PROSPECTING RIGHT OVER PORTION 2 (A PORTION OF PORTION 1), REMAINDER PORTION, REMAINDER PORTION OF PORTION 1 AND PORTION 3 OF THE FARM MAKGANYENE NO 667 KURUMAN RD MAGISTERIAL DISTRICT, NORTHERN CAPE PROVINCE

FINAL BASIC ASSESSMENT REPORT

MARCH 2020

REFERENCE NUMBER: *NC 30/5/1/1/2/2292 PR*

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EXECUTIVE SUMMARY

Makganyane Resources (Pty) Ltd intends submitting a Section 102 (S102) amendment application in terms of the MPRDA, 2002 to increase the number of boreholes to be drilled during the prospecting of Portion 2 (portion of Portion 1), Remainder Portion, Remainder Portion of Portion 1 and Portion 3 of the farm Makganyene No 667. The S102 application necessitates an application for a Part 2 amendment of the holder's EMP in terms of GNR 326 Section 31. The proposed S102 application does not constitute a listed activity or specified activity (NEMA). This report, the Final Basic Assessment Report, forms part of the departmental requirements, and presents the final report of the Part 2 (NEMA) amendment process.

Project Description:

The DMR granted Charlton Michael Rex a prospecting right (11 April 2019) for manganese ore, iron ore and diamonds (general) on the above mentioned properties. The prospecting right was ceded to Makganyane Resources (Pty) Ltd on 30 October 2019. Exploration of the approved PR area commenced on the Remaining Extent (RE), and Portion 1 (Remaining Extent) of the farm Makganyene No 667 in 2019. To date drilling results and available data have defined that a more comprehensive drilling campaign is needed and that the whole PR area should be viewed as a target. The general review of the geological date showed that with a decent exploration program the potential of the PR area may be that of the adjacent Heuningkrantz farm (Kolomela Mine Extension).

The PR Holder therefore identified the need to increase the drilling programme from nine boreholes to ±200. The expanded drilling campaign will take place in the same way as prospecting has been done to date. No bulk sampling will be done, no electricity will be needed and no servicing of equipment will take place on site. Should access be needed to one or more of the borehole locations that cannot be reached with existing farm roads/tracks the drill rig will drive through the veld to the earmarked area, avoiding prominent vegetation and large trees. The tracks to these areas will be below the threshold of the NEMA: EIA Regulations, 2014 (as amended) and no new roads will be constructed.

The decommissioning phase will entail the removal of the drill rig and any foreign material from site; sealing and capping of the drill holes and landscaping any compacted surfaces (if needed). Upon closure of the prospecting right the area will return to agricultural use. Due to the nature of the activity no buildings or permanent infrastructure needs to be demolished and the access roads will remain intact to be used by the landowner.

Site-, Activities and Technology Alternatives:

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

- The proposed drill plan allows for proper prospecting of the approved area;
- The footprint of the drainage line that crosses through Portion 3 of Makganyene No 667 was excluded from the impact footprint to prevent damage/disturbance of the area as a result of the prospecting activities.
- No bulk sampling is proposed; thereby minimising the footprint of disturbance and the resultant impact on the receiving environment.
- No large trees (>20 cm stem) or vegetation of significance (identified by the ECO) will be removed to allow prospecting activities, as the position of the borehole can be altered when needed.
- No formal roads have to be constructed to allow for the continuation of the activity.
- Upon closure, the entire prospecting area will be returned to agricultural use without any residual impacts.

No-go Alternative:

Should the S102 application be rejected the invasive phase of the prospecting operation will only allow for the drilling of nine boreholes and seven sumps as discussed above. The *status quo* / no-go alternative was not deemed the preferred option as the approved prospecting footprint requires a more intensive drilling programme to determine the geological status of the area.

Public Participation Process:

Regulation 32(1)(a)(aa) of the NEMA: EIA Regulations, 2014 (as amended) stipulates that an applicant (for a Part 2 amendment) must submit a report reflecting the changes to the EMPR that has been subjected to a public participation process (PPP). In light of this, the relevant stakeholders and I&AP's were informed of the S102 amendment application and proposed expansion of the drill plan, by means of notification letters that invited their comments on the DBAR and draft EMPR, on-site notices and an advertisement in the Northern Cape Express. The PPP documentation were available in both Afrikaans and English. A 30-day commenting period was allowed that ended on 2 March 2020. No comments were received on the DBAR and/or draft EMPR that could be incorporated into this final BAR and EMPR.

Basic Assessment Report:

The basic assessment report identifies the potential positive and negative impacts that the proposed activity will 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 prospecting activities will not impact the topography of the area, even should the drill plan be extended as proposed with the S102 amendment application.

Visual Characteristics

The viewshed analysis showed the visibility of the prospecting area ranges between intermittent and low visibility. The prospecting activities does not require the removal of vegetation and no permanent infrastructure will be erected. In light of this, the potential impact of the prospecting operation on the visual characteristics of the receiving environment is deemed to be of insignificance importance.

Air and Noise Quality

The prospecting activity does not trigger an application in terms of the NEM:AQA, 2004, as it will only contribute the emissions of one drill rig and two to three site vehicles at a time for the duration of the invasive operational phase. Should the PR Holder 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 and compatible with the current land use. The potential impact on the noise ambiance of the receiving environment is expected to be of low significance and representative of the machinery already operating in the area. The distance of the prospecting area from residential infrastructure further lessens the potential noise impact.

Geology and Soil

The prospecting activities does not require bulk sampling, or the excavation of trenches or pits, and therefore the impact of the operation on the geology of the study area is deemed to be of low significance, without any residual impact once the boreholes were capped.

Hydrology

The prospecting area falls within a NFEPA of conservation importance. An ephemeral drainage line passes thorough Portion 3 of Makganyene No 667. This report proposes that a 100 m no-go buffer be maintained around the drainage line to conserve its integrity. The PR Holder is in discussion with the DWS to determine the necessity of a WULA. Prospecting will not affect the integrity of the FEPA if the proposed buffer area around the ephemeral drainage line is maintained; nor will it have an

impact on the surface- or groundwater of the footprint area as very little process water (±1 000 l/day) is needed to allow the drilling of the boreholes.

Mining and Biodiversity:

When the prospecting footprint is layered over the Mining and Biodiversity Map, Portion 3 of Makganyene No 667 (north-eastern section of the prospecting footprint) falls over and area of highest biodiversity importance with a corresponding rating of highest risk for mining. The position of the highest biodiversity area corresponds with the position of the ephemeral drainage line (discussed above). Should the PR Holder implement the proposed 100 m buffer around the drainage line the conservation status of the area will be adequately protected, and in light of this the impact of the prospecting operation on the identified area is deeded to be of Low significance.

Groundcover:

Ground truthing showed that the vegetation cover of the prospecting footprint varies from natural to near natural, representing the Kuruman Mountain Bushveld (along the outcrops), Olifantshoek Plains Thornveld (majority of the footprint), and the Postmasburg Thornveld (intermittently dispersed through the footprint). The prospecting activities does not require the removal of any large trees or vegetation of significance. Due to the small footprint of a borehole, the drill position can be manipulated to drill between the trees. In light of this, the impact of the prospecting operation on the vegetation cover of the receiving environment is deemed to be of Low significance.

Fauna

The fauna within the PR footprint will not be impacted by the prospecting 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 proposed drilling programme will not have a significant impact on heritage resources, and recommended that the project can commence on the condition that SAHRA approves the proposal and the recommendations of the report is implemented.

Site Specific Infrastructure

No prospecting activities are planned for any of the developed areas on the farm. The abandoned infrastructure along the historic quarry pit on Portion 2 of Makganyene No 667 will remain intact. Other infrastructure within the PR footprint comprises of power lines, farm roads, fences and water reservoirs. None of these structures will be impacted by the prospecting activities.

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 84 828.63.

LIST OF ABBREVIATIONS

AMT	Audio-magnetotelluric
BGIS	Biodiversity GIS
CARA	Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983)
CBA	Critical Biodiversity Area
DALRRD	Department of Agriculture, Land Reform and Rural Development
DBAR	Draft Basic Assessment Report
DEDT	Department of Economic Development and Tourism
DENC	Department of Environment and Nature Conservation
DMR	Department of Mineral and Resources
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 2017)
EMPR	Environmental Management Programme
FBAR	Final Basic Assessment Report
Fe	Iron
FEL	Front-end-loader
GNR	Government Notice
I&AP's	Interested and Affected Parties
IOEC	Iron Ore Export Channel
MHSA	Mine Health and Safety Act, 1996 (Act No. 29 of 1996)
Mn	Manganese
MPRDA	Minerals and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002)
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)
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
PWP	Prospecting Works Programme
RE	Remaining Extent
S102	Section 102 amendment application in terms of the MPRDA, 2002
SAHRA	South African Heritage Resources Agency
SAHRIS	South African Heritage Resources Information System
SAMBF	South African Mining and Biodiversity Forum
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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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:	064 617 8510
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 30/5/1/1/2/2292 PR

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 prospecting project and declares its independence as required by the Environmental Impact Assessment Regulations, 2014 (as amended April 2017) (EIA Regulations).

i) Details of the EAP

Name of the Practitioner:	Ms Christine Fouché (Senior Environmental Specialist)
Tel No.:	021 851 2673
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 K.

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

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

b) Location of the overall Activity.

Table 1: Location of the prospecting area.

Farm Name:	• Remaining Extent of the farm Makganyene No 667 • Portion 1 (Remaining Portion) of the farm Makganyene No 667 • Portion 2 (a portion of Portion 1) of the farm Makganyene No 667 • Portion 3 of the farm Makganyene No 667
Application area (Ha)	1 549.44 ha
Magisterial district:	Kuruman
Distance and direction from the nearest town	±24 km north-west of Postmasburg on opposite sides of the R385 provincial road. Exit Postmasburg towards Olifantshoek. Drive ±24 km along the R385 and the site will be on the left and right of the road.
21 digit Surveyor General Code for each farm portion	• C04100000000066700000 • C04100000000066700001 • C04100000000066700002 • C04100000000066700003

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 prospecting area (red polygon) of Makganyane Resources (Pty) Ltd (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 "PR Holder") intends submitting a Section 102 (S102) amendment application in terms of the MPRDA, 2002 to increase the number of boreholes to be drilled during the prospecting of Portion 2 (portion of Portion 1), Remainder Portion, Remainder Portion of Portion 1 and Portion 3 of the farm Makganyene No 667. The S102 application necessitates an application for a Part 2 amendment of the holder's EMP in terms of GNR 326 Section 31. The proposed S102 application does not constitute a listed activity or specified activity (NEMA). See attached as Appendix C a copy of the proposed drill plan of the prospecting right.

i) Listed and specified activities

Table 2: Listed and specified activities triggered by the associated prospecting 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)
Section 102 amendment application to expand the drill plan.	1 549.44 ha	X	GNR 326 Section 31 Amendments to be applied for in terms of Part 2: *An environmental authorisation may be amended by following the process prescribed in this Part if the amendment will result in a change to the scope of a valid environmental authorization where such change will result in and increased level or change in the nature of impact where such level or change in nature of impact was not:* *a) assessed and included in the initial application for environmental authorization; or* *b) taken into consideration in the initial environmental authorization;*

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)
			and the change does not, on its own, constitute a listed or specified activity.

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)

1. BACKGROUND INFORMATION & CURRENT STATUS

The Department of Mineral Resources (DMR) granted Charlton Michael Rex a prospecting right (11 April 2019) for manganese ore, iron ore and diamonds (general) on the above mentioned properties. The prospecting right was ceded to Makganyane Resources (Pty) Ltd on 30 October 2019. The table below lists the GPS coordinates of the prospecting right footprint.

Table 3: GPS coordinates of the prospecting right.

NUMBER	DEGREES, MINUTES, SECONDS		DECIMAL DEGREES	
	LAT (S)	LONG (E)	LAT (S)	LONG (E)
1A	28°08’42.35”	22°54’42.37”	-28.145097°	22.911769°
1C	28°09’27.69”	22°56’14.23”	-28.157692°	22.937286°
1D	28°09’46.16”	22°55’03.61”	-28.162823°	22.917670°
2A	28°08’58.80”	22°54’47.84”	-28.149666°	22.913290°
2B	28°08’50.29”	22°55’20.36”	-28.147303°	22.922323°
2C	28°09’19.11”	22°55’29.96”	-28.155310°	22.924989°
2D	28°09’27.62”	22°54’57.44”	-28.157672°	22.915956°
3AT	28°08’04.65”	22°56’31.94”	-28.134624°	22.942206°
3BT	28°07’40.21”	22°57’42.93”	-28.127835°	22.961924°
3CT	28°08’53.30”	22°58’25.59”	-28.148140°	22.973776°
3DT	28°09’17.06”	22°56’54.85”	-28.154740°	22.948571°
3ET	28°08’18.66”	22°55’51.24”	-28.138516°	22.930899°
A	28°09’00.02”	22°53’50.99”	-28.150004°	22.897497°
D	28°09’59.73”	22°54’11.70”	-28.166593°	22.903251°

Figure 2: Satellite view showing the approved prospecting right footprint of Makganyane Resources (Pty) Ltd.

Exploration of the approved PR area commenced with detailed surface mapping along the outcrops present on the Remaining Extent (RE), and Portion 1 (Remaining Extent) of the farm Makganyene No 667 in 2019. This was followed by geo-physical surveys comprising of limited ground magnetic and audio-magnetotelluric surveys covering portions of the same properties. Data collected during the above surveys served as motivation for the implementation of a first phase drilling campaign. Percussion drilling was found efficient enough to achieve the desired objectives at the site and the drilling of the first boreholes commenced in July 2019. To date drilling results and available data have defined that a more comprehensive drilling campaign is needed and that the whole PR area should be viewed as a target. The general review of the geological date showed that with a decent exploration program the potential of the PR area may be that of the adjacent Heuningkrantz farm (Kolomela Mine Extension).

The prospecting at Makganyane does not necessitate bulk sampling, and the invasive phase of the operation thus far consisted of percussion drilling of boreholes along section lines. The table below provides an indication of the prospecting phases (current and future).

Table 4: Prospecting phases of the Makganyane operation.

PHASE	ACTIVITY	SKILL(S) REQUIRED	OUTCOME
PHASE 1 - 3 Non-invasive Prospecting	• Literature Survey/Review, • Geological Field Mapping, • Ground Geophysical Survey and Ground Magnetic Survey.	Geologist Geophysicist	• Desktop reports on previous drilling, maps, etc. • Interpretation of geological structure from field mapping for targets selection. • Ground magnetic surveys. • Audio-magnetotelluric (AMT) surveys.
PHASE 4 Invasive Prospecting	• Percussion Drilling.	Geologist Drilling Contractor	• Determine the stratigraphy. • Determine the continuation of the Gamagara Formation and the lithologies it overlies underneath the over thrusted formations. • Determine the footwall of the above. • Test grades present along mineralized zones (Mn and Fe). • Determine whether Mn and Fe mineralization is present underneath the Gamagara Formation. • Test continuation of mineralized zones. • Determine whether the unconformity straddled the Rooinekke Iron Formation of the Koegas Sub-Group or the Asbesheuwels Sub-Group. • Investigate the structural behavior of rock formations.
UPON APPROVAL OF THE S102 AMENDMENT APPLICATION			
PHASE 4 Invasive Prospecting	• Exploration boreholes. • 48 RAB holes – 150 m each	Geologist Drilling Contractor	• Borehole cored data & RAB data: lithological logs, geophysical down hole surveys, assay results for mineralized intercepts.
PHASE 5 – 6 Non-Invasive Prospecting	• Compilation, interpretation and modelling of data. • Detailed ground geophysical survey on individual positively mineralized targets to define possible extent.	Geologist Geophysicist	• Modelling of data. Interpretation and 3D modelling of potential deposit. • Generation & ranking of mineralized targets for further exploration work. • Survey report detailing individual targets. Plans for drill hole intersections supported by cross sections.
PHASE 7 Invasive Prospecting	• Boreholes to confirm continuity of mineralization & potential deposit size • 120 RC holes - 200 m	Geologist Drilling Contractor	• Widely spaced borehole cored data: lithological logs, geophysical down hole surveys, assay results for mineralized intercepts, metallurgical test work.

PHASE	ACTIVITY	SKILL(S) REQUIRED	OUTCOME
			• Risk assessment study to advance to next phase.
PHASE 8 Invasive Prospecting	• Resource definition drilling • 30 DD holes - 200 m	Geologist Drilling Contractor	• Closely spaced borehole cored data: lithological logs, geophysical down hole surveys, assay results for mineralized intercepts, metallurgical test work. • Resource estimation work producing an Inferred Mineral Resource.
PHASE 9 Non-Invasive Prospecting	• Analytical desktop pre-feasibility study.	Geologist Drilling Contractor	• Geological and pre-feasibility reports, maps & plans. • Risk assessment study to determine if a full feasibility is warranted.

The drilling operation requires the use of a truck mounted percussion drill rig that drills a standard BQ (60 mm outside diameter) or NQ size (75.7 mm outside diameter) hole not exceeding 200 m in depth. The drill rig applies a rotation motion and pressure into the ground and therefore penetrate the rock formation. The rock sample is then extracted via an inner tube as core. Down hole surveys is done every 50 m in each hole, while the core is marked, logged, photographed and sampled before it is sent to a laboratory for analysis.

When applicable, Percussion Rotary Air Blast (RAB) or Reverse Circulation (RC) drilling may be carried out for pre-collaring of diamond drill boreholes or for obtaining samples if significant depth of cover is encountered over particular targets.

The footprint of each borehole site is ±100 m² that allows for the placing of the drill rig and temporary on-site core storage. A numbered precast concrete slab is used to seal the borehole until it is permanently capped during the decommissioning phase.

1.1 Access Road

The existing farm roads are used to access the prospecting footprint. To date no new access roads had to be constructed.

1.2 Equipment and Infrastructure

The only equipment used during the invasive phase of the prospecting activities is the percussion drill rig. No other infrastructure is needed or has

been established. The drilling crew resides at the Beeshoek Mine, and therefore no campsite is needed on the earmarked properties.

1.3 Water Use

The drilling operation requires ±1 000 l of water per day that is bought from the landowners. Potable water is brought to site daily by the employees.

1.4 Electricity

The prospecting activities does not require electricity.

1.5 Waste Management

Due to the nature of the project, the small scale of the activity, and the fact that no infrastructure is established or maintenance work done within the earmarked footprint, very little to no general waste is generated as a direct result of the prospecting activities. Any waste generated during the invasive phase, is contained in the site vehicles and daily removed from the site.

To date no hazardous waste has been generated by the prospecting operation, and very little (if any) generation of hazardous waste is expected. Hazardous waste 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 contaminated soil will be contained in designated hazardous waste containers to be removed daily to a hazardous waste disposal yard at Postmasburg.

1.6 Servicing and Maintenance

No workshop or service area is needed, has been, or will be established within the boundaries of the prospecting right. When needed the maintenance/service of the drill rig will be performed at the contractor's off-site workshop.

2. SECTION 102 AMENDMENT PROPOSAL (OPERATIONAL PHASE)

The approved Prospecting Work Programme (PWP) of the project notes that the invasive prospecting activities will entail the following:

"*Diamond drilling will be done to determine the potential thickness and grade of any deposits:*

- *nine holes are recommended;*
- *holes depth will be ±20 m;*
- *holes will be logged and sampled, as combined samples, done by a geologist;*
- *samples will be analysed by an accredited laboratory for its content*."

However, to date drilling results and available data have defined that a more comprehensive drilling campaign is needed. The PR Holder therefore identified the need to increase the drilling programme from nine boreholes to ±200 (48 RAB holes, 120 RC holes, and 30 DD holes). At present a grid based drilling plan of 150 x 150 m is proposed that will be refined as the targets emerge to a grid of 50 x 50 m.

It must be noted though that the different phases of the prospecting herein envisaged are, by their nature, dependent on the results obtained during the preceding phases of such prospecting. The proposals are therefore made on the basis that results obtained during the preceding phases may necessitate reasonable changes and adaptations to such proposals, which will be reported as prescribed.

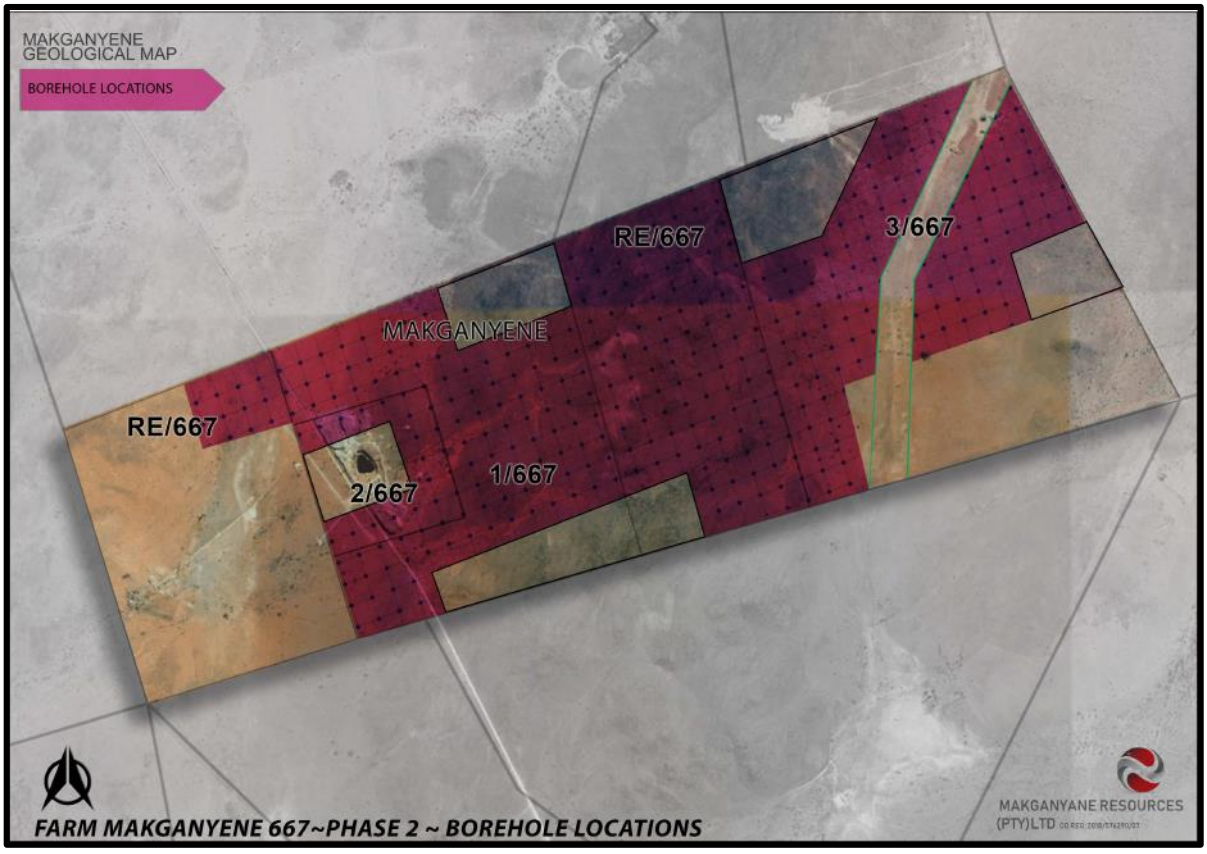


Figure 3: Proposed drilling plan.

The expanded drilling campaign will take place in the same way as prospecting has been done to date (discussed earlier). No bulk sampling will be done, no electricity will be needed and no servicing of equipment will take place on site. Should access be needed to one or more of the borehole locations that cannot be reached with existing farm roads/tracks the drill rig will drive through the veld to the earmarked area, avoiding prominent vegetation and large trees. The tracks to these areas will be below the threshold of the NEMA: EIA Regulations, 2014 (as amended) and no new roads will be constructed.

