



Environmental Consultant



**BASIC ASSESSMENT REPORT AND ENVIRONMENTAL MANAGEMENT PLAN FOR THE APPLIED PROSPECTING RIGHTS ON FARM PORTIONS OF MAPOCHSGRONDE FARM IN ELIAS MOTSOLEDI LOCAL MUNICIPALITY, LIMPOPO PROVINCE.**

**DMR REF NO: LP 30/5/1/1/2/ 13860 PR**  
**DRAFT REPORT**

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

**PREPARED BY:**

**Basia Environmental Consultants**

**Contact Person:** Mr. Tshia Malehase

**Tel:** 012 382 6343

**Cell:** 079 263 0597

**Email:** [info@basiaec.co.za](mailto:info@basiaec.co.za)

**Fax:** 086 226 4397

**PREPARED FOR:**

**Barzani Mining (Pty) Ltd**

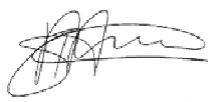
**Contact Person:** Mr. Thabo Moloto

**Tel:** 012 881 0210

**Cell:** 082 823 8871

**Email:** [thabo@barzanigroup.co.za](mailto:thabo@barzanigroup.co.za)

**Fax:** 086 476 7573

<b>COMPANY NAME:</b>	<b>Basia Environmental Consultants (Pty) Ltd</b>
<b>REPORT TITLE:</b>	BASIC ASSESSMENT REPORT AND ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT FOR PROSPECTING RIGHTS APPLICATION
<b>PROJECT:</b>	PROSPECTING RIGHTS APPLICATION
<b>DRAFT REPORT DATE:</b>	DECEMBER 2020
<b>REPORT WRITE-UP:</b>	<b>Mahlangu Seli</b> Environmental Consultant
	Signature: _____ 10 December 2020
<b>REVIEWER:</b>	<b>Malehase Tshia (Pr. Sci. Nat) (EAPASA)</b> Environmental Consultant
	Signature:  _____ Date: 10 December 2020
<b>PREPARED FOR:</b>	<b>Barzani Mining (Pty) Ltd</b> Barzani Mining Pty Ltd P.O Box Ruimisig 1739
<b>CONTACT DETAILS:</b>	Fax: 0862264397 Cell: 0792630597 Email: info@basiaec.co.za

<b>DOCUMENT OUTLINE</b>	<b>PAGE NUMBER</b>
<b>PART A: SCOPE OF ASSESSMENT AND BASIC ASSESSMENT REPORT</b>	<b>7-106</b>
<b>PART B: ENVIRONMENTAL MANAGEMENT PROGRAMME</b>	<b>106-115</b>
<b>PART C: REHABILITATION PLAN</b>	<b>116-127</b>
<b>PART D: HEALTH AND SAFETY ISSUES</b>	<b>128-137</b>
<b>APPENDIX A: EAP's CV</b>	
<b>APPENDIX B: PUBLIC CONSULTATION REPORT</b>	
<b>APPENDIX C: LOCALITY MAPS</b>	

*Note: Color pages are used to separate the appendices*

## EXECUTIVE SUMMARY

**Barzani Mining (Pty) Ltd** is applying for a Prospecting for Magnesite, Vanadium and Vermiculite on Portion 78, 80, 107, 437, 443, 444, 445, 446, 447, 448, 449, 454, 455 & 456 of Mapochsgronde 500 JS, Remainder of Farm Mapochsgronde 859 JS, Re of Mapochsgronde 865 JS, Re of Mapochsgronde 868 JS, Re of Mapochsgronde 869 JS, Re of Mapochsgronde 872 JS, Re of Mapochsgronde 873 JS, Re of Mapochsgronde 874 JS & Portion 1 & RE of Mapochsgronde 910 JS situated in the Magisterial District of Sekhukhune. The application was accepted on the October 2020 and bears the following reference number **LP 30/5/1/1/2/ 13860 PR**.

Prospecting is the first stage of the geological analysis in search for mineral deposits such as Magnesite, Vanadium and Vermiculite, especially by drilling. Drilling rig machines are used to create a small hole of about 20 cm in diameter to the depth of 50 m in the earths subsurface (about 15 cm in diameter) to obtain a Magnesite, Vanadium and Vermiculite sample.

The commencement of the proposed prospecting project will result in the undertaking of activities that are considered as listed activities in terms of the National Environmental Management Act, 1998 (Act 107 of 1998) as amended. The proposed activities trigger Government Notice 327 of 7 April 2017 (Listing notice 1; Activity 20) which requires a Basic Assessment to be conducted as part of the prospecting right application.

**Barzani Mining (Pty) Ltd** has appointed Basia Environmental Consultants (BEC) as the independent Environmental Assessment Practitioner (EAP) to facilitate the environmental authorization process for its proposed Magnesite, Vanadium and Vermiculite prospecting right application. Basia Environmental Consultants has undertaken site assessment and public participation process, together with associated stakeholders and landowner's engagement as wells to develop and provide environmental documentation.

This document provides a basic assessment study with identified environmental impacts, mitigation measures and Environmental Management Plan (EMP) for the proposed prospecting rights application for Magnesite, Vanadium and Vermiculite. This document which concerns the assessment of environmental impacts and a programme for the management of impacts of the proposed activities at the prospecting project, was compiled in terms of the EIA Regulations, 2017.



Before an EAP submits a final report they must have given registered I&APs access to, and an opportunity to comment on the report prior to the submission of the final report to the competent authority for approval. I&AP's and stakeholders were therefore invited to participate in the public review period of the Draft BAR and EMP, which is available to I&AP's as well as stakeholders for a period of 30 days (**from 11 December 2020 to 30 January 2021**). The consultation meeting will be held on the **08<sup>th</sup> of January 2021** at Highside Tarven in Tonteldoos.

The comments received will be incorporated in the final BAR and EMP which will be submitted on the **30<sup>th</sup> of January 2021**. This document intends to supply the competent authority with required information, an insight of the proposed project, the processes that were undertaken. In order to enable the department to make a decision.

## **PART A: BASIC ASSESSMENT REPORT**

### **1. OBJECTIVE OF THE BASIC ASSESSMENT PROCESS**

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

1. 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;
2. identify the alternatives considered, including the activity, location, and technology alternatives;
3. describe the need and desirability of the proposed alternatives,
4. 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 the these aspects to determine:
  - a. the nature, significance, consequence, extent, duration, and probability of the impacts occurring to; and
  - b. 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;
5. 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.

## 2. DETAILS OF THE EAP AND APPLICANTS

### 2. CONTACT PERSON AND CORRESPONDENCE ADDRESS

#### 2.1.1. Applicant's Contact Details

ITEM	COMPANY CONTACT DETAILS
Name	Barzani Mining (Pty) Ltd
Fax no:	086 276 8890
Cellular no:	082 823 8871
E-mail address:	thabo@barzanigroup.co.za
Postal address:	Barzani Mining Pty Ltd P.O Box Ruimisig 1739

#### 2.1.2. Applicant's company Profile

Barzani Mining is a privately 75.5% black-owned mining services company that was established within the Barzani Group of Companies to undertake the much needed value add contract mining services. The primary focus is surface mining which is a wide category of mining in which land and rock above the mineral deposit are removed and followed by related services. Barzani is enthusiastic about a sustainable development and accountable approach to mining. The Barzani Group has consistently proven itself within various sectors where they have exceeded the expectations of their clients in producing quality projects, locally and abroad.

#### **Contract mining services includes:**

- **Drill and Blast services**

Barzani Mining provides specialized services in drilling and blasting

production for surface mining, explosive supply options and they also have well-trained and experienced drillers, shot firers and blast crews.

- **Bulk Material Handling services ( crushing and screening)**  
Barzani supplies, operates and maintain modular, mobile and static crushing and screening plants for their clients.
- **Overburden Removal**  
Removal of topsoil and overburden that lies above mined minerals.
- **Topsoil stripping**  
Practice of mining a mineral seam by first removing a long strip of overlaying soil and rock.
- **Selective mining**  
Mining technique by which high-value ore is mined in such a way that the low-grade ore remaining in the mine is unable to be extracted profitably in the future.
- **Truck loading**  
Haul trucks are off-highway, rigid dump trucks specifically engineered for use in high-production mining environments.
- **Roadway maintenance**  
Remedying defects such as potholes that occur from time to time.

### 2.2.1. Details of the EAP

Name of the Practitioner	Tshia Malehase
Tel No	079 263 0597
Fax No	086 226 4397
Email address	<a href="mailto:info@basiec.co.za">info@basiec.co.za</a>
Company Name	Basia Environmental Consultant
Postal Address	Unit 10 Oakview, 40 Lynn Road, Karenpark Ext 42, Akasia, 0182

Name of the Practitioner	Seli Mahlangu
--------------------------	---------------

Tel No	076 025 8684
Email address	<a href="mailto:mahlangup@basiec.co.za">mahlangup@basiec.co.za</a>
Company Name	Basia Environmental Consultant

### **2.2.2. Expertise of the EAP**

#### **The qualifications of the EAP**

1) He hold M.Tech in Environmental Management from Tshwane University of Technology (TUT) which was completed in 2016. His research project was titled “Determination of mercury and its fractionation products in gold mine tailings dams and their surrounding areas in Gauteng. He was able to publish two scientific papers in reputable journals from this project and co-authored two scientific publication. He also hold BSc (Hon) degree in Environmental Science from Walter Sisulu University. His research project was titled “The impacts of Transkei Quarry on nearby water resources in Libode, Umtata, Eastern Cape.

He is currently lecturing and doing PhD in Environmental Management. His project is aiming to quantify organic-mercury species in different consumer products and environmental samples and their environmental risk assessments. He is registered with the South African Council for I Natural Scientist (SACNASP) as a Professional Natural Scientist in the field of Environmental Science (SACNASP: Reg no; 117391). He is also with the registered Environmental Assessment Practitioners Association of South Africa (EAPASA Reg no. 2020/1413)

2) Ms. S.Mahlangu holds a National Diploma in Environmental Sciences from Tshwane University of Technology (TUT) which was completed in 2019 and she is currently in pursuit of an Advanced Diploma qualification in the same field.

#### **2.2.3. Summary of the EAP’s experience**

1) Mr. Tshia Malehase is an independent Environmental Assessment Practitioner with extensive experience in a wide-range of environmental related projects, processes and prospecting rights applications.

Mr T. Malehase have been trained and worked in different Environmental Consulting Company for five (5) years, where he was groomed and exposed into different environmental applications, processes and documentation. This includes Environmental Impact Assessment, Basic assessment, Water Use Licences. He also had a privilege to work at the Department of Mineral resources where he worked with the applications for prospecting rights, mining permit and mining rights applications including the contingency plans and rehabilitation strategies.

He has undertaken environmental compliance (including basic assessments, water use license applications, social and environmental management systems, mining permits and prospecting right applications) and public participation processes. Overall, he has been in the field of environmental science and management, environmental chemistry and mining for over ten (10) years. Please refer to Appendix A for Malehase's CV which provides a detailed list of projects which illustrate Mr Malehase's competence in carrying out the EIA process.

2) Ms. S Mahlangu is an Environmental Assessment Practitioner (Junior) with one year experience in a wide-range of environmental related projects, processes and prospecting rights applications. She has been training and working in an Environmental Consulting Company where she is being groomed and exposed into different environmental applications, processes and documentation. This includes Environmental Impact Assessment, Basic assessment and Water Use License.

As a student, Ms. Mahlangu was part of the green campus initiative team which was responsible for promoting green leadership on campus by raising environmental awareness and building sustainable living practices through advocating for water conservation, energy conservation and efficiency, recycling and waste reduction. She would attend Educational excursions which involved training on aspects of wetland and nature reserve science and the facilitation of wetland education.

### 3. DETAILS OF THE PROPOSED PROJECT

#### 3.1. Location of the overall Activity

Table 1: *Location of overall activity*

Farm Name	Portion 78, 80, 107, 437, 443, 444, 445, 446, 447, 448, 449, 454, 455 & 456 of Mapochsgronde 500 JS, Remainder of Farm Mapochsgronde 859 JS, Re of Mapochsgronde 865 JS, Re of Mapochsgronde 868 JS, Re of Mapochsgronde 869 JS, Re of Mapochsgronde 872 JS, Re of Mapochsgronde 873 JS, Re of Mapochsgronde 874 JS & Portion 1 & RE of Mapochsgronde 910 JS
Application area (Ha)	Approximately 1514.093381
Magisterial district	Sekhukhune
Distance and direction from nearest town	The proposed prospecting area is located Km 15km East of Roosenekal, Limpopo Province.
21 digit Surveyor General Code for each farm portion	NOHS00000000500000078 NOHS00000000500000080 NOHS00000000500000107 NOHS00000000500000437 NOHS00000000500000443 NOHS00000000500000444 NOHS00000000500000445 NOHS00000000500000446 NOHS00000000500000447 NOHS00000000500000448 NOHS00000000500000449 NOHS00000000500000454

	N0HS00000000500000455
	N0HS00000000500000456
	N0HS00000000859000000
	N0HS00000000865000000
	N0HS00000000868000000
	N0HS00000000869000000
	N0HS00000000872000000
	N0HS00000000873000000
	N0HS00000000874000000
	N0HS00000000910000001
	N0HS00000000910000000



Table 2: Details of the farms and owners

LIST OF LAND OWNERS			
FARM NAME	PORTION	OWNER	DEEDS NUMBERS
Mapochsgronde 500 JS	78	Unknown	Unknown
	80	Unknown	unknown
	80	Unknown	Unknown
	437	Brassel Kerryl Robynn	T48113/2013
	443 & 445 Remainder	Mcduling Schalk Jacobs	T125725/97
	444	Phasey Gwendoline Anne	T158250/2005
	446	Stander Catharina Johanna Cecilia	T63229/2003
	447	Skilpadskuil PTY LTD	T24760/1984
	448	Paul Cassells	
	449	Steinreich PTY LTD	T3161/1979
	454	National Government of the Republic of South Africa	T97555/2015
	455	Republiek Van Suid-Afrika	T18457/1959
	456	Republiek Van Suid-Afrika	T20357/1959
Mapochsgronde 859 JS	Remainder	Mcduling Schalk Jacobus	T125725/1997
Mapochsgronde 865 JS	Remainder	Paul Cassells	
Mapochsgronde 868 JS	Portion 1 and remainder	Unknown	

Mapochsgronde 869 JS	Remainder	Unknown	
Mapochsgronde 872 JS	Remainder	Unknown	
Mapochsgronde 873 JS	Remainder	Unknown	
Mapochsgronde 874 JS	Remainder	Unknown	
Mapochsgronde 910 JS	Portion 1 and Remainder	Unknown	

Table 3: *Prospecting right boundary co-ordinates (WGS 84)*

<b>ID</b>	<b>LATITUDE</b>	<b>LONGITUDE</b>
A	-25.25635	29.914914
B	-25.287682	29.927978
C	-25.283732	29.931285
D	-25.277141	29.938852
E	-25.271145	29.942421
F	-25.269741	29.94787
G	-25.285993	29.960219
H	-25.292554	29.954146
I	-25.292917	29.953551
J	-25.293988	29.953045
K	-25.2951	29.95173
L	-25.297307	29.951344
M	-25.298538	29.947971
N	-25.302209	29.948369
O	-25.310266	29.951662
P	-25.310706	29.94964
Q	-25.309398	29.931889
R	-25.313954	29.933043
S	-25.310445	29.915839
T	-25.310052	29.915078
U	-25.302926	29.91202
V	-25.299416	29.912068

### **3.3. Locality map**

The proposed prospecting area is located within the Elias Motsoaledi Local Municipality, which falls under Sekhukhune District Municipality in the province of Limpopo. Figure 1 shows the locality maps of the proposed area. Figure 2 show farm portion numbers in respect to the area applied for.

APPLICATION FOR A PROSPECTING RIGHT FOR MAGNESITE, VANADIUM AND VERMICULITE ON Portion 78, 80, 107, 437, 443, 444, 445, 446, 447, 448, 449, 454, 455 & 456 of MAPOCHSGRONDE 500 JS, Re of MAPOCHSGRONDE 859 JS, Re of MAPOCHSGRONDE 860 JS, Re of MAPOCHSGRONDE 861 JS, Re of MAPOCHSGRONDE 865 JS, Re of MAPOCHSGRONDE 866 JS, Portion 1 & Re of MAPOCHSGRONDE 868 JS, Re of MAPOCHSGRONDE 869 JS, Re of MAPOCHSGRONDE 872 JS, Re of MAPOCHSGRONDE 873 JS, Re of MAPOCHSGRONDE 874 JS & Portion 1 & Re of MAPOCHSGRONDE 910 JS, located at Elias Motsoaledi Local Municipality, in the Sekhukhune District Municipality, LIMPOPO PROVINCE

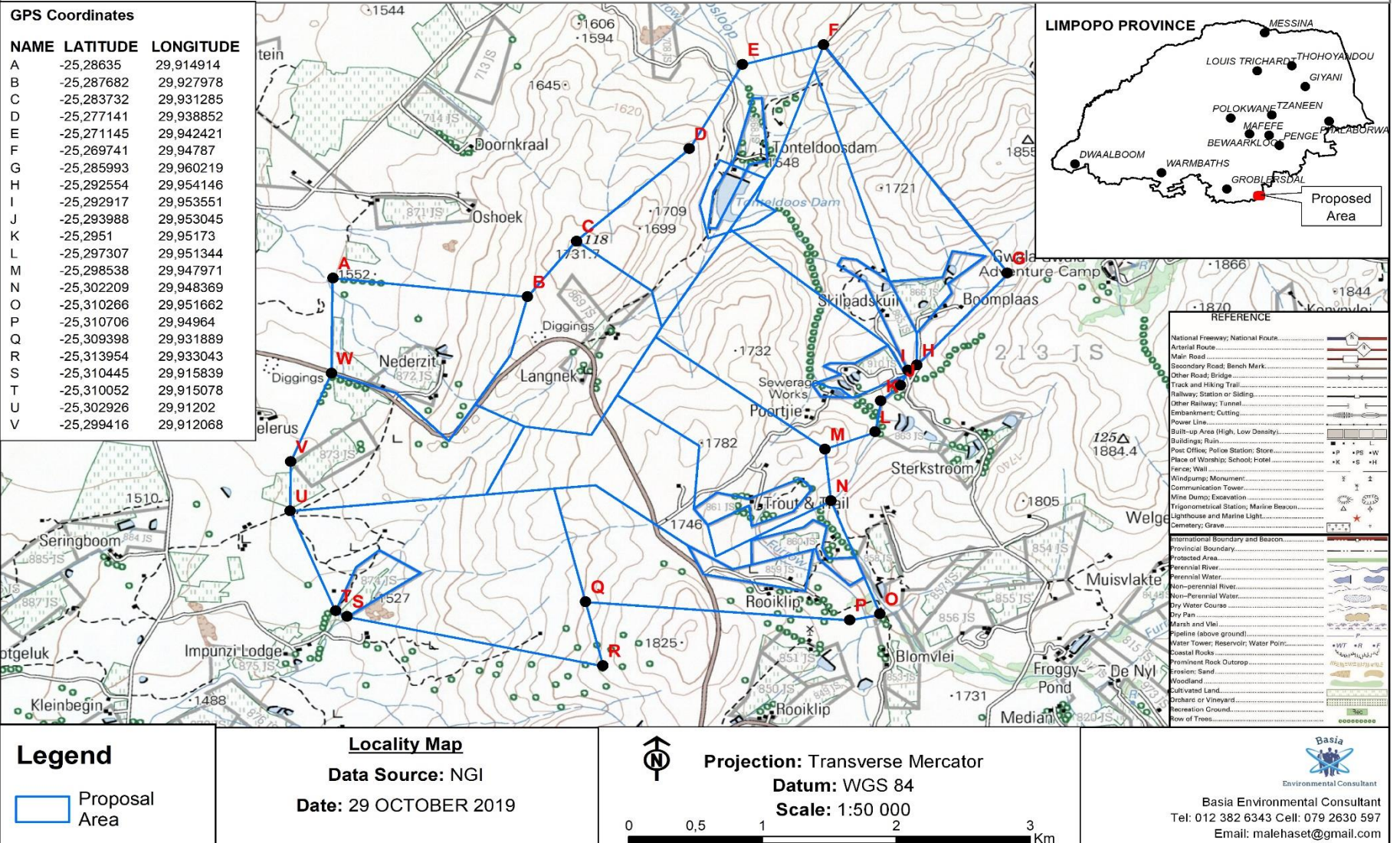


Figure 1: Locality Map of the proposed Prospecting Right Application Area.



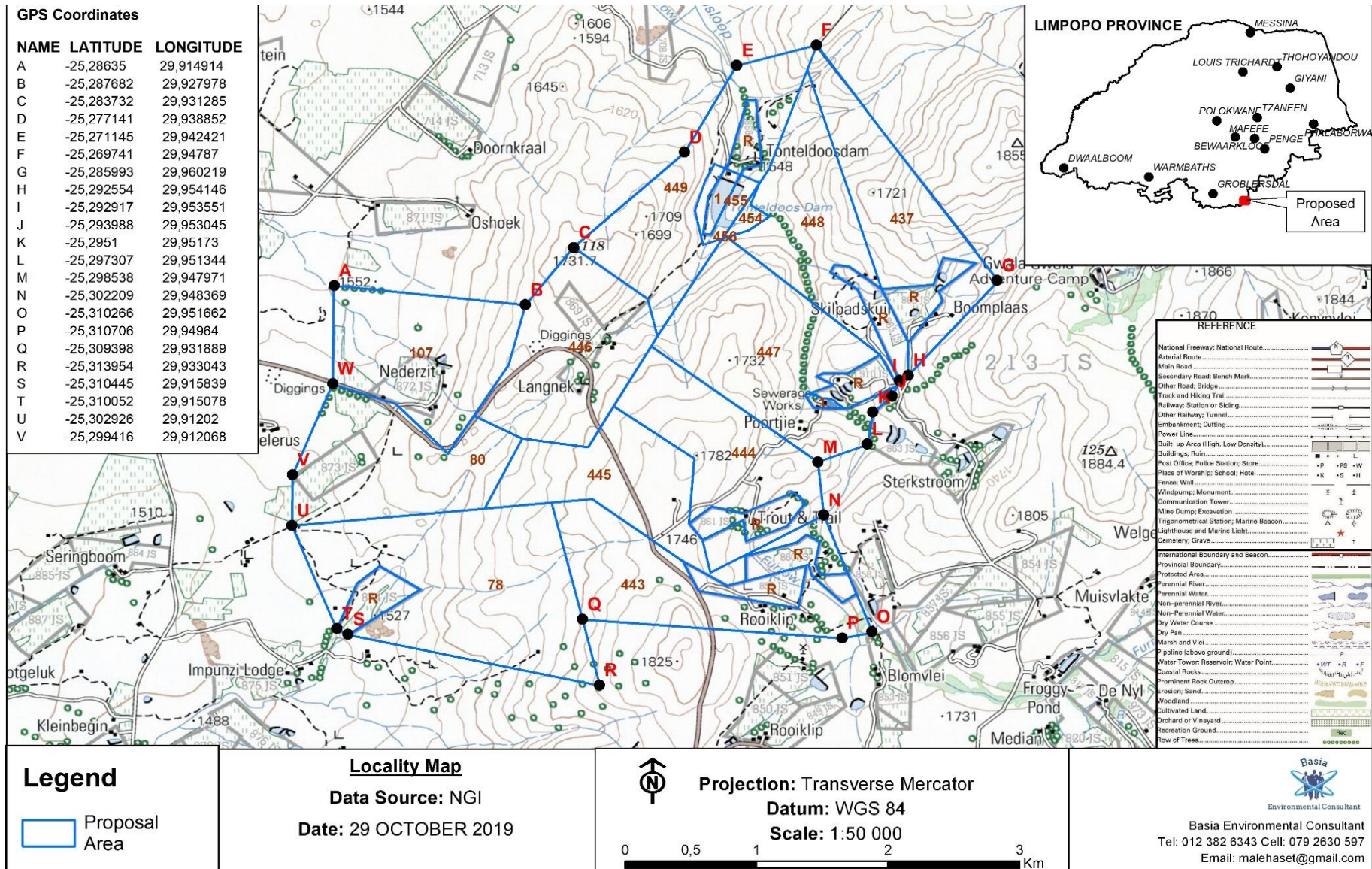


Figure 2: Locality map showing different farm portions.

## **4. DESCRIPTION OF THE RECEIVING ENVIRONMENT AND REGIONAL SETTINGS**

### **4.1. General socio-economic and environmental settings**

The proposed site is located within various farm portions of Mapochsgronde farm in Tonteldoos Village which is 74 km North-east of Middelburg and 20 Km Northwest of Dullstroom near the border of the Mpumalanga and Limpopo province of South Africa. Tonteldoos is found between the Western slopes of the Steenkampsberg and Mapochsberg, 15 Km East of the Roosenekal town, located close proximity to the R555 along D1526. The small town of Roosenekal is situated between Groblersdal and Lydenburg and falls within the Greater Roosenekal Area - which incorporates the Roosendal, Draaikraal, Tonteldoos, Laersdrif, Staapberg, Wapaaskloof and Rooikraal communities. The Elias Motsoaedi local Municipality has 30 wards it is said to cover approximately 3 713 km<sup>2</sup> of the whole district with Groblersdal and Rossenekal as the two main cities in the municipality. There is a population of 268 256 249 3 which constitutes of 97.9% black African, 0.1% Colored's, 0.2% Indians and 1.6% white people. Within the whole population only 26.1% have matric qualification and only 6.9% have obtained higher education qualifications. The Sekhukhune district (SDM) comprises of both rural and urban characteristics, however, it is mostly rural in nature and lies on the North western periphery of Mpumalanga. The SDM is located on the outskirts of major towns such as Pretoria, Nelspruit and Polokwane. It is estimated that approximately 5 % of the district's population lives in urban areas.

