEMENT OUTCOME
	Compliance to be monitored by the Environmental Control Officer.	• Ensure topsoil stripping, stockpiling and re-spreading is done in a systematic way. Plan mining in such a way that topsoil is stockpiled for the minimum possible time. • Place the topsoil on a levelled area, within the mining footprint. Do not stockpile topsoil in undisturbed areas. • Protect topsoil stockpiles against losses by water- and wind erosion. Position stockpiles so it is not vulnerable to erosion by wind and water. The establishment of plants (weeds or a cover crop) on the stockpiles will help to prevent erosion. • Ensure that topsoil heaps do not exceed 2 m in order to preserve micro-organisms within the topsoil, which can be lost due to compaction and lack of oxygen. • Keep temporary topsoil stockpiles free of invasive plant species. • Vegetate the topsoil heaps to be stored longer than 6 months with an indigenous grass seed mix if vegetation does not naturally germinate within the first growth season. • Divert storm- and runoff water around the stockpile area to prevent erosion. • Spread the topsoil evenly, to a depth of 300 mm, over the rehabilitated area upon closure of the site. • Strive to re-instate topsoil at a time of the year when vegetation cover can be established as quickly as possible afterwards, to that erosion of returned topsoil is minimized. The best time of year is at the end of the rainy season. • Plant a cover crop immediately after spreading topsoil to stabilise the soil and protect it from erosion. Fertilise the cover crop for optimum production. Rehabilitation extends until the first cover crop is well established. • Control run-off water with temporary banks, where necessary, to prevent accumulation of run-off causing down-slope erosion. • Monitor the rehabilitated area for erosion, and appropriately stabilize if erosion do occur, for at least 12 months after reinstatement.	

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTION	MANAGEMENT OUTCOME
HYDROLOGY Erosion Control and Storm Water Management	Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. Compliance to be monitored by the Environmental Control Officer.	• Limit clearing of vegetation to the proposed mining footprint and associated infrastructure. Ensure no clearing takes place outside the minimum required footprint. • Divert stormwater around the topsoil heaps and mining areas to prevent erosion. • Protect stockpiles from erosion, and store it on flat areas surrounded by appropriate berms where possible. • Ensure that adequate slope protection is provided when mining within steep slopes. • Control the outflow of run-off water from the mining excavation to prevent down-slope erosion, by constructing temporary banks and ditches that will direct run-off water (if needed). These must be in place at any points where overflow out of the excavation might occur. • Regularly monitor roads and other disturbed areas within the project for erosion, and ensure problem areas receive follow-up monitoring to assess the success of the remediation. • Rectify erosion problems within the mining area as a result of the mining activities immediately (within 48 hours) and monitored thereafter to ensure that it does not re-occur. • Conduct activity in terms of the Best Practice Guidelines for small-scale mining as developed by DWS. • Restrict polluting activities including storage of mining fleet, equipment wash down facilities and vehicle maintenance yards to the workshop areas and ensure it takes place on impermeable hard standing surfaces, which formally drain to a dirty water drainage system at the site. • Contain all fuels and chemicals stored or used on site in fit for purpose containers and store within designated storage areas. Ensure the designated storage areas are situated on an impermeable surface with a perimeter bund and a drainage sump. Size the volume of the bund and sump to contain at least 110% of the total volume of the fuel and chemicals being stored within the designated storage area.	• Impact on the environment caused by stormwater discharge is avoided and erosion is managed.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTION	MANAGEMENT OUTCOME
		Ensure that the storage areas have a roof to prevent inflow of rainwater, which would require the sump to be emptied more frequently.	
TERRESTRIAL BIODIVERSITY, CONSERVATION AREAS AND GROUNDCOVER Management of vegetation removal.	Permit holder to apply for a destruction/removal plant permit from DAERD&LR Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. Compliance to be monitored by the Environmental Control Officer.	• Clearly demarcate the mining boundaries and contain all operations to the approved mining area. Declare the area outside the mining boundaries a no-go area, and educate all staff accordingly. • Arrange a pre-commencement walk-through of the final mining footprint by a suitably qualified botanist for species of conservation concern that need to be removed/relocated prior to bush clearance. Obtain (if applicable) and implement a Plant Rescue Plan at the property. Keep a copy of the plan at the site. • Obtain permits from DAERD&LR for the removal of protected plant species (if required) and keep it on-site in the possession (at all times) of the flora search and rescue team. • Arrange a pre-commencement environmental induction for all staff on site to ensure that basic environmental principles are adhered to. This must include awareness of no littering, appropriate handling of pollution and chemical spills, avoiding fire hazards, minimising wildlife interactions, remaining within demarcated construction areas, etc. • Only commence with bush-clearance once the recommendations of the specialist (pre-commencement walkthrough) have been implemented. • Do not burn cleared vegetation to be retained at any time, but rather mulch and stockpiled it. Ideally cover the heaps with stockpiled topsoil and retain the material for future site rehabilitation. • The on-site ECO must provide supervision and oversight of vegetation clearing activities and other activities which may cause damage to the environment, especially during the site establishment phase, when the majority of vegetation clearing is taking place.	• Vegetation clearing is restricted to the authorised development footprint of the mine.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTION	MANAGEMENT OUTCOME
		• Ensure all vehicles remain on demarcated roads and prevent unnecessary driving in the veld outside these areas. • Do not translocated, uprooted or disturbed plants for rehabilitation or other purposes without express permission from the ECO and without the relevant permits. • Do not allow fires on-site.	
TERRESTRIAL BIODIVERSITY, CONSERVATION AREAS AND GROUNDCOVER Management of invasive plant species.	Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. Compliance to be monitored by the Environmental Control Officer.	• Implement an invasive plant species management plan to control all invasive plant species on site in terms of NEM:BA, 2004 and CARA, 1983. Do weed/alien ongoing clearing on throughout the life of the mining activities. • Do not allow planting or importing of any alien species to the site for landscaping, rehabilitation or any other purpose. • Keep all stockpiles (topsoil & overburden) free of invasive plant species. • Control declared invader or exotic species on the rehabilitated areas.	• Mining area is kept free of invasive plant species.
FAUNA Protection of fauna	Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. Compliance to be monitored by the Environmental Control Officer.	• Ensure no fauna is caught, killed, harmed, sold or played with. • The ECO or other suitably qualified person must remove any fauna directly threatened by the operational activities to a safe location. • Arrange that all personnel undergo environmental induction regarding fauna management and in particular awareness about not harming or collecting species such as snakes, tortoises and owls which are often persecuted out of superstition. 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. • Ensure all vehicles adhere to a low speed limit to avoid collisions with susceptible species such as snakes and tortoises.	• Disturbance to fauna is minimised.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTION	MANAGEMENT OUTCOME
		• Prevent litter, food or other foreign material thrown or left around the site. Keep such items in the site vehicles and daily removed it to the site camp.	
CULTURAL AND HERITAGE ENVIRONMENT Archaeological, heritage and palaeontological aspects.	Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. Compliance to be monitored by the Environmental Control Officer.	• Confine all mining to the development footprint area. • Implement the following change find procedure when discoveries are made on site: ▪ If during the pre-construction phase, construction, operations or closure phases of this project, any person employed by the developer, one of its subsidiaries, contractors and subcontractors, or service provider, finds any artefact of cultural significance or heritage site, this person must cease work at the site of the find and report this find to their immediate supervisor, and through their supervisor to the senior on-site manager. ▪ It is the responsibility of the senior on-site Manager to make an initial assessment of the extent of the find, and confirm the extent of the work stoppage in that area. ▪ The senior on-site Manager will inform the ECO of the chance find and its immediate impact on operations. The ECO will then contact a professional archaeologist for an assessment of the finds who will notify the SAHRA. ▪ Work may only continue once the go-ahead was issued by SAHRA. • Fossil Chance Find Protocol: ▪ When excavations begin the rocks must be given a cursory inspection by the environmental officer or designated person. Any fossiliferous material (plants, insects, bone, stromatolites) must be put aside in a suitably protected place. This way the project activities will not be interrupted. ▪ Photographs of similar fossils must be provided to the developer to assist in recognizing the fossil plants, vertebrates, invertebrates or trace fossils in the shales and mudstones (see Appendix G2).	• Impact to cultural/heritage resources is avoided or at least minimised.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTION	MANAGEMENT OUTCOME
		▪ Photographs of the putative fossils can be sent to the palaeontologist for a preliminary assessment. ▪ If there is any possible fossil material found by the developer/environmental officer/miners then the qualified palaeontologist sub-contracted for this project, must visit the site to inspect the selected material and check the dumps where feasible. ▪ Fossil plants or vertebrates that are considered to be of good quality or scientific interest by the palaeontologist must be removed, catalogued and housed in a suitable institution where they can be made available for further study. Before the fossils are removed from the site a SAHRA permit must be obtained. Annual reports must be submitted to SAHRA as required by the relevant permits. ▪ If no good fossil material is recovered, then no site inspections by the palaeontologist will be necessary. A final report by the palaeontologist must be sent to SAHRA once the project has been completed and only if there are fossils. ▪ If no fossils are found and the excavations have finished, then no further monitoring is required.	
LAND USE Loss of agricultural land for duration of mining.	Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. Compliance to be monitored by the Environmental Control Officer.	▪ If needed, sign mined-out/rehabilitated areas back to agricultural use once the cover crop stabilised.	▪ Mining has the least possible impact on the operation of the property.
EXISTING INFRASTRUCTURE Management of the access road.	Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. Compliance to be monitored by the Environmental Control Officer.	▪ Divert storm water around the access road to prevent erosion. ▪ Restrict vehicular movement to the existing access road to prevent crisscrossing of tracks through undisturbed areas.	▪ The access road remains accessible to the landowner and lawful occupiers during the operational phase, and upon closure, the road is returned in a better, or at least the same state as received by the permit holder.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTION	MANAGEMENT OUTCOME
		• Repair rutting and erosion of the access road caused as a direct result of the mining activities. • Prevent the overloading of the trucks and file proof of load weights for auditing by relevant officials. • Restrict the speed of all mining equipment/vehicles to 40 km/h on the access roads.	
GENERAL Waste management	Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. Compliance to be monitored by the Environmental Control Officer.	• Ensure regular vehicle maintenance, repairs and services only take place at the workshop and service area. Ensure drip trays are present if emergency repairs are needed on equipment not able to move to the workshop. Dispose all waste products in a closed container/bin to be removed from the emergency service area (same day) to the workshop in order to ensure proper disposal. Treat this as hazardous waste and dispose of it at a registered hazardous waste handling facility, alternatively arrange collection by a registered hazardous waste handling contractor. File safe disposal certificates for auditing purposes. • If a diesel bowser is used on site, equip it with a drip tray at all times. Use drip trays during each and every refuelling event. The nozzle of the bowser needs to rest in a sleeve to prevent dripping after refuelling. • Ensure drip trays are cleaned after each use. Do not allow dirty drip trays to be used on site. Dispose of dirty rags used to clean the drip trays as hazardous waste into a designated bin at the workshop, where it is incorporated into the hazardous waste removal system. • Collect any effluents containing oil, grease or other industrial substances in a suitable receptacle and remove it from the site, either for resale or for appropriate disposal at a recognized facility. File proof. • Obtain an oil spill kit, and train the employees in the emergency procedures to follow when a spill occurs as well as the application of the spill kit.	• Wastes are appropriately handled and safely disposed of at recognised waste facilities.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTION	MANAGEMENT OUTCOME
		• Clean spills immediately, within two hours of occurrence, to the satisfaction of the Regional Manager (DMRE) by removing the spillage together with the polluted soil and containing it in a designated hazardous waste bin until it is disposed of at a recognised facility. File proof. • Ensure suitable covered receptacles are available at all times and conveniently placed for the disposal of general waste. • Store non-biodegradable refuse such as glass bottles, plastic bags, metal scrap, etc., in a container with a closable lid at a collecting point to be collected at least once a month and disposed of at a recognized landfill site. Take specific precautions to prevent refuse from being dumped on or in the vicinity of the mine area. File proof of disposal. • Handle biodegradable refuse as indicated above. • Encourage re-use or recycling of waste products. • Do not bury or burn waste on the site. • Ensure all employees have access to proper ablution facilities that are either connected to an operational septic tank, or have a chemical drum system. Anchor chemical toilets and arrange weekly services for the duration of the mining activities by a registered liquid waste handling contractor. File the safe disposal certificates for auditing purposes. • Ensure that the use of any temporary, chemical toilet facilities do not cause any pollution to water sources or pose a health hazard. In addition, ensure that no form of secondary pollution arise from the disposal of refuse or sewage from the temporary, chemical toilets. Address any pollution problems arising from the above immediately. • Do not discharge water containing waste into the natural environment. • Implement measures to contain the waste water and safely dispose thereof.	