3. DECOMMISSIONING PHASE

The decommissioning phase will entail the removal of the drill rig and any foreign material from site; sealing and capping of the drill holes and landscaping any compacted surfaces (if needed). Upon closure of the prospecting right the area will return to agricultural use. Due to the nature of the activity no buildings or permanent infrastructure needs to be demolished and the access roads will remain intact to be used by the landowner.

The decommissioning activities will therefore consist of the following:

- Removal of all prospecting equipment from site;
- Sealing and capping of all the boreholes; and
- Landscaping of any/all compacted areas.

The PR Holder will comply with the minimum closure objectives as prescribed DMR and detailed below:

- Final Rehabilitation:

  Final rehabilitation of the surface area shall entail landscaping, levelling, maintenance, and clearing of invasive plant species (if applicable). All equipment, plant and other items used during the prospecting period will be removed from site (section 44 of the MPRDA, 2002). Waste material of any description will be removed from the prospecting 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 will be done (if applicable) in a sporadic manner during the life of the activity. 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 prospecting area was rehabilitated the PR Holder is required to submit a closure application to the Department of Mineral Resources 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 5: 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)(viii) The possible mitigation measures that could be applied on the level of risk – Storm water mitigation & *Management of invader plant species*.	The mitigation measures proposed for the site includes specifications of the CARA, 1983.
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 102 amendment application.	Part A1(d) Description of the scope of the proposed overall activity.	Application for a Section 102 amendment application sumitted to DMR-NC. Ref No: NC 30/5/1/1/2/2292 PR.
National Environmental Management Act,1998 (Act No. 107 of 1998) and the Environmental Impact Assessment Regulations, 2014 (as amended by GNR 326 effective 7 April 2017) • GNR 326 Section 31 Amendments to be applied for in terms of Part 2.	Part A1(d)(i) Listing and specified activities.	Application for a Part 2 amendment of the EMPR submitted to DMR-NC. Ref No: NC 30/5/1/1/2/2292 PR.

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)
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 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	The mitigation measures proposed for the site take into account the NEM:WA.
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 – *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.	The mitigation measures proposed for the site includes specifications of the NHRA, 1999.
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?	Prospecting within close proximity to the identified drainage line, may require a water use authorisation in terms of Section 39 of the NWA, 1998 for water uses as defined in section 21(c) and 21 (i). The PR Holder is in discussion with the DWS to determine the way forward.

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)
		The mitigation measures proposed for the site includes specifications of the NWA, 1998.
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

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)

The Makganyane project allows for the prospecting of manganese-, iron ore and diamonds (general) within the approved footprint. Based on the outcome of the first phase drilling campaign, the geologist reported that the property warrants an in depth investigation due to its proximity to recent iron ore deposits intersected on the farm Heuningkrantz and mining activities on Aucampsrust, where similar rock formations are present.

The nine boreholes, applied for during the initial PR application, is not sufficient to accurately determine the geological potential of the 1 549 ha footprint, and therefore the PR Holder intends submitting a S102 application to expand the drilling programme.

Further to the above, the preliminary exploration report recommended that:

- the surface outcrop mapping and the ground magnetic survey should be completed for the entire property;
- the AMT survey be completed for the entire property as there appears to be a correlation between the mineralised zones that were intersected during the drilling campaign and the AMT profiles;
- ground gravity surveys be considered as this will assist in generating potential targets for an intensive drilling programme; and
- an intensive drilling programme be implemented based on the data collected through the above mentioned methods.

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

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

- The proposed drill plan allows for proper prospecting of the approved area;
- The footprint of the drainage line that crosses through Portion 3 of Makganyene No 667 was excluded from the impact footprint to prevent damage/disturbance of the area as a result of the prospecting activities.
- No bulk sampling is proposed; thereby minimising the footprint of disturbance and the resultant impact on the receiving environment.
- No large trees (>20 cm stem) or vegetation of significance (identified by the ECO) will be removed to allow prospecting activities, as the position of the borehole can be altered when needed.
- No formal roads have to be constructed to allow for the continuation of the activity.
- Upon closure, the entire prospecting area will be returned to agricultural use without any residual impacts.

The environmental impact assessment process assessed the feasibility of the proposed alternative 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 approved EMPR of the prospecting proposal was updated to incorporate the project related mitigation measures and monitoring programmes identified during this assessment process. The preferred development option was subsequently finalized and is depicted on the attached drill plan (Appendix C).

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 Alternatives:

DMR approved the prospecting of 1 549.44 ha that extends over four portions (RE, 1, 2, and 3) of the farm Makganyene No 667 in April 2019. As the prospecting boundary was already approved site alternatives does not apply to the current prospecting operations nor the proposed expansion of the drill plan.

Project Alternatives:

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

The EMP proposed that the following prospecting equipment will be needed:

- Percussion drilling machine;
- Two Front-End-Loaders (FEL);
- 3624 Crusher with Screen;
- Excavator; and
- Two Dumper Trucks.

The EMP further proposed that there will be a total of seven sumps dug in the proposed footprint. The sumps will be dug by hand using pick and shovels to approximately 1.5 m x 1.5 m x 1 m. This entailed the removal and storage of topsoil from the seven sump areas. One sump was needed per borehole (the PWP proposed nine boreholes). A borehole site will have an approximate footprint of 1 000 m² that will allow for placing of the drill rig, sumps, small core logging tent and on-site core storage. A drill hole will have a 60 mm diameter and not exceed 250 m in depth. The holes will be drilled using a truck mounted drill rig that will spend approximately one week per drill hole. The EMP also proposed that two open pits will be made of 5-7 m deep and 3 m wide (the PWP does not make provision for bulk sampling).

Should the S102 application be rejected the invasive phase of the prospecting operation will only allow for the drilling of nine boreholes and seven sumps as discussed above. The *status quo* / no-go alternative was not deemed the preferred option as the approved prospecting footprint requires a more intensive drilling programme to determine the geological status of the area.

Project Alternative 1 (P1) (Preferred and Only Project Alternative):

Project Alternative 1 entails the prospecting of the 1 549.44 ha footprint area within the GPS coordinates as listed in Table 3 (above) through percussion drilling along a grid that allows for ±200 boreholes (refer to Figure 3 for a copy of the proposed drill plan).

Project Alternative 1 was identified during the assessment phase of the environmental impact assessment, by the PR Holder and project team, as the **preferred and only project alternative** due to the following:

- The proposed drill plan allows for proper prospecting of the approved area;
- The footprint of the drainage line that crosses through Portion 3 of Makganyene No 667 was excluded from the impact footprint to prevent damage/disturbance of the area as a result of the prospecting activities.
- No bulk sampling is proposed; thereby minimising the footprint of disturbance and the resultant impact on the receiving environment.
- No large trees (>20 cm stem) or vegetation of significance (identified by the ECO) will be removed to allow prospecting activities as the position of the borehole can be altered when needed.
- No formal roads have to be constructed to allow for the continuation of the activity.
- Upon closure, the entire prospecting area will be returned to agricultural use without any residual impacts.

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.

Prior to the approval of the prospecting right, a public participation process was conducted and I&AP's and stakeholders were telephonically contacted regarding the project. The table below lists the entities that were contacted.

Table 6: List of I&AP's and stakeholders contacted during the initial public participation process.

PREVIOUS PUBLIC PARTICIPATION		
I&AP / STAKEHOLDER	**METHOD OF CONSULTATION**	**COMMENTS**
Department of Land Affairs	Telephonic	Concerned about impact on the environment.
Mayor E Phete Tsantsabane Local Municipality	Telephonic	Concerned about impact on the environment.
Department of Water Affairs and Forestry	Telephonic	Concerned about water use.
Adv. J Bekebeke	Telephonic	Supported the application.

PREVIOUS PUBLIC PARTICIPATION		
I&AP / STAKEHOLDER	**METHOD OF CONSULTATION**	**COMMENTS**
Director General of the Northern Cape Provincial Government		
Mr JC Wessels Landowner	Telephonic	• Compensation. • Damage to fences and gates. • Access control to prevent theft. • Lack of rehabilitation.

Regulation 32(1)(a)(aa) of the NEMA: EIA Regulations, 2014 (as amended) stipulates that an applicant (for a Part 2 amendment) must submit a report reflecting the changes to the EMPR that has been subjected to a public participation process. In light of this, the relevant stakeholders and I&AP's were informed, of the S102 amendment application and proposed expansion of the drill plan, by means of a notification letter that invited comments on the DBAR and draft EMPR, on-site notices and an advertisement in the Northern Cape Express. A 30-day commenting period was allowed that ended on 02 March 2020 (see Appendix G). The following I&AP's and stakeholders were informed of the project:

Table 7: List of the I&AP's and stakeholders that were notified of the S102 amendment application to be submitted by Makganyane Resources (Pty) Ltd.

STAKEHOLDERS
• Department of Agriculture, Land Reform and Rural Development; • Department of Economic Development and Tourism; • Department of Environment and Nature Conservation; • Department of Labour; • Department of Roads and Public Works; • Department of Water and Sanitation; • Eskom; • Tsantsabane Local Municipality; • Tsantsabane Local Municipality: Ward Councillor; • ZF Mgcawu District Municipality; and • SAHRA.
LANDOWNERS, SURROUNDING LANDOWNERS & INTERESTED AND AFFECTED PARTIES
• Mr JC Wessels - Makganyene No 667/RE, 1, 2 (Landowner) • Mr JL Claassens - Makganyene No 667/3 (Landowner) • Kouwater Boerdery (Pty) Ltd - Metseatsididi No 666/RE, 2 • Mr CC Claassens - Magoloring No 669/RE • Me GHJ Claassens - Vlakfontein No 433/RE

STAKEHOLDERS		
Sishen Iron Ore Co (Pty) Ltd	-	Plaas No 432/1, 2 and Plaas No 364/0
Lynpunt Trust	-	Mapedi No 653/RE
Slabcon Trust	-	Metseatsididi No 666/1

No additional comments/objections were received on the DBAR and draft EMPR that could be incorporated into the final BAR and EMPR to be submitted to the DMR for decision-making.

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	No comment received.			
Mr JL Claassens Makganyene No 667/3	X	No comment received.			
Lawful occupier/s of the land					
N/A		N/A	N/A	N/A	
Landowners or lawful occupiers on adjacent properties	**X**	-	-	-	-
Kouwater Boerdery (Pty) Ltd Metseatsididi No 666/RE, 2	X	No comment received.			
Mr CC Claassens Magoloring No 669/RE	X	No comment received.			
Me GHJ Claassens Vlakfontein No 433/RE	X	No comment received.			
Sishen Iron Ore Co (Pty) Ltd Plaas No 432/1, 2 Plaas No 364/0	X	No comment received.			
Lynpunt Trust Mapedi No 653/RE	X	No comment received.			

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.
Slabcon Trust Metseatsididi No 666/1	X	On 30 January 2020, Dr Calitz confirmed that he is not interested in the project.			
Municipal councillor					
Tsantsabane Local Municipality: Ward Councillor	X	No comment received.			
Municipality					
Tsantsabane Local Municipality (TLM)	X	No comment received.			
Organs of state (Responsible for infrastructure that may be affected Roads Department, Eskom, Telkom, DWA e					
Department of Roads and Public Works (DRPW)	X	No comment received.			
Eskom	X	No comment received.			
Communities	No community were identified within the study area.				
Dept. Land Affairs	No comment received.				
Traditional Leaders	N/A	N/A	N/A	N/A	N/A

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.
Dept. Environmental Affairs					
Department of Environment and Nature Conservation (DENC)	X	No comment received.			
Other Competent Authorities affected					
Department of Agriculture, Land Reform and Rural Development (DALRRD)	X	No comment received.			
Department of Economic Development and Tourism (DEDT)	X	No comment received.			
Department of Water and Sanitation (DWS)	X	No comment received.			
Department of Labour (DoL)	X	No comment received.			
ZF Mgcawu District Municipality (ZFMDM)	X	No comment received.			
South African Heritage Resources Agency (SAHRA)	X	SAHRA requested (10 February 2020) that the DBAR must be loaded onto the SAHRIS website, which was done on the same day. To date no further comments were received from SAHRA.			
OTHER AFFECTED PARTIES					
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 prospecting 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.

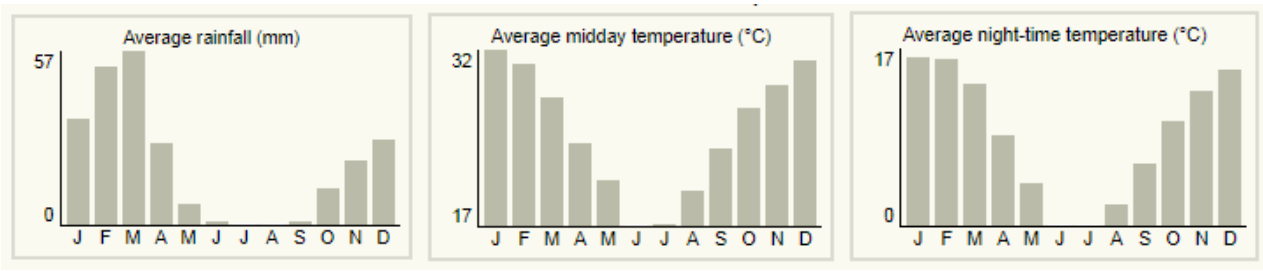


Figure 4: Statistical representation of the average rainfall, midday temperatures and night-time temperatures for the Postmasburg region (Chart obtained from saexplorer).

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

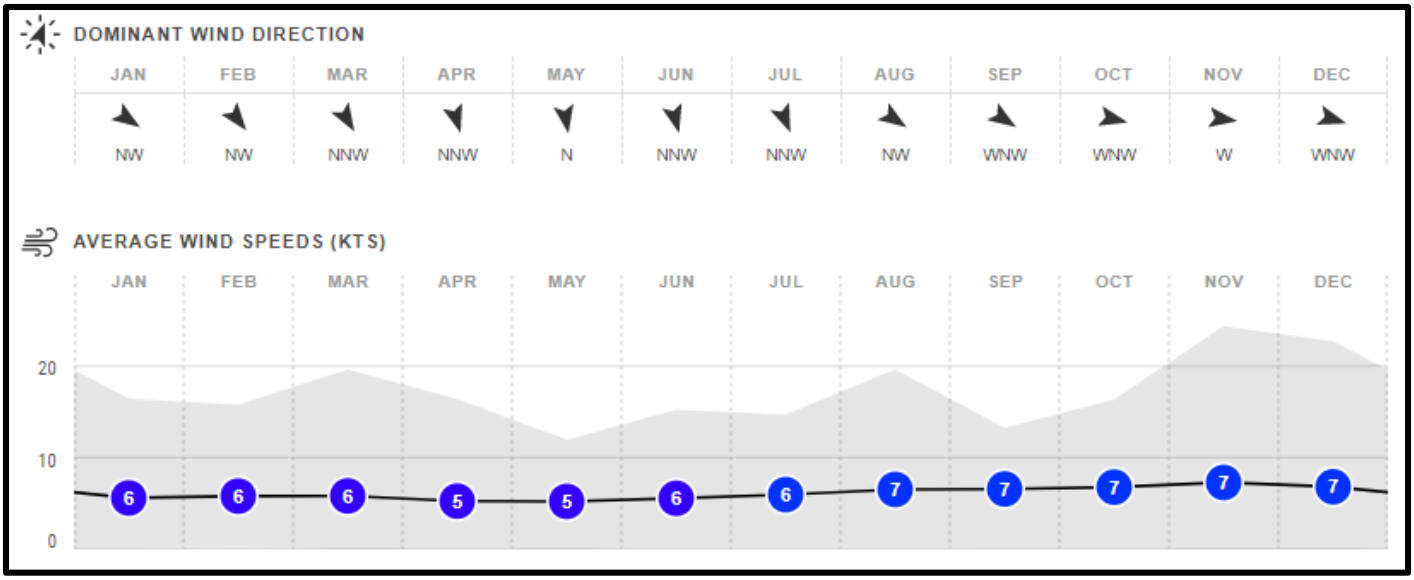


Figure 5: Image showing the dominant wind direction and average wind speed over a 12 month period for the Postmasburg area. (Image obtained from www.windfinder.com/windstatistics/postmasburg)

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.

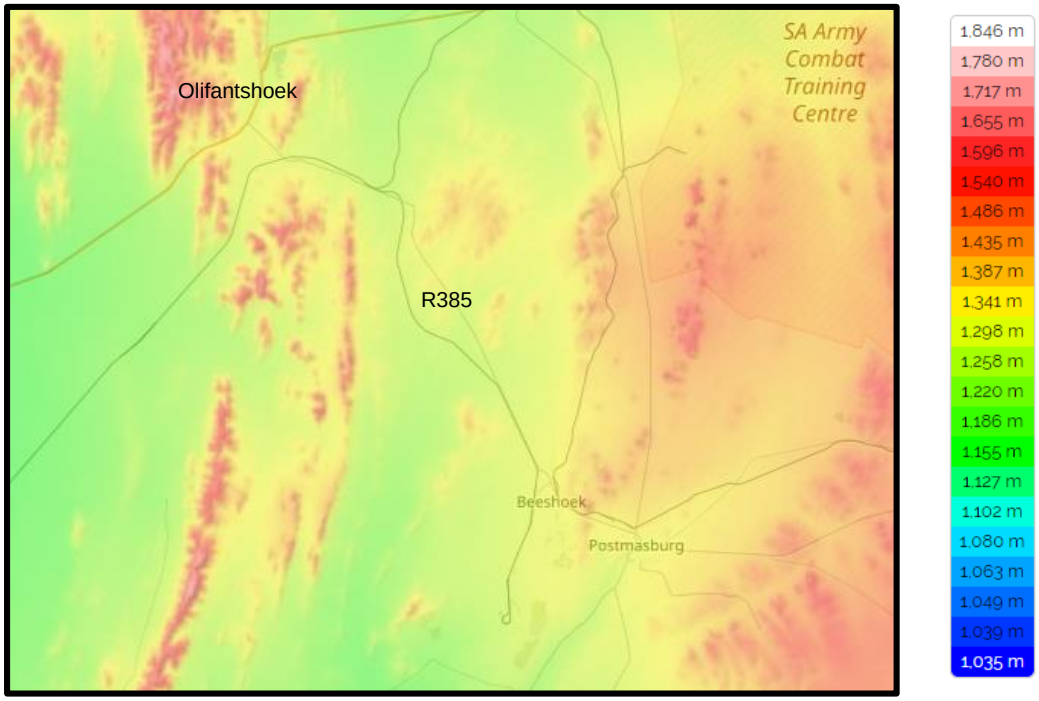


Figure 6: Map showing the topography of the greater Postmasburg – Olifantshoek area (image obtained from www.en-za.topographic-map.com/maps/7136/Postmasburg/).

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 prospecting area, include: agricultural activities (grazing) and mining (Kumba Heuningkranz). A diamond mine (Metseatsididi) operates along the northern boundary of the PR footprint, and the historic diamond mine on the Makganyene farm was never rehabilitated and remains as a landscape feature. 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.

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 related operations.

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.

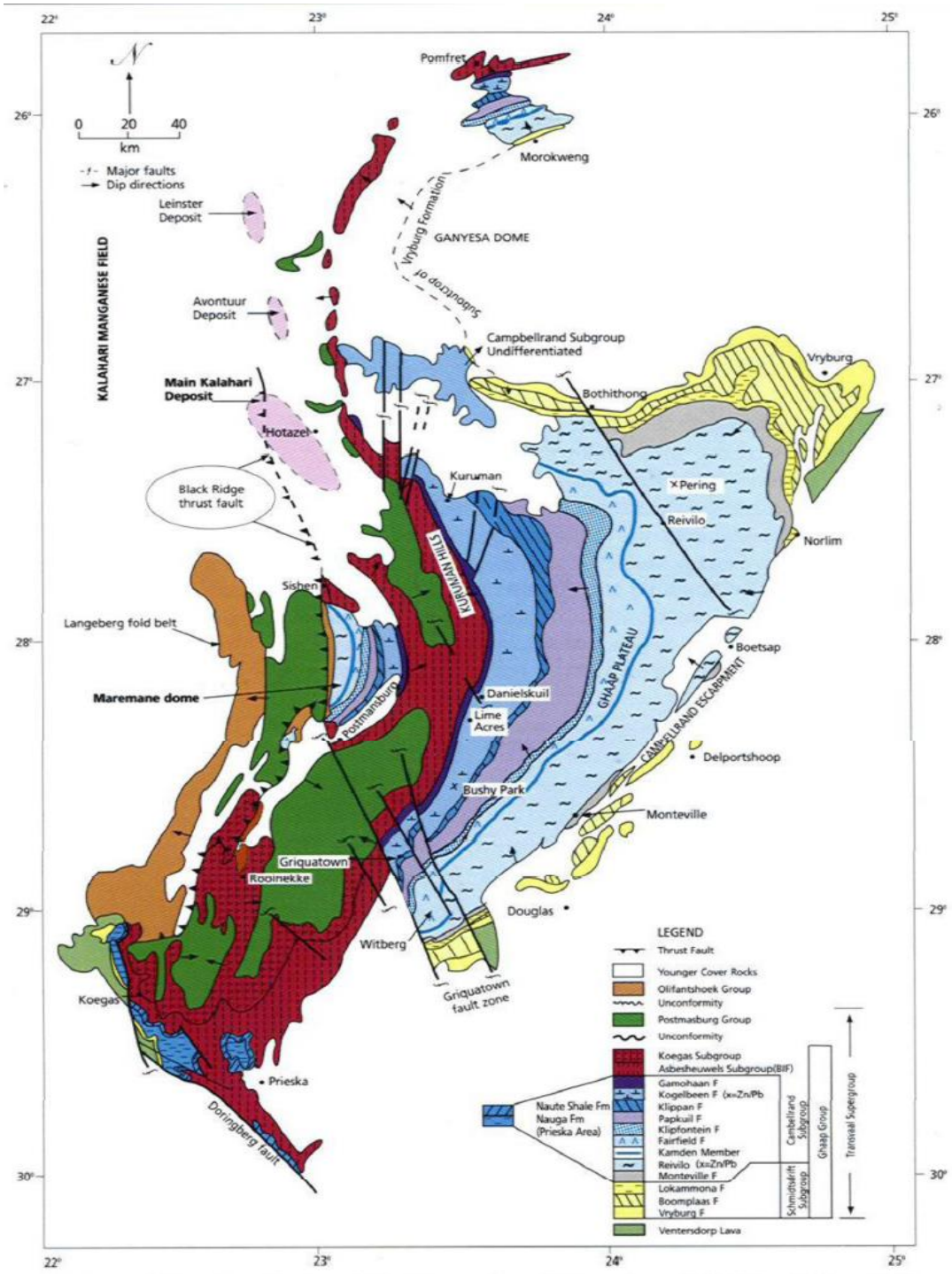


Figure 7: Geological map of Griqualand West (modified from Beukes 1986) (image obtained from Gamagara Resources (Pty) Ltd 2019).