The main urban centres within the district are Groblersdal, Burgersfort, Marble Hall, Jane Furse, Ohrigstad, Steelpoort and Driekop. Outside these towns, there are 605 villages which are sparsely populated and dispersed throughout the district. Towns and villages in the SDM are serviced by the districts major rivers- the Olyphant's River, Tubatse River and Elands R.

## **4.2. Current land use**

The land cover of the entire study area is a mix of farmlands, open bushveld, hills, low mountains farm houses, resorts and rural settlements. Agriculture (crop, animal poultry farming) is the main land use in the area, indicated by the predominance of "unimproved grassland" (livestock grazing) and the occurrence of areas of cultivation. The farmlands are a mix of cultivated lands, some of which are under pivot irrigation; cultivated lands under dryland production; and grazing lands for livestock. The open bushveld is a mix of wild bushveld in the broad valley and mostly on the hills and mountains. The rest of the study area has no urbanization and dominated mostly by farmhouses, lodges, sheds and farming related infrastructure. Mining is one of the prominent land use activities in the vicinity. There are few roads and power lines in the study area. All the roads are gravel roads. The land use of the area applied for is depicted in Figure 3 below.



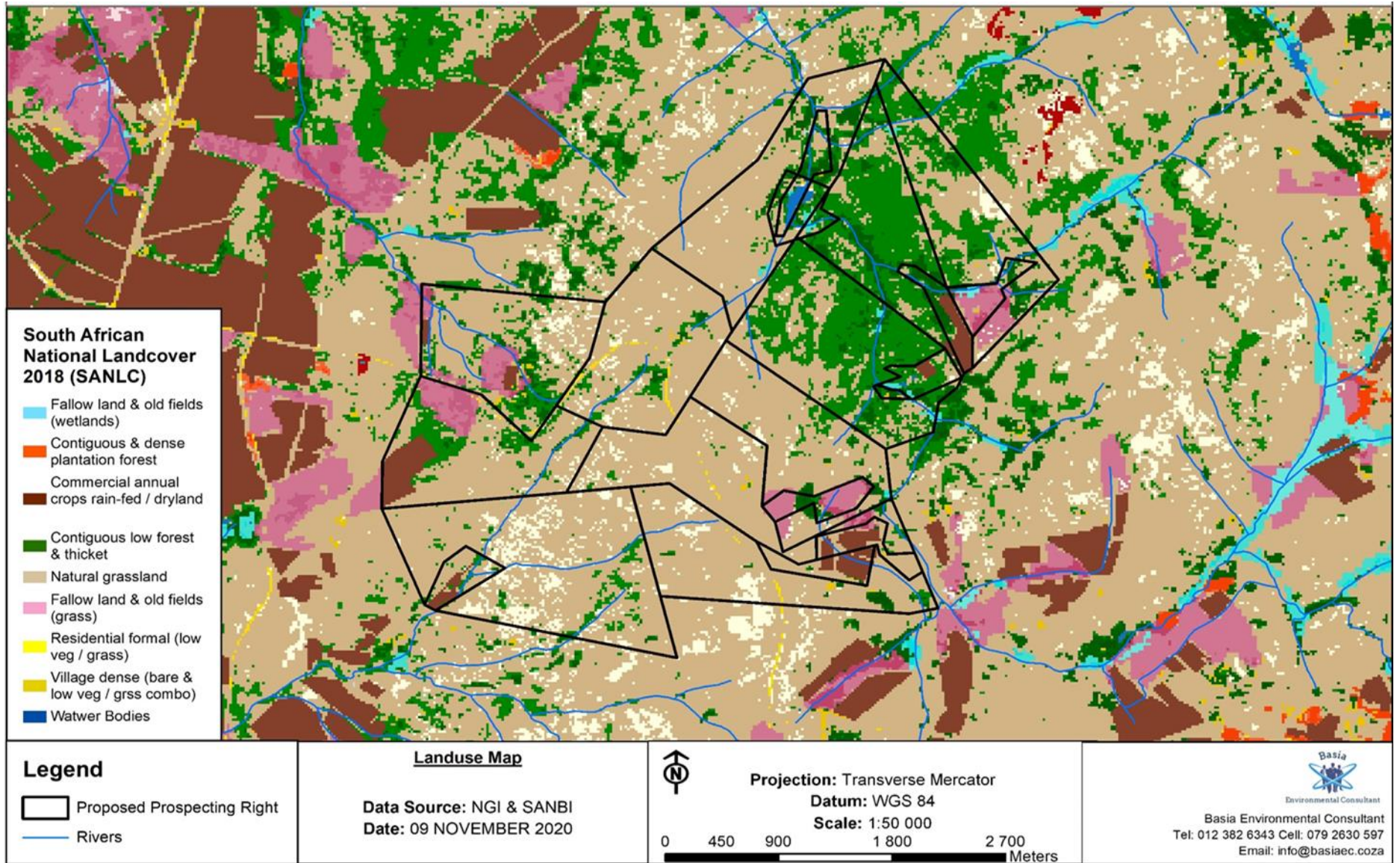


Figure 3: Landuse map of the proposed area



### **4.3. Surface Water**

The proposed prospecting area is within the B41B and B41C quaternary catchment. There are multiple river streams and wetlands within and in close proximity of the proposed site. There are three streams that pass within the proposed site; the Maraisloop, Tonteldosloop and the Klipbank spruit. Tonteldoosloop and Klipbank spruit are tributaries of the Steelpoort River which is one of the main tributaries of the Olifants River. It is an Olifants river Sub basin. The Olifants river basin covers an area of 54 600 Km<sup>2</sup> while the steelpoort cover an area of 7.139 Km<sup>2</sup> a stream and the estimate terrain elevation above sea level is 1461 metres. The Olifants River catchment (including the Letaba and Shingwedzi catchments) is a sub-catchment of the Limpopo Basin and is the largest tributary of the Limpopo River. The Olifants River runs a long course from the Highveld across varying terrain and geology to meet with the Limpopo River in Mozambique.

Figure 4 show the catchment area in relation to the proposed site.

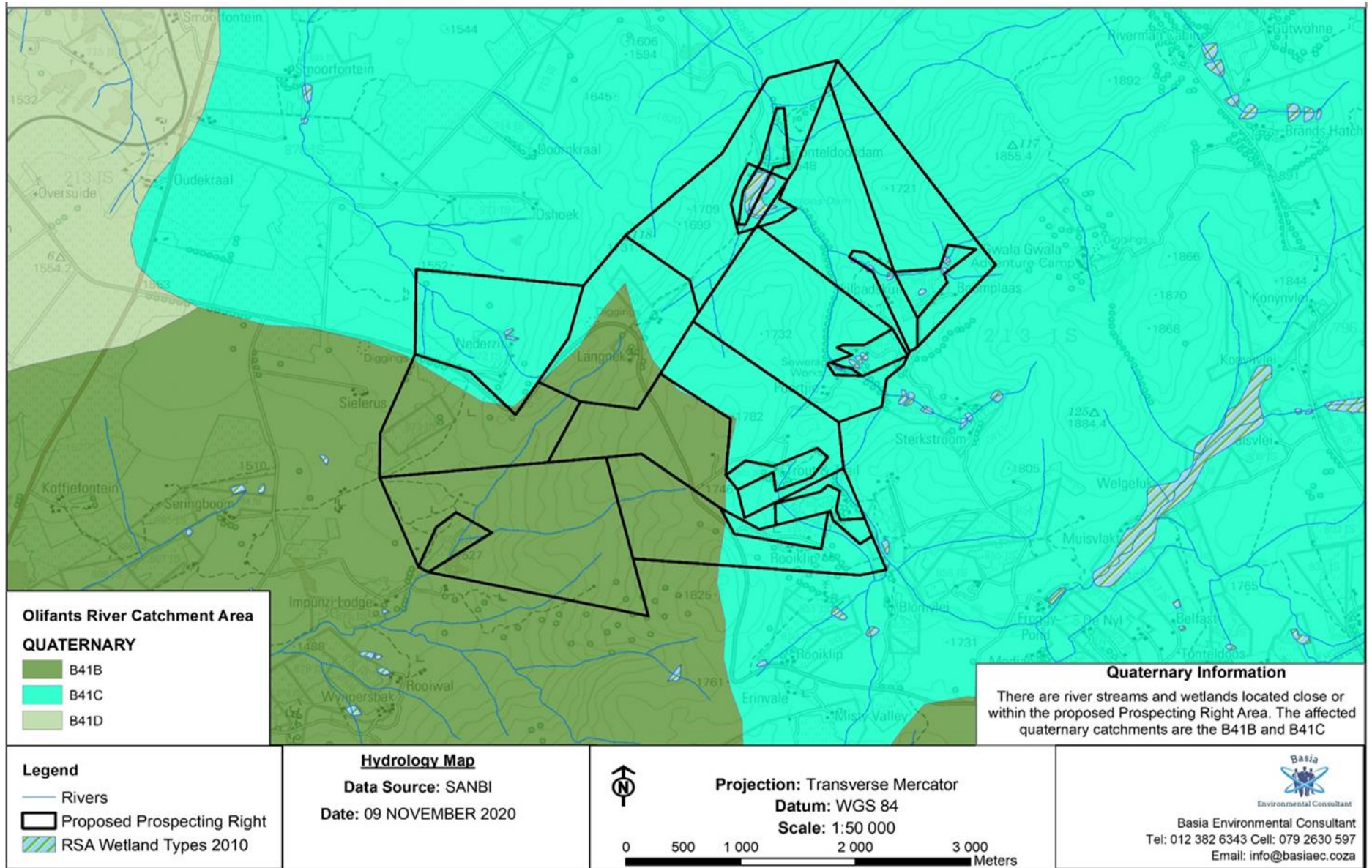


Figure 4: hydrology map of the proposed area

#### **4.4. Climate**

Climate change influences pest and disease distributions, flowering and fruiting seasons, and ground water resources. The increase in precipitation will increase the risk of periodic and extreme flood events. This will have positive effects on water resources in terms of quantity of water in rivers, increased groundwater and filling of dams. There are however, negative impacts in terms of flooding, increased erosion and the effect on water quality.

Elias Motsoaledi's climate is classified as warm and temperate (refer to figure 5 & 6). The district as a whole, is in the Savana Biome where the summers are warm and moist and winters are cool and dry and it receives more than 80% of its rainfall during the summer season. The area is in the summer rainfall (October to March) region of South Africa and has an approximated annual rainfall of 878mm. An average of 123.1mm is usually recorded for January, the month with the highest average rainfall. The average temperature for the year in this Municipality is (18.3°C). The warmest month, on average, is January with an average temperature of (22.9°C). The coolest month on average is June, with an average temperature of (11.2°C).

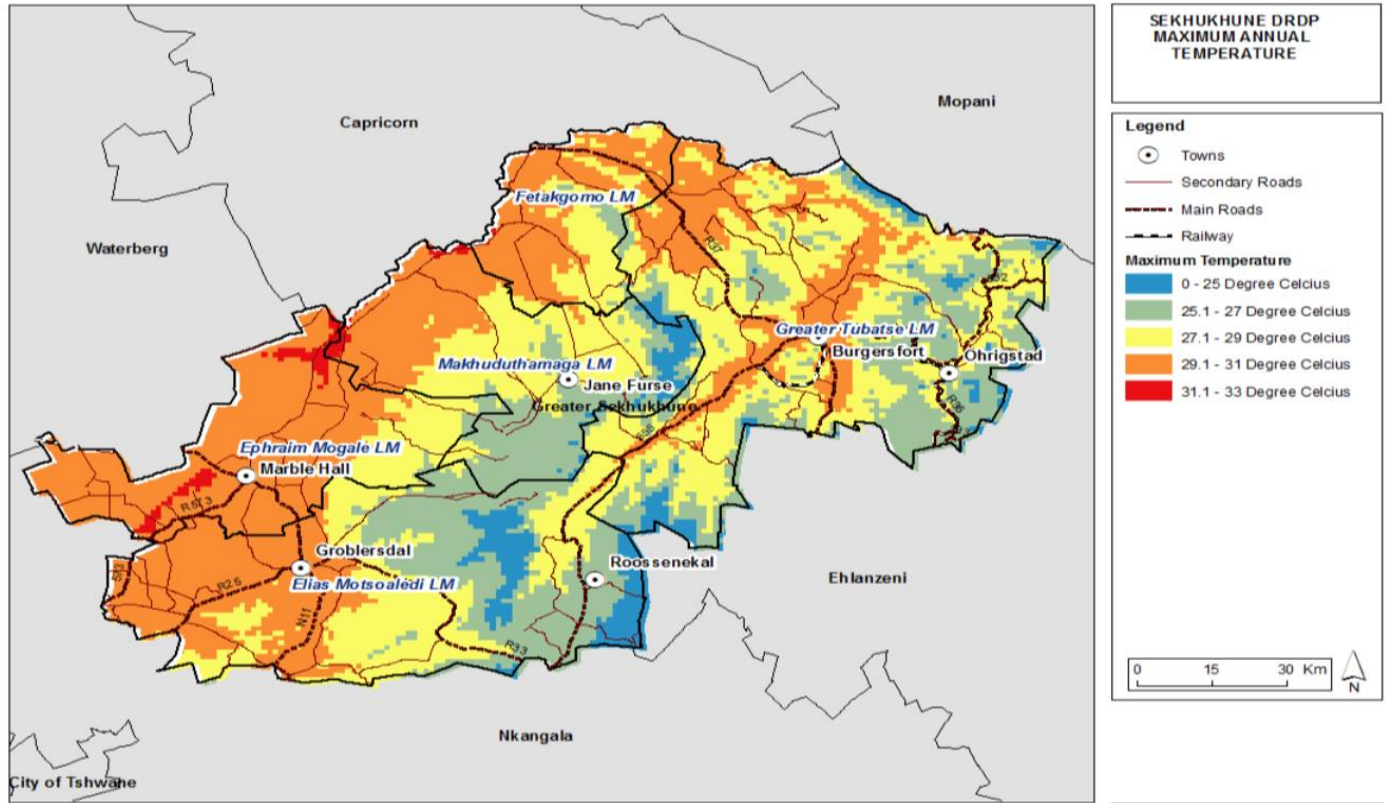


Figure 5: Monthly temperatures and precipitation of Elias Motsoaledi

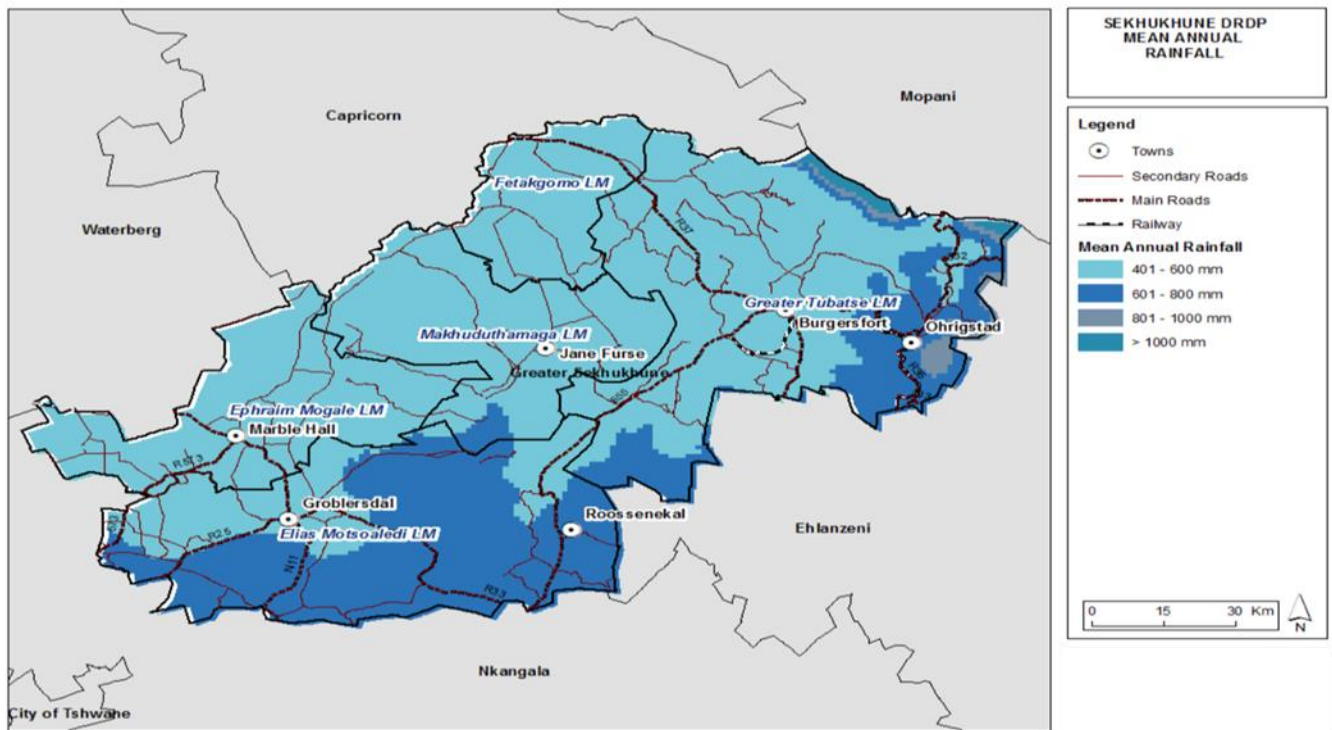


Figure 6: Monthly temperatures and precipitation of Elias Motsoaledi



## 4.5. Vegetation

The proposed site is located within the Sekhukhune Montanan Grassland of the Messic Highveld Grassland Bioregion which is a threatened species with an endangered status. The messic grasslands are made up of highly productive sourveld grasslands characterised by long-lived grasses that favour re-sprouting, and other plants that show a tendency to store carbohydrates in specialised underground storage organs; these plants withstand above-ground disturbance by being long-lived with only occasional replacement from seed and are adapted to a climate characterised by high summer rainfall. This is dense, sour grassland that occurs in the major chain of hills that transect the area and have a north-south orientation, creating moderately steep slopes with predominately eastern and western aspects. This vegetation type comprises the Roossenekal Sub centre of the (SPCE). There is tall grassland found on the plains and encroachment by indigenous or invasion by alien microphyllous tree species is common in places. There is no formal conservation in the area. Important taxa include: Small trees: *Protea caffra* subsp. *zaffre*, *Acacia caffra*, *Apodytes dimidiata* subsp. *Dimidiata*, *Canthium suberosum*, *Cussonia transvaalensis*, *Seemannaralia gerrardii*; woody climbers: *Rhoicissus tridentata*, *Lasminum quinatum*, *Triaspis glaucophylla*. *Austroafricana*; tall shrubs: *Euclea crispa* subsp. *crispa*, *Brachylaena ilicifolia*, *Diospyros austro-africana*, *Euclea linearis*, *Pavetta zeyheri*; low shrubs: *Gnidia caffra*, *Senecio microglossus*, *Dyschotiste rogersii*, *Elephantorrhiza praetermissa*, *Leonotis leonurus*, *Polygala uncinata*, *Rhus discolor*, *R. tumulicola* var. *meeuseana*, *R. wilmsii*; geoxylic suffrutex: *Elephantorrhiza elephantina*.

Mesic Highveld grasslands are key water production landscapes which is why many wetlands and pans and five major river systems have their origin in these grasslands. Loss of natural vegetation needs to be limited to prospecting activities, if not completely avoided

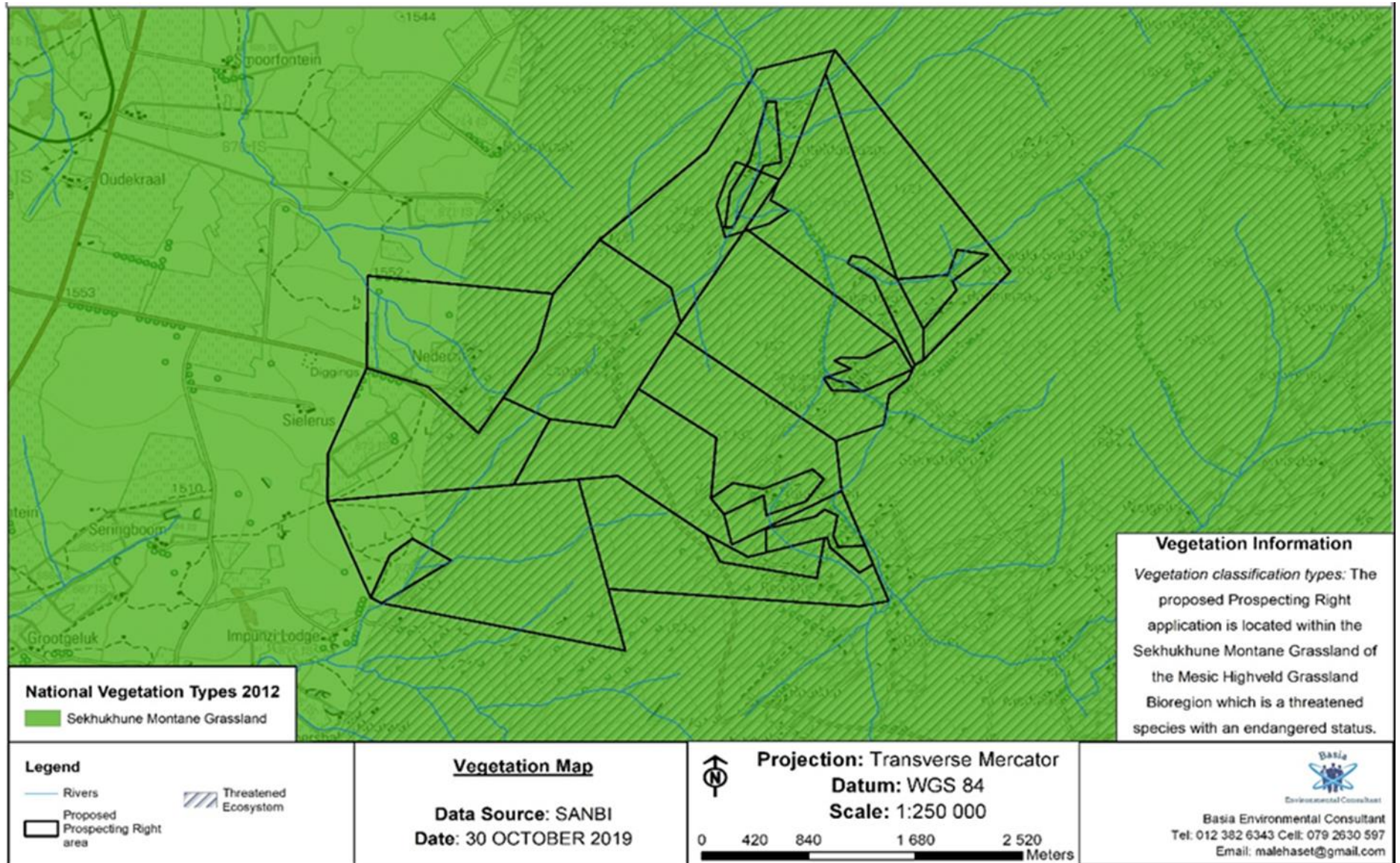


Figure 7: Vegetation Map of the proposed are

#### **4.5. Sensitivity Features**

There are multiple river streams cutting through the proposed area and the entire proposed area is located in CBA1 and also the ESA1 is adjacent the west of the proposed area. The river bufferzone is 50m and there is no formally protected area within or close by the proposed site. The proposed area is located within the Sekhukhune Montane Grassland of the Mesic Highveld Grassland Bioregion which is a threatened species with an endangered status. The Critical Biodiversity Areas (CBA) Optimal version is located within the proposed area. CBA Optimal are areas that are the most optimal to meet the biodiversity conservation targets while avoiding high cost areas as much as possible.

These sensitive areas are critical for sustainable development, hence intensive care is needed to prevent and avoid any potential impacts on these critical environment. The prospecting area should by all means consider and avoid impacting these features. Loss of natural vegetation needs to be limited to prospecting activities, if not completely avoided. Adequate bufferzone distances should be maintained in all phases of the project.