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTION	MANAGEMENT OUTCOME
		• Report any significant spillage of chemicals, fuels etc. during the lifespan of the mining activities to the Department of Water and Sanitation and other relevant authorities. • Implement the use of waste registers to keep record of the waste generated and removed from the mining area.	
GENERAL Storage/handling of hazardous substances/chemicals.	Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. Compliance to be monitored by the Environmental Control Officer.	• Place chemical storage areas on level ground to prevent offsite migration of any spilled product. • Ensure that the floor of the storage area is impermeable to prevent seepage of spilled products into the ground or ground water. • Control access to the chemicals/substances and implement a notification system of an appropriate staff member. • Ensure that the storage area is out of the 1:100 year floodline or further than 100 m from the edge of a watercourse, whichever is greatest. • Maintain a Hazardous Substances Register, and keep Safety Data Sheets (SDS) current for all chemicals used on site. • Ensure any fuel/used oil tanks have secondary containment in the form of an impermeable bund wall and base within which the tanks sits, raised above the floor, on plinths. Check that the bund capacity is sufficient to contain 110% of the tank's maximum capacity. Ensure that the distance and height of the bund wall relative to that of the tank is taken into consideration to ensure that any spillage does not result in hydrocarbons/other substances spouting beyond the confines of the bund. • Establish a formal inspection routine to check all equipment in the bund area, as well as the bund area itself for malfunctions or leakages. Inspect the bund area at least weekly and remove any accumulated rainwater and hand it as contaminated water. Check all valves and outlets to ensure that its intact and closed securely.	• The chemical/hazardous substances used on site are stored according to specifications without contaminating the receiving environment.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTION	MANAGEMENT OUTCOME
		• Ensure that the bund base slope towards an oil sump of sufficient size. Do not allow contaminated water to mix with clean water, and contain it until it is collected by a registered hazardous waste handling contractor or disposed of at a registered hazardous waste handling facility. • Use drip trays under all stationary equipment or vehicles. Place used drip trays within a bunded area and do not store on the bare soil. Discard the waste water originating from the cleaning of drip trays into the oil sump.	
GENERAL Management of health and safety risks	Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. Compliance to be monitored by the Environmental Control Officer.	• Ensure that workers have access to the correct PPE as required by law. • Locate sanitary facilities within 100 m from any point of work. • Manage all operations in compliance with the Mine Health and Safety Act, 1996 (Act No 29 of 1996). • Plan the type, duration and timing of blasting with due cognizance of other land users and structures in the vicinity. • Inform the surrounding landowners and communities in writing ahead of any blasting event. • Monitor the compliance of ground vibration and airblast levels to USBM standards with each blasting event. • Record all blasts with a vibro recorder. • Give audible warning of a pending blast at least 3 minutes in advance of the blast. • Limit fly rock, and collect and remove flyrock and rock spill that falls beyond the working area.	• Employees work in a healthy and safe environment.

n) 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 under *Part A(1)(m) Proposed impact management objectives and the impact management outcomes for inclusion in the EMPR* above should be considered for inclusion in the environmental authorisation.

o) 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 site inspections, desktop studies as well as the specialist study. No uncertainty regarding the proposed project or the receiving environment could be identified.

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

i) Reasons why the activity should be authorised or not.

Should the mitigation measures and monitoring programmes proposed in this document be implemented on site, no fatal flaws could be identified that were deemed as severe as to prevent the activity continuing.

ii) Conditions that must be included in the authorisation

The management objectives listed in this report under *Part A(1)(m) Proposed impact management objectives and the impact management outcomes for inclusion in the EMPR* should be considered for inclusion in the environmental authorisation.

q) Period for which the Environmental Authorisation is required.

The Applicant requests the Environmental Authorisation to be valid for the duration of the mining permit (at least five years to allow for possible renewal).

r) Undertaking

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

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

s) Financial Provision

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

i) Explain how the aforesaid amount was derived

The annual amount required to manage and rehabilitate the environment was estimated to be ±R 848 000. Please see the explanation as to how this amount was derived at attached as Appendix I – Financial and Technical Competence Report.

ii) 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 Prospecting Work Programme as the case may be).

The funding for the proposed Makganyane mining operation will be furnished by Strata Energy, Minerals and Resources (Pty) Ltd a major shareholder in Makganyane Resources (Pty) Ltd. Strata Energy, Minerals and Resources (Pty) Ltd secured sufficient funds that can be leveraged to fund the Makganyane mining operation.

t) Specific Information required by the competent Authority

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

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

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

Also refer to Part A(1)(i) Full description of the process undertaken to identify, assess and rank the impacts and risks the activity will impose on the preferred site through the life of the activity.

The following potential impacts were identified that may impact on socio-economic conditions of directly affected persons:

- **Visual intrusion associated with the proposed mining activities:**

  The viewshed analysis shows that the north-western portion of the mining area will have a higher visual impact that gradually lessens as the elevation drops towards the lower parts. This will result in the mining area being visible to the south-western and south-eastern neighbouring residences. The nearest residences within viewing distance to the proposed mining footprint are ±3.5 km to the south-east, while the residence of the landowner is ±4 km to the

south-west. The remaining residences within viewing distance of the mining footprint are all more than 7 km away. In light of this, and based on the fact that as the distance between the proposed development and the observer increases the visual impact will decrease the significance of the visual impact on the surrounding environment is deemed to be of medium significance.

The residual impact of the activity is expected to be of low-medium significance upon rehabilitation of the footprint area.

- **Dust nuisance caused as a result of the proposed mining activities:**

The proposed activity will generate dust as a result of blasting, the movement of earthmoving equipment, processing of the hard rock, and the loading and transporting of the material from site. The Applicant will have to implement dust suppression measures in order to control dust generation and prevent a dust nuisance to surrounding landowners/residents. The impact on the surrounding environment is deemed to be of low-medium significance. There will be no residual impact after closure.

- **Noise nuisance as a result of proposed mining activities:**

Due to the nature of the proposed activity, noise will be generated as a result of blasting, the processing of the material, as well as loading and transporting. The nuisance value of noise to be generated by heavy earthmoving equipment and the processing plant, to residence in the near vicinity is deemed to be of low-medium significance. The noise caused by blasting will be instantaneous and of short duration. The Applicant will timeously inform all the surrounding residents and occupants of the farm of each blasting event. All vehicles associated with the proposed activity will also be equipped with silencers and maintained in a road worthy condition in terms of the National Road Traffic Act, 1996 (Act No 93 of 1996). There will be no residual impact after closure.

- **Access control and management of existing infrastructure:**

Site management will at all times be responsible for the movement of their employees. No mining related personnel will be allowed to wander outside the approved footprint. The mining contractor will sign an agreement to this affect with the permit holder upon appointment, and will be held responsible for damages to fences or gates left ajar by mining related personnel.

(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 Appendix 2.19.2 and confirm that the applicable mitigation is reflected in 2.5.3; 2.11.6 and 2.12 herein).

No sites or artefacts classified as national estate as referred to in section 3(2) of the NHRA, 1999 were identified within the footprint of the proposed mining area.

u) 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 Appendix 4)

The site alternatives associated with the proposed mining activity, investigated during the impact assessment process, were done at the hand of information obtained during the site investigation, public participation process, specialist study as well as desktop studies conducted of the study area. As discussed earlier the following alternatives were considered:

1. Site Alternative 1 (preferred and only site alternative) – Development of the proposed iron ore mining area within the GPS coordinates as listed in Table 6.

2. Project Alternatives – The use of temporary infrastructure and mobile equipment (Preferred Alternative) was compared to the use of permanent infrastructure and fixed equipment, at the mining footprint, for the operational phase of the project.

3. No-go Alternative – No change to the *status quo*.

PART B

ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

1. DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME.

a) 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).

The details and expertise of Christine Fouché of Greenmined Environmental (Pty) Ltd that acts as EAP on this project has been included in Part A Section 1(a) as well as Appendix M as required.

b) 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, section (1)(h) herein as required).

The aspects of the activity that are covered by the draft environmental management programme has been described and included in Part A, section (1)(h).

c) Composite Map

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

As mentioned under Part A, section (1)(l)(ii) this map has been compiled and is attached as Appendix C1 to this document.

d) Description of impact management objectives including management statements

i) Determination of closure objectives.

(Ensure that the closure objectives are informed by the type of environment described in 2.4 herein)

The primary objective, at the end of the mine's life, is to obtain a closure certificate at minimum cost and in as short a time period as possible whilst still complying with the requirements of the Minerals and Petroleum Resources Development Act (Act No. 28 of 2002) [MPRDA]. To realise this, the following main objectives must be achieved:

- Remove all temporary infrastructure and waste from the mine as per the requirements of this EMPR and of the Provincial Department of Minerals and Resources and Energy.
- Shape and contour disturbed areas in compliance with the EMPR and closure plan (see Appendix J).

- Ensure that permanent changes in topography (due to mining) are sustainable and do not cause erosion or the uncontrolled damming of surface water.
- Make all excavations safe.
- Use the topsoil effectively to promote the re-establishment of vegetation.
- Ensure that all rehabilitated areas are stable and self-sustaining in terms of vegetation cover.
- Eradicate all weeds/invader plant species by intensive management of the mining area.

The site-specific closure objectives are discussed in the attached Closure Plan (Appendix J), however, a summary of the closure objectives for the proposed mine were included below.

The decommissioning phase will entail the reinstatement of the processing area by removing the stockpiled material, and site infrastructure/equipment and landscaping the disturbed footprints. Due to the impracticality of importing large volumes of fill to restore the excavation to its original topography, the rehabilitation option is to develop the pit into a minor landscape feature. This will entail creating a series of irregular benches along the excavation faces, the top edges of each face being blasted away to form scree slopes on the benches below, thereby reducing the overall face angle. The benches will be top-dressed with topsoil and vegetated with an appropriate grass mix if vegetation does not naturally establish in the area within six months of the replacement of the topsoil.

The decommissioning activities will therefore consist of the following:

- Sloping and landscaping the excavation;
- Removing all stockpiled material;
- Removing all mining machinery and equipment from site;
- Landscaping all disturbed areas and replacing the topsoil;
- Vegetating the reinstated area; and
- Controlling/monitoring the invasive plant species.

The future land use of the proposed area will be agriculture. Upon replacement of the topsoil, the area around the excavation will once again be available for grazing purposes, and the planting of the cover crop (to protect the topsoil) will tie in with the proposed land use.

Makganyane Resources (Pty) Ltd will comply with the minimum closure objectives as prescribed by the DMRE and detailed below:

- Rehabilitation of the excavated area:

  The excavated area must serve as a final depositing area for the placement of overburden. Rocks and coarse material removed from the excavation must be dumped into the excavation.

  No waste may be permitted to be deposited in the excavations.

  Once overburden, rocks and coarse natural materials has been added to the excavation and it was profiled with acceptable contours and erosion control measures, the topsoil previously stored must be returned to its original depth over the area.

  The area must be fertilized if necessary to allow vegetation to establish rapidly. The site shall 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 closure of the site.

  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 his or her specification.

- Rehabilitation of plant, office and service areas:

  Coarse natural material used for the construction of ramps must be removed and dumped into the excavations.

  Stockpiles must 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 shall be dealt with in accordance with section 44 of the Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002):

  - Where sites have been rendered devoid of vegetation/grass or where soils have been compacted owing to traffic, the surface shall be scarified or ripped.

- Areas containing French drains shall be compacted and covered with a final layer of topsoil to a height of 100 mm above the surrounding ground surface.
- The site shall be seeded with a vegetation seed mix adapted to reflect the local indigenous flora.

Photographs of the camp and office sites, before and during the mining operation and after rehabilitation, shall be taken at selected fixed points and kept on record for the information of the DMRE Regional Manager.

On completion of mining operations, the surface of these areas, if compacted due to hauling and dumping operations, shall be scarified to a depth of at least 200 mm and graded to an even surface condition. Where applicable/possible topsoil needs to be returned to its original depth over the area.

The area shall then be fertilized if necessary to allow vegetation to establish rapidly. The site shall be seeded with a local, adapted indigenous seed mix.

If a reasonable assessment indicates that the re-establishment of vegetation is unacceptably slow, the DMRE 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 his or her specification.

- <u>Final rehabilitation:</u>

Rehabilitation of the surface area shall entail landscaping, levelling, top dressing, land preparation, seeding (if required) and maintenance, and invasive plant species clearing.

All mining equipment, and other items used during the mining period must be removed from the site (section 44 of the MPRDA).

Waste material of any description, including receptacles, scrap, rubble and tyres, must be removed entirely from the mining area and disposed of at a recognized landfill facility. It will not be permitted to be buried or burned on the site.

The management of invasive plant species must be done in a sporadic manner during the life of the mining activities. Species regarded as Category 1a and 1b invasive species in terms of NEM:BA (National Environmental Management: Biodiversity Act 10 of 2004 and regulations applicable thereto) will be eradicated from the site.

Final rehabilitation shall be completed within a period specified by the Regional Manager.

Once the mining area was rehabilitated the permit holder is required to submit a closure application to the Department of Mineral Resources and Energy in accordance with section 43(4) of the MPRDA, 2002 that states: *"An application for a closure certificate must be made to the Regional Manager in whose region the land in question is situated within 180 days of the occurrence of the lapsing, abandonment, cancellation, cessation, relinquishment or completion contemplated in subsection (3) and must be accompanied by the prescribed environmental risk report".* The Closure Application will be submitted in terms of Regulation 62 of the MPRDA, 2002, and Government Notice 940 of NEMA, 1998 (as amended).

ii) Volume and rate of water use required for the operation

Any water required for the implementation of the project will be bought and transported to the mining area (in a water truck) where it will be stored in tanks until used. It is proposed that approximately 96 000 litres of water will be needed per day during the dry months (amount to decrease during the rainy season).

iii) Has a water use licence has been applied for?