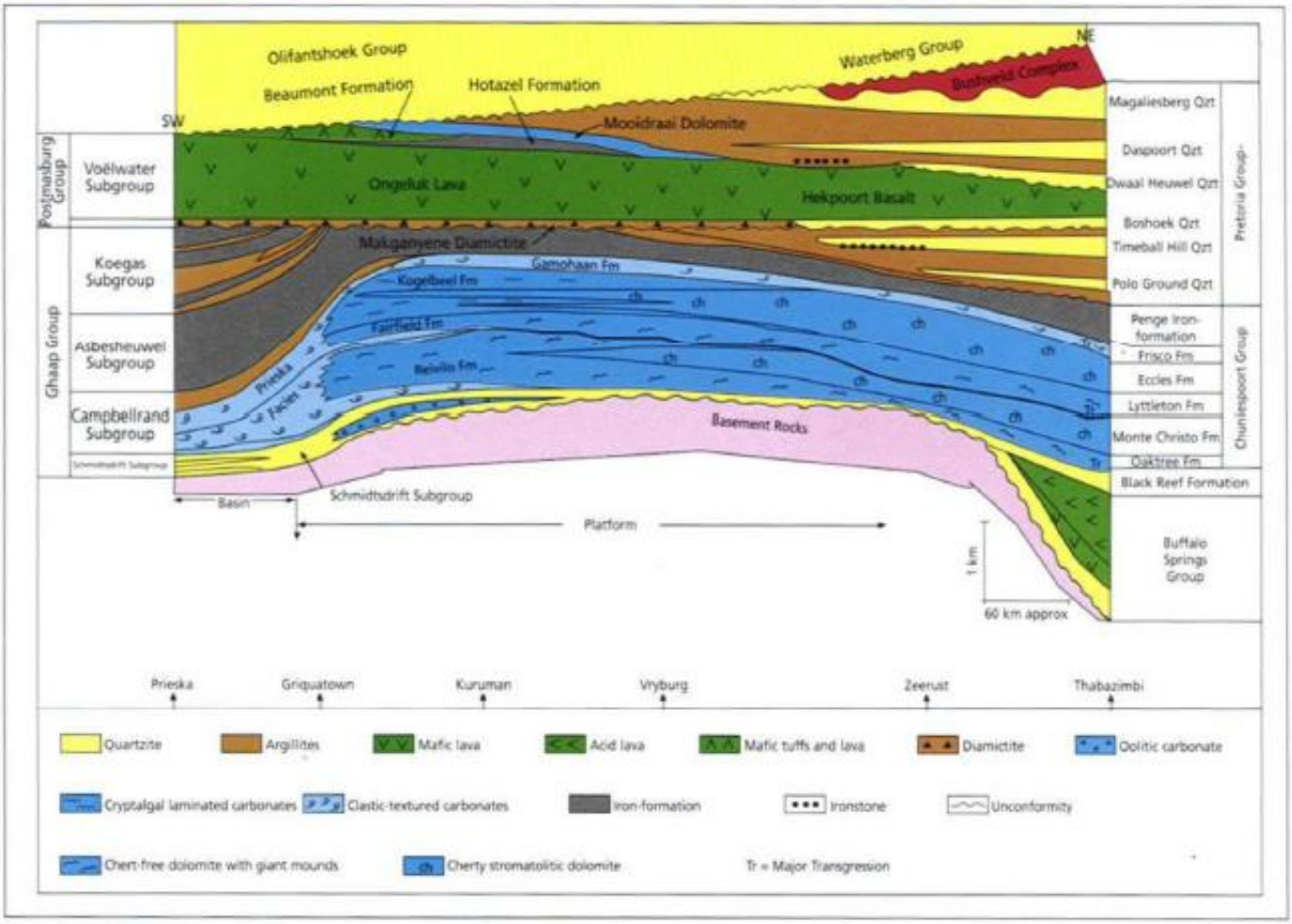


Figure 8: A southwest-northeast 600 km cross-section showing the simplified geology of the Transvaal Supergroup and the distribution of other important geological features (modified from Beukes 1983) (image obtained from Gamagara Resources (Pty) Ltd 2019).

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).

HYDROLOGY

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

The prospecting 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.*

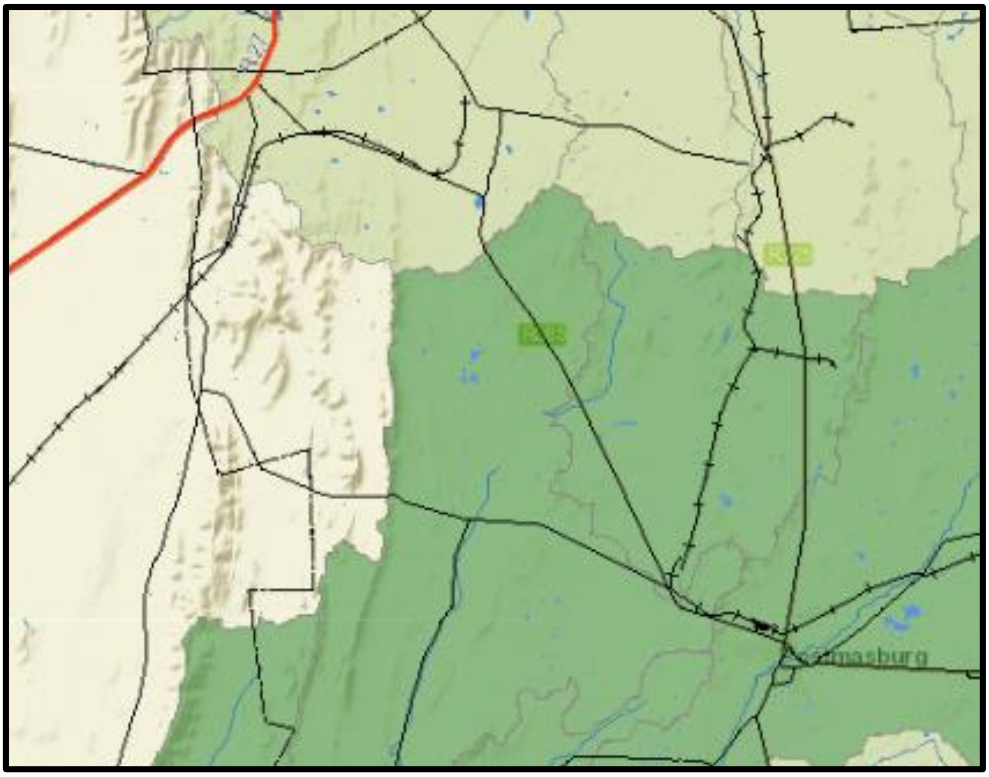


Figure 9: Map showing the position of the NFEPA (dark green polygon). The lighter green represents an Upstream FEPA. (Image obtained from the BGIS Map Viewer – National Wetlands and NFEPA)

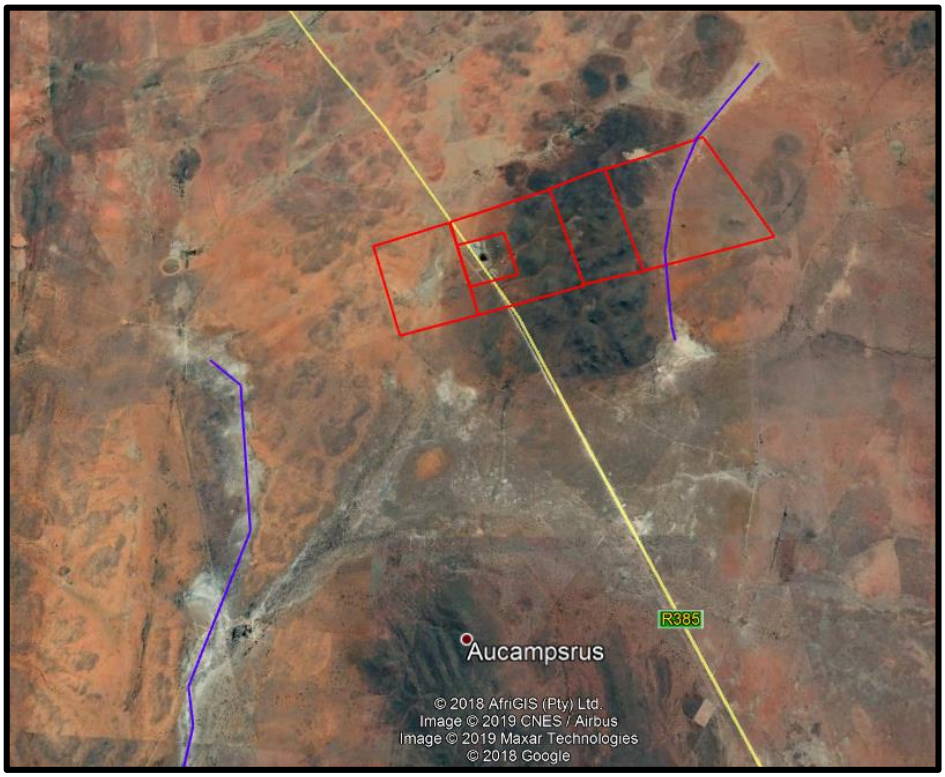


Figure 10: Satellite view of the two ephemeral drainage lines (blue lines) in the study area.

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 and prospecting 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/prospecting area, from exploration through to closure.

When the prospecting footprint is layered over the Mining and Biodiversity Map, as shown in the figure below, Portion 3 of the farm Makganyene No 667 (north-eastern section of the prospecting footprint) falls over and area of highest biodiversity importance with a corresponding rating of highest risk for mining. The Mining and Biodiversity Guideline's describes areas of highest biodiversity importance as: "*these areas are viewed as necessary to ensure protection of biodiversity, environmental sustainability, and human well-being."* The guideline notes that environmental screening, the EIA and specialists should focus on confirming the presence and significance of biodiversity features, and provide a site-specific basis on which to apply the mitigation hierarchy to inform regulatory decision-making.

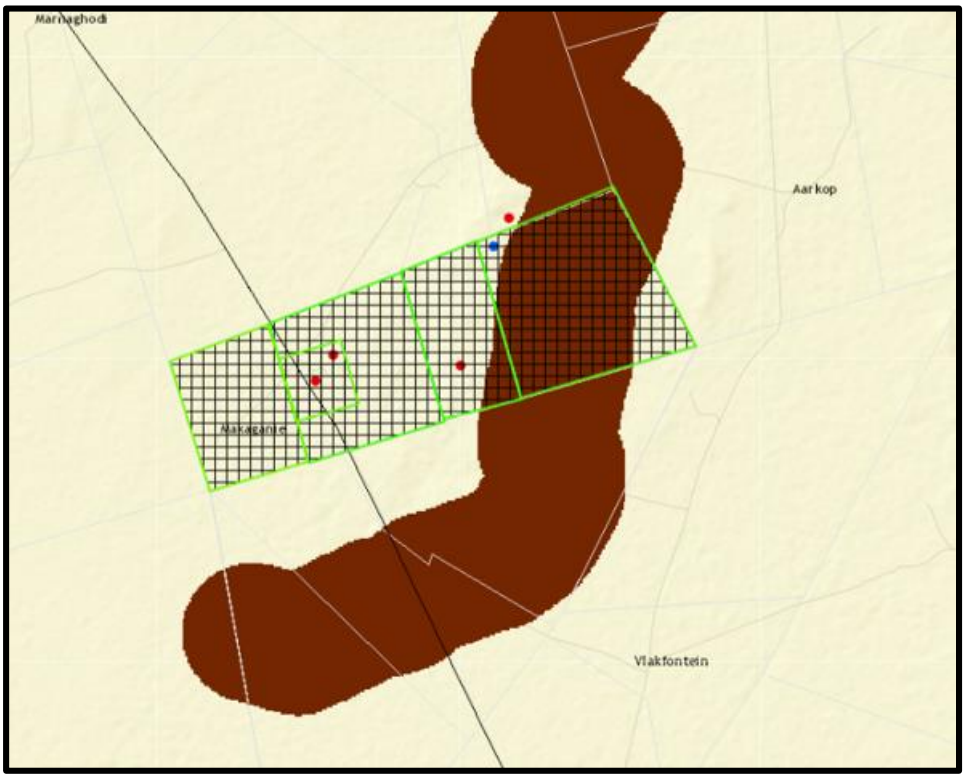


Figure 11: The Mining and Biodiversity importance map with the prospecting footprint indicated by the green polygon. The dark brown area shows an area of highest biodiversity importance with highest risk for mining (image obtained from the BGIS Map Viewer – Mining Guidelines).

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

The National Threatened Ecosystem and Indigenous Forests map as presented on the BGIS Map Viewer of SANBI does not identify biodiversity areas of concern for the study area (see figure below).

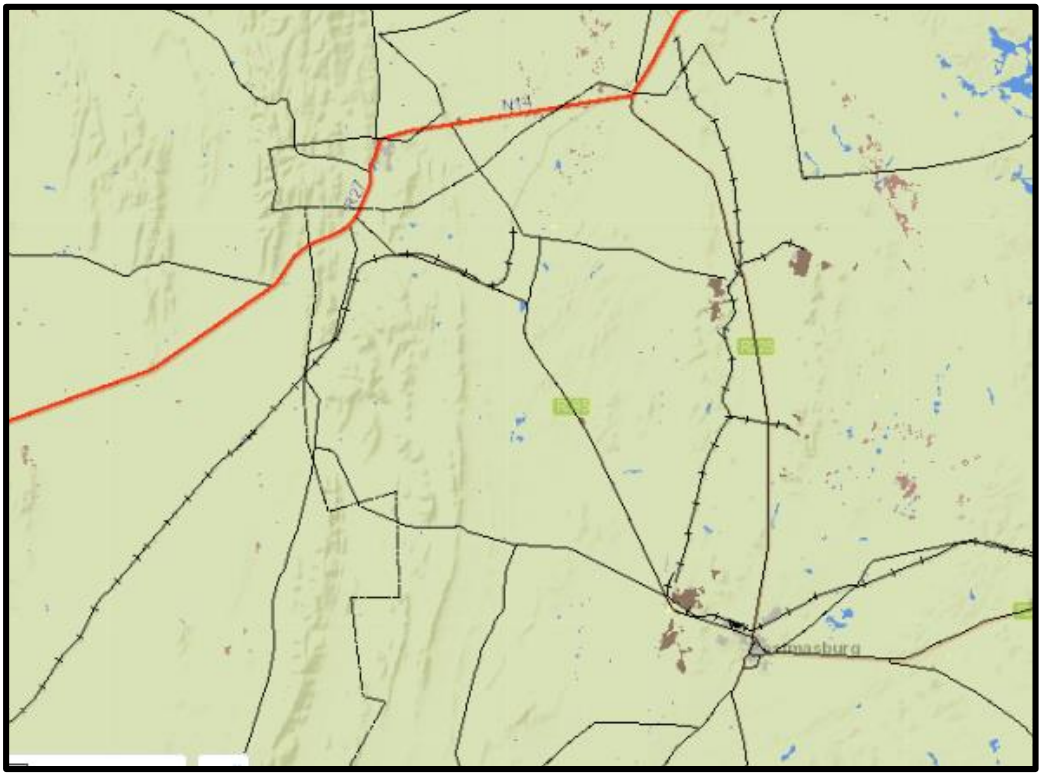


Figure 12: No areas of conservation importance has been listed on the National Threatened Ecosystem and Indigenous Forests map of SANBI. (Image obtained from BGIS Map Viewer).

However, in light of the identified area of highest biodiversity importance (discussed in the previous section that cuts through Portion 3 of the farm Makganyene No 677) it is expected that a conservation status of Critical Biodiversity Area (CBA) 1 could be assigned to the corresponding footprint. The area of conservation importance follows the footprint of the ephemeral drainage line in the north-east of the study area.

The Lexicon of Biodiversity Planning in South Africa provides the following definition for a CBA:

- Critical Biodiversity Area (CBA)*: "an area that must be maintained in a good ecological condition in order to meet biodiversity targets. CBA's collectively meet biodiversity targets for all ecosystem types as well as for species and ecological processes that depend on natural or near-natural habitat, that have not already been met in the protected area network."*

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) three vegetation types extends into the prospecting area i.e. the Kuruman Mountain Bushveld (SVk 10), the Olifantshoek Plains Thornveld (SVk 13), and the Postmasburg Thornveld (SVk 14).

Figure 13: National vegetation cover map showing the prospecting area within the Kuruman Mountain Bushveld (light sandy color), the Olifantshoek Plains Thornveld (light grey-brown color), and the Postmasburg Thornveld (darker brown-green color). (Image obtained from BGIS Map Viewer – National Vegetation Map).

1. <u>KURUMAN MOUNTAIN BUSHVELD (SVK 10)</u>

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 Ac*acia luederitzii, Boscia albitrunca* and *Searsia tenuinervis*, and with a usually sparse grass layer.

Some of the important taxa found in this vegetation type include *Acacia erioloba, A. 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: *Acacia 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.

3. POSTMASBURG THORNVELD (SVK 14)

The vegetation and landscape features of the Postmasburg Thornveld is described as flats surrounded by mountains supporting open, shrubby thornveld characterised by dense shrub layer often lacking a tree layer, the grass layer is very sparse. Shrubs are generally low with a karroid affinity.

Some of the important taxa found in this vegetation type include *Acacia erioloba, A. karroo, Searsia lancea, S. tridactyla, Ziziphus mucronata, Diospyros lycioides, Ehretia rigida, Tarchonanthus camphoratus, Grewia flava, Felicia muricata, Melolobium microphyllum, Sutera linariifolia,* Grammnoids*: Digitaria eriantha, Enneapogon scoparius, Eragrostis lehmanniana, Aristida adscensionis, A. congesta, A. diffusa.* Biogeographically Important Taxa*: Euphorbia bergii, Digitaria polyphylla.*

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.

Very little 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, the indigenous faunal action of the area is high and shows a rich diversity with various protected species still present. The following faunal species 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*)
- Namaqua Rock Mouse (*Aethomys namaquensis*)
- Slender Mongoose (*Galerella sanguinea*)
- Smith's Red Rock Hare (*Pronolagus rupestris*)
- Southern Multimamate Mouse (*Mastomys coucha*)
- Springhare (*Pedetes capensis*)
- Steenbok (*Raphicerus campestris*)
- Yellow Mongoose (*Cynictis penicillata*)

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)
- 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*)

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 Prospecting Application, Postmasburg, Northern Cape Province, 2019 – Appendix J)

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 11 known sites (Bruce, Kathu, Uitkoms, Sishen, Demaneng, Lylyveld and Mashwening); the Middle Stone Age by 5 sites (all in the vicinity of Kathu); and the Later Stone Age by 10 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).

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 prospecting area is placed on the PSM, it shows the study area to extend over an area of high (orange) to moderate (green) concern as presented in the figure below.

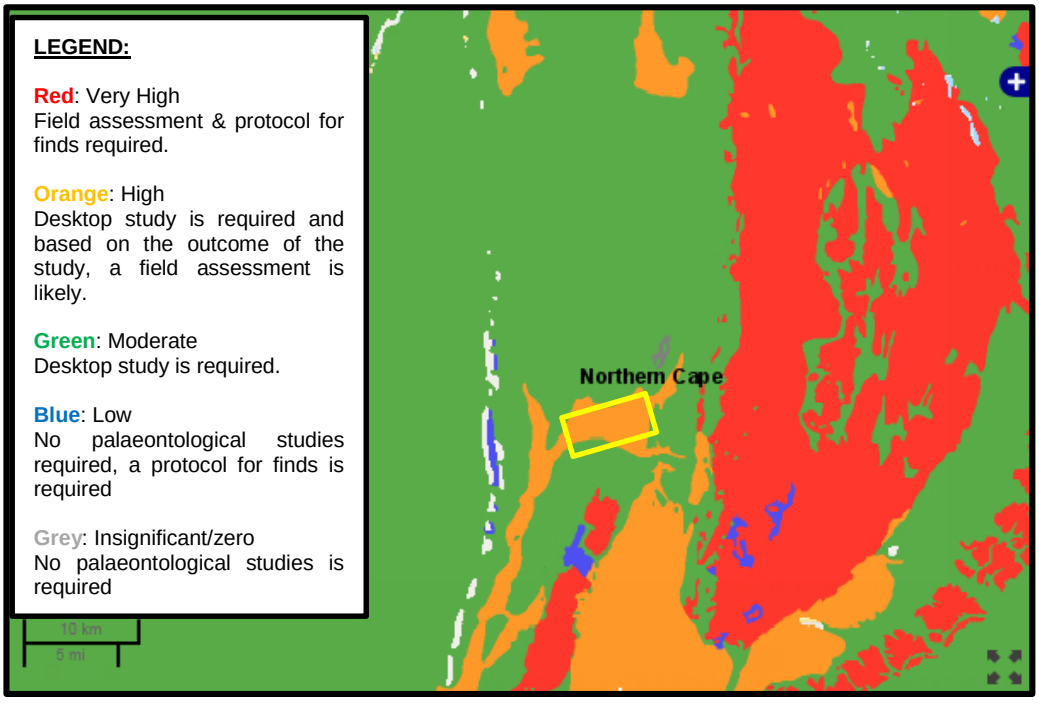


Figure 14: The SAHRA palaeontological sensitivity map shows the prospecting footprint (yellow polygon) falls in an area of high (yellow) to moderate (green) concern.

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.

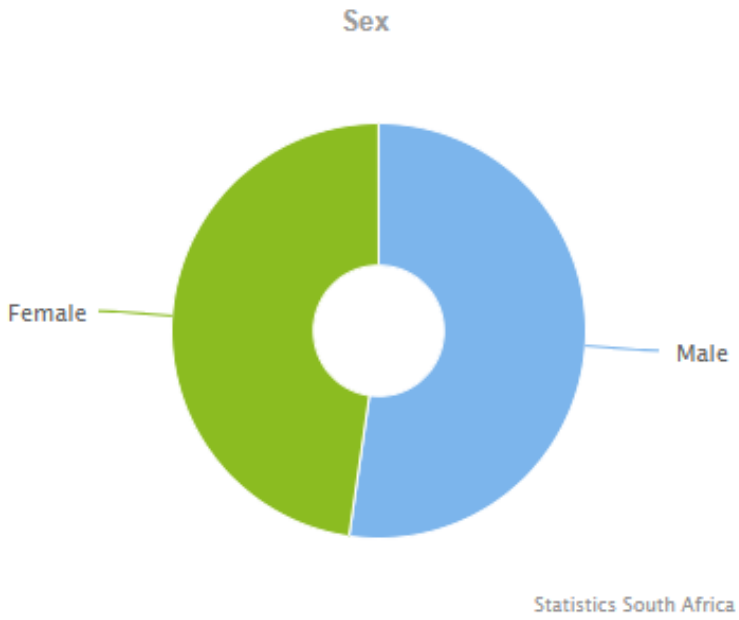


Figure 15: Gender profile (image obtained from Statistics South Africa).

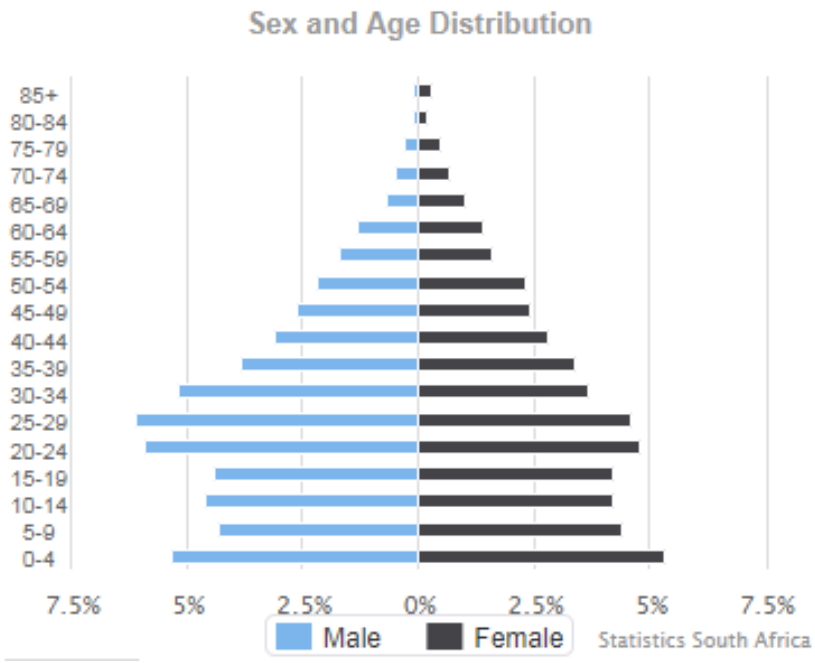


Figure 16: Gender and age distribution profile (image obtained from Statistics South Africa).