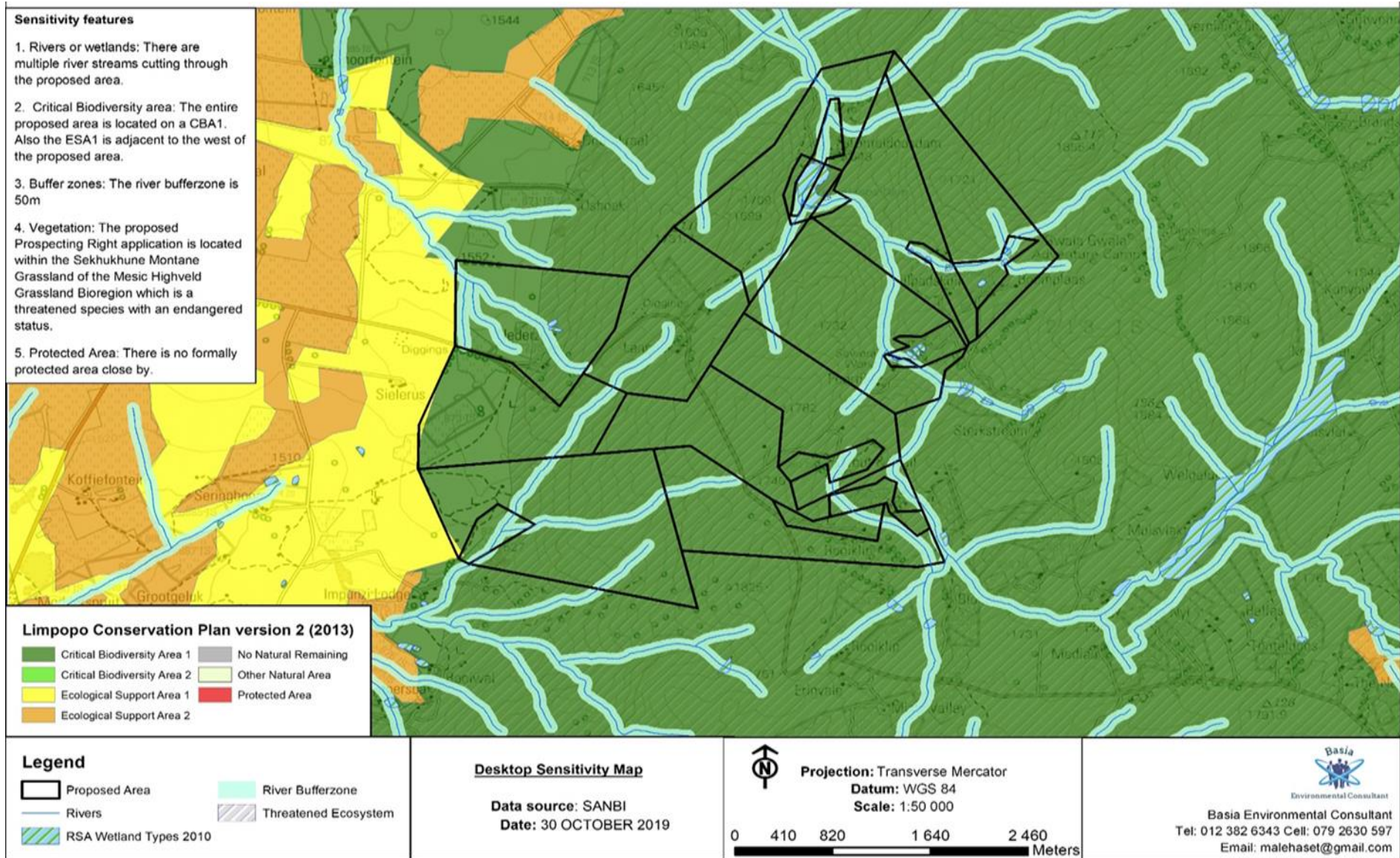


Figure 8: Sensitivity Map of the proposed area



#### **4.6. Mining and Biodiversity Guideline**

The mining and biodiversity guideline was developed by the Department of Mineral resources, Chamber of Mines, South African National Biodiversity Institute and the South African Mining and Biodiversity Forum, with the intention to find balance between economic growth and environmental sustainability. The Guideline is envisioned as a tool to foster a strong relationship between biodiversity and mining which will eventually translate into best practice within the mining sector. In identifying biodiversity priority areas which have different levels of risk against mining, the Guidelines categorize biodiversity priority areas into 4 classes with the following levels of risk for mining attached to them.

- A. Legally protected areas, where mining is prohibited.
- B. Areas of highest biodiversity importance, which are at a highest risk for mining.
- C. Areas of high biodiversity importance, which are at a high risk for mining.
- D. Areas of moderate biodiversity importance, which are at a moderate risk for mining.

Critical biodiversity areas (CBAs) are terrestrial and aquatic features in the landscape that are critical for conserving biodiversity and maintaining ecosystem functioning. Land-use guidelines aim to avoid loss or degradation of natural habitat in critical biodiversity area.

Figure 8 below indicates that a portion of the proposed site falls within category B of the mining and Biodiversity Guideline.

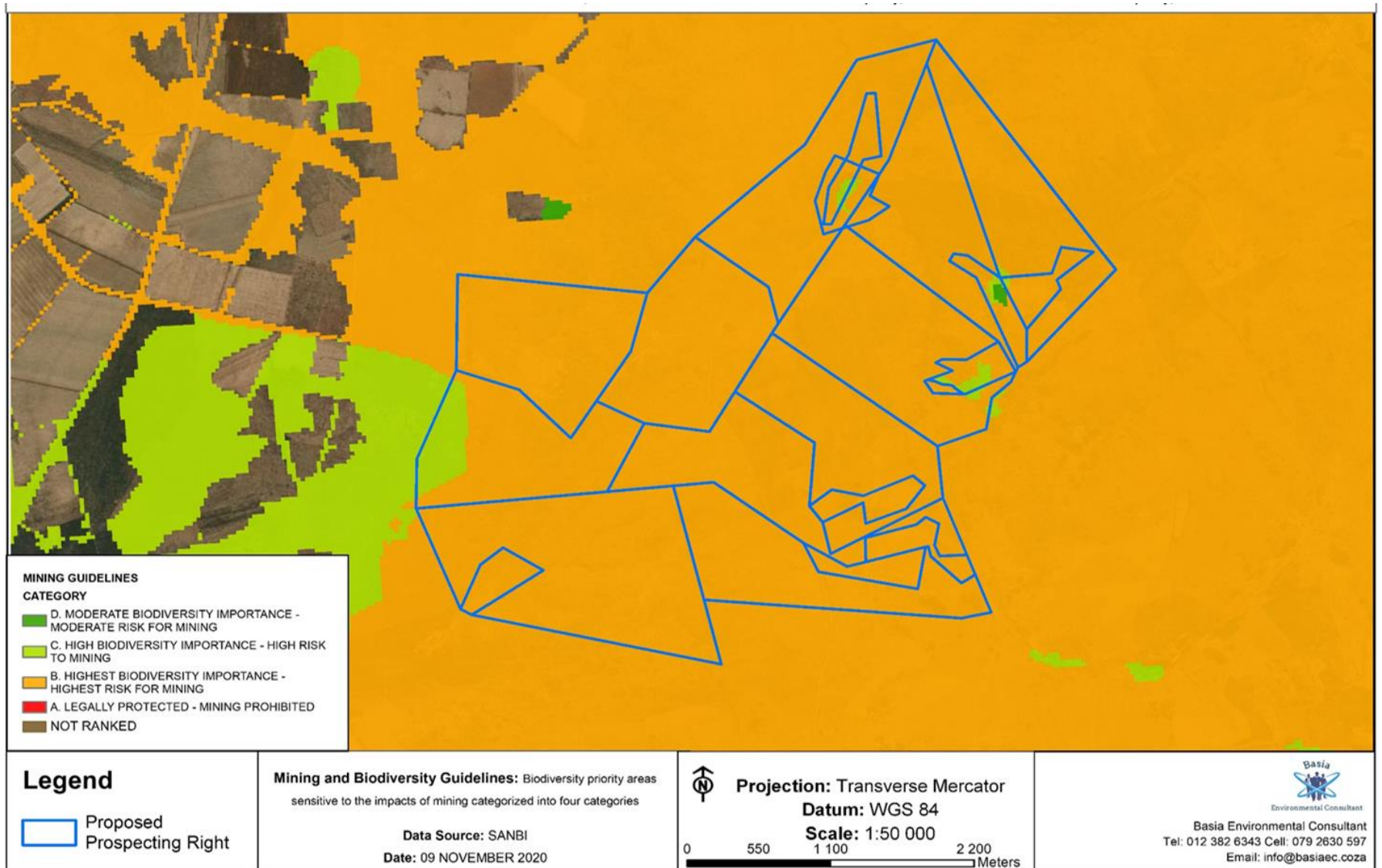


Figure 8: Mining and Biodiversity Guideline

#### **4.7. Geology**

The subsurface geology has a great influence on the terrain of Elias Motsoaledi including the soil and vegetation cover which are essential to the conditions of development. It is also the source of minerals that form the characteristics of the area.

The proposed site deposit is situated within the Dsjate sub group which is situated on the eastern lobe of the Bushveld Igneous Complex and the Transvaal geological supergroup in the Limpopo Province and is therefore characterized by gabbro, norite and anorthosite and only a small portion of the site is within the Roossenekal sub group which is characterized by Olivine, Diorite, Magnetite Grabber and Gabbronite.

Rocks of the Bushveld Igneous complex Sequence consist of the Main and Upper Zones which were subdivided into various subzones on the basis of characteristic rock types and marker horizons. The division between the Upper and the Main Zone is taken at the appearance of magnetite in the rocks. The upperzone is 2270m thick, occupies the area from Roossenekal in the east to the foot of the Sekhukhune Plateau in the west. The Main Magnetite Seam is the most prominent of all the seams of the Upper Zone, and owing to its thickness and its solid nature, it outcrops practically everywhere in the Bushveld Complex where this zone is developed. The Main Zone extends from Roossenekal in the west to the Dwars River, containing alternating mottled anorthosite and spotted noritic to anorthositic rocks and monotonous gabbroic rocks which show hardly any variation from top to bottom.

The Upper Zone of the Roossenekal sub group is a thick and laterally persistent sequence of differentiated, iron-rich cumulates that include the worlds' largest resources of Vanadiferous Titano-Magnetite (vanadiferous Ti-magnetite). The Ti-magnetite is coarsely crystalline due to annealing and expulsion of interstitial silicate material (Reynolds, 1985). The underlying Lower Main Zone is dominated by gabbronorite that contains inverted pigeonite, but at the height of the Pyroxenite Marker primary orthopyroxene reappears as a cumulus phase. Rocks are therefore generally referred to as gabbros in the main zone and magnetite gabbros in the Upper Zone.



APPLICATION FOR A PROSPECTING RIGHT FOR MAGNESITE, VANADIUM AND VERMICULITE ON Portion 78, 80, 107, 437, 443, 444, 445, 446, 447, 448, 449, 454, 455 & 456 of MAPOCHSGRONDE 500 JS, Re of MAPOCHSGRONDE 859 JS, Re of MAPOCHSGRONDE 860 JS, Re of MAPOCHSGRONDE 861 JS, Re of MAPOCHSGRONDE 865 JS, Re of MAPOCHSGRONDE 866 JS, Portion 1 & Re of MAPOCHSGRONDE 868 JS, Re of MAPOCHSGRONDE 869 JS, Re of MAPOCHSGRONDE 872 JS, Re of MAPOCHSGRONDE 873 JS, Re of MAPOCHSGRONDE 874 JS & Portion 1 & Re of MAPOCHSGRONDE 910 JS, located at Elias Motsoaledi Local Municipality, in the Sekhukhune District Municipality, LIMPOPO PROVINCE

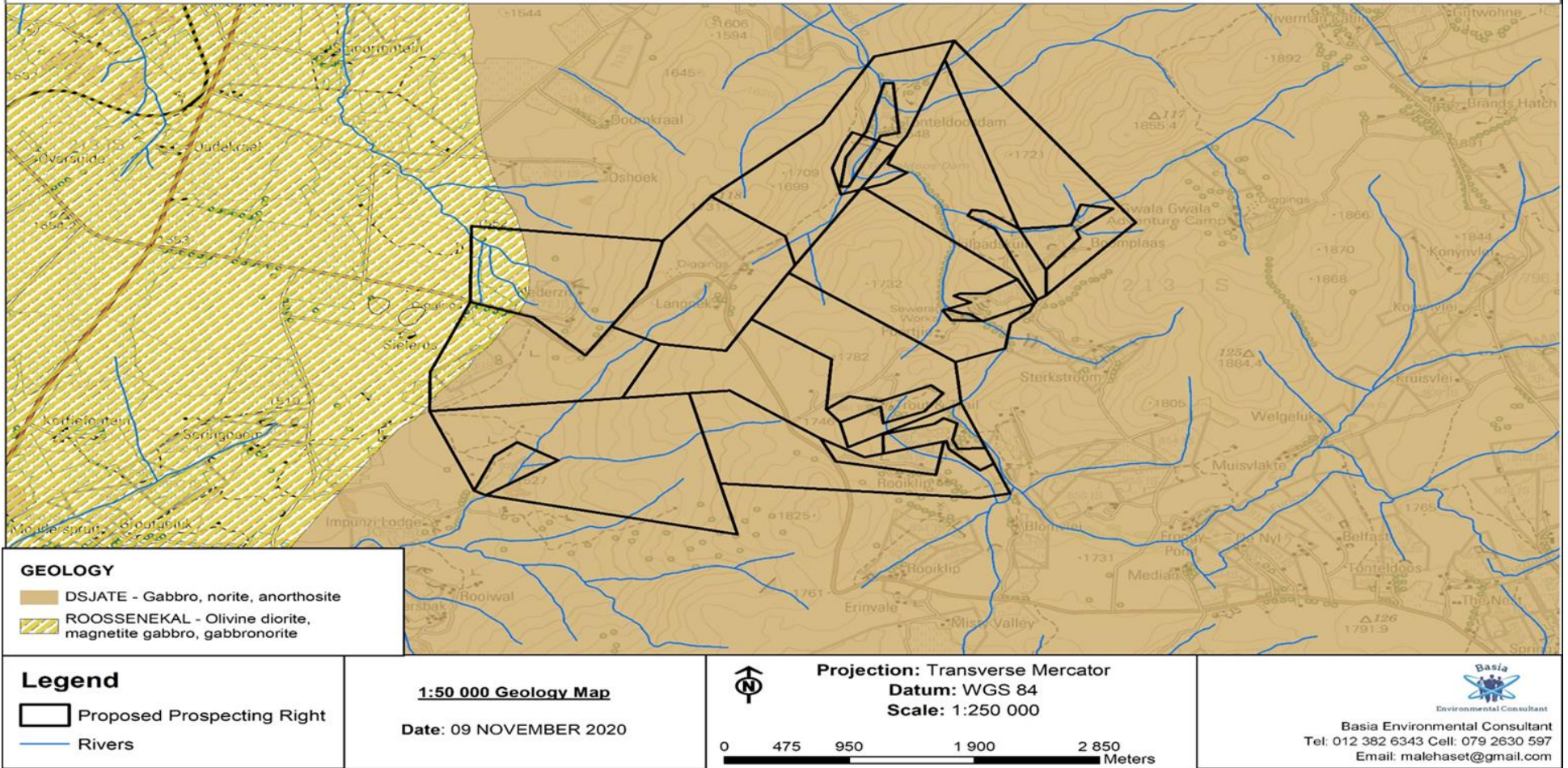


Figure 9: Showing the geology of the proposed site

#### **4.8. Topography**

The proposed site is settled between the Hilly Mapochsgronde Mountains. The Elias Motsoaledi Municipality's topography is characterized by undulating slopes interrupted by koppies, mountains and valleys. A large percentage of land within the proposed area cannot be considered for urban development due to the mountainous nature of the terrain, although this situation has other advantages in respect of water catchment areas.

#### **5.1. Environmental and Socio-economic conditions**

The World Bank last year deemed South Africa the world's most unequal society. The source of the inequality that plagues **South Africa** is multifaceted. Unemployment, poor education programs, lack of development opportunities and a collapsing public health system all play a role. Elias Motsoaledi is one the economic hubs which are consist of an unequal society. Majority of people within and in the proximity of the proposed area are living in the margins of poverty, with no hope for employment opportunities.

The main positive impacts of the prospecting activities will be the temporary creation of jobs during the prospecting phase of the project. The project may also result in a temporary boost in small local businesses in the area. If the process yields positive results, a process for permanent mine will be initiated.

## Description of specific environmental features and infrastructure on the site

The area is characterized by the meandering streams, watercourses with several tributaries confluences, farm houses, lodges, resorts and livestock and dispersed rural settlements. There are open grasslands, forests , wetlands, dams and rocky outcrops.

## 5. SITE SPECIFIC DESCRIPTION OF THE AFFECTED ENVIRONMENT

5.1. Below we describe observation that were gathered during site assessment. This includes vegetation, access roads to specific farms, infrastructure and servitudes and sensitive environmental features on the site.

### Description of the specific area applied for

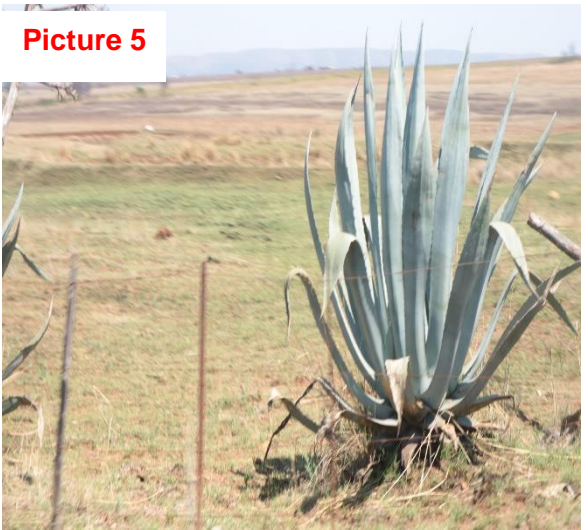
#### LOCATION OF THE PROPOSED PROJECT



The proposed project is located in various farm portions of Mapochsgronde in the Sekhukhune District Municipality within the Elias Motsoaledi Local Municipality also formally known as the Greater Groblersdal Local Municipality in the Limpopo Province. The Sekhukhune District Municipality comprises of both rural and urban characteristics, however it is mostly rural in nature and it lies on the North Western periphery of Mpumalanga. The proposed site is located approximately 15km east of Roosenekal and there are established access roads to the site from different directions.



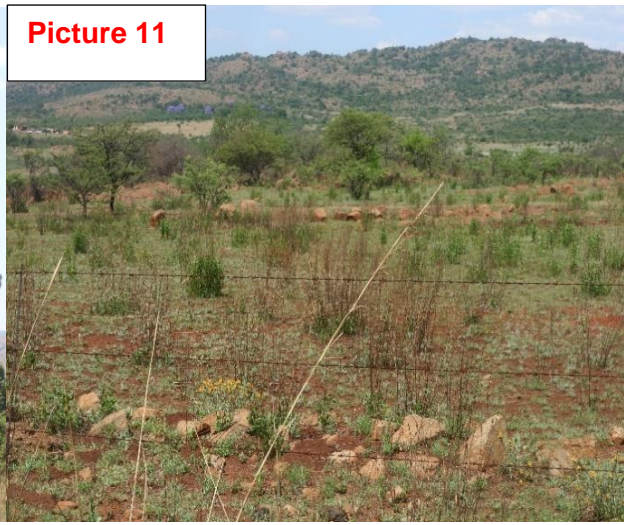
**Biodiversity**







**Picture 10**



**Picture 11**

□

The entire proposed site is mostly located on Mesic Highveld Grassland which is a bioregion which is a threatened species with an endangered status except a small portion on the west of the proposed area and it is interspersed with contiguous low forest and thicket mostly in the river valleys or streams and on the hills which is characterised by trees and shrubs. The Mesic Highveld grassland is characterised by the representation of grass with geophytes and herbs, trees identified are acacias and oak trees. The alien invasive plant species identified includes, amongst others the, Jakaranda tree, pine tree, black wattle, green wattle, spear thistle and many more.

## **GEOLOGY**



**Picture 12**



**Picture 13**

The study area is characterized by low mountain hills and moderate slopes and undulating terrains over the North West side. The main underlining geology in the proposed area is Gabbro, Norite and Anorthosite as per the literature.





Picture 14



Picture 15



Picture 16

25°29'96.16"S 29°55'55.3"E.

Prospecting pit that was digged for bulk sampling /prospecting of magnetite samples (Picture 14). There is presence of extensively weathered magnetite ores/rocks that show the development of various secondary oxidation and hydration products on the area. Magnetite is one of the oxides of iron and it also ferromagnetic.

**SOIL CAPACITY**



Picture 17



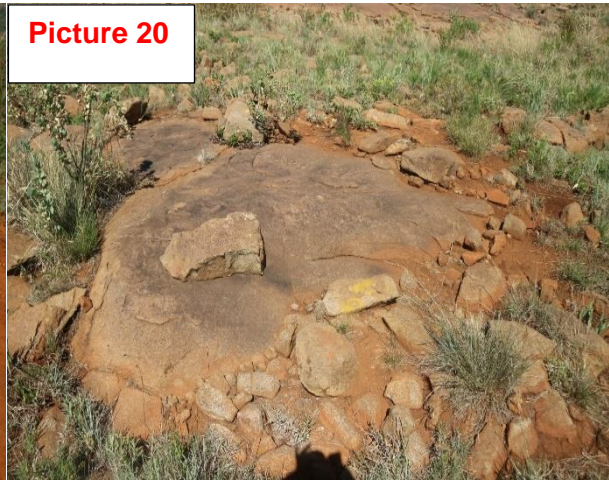
Picture 18

The soil on the main track going north on the area is mostly eroded since most of the topsoil is washed away.





Picture 19



Picture 20



Picture 21



Picture 22

The land cover of the proposed area is a mix of farmlands and surface rocks. The major soil type covering the study area is the loam soil which is combination of sandy and clay soil. The red soil indicates the presence of rich iron oxides (Picture 19) in the area. The diversity of soil types is influenced by the underlying geology which includes base layers of sedimentary rock (shales, mudstones and sandstones), cut through by dykes and ridges of dolerite, quartzite and gabbro.

## HYDROLOGY



Picture 23



Picture 24

Dried out ephemeral wetland which usually fills up during heavy rain seasons. Wetlands are of ecological importance in arid regions for their water holding ability and associated biota



**Picture 25**



**Picture 26**



Wetlands within the proposed prospecting application area. Wetlands areas are protected and therefore development within 100 m of the wetland is prohibited. No prospecting activities will be undertaken within 100m of any watercourses. The avoidance of wetland loss is priority.

**Picture 27**



**Picture 28**



Tonteldoos down stream where it is flowing in the southerly direction. It supplies water to Rossenekal Water Treatment Works.

**Picture 29**



**Picture 30**

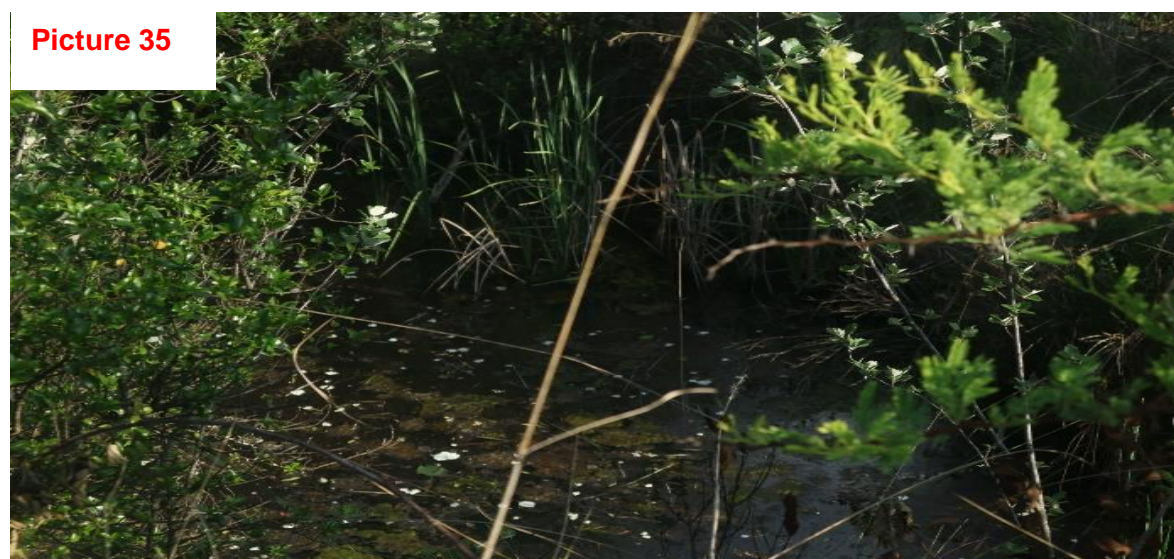




Tonteldoos middle stream.



Tonteldoos Upstream meandering within the proposed site in the South easterly direction.



Maraisloop stream cutting through the proposed site, one the tributaries that feed into the Tonteldoos Dam.



**Picture 36**



Man-made dam: Tonteldoosdam located on the North portion of the site, this dam was constructed for irrigation purposes since the area is dominated by farming activities.

**Picture 37**



**Picture 38**



Tonteldoos Dam was constructed in 1954 with a wall height of 12.7 Meters and a capacity of 630 000 cm<sup>3</sup>. This dams feeds into the Tonteldoos stream, one of the river streams cutting through the proposed site. The custodian of the dam is the department of Water Affairs.



**Picture 39**



**Picture 40**



**Picture 41**



**Picture 42**



Algal bloom scums visible in different parts of the dam, the algal bloom is commonly a direct result of anthropogenic pollution entering the dam.

## **ACCESS ROADS**

**Picture 43**



R555 Provincial Arterial Route joining the Sekhukhune District with other Provinces (Mpumalanga and Gauteng). The route R555 connects Springs with Ohrstad via Delma, Ogies, Witbank, Middleburg, Stofberg and Burgersfort.

**Picture 44**



**Picture 45**



**Picture 47**



**Picture 48**



There are multiple established access roads to the proposed prospecting application area from different directions. Gravel road that connects the site to R555 in the western direction of the site, there is another gravel road that connects the site to R577 in the North Western direction of the site from Roossenekal (east of Roossenekal) and another one that connects R555 and R577 from the North Eastern direction passing through the site. Existing Access roads need to be reconstructed while there may be a need to establish more access route where they will be needed.



## LAND USES

Farmlands are a mix of cultivated lands and grazing lands for crop farming and livestock feeding.

**Picture 49**



**Picture 50**



The agricultural activities within the site include crop farming (mainly maize) and livestock farming for commercial purposes. There are households that practice subsistence farming.

**Picture 51**



**Picture 52**



Cattle and sheep are feeding on the grassland. There are small poultry houses designed for chicken brooding for commercial purposes.



Picture 53



Picture 54



There is a rural settlement with few houses that are dispersed around and in close proximity of the proposed site, each house has pit toilets and kraals for cattle safe keeping.