The proposed project does not require a water use authorisation in terms of Section 39 of the NWA, 1998 as the water to be used on site will be bought and transported to the mining area.

iv) Impacts to be mitigated in their respective phases

Table 23: Impact to be mitigated in their respective phases

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
(as listed in 2.11.1)	of operation in which activity will take place. State; Planning and design, Pre-Construction, Operational, Rehabilitation, Closure, Post closure	(volumes, tonnages and hectares or m^2)	(describe how each of the recommendations herein will remedy the cause of pollution or degradation and migration of pollutants)	(A description of how each of the recommendations herein will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities)	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.
• Demarcation of site with visible beacons.	Site Establishment phase	4.9 ha	Demarcation of the site will ensure that all employees are aware of the boundaries of the mining area, and that work stay within the approved area.	Mining of the iron ore is only allowed within the boundaries of the approved area. • MPRDA, 2008 • NEMA, 1998	Beacons need to be in place throughout the life of the activity.
• Site establishment and infrastructure development.	Site Establishment & Operational Phase	4.9 ha	**<u>Loss of agricultural land for duration of mining:</u>** • The Applicant signed a lease agreement with the landowner to compensate for the loss of agricultural land for the duration of the mining period. If needed, mined-out/rehabilitated areas could revert back to agricultural use once the cover crop stabilised.	Use of agricultural land must be managed in accordance with the: • CARA, 1983 • Closure Plan (Appendix J)	Throughout the site establishment-, and operational phases.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
• Site establishment and infrastructure development. • Stripping and stockpiling of topsoil and overburden.	Site Establishment & Operational Phase	4.9 ha	**Visual Mitigation:** • The site must have a neat appearance and be kept in good condition at all times. • Mining equipment must be stored neatly in dedicated areas when not in use. • The permit holder must limit vegetation removal, and stripping of topsoil may only be done immediately prior to the mining/use of a specific area. • The excavation must be contained within the approved footprint of the permitted area. • Upon closure the site must be rehabilitated to ensure that the visual impact on the aesthetic value of the area is reduced to the minimum.	Management of the mining activities must be in accordance with the: • MPRDA, 2008 • NEMA, 1998	Throughout the site establishment- and operational phases.
• Site establishment and infrastructure development.	Site Establishment phase	4.9 ha	**Management of vegetation removal:** • The mining boundaries must be clearly demarcated and all operations must be contained to the approved mining area. The area outside the mining boundaries must be declared a no-go area, and all staff must be educated accordingly. • A pre-commencement walk-through of the final mining footprint, must be done by a suitably qualified botanist to identify species of conservation concern that need to be removed/relocated prior to bush clearance. The findings (if any) of the botanist must be culminated into a Plant Rescue Plan to be implemented on site. A copy of the Plant Rescue Plan (if applicable) must be available on site. • Permits for the removal of protected plant species (if required) must be obtained from	Natural vegetated areas must be managed in accordance with the: • NEM:BA, 2004 • NC-NCA, 2009 • NFA, 1998	Throughout the site establishment- and operational phases.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
			DAERD&LR and kept on-site in the possession (at all times) of the flora search and rescue team. • A pre-commencement environmental induction for all site staff must be provided to ensure that basic environmental principles are adhered to. This includes awareness of no littering, appropriate handling of pollution and chemical spills, avoiding fire hazards, minimising wildlife interactions, remaining within demarcated construction areas, etc. • Bush-clearance may only commence once the recommendations of the specialist (pre-commencement walkthrough) have been implemented. • Cleared vegetation to be retained at any time may not be burned, but can be mulched and stockpiled. Ideally the heaps can be covered with stockpiled topsoil and the material be retained for future site rehabilitation purposes. • The on-site ECO must provide supervision and oversight of vegetation clearing activities and other activities which may cause damage to the environment, especially during the site establishment phase, when the majority of vegetation clearing is taking place. • All vehicles must remain on demarcated roads and no unnecessary driving in the veld outside these areas may be allowed. • No plants may be translocated or otherwise uprooted or disturbed for rehabilitation or other purposes without express permission from the ECO and without the relevant permits. • No fires must be allowed on-site.		

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
• Site establishment and infrastructure development. • Stripping and stockpiling of topsoil and overburden.	Site Establishment & Operational Phase	4.9 ha	**Protection of Fauna:** • The site manager must ensure no fauna is caught, killed, harmed, sold or played with. • Any fauna directly threatened by the operational activities must be removed to a safe location by the ECO or other suitably qualified person. • All personnel must undergo environmental induction regarding fauna management and in particular awareness about not harming or collecting species such as snakes, tortoises and owls which are often persecuted out of superstition. 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. • All vehicles must adhere to a low speed limit to avoid collisions with susceptible species such as snakes and tortoises. • No litter, food or other foreign material may be thrown or left around the site. Such items must be kept in the site vehicles and daily removed to the site camp.	Site specific fauna must be managed in accordance with the: • NEM:BA, 2004 • NC-NCA, 2009 • NFA, 1998	Throughout the site establishment-, and operational phases.
• Site establishment and infrastructure development. • Excavation, loading and hauling to the processing plant.	Site Establishment, & Operational Phase.	4.9 ha	**Archaeological, Heritage and Palaeontological Aspects:** • All mining must be confined to the development footprint area. • Heritage Chance Find Procedure: ▪ If during the pre-construction phase, construction, operations or closure phases of this project, any person employed by the developer, one of its subsidiaries, contractors and subcontractors, or service provider, finds	Cultural/heritage aspects on site must be managed in accordance with the: • NHRA, 1999	Throughout the site establishment-, and operational phases.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
			any artefact of cultural significance or heritage site, this person must cease work at the site of the find and report this find to their immediate supervisor, and through their supervisor to the senior on-site manager. ▪ It is the responsibility of the senior on-site Manager to make an initial assessment of the extent of the find, and confirm the extent of the work stoppage in that area. ▪ The senior on-site Manager must inform the ECO of the chance find and its immediate impact on operations. The ECO must then contact a professional archaeologist for an assessment of the finds who must notify the SAHRA. ▪ Work may only continue once the go-ahead was issued by SAHRA. Fossil Chance Find Procedure: ▪ When excavations begin the rocks must be given a cursory inspection by the environmental officer or designated person. Any fossiliferous material (plants, insects, bone, stromatolites) must be put aside in a suitably protected place. This way the project activities will not be interrupted. ▪ Photographs of similar fossils must be provided to the developer to assist in recognizing the fossil plants, vertebrates, invertebrates or trace fossils in the shales and mudstones (see Appendix G2). ▪ Photographs of the putative fossils can be sent to the palaeontologist for a preliminary assessment. ▪ If there is any possible fossil material found by the developer/environmental officer/miners then the qualified palaeontologist sub-		

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
			contracted for this project, must visit the site to inspect the selected material and check the dumps where feasible. ▪ Fossil plants or vertebrates that are considered to be of good quality or scientific interest by the palaeontologist must be removed, catalogued and housed in a suitable institution where they can be made available for further study. Before the fossils are removed from the site a SAHRA permit must be obtained. Annual reports must be submitted to SAHRA as required by the relevant permits. ▪ If no good fossil material is recovered, then no site inspections by the palaeontologist will be necessary. A final report by the palaeontologist must be sent to SAHRA once the project has been completed and only if there are fossils. ▪ If no fossils are found and the excavations have finished, then no further monitoring is required.		
◆ Stripping and stockpiling of topsoil and overburden. ◆ Excavation, loading and hauling to the processing plant. ◆ Sloping and landscaping during rehabilitation.	Site Establishment-, Operational and Decommissioning Phase	4.9 ha	**<u>Topsoil Management</u>** ◆ The upper 300 mm of the soil must be stripped and stockpiled before mining. ◆ Topsoil is a valuable and essential resource for rehabilitation and it must therefore be managed carefully to conserve and maintain it throughout the stockpiling and rehabilitation processes. ◆ Topsoil stripping, stockpiling and re-spreading must be done in a systematic way. The mining plan have to be such that topsoil is stockpiled for the minimum possible time.	Topsoil stripping must be managed in accordance with the: ◆ CARA, 1983 ◆ NEM:BA, 2004 ◆ MPRDA, 2002 ◆ Closure Plan (Appendix J)	Throughout the site establishment-, and operational phases.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
			• The topsoil must be placed on a levelled area, within the mining footprint. No topsoil may be stockpiled in undisturbed areas. • Topsoil stockpiles must be protected against losses by water- and wind erosion. Stockpiles must be positioned so as not to be vulnerable to erosion by wind and water. The establishment of plants (weeds or a cover crop) on the stockpiles will help to prevent erosion. • Topsoil heaps may not exceed 2 m in order to preserve micro-organisms within the topsoil, which can be lost due to compaction and lack of oxygen. • The temporary topsoil stockpiles must be kept free of invasive plant species. • Topsoil heaps to be stored longer than a period of 6 months needs to be vegetated with an indigenous grass seed mix if vegetation does not naturally germinate within the first growth season. • Storm- and runoff water must be diverted around the stockpile area to prevent erosion. • The stockpiled topsoil must be evenly spread, to a depth of 300 mm, over the rehabilitated area upon closure of the site. • The permit holder must strive to re-instate topsoil at a time of year when vegetation cover can be established as quickly as possible afterwards, so that erosion of returned topsoil by both rain and wind, before vegetation is established, is minimized. The best time of year is at the end of the rainy season, when there is moisture in the soil for vegetation establishment and the risk of heavy rainfall events is minimal.		

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
			• A cover crop must be planted and established immediately after spreading of topsoil, to stabilize the soil and protect it from erosion. The cover crop must be fertilized for optimum biomass production. It is important that rehabilitation be taken up to the point of cover crop stabilization. Rehabilitation cannot be considered complete until the first cover crop is well established. • Run-off water must be controlled via temporary berms, where necessary, on the slopes to ensure that accumulation of run-off does not cause down-slope erosion. • The rehabilitated area must be monitored for erosion, and appropriately stabilized if any erosion occurs for at least 12 months after reinstatement.		
• Stripping and stockpiling of topsoil and/or overburden. • Drilling and blasting. • Excavation, loading and hauling to the processing plant. • Processing, stockpiling and transporting of material.	Site Establishment-, Operational-, and Decommissioning Phase	4.9 ha	**<u>Fugitive Dust Emission Mitigation Measures:</u>** • The liberation of dust into the surrounding environment must be effectively controlled by the use of, inter alia, straw, water spraying and/or environmentally friendly dust-allaying agents that contains no PCB's (e.g. DAS products). • The site manager must ensure continuous assessment of all dust suppression equipment to confirm its effectiveness in addressing dust suppression. • Speed on the haul roads must be limited to 20 km/h and 40 km/h on the access road to prevent the generation of excess dust. • Areas devoid of vegetation, which could act as a dust source, must be minimized and vegetation removal may only be done immediately prior to mining.	Dust generation on site must be managed in accordance with the: • NEM:AQA, 2004 Regulation 6(1) • National Dust Control Regulations, GN No R827 • ASTM D1739 (SANS 1137:2012)	Throughout the site establishment-, and operational phases.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
			• The crusher plant must have operational water sprayers to alleviate dust generation from the conveyor belts. • Fines, blowing from the drop end of the crusher plant, can be minimized by attaching strips of used conveyor belts to the conveyor's end. • Compacted dust must weekly be removed from the crusher plant to eliminate the dust source. • Loads must be flattened to prevent spillage during transportation on public roads. • Weather conditions must be taken into consideration upon commencement of daily operations. Limiting operations during very windy periods would reduce airborne dust and resulting impacts. • All dust generating activities shall comply with the National Dust Control Regulations, GN No R827 promulgated in terms of NEM:AQA (Act 39 of 2004) and ASTM D1739 (SANS 1137:2012). • Best practice measures shall be implemented during the stripping of topsoil, excavation, and transporting of material from site to minimize potential dust impacts.		
• Stripping and stockpiling of topsoil and/or overburden. • Drilling and blasting. • Excavation, loading and hauling to the processing plant.	Site Establishment-, Operational-, and Decommissioning Phase	4.9 ha	**Noise Handling:** • The permit holder must ensure that employees and staff conduct themselves in an acceptable manner while on site. • No loud music may be permitted at the mining area. • All mining vehicles must be equipped with silencers and maintained in a road worthy condition in terms of the National Road Traffic Act, 1996 (Act No 93 of 1996).	Noise generation on site must be managed in accordance with the: • NEM:AQA, 2004 Regulation 6(1) • NRTA, 1996	Throughout the site establishment-, and operational phases.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
• Processing, stockpiling and transporting of material.			• 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 each blasting occasion. • A qualified occupational hygienist must be contracted to quarterly monitor and report on the personal noise exposure of the employees working at the mine. The monitoring must be done in accordance with the SANS 10083:2004 (Edition 5) sampling method as well as NEM:AQA, 2004, SANS 10103:2008. • Best practice measures shall be implemented in order to minimize potential noise impacts.		
• Stripping and stockpiling of topsoil and/or overburden. • Sloping and landscaping during rehabilitation phase.	Site Establishment-, Operational, and Decommissioning Phase	4.9 ha	**<u>Management of Invasive Plant Species:</u>** • An invasive plant species management plan (Appendix K) must be implemented at the site to ensure the management and control of all species regarded as Category 1a and 1b invasive species in terms of NEM:BA (National Environmental Management: Biodiversity Act 10 of 2004 and regulations applicable thereto). Weed/alien clearing must be done on an ongoing basis throughout the life of the mining activities. • No planting or importing of any alien species to the site for landscaping, rehabilitation or any other purpose may be allowed. • All stockpiles (topsoil & overburden) must be kept free of invasive plant species. • Management must take responsibility to control declared invader or exotic species on the rehabilitated areas. The following control methods can be used:	Weeds and invader plants on site must be managed in accordance with the: • CARA, 1983 • NEM:BA, 2004	Throughout the site establishment-, operational, and decommissioning phases.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
			• 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 can be destroyed completely. ▪ The plants can be treated chemically by a registered pest control officer (PCO) through the use of an herbicide recommended for use by the PCO in accordance with the directions for the use of such an herbicide.		
• Stripping and stockpiling of topsoil and overburden. • Excavation, loading and hauling to the processing plant. • Sloping and landscaping during rehabilitation.	Site Establishment-, Operational and Decommissioning Phase	4.9 ha	**<u>Erosion Control and Storm Water Management:</u>** • Clearing of vegetation must be limited to the proposed mining footprint and associated infrastructure. No clearing outside of the minimum required footprint to take place. • Stormwater must be diverted around the topsoil heaps and mining areas to prevent erosion. • Stockpiles must be protected from erosion, stored on flat areas where possible, and be surrounded by appropriate berms. • When mining within steep slopes, it must be ensured that adequate slope protection is provided. • During mining, the outflow of run-off water from the mining excavation must be controlled to prevent down-slope erosion. This must be done by way of the construction of temporary banks and ditches that will direct run-off water (if needed). These must be in place at any points where overflow out of the excavation might occur. • Roads and other disturbed areas within the project area must be regularly monitored for erosion and problem areas must receive follow-	Erosion and storm water must be managed in accordance with the: • CARA, 1983 • NEMA, 1998 • NWA, 1998	Throughout the site establishment-, and operational phases.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION

			up monitoring to assess the success of the remediation.
			- Any erosion problems within the mining area as a result of the mining activities observed must be rectified immediately (within 48 hours) and monitored thereafter to ensure that it does not re-occur.
			- Mining must be conducted only 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:
			  ▪ 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. You must prevent clean water 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 or seeping into clean water systems.
			  ▪ A storm water management plan must apply for the entire life cycle of the mining activity 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 a storm water management plan.
			- Polluting activities including storage of mining fleet, equipment wash down facilities and vehicle maintenance yards must be restricted to the		