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%.

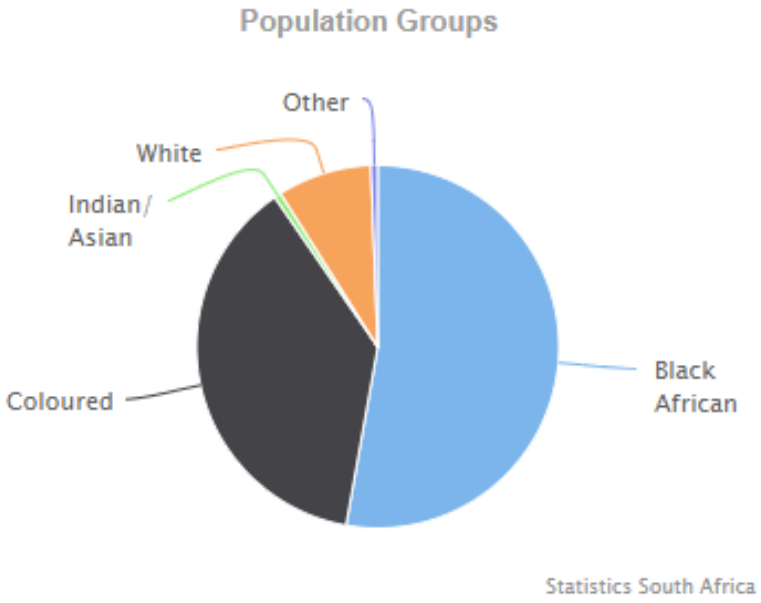


Figure 17: Population profile of the Tsantsabane municipal area (image obtained from Statistics South Africa).

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.

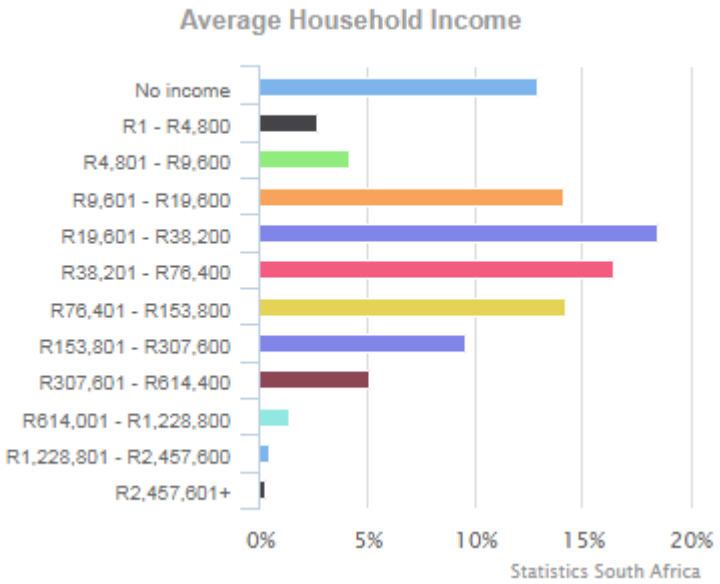


Figure 18: Average Household Income profile of the Tsantsabane municipal area (image obtained from Statistics South Africa).

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%.

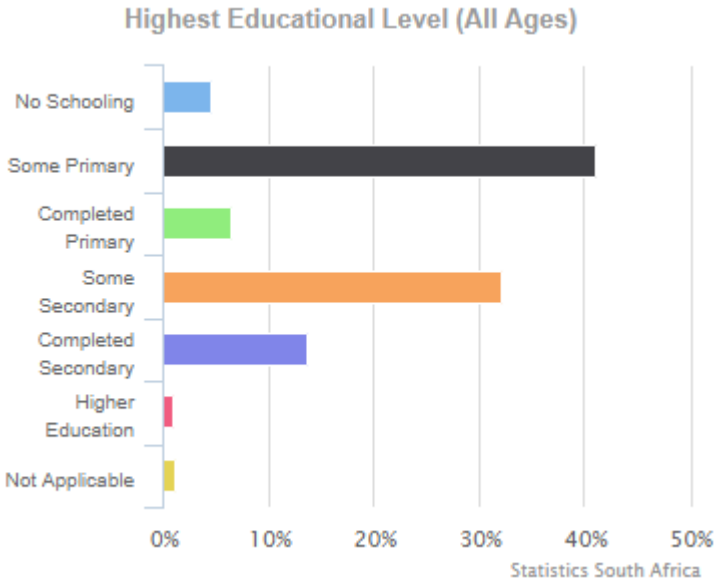


Figure 19: Average Household Income profile of the Tsantsabane municipal area (image obtained from Statistics South Africa).

(b) Description of the current land uses

The farm Makganyene No 667 is situated in a rural setting. The farm was previously mined for diamonds, and the open cast pit on Portion 2 (a portion of Portion 1) of Makganyene No 667 serves as a landmark. The R385 provincial road crosses through Portions 1 and 2 of Makganyene No 667. The land use of the property mainly comprises of livestock 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 prospecting area, include: agricultural activities (grazing) and mining (Kumba Heuningkranz). A diamond mine (Metseatsididi) operates along the northern boundary of the PR footprint. The following

table provides a description of the land uses and/or prominent features that occur within a 500 m radius of the prospecting footprint:

Table 9: Land uses and/or prominent features that occur within/within 500 m radius of prospecting 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	**YES**	-	The old diamond mine on the property was left un-rehabilitated and the spoil heaps from the mine is present to the north of the quarry pit. The DF Malan/Metseatsididi diamond mine operates along the northern boundary of Portion 3 of Makganyene No 667, while the mining right for the Anglo American Kumba Heuningkranz Mine was approved to the south of the Remainder of Makganyene No 667
Quarry, sand or borrow pit	**YES**	-	
Dam or reservoir	**YES**	-	Various farm dams occur within the prospecting footprint.
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	**YES**	-	The IOEC (Iron Ore Export Channel) railway line passes the southern corner of the prospecting footprint.
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 prospecting area forms part of an active farm.
River, stream or wetland	-	**NO**	A drainage line crosses through Portion 3 of Makganyene No 667.
Nature conservation area	-	**NO**	
Mountain, hill or ridge	**YES**	-	A range of outcrops intersects the centre part of the PR footprint. Mainly across the

LAND USE CHARACTER	YES	NO	DESCRIPTION
			Remaining Extent and Portion 1 of Makganyene No 667.
Museum	-	**NO**	
Historical building	-	**NO**	
Protected Area	-	**NO**	
Graveyard	**YES**	-	The HIA identified a stone cairn on a small hill that is possibly a pre-colonial grave. The identified feature falls outside the proposed drill plan. (Refer to Appendix J)
Archaeological site	**YES**	-	Exploration trenches measuring approximately 2 – 3 m is ±169 m from (outside) the proposed drill plan. (Refer to Appendix J)
Other land uses (describe)	-	**NO**	

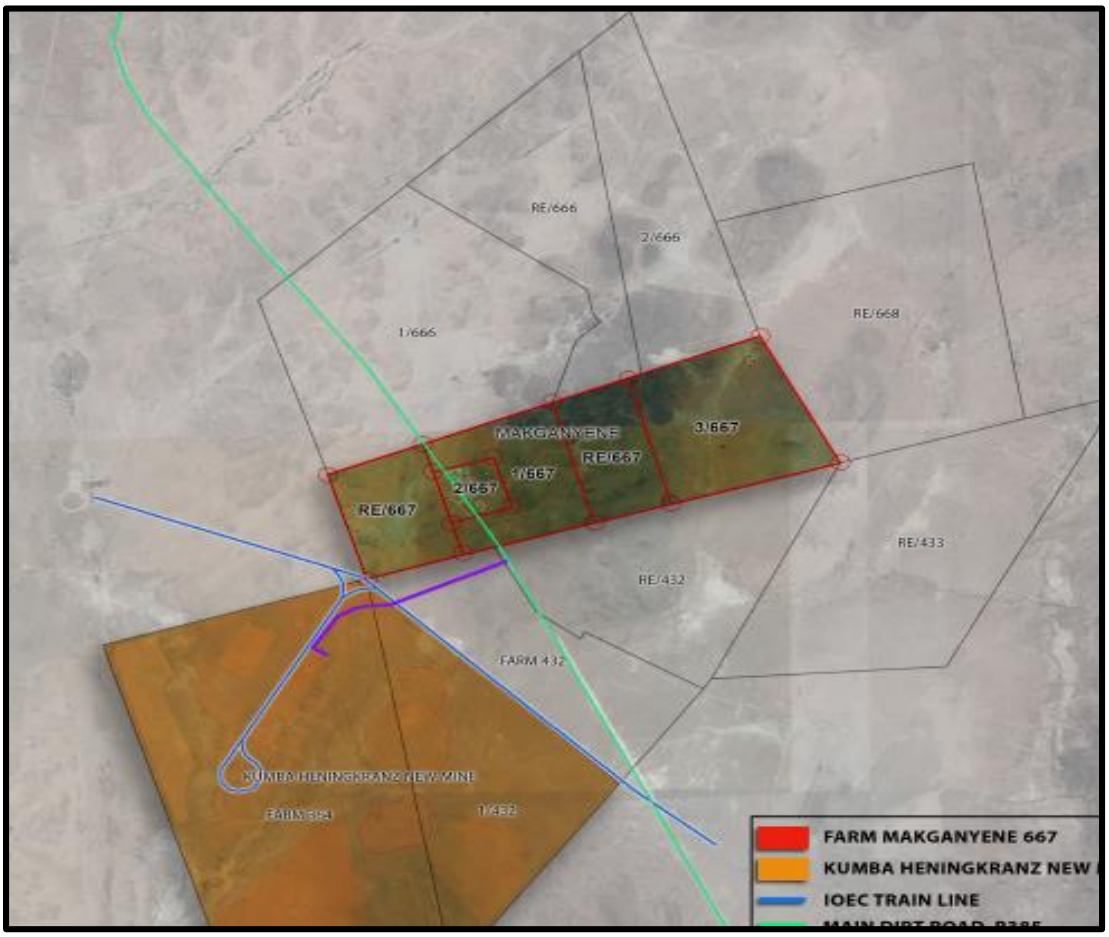


Figure 20: Map showing the position of the Heuningkranz mine in relation to the Makganyane prospecting right area.

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

SPECIFIC ENVIRONMENTAL FEATURES

SITE SPECIFIC TOPOGRAPHY

The topography of the prospecting area ranges from being flat in the south-west, gradually changing into an undulating area towards the centre where various outcrops

intersects the farm, upon which it flattens out again towards the north-eastern boundary of the PR footprint.

The mean elevation of the study area ranges from 1 262 amsl (lowest point) in the south to 1 349 amsl (highest point) at the peak of the outcrop range before dropping back to 1 298 amsl in the northern corner. The figure below shows an elevation gain of 110 m across the 7.18 km distance (southern to northern corner), a maximum slope of 8.8% with an average slope of 2.6%.

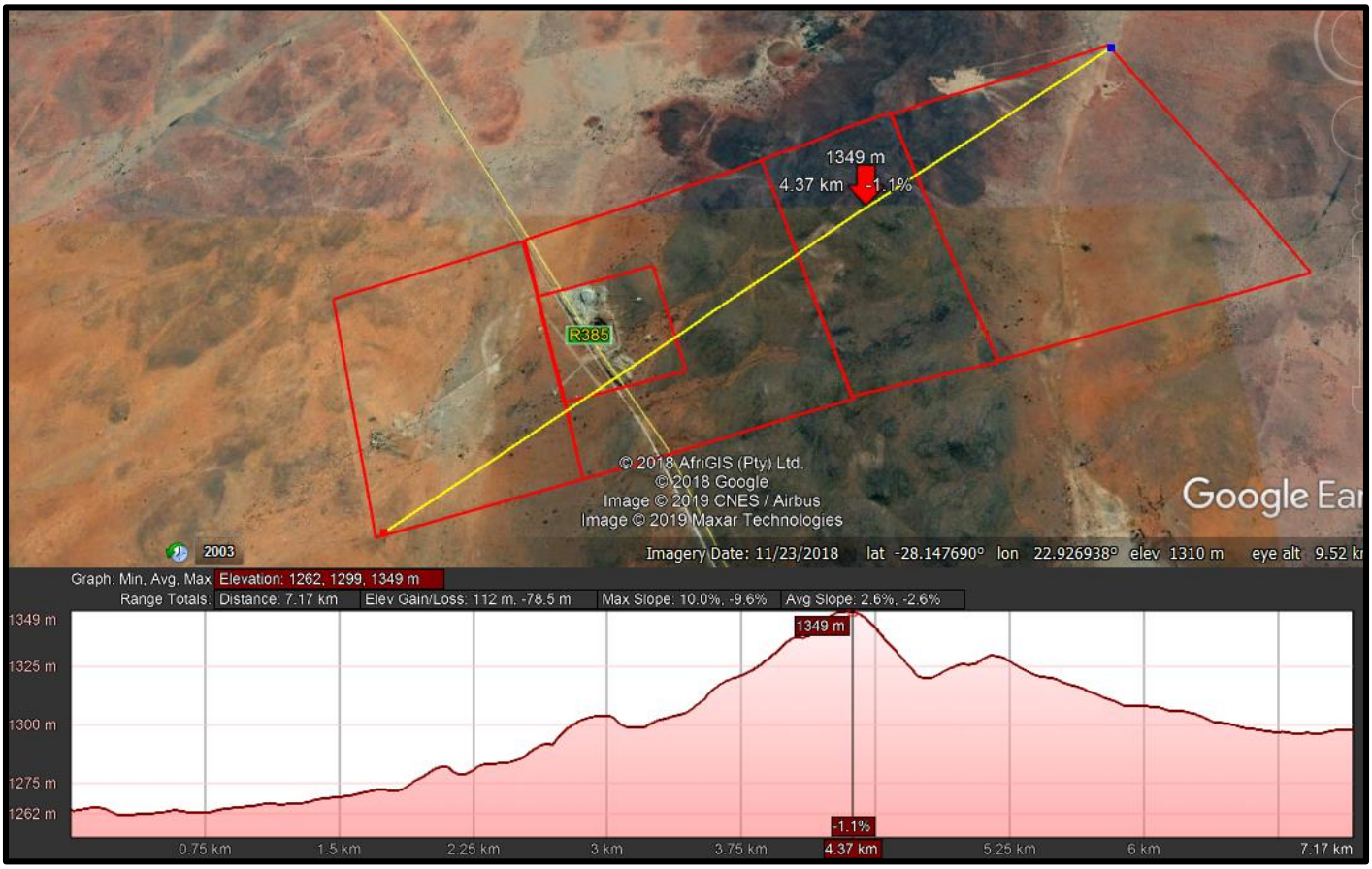


Figure 21: Elevation profile of the prospecting footprint (image obtained from Google Earth).

The prospecting activities will not impact the topography of the area, even should the drill plan be extended as proposed with the S102 amendment application. The potential for the prospecting activities to negatively impact the topography of the study area is of low significance. The activity will have no residual impact on the environment upon closure of the PR.

SITE SPECIFIC VISUAL CHARACTERISTICS

The Makganyane PR extends over 1 549 ha straddling the R385 provincial road to the east and west. As mentioned earlier, a range of outcrops extends into the farm lifting the elevation and enhancing the visual character of the site. The figures below show the viewshed analysis of the prospecting area within a ±10 km radius. The green

shaded areas shows the positions from where the prospecting area is visible. Due to the vast size of the PR footprint the viewshed analysis was drawn for the lower laying areas (western boundary), high laying areas (centre), and the western boundary.

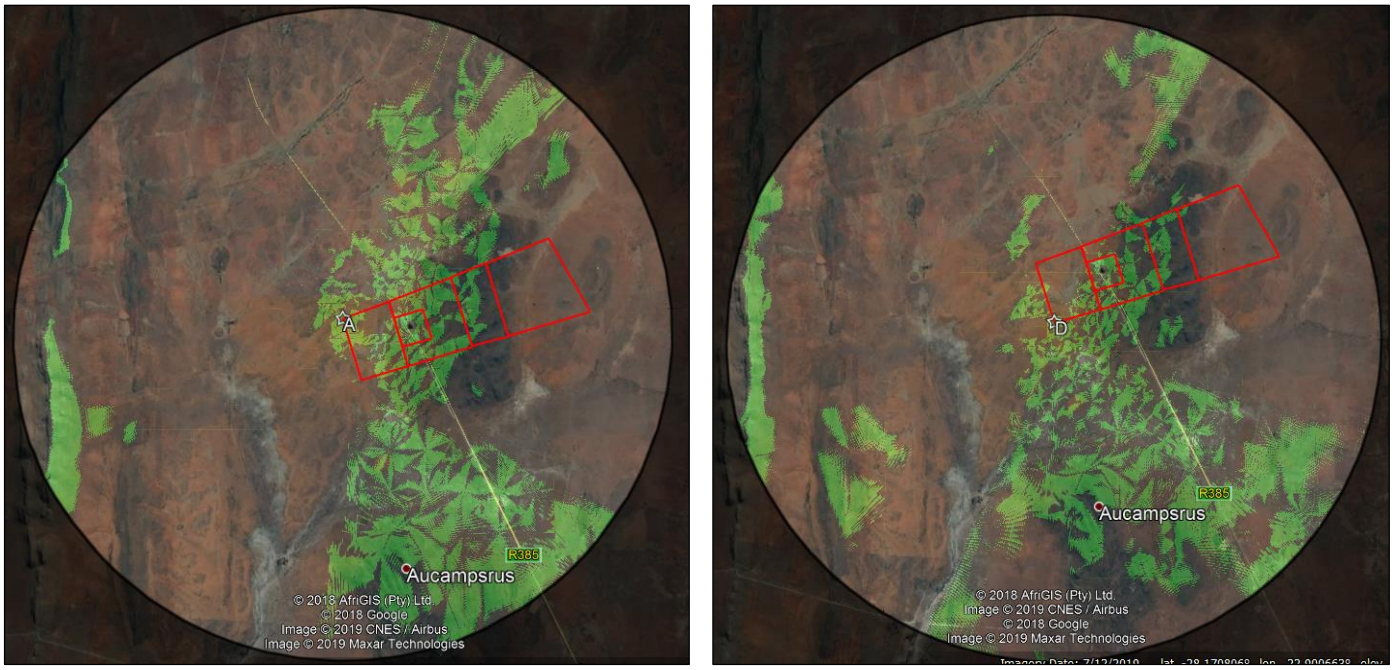


Figure 22: Viewshed of the western boundary of the prospecting area (image obtained from Google Earth).

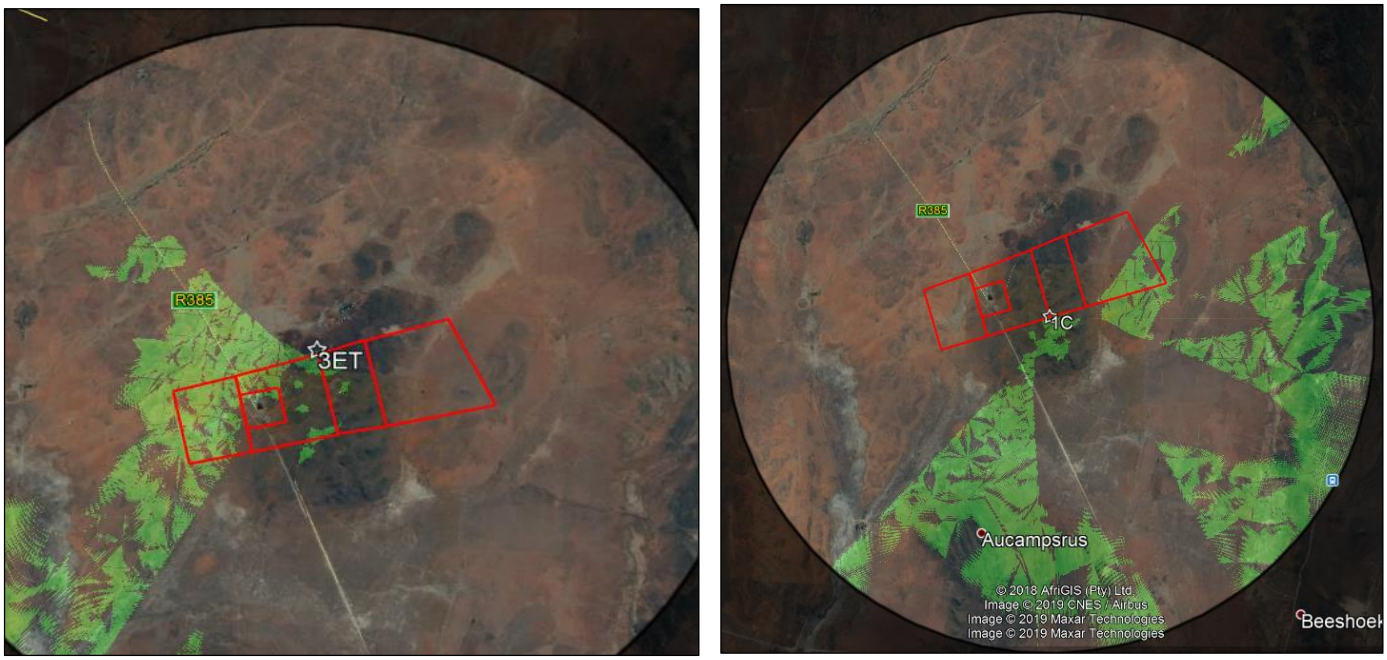


Figure 23: Viewshed of the highest area (centre) of the prospecting footprint (image obtained from Google Earth).

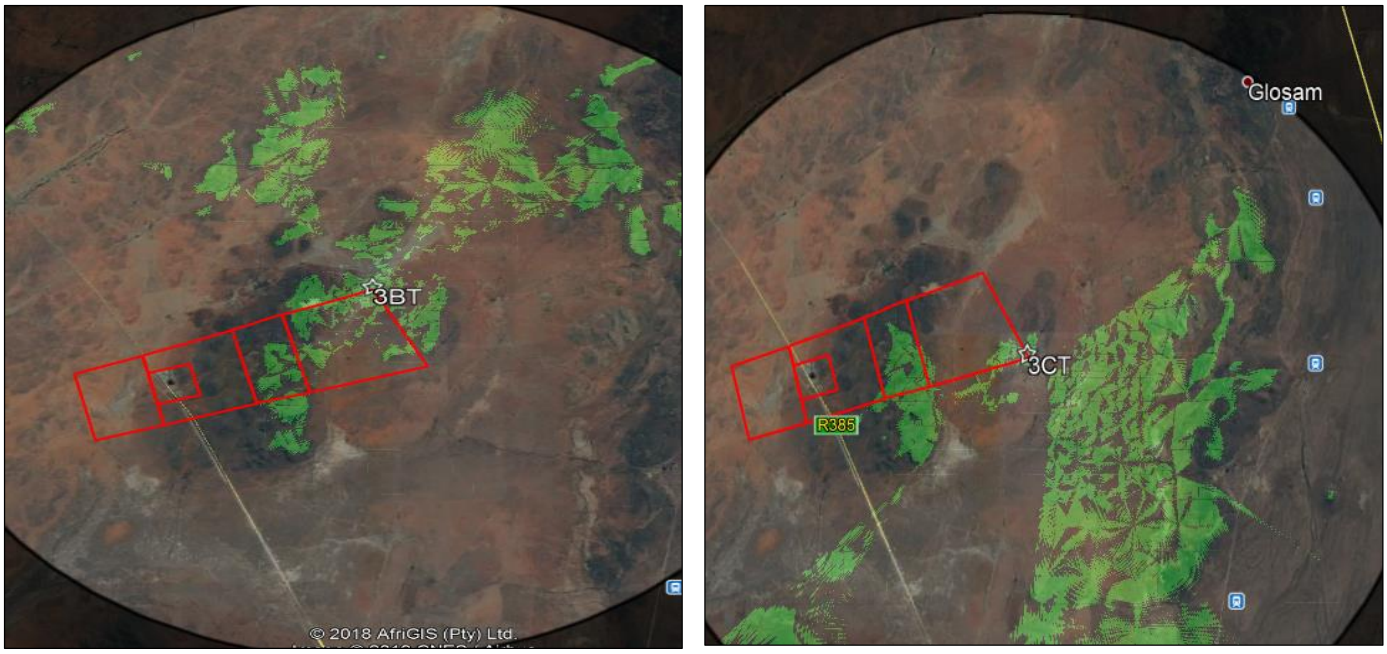


Figure 24: Viewshed of the eastern boundary of the prospecting area (image obtained from Google Earth).