Picture 55



Picture 56



Picture 57



Picture 58



There are lodges and resorts within and in close proximity to the proposed site.



**Picture 59**



There is a gravesite North east of the area and other graves within the farm houses. No Prospecting activities shall be undertaken near gravesites A 100 m bufferzone distance from this site must be maintained.

**Picture 59**



**Picture 59**



Eskom power lines passing through the proposed area for distribution of electricity to the farm and adjacent villages.

## 6.1. Prospecting work to be performed (Invasive)

- **Diamond/core drilling**

Diamond/core drilling operations will be carried out for the purpose of retrieving core samples and laboratory analyses will be performed on the core samples to establish the quality of Magnesite, Vanadium and Vermiculite and rock properties. No pits or trenches will be created during this activity. **Eighteen (18)** exploration boreholes will be executed over the period of 3 years (as per the law) however the work will be done as soon as possible to avoid prolonged stay in the area. Each borehole will be drilled to a depth of approximately 100m or less. Boreholes will be drilled at pre-planned sites. The boreholes will be drilled to intersect the expected mineralization zone and will be logged by the geologist. The intersected mineralized zone will be sampled and sent to the laboratory for quality determination. This data will form the basis for the geological modelling and financial evaluation.

The current rate per meter for drilling is R300 on average a borehole takes approximately one to five days to complete.

There will be no additional drilling, exceeding the number stipulated above.

- **Summary of precautions and measures taken;**

The proposed position of the boreholes have taken into account the following aspects:

- Geology of the area preferred
- Sensitive area biophysical (such as watercourses and critical biodiversity) and archaeological (such as graves).

No borehole is positioned within 100m from the above sensitive areas. Where it cannot be avoided mitigation measures outlined in the EMP will be adhered to.

Table 4: Equipment's to be used or needed

<b>Equipment and/or Technology to be used</b>	1 drill rig mounted on a 10-tonne truck or trailer
	2X (4X4) Bakkies
<b>Materials required</b>	Diesel
	Grease
	Hydraulic Oil
	One 50 kg Bag of cement/ Expansion foam per borehole
	Picks, shovels,
<b>Spillage control</b>	Dip trays
<b>Sanitation Facility</b>	Chemical toilets
<b>Waste Management</b>	Waste skip and Bins
<b>Safety</b>	Safety Boards



Table 5: Estimated cost for prospecting 18 boreholes

Activity	Year 1	Year 2	Year 3
	Expenditure	Expenditure	Expenditure
<b>Phase 1 (6 boreholes with the depth of 100m within 12 months)</b>			
Drilling (diamond/core)	R 125 000		
Rehabilitation costs	R 25 000		
Analytical cost	R 10 000		
Site establishment-accessibility, landowner consultation, water-supply, setup of field camp and associated infrastructure.	R20 000		
Owner compensation	R 5 000		
<b>Phase 2 (6 boreholes with the depth of 100m from 12-24 months)</b>			
Drilling (diamond/core)		R 125 000	
Rehabilitation costs		R 25 000	
Analytical cost		R 10 000	
Site establishment-accessibility, landowner consultation, water-supply, setup of field camp and associated infrastructure.		R 20 000	
Owner compensation		R 5 000	
<b>Phase 3 (6 boreholes from 24-36 months)</b>			
Drilling (diamond/core)			R 125 000
Rehabilitation costs			R 25 000
Analytical cost			R 10 000
Site establishment-accessibility, landowner consultation, water-supply, setup of field camp and associated infrastructure.			R 20 000
Owner compensation			R 5 000
<b>Annual total</b>	<b>R 185 000</b>	<b>R 185 000</b>	<b>R 185 000</b>
<b>Grand total</b>			<b>R 555 000</b>

## DESCRIPTION OF PLANNED NON-INVASIVE ACTIVITIES

### Data collection methods

Several studies outlined below will be conducted to supported and inform the economic and environmental and economic feasibility of the proposed projects.

- **Laboratory analysis**

Material obtained from drilling will be surveyed and sampled. Samples will be transported to an accredited laboratory for analysis of the quality of Magnesite, Vanadium and Vermiculite.

- **Geophysical survey work to be undertaken**

Down-hole geophysical methods using wire-line geophysical instruments will be used to gather geological and rock quality information of boreholes. Ad hoc down-hole geophysical investigation will be timeously conducted to verify lithological and structural properties of the subsurface in relation to the Magnesite, Vanadium and Vermiculite reserve areas.

- **Geohydrological survey**

The boreholes will also be used to gather geohydrological information with specific reference to aquifer yield testing and gathering of water samples for analytical purposes. Baseline preliminary conceptual groundwater flow models to estimate inflow rates into a probable underground mining operation using hydraulic aquifer parameters obtained during aquifer yield-testing will also be conducted in order to inform the type of mining to be applied for.

- **Rock distribution and reserve estimation**

Rock distribution and reserve estimation relate to computerized desk studies which encompass the following main actions:

- **Data processing and validation**

Data obtained during the drilling project needs to be processed and validated versus stratigraphic, structural and analytical data received and correlated with surrounding boreholes in the reserve area.

- **Lithofacies and rock quality modelling**

Variations in a stratigraphic unit across the reserve area are illustrated by contoured maps showing lateral trends of most significant properties. This is done by the

utilization of computerized geological software. Detailed in situ reserve and quality.

Determinations will then be possible through computer based modelling, and qualitative and quantitative calculations.

- **Consultation with landowners**

The database of I&AP's collected during the consultation process will be used to inform parties about the activities that will be conducted prior to execution and the timeframes. This will be a responsibility of the Mining Rights Officer. All issues relating to the prospecting programme such as dates, access routes, availability of water, and rehabilitation of the drill sites and any other items of mutual concern. The discussion and agreement between the parties will be captured in writing.

Table 6: Proposed prospecting phases and time frames

Phase	Activity	Skill(s) required	Timeframe	Outcome	Timeframe for outcome	What technical expert will sign off on the outcome?
<b>Invasive Prospecting works</b>						
	Diamond/core drilling (12 boreholes)	Geologist	Month 1-36	Positions and depth of Magnesite, Vanadium and Vermiculite reserves. Positions and type of rock	Month 1-36	Geologist Engineering Laboratory analyst
<b>Non-invasive Prospecting works</b>						
	Laboratory analysis	Analytical chemistry	Month 1-36	Quality of Magnesite, Vanadium and Vermiculite reserves	Month 1-36	Geologist
	Geophysical survey Rock distribution and reserve estimation Lithofacies and rock quality modelling	Geophysicist Geologist	Month 1-36	Geological and structural formation of the proposed area	Month 1-2	Geophysicist
	Geohydrological survey	Geohydrologist	Month 1-36	Geohydrological data of the Proposed area.	Month 1-12	Geohydrologist

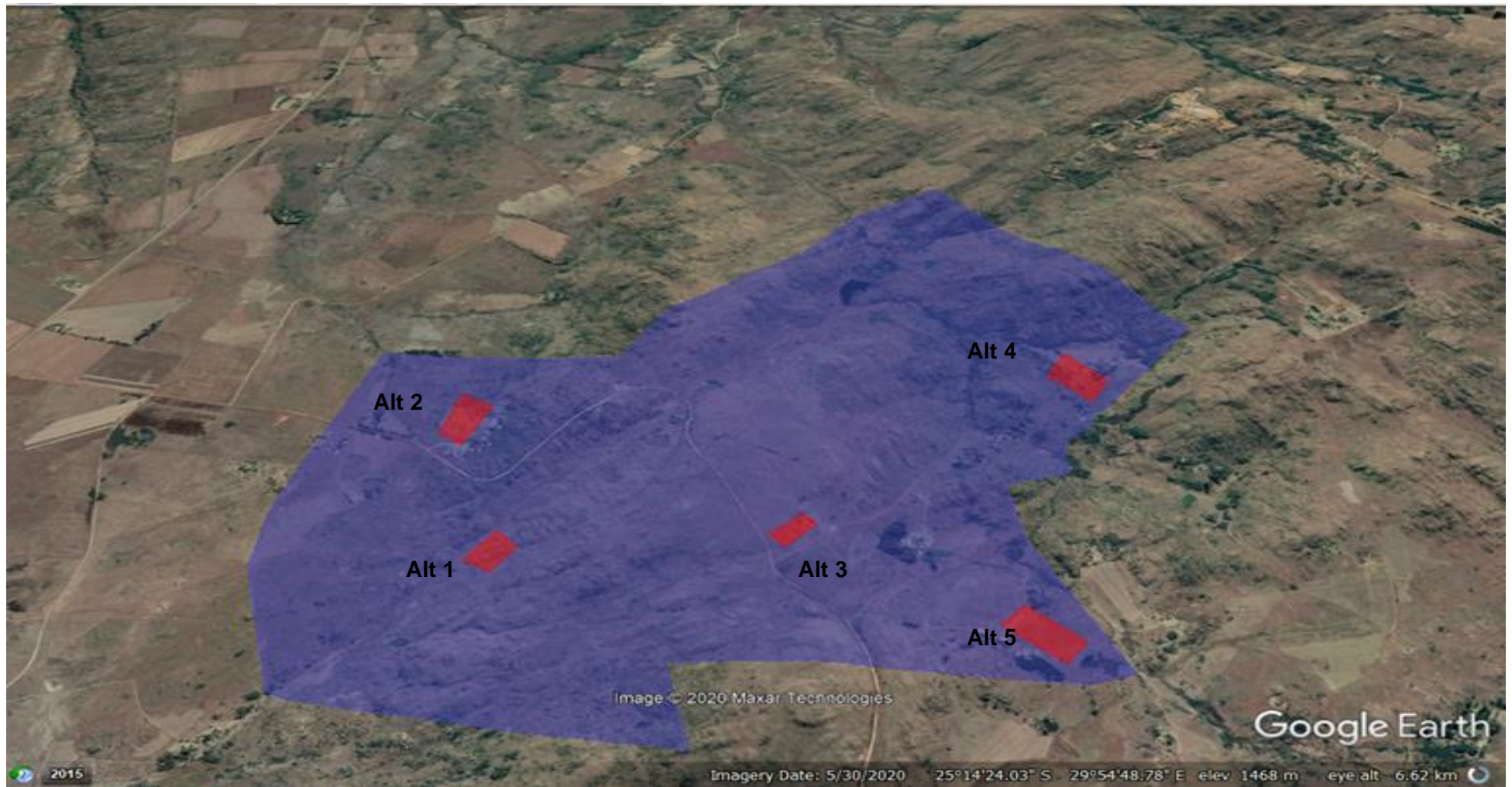


Phase	Activity	Skill(s) required	Timeframe	Outcome	Timeframe for outcome	What technical expert will sign off on the outcome?
	Consultation with I&AP's and landowners	Environmentalists	Month 1-36	Understanding and consensus between prospecting activities and affected parties.		

## **6. OPERATIONAL SITE LAYOUT**

The area show that there is limited access to other areas hence a camping site should be established in a middle and accessible area. The main operational site layout will be established depends on the location of the boreholes and have to taken into account the sensitivity of the environment in the area and have to avoided impeding critical resources in the area. This is where equipment's will and samples will be stored before transportation.

The site shows alternative, where the camping and storage of material will be placed (figure 9) as well as the design of the site facilities (figure 10).




 Infrastructure location in the proposed prospecting area

Figure 9: Showing the proposed location of material and infrastructure

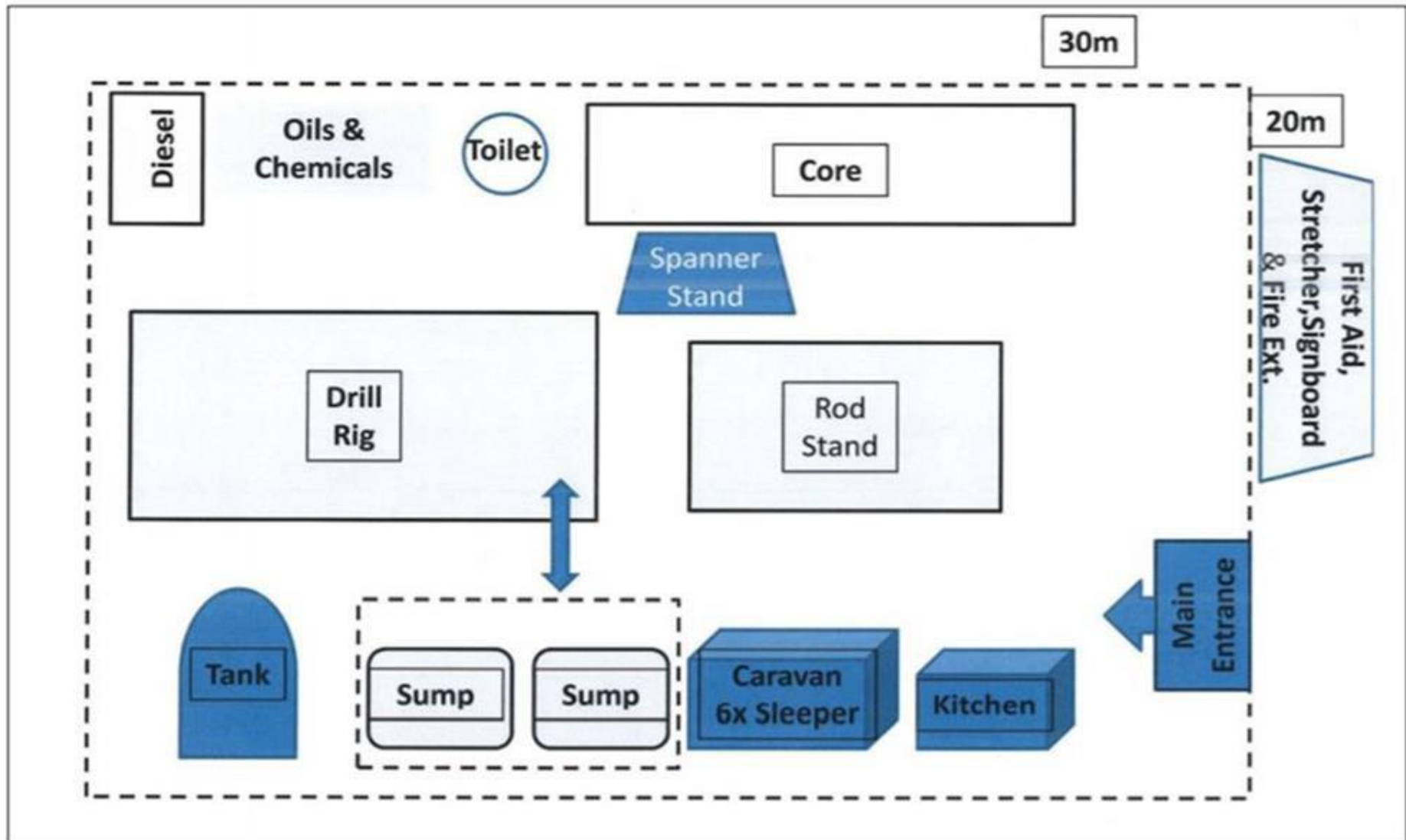


Figure 10: Showing the design of the site facilities



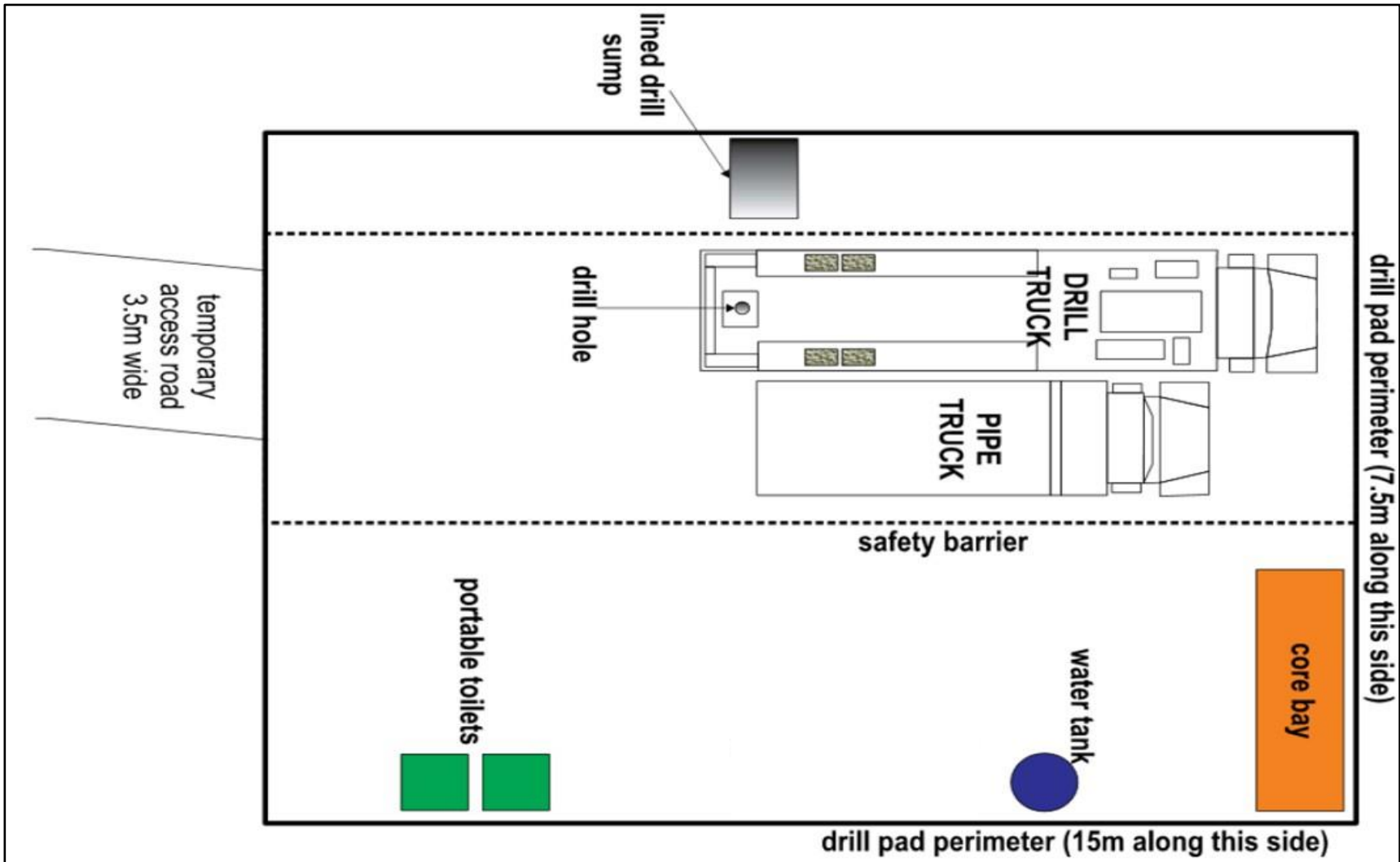


Figure 11: Showing equipment's and space that will be utilized on the drilling site

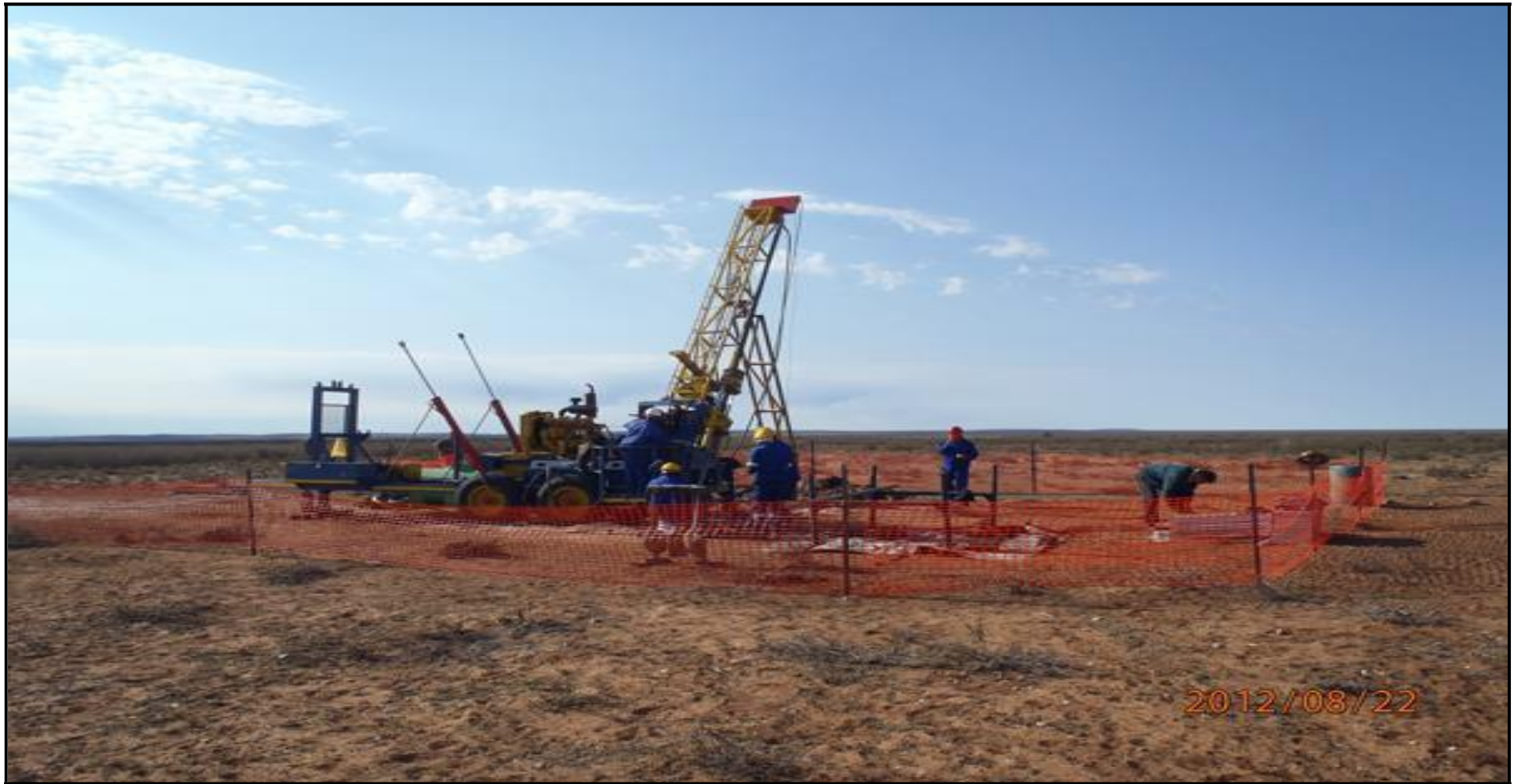


Figure 12: Shows a typical drilling site, drilling equipment's and personnel

## 7. LISTED AND SPECIFIED ACTIVITIES

The purpose of the EIA regulations is to avoid negative impacts on the environment, and where these cannot be avoided, ensure the mitigation and management of the impacts to acceptable levels, while optimising positive environmental impacts.

The proposed prospecting activity triggers activities listed in NEMA GNR 327: Listing Notice 1 as follows:

*Activity 20: “Any activity including the operation of that activity which requires a prospecting right in terms of Section 16 of the Minerals and Petroleum Resources Development Act, 2002 (Act 28 of 2002), including associate infrastructure, structures and earthworks, directly related to prospecting of a mineral resource”*

Table 7: Summary of NEMA listed activities being applied for

<b>NAME OF ACTIVITY</b>	<b>AERIAL EXTENT OF THE ACTIVITY Ha OR m<sup>2</sup></b>	<b>LISTED ACTIVITY</b>	<b>APPLICABLE LISTING NOTICE</b>
Prospecting	ha	Activity 20	GNR 983 Listing Notice 1
Drilling	0.2 Ha	Activity 20	GNR 983 Listing Notice 1
Site Camp	80m <sup>2</sup>	Activity 20	GNR 983 Listing Notice 1
Ablution facilities	10m <sup>2</sup>	Activity 20	GNR 983 Listing Notice 1
Accommodation	30m <sup>2</sup>	Activity 20	GNR 983 Listing Notice 1
Equipment storage	50m <sup>2</sup>	Activity 20	GNR 983 Listing Notice 1
Sample storage	40m <sup>2</sup>	Activity 20	GNR 983 Listing Notice 1
Temporal Site offices	40m <sup>2</sup>	Activity 20	GNR 983 Listing Notice 1
Access roads (tracks)	40m <sup>2</sup>	Activity 20	GNR 983 Listing Notice 1



## **8. DESCRIPTION OF ASSOCIATED ACTIVITIES TO BE UNDERTAKEN**

The following section presents detailed description of all the activities associated with the proposed prospecting application.

### **8.1. Fencing the office and storage site**

Fencing of the site for temporal offices and storage site will be required as a means of ensuring safety and restricting trespassers. The fencing however will be ecologically sensitive to ensure that species habitat is not divided. Fences will be clearly demarcated and appropriate signage will be displayed, similar to the signs in the images below. The necessary signage will also be erected in the vicinity of the sites to ensure visitors can easily and safely access the premises.

### **8.2. Temporary site and security offices**

The site offices for the project, including a small security hut at the entrance of the office and storage site will consist of container-type offices that is commercially available as off the shelve products, as illustrated in the image below. This ensures minimal construction requirements on site and also minimal degradation footprint. Keeping the disturbance area minimal and ensuring ease of mine closure and rehabilitation after life of mine make the temporary offices ideal, especially considering the short duration of the proposed activities and requirement of these offices. The visual impact associated with the structures will also be considered and natural colour paint will be applied to the structures to blend in with the background features.

Storm water management around the facilities must be considered. No housing facilities will be required as personnel will not be allowed to reside on site for the duration of the project but instead live off site from the mine. The security will however be present 24 hours a day on the mine for the duration of the project and even longer during the mine closure and rehabilitation period.