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
			workshop areas and must be undertaken on impermeable hard standing surfaces, which are formally drained to a dirty water drainage system at the site. • All fuels and chemicals stored or used on site must be contained within fit for purpose containers and stored within designated storage areas. In order to prevent pollution of the surrounding environment during an accidental spillage, the designated storage areas must be situated on an impermeable surface and must feature a perimeter bund and a drainage sump. The volume of the bund and sump must be sized to contain at least 110% of the total volume of the fuel and chemicals being stored within the designated storage area. The storage areas must feature a roof to prevent inflow of rainwater, which would require the sump to be emptied more frequently.		
• Stripping and stockpiling of topsoil and/or overburden. • Excavation, loading and hauling to the processing plant. • Processing, stockpiling and transporting of material. • Sloping and landscaping	Site Establishment-, Operational-, and Decommissioning Phase	4.9 ha	**Waste Management:** • Regular vehicle maintenance, repairs and services may only take place at the workshop and service area. 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 closed container/bin to be removed from the emergency service area (same day) to the workshop in order to ensure proper disposal. This waste must be treated as hazardous waste and must be disposed of at a registered hazardous waste handling facility, alternatively collected by a registered hazardous waste handling contractor. The safe disposal certificates must be filed for auditing purposes.	Mining related waste must be managed in accordance with the: • NWA, 1998 • NEM:WA, 2008	Throughout the site establishment-, operational and decommissioning phases.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
during rehabilitation phase.			• If a diesel bowser is used on site, it must be equipped with a drip tray at all times. Drip trays must be used during each and every refuelling event. The nozzle of the bowser needs to rest in a sleeve to prevent dripping after refuelling. • Site management must ensure drip trays are cleaned after each use. No dirty drip trays may be used on site. The dirty rags used to clean the drip trays must be disposed as hazardous waste into a designated bin at the workshop, where it is incorporated into the hazardous waste removal system. • 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 recognized facility. Proof of safe disposal must be filed for auditing purposes. • An oil spill kit must be obtained, and the employees must be trained in the emergency procedures to follow when a spill occurs as well as the application of the spill kit. • Spills must be cleaned up immediately, within two hours of occurrence, to the satisfaction of the Regional Manager (DMRE) by removing the spillage together with the polluted soil and containing it in a designated hazardous waste bin until it is disposed of at a recognised facility. Proof must be filed. • Suitable covered receptacles must be available at all times and conveniently placed for the disposal of general waste. • 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		

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
			to be collected at least once a month 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. Proof of disposal must be available for auditing purposes. • Biodegradable refuse must be handled as indicated above. • Re-use or recycling of waste products must be encouraged on site. • No waste may be buried or burned on the site. • All employees must have access to proper ablution facilities that are either connected to an operational septic tank, or have a chemical drum system. Chemical toilets must be anchored (to prevent blowing/falling over) and shall be serviced at least once a week for the duration of the mining activities by a registered liquid waste handling contractor. The safe disposal certificates must be filed for auditing purposes. • The use of any temporary, chemical toilet facilities must not cause any pollution to water sources or pose a health hazard. In addition, no form of secondary pollution should arise from the disposal of refuse or sewage from the temporary, chemical toilets. Any pollution problems arising from the above are to be addressed immediately by the permit holder. • When small volumes of wastewater are generated during the life of the mine the following is applicable: ▪ Water containing waste must not be discharged into the natural environment.		

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
			▪ Measures to contain the waste water and safely dispose thereof must be implemented. • It is important that any significant spillage of chemicals, fuels etc. during the lifespan of the mining activities is reported to the Department of Water and Sanitation and other relevant authorities. • Site management must implement the use of waste registers to keep record of the waste generated and removed from the mining area.		
• Drilling and blasting. • Excavation, loading and hauling to the processing plant. • Sloping and landscaping during rehabilitation phase.	Operational-, and Decommissioning Phase	4.9 ha	**Management of health and safety risks:** • Workers must have access to the correct personal protection equipment (PPE) as required by law. • Sanitary facilities must be located within 100 m from any point of work. • All operations must comply with the Mine Health and Safety Act, 1996 (Act No 29 of 1996). • The type, duration and timing of the blasting procedures must be planned with due cognizance of other land users and structures in the vicinity. • The surrounding landowners must be informed in writing ahead of each blasting event. • The compliance of ground vibration and airblast levels must be monitored to USBM standards with each blasting event. • A vibro recorder must be used to record all blasts. • Audible warning of a pending blast must be given at least 3 minutes in advance of the blast. • Measures to limit flyrock must be taken. All flyrock (of diameter 150 mm and larger) which	Health and safety aspects on site must be managed in accordance with the: • MHSA, 1996 • OHSA, 1993 • OHSAS 18001 • USBM standards	Throughout the site establishment-,operational and decommissioning phases.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
			falls beyond the working area, together with the rock spill must be collected and removed.		
• Processing, stockpiling and transporting of material.	Operational phase	±3.3 km	**Access road Management:** • Storm water must be diverted around the access road to prevent erosion. • Vehicular movement must be restricted to the existing access road and crisscrossing of tracks through undisturbed areas must be prohibited. • Rutting and erosion of the access road caused as a direct result of the mining activities must be repaired by the permit holder. • Overloading of the trucks must be prevented and proof of load weights must be filed and be available for auditing by relevant officials. • The speed of all mining equipment/vehicles must be restricted to 40 km/h on the access roads.	The access road must be managed in accordance with the: ❖ NRTA, 1996	Throughout the site establishment-, and operational phases.
• Site establishment and infrastructure development.	Site Establishment, & Operational Phase.	±300 m²	**Storage/Handling of Hazardous Substances/Chemicals:** • Chemical storage areas must be placed on level ground to prevent offsite migration of any spilled product. • The floor of the storage area must be impermeable to prevent seepage of spilled products into the ground or ground water. • Access to the chemicals/substances must be controlled and require prior notification of an appropriate staff member. • The storage area must be out of the 1:100 year floodline or further than 100 m from the edge of a watercourse, whichever is greatest. • A Hazardous Substances Register must be maintained, and Safety Data Sheets (SDS) must be kept current for all chemicals used on site.	Chemicals/hazardous substances must be stored in accordance with the: • HSA,1973 • NWA, 1998 • NEM:WA, 2008	Throughout the site establishment-, and operational phases.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
			• Any fuel/used oil tanks must have secondary containment in the form of an impermeable bund wall and base within which the tanks sits, raised above the floor, on plinths. The bund capacity must be sufficient to contain 110% of the tank's maximum capacity. The distance and height of the bund wall relative to that of the tank must also be taken into consideration to ensure that any spillage does not result in hydrocarbons/other substances spouting beyond the confines of the bund. • The site manager must establish a formal inspection routine to check all equipment in the bund area, as well as the bund area itself for malfunctions or leakages. The bund area must be inspected at least weekly and any accumulated rainwater removed and handled as contaminated water. All valves and outlets must be checked to ensure that its intact and closed securely. • The bund base must slope towards an oil sump of sufficient size. Contaminated water may not be allowed to mix with clean water, and must be contained until it is collected by a registered hazardous waste handling contractor or disposed of at a registered hazardous waste handling facility. • Drip trays must be used underneath all stationary equipment or vehicles. Used drip trays must be placed within a bunded area and are not be stored on bare soil. The waste water originating from the cleaning of drip trays must be discarded into the oil sump		

e) Impact Management Outcomes

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

Table 24: Impact Management Outcomes

ACTIVITY whether listed or not listed (E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc...etc..etc.)	POTENTIAL IMPACT (e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc...etc..)	ASPECTS AFFECTED	PHASE In which impact is anticipated (e.g. Construction, commissioning, operational Decommissioning, closure, post-closure))	MITIGATION TYPE (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...etc..) E.g. • Modify through alternative method. • Control through noise control • Control through management and monitoring Remedy through rehabilitation.	STANDARD TO BE ACHIEVED (Impact avoided, noise levels, dust levels, rehabilitation standards, end use objectives) etc.
Demarcation of site with visible beacons.	No impact could be identified other than the beacons being outside the boundaries of the approved mining area.	N/A	Site Establishment phase	Control through management and monitoring.	Mining of the iron ore is only allowed within the boundaries of the approved area. MPRDA, 2008 NEMA, 1998
Site establishment and infrastructure development**.**	Alteration of the agricultural sense of place.	The impact may affect the agricultural opportunities of the property.	Site Establishment & Operational Phase	The study area does not have a high agritourism-, or cultivation potential and the proposed mining operation will have a low visibility. The impact must be controlled through proper management.	Management of the mining activities must be in accordance with the: MPRDA, 2008 NEMA, 1998 CARA, 1983

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
• Site establishment and infrastructure development.	• Loss of agricultural land for duration of mining.	The impact may affect the agricultural opportunities of the property.	Site Establishment & Operational Phase	Should the proposed project be approved, the operation will temporarily interrupt the agricultural activities of the footprint area, only to be reversed upon the closure of the mine. The impact could be controlled through progressive rehabilitation.	Use of agricultural land must be managed in accordance with the: • CARA, 1983 • Closure Plan (Appendix J)
• Site establishment and infrastructure development. • Stripping and stockpiling of topsoil and overburden.	• Visual intrusion as a result of site establishment. • Visual intrusion caused by mining activities.	The visual impact may affect the aesthetics of the landscape.	Site Establishment & Operational Phase	Control: Implementing proper housekeeping.	Management of the mining activities must be in accordance with the: • MPRDA, 2008 • NEMA, 1998
• Site establishment and infrastructure development.	• Potential impact on the ESA.	This will impact on the biodiversity of the receiving environment.	Site Establishment & Operational Phase	Control: Implementing proper housekeeping.	Areas of conservation importance must be managed in accordance with the: • NEM:BA, 2004 • NC-NCA, 2009 • NFA, 1998
• Site establishment and infrastructure development.	• Potential impact on vegetation and listed and/or protected plant species.	This will impact on the biodiversity of the receiving environment.	Site Establishment phase	Control & Stop: Implementing good management practices and adhering to the recommendations of the botanist.	Natural vegetated areas must be managed in accordance with the: • NEM:BA, 2004 • NC-NCA, 2009 • NFA, 1998
• Site establishment and infrastructure development. • Stripping and stockpiling of topsoil and overburden.	• Potential impact on fauna within the footprint area. • Potential impact on local fauna due to distrubance and loss of available habitat.	This will impact on the biodiversity of the receiving environment.	Site Establishment & Operational Phase	Control & Stop: Implementing good management practices.	Site specific fauna must be managed in accordance with the: • NEM:BA, 2004 • NC-NCA, 2009 • NFA, 1998

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
• Site establishment and infrastructure development. • Excavation, loading and hauling to the processing plant.	• Potential impact on archaeological artefacts. • Potential impact on areas of palaeontological concerns.	This could impact on the cultural and heritage legacy of the receiving environment.	Site Establishment, & Operational Phase.	Control & Stop: Implementing good management practices.	Cultural/heritage aspects on site must be managed in accordance with the: • NHRA, 1999
• Site establishment and infrastructure development.	• Potential impact on surface- or ground water.	This could impact the hydrology of the receiving environment.	Site Establishment, & Operational Phase.	Control: Implementing the mitigation measures and rehabiltiation plan.	Any water related matters must be managed in accordance with the: • NWA, 1998
• Stripping and stockpiling of topsoil and overburden. • Excavation, loading and hauling to the processing plant. • Sloping and landscaping during rehabilitation.	• Loss of stockpiled topsoil during mining and stockpiling. • Potential erosion of denuded areas. • Facilitation of erosion due to mining activities. • Erosion of returned topsoil after rehabilitation.	The loss/contamination of topsoil and erosion of the footprint will affect the rehabilitation of the excavation upon closure of the site.	Site Establishment-, Operational and Decommissioning Phase	Control & Remedy: Proper housekeeping and storm water management.	Topsoil stripping must be managed in accordance with the: • CARA, 1983 • NEM:BA, 2004 • MPRDA, 2002 • Closure Plan (Appendix J)
• Stripping and stockpiling of topsoil and/or overburden. • Drilling and blasting. • Excavation, loading and hauling to the processing plant. • Processing, stockpiling and transporting of material.	• Dust nuisance caused as a result of the disturbance of soil. • Dust nuisance caused by blasting activities. • Dust nuisance due to excavation and from loading and vehicles	Increased dust generation will impact on the air quality of the receiving environment.	Site Establishment-, Operational-, and Decommissioning Phase	Control: Dust suppression methods and proper housekeeping.	Dust generation on site must be managed in accordance with the: • NEM:AQA, 2004 Regulation 6(1) • National Dust Control Regulations, GN No R827 • ASTM D1739 (SANS 1137:2012)