The following conclusions were made from the viewshed analysis:

- **Western Boundary –** Intermittent visibility mainly from the higher laying areas to the north, and south.
- **Centre –** Low visibility from the immediate surroundings towards the west, south-west and southeast.
- **Eastern Boundary –** Intermittent visibility mainly from the south-east with low visibility from the north, north-east.

As mentioned earlier, the area of disturbance is expected to be ±100 m² per drill site, to be reinstated upon closure of the operation. The prospecting activities does not require the removal of vegetation and no permanent infrastructure will be erected. In light of this, the potential impact of the prospecting operation on the visual characteristics of the receiving environment is deemed to be of insignificance importance.

SITE SPECIFIC AIR AND NOISE QUALITY

The prospecting footprint encompasses the residence of Mr Wessels (landowner of Makganyene No 667/1,2,RE) in the west. The figure below shows the position of the nearest surrounding residences/infrastructure to the PR footprint.

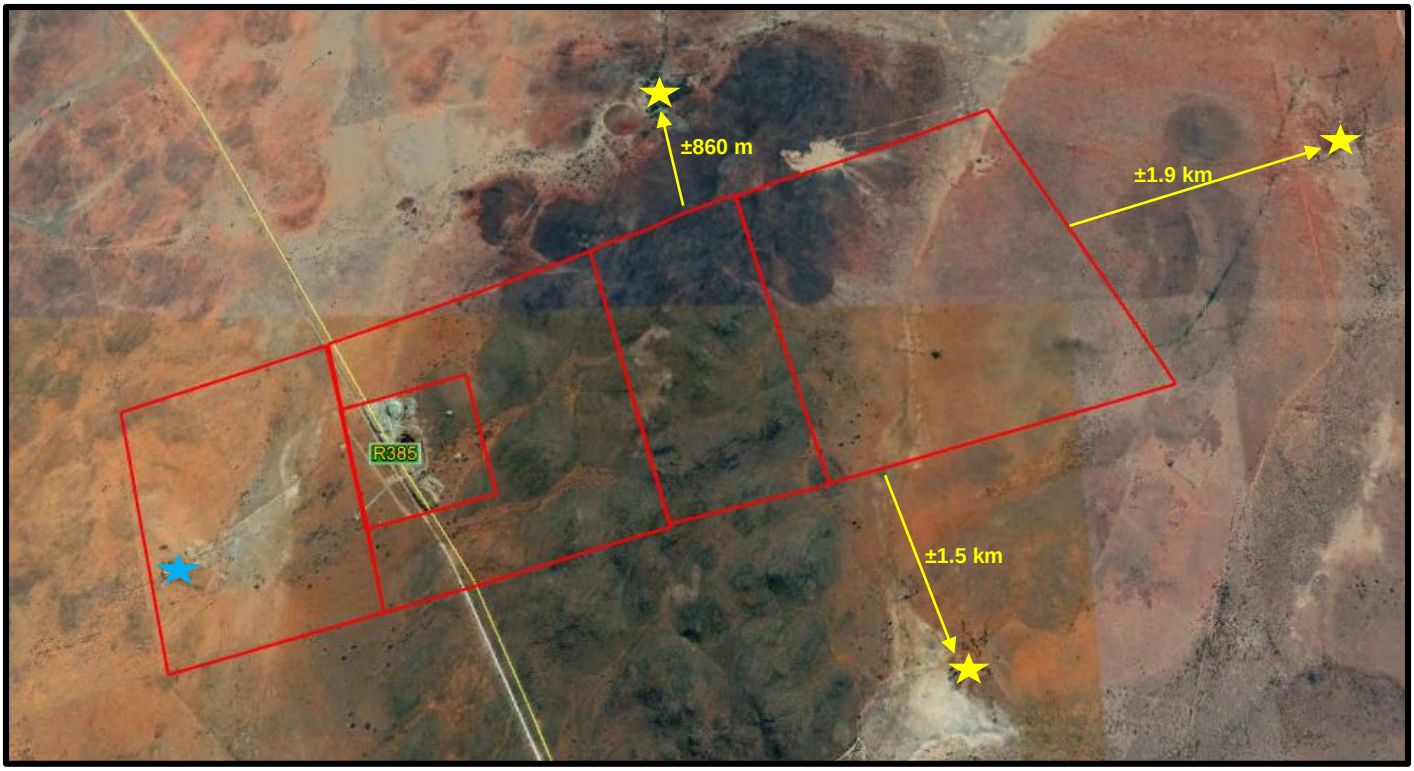


Figure 25: Satellite view showing the distance between the prospecting footprint and surrounding residences. The blue star indicates the residence of Mr Wessels (image obtained from Google Earth).

Presently, the air quality of the study area is mainly impacted on by traffic along the R385, mining 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 prospecting activity does not trigger an application in terms of the said act, as it will only contribute the emissions of one drill rig and two to three site vehicles at a time for the duration of the invasive operational phase. Should the PR Holder 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 and compatible with the current land use.

The potential impact on the noise ambiance of the receiving environment is expected to be of low significance and representative of the machinery already operating in the area. The distance of the prospecting area from residential infrastructure further lessens the potential noise impact.

SITE SPECIFIC GEOLOGY AND SOIL

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

According to the Makganyane Geological and Preliminary Exploration Report (2019), most of the surface outcrop features towards the east of the property comprises diamictites of the Makganyene Formation. Some quartzite splays cover the diamictite in places. The flat laying topography to the west comprises mostly of sand and sporadic

outcrops of the Ongeluk lava. Two almost parallel linear features with a south-southwest to north-north-east trend are present on the geological sheet, possibly representing the continuation of thrust faults. The western feature seems to connect with a thrust-fault. The report notes that the property warrants in depth investigation due to the close location to recent iron ore deposits intersected on the farm Heuningkrantz and mining activities on Aucampsrust, where similar rock formations are present. Both the Gamagara Formation and the Rooinekke Iron Formation are hosts rocks to iron and manganese mineralization. Clastic ore deposits present on Kameelhoek, Aucampsrust and Makganyene were documented by Nel, T in 1929.

Surface Outcrop Mapping

Manganese bearing jasperoied and mudstone, typical to the Rooinekke and Naragas formations of the Koegas Sub-Group, as well as banded iron formations are present in outcrop. It was suggested that slivers of the Makganyene diamictite are overlaying the Rooinekke Iron Formation of the Koegas Sub-Group in outcrop. Weathered lava fragments and poor outcrops are present towards the west. Marthaspoort quartzite, defining the top of the Gamagara Formation, is present on different localities towards the east. Iron ore and flagstone remnants are present up-dip of the Marthaspoort quartzite. Refer to Appendix E for a copy of the preliminary outcrop mapping.

As mentioned earlier, the invasive phase of the PR involves percussion drilling. The geological report lists the following objectives regarding the planned percussion drilling:

- Determine the stratigraphy;
- Determing the continuation of the Gamagara Formation and the lithologies it overlay underneat the over thrusted formations;
- Determine the footwall of the above;
- Test grades along mineralised zones if present (Mn an Fe)
- Determine whether iron and/or manganese mineralisation is present underneath the Gamagara Formation.
- Test continuation of mineralised zones.
- Determine whether the unconformity, prior to the deposition of the Gamagara Formation and thrust, straddled the Rooinekke Iron Formation of the Koegas Sub-Group or the Asbesheuwels Sub-Group.
- Investigate the structural behaviour of rock formations.

The prospecting activities does not require bulk sampling, or the excavation of trenches or pits, and therefore the impact of the operation on the geology of the study area is deemed to be of low significance, with no residual impact once the boreholes were capped.

SITE SPECIFIC HYDROLOGY

The prospecting area falls within a NFEPA of conservation importance. The FEPA status of the area indicates that it is currently in a good condition to contribute to the biodiversity goals of the country. Although the FEPA 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.

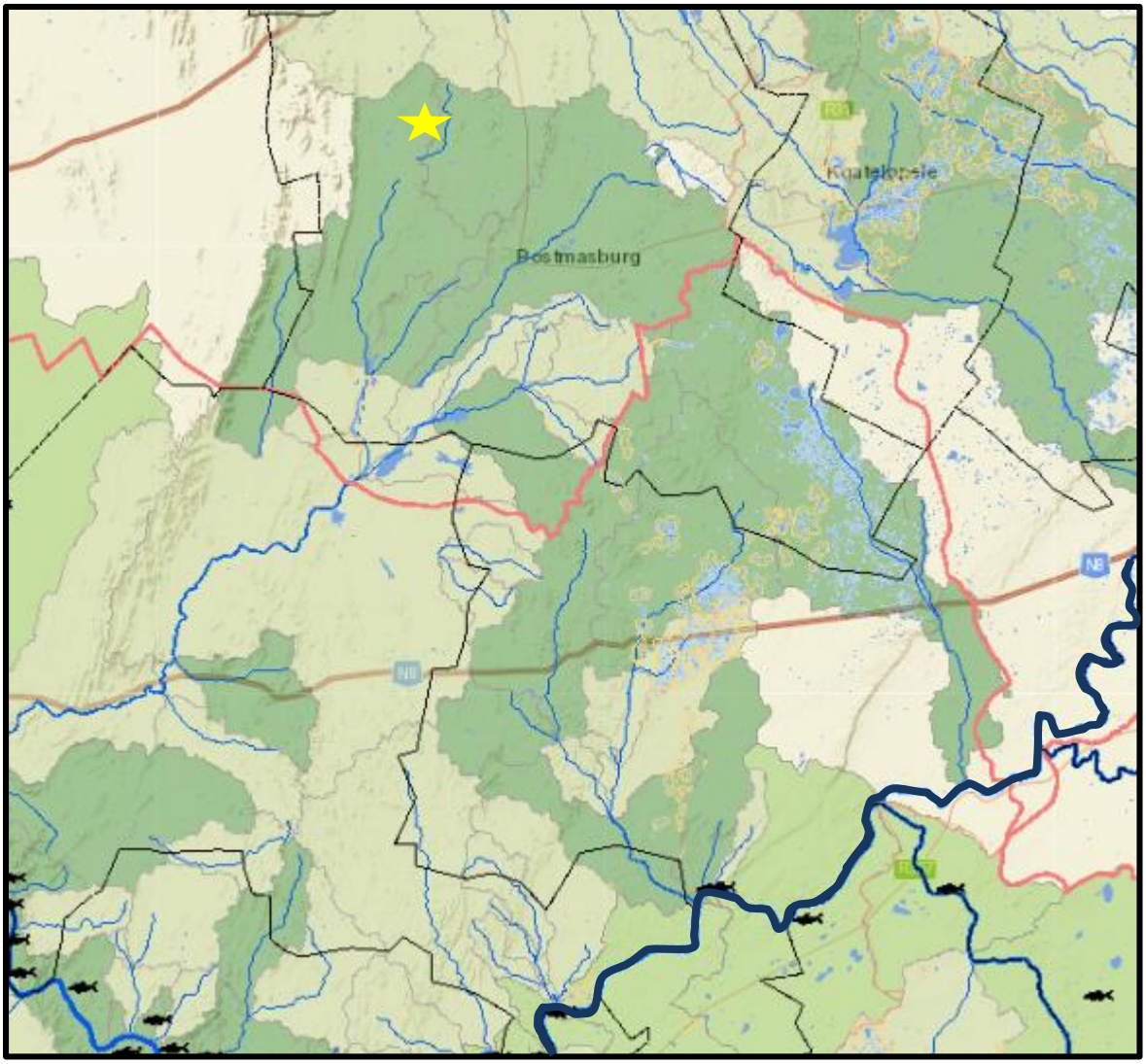


Figure 26: Map showing the sub-quaternary catchment (dark green) associated with the Orange River (dark blue line) in which the prospecting area (yellow star) falls. (Image obtained from the BGIS Map Viewer – National Wetlands and NFEPA)

Figure 27: Zoomed in map showing the position of the prospecting area in relation to the FEPA (dark green polygon). (Image obtained from the BGIS Map Viewer – National Wetlands and NFEPA)

As mentioned earlier, an ephemeral drainage line passes thorough Portion 3 of Makganyene No 667 as shown in the figure below. Prospecting within close proximity to the drainage line, may require a water use authorisation in terms of Section 39 of the NWA, 1998 for water uses as defined in section 21(c) and 21 (i). It is proposed that a 100 m no-go buffer be maintained around the drainage line to conserve its integrity. The PR Holder is in discussion with the DWS to determine the necessity for a WULA should the no-go buffer be implemented.

Figure 28: Satellite view showing the proposed buffer around the drainage line passing through the prospecting area. (Image obtained from Google Earth)

Prospecting will not affect the integrity of the FEPA if the proposed buffer area around the ephemeral drainage line is maintained; nor will it have an impact on the surface- or groundwater of the footprint area as very little process water (±1 000 l/day) is needed to allow the drilling of the boreholes.

SITE SPECIFIC MINING AND BIODIVERSITY CONSERVATION AREAS

As mentioned earlier, when the prospecting footprint is layered over the Mining and Biodiversity Map, Portion 3 of Makganyene No 667 (north-eastern section of the prospecting footprint) falls over and area of highest biodiversity importance with a corresponding rating of highest risk for mining (see Figure 11).

The position of the highest biodiversity area corresponds with the position of the ephemeral drainage line (discussed above). Should the PR Holder implement the proposed 100 m buffer around the drainage line the conservation status of the area will be adequately protected, and in light of this the impact of the prospecting operation on the identified area is deeded to be of Low significance.

SITE SPECIFIC GROUNDCOVER

Ground truthing showed that the vegetation cover of the prospecting footprint varies from natural to near natural, representing the Kuruman Mountain Bushveld (along the outcrops), Olifantshoek Plains Thornveld (majority of the footprint), and the Postmasburg Thornveld (intermittently dispersed through the footprint). Disturbance to the natural vegetation cover mainly occurred on Portion 2 of Makganyene No 667 where the historic quarry pit was established, and the RE of Makganyene No 667 where the farm yard (with associated infrastructure) and some lands, for commercial crop planting, were established. Apart from these areas, the vegetation cover of the PR footprint is classified as natural.

Figure 29: Photographs of the vegetation cover on the Remainder of Makganyene No 667.

Figure 30: Photographs of the groundcover of Portion 2 of Makganyene No 667.

The prospecting activities does not require the removal of any large trees or vegetation of significance. Due to the small footprint of a borehole, the drill position can be manipulated to drill between the trees. In light of this, the impact of the prospecting operation on the vegetation cover of the receiving environment is deemed to be of Low significance.

At the time of the inspection, invasive plant species such as Mesquite (*Prosopis glandulosa*), Seringa (*Melia azedarach*), and Wild Tobacco (*Nicotiana glauca*) were noted that established due to the disturbance of the natural groundcover. Should any of these species germinate within areas that were prospected, the PR Holder will be responsible to clear the problem plants from the site.

SITE SPECIFIC FAUNA

The terrestrial site specific fauna of the study area represents the fauna of the surrounding environment. The fauna within the PR footprint will not be impacted by the prospecting activities 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 Prospecting Application, Postmasburg, Northern Cape Province, 2019 – Appendix J)

HCAC – Heritage Consultants (HCAC) was appointed to conduct a high-level heritage scan and Impact Assessment of the Makganyane drill plan area.

The HIA (Heritage Impact Assessment) notes that the general area consists of two kinds of topographical elements: undulating plains characterised by thick sand cover and a range of hills roughly splitting the area in two. Archaeological visibility is the lowest on the plains that are mantled with Aeolian sand and characterised by grass veld.

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. This is largely related to small stock but has not left much trace. Some mining activities also took place between 1967 and 1982 with a single farmstead located in the western portion of the study area. Human impact is limited to isolated farming infrastructure like farm fences, tracks, wind pumps and dams relating to the cultural landscape that consist of extensive farming and mining activities. The cultural landscape (mining and farming activities) is generally modern without significant cultural landscape elements of concern and impacts are deemed to be of low significance.

The local geology is not conducive to the forming of shelters on the ridges in contrast to areas where small shelters have been noted with lithic scatters to the north-west and to the east on the farms Heuningkrans, Langverwacht and Mookaneng (Kusel 2013 and vd Walt 2019). No rock art, historical farm steads or colonial-era stone-walling (dwellings or kraals) were recorded.

During the survey ten find spots consisting of isolated stone tools were recorded. These find spots are out of context and of no significance. The survey also recorded four features consisting of two cemeteries, a stone cairn that could possibly mark a pre-colonial burial and one feature relating to previous exploration. All four features are located outside of the proposed drilling plan area and will not be impacted on.

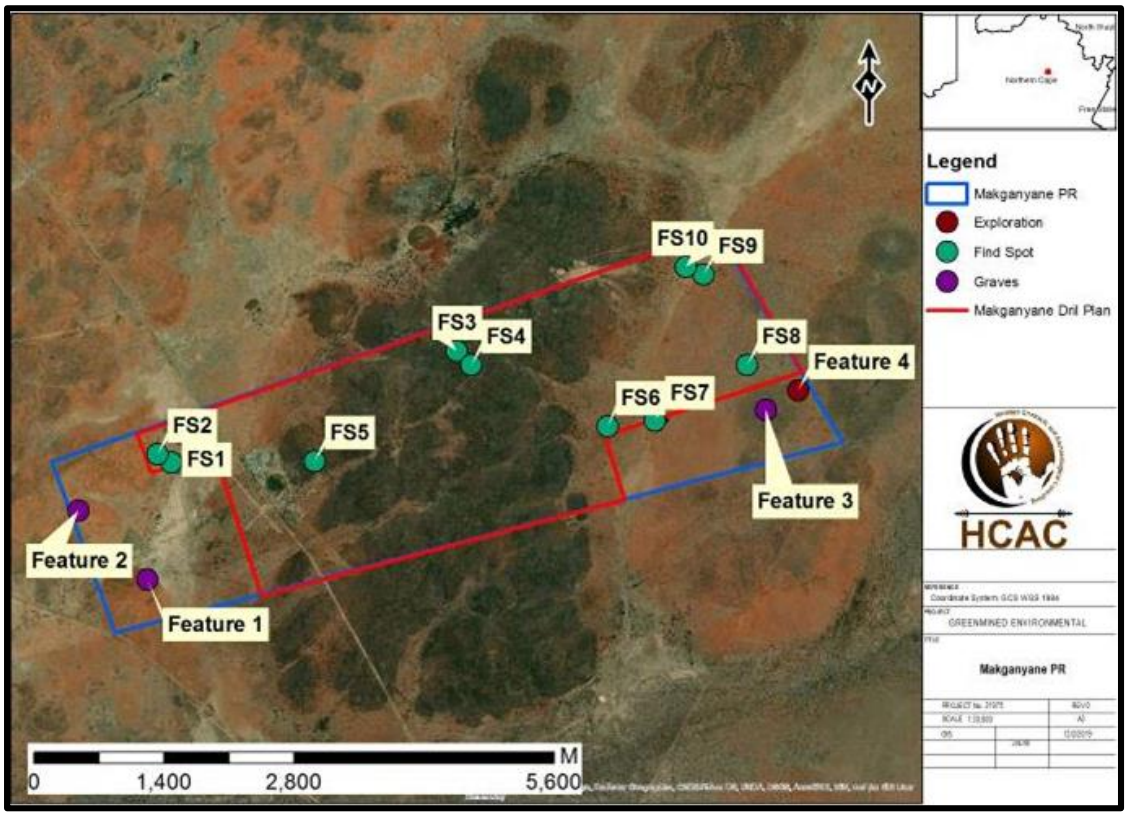


Figure 31: Position of heritage features recorded during the survey.

In terms of the paleontological component, an independent study was conducted by Prof Marion Bamford (2019) the study concluded that the proposed site lies on some ancient non-fossiliferous rocks and mostly on windblown sands and sand dunes of the Quaternary Kalahari Group sands. It is very unlikely that these sands preserve in situ fossils because the sands have been transported and there are no pans or springs in the area. Fossils have been recovered from similar sediments in other parts of the country so a Fossil Chance Find Protocol was added to the EMPR. Based on this information Prof Bamford is of the opinion that no palaeontological site visit is required unless fossils are discovered once prospecting commence. It was also noted that the Makganyane Formation diamictites do not contain fossils although they are indicated as such by the SAHRIS palaeosensitivity map.

Based on the results of the field work and previous studies conducted in the area cultural layering dating back to the Stone Age with scatters and sites dating to the ESA, MSA and LSA are on record for the larger area. The known distribution of finds in the study area in relation to site distribution associated with landscape features was used as the main criteria for generating a three-tier sensitivity map of the study area as presented below.

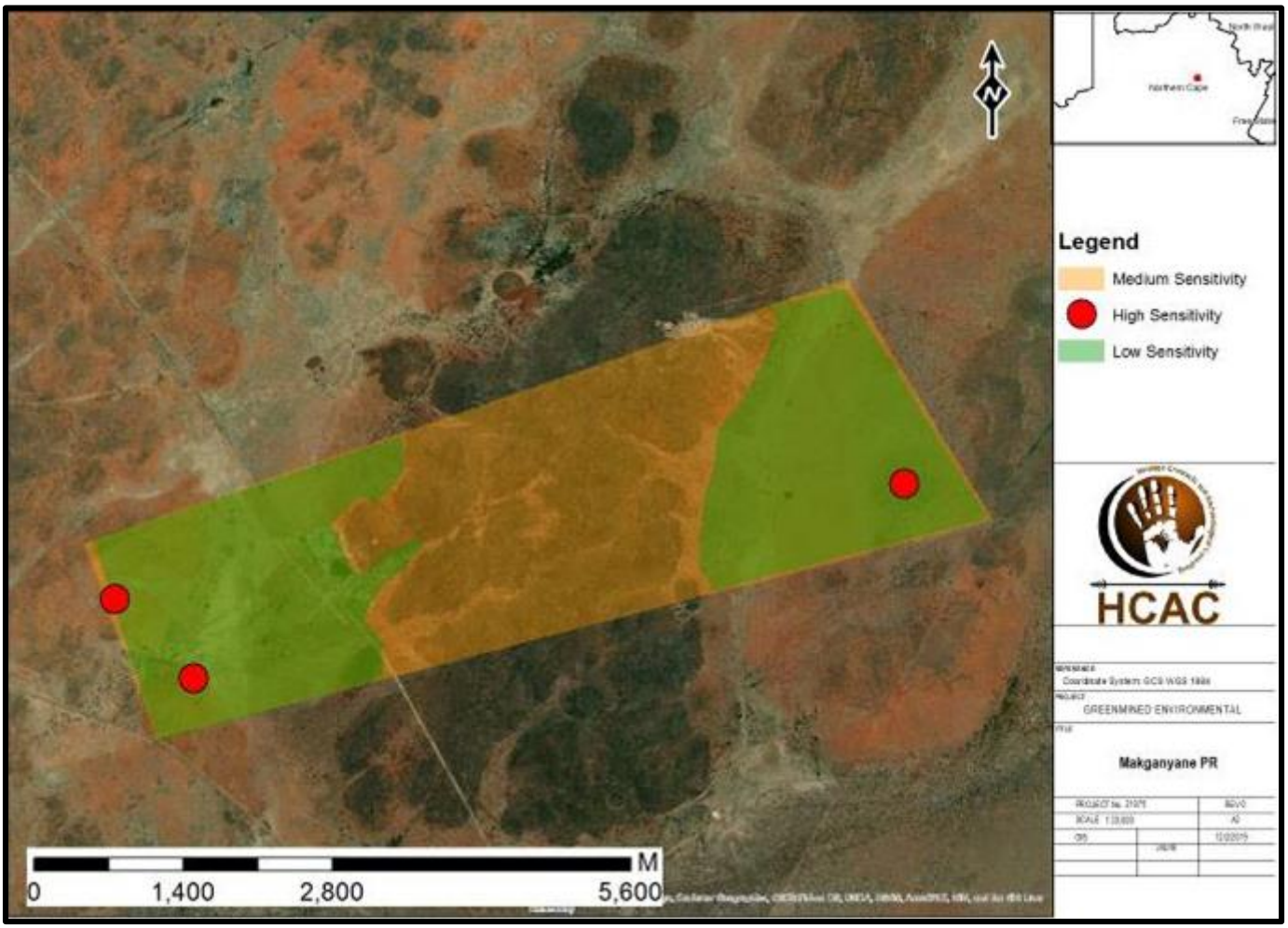


Figure 32: Heritage sensitivity map.