Image 1: A temporal security office



Image 2: A temporary site offices

### **8.3. Temporary sanitation (Ablution facilities) and change house**

Similar to the structure indicated in the section above, the temporal sanitation and change house will be a container type facilities which can easily be brought to site and also removed after life of mine. A two change rooms must be provided, one for designated for male and the other for females. Four temporal toilets must be provided, two for females and two for males. The prospecting area will not constitute or host more than 15 people/personnel at the same time. Temporal toilets will be supplied and serviced by an independent contractor whom will be responsible for the management and disposal of waste.

This ensures no major construction and approval is required for a full scale sewage treatment facility. Water requirements relating to ablutions and drinking water are expected to be minimal and will be brought to the site by a tanker. The current expectation is that 15 employees will require 45 liter per person per day (liter pp/day) amounting to 1350 liters per day.



Image 3: A temporal toilet

#### Drilling (Prospecting):

Please refer above section for a detailed description of the prospecting activities to be undertaken.

#### Access Roads

There is a major road to access the sited which N11. Thereafter, there are several gravel roads that connects the companies adjacent to the proposed site with the main road. Some of these roads will be used to access the proposed prospecting project area (shown by red line). Where sites cannot be accessed via existing roads, the area will be access by tracks, no new roads will be established, and no vegetation will be removed or uprooted for the purpose of accessing the area. The figure 5 below show the access roads to the site (marked with red lines).

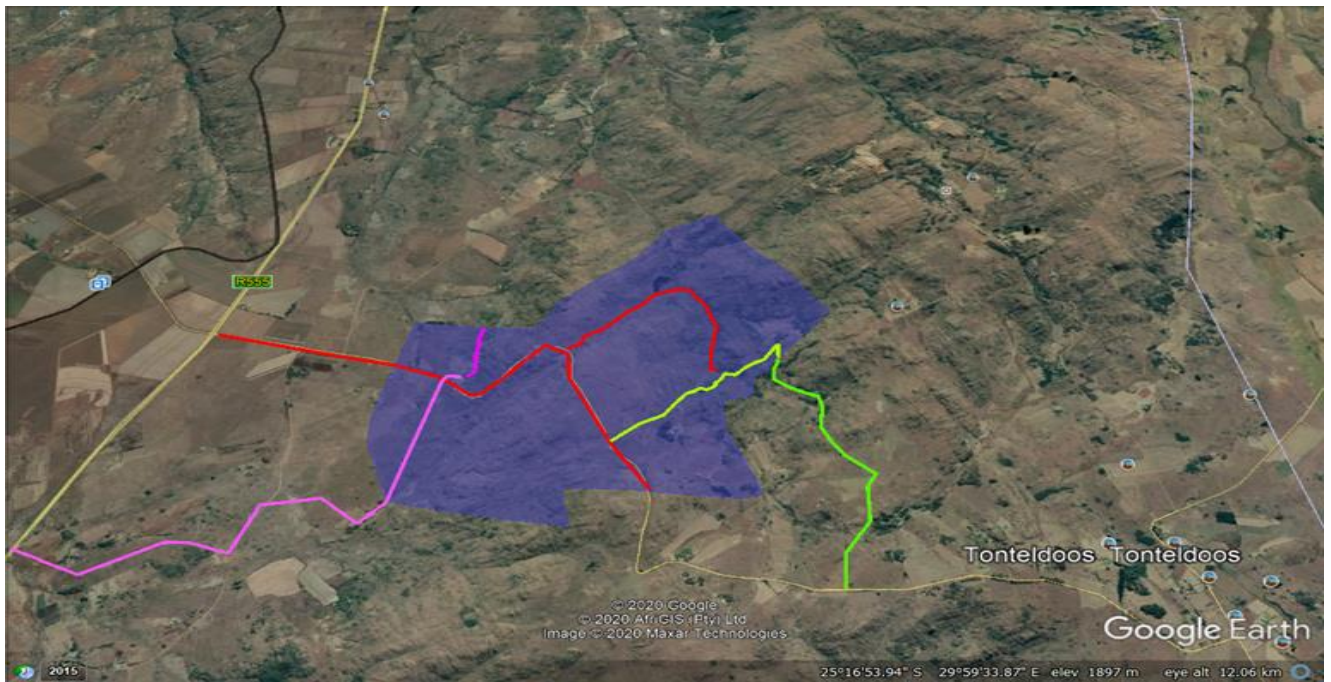


Figure 13: Show available access road to various parts of the proposed area.

### 8.5. Diesel Supply

Diesel powered vehicles and machinery will be used for the proposed project.

### 8.6. Water Supply

RC drilling in general does not require water while a continuous water supply is needed during core drilling.

The water will be purchased from local contractors and brought onto site by water tank truck to the identified drill sites. Portable on-site storage tanks (water bowsers) will be installed for the water supply. Water bowsers with the capacity of 500 gallon will be deployed to the sites and filled with water that will be used during the operational phase such as for dust suppression or core drilling. Consumable waste for personnel will be purchased from local stores.





Image 4: Water tank truck to supply water to the site



Image 5: Water bowsers to store water



Image 6: Packaged drinkable water

### **8.6.1. Volumes and rate of water use required for the operation**

The rate of water use required for the operation is about 50 liters a day.

### **8.6.2. Has a water use license has been applied for?**

There will be no abstraction of water from the watercourses nor working on the river bed. No listed activity on Section 21 of the Water Act has been triggered.

### **8.7. Waste management**

The necessary waste receptacles will be in place for general domestic waste separation and management. Two mobile Waste Skips (one for hazardous waste and

one for non-hazardous waste) and four mobile waste bins (two for hazardous waste and two for non-hazardous waste) to be clearly labeled and place in strategic area on site to ensure easy access. These waste bins will be used for collection of different types of waste and will be removed from the site to a licensed waste facility by a registered and approved contractor. The diagram below show the mobile waste skips and waste bins. Mobile waste skips ensures minimal impact on the environment they are placed on.



Image 7: Mobile waste skips



Image 8: Mobile waste skips

Waste will be generated from the start to the decommissioning of the project. It is proposed that the waste that would be generated on site would be managed by reducing, reusing and recycling as far as possible. A certified and approved external contractor will be responsible for the removal and disposal of the waste at a registered landfill. The overall aim of the project is to keep the carbon footprint of the entire project as small as possible. This will include the use of “green” products as far as possible.

Several waste streams are likely to originate from the activities associated with day to day activities in the workplace. Some of these waste streams may not be hazardous, but the majority may contain a component(s) that may need special treatment. The nature of these waste streams may also vary due to composition and physical form. In order to make informed decisions on determining the appropriate waste management options to handle, treat and dispose of waste, the different waste streams must be identified in terms of hazardous and non-hazardous wastes.

Waste streams can be categorised into 6 (six) different streams, based on similar health and environmental concerns namely:

- ***Inorganic wastes*** – acids, alkalis and other solid residues.
- ***Oily wastes*** – primarily from the processing, storage and use of mineral oils.

- **Organic wastes** – halogenated solvents residues, non-halogenated solvent residues, polycarbon based (PCB) wastes from paint and resin wastes.
- **Putrescible Organic Waste** – wastes from production of edible oils, slaughter houses, tanneries and other *animal based products*.
- **High Volume/Low Hazard Wastes** – waste based on their intrinsic properties present relatively low hazards but may pose problems due to high volumes such as plastics
- **Miscellaneous Wastes** – infectious waste from diseased human/animal tissue, redundant chemicals, laboratory wastes and explosive wastes from manufacturing operations or redundant munitions.

**General waste** to be generated from the proposed project area will include domestic waste which includes old food, polystyrene, old stationary, discarded Personal Protective Equipment (PPE) and old clothing generated from the drilling and campsites. **Hazardous waste** hazardous waste to be generated includes mineral residue, hydrocarbon wastes (oil and liquid fuel wastes) and sewage waste. Mineral residue will include cores, muds and drilling chips generated during the drilling of the exploration boreholes. The mineral residue will be removed from the site and disposed of at a registered waste disposal site.

**The following shall apply to the temporary storage of waste at source:**

The employer shall provide adequate and appropriate containers/receptacles for the temporary storage of waste at source;

- Adequate containers must be available to store different types of waste separately to allow for recycling and disposal according to the integrated waste management plan;
- Dedicated storage areas for various types of waste must be allocated and clearly demarcated;
- Waste collected at source shall be collected on a daily basis;
- Waste must be stored in such a manner that it can be safely accessed and loaded;
- Should waste be stored in containers, drums or skips care must be taken that:
  - Waste types (special vs. controlled vs. general waste) are not mixed.
  - Waste is not kept in a corroded or worn container.
  - The container is secure so as to prevent accidental spillage or leakage.
  - All waste skips and containers are labelled with their contents.
  - Skips or containers do not overflow.
  - Skips for special waste is always covered.
  - Skips for controlled waste is covered skips wherever possible.
- Waste must be kept in such a way as to prevent it falling while in storage or while it is being transported;
- Waste must be protected from scavenging by people and animals;
- Do not dispose of (burn, bury or treat) waste on site;
- Collection of waste must be scheduled and the site/location manager must be notified beforehand of collection times and type of waste to be collected; and
- Implement dust suppression measures, such as wetting of access routes and accumulated controller waste.

*Mineral residue will include cores, muds and drilling chips generated during the drilling*



*of the exploration boreholes. The mineral residue will be removed from the site and disposed of at a registered waste disposal site. During the drilling activities, limited quantities of diesel fuel, oil and lubricants will be stored on site. The only dangerous good that will be stored in any significant amount will be the diesel fuel. No more than 30 m<sup>3</sup> will be stored above ground in diesel storage tank.*

## 9. Policy and Legislative Context

Table 8: *Policy and legislative context*

<p><b>APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT</b>            (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)</p>	<p><b>REFERENCE WHERE APPLIED</b></p>	<p><b>HOW DOES THIS DEVELOPMENT COMPLY WITH AND RESPOND TO THE LEGISLATION AND POLICY CONTEXT.</b>            (E.g. In terms of the National Water Act a Water Use License has/ has not been applied for)</p>
<p>Constitution of South Africa (Act 108 of 1996)</p>	<p>Everyone has the right to a safe environment</p>	<p>Social and environmental impact assessment were conducted, and potential measures are being outlined in the EMP.</p>
<p>Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) (MPRDA)</p>	<p>The department of Mineral Resources is a custodian of minerals in South Africa. An Application for Prospecting has been logged and accepted.</p>	<p>A prospecting right application was submitted to the DMR and due processes are followed.</p>
<p>National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA)</p>	<p>There are no aspects of heritage importance in the area, except the graves that have been identified.</p>	<p>The Draft BAR and EMPr is submitted to the through the South African Heritage Resources Information System (SAHRIS) to determine whether the site is sensitive or not in terms of heritage and archaeology. In this study we have identification of position of graves was thoroughly conducted with elders and owners of the proposed area.</p>

National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA)	EIA regulations and guidelines are being followed throughout the application process.	This BA is being undertaken in terms of NEMA in order to determine any possible impacts on the environment and to undertake mitigation measures that reduce any potential harm to the environment. An application for an Environmental Authorisation is submitted to the DMR with supporting documents. The EDTEA Limpopo has been consulted for comments.
National Environmental Management: Waste Act (Act No. 59 of 2008) (NEM: WA)	Waste will be generated during prospecting activities	The EDTEA Limpopo has been consulted for comments.
Municipal Integrated Development Plans (IDPs)	The proposed activity is within the Elias Motsoaledi Local Municipality	One of the key issues identified by the IDPs is to facilitate the land claims. Municipal plans were used to identify relevant socio-economic information and spatial development information within Which the area falls under.
Occupational Health and Safety Act: Act No 85 of 1993	The health of personnel and surrounding community have to be safeguarded	Health and Safety are key components of any mining activity. Health and Safe measures are provided in appendix D. Measures included are in accordance with this Act
Conservation of Agricultural Resources Act: Act No 43 of 1983.	Conservation of forests and critical biodiversity in the area is important.	Although the area was previously mined, it is located within the CBA and Agricultural area, measures has been put in place in accordance with the act not to affect the agricultural resources.
National Environmental Management: biodiversity Act 10 of 2004.	Conservation of critical biodiversity in the area is important.	Although the area was previously mined, it is located within the CBA and Agricultural area, measures has been put in place in accordance with the act not to affect the agricultural resources.

Environmental Conservation Act: Act No 73 of 1989.	Conservation of critical biodiversity in the area is important.	Elements of this Act were used as a guideline for best practice
--	---	---

## **10. Need and Desirability of the proposed activities**

### **10.1 Environmental desirability**

The area is characterised by warm and temperate climate and weather, which are convenient to prospect throughout the year, hence even future mining will be favored. The topography of the proposed area is generally even, thus minimising the potential of runoff erosion from the operational site activities. The proposed site is located within the Sekhukhune Montanan Grassland of the Messsic Highveld Grassland Bioregion which is a threatened species with an endangered status. There are threatened species within the proposed area, and therefore great care is needed. Despite the sensitive areas, there are few shrubs and invasive species in the area, hence the site is easily accessible with low impact on the biodiversity and the environment. Loss of vegetation should be avoided and the disturbed areas must be rehabilitated as quick as possible to avoid soil erosion and before the Alien invasive species encroach into disturbed areas.

### **10.2. Socio-economic desirability**

Although prospecting activities are not labour intensive, few people will be hired to assist with general activities. The services required can also be sourced locally depending on their availability thus growing the economy of the area.

The dirt road will be refurbished and maintained to suitable construction road standards upgraded to the applicable standards which includes a gravel road leading into the mine.

Currently South Africa is faced with an outbreak of illegal mining at a national scale which is associated with death of illegal miners as a result of conflict, thus prospecting activities reduces the probability of these incidents and on other hand promoting the sustainable and regulated exploration of natural resources in an environmental friendly manner.

Additionally, the mineral prospecting activities will stimulate an income for the local minority that will be involved in the activity from site clearance, excavation to testing. The result will provide a gateway for the stimulation of sustainable income for local community at the operational stage of prospecting activities.



The mining industry is of great importance to the South African economy. South Africa is currently ranked 5<sup>th</sup> internationally in terms of mining contribution to GDP and the country is ranked in the top three globally in terms of production of **Vanadium (25%)**, **Vermiculite (35%)** and other valuable minerals. In 2018, the mining industry contributed R93bn to fixed investment, which constituted 17% of private sector investment and 10.5% of total fixed investment, respectively. South Africa's well-integrated mining value chain supplies inputs into various manufacturing sectors including metal fabrication, automotive and jewellery manufacturing.

**Vanadium** is mainly used in steelmaking in the form of ferrovanadium (FeV) and, is preferred for its anti-corrosion properties, as well as its ability to reduce the overall weight of material, and has as a result found application in the aerospace and automotive industries. Vanadium pentoxide ( $V_2O_5$ ) is another vanadium product that is mostly used as an electrolyte in vanadium redox flow batteries. South Africa's **vanadium** production fell by 10.7% percent year-on-year (y-o-y) in 2017.

**Vermiculite** is widely used in horticulture, because of its characteristics to control soil moisture and host mineral fertilisers. Other commercial applications include building plaster; fire protection; refractory; friction linings; special coatings; animal feed; and packaging. South Africa (SA) remained the world's largest producer of **vermiculite**, contributing about 39 percent to total world production, followed by United States of America (USA) at 23 % percent and Brazil at 11% percent.

Fine dried **Magnetite**, produced from natural iron oxide, is used in foundry as a sand additive to prevent surface defects of the casted metal, heat storage or as an iron source for iron catalysts. Iron ore is produced from two types of iron ore mineral: haematite ( $Fe_2O_3$ ) and magnetite ( $Fe_3O_4$ ). The growth in iron ore demand has been concomitant with the rapidly growing steel production from emerging economies. In a global context, South Africa has less than 1% of global iron reserves, but produces nearly 5% of global exports.

### **10.3. Overall desirability**

Assessment of the geological data available has determined that the area in question may have the proposed minerals. In order to ascertain the above and determine the nature, location and extent of the subject minerals within the proposed prospecting area, it will be necessary that prospecting be undertaken. The prospecting will also determine if there are any features that may have an impact on the economic extraction of the subject minerals. The mineral that will be prospected is Magnesite, Vanadium and Vermiculite.

A prospecting right allows a company to survey or investigate the area of land for the purpose of identifying an actual or probable mineral deposit. The data that will be obtained from the prospecting of the minerals being applied for will be necessary to determine how and where the minerals will be extracted and how much economically viable mineral reserves are available within the proposed prospecting area.

## **11. Motivation for the overall preferred site, activities and technology alternatives**

Pre-feasibility and desktop study was conducted before the application was lodged. The main Magnesite, Vanadium and Vermiculite ores present in the area occur in the Bushveld Complex.

It is projected to intersect economically mineable Magnesite, Vanadium and Vermiculite in the upper and lower zones. A geological map of the area is attached above. The geological map justifies.

The description why there is a possibility that the minerals applied for could occur on the land concerned

## **12. DESCRIPTION OF TECHNOLOGICAL ALTERNATIVES**

- **Diamond drilling:**

This is a drilling method whereby a solid core is extracted from depth, for examination on the surface. The key technology of the diamond drill is the actual diamond bit itself. It is composed of industrial diamonds set into a soft metallic matrix. As shown in the figure, the diamonds are scattered throughout the matrix, and the action relies on the matrix to slowly wear during the drilling, so as to expose more diamonds. The bit is mounted onto a drill stem, which is connected to a rotary drill. Water is injected into

the drill pipe, so as to wash out the rock cuttings produced by the bit and also to reduce the heat produced due to friction which causes less wear and tear of the bits.

The drill rigs are truck-mounted and equipped with diesel driven engines to provide power to the drill. A truck fitted with a water tank is used to provide the water supply for the drilling process. The drill site is not larger than 30 m x 30 m (900 m<sup>2</sup>) and consists of a drill rig, water pump, caravan and portable chemical toilet.

Except for the sump required by the drill rig, no excavations will be required. The dimension of the boreholes will be  $\pm 30$  cm) and the average depth is estimated to be 70 m. On completion, a PVA pipe of the same size with the hole will be inserted up to the bottom, fill with concrete cement and capped.

- **Core drilling:**

Merely advancing the drill by rotary action (and washing) causes a core to be extracted inside the barrel. However, at a depth of perhaps 50 m, there must be a way to retrieve the core and take it to the surface. Constantly withdrawing the entire heavy drill pipe is impractical, so methods were developed to pull up the core inside the barrel. If the rock would always be solid granite, and the core would always break at the drill bit, then it would be a simple matter to stop the drilling, and lower a simple grabbing device by a wire and pull up the core. Unfortunately, many applications require an undisturbed core in fractured rock, which calls for elaborate wire-line devices.

The drill rigs are truck-mounted and equipped with diesel driven engines to provide power to the drill. The drill site is not larger than 30 m x 30 m (900 m<sup>2</sup>) and consists of a drill rig, water pump, caravan and portable chemical toilet.

Except for the sump required by the drill rig, no excavations will be required. The dimension of the boreholes will be  $\pm 30$  cm) and the average depth is estimated to be 50 m. On completion, a PVA pipe of the same size with the hole will be inserted up to the bottom, fill with concrete cement and capped.

## **Other options could might be employed**

- **Percussion drilling:**

The drill site is not larger than 30 m x 30 m (900 m<sup>2</sup>) and consists of a diesel powered truck mounted drill rig, a truck transporting drill rods and other equipment, a compressor and portable chemical toilet. Rock fragments are blown out the top of the hole and are collected at 1m depth intervals and arranged on the ground to enable continuous detailed lithological descriptions of the stratigraphic horizons to be made. Percussion holes will either be cemented if not further utilized, or will be fitted with a cap and be used for water levels and water quality monitoring.

- **Directional drilling:**

The drill site is not larger than 150 m x 150 m (22 500 m<sup>2</sup>) and consists of a drilling water sumps, a diesel powered drill rig, a truck transporting drill rods and various other equipment, a generator, portable offices and chemical toilets. There are access control and a security fence around the site. On completion, the site will be rehabilitated to acceptable standards.

Rock fragments are washed out the top of the hole and are sampled at 10m depth intervals and collected on small bottles and sent to the laboratory for rock analysis. All percussion holes are sealed with cement up to the depth of start of rock.

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

Pre-feasibility study were conducted before the application was lodged. The site have deemed desirable for prospecting and future mining. Hence, there is no alternatives.

#### **13.1. Details of the development footprint alternatives considered**

All development alternatives have been applied for, this sites was accepted. There are no development footprint alternatives, because we don't know whether it will be accepted or the minerals are present.

#### **13.2. The property on which or location where it is proposed to undertake the activity**

As mentioned above, that there is no alternative site. The activity is located Limpopo within the administrative boundaries of Sekhukhune District Municipality (SDM) in Elias Motsoaledi Local Municipality.

#### **13.3. The type of activity to be undertaken**

The application is for prospecting rights and no alternatives were established. The activity will be conducted in phases as described in Section (i) of this report.

#### **13.4. The design or layout of the activity**

The location of the infrastructure have been determined based on the accessibility of the area, distance and environmental attributes such as wetlands, watercourses, protected flora and fauna. Detailed description is provided above in section C "description of the scope of the proposed overall activity".

#### **13.5. The technology to be used in the activity**

The proposed technologies have been chosen based on long term proven success in prospecting activity. Diamond drilling is the most convenient and cost effective drilling method.



### **13.6. The operational aspects of the activity**

No permanent services in terms of water supply, electricity, and or sewage facilities will be required. Temporary access roads will however be constructed in areas where there are no existing access routes. The activities will commence with Phase 1, during which desktop studies will be conducted. After the desktop studies, geological mapping will be undertaken to ensure that all the targets with Magnesite, Vanadium and Vermiculite outcrop identified during the desktop study are not cultural features. This phase will also include planning for the drilling survey.

Phase 1 will entail the invasive prospecting drilling campaign where the extent of mineralisation will be defined and the geological continuity of the geological continuity of the mineralised zone will be determined. The drilling information will also be used to construct ore thickness, overburden thickness and basement elevation contour plans.

### **13.7. The option of not implementing the activity**

The option of not implementing the activity will result in a loss of valuable information regarding the mineral status (Magnesite, Vanadium and Vermiculite) present on the affected properties. In addition to this, should economical reserves be present and the applicant does not have the opportunity to prospect, the opportunity to utilise the reserves will be lost and contribute to the growth of the country's economy.

## **14. Details of the public participation process followed**

The Public Participation Process (PPP) has been structured to provide I&APs with an opportunity to gain more knowledge about the proposed project, to provide input through the review of documents/reports, and to voice any issues or concern at various stages throughout the EIA process. This process includes all I&AP's (e.g. directly affected landowners, national-, provincial- and local authorities, and local communities etc.).

The Public Participation Process (PPP) was conducted in terms of Chapter 6 of the National Environmental Management Act, 1998 (Act 107 of 1998). The Public

Participation Process conducted to date is summarised below, please refer to Appendix B for a detailed Stakeholder Engagement Report.

Table 9: Summary of the PPP undertaken

Task	Details	Date
I&AP notification		
I&AP identification	<p>An I&amp;AP database was developed for the project by establishing the jurisdiction of organisations, individuals and businesses in proximity to the project site or within an interest in the proposed development.</p> <p>The database of I&amp;APs includes the landowner, the adjacent landowners, relevant district and local municipal officials, relevant national and provincial government officials, and organisations. This database is being augmented via chain referral during the BA process and will be continually updated as new I&amp;AP's are identified throughout the project lifecycle. The current list of potential I&amp;AP's is attached in Appendix B</p>	Continuous process
Site notices	A2 Site notices were placed at strategic points to inform the general public of the proposed project and the PPP. Photos of the site notices have been included in Appendix B	16 October 2020
Media Adverts	The Sekhukhune Times Advertiser newspaper was used to advertise the proposed project	14 October 2020
Comments period	The comments received from the landowners to date, are captured in the stakeholder engagement report	October 2020-January 2021

Comment on Draft BAR and EMP	All the relevant I&AP's stakeholders were notified of the availability of the DBAR to provide their comments.	December 2020- January 2021
Public participation meeting	The community meeting to be held on the <b>08<sup>th</sup> of January 2021</b> . See details on PPP on Appendix B	08 January 2021
Final BAR submission	Three copies of BAR were submitted to DMR and uploaded on SAMRAD system	30 January 2021

#### **14.1. Summary of issues raised by I&AP's**

Please refer to Appendix B for full details of the consultation process followed, comments received and responses.

### **15. METHODOLOGY USED IN DETERMINING AND RANKING THE NATURE, SIGNIFICANCE, CONSEQUENCES, EXTENT, DURATION AND PROBABILITY OF POTENTIAL ENVIRONMENTAL IMPACTS AND RISKS**

All the identified potential impact were assessed according to the following Impact Assessment Methodology as described below. This methodology has been utilised for the assessment of environmental impacts where the consequence (severity of impact, spatial scope of impact and duration of impact) and likelihood (frequency of activity and frequency of impact) have been considered in parallel to provide an impact rating and hence an interpretation in terms of the level of environmental management required for each impact. The risk ratings and significance are indicated in the tables below.

TABLE 10: SEVERITY

How severe does the aspects impact on resource quality (flow regime, water quality, geomorphology, biota, habitat)?

Insignificant / non –harmful	1
Small / potentially harmful	2
Significant / slightly harmful	3
Great/ harmful	4
Disastrous / extremely harmful and /or wetland(s) involved	5
Where "or wetland(s) are involved" it means that the activity is located within the delineated boundary of any wetland. The score of 5 is only compulsory for the significance rating.	

TABLE 11: SPATIAL SCALE

How big is the area that the aspect is impacting on?