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
	transporting the material. • Dust nuisance due generated at the processing plant.				
• Stripping and stockpiling of topsoil and/or overburden. • Drilling and blasting. • Excavation, loading and hauling to the processing plant. • Processing, stockpiling and transporting of material.	• Noise nuisance generated by earthmoving machinery. • Noise nuisance as a result of blasting. • Noise nuisance as a result of the mining activities. • Noise nuisance stemming from operation of the processing plant.	Should noise levels become excessive it may have an impact on the noise ambiance of the receiving environment.	Site Establishment-, Operational-, and Decommissioning Phase	Control: Noise suppression methods and proper housekeeping.	Noise generation on site must be managed in accordance with the: • NEM:AQA, 2004 Regulation 6(1) • NRTA, 1996
• Stripping and stockpiling of topsoil and/or overburden. • Sloping and landscaping during rehabilitation phase.	• Infestation of the topsoil heaps and mining area with weeds or invader plant species. • Infestation of the reinstated areas by weeds and invader plant species.	Infestation of the footprint by invader plant species may affect the biodiversity of the receiving environment.	Site Establishment-, Operational, and Decommissioning Phase	Control & Remedy: Implementation of an invasive plant species management plan.	Weeds and invader plants on site must be managed in accordance with the: • CARA, 1983 • NEM:BA, 2004
• Stripping and stockpiling of topsoil and/or overburden. • Excavation, loading and hauling to the processing plant.	• Potential contamination of footprint area and surface runoff as a result of hydrocarbon spillages.	Contamination of the footprint area will negatively impact the soil, surface runoff and potentially the groundwater. It will	Site Establishment-, Operational-, and Decommissioning Phase	Control & Remedy: Proper housekeeping and implementation of an emergency response plan and waste management plan.	Mining related waste must be managed in accordance with the: • NWA, 1998 • NEM:WA, 2008

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
• Processing, stockpiling and transporting of material. • Sloping and landscaping during rehabilitation phase.	• Soil contamination from hydrocarbon spills and/or littering. • Potential contamination of environment due to improper waste management. • Potential impact associated with litter/waste left at the mining area.	also incur additional costs to the permit holder.			
• Drilling and blasting. • Excavation, loading and hauling to the processing plant. • Sloping and landscaping during rehabilitation phase.	• Health and safety risk posed by blasting activities. • Unsafe working environment for employees. • Safety risk posed by un-sloped areas.	An unsafe working environment affects the labour force, as well as pose a threat to animals and humans that may enter the mining footprint.	Operational-, and Decommissioning Phase	<u>Stop & Control:</u> Adherance to the blasting rules and regulations, demarcation of the mining area and proper housekeeping.	Health and safety aspects on site must be managed in accordance with the: • MHSA, 1996 • OHSA, 1993 • OHSAS 18001 • USBM standards
• Processing, stockpiling and transporting of material.	• Overloading of trucks impacting road infrastructure. • Degradation of the access road.	Collapse of the internal road infrastructure will affect the landowner and lawful occupiers negatively. If the mine negatively affect public traffic it may incur additional costs and complaints from the public.	Operational phase	<u>Control & Remedy:</u> Maintaining the access road for the duration of the operational phase, as well as leabing it in a representative or better condition than prior to mining.	The access road must be managed in accordance with the: ❖ NRTA, 1996

f) 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)

Table 25: Impact Management Actions

ACTIVITY whether listed or not listed (E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc...etc..etc.)	**POTENTIAL IMPACT** (e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc...etc..)	**MITIGATION TYPE** (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... etc.) E.g. • Modify through alternative method. • Control through noise control • Control through management and monitoring Remedy through rehabilitation.	**TIME PERIOD FOR IMPLEMENTATION** 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.	**COMPLIANCE WITH STANDARDS** (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)
Demarcation of site with visible beacons.	No impact could be identified other than the beacons being outside the boundaries of the approved mining area.	Control through management and monitoring.	Beacons need to be in place throughout the life of the mine.	Mining of the iron ore is only allowed within the boundaries of the approved area. MPRDA, 2008 NEMA, 1998
Site establishment and infrastructure development**.**	Alteration of the agricultural sense of place.	The study area does not have a high agritourism-, or cultivation potential and the proposed mining	Throughout site establishment- and operational phases.	Management of the mining activities must be in accordance with the: MPRDA, 2008

ACTIVITY	POTENTIAL IMPACT	MITIGATION TYPE	TIME PERIOD FOR IMPLEMENTATION	COMPLIANCE WITH STANDARDS
		operation will have a low visibility. The impact must be controlled through proper management.		• NEMA, 1998 • CARA, 1983
• Site establishment and infrastructure development.	• Loss of agricultural land for duration of mining.	Should the proposed project be approved, the operation will temporarily interrupt the agricultural activities of the footprint area, only to be reversed upon the closure of the mine. The impact could be controlled through progressive rehabilitation.	Throughout site establishment- and operational phases.	Use of agricultural land must be managed in accordance with the: • CARA, 1983 • Closure Plan (Appendix J)
• Site establishment and infrastructure development. • Stripping and stockpiling of topsoil and overburden.	• Visual intrusion as a result of site establishment. • Visual intrusion caused by mining activities.	Control: Implementing proper housekeeping.	Throughout site establishment- and operational phases.	Management of the mining activities must be in accordance with the: • MPRDA, 2008 • NEMA, 1998
• Site establishment and infrastructure development. • Cumulative Impacts	• Potential impact on the ESA.	Control: Implementing proper housekeeping.	Applicable during the site establishment phase, and to be managed throughout the operational and decommissioning phases.	Areas of conservation importance must be managed in accordance with the: • NEM:BA, 2004 • NC-NCA, 2009 • NFA, 1998
• Site establishment and infrastructure development.	• Potential impact on vegetation and listed and/or protected plant species.	Control & Stop: Implementing good management practices and adhering to the recommendations of the botanist.	Applicable during the site establishment phase, and to be managed throughout the operational and decommissioning phases.	Natural vegetated areas must be managed in accordance with the: • NEM:BA, 2004 • NC-NCA, 2009 • NFA, 1998
• Site establishment and infrastructure development. • Stripping and stockpiling of topsoil and overburden.	• Potential impact on fauna within the footprint area. • Potential impact on local fauna due to distrubance and loss of available habitat.	Control & Stop: Implementing good management practices.	Throughout operational- and decommissioning phases.	Site specific fauna must be managed in accordance with the: • NEM:BA, 2004 • NC-NCA, 2009 • NFA, 1998
• Site establishment and infrastructure development.	• Potential impact on archaeological artefacts.	Control & Stop: Implementing good management practices.	Throughout site establishment-, and operational phase.	Cultural/heritage aspects on site must be managed in accordance with the:

ACTIVITY	POTENTIAL IMPACT	MITIGATION TYPE	TIME PERIOD FOR IMPLEMENTATION	COMPLIANCE WITH STANDARDS
• Excavation, loading and hauling to the processing plant.	• Potential impact on areas of palaeontological concerns.			• NHRA, 1999
• Site establishment and infrastructure development.	• Potential impact on surface- or ground water.	Control: Implementing the mitigation measures and rehabilitation plan.	Throughout site establishment-, and operational phase.	Any water related matters must be managed in accordance with the: • NWA, 1998
• Stripping and stockpiling of topsoil and overburden. • Excavation, loading and hauling to the processing plant. • Sloping and landscaping during rehabilitation.	• Loss of stockpiled topsoil during mining and stockpiling. • Potential erosion of denuded areas. • Facilitation of erosion due to mining activities. • Erosion of returned topsoil after rehabilitation.	Control & Remedy: Proper housekeeping and storm water management.	Throughout site establishment- and operational phases.	Topsoil stripping must be managed in accordance with the: • CARA, 1983 • NEM:BA, 2004 • MPRDA, 2002 • Closure Plan (Appendix J)
• Stripping and stockpiling of topsoil and/or overburden. • Drilling and blasting. • Excavation, loading and hauling to the processing plant. • Processing, stockpiling and transporting of material.	• Dust nuisance caused as a result of the disturbance of soil. • Dust nuisance caused by blasting activities. • Dust nuisance due to excavation and from loading and vehicles transporting the material. • Dust nuisance due generated at the processing plant.	Control: Dust suppression methods and proper housekeeping.	Throughout site establishment- and operational phases.	Dust generation on site must be managed in accordance with the: • NEM:AQA, 2004 Regulation 6(1) • National Dust Control Regulations, GN No R827 • ASTM D1739 (SANS 1137:2012)
• Stripping and stockpiling of topsoil and/or overburden. • Drilling and blasting. • Excavation, loading and hauling to the processing plant. • Processing, stockpiling and transporting of material.	• Noise nuisance generated by earthmoving machinery. • Noise nuisance as a result of blasting. • Noise nuisance as a result of the mining activities. • Noise nuisance stemming from operation of the processing plant.	Control: Noise suppression methods and proper housekeeping.	Throughout site establishment- and operational phases.	Noise generation on site must be managed in accordance with the: • NEM:AQA, 2004 Regulation 6(1) • NRTA, 1996

ACTIVITY	POTENTIAL IMPACT	MITIGATION TYPE	TIME PERIOD FOR IMPLEMENTATION	COMPLIANCE WITH STANDARDS
• Stripping and stockpiling of topsoil and/or overburden. • Sloping and landscaping during rehabilitation phase.	• Infestation of the topsoil heaps and mining area with weeds or invader plant species. • Infestation of the reinstated areas by weeds and invader plant species.	Control & Remedy: Implementation of an invasive plant species management plan.	Throughout operational- and decommissioning phases.	Weeds and invader plants on site must be managed in accordance with the: • CARA, 1983 • NEM:BA, 2004
• Stripping and stockpiling of topsoil and/or overburden. • Excavation, loading and hauling to the processing plant. • Processing, stockpiling and transporting of material. • Sloping and landscaping during rehabilitation phase.	• Potential contamination of footprint area and surface runoff as a result of hydrocarbon spillages. • Soil contamination from hydrocarbon spills and/or littering. • Potential contamination of environment due to improper waste management. • Potential impact associated with litter/waste left at the mining area.	Control & Remedy: Proper housekeeping and implementation of an emergency response plan and waste management plan.	Throughout operational- and decommissioning phases.	Mining related waste must be managed in accordance with the: • NWA, 1998 • NEM:WA, 2008
• Drilling and blasting. • Excavation, loading and hauling to the processing plant. • Sloping and landscaping during rehabilitation phase.	• Health and safety risk posed by blasting activities. • Unsafe working environment for employees. • Safety risk posed by un-sloped areas.	Stop & Control: Adherance to the blasting rules and regulations, demarcation of the mining area and proper housekeeping.	Throughout operational- and decommissioning phases.	Health and safety aspects on site must be managed in accordance with the: • MHSA, 1996 • OHSA, 1993 • OHSAS 18001 • USBM standards
• Processing, stockpiling and transporting of material.	• Overloading of trucks impacting road infrastructure. • Degradation of the access road.	Control & Remedy: Maintaining the access road for the duration of the operational phase, as well as leabing it in a representative or better condition than prior to mining.	Throughout site establishment- and operational phases.	The access road must be managed in accordance with the: ❖ NRTA, 1996

i) Financial Provision

(1) Determination of the amount of Financial Provision.

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

The decommissioning phase will entail the reinstatement of the processing area by removing the stockpiled material, and site infrastructure/equipment and landscaping the disturbed footprints. Due to the impracticality of importing large volumes of fill to restore the excavation to its original topography, the rehabilitation option is to develop the excavation into a minor landscape feature. This will entail creating a series of irregular benches along the excavation faces, the top edges of each face being blasted away to form scree slopes on the benches below, thereby reducing the overall face angle. The benches will be top-dressed with topsoil and vegetated with an appropriate grass mix if vegetation does not naturally establish in the area within six months of the replacement of the topsoil. The applicant will comply with the minimum closure objectives as prescribed by DMRE.

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

This report, the Draft Basic Assessment Report, includes all the environmental objectives in relation to closure and will be made available for perusal by the landowner, registered I&AP's and stakeholders over a 30-days commenting period.

(c) 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.

The requested rehabilitation plan is attached as Appendix E.

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

The decommissioning phase will entail the final rehabilitation of the mining site. Final landscaping, levelling and top dressing will be done on all areas to be rehabilitated. The rehabilitation of the mining area as indicated on the rehabilitation plan attached as Appendix E will comply with the minimum

closure objectives as prescribed by DMRE and detailed below, and therefore is deemed to be compatible:

Rehabilitation of the excavated area:

- The excavated area must serve as a final depositing area for the placement of overburden.
- Rocks and coarse material removed from the excavation must be dumped into the excavation.
- No waste may be permitted to be deposited in the excavations.
- Once overburden, rocks and coarse natural materials has been added to the excavation and it was profiled with acceptable contours and erosion control measures, the topsoil previously stored must be returned to its original depth over the area.
- The area must be fertilized if necessary to allow vegetation to establish rapidly. The site shall 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 closure of the site.
- If a reasonable assessment indicates that the re-establishment of vegetation is unacceptably slow, the Regional Manager (DMRE) 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 his or her specification

Rehabilitation of plant, office and service areas:

- Coarse natural material used for the construction of ramps must be removed and dumped into the excavations.
- Stockpiles must 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 shall be dealt with in accordance with section 44 of the Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002):
    - Where sites have been rendered devoid of vegetation/grass or where soils have been compacted owing to traffic, the surface shall be scarified or ripped.

- Areas containing French drains shall be compacted and covered with a final layer of topsoil to a height of 10 cm above the surrounding ground surface.
- The site shall be seeded with a vegetation seed mix adapted to reflect the local indigenous flora.

- Photographs of the camp and office sites, before and during the mining operation and after rehabilitation, shall be taken at selected fixed points and kept on record for the information of the DMRE Regional Manager. _
- On completion of mining operations, the surface of these areas, if compacted due to hauling and dumping operations, shall be scarified to a depth of at least 200mm and graded to an even surface condition. Where applicable/possible topsoil needs to be returned to its original depth over the area.
- The area shall then be fertilized if necessary to allow vegetation to establish rapidly. The site shall be seeded with a local, adapted indigenous seed mix.
- If a reasonable assessment indicates that the re-establishment of vegetation is unacceptably slow, the DMRE 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 his or her specification.