The HIA notes that the chances of impacting unknown archaeological sites of significance in the study area is considered to be low. The impact footprint of percussion drilling for exploration is very small. Any direct impacts that did occur would be during the drilling phase only and expected to be of low significance, none of the recorded heritage features are located within the area marked for the drilling plan. Due to the fact that the area is generally speaking of low heritage significance the cumulative impacts are low.

The HIA concludes that the impact of the proposed drilling on heritage resources will not have a significant impact on the heritage resources of the Northern Cape, 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)(h)(viii) The possible mitigation measures*) is implemented.

SITE SPECIFIC INFRASTRUCTURE

The farm yard of the landowner was established on the RE of Makganyene No 667. No prospecting activities are planned for any of the developed areas on the farm (refer to Figure 3). The abandoned infrastructure along the historic quarry pit on Portion 2 of Makganyene No 667 will remain intact, and will not be disturbed by the prospecting programme. Other infrastructure within the PR footprint comprises of power lines, farm roads, fences and water reservoirs. None of these structures will be impacted by the prospecting activities.

(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/CONSTRUCTION PHASE

Phase 1 of the invasive prospecting operations already commenced in July 2019, and as no site camp will be established no activities or impacts associated with this phase were identified.

OPERATIONAL PHASE

Visual intrusion due to prospecting operation

Severity	Duration	Extent	Consequence	Probability	Frequency	Likelihood	**Significance**
Rating: Low					**Degree of Mitigation: No mitigation**		
1	3	1	1.6	1	4	2.5	**4**

Dust nuisance due to prospecting activities

Severity	Duration	Extent	Consequence	Probability	Frequency	Likelihood	**Significance**
Rating: Low-Medium					**Degree of Mitigation: Full**		
2	4	2	2.7	3	3	3	**8.1**

Noise nuisance due to prospecting activities

Severity	Duration	Extent	Consequence	Probability	Frequency	Likelihood	**Significance**
Rating: Low-Medium					**Degree of Mitigation: Partial**		
2	4	2	2.7	1	5	3	**8.1**

Soil contamination associated with littering and hydrocarbon spills

Severity	Duration	Extent	Consequence	Probability	Frequency	Likelihood	**Significance**
Rating: Low-Medium					**Degree of Mitigation: Full**		
3	4	2	3	3	3	3	**9**

Potential negative impact on the FEPA, area of biodiversity concern and/or drainage line

Severity	Duration	Extent	Consequence	Probability	Frequency	Likelihood	**Significance**
Rating: Low-Medium					**Degree of Mitigation: Full**		
4	4	5	4.3	2	1	1.5	**6.5**

Negative impact on the natural vegetation of the footprint

Severity	Duration	Extent	Consequence	Probability	Frequency	Likelihood	**Significance**
Rating: Low-Medium					**Degree of Mitigation: Full**		
3	4	1	2.6	3	2	2.5	**6.5**

Infestation of the prospecting area with invader plant species

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium					**Degree of Mitigation: Full**		
3	4	2	3	3	2	2.5	**7.5**

Potential impact on fauna within the footprint area

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium					**Degree of Mitigation: Full**		
2	4	1	2.3	3	2	3.5	**8**

Potential impact on areas/infrastructure of heritage or cultural concern

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium					**Degree of Mitigation: Full**		
3	4	5	4	2	1	1.5	**6**

Deterioration of the access road to the prospecting area

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium					**Degree of Mitigation: Full**		
2	4	2	2.6	3	2	2.5	**6.5**

DECOMMISSIONING PHASE

Uncapped boreholes left by contractor

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium					**Degree of Mitigation: Full**		
3	5	1	3	3	1	2	**6**

Potential impact associated with litter/hydrocarbon spills left in the prospecting area

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium					**Degree of Mitigation: Full**		
3	5	2	3.3	3	1	2	**6.6**

Erosion of access roads or vehicle tracks

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium					**Degree of Mitigation: Full**		
3	5	1	3	3	2	2.5	**7.5**

Return of prospecting area to agricultural use **(Positive Impact)**

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium-High					**Degree of Mitigation: N/A**		
5	5	1	3.6	5	5	5	**18**

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 10: 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/	Low cost to mitigate	Substantial cost to mitigate/	High cost to mitigate	Prohibitive cost to mitigate/

	High potential to mitigate impacts to level of insignificance/ Easily reversible		Potential to mitigate impacts/ Potential to reverse impact		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 11: 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 12: 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 13: 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 14: 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 15: 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 16: 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 17: 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 18: 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)

As explained earlier, Project Alternative 1 entails the prospecting of the 1 549.44 ha footprint area through percussion drilling along a grid that allows for ±200 boreholes. Project Alternative 1 was identified as the preferred and only project alternative due to the following:

- The proposed drill plan allows for proper prospecting of the approved area;
- The footprint of the drainage line that crosses through Portion 3 of Makganyene No 667 was excluded from the impact footprint to prevent damage/disturbance of the area as a result of the prospecting activities.
- No bulk sampling is proposed; thereby minimising the footprint of disturbance and the resultant impact on the receiving environment.
- No large trees or vegetation of significance will be removed to allow prospecting activities as the position of the borehole can be altered when needed.
- No formal roads have to be constructed to allow for the continuation of the activity.
- Upon closure, the entire prospecting area will be returned to agricultural use without mining related residual impacts.

PROJECT ASSOCIATED POSITIVE IMPACTS:

- The proposed drill plan allows for proper prospecting of the approved area; and
- Upon closure, the entire prospecting area will be returned to agricultural use without mining related residual impacts.

POTENTIAL NEGATIVE IMPACTS:

OPERATIONAL PHASE

- Visual intrusion due to prospecting operation;
- Dust nuisance due to prospecting operation;

- Noise nuisance due to prospecting operation;
- Soil contamination associated with littering and hydrocarbon spills;
- Potential negative impact on the FEPA, area of biodiversity concern and/or drainage line;
- Negative impact on the natural vegetation of the footprint;
- Infestation of the prospecting area with invader plant species;
- Potential impact on fauna within the footprint area;
- Potential impact on areas/infrastructure of heritage or cultural concern; and/or
- Deterioration of the access road to the prospecting area.

DECOMMISSIONING PHASE

- Uncapped boreholes left by contractor;
- Potential impact associated with litter/hydrocarbon spills left in the prospecting area; and/or
- Erosion of access roads or vehicle tracks.

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 prospecting activity on the receiving/surrounding environment:

VISUAL CHARACTERISTICS

Visual Mitigation:

The risk of the prospecting activities having a negative impact on the aesthetic quality of the surrounding environment is deemed to be of low significance should the following mitigation measures be implemented.

- Prospecting must be contained to the approved boundaries.
- Every borehole site must have a neat appearance and be kept in good condition at all times.
- The drilling contractor must limit vegetation removal (if applicable), and avoid the removal of large trees (>20 cm stem) or vegetation of significance (identified by the ECO).
- Upon closure every borehole site must be rehabilitated and landscaped to address any residual impact.

AIR AND NOISE QUALITY

Fugitive Dust Emission Mitigation:

The risk of dust, generated due to the prospecting activities, having a negative impact on the surrounding environment can be reduced to being low through the implementation of the following mitigation measures:

- The liberation of dust into the surrounding environment must be effectively controlled (when applicable) 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).
- Speed on the access road must be limited to 40 km/h to prevent the generation of excess dust.
- Areas devoid of vegetation, which could act as a dust source, must be minimized.
- 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).

Noise Handling:

The risk of noise, generated by the prospecting activity, having a negative impact on the surrounding environment can be reduced to being low through the implementation of the mitigation measures listed below:

- The PR Holder must ensure that employees and staff conduct themselves in an acceptable manner while on site.
- No loud music may be permitted at the prospecting area.
- All project related 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).
- Best practice measures shall be implemented in order to minimize potential noise impacts.

GEOLOGY AND SOIL

Waste Management:

The risk of uncontrolled waste generation having a negative impact on the surrounding environment can be reduced to being low through the implementation of the mitigation measures listed below:

- Regular vehicle maintenance, repairs and services may only take place at an off-site workshop and service area, and none of the above is allowed in the prospecting footprint. When a breakdown occurs, the contractor must arrange for the removal of the machine, within 6 hours, to a recognised workshop where it can be mended.

- Ablution facilities must be provided in the form of a chemical toilet that is placed near the area being prospected. The chemical toilet must be serviced at least once every two weeks for the duration of the prospecting activities.
- The use of any temporary, chemical toilet facilities may 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 PR Holder.
- 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.
- A spill kit must be available on-site which can be operated by trained employees for the *ad hoc* remediation of minor chemical and hydrocarbon spillages.
- 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.
- Should spillage occur, such as oil or diesel leaking from a burst pipe, the contaminated soil must, within the first hour of occurrence, be collected in a suitable receptacle and removed from the site, either for resale or for appropriate disposal at a recognized facility. Proof must be filed.
- General waste must be contained in the site vehicles and daily removed from the prospecting area to a recognised general waste landfill site.
- No waste may be buried or burned on the site.
- No chemicals or hazardous materials may be stored at the prospecting area.
- It is important that any significant spillage of chemicals, fuels etc. during the lifespan of the activities is reported to the Department of Water and Sanitation and other relevant authorities.

HYDROLOGY AND MINING BIODIVERSITY

Mitigating the potential impact on the FEPA, area of biodiversity concern and/or drainage line:

The potential of the prospecting activity having a negative impact on the FEPA, area of conservation importance and/or the ephemeral drainage line is deemed to be of low significance, should the following mitigation measures be implemented:

- No activities may take place, without the necessary authorisation from the DWS, within a horizontal distance of 100 m from any watercourse (including the drainage line).

- Should a water use authorisation become applicable to the project, the PR Holder must at all times adhere to the conditions thereof.
- Upon closure, the PR Holder must remove all prospecting related equipment/machinery from the footprint.

Storm Water Mitigation:

The following mitigation measures are proposed regarding storm water handling:

- Drainage must be controlled to ensure that runoff from the prospecting area does not culminate in off-site pollution, flooding or result in damage to storm water discharge points.
- Storm water must be diverted around the access roads and/or tracks to prevent erosion.
- 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 (if applicable).
- 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.

GROUNDCOVER

Mitigating the Potential Impact on Vegetation Cover:

The risk of the prospecting activity having a negative impact on the vegetation cover of the footprint can be reduced to being low through the implementation of the mitigation measures listed below:

- All areas outside the prospecting boundary must be declared a no-go area, and all employees must be educated accordingly.
- No plants may be removed without the approval of an environmental control officer (ECO).
- Vehicle traffic must as far as possible be contained to the exiting farm roads. No crisscrossing through undisturbed areas may be allowed.

Management of Invasive Plant Species:

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

- An invasive plant species management plan must be implement on site to control weeds and invasive plants on denuded- and reinstated areas in terms of the NEM:BA, 2004 and CARA, 1983.
- Management must take responsibility to control declared invader or exotic species that germinate on 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 risk resulting from the prospecting activity on the fauna of the footprint area as well as the surrounding environment, can be reduced to low through the implementation of the mitigation measures listed below:

- The site manager must ensure no fauna is caught, killed, harmed, sold or played with.
- Workers must be instructed to report any animals that may be trapped in the working area.
- No snares may be set or nests raided for eggs or young.

CULTURAL AND HERITAGE ENVIRONMENT

Archaeological, Heritage and Palaeontological Aspects:

The impact on archaeological, heritage and palaeontological aspects, as a result of the prospecting activities, can be reduced to being low through the implementation of the mitigation measures listed below:

- All prospecting must be confined to the approved footprint area.
- Known heritage resources must be avoided with a buffer zone of 30 m.
- Existing roads must be used as far as possible.
- Any future listed activity (not yet approved) must be subjected to an HIA.
- The ECO for the project must assess drill locations when these become available prior to drilling to confirm there are no graves, stone walling or any heritage features.
- If during the 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 SAHRA.
- Work may only continue once the go-ahead was issued by SAHRA.

EXISTING INFRASTRUCTURE

Access Road and Infrastructure Management:

The impact on the access road, as a result of the prospecting activities, can be reduced to being low through the implementation of the mitigation measures listed below:

- 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 prospecting activities must be repaired by the PR Holder.
- Prior to commencement, all contractors must sign an agreement confirming their responsibility towards the movement of their employees.
- Damages to fences (by prospecting employees) must be repaired/reinstated by the responsible contractor. Losses, due to gates left open by prospecting employees, must be compensated by the responsible entity.

GENERAL

Management of Health and Safety Risks:

The following mitigation measures are proposed to minimise the potential health and safety impacts:

- Adequate ablution facilities and water for human consumption must daily be available on site.
- Workers must have access to the correct personal protection equipment (PPE) as required by law.
- All operations must comply with the Mine Health and Safety Act, 1996 (Act No 29 of 1996).
- Boreholes must daily be covered even if prospecting will continue the following day. Upon closure all boreholes must be sealed off and capped as prescribed in the rehabilitation plan.

ix) Motivation where no alternative sites were considered.

As mentioned previously, DMR approved the prospecting activity and footprint in April 2019, and therefore no site alternatives apply to the current prospecting operations nor the proposed expansion of the drill plan. Project Alternative 1 was identified as the only project alternative as the first phase investigation of the area showed the need for a more extensive drilling campaign that cannot be achieved through the current borehole allowance. The proposed alternative excludes the drainage line from the proposed area of impact, does not necessitate bulk sampling, the removal of large trees or construction of formal roads, and upon closure

the entire prospecting area can be returned to agricultural use, and were therefore deemed to be the best option.

x) Statement motivating the alternative development location within the overall site.
(Provide a statement motivating the final site layout that is proposed)

Project Alternative 1 was identified during the assessment phase of the environmental impact assessment as the preferred and only site alternative. The following matters contributed to the identification of the preferred project proposal:

1. **Topography** – The prospecting activities will not impact the topography of the area, even should the drill plan be extended as proposed with the S102 amendment application. The activity will have no residual impact on the environment upon closure of the PR.

2. **Visual Characteristics** – The viewshed analysis showed that the visual impact of the prospecting operation will be of low significance. The small scale of the proposed operation, and the continued reinstatement of the boreholes contributes to the low visual significance. Should the PR Holder successfully rehabilitate the borehole sites (upon closure), no residual visual impact is expected upon closure.

3. **Air and Noise Quality** – The proposed activity will contribute the emissions of one drill rig and two to three site vehicles at a time to the receiving environment for the duration of the operational phase. Should the PR Holder 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 and compatible with the current land use. The potential impact on the noise ambiance of the receiving environment is expected to be of low significance and representative of the current farm equipment.

4. **Geology and Soil –** The prospecting activities does not require bulk sampling, nor the excavation of trenches or pits, and therefore the impact of the operation on the geology of the study area is deemed to be of low significance, with no residual impact once the boreholes were capped.

5. **Hydrology –** Prospecting will not affect the integrity of the FEPA if the proposed buffer area around the ephemeral drainage line is maintained; nor will it have an impact on the surface- or groundwater of the footprint area as very little process water (±1 000 l/day) is needed to allow the drilling of the boreholes.

6. **Mining Biodiversity and Groundcover –** Should the PR Holder implement the proposed 100 m buffer around the drainage line the conservation status of the area will be adequately protected, and in light of this the impact of the prospecting operation on the identified area of conservation importance is deeded to be of low significance. The

prospecting activities does not require the removal of any large trees or vegetation of significance. Due to the small footprint of a borehole, the drill position can be manipulated to drill between the trees. In light of this, the impact of the prospecting operation on the vegetation cover of the receiving environment is deemed to be of low significance.

7. **Fauna -** The fauna within the PR footprint will not be impacted by the prospecting activities as they will be able to move away or through the site, without being harmed. Workers will be educated and managed to ensure that no fauna of the site is harmed.

8. **Cultural and Heritage Environment** - The HIA concluded that the impact of the proposed drilling on heritage resources will not have a significant impact on the heritage resources of the Northern Cape, and recommended that the project can commence on the condition that SAHRA approves the proposal and the recommendations of the report is implemented.

9. **Site Specific Infrastructure** – No prospecting activities are planned for any of the developed areas on the farm. The abandoned infrastructure along the historic quarry pit on Portion 2 of Makganyene No 667 will remain intact. Other infrastructure within the PR footprint comprises of power lines, farm roads, fences and water reservoirs. None of these structures will be impacted by the prospecting activities.

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 prospecting 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.

OPERATIONAL PHASE

Visual intrusion due to prospecting operation

Severity	Duration	Extent	Consequence	Probability	Frequency	Likelihood	**Significance**
Rating: Low					**Degree of Mitigation: No mitigation**		
1	3	1	1.6	1	4	2.5	**4**

Dust nuisance due to prospecting activities

Severity	Duration	Extent	Consequence	Probability	Frequency	Likelihood	**Significance**
Rating: Low					**Degree of Mitigation: Full**		
2	1	2	1.7	2	2	2	**3.4**

Noise nuisance due to prospecting activities

Severity	Duration	Extent	Consequence	Probability	Frequency	Likelihood	**Significance**
Rating: Low					**Degree of Mitigation: Partial**		
2	4	2	2.7	1	2	1.5	**4**

Soil contamination associated with littering and hydrocarbon spills

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

Potential negative impact on the FEPA, area of biodiversity concern and/or drainage line

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

Negative impact on the natural vegetation of the footprint

Severity	Duration	Extent	Consequence	Probability	Frequency	Likelihood	**Significance**
Rating: Low					**Degree of Mitigation: Full**		
2	4	1	2.6	2	1	1.5	**3.9**

Infestation of the prospecting area with invader plant species

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

Potential impact on fauna within the footprint area

Severity	Duration	Extent	Consequence	Probability	Frequency	Likelihood	**Significance**
Rating: Low					**Degree of Mitigation: Full**		
2	4	1	2.3	2	1	1.5	**3.5**

Potential impact on areas/infrastructure of heritage or cultural concern

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

Deterioration of the access road to the prospecting area

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

DECOMMISSIONING PHASE

Uncapped boreholes left by contractor

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

Potential impact associated with litter/hydrocarbon spills left in the prospecting area

Severity	Duration	Extent	Consequence	Probability	Frequency	Likelihood	**Significance**
Rating: Low					**Degree of Mitigation: Full**		
3	1	1	1.7	2	1	1.5	**2.6**

Erosion of access roads or vehicle tracks

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

Return of prospecting area to agricultural use **(Positive Impact)**

Severity	Duration	Extent	Consequence	Probability	Frequency	Likelihood	**Significance**
Rating: Medium-High					**Degree of Mitigation: Full**		
5	5	1	3.6	5	5	5	**18**

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 19: Assessment of each identified potentially significant impact and risk

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, air pollution, etc…etc…etc.)	ASPECTS AFFECTED	PHASE In which impact is anticipated. (E.g. Construction, commissioning, operational Decommissioning closure, post closure.)	SIGNIFICANCE If not mitigated.	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 through rehabilitation.	SIGNIFICANCE If not mitigated.
Percussion Drilling	Visual intrusion due to prospecting operation.	The visual impact may affect the aesthetics of the landscape.	Operational Phase	Low	Control: Implementing proper housekeeping.	Low
Percussion Drilling	Dust nuisance due to prospecting activities.	Increased dust generation will impact on the air quality of the receiving environment.	Operational Phase	Low-Medium	Control: Dust suppression methods and proper housekeeping.	Low
Percussion Drilling	Noise nuisance due to prospecting activities.	Should noise levels become excessive it may have an impact on the noise ambiance of	Operational Phase	Low-Medium	Control: Noise suppression methods and proper housekeeping.	Low

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE	MITIGATION TYPE	SIGNIFICANCE
		the receiving environment.				
• Percussion Drilling • Decommissioning and Rehabilitation	• Soil contamination assocated with littering and hydrocarbon spills. • Potential impact assocaited with litter/hydrocarbon spills left in the prospecting 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 PR Holder.	Operational Phase	• Low-Medium • Low-Medium	Control & Remedy: Proper housekeeping and implementation of an emergency response plan.	• Low • Low
• Percussion Drilling	• Potential negative impact on the FEPA, area of biodiversity concern and/or drainage line.	This will impact on the biodiversity of the receiving environment.	Operational Phase	• Low-Medium	Control: Keeping prospecting operations to the approved boundaries and out of the buffer area.	• Low
• Percussion Drilling	• Negative impact on the natural vegeation of the footprint.	This will impact on the biodiversity of the receiving environment.	Operational Phase	• Low-Medium	Control: Minimise the removal of vegetation and confining vehicular traffic to existing roads/tracks.	• Low
• Percussion Drilling	• Infestation of the prospecting ara with invader plant species.	This will impact on the biodiversity of the receiving environment.	Operational Phase	• Low-Medium	Control: Implementing invader plant control measures.	• Low
• Percussion Drilling	• Potential impact on fauna within the footprint area.	This will impact on the biodiversity of the receiving environment.	Operational Phase	• Low-Medium	Control & Stop: Implementing good management practices.	• Low
• Percussion Drilling	• Potential impact on area/infrastructure of heritage or cultural concern.	This could impact on the cultural and heritage	Operational Phase	• Low-Medium	Control & Stop: Implementing good management practices, as well as the chance-find protocol.	• Low

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE	MITIGATION TYPE	SIGNIFICANCE
		legacy of the receiving environment.				
• Percussion Drilling • Decommissionoing and Rehabilitation	• Deterioration of the access road to the prospecting area. • Erosion of access roads or vehicle tracks.	Collapse of the road infrastructure will affect the landowners.	Operational Phase	• Low-Medium	Control & Remedy: 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 prospecting.	• Low
• Decommissionoing and Rehabilitation	• Uncapped boreholes left by contractor.	Uncapped boreholes will pose a safety risk to the animals and humans of the area.	Operational Phase	• Low-Medium	Control: Implementing the mitigation measures and rehabiltiation plan.	• Low

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 20: 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 Prospecting Application, Postmasburg, Northern Cape Province.	**Recommendations:** Fossils have been recovered from similar sediments in other parts of the country so a Fossil Chance Find Protocol should be added to the EMPr. Based on this information it is recommended that no palaeontological site	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
(See Appendix J for a full copy of the document)	visit is required unless fossils are discovered once prospecting commence. The impact of the proposed drilling on heritage resources will not have a significant impact on the heritage resources of the Northern Cape. It is recommended that the proposed project can commence on the condition that the following recommendations are implemented and based on approval from SAHRA: • Implementation of a chance finds procedure as outlined below; • Known heritage resources should be avoided with a buffer zone of 30 meters; • Existing roads should be used as far as possible; • Any future listed activities should be subjected to an HIA; • The ECO for the project should assess drill locations when these become available prior to drilling to confirm there are no graves, stone walling or any heritage features. <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 site, this person must cease work at the site of the find and report		

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
	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.		