Area specific (at impact site)	1
Whole site (entire surface right)	2
Regional / neighbouring areas	3
National	4
Global (impacting beyond SA boundary)	5

TABLE 12: DURATION

How long does the aspect impact on the environment and resource quality?

One day to one month, PES, EIS and /or REC not impacted	1
One month to one year, PES, EIS and /or REC impacted but no change in status	2
One year to 10 years, PES, EIS and /or REC impacted to a lower status but can be improved over this period through mitigation	3
Life of the activity, PES, EIS and /or REC permanently lowered	4
More than life of the organisation /facility, PES and EIS scores, a E or F	5

PES and EIS (sensitivity) must be considered.	
---	--

**TABLE 13: FREQUENCY OF THE ACTIVITY**

How often do you do the specific activity?

Annually or less	1
6 monthly	2
Monthly	3
Weekly	4
Daily	5

**TABLE 14: FREQUENCY OF THE INCIDENT/IMPACT**

How often does the activity impact on the environment?

Almost never / almost impossible / >20%	1
Very seldom / highly unlikely / >40%	2
Infrequent / unlikely / seldom / >60%	3
Often / regularly/ likely / possible / >80%	4
Daily / highly likely / definitely / >100%	5

**TABLE 15: LEGAL ISSUES**

How is the activity governed by legislation?

No legislation	1
Fully covered by legislation	5
Located within the regulated areas	

**TABLE 16: DETECTION**

How quickly can the impacts/risks of the activity be observed on the resource quality, people or property?

Immediately	1
-------------	---



Without much effort	2
Need some effort	3
Remote and difficult to observe	4
Covered	5

**TABLE 17: RATING CLASSES**

Rating	Class	Management description
1-55	(L) Low risk	Acceptable as is or consider requirements for mitigation. Impact to watercourses and resource quality small and easily mitigated
56-169	(M) Moderate risk	Risk and impact on watercourses are notably and require mitigation measures on a higher level, which costs more and require specialist input. Licence required.
170-300	(H) High risk	Watercourse(s) impacts by the activity are such that they impose a long-term threat on a large scale and lowering of the Reserve. Licence required.

A low risk class must be obtained for all activities to be considered for a GA

**TABLE 18: CALCULATION**

Consequence = Severity + Spatial Scale + Duration
Likelihood = Frequency of Activity + Frequency of Incident + Legal Issues + Detection
Significance \Risk = Consequence X Likelihood

**TABLE 19: RATING CLASSES**

Rating	Risk Class	Management Description
1-55	Low (L)	Acceptable as is or consider requirement for mitigation impact
56-169	Moderate (M)	Risk and impact on notably are required and mitigation measures on a higher level

170-300	High (H)	Impact on the environment has a long term impact.
---------	----------	---

TABLE 20: CALCULATION

Consequence = Severity + Spatial Scale + Duration
Likelihood = Frequency of Activity + Frequency of Incident + Legal Issues + Detection
Significance \Risk = Consequence X Likelihood

TABLE 21: RATING CLASSES

Rating	Risk Class	Management Description
1-55	Low (L)	Acceptable as is or consider requirement for mitigation impact
56-169	Moderate (M)	Risk and impact on notably are required and mitigation measures on a higher level
170-300	High (H)	Impact on the environment has a long term impact.

**16. 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.**

In order to identify the potential impacts associated with the proposed prospecting activities, the following steps were undertaken:

- Desktop studies were initially conducted with a greater focus on sensitive phenomenon in the area.
- Site assessment was undertaken on the ground as well as verifying the finding of the desktop study.
- The stakeholder consultant process was undertaken in a manner to be interactive, providing the landowners and identified stakeholders with an opportunity to provide input into the project. This is considered a key focus as the local residents have capabilities of providing site-specific information, which may not be available in desktop research material. Stakeholders were requested, as part of the notification letter, to provide their views on the project, and to state any

potential concerns they may have. All comments and responses provide will be collated into the Comments and Responses Register, which will be attached to the final BAR, and will also be incorporated into the final impact assessment.

- A detailed desktop study was undertaken to determine the environmental setting in which the project is located. Based on the desktop investigations, various resources were used to determine the significance and sensitivity of the various environmental considerations. The desktop investigation involved the use of:
  - The South African National Biodiversity Institute (SANBI) Biodiversity Geographic Database LUDS System;
  - The Department of Environmental Affairs 2015 Landcover and Landuse Mapping Database;
  - Department of Water and Sanitation information documents such as the Internal Strategic Perspective (ISP) and Groundwater Vulnerability Reports
  - Municipal Integrated Development Plans for Local and district Municipalities; and
  - The Provincial Spatial Development Framework for the Limpopo Province. The rating of the identified impacts was undertaken in a quantitative manner as provided in Section V (impact rating). The ratings were undertaken in a manner to calculate the significance of each of the impacts. The identification of management and mitigation measures was done based on the significance of the impacts and measures included are considered sufficient, appropriate and practical to protect the environment.

### **16.1. Findings of risk assessment and risk rating**

The following table present the identified impacts associated with the proposed activity. The impacts have been rated based on the method outlined below. As it can be see in the table, all risks identified are moderate before the implementation of mitigation and prevention measures.

TABLE 22: IMPACT ASSESSMENT TABLE FOR THE CONSTRUCTION PHASE

Environmental Aspect	Nature of potential impact/risk	Environmental Impact Significance Before Mitigation											Risk Rating
		Severity	Spatial Scale	Duration	Consequence	Frequency of Activity	Frequency of impact	Legal issues	Detection	Likelihood	Significance/risk		
Social	Influx of job seekers will have a negative social impact on the landowners and land occupiers.	2	1	3	6	4	2	5	1	12	72	Moderate	
	Unauthorised access to private property outside of the demarcated areas will result in conflict with landowners.	2	1	3	6	4	2	5	1	12	72	Moderate	
	Increased traffic in the area will increase the likelihood of accidents on the roads, posing a health and safety issue for the land owners and land occupiers.	2	1	3	6	4	2	5	1	12	72	Moderate	
	The influx of job seekers in the area may result in an	2	1	3	6	4	2	5	2	13	78	Moderate	



	increase in petty crimes.												
	Possible boost in short term local small business opportunities.	3	3	3	9	4	2	5	1	12	108	Moderate	
Ground water	Localised spillages of oils from machinery leaching to groundwater contamination.	2	1	3	6	4	2	5	1	12	78	Moderate	
	Existing boreholes within the prospecting area may create conduits of flow to the groundwater unless sealed.	2	1	3	6	4	2	5	1	12	78	Moderate	
Surface Water	Increase in silt load in runoff due to site clearing, grubbing and the removal of topsoil from the footprint area associated with the drill sites and associated infrastructure.	2	3	1	6	4	2	5	1	12	78	Moderate	
	Potential deterioration in water quality due to the potential accidental spillages of hazardous substances.	2	3	2		4	2	5	1	12	78	Moderate	
	Debris from poor handling of materials and/or waste blocking watercourses, resulting in flow impediment and pollution.	2	2	2									

	Contaminated dirty water runoff to surrounding areas resulting in the impact on local surface water quality.	2	3	2	6	4	2	5	1	12	78	Moderate	
	Increase of surface runoff and potentially contaminated water that needs to be maintained in the areas where site clearing occurred.	2	2	2	6	4	2	5	1	12	78	Moderate	
Wetlands and Aquatic Ecosystems	Localised changes to the riparian areas as a result of the impact to vegetation.	3	3	3	9	4	2	5	1	12	108	Moderate	
	Loss of habitat and wetland ecological structure as a result of site clearance activities and uncontrolled wetland degradation.	3	3	3	9	4	2	5	1	12	108	Moderate	
	Impact on the wetlands systems as a result of changes to the sociocultural service provisions.	3	3	3	9	4	2	5	1	12	108	Moderate	
	Increased runoff due to topsoil removal and vegetation clearance leading to possible erosion and sedimentation of wetland and riparian resources.												

	Soil compaction and levelling as a result of construction activities and vehicle movement leading to loss of wetland and riparian habitat.	3	3	3	9	4	2	5	1	12	108	Moderate
	Impact on the hydrological functioning of the wetland systems.	3	3	3	9	4	2	5	1	12	108	Moderate
Heritage Resources	The proposed project has the potential to impact on local graves within the area.	2	1	2	5	4	2	5	1			
Palaeontological Resources	The proposed project has the potential to impact on sites of archaeological importance.	2	1	2	5	4	2	5	1			
	Drilling of exploratory boreholes has potential to impact on palaeontological resources	2	1	2	5	4	2	5	1	12	60	Moderate
Flora	Loss of localised biodiversity habitats within sensitive areas due to site clearance and establishment of drill sites.	2	1	2	5	4	2	5	1	12	60	Moderate
	Loss of localised floral species diversity including RDL	2	1	2	5	4	2	5	1	12	60	Moderate

	and medicinal protected species due to site clearance and establishment of drill sites.												
	Potential spreading of alien invasive species as indigenous vegetation is removed and pioneer alien species are provided with a chance to flourish.	2	1	2	5	4	2	5	1	12	60	Moderate	
Fauna	Tracks of vegetation may result in loss of faunal habitat ecological structure, species diversity and loss of species of conservation concern.	2	1	2	5	4	2	5	1	12	60	Moderate	
	Habitat fragmentation as a result of construction activities of the access roads leading to loss of floral diversity.	2	1	2	5	4	2	5	1	12	60	Moderate	
	Loss of faunal diversity and ecological integrity as a result of construction activities, erosion, poaching and faunal specie trapping.	2	1	2	5	4	2	5	1	12	60	Moderate	
	Movement of construction vehicles and machinery may	2	1	2	5	4	2	5	1	12	60	Moderate	









	result in collision with fauna, resulting in loss of fauna.												
Air Quality	Possible increase in dust generation, PM10 and PM2.5 as a result of bulk earthworks, operation of heavy machinery, and material movement.	2	1	2	5	4	2	5	1	12	60	Moderate	
	Increase in carbon emissions and ambient air pollutants (NO2 and SO2) as a result of movement of vehicles and operation of machinery/equipment.	2	2	2	6	4	2	5	1	12	78	Moderate	
Visual	Scaring of the landscape as a result of the clearance of vegetation.	2	1	2	5	4	2	5	1	12	60	Moderate	
	Visual intrusion as a result of the movement of machinery and the establishment of the required infrastructure.	2	2	2	6	4	2	5	1	12	78	Moderate	
	Indirect visual impact due to dust generation as a result of the movement of vehicles and materials, to and from the site area.	2	2	2	6	4	2	5	1	12	78	Moderate	
Noise	The use of vehicles and machinery during the	2	2	2	6	4	2	5	1	12	78	Moderate	

	construction phase may generate noise in the immediate vicinity.												
Soil, Land use and Land Capability	Localised chemical pollution of soils as a result of vehicle hydrocarbon spillages and compaction.	2	1	2	6	4	2	5	1	12	78	Moderate	
	Localised clearing of vegetation and compaction of the construction footprint will result in the soils being particularly more vulnerable to soil erosion.	2	1	2	6	4	2	5	1	12	78	Moderate	
	Localised loss of resource and its utilisation potential due to compaction over unprotected ground/soil.	2	1	2	6	4	2	5	1	12	78	Moderate	
	Localised loss of soil and land capability due to reduction in nutrient status - denitrification and leaching due to stripping and stockpiling footprint areas.	2	1	2	6	4	2	5	1	12	78	Moderate	
Traffic	Increase in traffic volumes as a result of pre-construction	2	3	2	7	4	2	5	1	12	84	Moderate	



	Possible boost in short term local small business opportunities.	3	3	3	9	4	2	5	1	12	108	Moderate
Surface Water	Increase in silt load in runoff due to site clearing, grubbing and the removal of topsoil from the footprint area associated with the drill sites and associated infrastructure.	2	3	1	6	4	2	5	1	12	78	Moderate
	Potential deterioration in water quality due to the potential accidental spillages of hazardous substances.	2	3	2		4	2	5	1	12	78	Moderate
	Debris from poor handling of materials and/or waste blocking watercourses, resulting in flow impediment and pollution.	2	2	2								
	Contaminated dirty water runoff to surrounding areas resulting in the impact on local surface water quality.	2	3	2	6	4	2	5	1	12	78	Moderate
	Increase of surface runoff and potentially	2	2	2	6	4	2	5	1	12	78	Moderate

<p>contaminated water that needs to be maintained in the areas where site clearing occurred.</p>											
--	--	--	---	--	--	--	--	---	---	---	---



Flora	Loss of localised biodiversity habitats within sensitive areas due to site clearance and establishment of drill sites.	2	1	2	5	4	2	5	1	12	60	Moderate
	Loss of localised floral species diversity including RDL and medicinal protected species due to site clearance and establishment of drill sites.	2	1	2	5	4	2	5	1	12	60	Moderate
	Potential spreading of alien invasive species as indigenous vegetation is removed and pioneer alien species are provided with a chance to flourish.	2	1	2	5	4	2	5	1	12	60	Moderate
Fauna	Vegetation clearance may result in loss of faunal habitat ecological structure, species diversity and loss of species of conservation concern.	2	1	2	5	4	2	5	1	12	60	Moderate
	Habitat fragmentation as a result of construction activities of the access roads leading to loss of floral diversity.	2	1	2	5	4	2	5	1	12	60	Moderate

	Loss of faunal diversity and ecological integrity as a result of construction activities, erosion, poaching and faunal specie trapping.	2	1	2	5	4	2	5	1	12	60	Moderate
	Movement of construction vehicles and machinery may result in collision with fauna, resulting in loss of fauna.	2	1	2	5	4	2	5	1	12	60	Moderate
Air Quality	Possible increase in dust generation, PM10 and PM2.5 as a result of bulk earthworks, operation of heavy machinery, and material movement.	2	1	2	5	4	2	5	1	12	60	Moderate
	Increase in carbon emissions and ambient air pollutants (NO2 and SO2) as a result of movement of vehicles and operation of machinery/equipment .	2	2	2	6	4	2	5	1	12	78	Moderate
Visual	Scaring of the landscape as a result of the clearance of vegetation.	2	1	2	5	4	2	5	1	12	60	Moderate
	Visual intrusion as a	2	2	2	6	4	2	5	1	12	78	Moderate

result of the movement of machinery and the establishment of the required infrastructure.												
---	--	--	--	--	--	--	--	--	--	--	--	--

	Indirect visual impact due to dust generation as a result of the movement of vehicles and materials, to and from the site area.	2	2	2	6	4	2	5	1	12	78	Moderate
Noise	The use of vehicles and machinery during the construction phase may generate noise in the immediate vicinity.	2	2	2	6	4	2	5	1	12	78	Moderate
Soil, Land use and Land	Localised chemical pollution of soils as a result of vehicle hydrocarbon spillages and compaction.	2	1	2	6	4	2	5	1	12	78	Moderate
Capability	Localised clearing of vegetation and compaction of the construction footprint will result in the soils being particularly more vulnerable to soil erosion.	2	1	2	6	4	2	5	1	12	78	Moderate
	Localised loss of resource and its utilisation potential due to compaction over unprotected ground/soil.	2	1	2	6	4	2	5	1	12	78	Moderate
	Localised loss of soil and land capability	2	1	2	6	4	2	5	1	12	78	Moderate





	stripping and stockpiling footprint areas.												
Traffic	Increase in traffic volumes as a result of pre-construction activities which may lead to an increase in traffic congestion along the roads as well as the farm roads around the prospecting area.	2	3	2	7	4	2	5	1	12	84	Moderate	
Climate	Emissions of Green House Gases as a result of the use of plant, heavy moving machinery, generators etc.	2	2	2	6	4	2	5	1	12	78	Moderate	
Waste Management	Potential water and soil pollution as a result of inappropriate waste management practices.	2	3	2	6	4	2	5	1	12	78	Moderate	
Palaeontological Resources	Drilling of boreholes has potential to impact on paleontological resources	2	1	2	5	4	2	5	1	12	60	Moderate	

**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.**

Several potential impacts of the activity are highlighted above. The impacts of the proposed activity have no alternative, but to be mitigated. The only available option is to keep required buffer zone from sensitive environments such as wetlands, riparian zones and watercourses.

The positive impacts of the activities are the creation of employment, which is required in the region. Should Magnesite, Vanadium and Vermiculite be found in the project area, Amaris (Pty) Ltd will be able to mine the available reserves. This will result in job creation and support to local businesses is continued. Amaris (Pty) Ltd expect that substantial benefits from the project (should Magnesite, Vanadium and Vermiculite be found) will accrue to the immediate project area, the sub-region and the province of the Limpopo. Magnesite, Vanadium and Vermiculite in South Africa is of important economic value. This prospecting activity has a potential to decrease level of unemployment rate in proposed areas and surroundings. This prospecting activity will bring revenue into the city and the province which will in turn boost the economy of the country. The project will also contribute in the supply of energy as Magnesite, Vanadium and Vermiculite is the primary source of energy in South Africa.

The proposed activities have medium to low significance impacts, which will be short term activities in nature. The probability of occurrence of an impact was determined and most of the activities can be controlled and impacts can be reduced or avoided. The probability was also determined based on other prospecting activities of similar nature. It was found that generally prospecting activities have low impact on the environment.

**16.2. Assessment of each identified, proposed mitigation measures and significant impact after mitigation measures.**

TABLE 23: ASSESSMENT OF EACH IDENTIFIED POTENTIALLY SIGNIFICANT IMPACT AND RISK

Potential Impact	Significance Rating (before mitigation)	Proposed Mitigation	Significance Rating (after Mitigation)
Socio-Economic	Moderate	Employment of local people, unless the skills and expertise required are not available locally.  Random and regular alcohol and drug testing shall be conducted on all personnel responsible for operating machinery and driving construction vehicles to ensure the safety of the public;	Low
	Moderate	Security and safety should be emphasized; No construction workers shall be allowed to access private properties without the owner's knowledge and consent; Access to private property and areas outside the designated operation areas shall be strictly prohibited.	Low
	Moderate	Local speed limits and traffic laws shall apply at all times to minimise	Low

		<p>the occurrences of accidents on public roads;</p> <p>Where possible the transportation of materials and rubbish shall be undertaken outside traffic peak hours to minimise inconveniencing residents;</p> <p>The number of vehicles on the roads shall be kept to a minimum;</p> <p>Materials transported on public roads must be covered.</p>	
	Moderate	<p>Liaise with the SAPD and existing forums in order to implement effective crime prevention strategies; and</p> <p>The applicant will ensure that as far as possible locals will be used during the operation of the mining project.</p> <p>Recruitment will not be undertaken on site.</p>	Low
Impact on health, and safety of workers.	Moderate	<p>Training of workers in the correct use of the machinery and/or equipment so as to avoid incidents.</p> <ul style="list-style-type: none"> <li>- Workers to wear Personal Protective Equipment (PPE).</li> <li>- Hazardous material must be correctly labelled and handled in a safe manner.</li> </ul>	Low
Flora	Moderate	Pre-execution walk through the facility in order to locate species	Low

		<p>of conservation concern that can be translocated as well as comply with permitting conditions.</p> <p>No species of conservation importance was observed on the site, however if there is a need to remove them a permit will be achieved from the competent authority.</p> <p>Prior to construction any CI and medicinally important floral specimens that may occur within the site layout should be collected and replanted in the Surrounding areas.</p>	
<p>Flora (Biodiversity and alien vegetation).</p>	<p>Moderate</p>	<p>Keep the footprint of the disturbed area to the minimum and designated areas only.</p> <p>Vegetate and irrigate open areas to limit erosion, but take care not to cause erosion by irrigating. Removal of vegetation during prospecting activities will be minimised to reduce the risk of excessive open areas occurring.</p> <p>Limit the extent of vegetation disturbance to the absolute minimum.</p> <p>Adhere to existing roads, and if new tracks are established they must not cross sensitive areas such as the ridges or drainage lines.</p>	<p>Low</p>



		<p>Implement an alien and invasive plant management plan. The plan should include details of monitoring and removing or controlling the recruitment of alien and invasive species within the disturbed areas. Note that alien and invasive plant control will extend further than the footprint boundaries.</p>	
Air quality	Moderate	<p>Dust suppression must be conducted during the operational phase of the project. Correct speed will be maintained at the proposed project site. Vehicle maintenance must be conducted regularly to avoid excessive diesel fumes. Where practical possibly rehabilitation should be undertaken progressively. Exposed areas should be revegetated with locally indigenous flora. If the soil is compacted, it should be ripped, and fertilised. Implement effective and environmentally-friendly dust control measures, such as mulching or periodic wetting of the entrance road. A complaints register should be kept on site, with records of complaints</p>	Low

		received and manner in which the complaint was addressed.	
Noise disturbances	Moderate	<p>The noise created by the proposed development is not expected to be problematic. If required, noise reduction measures will have to be implemented in compliance with Noise standards and Regulations. No sound amplification equipment to be used on site, except in emergency situations. Limit vehicles travelling to and from the site to minimise traffic noise to the surrounding environment. Limit activities to day time hours. Prospecting related machines and vehicles to be serviced on a regular basis to ensure noise suppression mechanisms are effective. Activities that will generate the most noise should be limited to during the day, where viable, in order minimise disturbance. Equipment that is not in use should be switched off.</p> <p>A complaints register should be</p>	

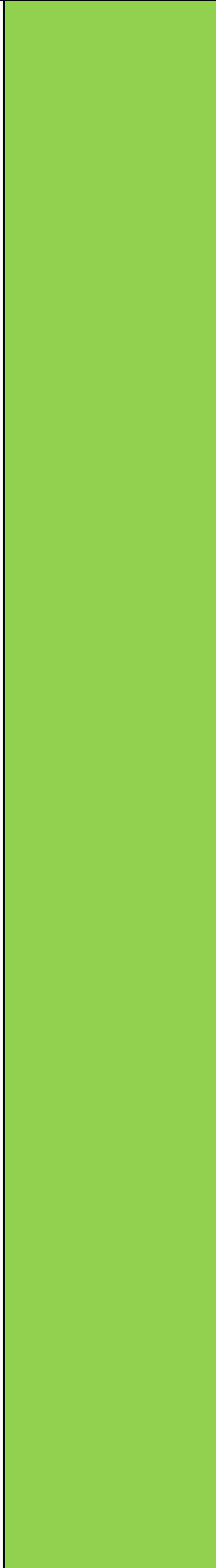
		<p>kept on site, with records of complaints received and manner in which the complaint was addressed.</p>	
--	--	---	--

visual alteration	Moderate	<p>Limit the footprint area of the construction where possible.</p> <p>Topsoil stockpiles should be vegetated and positioned to reduce visual disturbance where possible.</p> <p>Re-slope and reinstate the bank topography correctly during decommissioning.</p> <p>Re-sloped and reinstated riparian areas should be armoured against surface runoff which may result in erosion and downslope sedimentation</p>	Low
Generation of waste.	Moderate	<p>Any waste generated must be stored in such a manner that it prevents pollution and amenity impacts.</p> <p>Bins will be provided for waste and removed regularly from the site.</p> <p>Waste to be disposed of at a licenced landfill site.</p> <p>Hazardous waste to be correctly stored and disposed of in terms of relevant legislation and guidelines.</p>	Low
Soil contamination	Moderate	<p>Prevent any spills from occurring; If a spill occurs it is to be cleaned up immediately and Reported to the appropriate authorities.</p> <p>- All vehicles are to be serviced</p>	Low

		<p>in a correctly banded area or at an off-site location.</p> <p>- Ensure that spillage control kits are available during transport and on storage sites in case of any accidental leakages of spillages, which can then be cleared immediately.</p> <p>Machinery should be maintained properly.</p> <p>Diesel and other chemicals should be handled appropriately. Refuelling protocols must be followed to ensure no diesel is spilled during filling.</p>	
Soils Land use and Land Capability	Moderate	<p>Ensure that topsoil is properly stored, away from the streams and drainage areas.</p> <p>The soils must be used for the backfilling and rehabilitation the boreholes.</p> <p>The rehabilitated area must be seeded with recommended seed mix consisting of indigenous species</p> <p>Tarpaulins must be placed on the ground to prevent oil, grease, hydraulic fluid and diesel spills during emergency repairs.</p> <p>Existing roads will be used as far as possible;</p>	Low



		Any temporary roads created, single track or formal shall be ripped or ploughed, and where necessary fertiliser (based on soil analysis) applied to ensure the regrowth of vegetation;	
Climate	Moderate	The number of construction vehicles and trips shall be kept to a minimum. All the vehicles shall undergo maintenance on a regular basis to improve on the combustion engine vehicle efficiency.	Low
Traffic	Moderate	Local speed limits and traffic laws shall apply at all times to minimise the occurrences of accidents on public roads; and Where possible the transportation of construction materials and rubbish shall be undertaken outside traffic peak hours to minimize inconveniencing residents.	Low

<p>Palaeontological Resources</p>	<p>Moderate</p>	<p>A 100 m buffer zone should be maintained between the proposed borehole location and the graves. Should any paleontological or cultural artefacts be discovered work at the point of discovery must stop, the location be clearly demarcated and SAHRA contacted immediately. Work at the discovery site may only be recommenced on instruction from SAHRA.</p> <p>Should any paleontological or cultural artefacts be discovered work at the point of discovery must stop, the location be clearly demarcated and SAHRA contacted immediately. Work at the discovery site may only be recommenced on instruction from SAHRA.</p> <p>Personnel will be informed about the consequences of unlawful removal of cultural and historical remains and artefacts associated with heritage sites.</p> <p>Any heritage features which might be on site must be marked a No-Go area.</p>	
-----------------------------------	-----------------	--	--

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

Current land uses inside the prospecting area, such as farming and grazing, may be temporarily impacted through the presence of the fenced areas that drill rigs will operate within. These will however, be small areas. These areas will be rehabilitated post drilling activities and the areas will once again become available for grazing. Other potential socio-economic impacts will include:

- Nuisance noise due to on site activities and drilling;
- Poor access control resulting in impacts on cattle movement, breeding and grazing practises;
- Influx of job-seekers to site, which may result in an increase in opportunistic crime;
- Uncontrolled access to private property outside of the demarcated boundaries; and
- Visual impact as a result of the vegetation clearance.