Final rehabilitation:

- Rehabilitation of the surface area shall entail landscaping, levelling, top dressing, land preparation, seeding (if required), maintenance, and clearing of invasive plant species.
- All equipment, plant, and other items used during the mining period must be removed from the site (section 44 of the MPRDA).
- Waste material of any description, including receptacles, scrap, rubble and tyres, must be removed entirely from the mining area and disposed of at a recognized landfill facility. It will not be permitted to be buried or burned on the site.
- The management of invasive plant species must be done in a sporadic manner during the life of the mining activities. Species regarded as Category 1a and 1b invasive species in terms of NEM:BA (National Environmental Management: Biodiversity Act 10 of 2004 and regulations applicable thereto) need to be eradicated from the site.

- Final rehabilitation must be completed within a period specified by the Regional Manager (DMRE).

(e) 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.

Mine type and saleable mineral by-product

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

Mineral type	Iron Ore
Saleable mineral by-product	None

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

Environmental sensitivity of the mine area

According to Table B.4

Environmental sensitivity of the mine area	Low

Level of information

According to Step 4.2:

Level of information available	Extensive

Identify closure components

According to Table B.5 and site-specific conditions

Component No.	Main description	Applicability of closure components (Circle Yes or No)	
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	-	NO
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	-

Unit rates for closure components

According to Table B.6 master rates and multiplication factors for applicable closure components.

Component No.	Main description	Master rate	Multiplication factor
1	Dismantling of processing plant and related structures (including overland conveyors and power lines)	-	-
2(A)	Demolition of steel buildings and structures	-	-
2(B)	Demolition of reinforced concrete buildings and structures	-	-
3	Rehabilitation of access roads	-	-
4(A)	Demolition and rehabilitation of electrified railway lines	-	-
4(B)	Demolition and rehabilitation of non-electrified railway lines	-	-
5	Demolition of housing and facilities	-	-
6	Opencast rehabilitation including final voids and ramps	268 200	0.04
7	Sealing of shafts, adits and inclines	-	-
8(A)	Rehabilitation of overburden and spoils	-	-
8(B)	Rehabilitation of processing waste deposits and evaporation ponds (basic, salt-producing)	-	-

Component No.	Main description	Master rate	Multiplication factor
8(C)	Rehabilitation of processing waste deposits and evaporation ponds (acidic, metal-rich)	-	-
9	Rehabilitation of subsided areas	-	-
10	General surface rehabilitation, including grassing of all denuded areas	141 640	1.00
11	River diversions	-	-
12	Fencing	-	-
13	Water management (Separating clean and dirty water, managing polluted water and managing the impact on groundwater)	-	-
14	2 to 3 years of maintenance and aftercare	18 849	1.00

Determine weighting factors

According to Tables B.7 and B.8

Weighting factor 1: Nature of terrain/accessibility	1.10 (Undulating)
Weighting factor 2: Proximity to urban area where goods and services are to be supplied	1.05

Calculation of closure costs

Table B.10 Template for Level 2: "Rules-based" assessment of the quantum for financial provision

Table 26: Calculation of closure cost

CALCULATION OF THE QUANTUM							
Mine:	Makganyane Resources (Pty) Ltd			**Location:**	Postmasburg		
Evaluators:	C Fouché			**Date:**	04 August 2021		
No	**Description**	**Unit**	**A Quantity**	**B Master rate**	**C Multiplication factor**	**D Weighting factor 1**	**E=A *B*C*D Amount (Rand)**
			Step 4.5	**Step 4.3**	**Step 4.3**	**Step 4.4**	
1	Dismantling of processing plant and related structures (including overland conveyors and power lines)	m^2	0	18	1.00	1.10	R 0.00
2(A)	Demolition of steel buildings and structures	m^2	0	256	1.00	1.10	R 0.00
2(B)	Demolition of reinforced concrete buildings and structures	m^2	0	377	1.00	1.10	R 0.00
3	Rehabilitation of access roads	m^2	0	46	1.00	1.10	R 0.00
4(A)	Demolition and rehabilitation of electrified railway lines	m	0	444	1.00	1.10	R 0.00
4(B)	Demolition and rehabilitations of non-electrified railway lines	m	0	242	1.00	1.10	R 0.00
5	Demolition of housing and/or administration facilities	m^2	0	512	1.00	1.10	R 0.00
6	Opencast rehabilitation including final voids and ramps	ha	3	268 200	0.04	1.10	R 35 402.40
7	Sealing of shaft, audits and inclines	m^3	0	137	1.00	1.10	R 0.00
8(A)	Rehabilitation of overburden and spoils	ha	0	178 800	1.00	1.10	R 0.00
8(B)	Rehabilitation of processing waste deposits and evaporation ponds (basic, salt-producing waste)	ha	0	222 692	1.00	1.10	R 0.00
8(C)	Rehabilitation of processing waste deposits and evaporation ponds (acidic, metal-rich waste)	ha	0	646 804	0.51	1.10	R 0.00
9	Rehabilitation of subsided areas	ha	0	149 718	1.00	1.10	R 0.00
10	General surface rehabilitation	ha	1.2	141 640	1.00	1.10	R 186 964.80

11	River diversions	ha	0	141 640	1.00	1.10	R 0.00
12	Fencing	m	0	162	1.00	1.10	R 0.00
13	Water Management	ha	0	53 855	0.17	1.10	R 0.00
14	2 to 3 years of maintenance and aftercare	ha	4.9	18 849	1.00	1.10	R 101 596.11
15(A)	Specialists study	Sum	0				R 0.00
15(B)	Specialists study	Sum	0				R 0.00
Sum of items 1 to 15 above							R 323 963.31
Multiply Sum of 1-15 by Weighting factor 2 (Step 4.4)		1.05		R 323 963.31		**Sub Total 1**	R 340 161.48

1	Preliminary and General	6% of Subtotal 1 if Subtotal 1 <R100 000 000.00	R 20 409.69
		12% of Subtotal 1 if Subtotal 1 >R100 000 000.00	-
2	Contingency	10.0% of Subtotal 1	R 34 016.15
		Sub Total 2 (Subtotal 1 plus management and contingency)	R 394 587.31
		Vat (15%)	R 59 188.10
		GRAND TOTAL (Subtotal 3 plus VAT)	**R 453 775.41**

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 **R 453 775.41**.

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

Herewith I, the person, whose name is stated below confirm that I am the person authorised to act as representative of the Applicant in terms of the resolution submitted with the application. I herewith confirm that the company will provide the amount that will be determined by the Regional Manager in accordance with the prescribed guidelines.

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

g) Monitoring of Impact Management Actions
h) Monitoring and reporting frequency
i) Responsible persons
j) Time period for implementing impact management actions
k) Mechanisms for monitoring compliance

Table 27: Mechanisms for monitoring compliance with and performance assessment against the EMPR and reporting thereon.

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
Demarcation of site with visible beacons	Maintenance of beacons	• Visible beacons need to be placed at the corners of the mining area.	Responsibility: • Site Manager to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. • Compliance to be monitored by the independent Environmental Control Officer during the annual environmental audit. Role: • Ensure beacons are in place throughout the life of the mine.	Applicable throughout site establishment-, operational-, and decommissioning phases. • Daily compliance monitoring by site management. • Annual compliance monitoring of site by an Environmental Control Officer.
• Site establishment and infrastructure development**.**	Land Use: • Loss of agricultural land for duration of mining.	• Mining schedule	Responsibility: • Site Manager to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. • Compliance to be monitored by the independent Environmental Control Officer during the annual environmental audit.	Applicable throughout site establishment-, operational-, and decommissioning phases. • Daily compliance monitoring by site management. • Annual compliance monitoring of site by an Environmental Control Officer.

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
			Role: • If needed, sign mined-out/rehabilitated areas back to agricultural use once the cover crop stabilised.	
• Site establishment and infrastrucutre development. • Stripping and stockpiling of topsoil and/or overburden.	Visual Characteristics: • Visual intrusion as a result of site establishment. • Visual intrusion caused by mining activities.	• Minimize the visual impact of the activity on the surrounding environment through proper site management and implementing good housekeeping practices.	Responsibility: • Site Manager to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. • Compliance to be monitored by the independent Environmental Control Officer during the annual environmental audit. Role: • Ensure that the site have a neat appearance and is kept in good condition at all times. • Store mining equipment in a dedicated area when not in use. • Limit vegetation removal, and only strip topsoil immediately prior to the mining/use of a specific area. • Contain excavations to the approved footprint of the permitted area. • Upon closure, rehabilitate the site to ensure that the visual impact on the aesthetic value of the area is reduced to the minimum.	Applicable throughout site establishment-, operational-, and decommissioning phases. • Daily compliance monitoring by site management. • Annual compliance monitoring of site by an Environmental Control Officer.
• Site establishment and infrastructure development.	Terrestrial Biodiversity, Conservation Areas and Groundcover: • Potential impact on the ESA objectives; • Potential impact on vegetation and listed	• Visible beacons indicating the boundary of the mineable area. • Pre-commencement walkthrough with botanist.	Responsibility: • Site Manager to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. • Botanist to identify plants of importance. • Compliance to be monitored by the independent Environmental Control Officer during the annual environmental audit.	Applicable throughout site establishment-, operational-, and decommissioning phases. • Daily compliance monitoring by site management. • Annual compliance monitoring of site by an Environmental Control Officer.

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
	and/or protected plant species.	• Removal permit, should protected or red data species be relocated. • Cover crop to seed reinstated areas upon closure.	<u>Role:</u> • Clearly demarcate the mining boundaries and contain all operations to the approved mining area. Declare the area outside the mining boundaries a no-go area, and educate all staff accordingly. • Arrange a pre-commencement walk-through of the final mining footprint by a suitably qualified botanist for species of conservation concern that need to be removed/relocated prior to bush clearance. Obtain (if applicable) and implement a Plant Rescue Plan at the property. Keep a copy of the plan at the site. • Obtain permits from DAERD&LR for the removal of protected plant species (if required) and keep it on-site in the possession (at all times) of the flora search and rescue team. • Arrange a pre-commencement environmental induction for all staff on site to ensure that basic environmental principles are adhered to. This must include awareness of no littering, appropriate handling of pollution and chemical spills, avoiding fire hazards, minimising wildlife interactions, remaining within demarcated construction areas, etc. • Only commence with bush-clearance once the recommendations of the specialist (pre-commencement walkthrough) have been implemented. • Do not burn cleared vegetation to be retained at any time, but rather mulch and stockpiled it. Ideally cover the heaps with stockpiled topsoil and retain the material for future site rehabilitation.	

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			• The on-site ECO must provide supervision and oversight of vegetation clearing activities and other activities which may cause damage to the environment, especially during the site establishment phase, when the majority of vegetation clearing is taking place. • Ensure all vehicles remain on demarcated roads and prevent unnecessary driving in the veld outside these areas. • Do not translocated, uprooted or disturbed plants for rehabilitation or other purposes without express permission from the ECO and without the relevant permits. • Do not allow fires on-site.	
• Site establishment and infrastructure development. • Stripping and stockpiling of topsoil and/or oberburden.	<u>Fauna:</u> Potential impact on fauna within the footprint area.	• Toolbox talks to educate employees how to handle fauna that enter the work areas.	<u>Responsibility:</u> • Site Manager to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. • Compliance to be monitored by the independent Environmental Control Officer during the annual environmental audit. <u>Role:</u> • Ensure no fauna is caught, killed, harmed, sold or played with. • The ECO or other suitably qualified person must remove any fauna directly threatened by the operational activities to a safe location. • Arrange that all personnel undergo environmental induction regarding fauna management and in particular awareness about not harming or collecting species such as snakes, tortoises and owls which are often persecuted out of superstition. Instruct workers	Applicable throughout site establishment-, and operational phases. • Daily compliance monitoring by site management. • Annual compliance monitoring of site by an Environmental Control Officer.

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			to report any animals that may be trapped in the working area. - Ensure no snares are set or nests raided for eggs or young. - Ensure all vehicles adhere to a low speed limit to avoid collisions with susceptible species such as snakes and tortoises. - Prevent litter, food or other foreign material thrown or left around the site. Keep such items in the site vehicles and daily removed it to the site camp.	
- Site establishment and infrastructure development. - Excavation, loading and hauling to the processing plant.	<u>Cultural and Heritage Environment:</u> - Potential impact on arcahaeological artefacts. - Potential impact on areas of palaeontological concern.	- Contact number of an archaeologist & palaeontologist that can be contacted when a discovery is made on site. - Photographs of similar fossils.	<u>Responsibility:</u> - Site Manager to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. - Compliance to be monitored by the independent Environmental Control Officer during the annual environmental audit. <u>Role:</u> - Confine all mining to the development footprint area. - Implement the following change find procedure when discoveries are made on site: ▪ If during the pre-construction phase, construction, operations or closure phases of this project, any person employed by the developer, one of its subsidiaries, contractors and subcontractors, or service provider, finds any artefact of cultural significance or heritage site, this person must cease work at the site of the find and report this find to their immediate supervisor, and through their supervisor to the senior on-site manager.	Applicable throughout site establishment-, and operational phases. - Daily compliance monitoring by site management. - Annual compliance monitoring of site by an Environmental Control Officer.

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			▪ It is the responsibility of the senior on-site Manager to make an initial assessment of the extent of the find, and confirm the extent of the work stoppage in that area. ▪ The senior on-site Manager will inform the ECO of the chance find and its immediate impact on operations. The ECO will then contact a professional archaeologist for an assessment of the finds who will notify the SAHRA. ▪ Work may only continue once the go-ahead was issued by SAHRA. Fossil Chance Find Procedure: ▪ When excavations begin the rocks must be given a cursory inspection by the environmental officer or designated person. Any fossiliferous material (plants, insects, bone, stromatolites) must be put aside in a suitably protected place. This way the project activities will not be interrupted. ▪ Photographs of similar fossils must be provided to the developer to assist in recognizing the fossil plants, vertebrates, invertebrates or trace fossils in the shales and mudstones (see Appendix G2). ▪ Photographs of the putative fossils can be sent to the palaeontologist for a preliminary assessment. ▪ If there is any possible fossil material found by the developer/environmental officer/miners then the qualified palaeontologist sub-contracted for this project, must visit the site to inspect the selected material and check the dumps where feasible.	