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 intends submitting a Section 102 (S102) amendment application in terms of the MPRDA, 2002 to increase the number of boreholes to be drilled during the prospecting of Portion 2 (portion of Portion 1), Remainder Portion, Remainder Portion of Portion 1 and Portion 3 of the farm Makganyene No 667. The S102 application necessitates an application for a Part 2 amendment of the holder's EMP in terms of GNR 326 Section 31. The proposed S102 application does not constitute a listed activity or specified activity. Drilling commenced in July 2019 and to date the results showed that a more comprehensive drilling campaign is needed. The PR Holder therefore identified the need to increase the drilling programme from 9 boreholes to ±200.

Topography

The topography of the prospecting area ranges from being flat in the south-west, gradually changing into an undulating area towards the centre where various outcrops intersects the farm, upon which it flattens out again towards the north-eastern boundary of the PR footprint. The prospecting activities will not impact the topography of the area, even should the drill plan be extended as proposed with the S102 amendment application.

Visual Characteristics

The viewshed analysis showed the visibility of the prospecting area ranges between intermittent and low visibility. The prospecting activities does not require the removal of vegetation and no permanent infrastructure will be erected. In light of this, the potential impact of the prospecting operation on the visual characteristics of the receiving environment is deemed to be of insignificance importance.

Air and Noise Quality

The prospecting activity does not trigger an application in terms of the NEM:AQA, 2004, as it will only contribute the emissions of one drill rig and two to three site vehicles

at a time for the duration of the invasive operational phase. Should the PR Holder 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 and compatible with the current land use. The potential impact on the noise ambiance of the receiving environment is expected to be of low significance and representative of the machinery already operating in the area. The distance of the prospecting area from residential infrastructure further lessens the potential noise impact.

Geology and Soil

According to the Makganyane Geological and Preliminary Exploration Report (2019), most of the surface outcrop features towards the east of the property comprises diamictites of the Makganyene Formation. Some quartzite splays cover the diamictite in places. The flat laying topography to the west comprises mostly of sand and sporadic outcrops of the Ongeluk lava. Two almost parallel linear features with a south-southwest to north-north-east trend are present on the geological sheet, possibly representing the continuation of thrust faults. The western feature seems to connect with a thrust-fault. The report notes that the property warrants in depth investigation due to the close location to recent iron ore deposits intersected on the farm Heuningkrantz and mining activities on Aucampsrust, where similar rock formations are present. Both the Gamagara Formation and the Rooinekke Iron Formation are hosts rocks to iron and manganese mineralization. Clastic ore deposits present on Kameelhoek, Aucampsrust and Makganyene were documented by Nel, T in 1929. The prospecting activities does not require bulk sampling, or the excavation of trenches or pits, and therefore the impact of the operation on the geology of the study area is deemed to be of low significance, with no residual impact once the boreholes were capped.

Hydrology

The prospecting area falls within a NFEPA of conservation importance. An ephemeral drainage line passes thorough Portion 3 of Makganyene No 667. Prospecting within close proximity to the drainage line, may require a water use authorisation in terms of Section 39 of the NWA, 1998 for water uses as defined in section 21(c) and 21 (i). This report proposes that a 100 m no-go buffer be maintained around the drainage line to conserve its integrity. The PR Holder is in discussion with the DWS to determine the necessity of a WULA. Prospecting will not affect the integrity of the FEPA if the

proposed buffer area around the ephemeral drainage line is maintained; nor will it have an impact on the surface- or groundwater of the footprint area as very little process water (±1 000 l/day) is needed to allow the drilling of the boreholes.

Mining and Biodiversity:

When the prospecting footprint is layered over the Mining and Biodiversity Map, Portion 3 of Makganyene No 667 (north-eastern section of the prospecting footprint) falls over and area of highest biodiversity importance with a corresponding rating of highest risk for mining. The position of the highest biodiversity area corresponds with the position of the ephemeral drainage line (discussed above). Should the PR Holder implement the proposed 100 m buffer around the drainage line the conservation status of the area will be adequately protected, and in light of this the impact of the prospecting operation on the identified area is deeded to be of Low significance.

Groundcover:

Ground truthing showed that the vegetation cover of the prospecting footprint varies from natural to near natural, representing the Kuruman Mountain Bushveld (along the outcrops), Olifantshoek Plains Thornveld (majority of the footprint), and the Postmasburg Thornveld (intermittently dispersed through the footprint). The prospecting activities does not require the removal of any large trees or vegetation of significance. Due to the small footprint of a borehole, the drill position can be manipulated to drill between the trees. In light of this, the impact of the prospecting operation on the vegetation cover of the receiving environment is deemed to be of Low significance.

Fauna

The fauna within the PR footprint will not be impacted by the prospecting 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 drilling on heritage resources will not have a significant impact on heritage resources, and recommended that the project can commence on the condition that SAHRA approves the proposal and the recommendations of the report is implemented

Site Specific Infrastructure

The farm yard of the landowner was established on the RE of Makganyene No 667. No prospecting activities are planned for any of the developed areas on the farm. The abandoned infrastructure along the historic quarry pit on Portion 2 of Makganyene No 667 will remain intact. Other infrastructure within the PR footprint comprises of power lines, farm roads, fences and water reservoirs. None of these structures will be impacted by the prospecting activities.

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 drill plan attached as Appendix C.

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 proposed drill plan allows for intensive prospecting of the approved area; and
- Upon closure, the entire prospecting area will be returned to agricultural use with no residual impacts.

The potential negative impacts associated with the project are all of low significance after mitigation:

- Visual intrusion due to prospecting operation;
- Dust nuisance due to prospecting operation;
- Noise nuisance due to prospecting operation;
- Soil contamination associated with littering and hydrocarbon spills;
- Potential negative impact on the FEPA, area of biodiversity concern and/or drainage line;
- Negative impact on the natural vegetation of the footprint;
- Infestation of the prospecting area with invader plant species;
- Potential impact on fauna within the footprint area;
- Potential impact on areas/infrastructure of heritage or cultural concern;
- Deterioration of the access road to the prospecting area.
- Uncapped boreholes left by contractor;
- Potential impact associated with litter/hydrocarbon spills left in the prospecting area; and/or
- Erosion of access roads or vehicle tracks.

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

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTION	MANAGEMENT OUTCOME
VISUAL CHARACTERISTICS Mitigating the visual impact.	Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. Compliance to be monitored by the Environmental Control Officer.	• Contain prospecting to the approved boundaries. • Ensure every borehole site has a neat appearance and is kept in good condition at all times. • Limit vegetation removal, and avoid the removal of large trees (>20 cm stem) or vegetation of significance (identified by ECO). • Rehabilitate and landscape every borehole site to address any residual impact.	• Minimise the impact of the proposed project on the visual characteristics of the receiving environment during the operational phase, and ensure no residual impact remains after closure.
AIR QUALITY Dust management	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, straw, water spraying and/or environmentally friendly dust-allaying agents that contains no PCB's (e.g. DAS products). • Limit speed on the access roads to 40 km/h to prevent the generation of excess dust. • Minimise areas devoid of vegetation. • 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).	• Dust prevention measures are applied to minimise the generation of dust.
NOISE AMBIANCE 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 prospecting 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.	• Prevent unnecessary noise to the environment by ensuring that noise from development activity is mitigated.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTION	MANAGEMENT OUTCOME
		• Implement best practice measures to minimise potential noise impacts.	
GEOLOGY AND SOIL 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 takes place at an off-site workshop and service area, and that none of the above is allowed in the prospecting footprint. When a breakdown occurs, arrange for the removal of the machine within 6 hours to a recognised workshop where it can be mended. • Provide ablution facilities in the form of a chemical toilet that is placed near the area being prospected. Ensure the toilet is serviced at least once every two weeks for the duration of the prospecting activities. • Ensure that the use of any temporary, chemical toilet facilities does 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. • Equip the diesel bowser with a drip tray if used on site. The nozzle of the bowser must rest in a sleeve to prevent dripping after refuelling. • Clean drip trays after use. Do not use dirty drip trays. • Keep a spill kit on site. • Collect any effluents containing oil, grease or other industrial substances in a suitable receptacle and removed from the site, either for resale or for appropriate disposal at a recognized facility. • Collect the contaminated soil from spillage that occurred, such as oil or diesel leaking from a burst pipe, within the first hour of occurrence, in a suitable receptacle and removed from the site, either for resale or for appropriate disposal at a recognized facility. File proof.	• Wastes are appropriately handled and safely disposed of at a recognised waste facility.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTION	MANAGEMENT OUTCOME
		• Contain general waste in site vehicles and daily remove waste from the prospecting area to a recognised general waste landfill site. • Prevent the burning or burying of waste on site. • Do not store chemicals or hazardous materials at the prospecting area. • Report any significant spillage of chemicals, fuels etc. during the lifespan of the prospecting activities to the Department of Water and Sanitation and other relevant authorities.	
HYDROLOGY AND MINING BIODIVERSITY Mitigating the potential impact on the FEPA, area of biodiversity concern and/or drainage line.	Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. Compliance to be monitored by the Environmental Control Officer.	• Do not allow any activities within a horizontal distance of 100 m from any watercourse (including the drainage line), without the necessary authorisation from the DWS. • Adhere to the conditions of the water use authorisation (if authorisation is applicable). • Remove all prospecting related equipment/machinery from the footprint upon closure.	• Prospecting does not affect the drainage/surface water of the footprint.
HYDROLOGY 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.	• Control drainage to ensure that runoff from the prospecting area does not culminate in off-site pollution, flooding or result in damage to storm water discharge points. • Divert storm water around the access roads and/or tracks to prevent erosion. • Keep clean water clean, and route it to a natural watercourse by a system separate from the dirty water system (if applicable). • Collect dirty water and contain it in a system separate from the clean water system. • Prevent dirty water from spilling or seeping into clean water systems.	• Uncontrolled storm water impact to the environment is avoided.
GROUNDCOVER Vegetation management.	Site Manager to ensure compliance with the guidelines as stipulated in the EMPR.	• Declare the area outside the prospecting boundary a no-go area, and educate all employees accordingly.	• Vegetation clearing (if needed) is controlled and restricted to the authorised prospecting footprint.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTION	MANAGEMENT OUTCOME
	Compliance to be monitored by the Environmental Control Officer.	• Do not remove plants without the approval of an environmental control officer (ECO). • Contain vehicle traffic (as far as possible) to the existing farm roads. Do not allow crisscrossing through undisturbed areas.	
GROUNDCOVER Mitigating invader plants.	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 denuded- and reinstated areas in terms of NEM:BA, 2004 and CARA, 1983. • Control declared invader or exotic species on the rehabilitated areas.	• Prospecting area is kept free of invasive plant species.
FAUNA Mitigating the fauna component.	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. • 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.	• Disturbance to fauna is minimised.
CULTURE/HERITAGE Mitigating cultural/heritage 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 prospecting to the footprint area. • Demarcate known heritage resources with a 30 m buffer zone and manage as a no-go area. • Use existing roads as far as possible. • Subject any future listed activity (not yet approved) to an HIA. • Ensure that the ECO for the project assess drill locations prior to drilling to confirm there are no graves, stone walling or any heritage features. • Implement the following change find procedure when discoveries are made on site: ▪ If during the 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	• Impact to cultural/heritage resources is avoided or at least minimised.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTION	MANAGEMENT OUTCOME
		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 SAHRA. ▪ Work may only continue once the go-ahead was issued by SAHRA.	
EXISTING INFRASTRUCTURE Control of 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. Repair rutting and erosion of the access road caused as a direct result of prospecting. Sign an agreement, prior to commencement, confirming responsibility towards the movement of employees. If responsible, repair/reinstate damaged fences and/or compensate losses due to gates left ajar.	The access road remains accessible to the road users during the operational phase, and upon closure the road is returned in a better, or at least the same state as received by the PR Holder.
GENERAL Health and safety aspects.	Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. Compliance to be monitored by the Environmental Control Officer.	Ensure adequate ablution facilities and water for human consumption is daily available on site. Ensure that workers have access to the correct PPE as required by law. Manage all operations in compliance with the Mine Health and Safety Act, 1996 (Act No 29 of 1996). Cover boreholes daily. Seal and cap all boreholes as prescribed in the rehabilitation plan, upon closure.	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 PR Holder requests the Environmental Authorisation to be valid for the duration of the prospecting right (at least 2024 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 average annual amount required to manage and rehabilitate the environment was estimated to be ±R 108 483. The table below shows the proposed cost regarding site rehabilitation of the applicable invasive phases of the prospecting activity.

Table 22: Proposed annual rehabilitation cost.

PHASE	YEAR	COST
Phase 4 (13-18 months)	2	R 89 456
Phase 7 (31-42 months)	3	R 117 024
Phase 7 (31-42 months)	4	R 117 024
Phase 8 (42-54 months)	4	R 109 456
Phase 8 (42-54 months)	5	R 109 456
Average annual rehabilitation cost		R 108 483

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 Makganyane prospecting 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 prospecting operation (as presented in the PWP).

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)

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

- **Visual intrusion associated with the prospecting activities:**

  The prospecting activities does not require the removal of vegetation and no permanent infrastructure will be erected. In light of this, the potential impact of the prospecting operation on the visual characteristics of the receiving environment is deemed to be of insignificance importance.

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

  The prospecting activity will contribute the emissions of one drill rig and two to three site vehicles at a time for the duration of the invasive operational phase. Dust generated as result of the prospecting will also stem from the movement of these vehicles. Should the PR Holder 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 and compatible with the current land use.

- **Noise nuisance as a result of prospecting activities:**

  The potential impact on the noise ambiance of the receiving environment is expected to be of low significance and representative of the machinery already operating in the area. The distance of the prospecting area from residential infrastructure further lessens the potential noise impact.

- **Prospecting affecting surface water or aggravating the scarcity of water:**

  The prospecting activity requires ±1 000 l of water/day that is bought in a controlled manner from the landowners. No prospecting will take place within the identified drainage line or other water resources (if identified). In light of this, the potential of prospecting impact the water resources of the footprint area is deemed very low.

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

  As mentioned earlier, the drilling campaign will be headed by a drill contractor. Site management will at all times be responsible for the movement of their employees. No prospecting personnel will be allowed to wander outside the

approved footprint. The contractor will sign an agreement to this affect upon appointment, and will be held responsible for damages to fences or gates left ajar by prospecting 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 drill plan.

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)

Site Alternatives:

DMR approved the prospecting of 1 549.44 ha that extends over four portions (RE, 1, 2, and 3) of the farm Makganyene No 667 in April 2019. As the prospecting boundary was already approved site alternatives does not apply to the current prospecting operations nor the proposed expansion of the drill plan.

Project Alternatives:

Project Alternative 1, as discussed earlier, was identified during the assessment phase of the environmental impact assessment by the PR Holder and project team, as the preferred and only viable site alternative. Should the S102 application be approved, prospecting of the area will take place through percussion drilling along a grid that allows for ±200 boreholes.

No-go Alternative:

The no-go alternative entails no change to the *status quo* and is therefore a real alternative that must be considered. Should the no-go alternative be implemented, the PR Holder can only drill nine boreholes and seven sumps across the approved 1 549 ha area.

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 that acts as EAP on this project has been included in Part A Section 1(a) as well as Appendix K 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 C 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 end objective is for all the boreholes to be sealed and capped to, in the end, return the area to agricultural use. No buildings/infrastructure, other than the chemical toilet and drill rig, need to be demolished/removed, and the access roads/tracks will remain intact to be used by the landowners.

The decommissioning activities will consist of the following:

- Removal of all prospecting equipment from site;
- Sealing and capping of all the boreholes; and
- Landscaping of any/all compacted areas.

The PR Holder will comply with the minimum closure objectives as prescribed DMR and detailed below:

- Final Rehabilitation:

  Final rehabilitation of the surface area shall entail landscaping, levelling, maintenance, and clearing of invasive plant species (if applicable). All equipment, plant and other items used during the prospecting period will be removed from site (section 44 of the MPRDA, 2002). Waste material of any description will be removed entirely from the prospecting 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 will be done in a sporadic manner during the life of the activity. 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.

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

The drilling operation require ±1 000 l of water per day, and potable water is brought to site daily by the employees.

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

Prospecting within close proximity to the drainage line, may require a water use authorisation in terms of Section 39 of the NWA, 1998 for water uses as defined in section 21(c) and 21 (i). The PR Holder is in discussion with the DWS to determine the necessity of the authorisation and the required way forward.

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.
• Percussion Drilling	Operational Phase	100 m² per borehole site (±2 ha)	**Visual Mitigation** • Prospecting must be contained to the approved boundaries. • Every borehole site must have a neat appearance and be kept in good condition at all times. • The drilling contractor must limit vegetation removal (if applicable), and avoid the removal of large trees (>20 cm stem) or vegetation of significance (identified by ECO). • Upon closure every borehole site must be rehabilitated and landscaped to address any residual impact.	Management of the prospecting area must be in accordance with the: • MPRDA, 2008 • NEMA, 1998	Throughout the operational phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
• Percussion Drilling	Operational Phase	100 m² per borehole site (±2 ha)	**Fugitive Dust Emission Mitigation:** • The liberation of dust into the surrounding environment must be effectively controlled (when applicable) 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). • Speed on the access road must be limited to 40 km/h to prevent the generation of excess dust. • Areas devoid of vegetation, which could act as a dust source, must be minimized. • 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).	Dust generation 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 operational-, and decommissioning phase.
• Percussion Drilling	Operational Phase	100 m² per borehole site (±2 ha)	**Noise Handling:** • The PR Holder must ensure that employees and staff conduct themselves in an acceptable manner while on site. • No loud music may be permitted at the prospecting area. • All project related 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). • Best practice measures shall be implemented in order to minimize potential noise impacts.	Noise generation must be managed in accordance with the: • NEM:AQA. 2004 Regulation 6(1) • NRTA, 1996	Throughout the operational-, and decommissioning phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
• Percussion Drilling • Decommissioniong and Rehabilitation	Operational Phase & Decommissioning Phase	100 m² per borehole site (±2 ha)	**Waste Management:** • Regular vehicle maintenance, repairs and services may only take place at an off-site workshop and service area, and none of the above is allowed in the prospecting footprint. When a breakdown occurs, the contractor must arrange for the removal of the machine, within 6 hours, to a recognised workshop where it can be mended. • Ablution facilities must be provided in the form of a chemical toilet that is placed near the area being prospected. The chemical toilet must be serviced at least once every two weeks for the duration of the prospecting activities. • The use of any temporary, chemical toilet facilities may 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 PR Holder. • 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.	Prospecting related waste must be managed in accordance with the: • NWA, 1998 • NEM:WA, 2008 • NEM:WA, 2008: National norms and standards for the storage of waste (GN 926) • NEMA, 1998 (Section 30)	Throughout the operational-, and decommissioning phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
			• A spill kit must be available on-site which can be operated by trained employees for the *ad hoc* remediation of minor chemical and hydrocarbon spillages. • 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. • Should spillage occur, such as oil or diesel leaking from a burst pipe, the contaminated soil must, within the first hour of occurrence, be collected in a suitable receptacle and removed from the site, either for resale or for appropriate disposal at a recognized facility. Proof must be filed. • General waste must be contained in the site vehicles and daily removed from the prospecting area to a recognised general waste landfill site. • No waste may be buried or burned on the site. • No chemicals or hazardous materials may be stored at the prospecting area. • It is important that any significant spillage of chemicals, fuels etc. during the lifespan of the activities is reported to the Department of Water and Sanitation and other relevant authorities.		
• Percussion Drilling	Operational Phase	100 m² per borehole site (±2 ha)	**<u>Mitigating the potential impact on the FEPA, area of biodiversity concern and/or drainage line:</u>** • No activities may take place, without the necessary authorisation from the DWS,	The biodiversity of the area must be managed in accordance with the: • NEM:BA 2004 • NWA, 1998	Throughout the operational phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
			within a horizontal distance of 100 m from any watercourse (including the drainage line). • Should a water use authorisation become applicable to the project, the PR Holder must at all times adhere to the conditions thereof. • Upon closure, the PR Holder must remove all prospecting related equipment/machinery from the footprint.	• MPRDA, 2002	
• Percussion Drilling	Operational Phase	100 m² per borehole site (±2 ha)	**Storm Water Mitigation:** • Drainage must be controlled to ensure that runoff from the prospecting area does not culminate in off-site pollution, flooding or result in damage to storm water discharge points. • Storm water must be diverted around the access roads and/or tracks to prevent erosion. • 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 (if applicable). • 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.	Storm water must be managed in accordance with the: • CARA, 1983 • NEMA, 1998 • NWA, 1998	Throughout the operational phase.
• Percussion Drilling	Operational Phase	100 m² per borehole site (±2 ha)	**Mitigation the Potential Impact and Vegetation Cover:** • All areas outside the prospecting boundary must be declared a no-go area, and all employees must be educated accordingly.	Vegetation cover must be managed in accordance with the: • CARA, 1983 • NEMA, 1998 • NEM:BA 2004	Throughout the operational phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
			▪ No plants may be removed without the approval of an environmental control officer (ECO). ▪ Vehicle traffic must as far as possible be contained to the exiting farm roads. No crisscrossing through undisturbed areas may be allowed.		

▪ Percussion Drilling
▪ Decommissioning and Rehabilitation
	Operational Phase
	&
	Decommissioning Phase
		100 m² per borehole site (±2 ha)	**Management of Invader Plant Species:**
			▪ An invasive plant species management plan must be implement on site to control weeds and invasive plants on denuded- and reinstated areas in terms of the NEM:BA, 2004 and CARA, 1983.
			▪ Management must take responsibility to control declared invader or exotic species that germinate on 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.
				Invader plants must be managed in accordance with the:
				▪ CARA, 1983
				▪ NEM:BA 2004
					Throughout the operational, and decommissioning phase.

▪ Percussion Drilling	Operational Phase	100 m² per borehole site (±2 ha)	**Protection of Fauna:** ▪ The site manager must ensure no fauna is caught, killed, harmed, sold or played with. ▪ Workers must be instructed to report any animals that may be trapped in the working area. ▪ No snares may be set or nests raided for eggs or young.	Fauna must be managed in accordance with the: ▪ NEM:BA 2004	Throughout the and operational phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
• Percussion Drilling	Operational Phase	100 m² per borehole site (±2 ha)	**Archaeological, Heritage and Palaeontological Aspects:** • All prospecting must be confined to the approved footprint area. • Known heritage resources must be avoided with a buffer zone of 30 m. • Existing roads must be used as far as possible. • Any future listed activity (not yet approved) must be subjected to an HIA. • The ECO for the project must assess drill locations when these become available prior to drilling to confirm there are no graves, stone walling or any heritage features. • If during the 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 SAHRA.	Cultural/heritage aspects must be managed in accordance with the: • NHRA, 1999	Throughout the operational phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
			• Work may only continue once the go-ahead was issued by SAHRA.		
• Percussion Drilling	Operational Phase	100 m² per borehole site (±2 ha)	**Access Road and Infrastructure Mitigation:** • 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 prospecting activities must be repaired by the PR Holder. • Prior to commencement, all contractors must sign an agreement confirming their responsibility towards the movement of their employees. • Damages to fences (by prospecting employees) must be repaired/reinstated by the responsible contractor. Losses, due to gates left open by prospecting employees, must be compensated by the responsible entity.	The site infrastructure must be managed in accordance with the: • NRTA, 1996 • MPRDA, 2002	Throughout the operational phase.
• Percussion Drilling	Operational Phase	100 m² per borehole site (±2 ha)	**Management of Health and Safety Risks:** • Adequate ablution facilities and water for human consumption must daily be available on site. • Workers must have access to the correct personal protection equipment (PPE) as required by law. • All operations must comply with the Mine Health and Safety Act, 1996 (Act No 29 of 1996).	Health and safety aspects must be managed in accordance with the: • MHSA, 1996 • OHSA, 1993 • OHSAS, 18001	Throughout the operational and decommissioning phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
			• Boreholes must daily be covered even if prospecting will continue the following day. Upon closure all boreholes must be sealed off and capped as prescribed in the rehabilitation plan.		