Management and mitigation measures must be implemented to prevent environmental pollution which may impact on environmental resources utilised by communities, landowners and other stakeholders. Measures to manage the potential impacts on communities, individuals or competing land uses in close proximity include;

### **16.4. Summary of Mitigation measures on above mentioned direct impacts**

#### Noise due to construction activities and drilling:

- Directly affected and adjacent landowners and land occupiers must be informed of the planned dates of the drilling activities and a grievance lodging mechanism must be made available to the stakeholders.
- Site activities shall be concluded during daytime hours (0700 to 1730), to avoid night time noise disturbances and night time collisions with fauna.

#### Poor access control resulting in impacts on cattle movement, breeding and grazing practices:

- Access control procedures must be agreed on with the farm owners and all on site personnel shall be trained on these procedures.

Influx of job seekers to the site which may result in increased opportunistic crime:

- Casual labour shall not be recruited at the site. This will eliminate the incentive for people to travel to site seeking employment. Where necessary, a recruitment centre may be established in the major town areas;
- The landowners shall be notified on unauthorised persons encountered on site; and
- Where necessary, the South African Police Service (SAPS) will be notified of unauthorized persons encountered on site.

Visual Impact:

- Wet dust suppression will be undertaken to manage nuisance dust from construction vehicle movements and other construction activities as and when necessary; The portable ablution facilities and any other infrastructure will be acquired with a consideration for colour. Natural earth, green and mat black options which blend with the surrounding must be favoured;
- A waste management system will be implemented, and sufficient waste bins will be provided for on site. A fine system must be implemented to further prohibit littering and poor housekeeping practices; and
- Vegetation cover shall be used where drill rigs will be located to minimise visual impacts.

## **17. Environmental Impact statement**

### **17.1. Summary of the key findings of the environmental impact assessment;**

During the proposed prospecting operation impacts may occur on soils, natural vegetation, surface water, groundwater, sensitive landscapes, air quality, noise, visual aspects, and sites of archaeological and cultural importance should the EMPr not be adhered to.

Barzani (Pty) Ltd will undertake measures to ensure that the identified impacts are minimized. Assessment of the impacts with the proposed mitigation measures has shown the significance of the impacts on all affected environmental aspects to be reduced from medium and low to low and negligible significance.

Land use will not change. Several landowners and land occupiers within the proposed project area may be affected although on a temporary basis due to the need to access the sites and the establishment and use of the campsite. Measures such as safety along the roads and dust suppression will be undertaken to ensure that the impacts on the land owners and land occupiers are minimised.

Sediments will be created from the site during the construction, operational and decommissioning phase, which may impact negatively on the surrounding water and environment.

### **17.2. The Summary of specialist reports**

No specialist studies were conducted as part of this application.

## **18. PROPOSED IMPACT MANAGEMENT OBJECTIVES AND THE IMPACT MANAGEMENT OUTCOMES FOR INCLUSION IN THE EMPR**

The objectives of the EMPr will be to:

- Provide sufficient information to strategically plan the prospecting activities as to avoid unnecessary social and environmental impacts;
- Provide sufficient information and guidance to plan the prospecting activities in a manner that will reduce impacts (social, physical and biological) as far as is



practically possible;

- Ensure an approach that will provide the necessary confidence in terms of environmental compliance; and
- Provide a management plan that is effective and practical for implementation.

Through the implementation of the identified proposed mitigation measures, it is anticipated that the identified impacts can be managed and mitigated effectively. All the impacts were assessed to have significance ranging between medium and low without the implementation of mitigation measures. All the identified impacts will have a reduced significance of low when the mitigation measures have been implemented.

## **19. ASPECTS FOR INCLUSION AS CONDITIONS OF AUTHORISATION**

The following conditions should be included in the Environmental Authorisation:

- A minimum distance of 50 m from any dwellings or infrastructure must be kept;
- Landowners as well as land occupiers must be re-consulted at least 30 days prior to any prospecting activities undertaken on their properties;
- A map detailing the drilling locations should be submitted to the relevant landowners, prior to the commencement of the prospecting activities;
- No activities may be undertaken within 100m of watercourses

## **20. DESCRIPTION OF ANY ASSUMPTIONS, UNCERTAINTIES AND GAPS IN KNOWLEDGE.**

There are no assumptions, uncertainties or gaps on the proposed project.

## **21. REASONED OPINION AS TO WHETHER THE PROPOSED ACTIVITY SHOULD OR SHOULD NOT BE AUTHORIZED**

### **21.1. Reasons why the activity should be authorized or not**

The option of not approving the activities sediments will result in a significant loss of valuable information regarding the mineral status (in terms of Magnesite, Vanadium and Vermiculite), present on the identified properties. In addition, should economical

reserved be present and the applicant does not have the opportunity to prospect the opportunity to utilize these reserves for future phases will be lost.

According to the impact assessment undertaken for the proposed project, the impacts of the project are considered to be of medium and low significance. The significance of the impacts can be reduced to low and very low when the mitigation measures are implemented.

The project will also have positive impacts due to the employment to be created although for a short term, as well as a short boost to local businesses.

The stakeholders will also be requested for their comments. All comments to be received during Public Participation Process will be included in this BAR and EMPr. These comments will be addressed the as far as possible to the satisfaction of the interested and affected parties.

The management of the impacts identified in the impact assessment for all phases of the proposed project will be undertaken through a range of programmes and plans contained in the EMPr. In consideration of the layout plan and the management and mitigation measures contained within the EMPr compiled for the project, which are expected to be effectively implemented, there will be significant reduction in the significance of potential impacts.

### **21.2. Period for which the Environmental Authorisation is required**

The prospecting right has been applied for a period of five (5) years. The Environmental Authorisation should therefore allow for 5 year of prospecting and associated activities.

## **22. FINANCIAL PROVISION**

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

**Table 24: COSTS WERE CALCULATED AS SHOWN IN TABLE BELOW**

No.	Description	Unit	A	B	C	D	E=A*B*C*D
			Quantity	Master Rate	Multiplication factor	Weighting factor 1	Amount (Rands)
1	Dismantling of processing plant and related structures (including overland conveyors and powerlines)	m3	0	14,05	1	1	0
2 (A)	Demolition of steel buildings and structures	m2	0	195,76	1	1	0
2(B)	Demolition of reinforced concrete buildings and structures	m2	0	288,49	1	1	0
3	Rehabilitation of access roads	m2	0,1	35,03	1	1	3,503
4 (A)	Demolition and rehabilitation of electrified railway lines	m	0	340,01	1	1	0
4 (A)	Demolition and rehabilitation of non-electrified railway lines	m	0	185,46	1	1	0
5	Demolition of housing and/or administration facilities	m2	0	391,53	1	1	0
6	Opencast rehabilitation including final voids and ramps	ha	0	205242,6	1	1	0
7	Sealing of shafts adits and inclines	m3	0,01	105,09	1	1	1,0509
8 (A)	Rehabilitation of overburden and spoils	ha	0	136828,1	1	1	0
8 (B)	Rehabilitation of processing waste deposits and evaporation ponds (non-polluting potential)	ha	0	170416,93	1	1	0
8 (C)	Rehabilitation of processing waste deposits and evaporation ponds (polluting potential)	ha	0	494971,55	1	1	0
9	Rehabilitation of subsided areas	ha	0	114572,3	1	1	0
10	General surface rehabilitation	ha	0,01	108390,94	1	1	1083,9094
11	River diversions	ha	0	1083904	1	1	0
12	Fencing	m	0	123,64	1	1	0
13	Water management	ha	0	41213,28	1	1	0
14	2 to 3 years of maintenance and aftercare	ha	0	14424,65	1	1	0
15 (A)	Specialist study	Sum	0			1	0
15 (B)	Specialist study	Sum				1	0
<b>Sub Total 1</b>							<b>1088,4633</b>
1	Preliminary and General		130,615596		<b>weighting factor 2</b>		130,615596
					1		
2	Contingencies				108,84633		108,84633
<b>Subtotal 2</b>							<b>1327,93</b>
<b>VAT (15%)</b>							<b>199,19</b>
<b>Grand Total</b>							<b>1527</b>

### **22.1. Explain how the aforesaid amount was derived**

The financial provision for the environmental rehabilitation and closure of any mine/prospecting and its associated operations forms an integral part of the MPRDA. Sections 41 (1) and, 41 (2), 41 (3) and 45 of the MPRDA deal with the financial provision for rehabilitation and closure. During 2012, the DMR made updated rate available for the calculation of the closure costs, where contractor's costs are not available, these apply.

The "Guideline Document for the Evaluation of Financial Provision made by the Mining Industry" was developed by the DMR in January 2005 in order to empower the personnel at Regional DMR offices to review the quantum determination for the rehabilitation and closure of mining sites. With the determination of the quantum for closure, it must be assumed that the infrastructure had no salvage value (clean closure). The closure cost estimate (clean closure) was determined in accordance with the DMR guidelines.

### **22.2. Confirm that this amount can be provided for operating expenditure**

The amount required to cover the prospecting operation, including rehabilitation and closure is estimated to be **R 397 000.00** this stage. Barzani Mining (Pty) Ltd will fund the operation. The applicant hereby confirms that the amount is anticipated to be an operating cost and is provided for as such in the Prospecting Work Programme.

## **23. Specific Information required by the competent Authority**

**23.1. 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:-**

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

There are no aspects earmarked as of heritage importance by the Act in the area, none was observed during site assessment or raised during the consultation process. However, there is a gravesite within the site.

## **PART B: ENVIRONMENTAL MANAGEMENT PROGRAMME**

### **2.1 DESCRIPTION OF IMPACT MANAGEMENT OBJECTIVES INCLUDING MANAGEMENT STATEMENTS**

#### **Determination of closure objectives.**

Rehabilitation actions for the proposed prospecting activities will be undertaken in three phase's namely concurrent rehabilitation, final decommissioning and rehabilitation, thereafter a closure.

#### **Concurrent rehabilitation objectives include:**

- Backfilling, sealing and capping of drilled boreholes
- Clean up of surrounding areas, removing pollution and waste materials
- Spread overburden and topsoil evenly and re-vegetate disturbed areas
- Inspect rehabilitated areas to monitor re-vegetation rate and remove alien invader species that may establish in the area

#### **Final decommissioning and rehabilitation objectives:**

- Remove all temporary infrastructure from the site camp and at prospecting sites
- Rip and seed disturbed areas such as on tracks, camping sites, ablution facilities etc.
- Inspect rehabilitated areas to monitor re-vegetation rate as well as to remove alien invader species

It is recommended that concurrent rehabilitation is undertaken to improve the success of rehabilitation. The rehabilitated areas must be monitored to ensure that the objectives of rehabilitation are met, and correct rehabilitation process is followed.

**The closure objectives are to:**

- Make all areas safe for humans, wild animals and livestock
- Prevent soil, surface and groundwater contamination by managing runoff water on site
- Minimise negative health and environmental impacts
- Establish a sustainable cover to prevent erosion and enhance ecological succession
- Maintain and restore biodiversity levels to provide appropriate habitat for fauna
- Protected drainage lines and watercourses
- Do not leave any infrastructure onsite
- Use approved sites for safe disposal of all wastes from the drilling sites
- Monitor key environmental variables (i.e. soils, erosion, vegetation) to demonstrate stability of rehabilitated areas
- Adhere to all statutory and other legal requirements
- Report on the progress of the rehabilitation process

**Volumes and rate of water use required for the operation**

The rate of water use required for the operation is about 50 liters a day.

**Has a water use license has been applied for?**



There will be no abstraction of water from the watercourses nor working on the river bed. No listed activity on Section 21 of the Water Act has been triggered.

2.1.1 IMPACTS TO BE MITIGATED IN THEIR RESPECTIVE PHASES

Table 25: Measure to rehabilitate the environment affected by the undertaking of any listed activity

Impact	Potential Impact (Including the potential impacts for cumulative impacts)	Aspects Affected	Phase (In which impact is anticipated)	Significance (if not Mitigated)	Mitigation Type	Significance (if mitigated)
Socio-economic	Disturbance on the existing socio-economic routines of the communities	Social and economic	ALL	Moderate	Education and environmental awareness on issues related to mining.  Ensure local community members are given first priority during employment,	Low

Impact	Potential Impact (Including the potential impacts for cumulative impacts)	Aspects Affected	Phase (In which impact is anticipated)	Significance (if not Mitigated)	Mitigation Type	Significance (if mitigated)
					<p>service delivery and communication should be enhance through the election of community liaising person.</p> <p>Fence the proposed mining area and adhere to prevention and mitigate measures.</p>	

Impact	Potential Impact (Including the potential impacts for cumulative impacts)	Aspects Affected	Phase (In which impact is anticipated)	Significance (if not Mitigated)	Mitigation Type	Significance (if mitigated)
					Develop the area and uplift local people and business.	
Ground water through soil contamination	Spillages of chemicals during the operation	Environmental	ALL	Moderate	Prevent by properly storing fuel on site and re-fuelling to be done from a bowser that do not drip.	Low
Surface Water through soil contamination	Erosion of contaminants and soil to nearby streams	Environmental	All	Moderate	Dust suppression measures Erosion control measures	Low

Impact	Potential Impact (Including the potential impacts for cumulative impacts)	Aspects Affected	Phase (In which impact is anticipated)	Significance (if not Mitigated)	Mitigation Type	Significance (if mitigated)
Biodiversity (Flora and fauna)	Affecting flora and fauna during the execution of proposed activities	Environmental	All	Moderate	Revegetation of indigenous species Avoid killing species. If after two years vegetation has not established sufficiently, taking into account environmental conditions, such as droughts, re-vegetation or other alternative remediation measures must to be undertaken.	Low

Impact	Potential Impact (Including the potential impacts for cumulative impacts)	Aspects Affected	Phase (In which impact is anticipated)	Significance (if not Mitigated)	Mitigation Type	Significance (if mitigated)
					If any invasive alien vegetation is noted, it must be removed immediately. Alien vegetation clearing to be undertaken if non-invasive alien species increase to over 5% of the area	
Air Quality	Dust and emission of greenhouse gases from the equipment's and vehicles	Environment	All	Moderate	Control dust by wetting during dry, dusty conditions. Dust suppression Using less vehicles	



Impact	Potential Impact (Including the potential impacts for cumulative impacts)	Aspects Affected	Phase (In which impact is anticipated)	Significance (if not Mitigated)	Mitigation Type	Significance (if mitigated)
Visual	Prospecting associated activities will result in changes on the landscape	Social	All	Moderate	The visual impact would be addressed by means of: <ul style="list-style-type: none"> <li>• Re-vegetation with grasses</li> <li>• Removal of any infrastructure, scrap, waste that would contribute to a negative impact</li> </ul>	
Noise	Noise from trucks and equipment used	Social	All	Moderate		

Impact	Potential Impact (Including the potential impacts for cumulative impacts)	Aspects Affected	Phase (In which impact is anticipated)	Significance (if not Mitigated)	Mitigation Type	Significance (if mitigated)
Soil, Land use and Land Capability	Excavations will result in change on the surface	Environmental	All	Moderate	Prevent erosion by placing of berms Follow correct topsoil stripping and stockpiling methods. Restoration of the landform and removal of infrastructure to reinstate land use potential Ensure rehabilitation plan is followed Implement erosion control measures	

Impact	Potential Impact (Including the potential impacts for cumulative impacts)	Aspects Affected	Phase (In which impact is anticipated)	Significance (if not Mitigated)	Mitigation Type	Significance (if mitigated)
					Monitor erosion and remediate where necessary	
Traffic	Traffic on the affected roads will be affected.	Social	All	Moderate	Control impact on roads by properly servicing the operating trucks Speed limit should be 40 km per hr on gravel roads.	
Climate	Release of greenhouse gases	Environmental	All	Moderate	Service equipment and vehicles regularly.	Low

Impact	Potential Impact (Including the potential impacts for cumulative impacts)	Aspects Affected	Phase (In which impact is anticipated)	Significance (if not Mitigated)	Mitigation Type	Significance (if mitigated)
					Minimise the use of equipment where is not necessary. Avoid burning of waste material	
Waste Management	Waste will be generated from offices, employers and other proposed activities				Effective solid waste management Sufficient housekeeping Appropriate materials management	Low
Graves						

## **PART C: REHABILITATION PLAN**

Rehabilitation involves restoring a drilled borehole on completion of the prospecting activity including the surrounding affected area where the activity was undertaken back to its initial state and sometimes improving it by using various reconstruction methods and treatments. This document supplies the Department of Mineral Resources (DMR) with information pertaining to rehabilitation and closure plan for the proposed prospecting as required in terms of the National Environmental Management Act 107 of 1998 (NEMA) and the Mineral and Petroleum Resources Development Act 28 of 2002.

**The proposed prospecting activities will be conducted in the following phases:**

- Site Preparation
- Invasive drilling and concurrent rehabilitation
- Final decommissioning, rehabilitation and closure

The aim of rehabilitation is to return the disturbed prospecting target areas to their natural state. It is important to rehabilitate disturbed areas to ensure a safe and stable land use after prospecting for humans, wild animals and livestock.

- **Summary of rehabilitation and closure actions**

Rehabilitation actions for the proposed prospecting activities will be undertaken in three phase's namely concurrent rehabilitation, final decommissioning and rehabilitation, thereafter a closure. **Concurrent rehabilitation would include:**

- Backfilling, sealing and capping of drilled boreholes
- Clean up of surrounding areas, removing pollution and waste materials
- Spread overburden and topsoil evenly and re-vegetate disturbed areas
- Inspect rehabilitated areas to monitor re-vegetation rate and remove alien invader species that may establish in the area

### **Final decommissioning and rehabilitation:**

- Remove all temporary infrastructure from the site camp and at prospecting sites
- Rip and seed disturbed areas such as on tracks, camping sites, ablution facilities etc.
- Inspect rehabilitated areas to monitor re-vegetation rate as well as to remove alien invader species

It is recommended that concurrent rehabilitation is undertaken to improve the success of rehabilitation. The rehabilitated areas must be monitored to ensure that the objectives of rehabilitation are met, and correct rehabilitation process is followed.

### **The importance of rehabilitation**

There are a variety of reasons for rehabilitating the prospected area. Below we provide some of the reasons.

- Make all areas safe for humans, wild animals and livestock
- Prevent soil, surface and groundwater contamination by managing runoff water on site
- Minimise negative health and environmental impacts
- Establish a sustainable cover to prevent erosion and enhance ecological succession
- Maintain and restore biodiversity levels to provide appropriate habitat for fauna
- Protected drainage lines and watercourses
- Do not leave any infrastructure onsite
- Use approved sites for safe disposal of all wastes from the drilling sites
- Monitor key environmental variables (i.e. soils, erosion, vegetation) to demonstrate stability of rehabilitated areas
- Adhere to all statutory and other legal requirements



- Report on the progress of the rehabilitation process

### Capping and plugging of drilled boreholes

- PVC drill hole collar of the same size “diameter & length” with the drill hole must be readily available, with a temporal and permanent cap/plug. The temporal cap can be pushed into the PVC collar to the bottom of the collar with the backfilling “un-contaminated soil” material. Thus, is to eliminate the movement of the backfilled material within the PVC collar to the outlet environment. See the figure below.

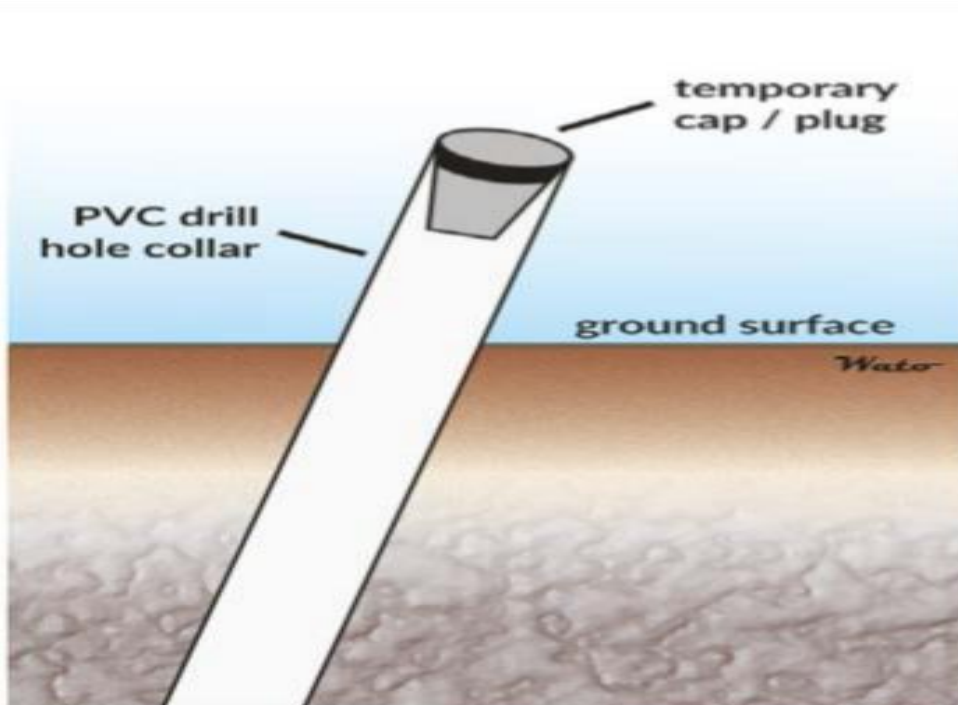


Figure 14: Showing the PVC drill hole collar of the same size “diameter & length” with the drill hole inserted.

- The PVC collars backfilling material must leave a space of 1 m below the surface, then a permanent cap/plug (non-degradable/metal plate) can be placed which can take up to 10 cm. The plug is to be at least 50 mm larger than the diameter of the drill hole, but depending on the nature of the ground, must be of sufficient size as to remain firmly in position.

- The remaining portion of a metre left on the PVC collar must be cut below ground level to a minimum depth of 1 m. See the figure below.

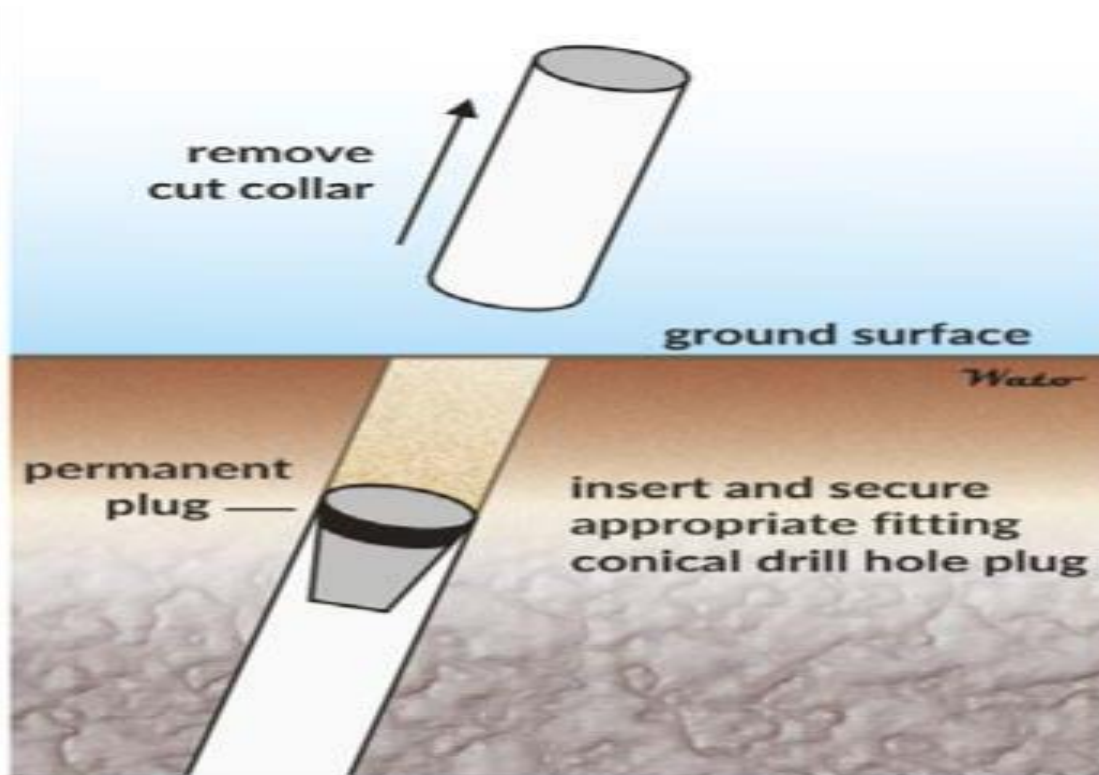


Figure 15: Showing the PVC collar cut at 1 m below the earth surface, the cap is then installed.

- After capping has stabilized, backfilling the remaining 1 m above the PVC collar with topsoil. The soil backfill should be compacted and mounded over the hole to allow for subsidence and to limit the pooling of surface water. The intention is that water shall not ingress the hole, causing erosion. Particular care is required to ensure the long term effectiveness of the plugging procedure.