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			▪ Fossil plants or vertebrates that are considered to be of good quality or scientific interest by the palaeontologist must be removed, catalogued and housed in a suitable institution where they can be made available for further study. Before the fossils are removed from the site a SAHRA permit must be obtained. Annual reports must be submitted to SAHRA as required by the relevant permits. ▪ If no good fossil material is recovered, then no site inspections by the palaeontologist will be necessary. A final report by the palaeontologist must be sent to SAHRA once the project has been completed and only if there are fossils. ▪ If no fossils are found and the excavations have finished, then no further monitoring is required.	
◆ Stripping and stockpiling of topsoil and/or vegetation.	<u>Geology and Soil:</u> ◆ Loss of stockpiled topsoil during mining and stockpiling.	◆ Earthmoving equipment to strip and stockpile topsoil. ◆ Cover crop to be established on topsoil heaps (if needed). ◆ Erosion control infrastructure (if needed).	<u>Responsibility:</u> ◆ Site Manager to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. ◆ Compliance to be monitored by the independent Environmental Control Officer during the annual environmental audit. <u>Role:</u> ◆ Strip and stockpile the upper 300 mm of the soil before mining. ◆ Carefully manage and conserve the topsoil throughout the stockpiling and rehabilitation process. ◆ Ensure topsoil stripping, stockpiling and re-spreading is done in a systematic way. Plan	Applicable throughout site establishment-, operational-, and decommissioning phases. ◆ Daily compliance monitoring by site management. ◆ Annual compliance monitoring of site by an Environmental Control Officer.

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			mining in such a way that topsoil is stockpiled for the minimum possible time. - Place the topsoil on a levelled area, within the mining footprint. Do not stockpile topsoil in undisturbed areas. - Protect topsoil stockpiles against losses by water- and wind erosion. Position stockpiles so it is not vulnerable to erosion by wind and water. The establishment of plants (weeds or a cover crop) on the stockpiles will help to prevent erosion. - Ensure that topsoil heaps do not exceed 2 m in order to preserve micro-organisms within the topsoil, which can be lost due to compaction and lack of oxygen. - Keep temporary topsoil stockpiles free of invasive plant species. - Vegetate the topsoil heaps to be stored longer than 6 months with an indigenous grass seed mix if vegetation does not naturally germinate within the first growth season. - Divert storm- and runoff water around the stockpile area to prevent erosion. - Spread the topsoil evenly, to a depth of 300 mm, over the rehabilitated area upon closure of the site. - Strive to re-instate topsoil at a time of the year when vegetation cover can be established as quickly as possible afterwards, to that erosion of returned topsoil is minimized. The best time of year is at the end of the rainy season. - Plant a cover crop immediately after spreading topsoil to stabilise the soil and protect it from erosion. Fertilise the cover crop for optimum	

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			production. Rehabilitation extends until the first cover crop is well established. • Control run-off water with temporary banks, where necessary, to prevent accumulation of run-off causing down-slope erosion. • Monitor the rehabilitated area for erosion, and appropriately stabilize if erosion do occur, for at least 12 months after reinstatement.	
• Stripping and stockpiling of topsoil and/or overburden; • Drilling and blasting; • Excavation, loading and hauling to the processing plant; • Processing, stockpiling and transporting of material.	<u>Air and Noise Quality:</u> • Dust nuisance as a result of the disturbance of soil. • Dust nuisance caused by blasting activities. • Dust nuisance due to excavation and from loading and vehicles transporting the material. • Dust nuisance generated at the processing plant.	• Gravimetric dust monitoring equipment. • Dust suppression equipment such as a water car, water dispenser and sprayers on the crusher plant. • Signage that clearly reduce the speed on the access roads.	<u>Responsibility:</u> • Site Manager to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. • Compliance to be monitored by the independent Environmental Control Officer during the annual environmental audit. <u>Role:</u> • Control the liberation of dust into the surrounding environment by the use of; inter alia, water spraying and/or other dust-allaying agents. • Ensure continuous assessment of all dust suppression equipment to confirm its effectiveness in addressing dust suppression. • Limit speed on the haul roads to 20 km/h and 40 km/h on the access road to prevent the generation of excess dust. • Minimise areas devoid of vegetation, and only remove vegetation immediately prior to mining. • Install water sprayers at the crusher plant to alleviate dust generation from the conveyor belts. • Minimise fines, blowing from the drop end of the crusher plant by attaching strips of used conveyor belts to the conveyor's end. • Weekly remove compacted dust from the crusher plant to eliminate the dust source.	Applicable throughout site establishment-, and operational phases. • Daily compliance monitoring by site management. • Annual compliance monitoring of site by an Environmental Control Officer.

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			• Flatten loads to prevent spillage during transportation on public roads. • Consider weather conditions upon commencement of daily operations. Limit operations during very windy periods to reduce airborne dust and resulting impacts. • Ensure dust generating activities comply with the National Dust Control Regulations, GN No R827 promulgated in terms of NEM:AQA, 2004 and ASTM D1739 (SANS 1137:2012). • Implement best practice measures during the stripping of topsoil, excavation, and transporting of material from site to minimize potential dust impacts.	
• Stripping and stockpiling of topsoil and/or overburden. • Drilling and blasting; • Excavation, loading and hauling to the processing plant; • Processing, stockpiling and transporting of material.	<u>Air and Noise Quality:</u> • Noise nuisance generated by earthmoving machinery. • Noise nuisance as a result of blasting. • Noise nuisance as a result of the mining activities. • Noise nuisance stemming from operation of the processing plant.	• Personal noise exposure monitoring equipment. • Signage indicating noise zones. • Silencers fitted to all project related vehicles, and the use of vehicles that are in road worthy condition in terms of the National Road Traffic Act, 1996.	<u>Responsibility:</u> • Site Manager to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. • Compliance to be monitored by the independent Environmental Control Officer during the annual environmental audit. <u>Role:</u> • Ensure that employees and staff conduct themselves in an acceptable manner while on site. • No loud music may be permitted at the mining area. • Ensure that all project related vehicles are equipped with silencers and maintained in a road worthy condition in terms of the National Road Traffic Act, 1996. • Plan the type, duration and timing of the blasting procedures with due cognizance of other land users and structures in the vicinity. Notify the	Applicable throughout site establishment-, and operational phases. • Daily compliance monitoring by site management. • Annual compliance monitoring of site by an Environmental Control Officer.

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			surrounding land owners in writing prior to each blasting occasion. • Contract a qualified occupational hygienist to quarterly monitor and report on the personal noise exposure of the employees working at the mine. Monitoring must be in accordance with SANS 10083:2004 (Edition 5) sampling method as well as NEM:AQA 2004, SANS 10103:2008. • Implement best practice measures to minimise potential noise impacts.	
• Stripping and stockpiling of topsoil and/or overburden; • Sloping and landscaping during rehabilitation.	<u>Terrestrial biodiversity, conservation areas and groundcover:</u> • Infestation of the topsoil heaps and mining area with weeds or invader plant species. • Infestation of the reinstated areas by weeds and invader plant species.	• Designated team to cut or pull out invasive plant species that germinated on site. • Herbicide application equipment.	<u>Responsibility:</u> • Site Manager to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. • Compliance to be monitored by the independent Environmental Control Officer during the annual environmental audit. <u>Role:</u> • Implement an invasive plant species management plan to control all invasive plant species on site in terms of NEM:BA, 2004 and CARA, 1983. Do weed/alien ongoing clearing on throughout the life of the mining activities. • Do not allow planting or importing of any alien species to the site for landscaping, rehabilitation or any other purpose. • Keep all stockpiles (topsoil & overburden) free of invasive plant species. • Control declared invader or exotic species on the rehabilitated areas.	Applicable throughout site establishment-, operational-, and decommissioning phases. • Daily compliance monitoring by site management. • Annual compliance monitoring of site by an Environmental Control Officer.

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• Stripping and stockpiling of topsoil and/or overburden. • Excavation, loading and hauling to the processing plant. • Sloping and landscaping during rehabilitation.	<u>Hydrology:</u> • Potential erosion of denuded areas. • Facilitation of erosion due to mining activities. • Erosion of returned topsoil after rehabilitation.	• Storm water management structures such as berms to direct storm- and runoff water around the stockpiled topsoil area.	<u>Responsibility:</u> • Site Manager to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. • Compliance to be monitored by the independent Environmental Control Officer during the annual environmental audit. <u>Role:</u> • Divert stormwater around the topsoil heaps and mining areas to prevent erosion. • Protect stockpiles from erosion, and store it on flat areas surrounded by appropriate berms where possible. • Ensure that adequate slope protection is provided when mining within steep slopes. • Control the outflow of run-off water from the mining excavation to prevent down-slope erosion, by constructing temporary banks and ditches that will direct run-off water (if needed). These must be in place at any points where overflow out of the excavation might occur. • Regularly monitor roads and other disturbed areas within the project for erosion, and ensure problem areas receive follow-up monitoring to assess the success of the remediation. • Rectify erosion problems within the mining area as a result of the mining activities immediately (within 48 hours) and monitored thereafter to ensure that it does not re-occur. • Conduct activity in terms of the Best Practice Guidelines for small-scale mining as developed by DWS. • Restrict polluting activities including storage of mining fleet, equipment wash down facilities and	Applicable throughout site establishment-, operational-, and decommissioning phases. • Daily compliance monitoring by site management. • Annual compliance monitoring of site by an Environmental Control Officer.

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			vehicle maintenance yards to the workshop areas and ensure it takes place on impermeable hard standing surfaces, which formally drain to a dirty water drainage system at the site. • Contain all fuels and chemicals stored or used on site in fit for purpose containers and store within designated storage areas. Ensure the designated storage areas are situated on an impermeable surface with a perimeter bund and a drainage sump. Size the volume of the bund and sump to contain at least 110% of the total volume of the fuel and chemicals being stored within the designated storage area. Ensure that the storage areas have a roof to prevent inflow of rainwater, which would require the sump to be emptied more frequently.	
• Stripping and stockpiling of topsoil and/or overburden. • Excavation, loading and hauling to the processing plant; • Processing, stockpiling and transporting of material; • Sloping and landscaping during rehabilitation.	<u>General:</u> • Potential contamination of footprint area and surface runoff as a result of hydrocarbon spillages. • Soil contamination from hydrocarbon spills and/or littering. • Potential contamination of environment due to improper waste management. • Potential impact associated with litter/waste left at the mining area.	• Oil spill kit. • Sealed drip trays. • Formal waste disposal system with waste registers.	<u>Responsibility:</u> • Site Manager to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. • Compliance to be monitored by the independent Environmental Control Officer during the annual environmental audit. <u>Role:</u> • Ensure regular vehicle maintenance, repairs and services only take place at the workshop and service area. Ensure drip trays are present if emergency repairs are needed on equipment not able to move to the workshop. Dispose all waste products in a closed container/bin to be removed from the emergency service area (same day) to the workshop in order to ensure proper disposal. Treat this as hazardous waste and dispose of it at a registered hazardous waste handling facility,	Applicable throughout site establishment-, operational-, and decommissioning phases. • Daily compliance monitoring by site management. • Annual compliance monitoring of site by an Environmental Control Officer.

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			alternatively arrange collection by a registered hazardous waste handling contractor. File safe disposal certificates for auditing purposes. - If a diesel bowser is used on site, equip it with a drip tray at all times. Use drip trays during each and every refuelling event. The nozzle of the bowser needs to rest in a sleeve to prevent dripping after refuelling. - Ensure drip trays are cleaned after each use. Do not allow dirty drip trays to be used on site. Dispose of dirty rags used to clean the drip trays as hazardous waste into a designated bin at the workshop, where it is incorporated into the hazardous waste removal system. - Collect any effluents containing oil, grease or other industrial substances in a suitable receptacle and remove it from the site, either for resale or for appropriate disposal at a recognized facility. File proof. - Obtain an oil spill kit, and train the employees in the emergency procedures to follow when a spill occurs as well as the application of the spill kit. - Clean spills immediately, within two hours of occurrence, to the satisfaction of the Regional Manager (DMRE) by removing the spillage together with the polluted soil and containing it in a designated hazardous waste bin until it is disposed of at a recognised facility. File proof. - Ensure suitable covered receptacles are available at all times and conveniently placed for the disposal of general waste. - Store non-biodegradable refuse such as glass bottles, plastic bags, metal scrap, etc., in a container with a closable lid at a collecting point to be collected at least once a month and	

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			disposed of at a recognized landfill site. Take specific precautions to prevent refuse from being dumped on or in the vicinity of the mine area. File proof of disposal. Handle biodegradable refuse as indicated above. Encourage re-use or recycling of waste products. Do not bury or burn waste on the site. Ensure all employees have access to proper ablution facilities that are either connected to an operational septic tank, or have a chemical drum system. Anchor chemical toilets and arrange weekly services for the duration of the mining activities by a registered liquid waste handling contractor. File the safe disposal certificates for auditing purposes. Ensure that the use of any temporary, chemical toilet facilities do not cause any pollution to water sources or pose a health hazard. In addition, ensure that no form of secondary pollution arise from the disposal of refuse or sewage from the temporary, chemical toilets. Address any pollution problems arising from the above immediately. Do not discharge water containing waste into the natural environment. Implement measures to contain the waste water and safely dispose thereof. Report any significant spillage of chemicals, fuels etc. during the lifespan of the mining activities to the Department of Water and Sanitation and other relevant authorities. Implement the use of waste registers to keep record of the waste generated and removed from the mining area.	