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	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
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, groundwater contamination, air pollution etc...etc..)		In which impact is anticipated (e.g. Construction, commissioning, operational Decommissioning, closure, post-closure))	(modify, remedy, control, or stop) through (e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc...etc..) E.g. • Modify through alternative method. • Control through noise control • Control through management and monitoring Remedy through rehabilitation.	(Impact avoided, noise levels, dust levels, rehabilitation standards, end use objectives) etc.
• Percussion Drilling	• Visual intrusion due to prospecting operation.	The visual impact may affect the aesthetics of the landscape.	Operational Phase	<u>Control:</u> Implementing proper housekeeping.	Management of the prospecting area must be in accordance with the: • MPRDA, 2008 • NEMA, 1998

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
• Percussion Drilling	• Dust nuisance due to prospecting activities.	Increased dust generation will impact on the air quality of the receiving environment.	Operational Phase	Control: Dust suppression methods and proper housekeeping.	Dust generation 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)
• Percussion Drilling	• Noise nuisance due to prospecting activities.	Should noise levels become excessive it may have an impact on the noise ambiance of the receiving environment.	Operational Phase	Control: Noise suppression methods and proper housekeeping.	Noise generation must be managed in accordance with the: • NEM:AQA. 2004 Regulation 6(1) • NRTA, 1996
• Percussion Drilling • Decommissioning and Rehabilitation	• Soil contamination assocated with littering and hydrocarbon spills. • Potential impact assocaited with litter/hydrocarbon spills left in the prospecting 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 PR Holder.	Operational Phase	Control & Remedy: Proper housekeeping and implementation of an emergency response plan.	Prospecting related waste must be managed in accordance with the: • NWA, 1998 • NEM:WA, 2008 • NEM:WA, 2008: National norms and standards for the storage of waste (GN 926) • NEMA, 1998 (Section 30)
• Percussion Drilling	• Potential negative impact on the FEPA, area of biodiversity concern and/or drainage line.	This will impact on the biodiversity of the receiving environment.	Operational Phase	Control: Keeping prospecting operations to the approved boundaries and out of the buffer area.	The biodiversity of the area must be managed in accordance with the: • NEM:BA 2004 • NWA, 1998 • MPRDA, 2002

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
• Percussion Drilling	• Negative impact on the natural vegeation of the footprint.	This will impact on the biodiversity of the receiving environment.	Operational Phase	Control: Minimise the removal of vegetation and confining vehicular traffic to existing roads/tracks.	Vegetation cover must be managed in accordance with the: • CARA, 1983 • NEMA, 1998 • NEM:BA 2004
• Percussion Drilling	• Infestation of the prospecting ara with invader plant species.	This will impact on the biodiversity of the receiving environment.	Operational Phase	Control: Implementing invader plant control measures.	Invader plants must be managed in accordance with the: • CARA, 1983 • NEM:BA 2004
• Percussion Drilling	• Potential impact on fauna within the footprint area.	This will impact on the biodiversity of the receiving environment.	Operational Phase	Control & Stop: Implementing good management practices.	Fauna must be managed in accordance with the: • NEM:BA 2004
• Percussion Drilling	• Potential impact on area/infrastructure of heritage or cultural concern.	This could impact on the cultural and heritage legacy of the receiving environment.	Operational Phase	Control & Stop: Implementing good management practices, as well as the chance-find protocol.	Cultural/heritage aspects must be managed in accordance with the: • NHRA, 1999
• Percussion Drilling • Decommissionoing and Rehabilitation	• Deterioration of the access road to the prospecting area. • Erosion of access roads or vehicle tracks.	Collapse of the road infrastructure will affect the landowners.	Operational Phase	Control & Remedy: 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 prospecting.	The site infrastructure must be managed in accordance with the: • NRTA, 1996 • MPRDA, 2002
• Decommissionoing and Rehabilitation	• Uncapped boreholes left by contractor.	Uncapped boreholes will pose a safety risk to the animals and humans of the area.	Operational Phase	Control: Implementing the mitigation measures and rehabiltiation plan.	Rehabilitation must take place in accordance with the: • MPRDA, 2002 • Rehabilitation Plan

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)
Percussion Drilling	Visual intrusion due to prospecting operation.	<u>Control:</u> Implementing proper housekeeping.	Throughout the operational phase.	Management of the prospecting area must be in accordance with the: MPRDA, 2008 NEMA, 1998
Percussion Drilling	Dust nuisance due to prospecting activities.	<u>Control:</u> Dust suppression methods and proper housekeeping.	Throughout the operational phase.	Dust generation must be managed in accordance with the: NEM:AQA. 2004 Regulation 6(1)

ACTIVITY	POTENTIAL IMPACT	MITIGATION TYPE	TIME PERIOD FOR IMPLEMENTATION	COMPLIANCE WITH STANDARDS
				• National Dust Control Regulations, GN No R827 • ASTM D1739 (SANS 1137:2012)
• Percussion Drilling	• Noise nuisance due to prospecting activities.	Control: Noise suppression methods and proper housekeeping.	Throughout the operational phase.	Noise generation must be managed in accordance with the: • NEM:AQA. 2004 Regulation 6(1) • NRTA, 1996
• Percussion Drilling • Decommissioning and Rehabilitation	• Soil contamination assocated with littering and hydrocarbon spills. • Potential impact assocaited with litter/hydrocarbon spills left in the prospecting area.	Control & Remedy: Proper housekeeping and implementation of an emergency response plan.	Throughout the operational, and decommissioning phase.	Prospecting related waste must be managed in accordance with the: • NWA, 1998 • NEM:WA, 2008 • NEM:WA, 2008: National norms and standards for the storage of waste (GN 926) • NEMA, 1998 (Section 30)
• Percussion Drilling	• Potential negative impact on the FEPA, area of biodiversity concern and/or drainage line.	Control: Keeping prospecting operations to the approved boundaries and out of the buffer area.	Throughout the operational phase.	The biodiversity of the area must be managed in accordance with the: • NEM:BA 2004 • NWA, 1998 • MPRDA, 2002
• Percussion Drilling	• Negative impact on the natural vegeation of the footprint.	Control: Minimise the removal of vegetation and confining vehicular traffic to existing roads/tracks.	Throughout the operational phase.	Vegetation cover must be managed in accordance with the: • CARA, 1983 • NEMA, 1998 • NEM:BA 2004
• Percussion Drilling	• Infestation of the prospecting ara with invader plant species.	Control: Implementing invader plant control measures.	Throughout the operational phase.	Invader plants must be managed in accordance with the: • CARA, 1983 • NEM:BA 2004

ACTIVITY	POTENTIAL IMPACT	MITIGATION TYPE	TIME PERIOD FOR IMPLEMENTATION	COMPLIANCE WITH STANDARDS
• Percussion Drilling	• Potential impact on fauna within the footprint area.	Control & Stop: Implementing good management practices.	Throughout the operational phase.	Fauna must be managed in accordance with the: • NEM:BA 2004
• Percussion Drilling	• Potential impact on area/infrastructure of heritage or cultural concern.	Control & Stop: Implementing good management practices, as well as the chance-find protocol.	Throughout the operational phase.	Cultural/heritage aspects must be managed in accordance with the: • NHRA, 1999
• Percussion Drilling • Decommissionoing and Rehabilitation	• Deterioration of the access road to the prospecting area. • Erosion of access roads or vehicle tracks.	Control & Remedy: 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 prospecting.	Throughout the operational- and decommissioning phase.	The site infrastructure must be managed in accordance with the: • NRTA, 1996 • MPRDA, 2002
• Decommissionoing and Rehabilitation	• Uncapped boreholes left by contractor.	Control: Implementing the mitigation measures and rehabiltiation plan.	Throughout the decommissioning phase.	Rehabilitation must take place in accordance with the: • MPRDA, 2002 • Rehabilitation Plan

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 closure objectives entail removing the drill rig and any foreign material from the site; sealing and capping of the drill holes and landscaping any compacted areas (if needed). Invasive plant species will be controlled on the reinstated areas during a 12 months' aftercare period to address germination of problem plants. The PR Holder will comply with the minimum closure objectives as prescribed by DMR.

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

This report, the Final Basic Assessment Report and EMPR, includes all the environmental objectives in relation to closure and were available for perusal by the landowner, I&AP's and stakeholders over a 30-days commenting period. No additional comments were received on the draft BAR that could be incorporated into the Final BAR & EMPr.

(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 F.

(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 prospecting footprint. Final landscaping, levelling and top dressing will be done. The rehabilitation of the prospecting area as indicated on the rehabilitation plan attached as Appendix F will comply with the minimum closure objectives as prescribed by DMR and detailed below, and therefore is deemed to be compatible:

- Final Rehabilitation:

  Final rehabilitation of the surface area shall entail landscaping, levelling, maintenance, and clearing of invasive plant species (if applicable). All equipment, plant and other items used during the prospecting period will be removed from site (section 44 of the MPRDA, 2002). Waste material of any description will be removed from the prospecting 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 will be done (if applicable) in a sporadic manner during the life of the activity. 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.

(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.

Prospecting type and saleable mineral by-product

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

Mineral type	Manganese Ore Iron Ore Diamonds (General)
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 prospecting 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	-	**NO**
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	-	-
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)	-	-
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	133 622	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	17 782	1.00

Determine weighting factors

According to Tables B.7 and B.8

Weighting factor 1: Nature of terrain/accessibility	1.00 (Flat)
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:**	10 January 2020		
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	17	1.00	1.00	R 0.00
2(A)	Demolition of steel buildings and structures	m^2	0	241	1.00	1.00	R 0.00
2(B)	Demolition of reinforced concrete buildings and structures	m^2	0	356	1.00	1.00	R 0.00
3	Rehabilitation of access roads	m^2	0	43	1.00	1.00	R 0.00
4(A)	Demolition and rehabilitation of electrified railway lines	m	0	419	1.00	1.00	R 0.00
4(B)	Demolition and rehabilitations of non-electrified railway lines	m	0	229	1.00	1.00	R 0.00
5	Demolition of housing and/or administration facilities	m^2	0	483	1.00	1.00	R 0.00
6	Opencast rehabilitation including final voids and ramps	ha	0	253 019	0.04	1.00	R 0.00
7	Sealing of shaft, audits and inclines	m^3	0	130	1.00	1.00	R 0.00
8(A)	Rehabilitation of overburden and spoils	ha	0	168 679	1.00	1.00	R 0.00
8(B)	Rehabilitation of processing waste deposits and evaporation ponds (basic, salt-producing waste)	ha	0	210 087	1.00	1.00	R 0.00
8(C)	Rehabilitation of processing waste deposits and evaporation ponds (acidic, metal-rich waste)	ha	0	610 192	0.51	1.00	R 0.00
9	Rehabilitation of subsided areas	ha	0	141 244	1.00	1.00	R 0.00
10	General surface rehabilitation	ha	0.4	133 622	1.00	1.00	R 53 448.80
11	River diversions	ha	0	133 622	1.00	1.00	R 0.00

12	Fencing	m	0	152	1.00	1.00	R 0.00
13	Water Management	ha	0	50 807	0.17	1.00	R 0.00
14	2 to 3 years of maintenance and aftercare	ha	0.4	17 782	1.00	1.00	R 7 112.80
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 60 561.60
Multiply Sum of 1-15 by Weighting factor 2 (Step 4.4)		1.05		R 60 561.60		**Sub Total 1**	R 63 589.68

1	Preliminary and General	6% of Subtotal 1 if Subtotal 1 <R100 000 000.00	R 3 815.38
		12% of Subtotal 1 if Subtotal 1 >R100 000 000.00	-
2	Contingency	10.0% of Subtotal 1	R 6 358.97
		Sub Total 2 (Subtotal 1 plus management and contingency)	R 73 764.03
		Vat (15%)	R 11 064.60
		GRAND TOTAL (Subtotal 3 plus VAT)	**R 84 828.63**

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 84 828.63.**

(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 PR Holder 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
• Percussion Drilling	**Visual Characteristics:** • Visual intrusion due to prospeccting operation.	• Minimize the visual impact of the activity on the surrounding environment through proper site management and implementing good housekeeping practices.	Role: • 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. Responsibility: • Contain prospecting to the approved boundaries. • Ensure every borehole site has a neat appearance and is kept in good condition at all times. • Limit vegetation removal, and avoid the removal of large trees (>20 cm stem) or vegetation of significance (identified by ECO). • Rehabilitate and landscape every borehole site to address any residual impact.	Applicable throughout operational-, and decommissioning phases. • Daily compliance monitoring by site management. • Annual compliance monitoring of site by an Environmental Control Officer.
• Percussion Drilling	**Air Quality:** • Dust nuisance due to prospecting activities.	• Dust suppression equipment such as a water car (when needed).	Role: • Site Manager to ensure day-to-day compliance with the guidelines as stipulated in the EMPR.	Applicable throughout operational-, and decommissioning phases.

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
		• Signage that clearly reduce the speed on the access roads.	• Compliance to be monitored by the independent Environmental Control Officer during the annual environmental audit. <u>Responsibility:</u> • Control the liberation of dust into the surrounding environment 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). • Limit speed on the access roads to 40 km/h to prevent the generation of excess dust. • Minimise areas devoid of vegetation. • 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).	• Daily compliance monitoring by site management. • Annual compliance monitoring of site by an Environmental Control Officer.
• Percussion Drilling	**<u>Noise Ambiance:</u>** • Noise nuisance due to prospecting activities.	• 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>Role:</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>Responsibility:</u> • Ensure that employees and staff conduct themselves in an acceptable manner while on site. • No loud music may be permitted at the prospecting 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. • Implement best practice measures to minimise potential noise impacts.	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
• Percussion Drilling • Decommissioning and Rehabilitation	**Waste Management:** • Soil contamination associated with littering and hydrocarbon spills. • Potential impact associated with litter/hdyrocabon spills left in the prospecting area.	• Oil spill kit. • Sealed drip trays. • Formal waste disposal system with waste registers.	Role: • 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. Responsibility: • Ensure regular vehicle maintenance, repairs and services takes place at an off-site workshop and service area, and that none of the above is allowed in the prospecting footprint. When a breakdown occurs, arrange for the removal of the machine within 6 hours to a recognised workshop where it can be mended. • Provide ablution facilities in the form of a chemical toilet that is placed near the area being prospected. Ensure the toilet is serviced at least once every two weeks for the duration of the prospecting activities. • Ensure that the use of any temporary, chemical toilet facilities does 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. • Equip the diesel bowser with a drip tray if used on site. The nozzle of the bowser must rest in a sleeve to prevent dripping after refuelling. • Clean drip trays after use. Do not use dirty drip trays. • Keep a spill kit on site. • Collect any effluents containing oil, grease or other industrial substances in a suitable	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
			receptacle and removed from the site, either for resale or for appropriate disposal at a recognized facility. • Collect the contaminated soil from spillage that occurred, such as oil or diesel leaking from a burst pipe, within the first hour of occurrence, in a suitable receptacle and removed from the site, either for resale or for appropriate disposal at a recognized facility. File proof. • Contain general waste in site vehicles and daily remove waste from the prospecting area to a recognised general waste landfill site. • Prevent the burning or burying of waste on site. • Do not store chemicals or hazardous materials at the prospecting area. • Report any significant spillage of chemicals, fuels etc. during the lifespan of the prospecting activities to the Department of Water and Sanitation and other relevant authorities.	
• Percussion Drilling	**<u>Hydrology and Mining Biodiversity</u>** • Potential negative impact on the FEPA, area of biodiversity concern and/or drainage line.	• Visible beacons indicating the boundary of the buffer area.	<u>Role:</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>Responsibility:</u> • Do not allow any activities within a horizontal distance of 100 m from any watercourse (including the drainage line), without the necessary authorisation from the DWS. • Adhere to the conditions of the water use authorisation (if authorisation is applicable). • Remove all prospecting related equipment/machinery from the footprint upon closure.	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
• Percussion Drilling	**Hydrology** • Storm water management.	• Storm water management structures such as berms to direct storm- and runoff water around the work area (when needed).	Role: • 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. Responsibility: • Control drainage to ensure that runoff from the prospecting area does not culminate in off-site pollution, flooding or result in damage to storm water discharge points. • Divert storm water around the access roads and/or tracks to prevent erosion. • Keep clean water clean, and route it to a natural watercourse by a system separate from the dirty water system (if applicable). • Collect dirty water and contain it in a system separate from the clean water system. • Prevent dirty water from spilling or seeping into clean water systems.	Applicable throughout site establishment-, operational-, and decommissioning phases. • Daily compliance monitoring by site management. • Annual compliance monitoring of site by an Environmental Control Officer.
• Percussion Drilling	**Groundcover** • Negative impact on the natural vegetation of the footprint.	• Pre-clearance go-ahead from ECO. • Employee induction meetings.	Role: • 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. Responsibility: • Declare the area outside the prospecting boundary a no-go area, and educate all employees accordingly. • Do not remove plants without the approval of an environmental control officer (ECO).	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
			• Contain vehicle traffic (as far as possible) to the existing farm roads. Do not allow crisscrossing through undisturbed areas.	
• Percussion Drilling	**Groundcover:** • Infestation of the prospecting area with invader plant species.	• Designated team to cut or pull out invasive plant species that germinated on site. • Herbicide application equipment.	Role: • 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. Responsibility: • Implement an invasive plant species management plan to control all invasive plant species on site in terms of NEM:BA, 2004 and CARA, 1983. • 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.
• Percussion Drilling	**Fauna:** • Potential impact on fauna within the footprint area.	• Toolbox talks to educate employees how to handle fauna that enter the work areas.	Role: • 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. Responsibility: • Ensure no fauna is caught, killed, harmed, sold or played with. • 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.	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
• Percussion Drilling	• Potential impact on areas/infrastructure of heritage or cultural concern.	• Contact number of an archaeologist that can be contacted when a discovery is made on site.	<u>Role:</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>Responsibility:</u> • Confine all prospecting to the footprint area. • Demarcate known heritage resources with a 30 m buffer zone and manage as a no-go area. • Use existing roads as far as possible. • Subject any future listed activity (not yet approved) to an HIA. • Ensure that the ECO for the project assess drill locations prior to drilling to confirm there are no graves, stone walling or any heritage features. • Implement the following change find procedure when discoveries are made on site: ▪ If during the 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	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
			assessment of the finds who will notify SAHRA. ▪ Work may only continue once the go-ahead was issued by SAHRA.	
Percussion Drilling	**Existing Infrastructure:** Deterioration of the access road to the prospecting area. Erosion of access roads or vehicle tracks.	Grader to restore the road surface when needed.	Role: 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. Responsibility: 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 prospecting activities. Sign an agreement, prior to commencement, confirming responsibility towards the movement of employees. If responsible, repair/reinstate damaged fences and/or compensate losses due to gates left ajar.	Applicable throughout operational phases. Daily compliance monitoring by site management. Annual compliance monitoring of site by an Environmental Control Officer.
Percussion Drilling	**General:** Potential health and safety risks to employees.	Stocked first aid box. Level 1 certified first aider. All appointments in terms of the Mine Health and Safety Act, 1996.	Role: 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 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
			Responsibility: • Ensure adequate ablution facilities and water for human consumption is daily available on site. • Ensure that workers have access to the correct PPE as required by law. • Manage all operations in compliance with the Mine Health and Safety Act, 1996 (Act No 29 of 1996). • Cover boreholes daily. • Seal and cap all boreholes as prescribed in the rehabilitation plan, upon closure.	

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 DMR 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 Section 102 amendment application was approved a copy of the amended EMPR will be handed to the site manager for his perusal. 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 prospecting continues. An Environmental Control Officer needs to check compliance of the prospecting 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 PR Holder undertakes to annually review and update the financial provision calculation, upon which it will be submitted to DMR 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:

09 March 2020

Date:

-END-

APPENDIX A1

REGULATION 42 PROSPECTING PLAN

APPENDIX A2

REGULATION 2(2) PROSPECTING PLAN

APPENDIX B
LOCALITY MAP

APPENDIX C
PROPOSED DRILL PLAN

APPENDIX D

LAND USE MAP

APPENDIX E
OUTCROP MAPPING

APPENDIX F

REHABILITATION PLAN

APPENDIX G

COMMENTS AND RESPONSE REPORT

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 prospecting 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			
SITE ALTERNATIVE 1			
TYPE OF IMPACT	**DURATION**	**LIKELIHOOD**	**SIGNIFICANCE**
Operational Phase:			
• Visual intrusion due to prospecting operation.	**Duration of operational phase**	**Low Possibility**	**Low Concern**
• Dust nuisance due to prospecting activities.		**Low Possibility**	**Low Concern**
• Noise nuisance due to prospecting activities.		**Low Possibility**	**Low Concern**
• Soil contamination associated with littering and hydrocarbon spills.		**Low Possibility**	**Low Concern**
• Potential negative impact on the FEPA, area of biodiversity concern and/or drainage line.		**Low Possibility**	**Low Concern**
• Negative impact on the natural vegetation of the footprint.		**Low Possibility**	**Low Concern**
• Infestation of the prospecting area with invader plant species.		**Low Possibility**	**Low Concern**
• Potential impact on fauna within the footprint area.		**Low Possibility**	**Low Concern**
• Potential impact on areas/infrastructure of heritage or cultural concern.		**Low Possibility**	**Low Concern**
• Deterioration of the access road to the prospecting area.		**Low Possibility**	**Low Concern**
Decommissioning Phase:		**LIKELIHOOD**	**SIGNIFICANCE**
• Uncapped boreholes left by contractor.	**Duration of decommissioning phase**	**Low Possibility**	**Low Concern**
• Potential impact associated with litter/hydrocarbon spills left in the prospecting area.		**Low Possibility**	**Low Concern**
• Erosion of access roads or vehicle tracks.		**Low Possibility**	**Low Concern**
• Return of prospecting area to agricultural use **(Positive Impact)**		**Definite**	**Medium – High (+)**

APPENDIX I

PHOTOGRAPHS OF THE SITE

PHOTOGRAPHS OF THE PROSPECTING FOOTPRINT



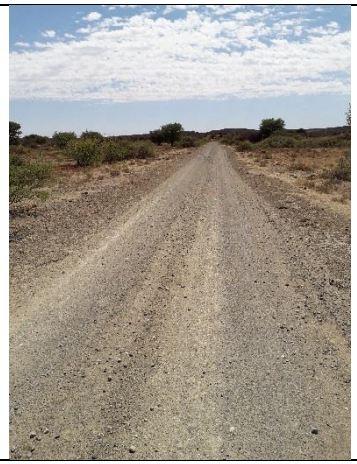



PHOTOGRAPHS OF THE PROSPECTING FOOTPRINT

OPEN CAST PIT PREVIOUSLY MINED FOR DIAMONDS

EXISTING INFRASTRUCTURE WITHIN THE FOOTPRINT

PERCUSSION DRILLING OF A BOREHOLE



EXISTING ROAD INFRASTRUCTURE

AGRICULTURAL DEVELOPED AREAS

APPENDIX J

HERITAGE IMPACT ASSESSMENT

APPENDIX K
CV AND PROOF OF EXPERIENCE OF THE EAP