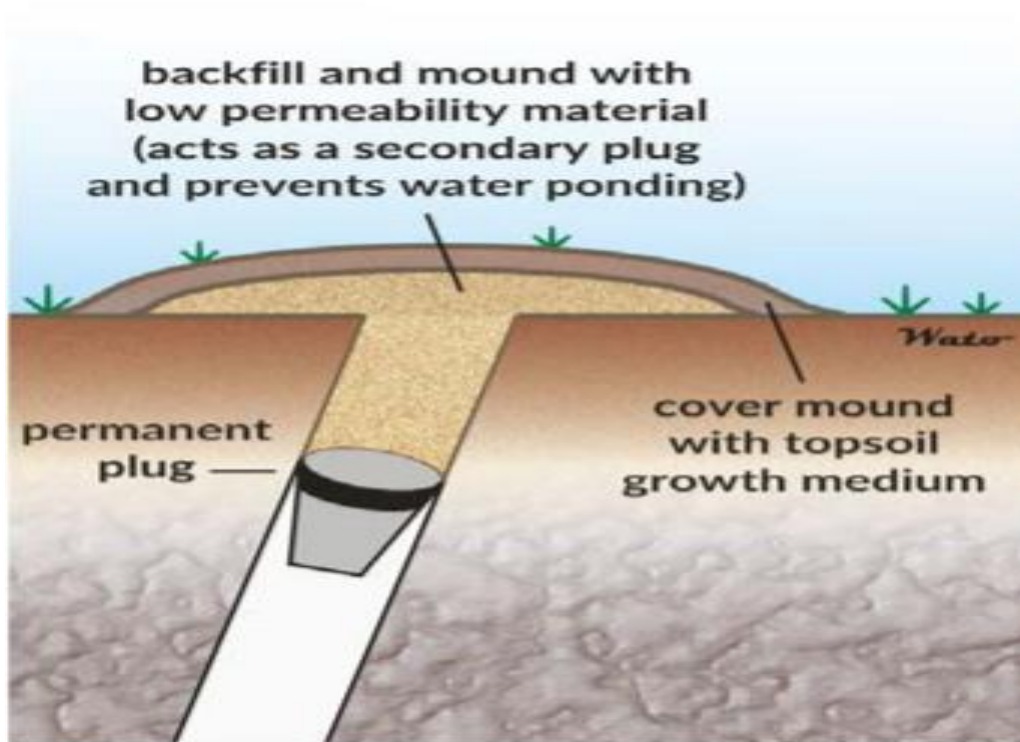


Figure 16: The remaining 1 m above the PVC collar with filled with topsoil

- **Capping and plugging of drill holes intersecting a single confined aquifer**

The main objectives of sealing drill holes in single confined aquifers is to contain water in the aquifer. Drill holes must be plugged across the aquifer confining bed interface for a thickness of about 4 m (2 m above the interface and 2 m below); and then backfilled or plugged as outlined previously.

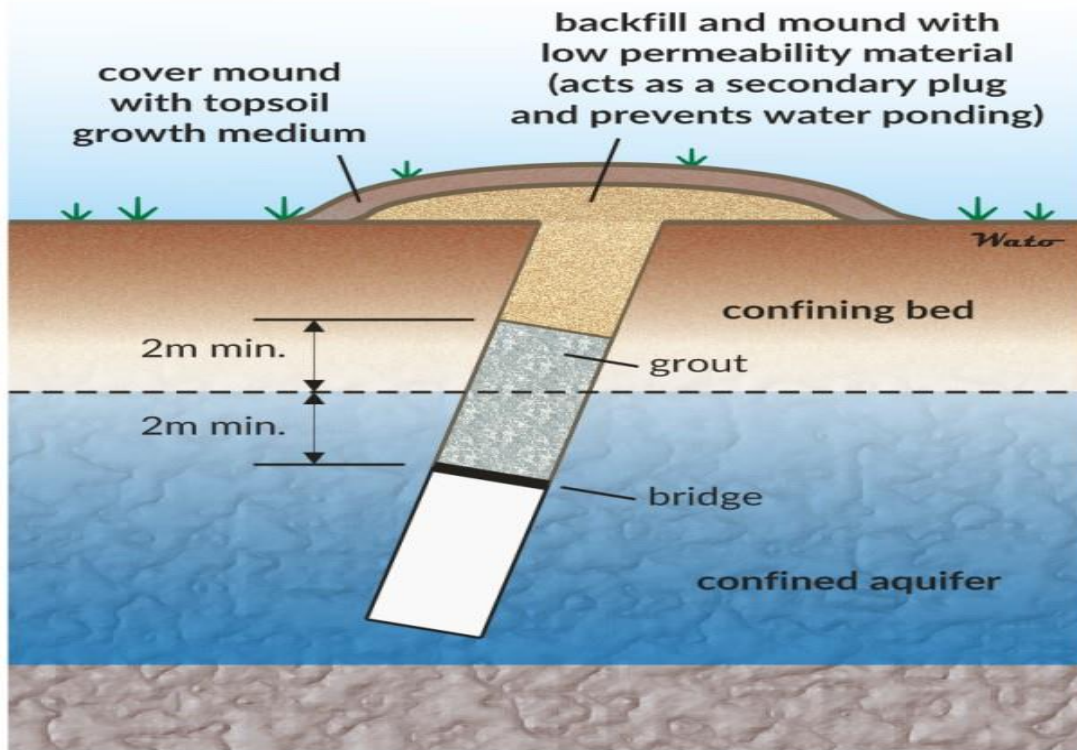


Figure 17: Sealing drill holes in single confined aquifers

### Capping and plugging of drill holes intersecting multiple aquifers

- Major aquifers should be sealed to prevent inter-aquifer flow. Concrete plugs must be positioned at the interfaces between aquifers and the overlying confining beds. The concrete should be at least 4 m thick, with 2 m above and 2 m below the interface. Holes should then be backfilled or plugged as outlined previously, with compaction and mounding of backfilled material. Shallow drill holes can be backfilled from the base of the hole to the surface with concrete.

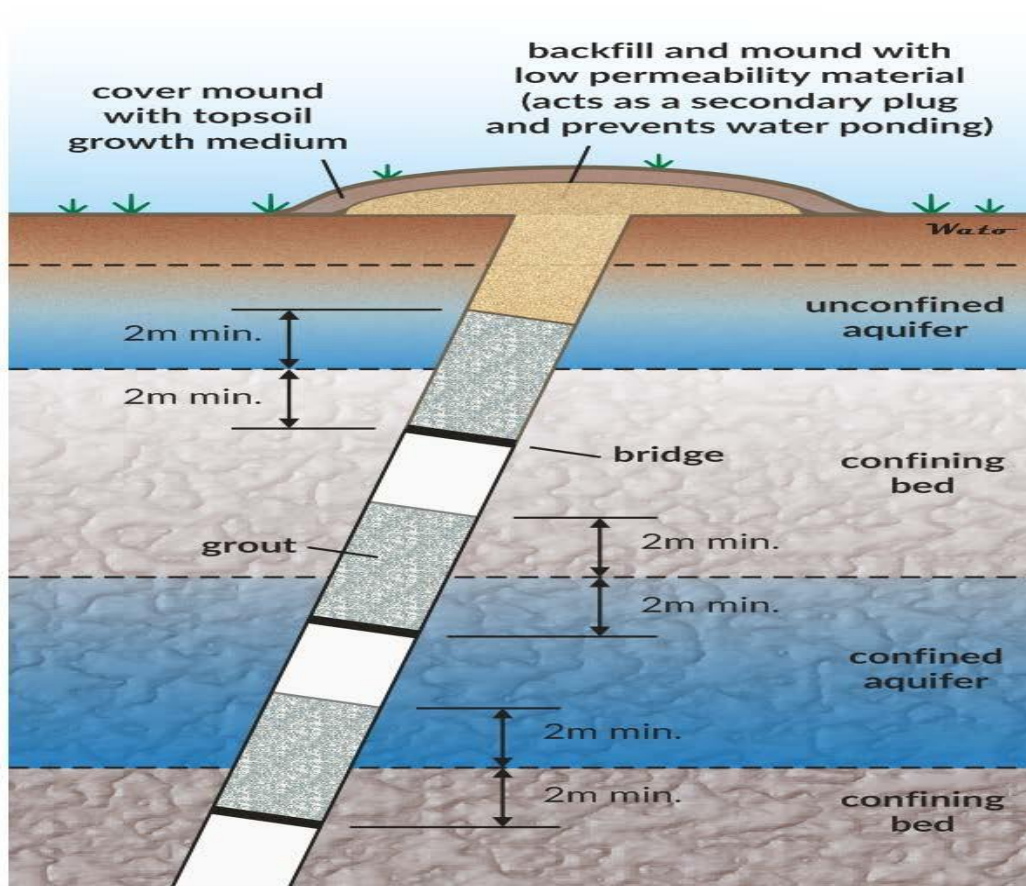


Figure 18: Showing how Interfaces between aquifers and the overlying confining beds must be placed

### Rehabilitation of the surrounding area of the drill site

- Dependent on site conditions and surrounding landscape, it may be necessary to conduct earthworks to stabilise and reshape the site. The site is required to be remediated to as near original condition as possible, following the completion of the drilling program.
- Ground which has become compacted by the use of heavy machinery and traffic is to be ripped along contour, not down slope, to loosen soil, promote water infiltration, aid revegetation and minimise soil erosion.
- Earth and overburden that was excavated from the pads and benches is required to be pushed, raked or pulled back over. The stockpiled topsoil and vegetation should be re-spread over the site.

- All sample bags, waste materials and contaminants must be removed from site and disposed of in an appropriate manner, following the completion of the drilling program.
- Drill cuttings that are acidic, radioactive or of a substantially different colour to the surface soil must be backfilled in the drill hole, sump or other excavation. All other cuttings are required to be dispersed around the site or raked over.
- Drill sumps must be backfilled with the excavated material and re-spread with stored topsoil.
- Permanent survey markers should be kept to a minimum and wooden pegs should be used in preference to steel pegs.
- Tracks constructed to access the drill site must be remediated, they must be ripped or ploughed, and where necessary fertiliser (based on soil analysis) applied to ensure the regrowth of vegetation.
- If reasonable assessment indicates that re-establishment of vegetation is unacceptably slow the Regional Manager may require that the soil be analysed and any deleterious effects on the soil arising from the prospecting operation, be correct and the area be seeded with seed mix to Regional Managers specification;

### **Decommissioning phase**

- All bores that are to be permanently decommissioned must be sealed completely and filled in a manner that prevents vertical movement of water within the bore.
- The sealing material must not pose any potential human or environmental health risk and should be more impervious than the material through which the bore was drilled. Concrete cement should be used as the primary sealing material and should be placed from the base of the hole upwards.
- Fill material should consist of clean or disinfected sand, coarse stone, clay or drill cuttings.
- Boreholes with high flows and pressure should be sealed exclusively with concrete cement to a depth of the hole.



- All bores should be sealed with an approved sealing material from a depth of 1 m to around 30 c below the ground surface. Topsoil should be placed above this to assist in full rehabilitation. Surface casings may be left in place if they have been pressure cemented or if they have been determined to be sound, in which case they must be bridged with concrete cement.
- Concrete bridges may be used where it is not practicable to fill the entire PVC drill hole collar. A minimum of 10 m is required for a bridge (20 m for a flowing bore). These will be set in impermeable strata immediately above and below each aquifer formation in the bore.
- Records should be complete and accurate regarding the location of borehole and the procedure used for decommissioning and rehabilitating the site.

### **Closure Period and Post Closure Requirements**

The closure period is the period between stopping of prospecting activities and the completion of active rehabilitation processes on the disturbed areas. The nature of borehole and drill site rehabilitation is of such that closure may be implemented for individual boreholes as and when analysis ends.

The closure options together with monitoring must be undertaken for the period of 2 years post final decommission. Thereafter a closure can be achieved. This closure should be in line with the requirements of the MPRDA Regulations. Following successful completion of the closure actions it is suggested that a further post closure period of 2 years be assigned to monitor the success of closure. The post closure monitoring will include:

- Inspection of drill hole caps;
- Inspect and remedy any erosion around rehabilitated drill sites
- Inspect rehabilitated areas re-vegetation rate
- Remove alien invader species

## **Required expertise**

**Engineering personnel:** An engineer with at least 5 years of experience must be responsible to ensure that the rehabilitation program is implemented as outlined. The engineer must also enforce the following;

- confirming that workers are trained and competent for the task undertaken
- providing clear work instructions
- inspecting and monitoring workplace conditions
- continuously evaluating worker performance and correcting unsafe acts
- reporting and rectifying hazards
- assuring implementation of the company's safety systems
- demanding compliance with safety rules and procedures
- conducting meaningful observations, consultation and interventions

**Environmental, Health and safety personnel:** with at least 3 years' experience in relevant fields of rehabilitation.

- Monitor and report the potential environmental, health and safety risk
- Identify priorities for replacing or modifying the rehabilitation plan.
- Develop an action plan with due dates and responsibilities for the rehabilitation process
- Conduct an audit of rehabilitation to ensure that all practical measures have been taken to control risk associated
- Produce and environmental, health and safety report monthly and quarterly

## **Recommendations**

### **Compliance with Closure Plan**

The closure objectives can only be achieved by fulfilling the responsibilities as set out in this rehabilitation plan. Closure objectives cannot be achieved if the actions of the rehabilitation plan are not complied with resulting in an unsuccessful closure plan.

### **Annual update requirements of the plan**

The rehabilitation and closure plan must be reviewed annually and updated as and when major changes are effected to the Prospecting Works Programme.

### **On-site documents**

The closure plan must be available onsite as per the requirements of Regulation 26 (h) of NEMA EIA Regulations of 2014.

### **EXPLAIN WHY IT CAN BE CONFIRMED THAT THE REHABILITATION PLAN IS COMPATIBLE WITH THE CLOSURE OBJECTIVES.**

Care and adherence to environmental issues is a priority. Most recent and sustainable technology will be used to restore the environment close to its initial state. Please refer to the rehabilitation plan above.

### **CALCULATE AND STATE THE QUANTUM OF THE FINANCIAL PROVISION REQUIRED TO MANAGE AND REHABILITATE THE ENVIRONMENT IN ACCORDANCE WITH THE APPLICABLE GUIDELINE.**

The financial provision for the environmental rehabilitation and closure of any mine/prospecting and its associated operations forms an integral part of the MPRDA. Section 41 (1) and 41(3) and 45 of the MPRDA deal with the financial provision for rehabilitation and closure. During 2012, the DMR made updated rate available for the calculation of the closure costs, where contractor's costs are not available these apply

The Guideline document for the evaluation of financial provision made by the Mining Industry was developed by the DMR in January 2005 in order to empower the personnel at Regional DMR offices to review the quantum determination for the rehabilitation and closure for mining sites.

With the determination of the quantum closure, it must be assumed that the infrastructure had no salvage value (clean closure). The closure costs were calculated above to be **R 397 000**, and are available to execute the proposed activities.

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

Barzani Mining (Pty) Ltd have finances allocated for the proposed project, a deposit will be made to the DMR trust fund account and proof of payment will be submitted.

### **MECHANISMS FOR MONITORING COMPLIANCE WITH AND PERFORMANCE ASSESSMENT AGAINST THE ENVIRONMENTAL MANAGEMENT PROGRAMME AND REPORTING THEREON INCLUDING**

- The environmental Officer be employed on daily basis of the operation for monitoring of impact Management Actions
- The environmental Officer will generate daily and monthly monitoring reports, external audits will be conducted on quarterly basis
- The environmental officer is responsible for monitoring compliance
- Impacts should be immediately managed with urgency.
- Mechanism for monitoring compliance should be reviewed and updated.

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

Annual environmental audits must be undertaken to ensure compliance with the authorization conditions and EMPr.

### **ENVIRONMENTAL AWARENESS PLAN**

#### **MANNER IN WHICH THE APPLICANT INTENDS TO INFORM HIS OR HER EMPLOYEES OF ANY ENVIRONMENTAL RISK WHICH MAY RESULT FROM THEIR WORK.**

Before the proposed project of prospecting commence, all the employees whom will be responsible for identifying environmental risks will go to training to get the insight information on how they will compile environmental risk study. It is a standard practice for all employees to attend induction training where environmental course will be explained in more detail related to the project. The training should cover the relevant

part of the EMP which is formed as a guide to contractors and employees regarding environmental related issues and how to mitigate such issues

### **MANNER IN WHICH RISKS WILL BE DEALT WITH IN ORDER TO AVOID POLLUTION OR THE DEGRADATION OF THE ENVIRONMENT.**

The Applicant “Barzani Mining (Pty) Ltd” and contractors will be responsible for the implementation section 28 of NEMA at all times “duty of care” to mitigate any impacts in order to avoid pollution or degradation of the environment appropriate implementation of the recommended mitigation measures specified in the EMPr will be monitored through monthly site audits by an EAP and annual EMP audits undertaken by a third party.

The Following Documents Will Be Used As Reference For Identifying And Managing Impacts:

- Approved Empr;
- Approved EA; And
- Adoption and implementation Environmental Management Systems.

### **SPECIFIC INFORMATION REQUIRED BY THE COMPETENT AUTHORITY**

No specific information was required by the competent authority.

## **PART D: PROSPECTING HEALTH AND SAFETY ISSUES**

In the event of contractual agreements with service providers to such that if enhances health and safety. Owner or employer remains responsible for compliance

### **Hazard Identification and Risk Assessment**

- a) Task analysis for every operation to be conducted, and bigger to be broken down to smaller tasks.
- b) Hazards to be identified on each and every task.
  - o Drilling hazards

Drilling in any environment is potentially hazardous, but when risk are identified prior execution and mitigation measure are put in place. The risk of drilling becomes low on both the environment and human health.

There are hazards associated with the preparation of camps, work sites and drill pads, as well as those specific to the operation of drill rigs.

Western Australia's code of practice for mineral exploration drilling encourages operators to develop site-specific solutions for the major hazard categories identified for the remote exploration environment, including:

- o rotating and moving parts
- o hazardous substances and dangerous good
- o manual tasks
- o working in hot environments
- o fatigue and mental wellbeing
- o dust
- o noise
- o ionising radiation
- o hot work
- o extreme weather and bushfire

- c) Risk assessment to be conducted for every identified hazard.

The EMP provides measures to be used when dealing with impacts. However, hazard specific assessment will be conducted based on the urgency of the identified hazard.

- d) Effective measures to be put in place to deal with risks associated with identified hazards.



A standard operating procedure (SOP) that addresses the use of correct personal protective equipment, safe handling, safe use, and proper disposal should be established. Thorough training and drills should be conducted regarding the company's spill response plans and chemical hygiene plans.

Where there is a possibility of heat stress occurring, companies need to carry out a risk assessment that considers the work rate, working climate and worker clothing and respiratory protective equipment. Where possible, control the temperature using engineering solutions, provide mechanical aids where possible to reduce the work rate, and regulate the length of exposure to hot environments. Furthermore, personal protective equipment should be provided, such as specialised protective clothing that incorporates personal cooling systems or breathable fabrics. Furthermore, companies should provide training for workers, especially new and young employees, and monitor the health of workers at risk.

To protect workers against noise, the companies should evaluate working conditions and noise exposure through risk assessments. Avoiding and reducing exposure can be achieved by applying engineering controls at the noise source or along the noise path to reduce exposures, such as vibration dampeners or absorptive panels. Regular maintenance of machines is also essential to reducing noise. Employer must ensure proper use of personal hearing protection amongst.

noise-exposed employees, while providing necessary health and safety training and maintaining up-to-date health surveillance records.

### Standard Working Procedures and COP's

a) Compilation of all mandatory COP's prior to commencement of prospecting.

The purpose of this schedule is to ensure that employees are not only trained but that the principles are continuously re enforced.

Table 26: Working procedures

Activity	Time allocation and frequency	Objective
Induction (all staff and workers)	1-hour training on environmental awareness training as part of site induction	<p>Develop an understanding of what is meant by the natural environmental and social environment and establish a common language as it relates to environmental, health, safety and community aspects.</p> <p>Establish a basic knowledge of the environmental legal framework and consequences of non-compliance.</p> <p>Clarify the content and required actions for the implementation of the Environmental Management Plan.</p> <p>Confirm the spatial extent of areas regarded as sensitive and clarify restrictions.</p> <p>Provide a detailed understanding of the definition, the method for identification and required response to emergency incidents</p>

Monthly Awareness Talks (all staff and workers)	30-minute awareness talks	Based on actual identified risks and incidents (if occurred) reinforce legal requirements, appropriate responses and measures for the adaptation of mitigation and/or management practices.
Risk Assessments (Environmental officer, supervisor and workers involved in task)	Daily task-based risk assessment	Establish an understanding of the risks associated with a specific task and the required mitigation and management measures daily as part of daily tool box talks.



Figure 19: Typical example of meeting before commencing with work

- b) Based on the proposed effective measures and mandatory COP's safe and healthy working procedures must be formulated and documented.
- c) Contents of the COP's must be properly communicated to different levels of the organization and effectively implemented.

### **Development of procedures and checklists**

The following procedures will be developed, and all staff and workers will be adequately trained on the content and implementation thereof.

- **Emergency preparedness and response**

The procedure will be developed to specifically include risk identification, preparedness, response measures and reporting. The procedure will specifically include spill and fire risk, preparedness and response measures. The appropriate emergency control centres (fire department, hospitals) will be identified and the contact numbers obtained and made available on site. The procedure must be developed in consultation with all potentially affected landowners. In the event that risks are identified which may affect adjacent landowners (or other persons), the procedure will include the appropriate communication strategy to inform such persons and provide response measures to minimise the impact.

- **Incident reporting procedure**

Incident reporting will be undertaken in accordance with an established incident reporting procedure to (including but not limited to):

Provide details of the responsible person including any person who: (i) is responsible for the incident; (ii) owns any hazardous substance involved in the incident; or (iii) was in control when the incident occurred

- Provide details of the incident (time, date, location)
- The details of the cause of the incident
- Identify the aspects of the environment impacted
- The details corrective action taken
- The identification of any potential residual or secondary risks that must be monitored and corrected or managed

- **Environmental and social audit checklist**

An environmental audit checklist will be established to include the environmental and social mitigation and management measures as developed and approved as part of the Environmental Management Plan. Non-conformances will be identified and corrective action taken where required.

- **Health and Safety Equipment and Personal Protective Equipment**

Ensure necessary and appropriate tools, fit for the purposes are provided for employees perform work.



Figure 20: Typical PPE

Use respiratory protection when needed. The controls cited in this report may greatly reduce worker exposure to dust; however, respirators may still be necessary to reduce exposure to crystalline silica below the NIOSH REL of  $50\mu\text{g}/\text{m}^3$ . Due to the health risk related to exposure to crystalline silica, proper personal respiratory masks are needed when drilling, and should continue to be used even after dust suppressive methods are established. Necessary personal protective equipment to be provided.



Figure 21: Health and safety sign

c) All necessary adequate hygiene facilities to be provided.

## Provision of potable and palatable water

The employer must ensure that sufficient potable and palatable water, which comply with the requirements set out, is readily available to all employees and clearly identified as drinkable.

Table 27: Categorisation and minimum standards for strenuous work

<p><b>Very Heavy</b></p>	<p>Manual Material Handling: Consists of 34-66% of the work shift (daily exposure).</p> <p>Work Environment: Manual material handling takes place in restricted work environments (ceiling heights of 0.850m - 1.5m).</p> <p>Heat Exposure: Daily exposure to high environmental heat loads for more than 34% of the work shift.</p> <p>Production / Non-production Related: Work tasks are imposed by a process (directly linked to production).</p>
<p><b>Heavy</b></p>	<p>Manual Material Handling: Consists of 34-66% of the work shift (daily exposure).</p> <p>Work Environment: Manual material handling takes place in unrestricted work environments.</p> <p>Heat Exposure: Daily exposure to high environmental heat loads for more than 34% of the work shift.</p> <p>Production / No-production Related: Work tasks are imposed by a process (directly or indirectly linked to production).</p>
<p><b>Moderate</b></p>	<p>Manual Material Handling: Load handling consists of less than 34% of the work shift on a daily basis or more than 34% of the work shift on an occasional basis.</p> <p>Work Environment: Unrestricted work environments or supervisory work in restricted environments.</p>



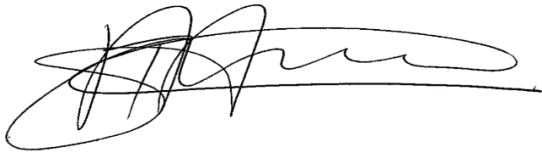
	<p>Heat Exposure: Occasional exposure or daily exposure in case of supervisory work.</p> <p>Production / Non-production Related: Work tasks indirectly linked to production.</p>
Light	<p>Manual Material Handling: Load handling consists of less than 34% of the work shift – occasional load handling.</p> <p>Work Environment: Unrestricted work environments and/or occasional exposure to restricted work areas.</p> <p>Heat Exposure: Occasional exposure.</p> <p>Production / Non-production Related: Work tasks indirectly linked to production.</p>
Sedentary	<p>Manual Material Handling: Load handling limited to loads of up to 10kg, occasional exposure only.</p> <p>Work Environment: Unrestricted. Work tasks take place in a seated/standing work position for at least 50% of the work shift.</p> <p>Heat Exposure: Not exposed to heat.</p>
Roaming	<p>Manual Material Handling: None. No external workloads required other than wearing PPE.</p> <p>Work Environment: Unrestricted.</p> <p>Heat Exposure: Low exposure to heat. Production / Non-production Related: Not linked to production.</p>

➤ **2.4. UNDERTAKING**

The EAP herewith confirms

- a) The correctness of the information provided in the reports
- b) The inclusion of comments and inputs from stakeholders and I&APs
- c) The inclusion of inputs and recommendations from the specialist reports where relevant
- d) That the information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested and affected parties are correctly reflected herein

TSHIA MALEHASE



---

Signature of the Environmental Impact Practitioner

BASIA ENVIRONMNETAL CONSULTING

Name of Company

12 October 2020

Date