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• Drilling and blasting; • Excavation, loading and hauling to the processing plant; • Sloping and landscaping during rehabilitation.	<u>Health and Safety:</u> • Health and safety risk posed by blasting activities. • Unsafe working environment for employees. • Safety risk posed by un-sloped areas.	• Stocked first aid box. • Level 1 certified first aider. • All appointments in terms of the Mine Health and Safety Act, 1996. • Vibro recorder.	<u>Responsibility:</u> • Site Manager to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. • Compliance to be monitored by the independent Environmental Control Officer during the annual environmental audit. <u>Role:</u> • Ensure that workers have access to the correct PPE as required by law. • Locate sanitary facilities within 100 m from any point of work. • Manage all operations in compliance with the Mine Health and Safety Act, 1996 (Act No 29 of 1996). • Plan the type, duration and timing of blasting with due cognizance of other land users and structures in the vicinity. • Inform the surrounding landowners and communities in writing ahead of any blasting event. • Monitor the compliance of ground vibration and airblast levels to USBM standards with each blasting event. • Record all blasts with a vibro recorder. • Give audible warning of a pending blast at least 3 minutes in advance of the blast. • Limit fly rock, and collect and remove flyrock and rock spill that falls beyond the working area.	Applicable throughout operational-, and decommissioning phases. • Daily compliance monitoring by site management. • Annual compliance monitoring of site by an Environmental Control Officer.
• Processing, stockpiling and transporting of material.	<u>Existing Infrastructure:</u>	• Grader to restore the road suurface when needed.	<u>Responsibility:</u> • Site Manager to ensure day-to-day compliance with the guidelines as stipulated in the EMPR.	Applicable throughout operational phase. • Daily compliance monitoring by site management.

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	• Overloading of trucks impacting road infrastructure. • Degradation of the access road.		• Compliance to be monitored by the independent Environmental Control Officer during the annual environmental audit. <u>Role:</u> • Divert storm water around the access road to prevent erosion. • Restrict vehicular movement to the existing access road to prevent crisscrossing of tracks through undisturbed areas. • Repair rutting and erosion of the access road caused as a direct result of the mining activities. • Prevent the overloading of the trucks and file proof of load weights for auditing by relevant officials. • Restrict the speed of all mining equipment/vehicles to 40 km/h on the access roads.	• Annual compliance monitoring of site by an Environmental Control Officer.
• Site establishment and infrastructure development.	<u>General:</u> • Storage/handling of hazardous substance/chemicals.	• Storage areas with impermeable surfaces and bund walls that can hold 110% of the product amount stored in it. • Hazardous Substances Register and Safety Data Sheets. • Drip trays. • Inspection programme. • Operational oil sump.	<u>Responsibility:</u> • Site Manager to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. • Compliance to be monitored by the independent Environmental Control Officer during the annual environmental audit. <u>Role:</u> • Place chemical storage areas on level ground to prevent offsite migration of any spilled product. • Ensure that the floor of the storage area is impermeable to prevent seepage of spilled products into the ground or ground water. • Control access to the chemicals/substances and implement a notification system of an appropriate staff member.	Applicable throughout site establishment-, and operational phases • Daily compliance monitoring by site management. • Annual compliance monitoring of site by an Environmental Control Officer.

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
			• Ensure that the storage area is out of the 1:100 year floodline or further than 100 m from the edge of a watercourse, whichever is greatest. • Maintain a Hazardous Substances Register, and keep Safety Data Sheets (SDS) current for all chemicals used on site. • Ensure any fuel/used oil tanks have secondary containment in the form of an impermeable bund wall and base within which the tanks sits, raised above the floor, on plinths. Check that the bund capacity is sufficient to contain 110% of the tank's maximum capacity. Ensure that the distance and height of the bund wall relative to that of the tank is taken into consideration to ensure that any spillage does not result in hydrocarbons/other substances spouting beyond the confines of the bund. • Establish a formal inspection routine to check all equipment in the bund area, as well as the bund area itself for malfunctions or leakages. Inspect the bund area at least weekly and remove any accumulated rainwater and hand it as contaminated water. Check all valves and outlets to ensure that its intact and closed securely. • Ensure that the bund base slope towards an oil sump of sufficient size. Do not allow contaminated water to mix with clean water, and contain it until it is collected by a registered hazardous waste handling contractor or disposed of at a registered hazardous waste handling facility. • Use drip trays under all stationary equipment or vehicles. Place used drip trays within a bunded area and do not store on the bare soil. Discard	

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
			the waste water originating from the cleaning of drip trays into the oil sump.	
• Sloping and landscaping during rehabilitation.	<u>Topography:</u> • Landscaping of mining area.	• Earthmoving equipment to reinstate mined-out areas. • Cover crop to be established on reinstated area. • Erosion control infrastructure (when needed).	<u>Responsibility:</u> • Site Manager to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. • Compliance to be monitored by the independent Environmental Control Officer during the annual environmental audit. <u>Role:</u> • Use the excavated area for the final depositing of overburden. • Dump rocks and coarse material removed from the excavation into the excavation. • Remove coarse natural material used for the construction of ramps and dump it into the excavations. • Remove stockpiles during the decommissioning phase, rip the area and return the topsoil to its original depth to provide a growth medium. • Do not permit any waste to be deposited into the excavations. • Return the previously stored topsoil to its original depth, once overburden, rocks and coarse natural materials have been added to the excavation and it was profiled with acceptable contours and erosion control measures. • If necessary, fertilize the area to allow vegetation to establish rapidly. Seed the site 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 six months from closure of the site.	Applicable throughout decommissioning phase. • Daily compliance monitoring by site management. • Annual compliance monitoring of site by an Environmental Control Officer.

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
			• If required by the Regional Manager (DMRE) the soil must be analysed and any deleterious effects on the soil arising from the mining operation must be corrected and the area be seeded with a vegetation seed mix to his/her specification. • On completion of operations, deal with all structures or objects in accordance with section 44 of the Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002). • On completion of mining operations, scarify the surface of all plant-, stockpiling-, and/or office areas, if compacted due to hauling and dumping operations, to a depth of at least 200mm and graded it to an even surface condition. Where applicable/possible return topsoil to its original depth over the area.	

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

The Environmental Audit Report in accordance with Appendix 7 as prescribed in Regulation 34 of the EIA Regulations, 2014 (as amended) will annually be submitted to DMRE for compliance monitoring purposes or in accordance with the time period stipulated by the Environmental Authorisation.

m) Environmental Awareness Plan

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

Once the Applicant received the mining permit and may commence with the proposed activity, a copy of the Environmental Management Programme will be handed to the site manager for his perusal. Issues such as the mining boundaries, fire principals and hazardous waste handling will be discussed.

An induction meeting will be held with all the site workers to inform them of the Basic Rules of Conduct with regard to the environment.

ii) Manner in which risk will be dealt with in order to avoid pollution or the degradation of the environment.

The operations manager must ensure that he/she understands the EMPR document and its requirement and commitments before any mining continues. An Environmental Control Officer needs to check compliance of the mining activity 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.

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

- **Water Management and Erosion:**
  - Check that rainwater flows around work areas and are not contaminated.

- Report any erosion.
- Check that dirty water is kept from clean water.

- **Waste Management:**

  - Take care of your own waste.
  - Don't burn waste.
  - Pick-up any litter laying around.

- **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.

- **Discoveries:**

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

- **Air Quality:**

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

- **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.

- **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.

- **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.

n) 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 being sufficient to cover the environmental liability at the time and for closure of the mine at that time.

2. UNDERTAKING

The EAP herewith confirms

a) the correctness of the information provided in the reports **X**
b) the inclusion of comments and inputs from stakeholders and I&AP's **X**
c) the inclusion of inputs and recommendations from the specialist reports where relevant, and **X**
d) that the information provided by the EAP to interested and affected parties and any response by the EAP to comments or inputs made by interested and affected parties are correctly reflected herein **X**

Signature of the environmental assessment practitioner:

Greenmined Environmental (Pty) Ltd

Name of Company:

14 September 2021

Date:

UNDERTAKING

I,…..*Lionel Koster*……the undersigned and duly authorised thereto by……*Makganyane Resources (Pty) Ltd*……

Company / ~~Closed Corporation / Municipality or Council~~
(Delete whichever is not applicable)

hereby undertake to implement all the aspects contained in the BAR and EMPR / ~~EIA and EMPR~~ and accept full responsibility therefore.
(Delete whichever is not applicable)

SIGNED at …… this …… day …… 2021

FINAL DOCUMENT TO BE SIGNED BY APPLICANT

_____

SIGNATURE

WITNESSES:

1……..

2…….

Official use

APPROVAL

Approved in terms of the National Environmental Management Act (NEMA), 1998 (Act 107 of 1998), as amended.

SIGNED at …… this …… day …… 2021

_____

REGIONAL MANAGER

NORTHERN CAPE

Undertaking/eg **-END-**

APPENDIX A

REGULATION 2.2 MINE PLAN

APPENDIX B

LOCALITY MAP

APPENDIX C1

SITE LAYOUT PLAN

APPENDIX C2

PROCESS FLOW DIAGRAM

APPENDIX D

LAND USE MAP

APPENDIX E

REHABILITATION MAP

APPENDIX F1

COMMENTS AND RESPONSE REPORT

APPENDIX F2

PROOF OF PUBLIC PARTICIPATION

APPENDIX F3

COPY OF LEASE AGREEMENT WITH LANDOWNER

APPENDIX G1

HERITAGE IMPACT ASSESSMENT

APPENDIX G2

PALAEONTOLOGICAL IMPACT ASSESSMENT

APPENDIX H

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 mining 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 the significance of impacts.

ENVIRONMENTAL IMPACT STATEMENT			
TYPE OF IMPACT	**DURATION**	**LIKELIHOOD**	**SIGNIFICANCE**
Site Establishment & Infrastructure Development:			
• Alteration of the agricultural sense of place.	**Duration of site establishment phase (±1 month)**	**Possible**	**Medium Concern**
• Loss of agricultural land for duration of mining.		**Definite**	**Medium Concern**
• Visual intrusion as a result of site establishment.		**Possible**	**Medium Concern**
• Potential impact on the ESA objectives.		**Low Possibility**	**Low Concern**
• Potential impact on vegetation and listed and/or protected plant species.		**Low Possibility**	**Low Concern**
• Potential impact on fauna within the footprint area.		**Low Possibility**	**Low Concern**
• Potential impact on archaeological artefacts.		**Low Possibility**	**Low Concern**
• Potential impact on surface- or ground water.		**Low Possibility**	**Low Concern**
• New job opportunities as a result of the mining operation (Positive Impact)		**Definite (+)**	**High (+)**
Stripping and Stockpiling of Topsoil and/or Overburden:	**Duration of site establishment phase (±1 month)**	**LIKELIHOOD**	**SIGNIFICANCE**
• Visual intrusion caused by mining activities.		**Possible**	**Medium Concern**
• Loss of stockpiled topsoil during mining and stockpiling.		**Low Possibility**	**Low Concern**
• Dust nuisance as a result of the disturbance of soil.		**Low Possibility**	**Low Concern**
• Noise nuisance generated by earthmoving machinery.		**Low Possibility**	**Low Concern**
• Infestation of the topsoil heaps and mining area with weeds or invader plant species.		**Low Possibility**	**Low Concern**
• Potential impact on local fauna due to disturbance and loss of available habitat.		**Low Possibility**	**Low Concern**
• Potential erosion of denuded areas.		**Low Possibility**	**Low Concern**
• Potential contamination of footprint area and surface runoff as a result of hydrocarbon spillages.		**Low Possibility**	**Low Concern**

ENVIRONMENTAL IMPACT STATEMENT			
Drilling and Blasting: • Health and safety risk posed by blasting activities. • Dust nuisance caused by blasting activities. • Noise nuisance as a result of blasting.	**Duration of operational phase (5 years maximum)**	**LIKELIHOOD** **Low Possibility** **Possible** **Possible**	**SIGNIFICANCE** **Low Concern** **Low-Medium Concern** **Low-Medium Concern**
Excavation, Loading and Hauling to the Processing Plant: • Dust nuisance due to excavation and from loading and vehicles transporting the material. • Noise nuisance as a result of the mining activities. • Unsafe working environment for employees. • Soil contamination from hydrocarbon spills and/or littering. • Potential impact on areas of palaeontological concern. • Facilitation of erosion due to mining activities.	**Duration of operational phase (5 years maximum)**	**LIKELIHOOD** **Low Possibility** **Low Possibility** **Low Possibility** **Low Possibility** **Low Possibility** **Low Possibility**	**SIGNIFICANCE** **Low Concern** **Low-Medium Concern** **Low Concern** **Low Concern** **Low Concern** **Low Concern**
Processing, Stockpiling and Transporting of Material: • Dust nuisance generated at the processing plant. • Noise nuisance stemming from operation of the processing plant. • Potential contamination of environment due to improper waste management. • Overloading of trucks impacting road infrastructure. • Degradation of the access road.	**Duration of operational phase (5 years maximum)**	**LIKELIHOOD** **Low Possibility** **Low Possibility** **Low Possibility** **Low Possibility** **Low Possibility**	**SIGNIFICANCE** **Low Concern** **Low-Medium Concern** **Low Concern** **Low Concern** **Low Concern**
Sloping and Landscaping during Rehabilitation: • Safety risk posed by un-sloped areas. • Erosion of returned topsoil after rehabilitation. • Infestation of the reinstated areas by weeds and invader plant species. • Potential impact associated with litter/waste left at the mining area. • Return of the mining area to agricultural use upon closure (Positive Impact)	**Duration of decommissioning phase (±1 month)**	**LIKELIHOOD** **Low Possibility** **Low Possibility** **Low Possibility** **Low Possibility** **Definite (+)**	**SIGNIFICANCE** **Low Concern** **Low Concern** **Low Concern** **Low Concern** **Medium-High (+)**

APPENDIX I

FINANCIAL AND TECHNICAL COMPETENCE REPORT

APPENDIX J

CLOSURE PLAN

APPENDIX K

INVASIVE PLANT SPECIES MANAGEMENT PLAN

APPENDIX L

PHOTOGRAPHS OF THE SITE

PHOTOGRAPHS OF THE PROPOSED MINING FOOTPRINT

APPENDIX M

CV AND EPERIENCE RECORD OF EAP