DMR Reference: **NW 12498**

Applicant:

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Company Reg.K2018508700
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Report Name:

Basic Assessment Report and Environmental Management Programme Report for Prospecting on Farm Boschpoort 284 JQ Portions 12, 26 and 33

Located 2 Kilometers East of Boschpoort Dam, Rustenburg Local Municipality, North West Province

Prospecting Area: Boschpoort 284 JQ Portion 12, 26 and 33

Report Status: Version 01
Report Date: 20 February 2019

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PROJECT INFORMATION

DMR Prospecting Right Reference

NW 12498

Prospecting Right Applicant

K2018508700 Proprietary Limited (the applicant)
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Company Reg. K2018508700
Responsible Person: Boitumelo Koshane (Director)
E: Boitumelo.koshane@bafokeng.com

Prospecting Right Area

565.11 hectares of land covering Portions 12,26 and 33 of farm Boschpoort 284 JQ

Region / District

Rustenburg Local Municipality
Bojanala Platinum District Municipality, North-West Province

Minerals

Dimensions stone, associated with gabbro-norite

Nearby Towns and Villages

Phokeng, 21 km to the west
Rustenburg, 16k m south-west
Mosonthal, within and adjacent
Ikageng, within and adjacent
Lesung, 1 km to the north
Marakana, 500 m to the north-east

Report Details

Report Name:	**Basic Assessment Report and Environmental Management Programme Report for Prospecting on Farm Boschpoort 284 JQ Portions 12, 26 and 33, Located 2 Kilometers east of Boschpoort Dam, Rustenburg Local Municipality, North West Province**
Report Status:	Version 01
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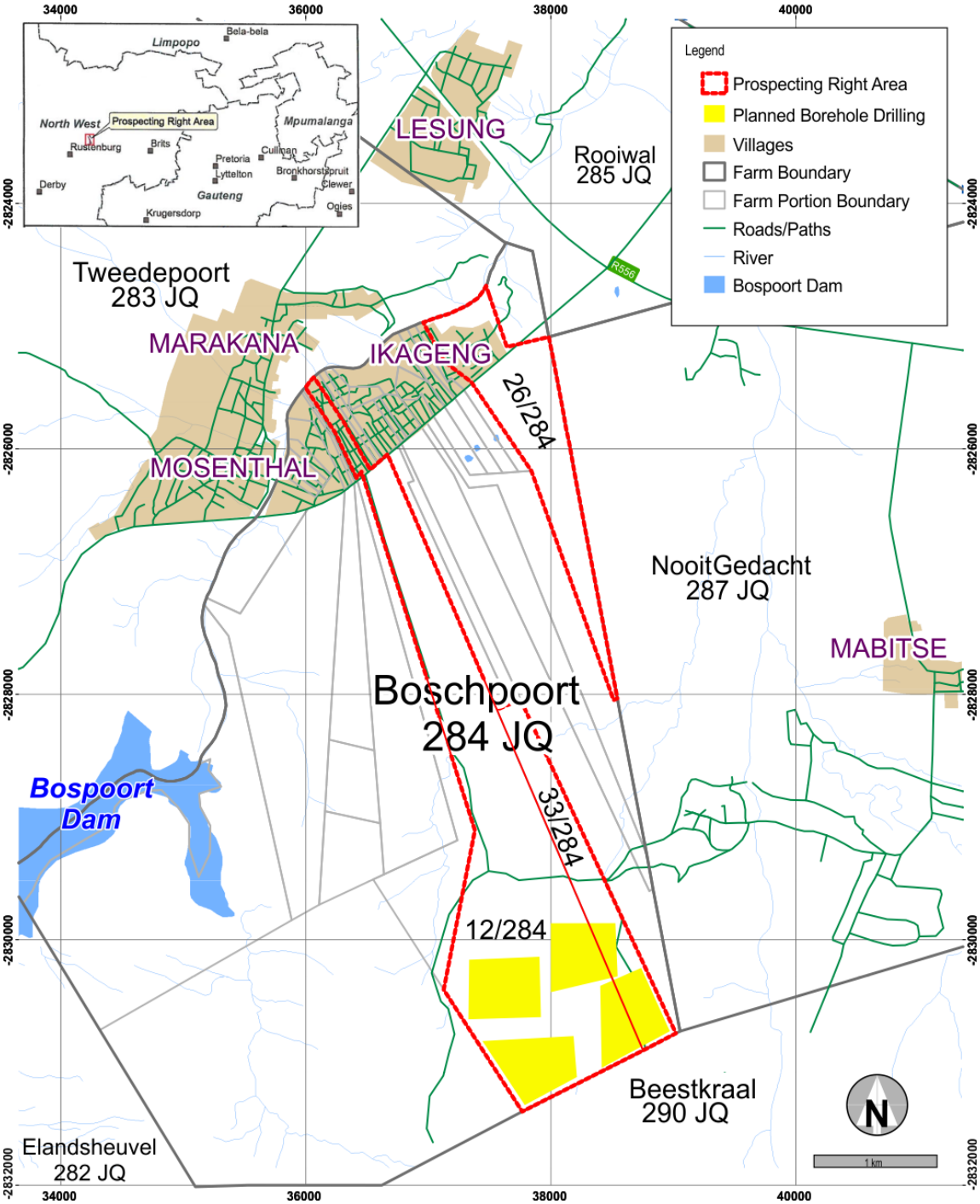
1 SUMMARY AND ENVIRONMENTAL IMPACT STATEMENT

PROSPECTING ACTIVITIES PLANNED

K2018508700 (Pty) Ltd (applicant) has applied for prospecting rights on Portions 12, 33 and 26 of the Farm Boschpoort 284 JQ. The application area covers 565.11 hectares of land. The landowner is the National Government of the Republic of South Africa, for the Royal Bafokeng Nation. K2018508700 (Pty) Ltd is managed by The Royal Bafokeng Nation Development Trust that, through its subsidiary Boitshimololedi Proprietary Limited, will finance the prospecting and any environmental rehabilitation and closure costs.

The prospecting right application area is located in the North-west Province, 2 kilometers east of Bospoort Dam and adjacent to Mosenthal and Ikageng villages. Lesung village is 1 km to the north, and Marakana village is 500 m to the north-east. Nearby large urban areas include, Phokeng, 21 km to the west, and Rustenburg, 16 km to the south-west (Locality Map below).



Locality Map

DESCRIPTION OF THE AFFECTED ENVIRONMENT / EXISTING ENVIRONMENTAL DEGRADATION

Topograpy and water courses

Extensive former dimension stone mining has dramatically altered the local topography and disrupted drainage patterns and the flow of surface water throughout the blocks targeted for drilling of boreholes. No water courses are therefore noticeable within 100 m of the blocks targeted for the drilling of boreholes since extensive quarries, heaps of waste rock, and haul roads have redirected surface water flow towards various depressions in the landscape and some quarry pits that are filled with water for most of the time.

Land use

The blocks targeted for drilling of boreholes in the southern parts of farm Boschpoort portions 12 and 33 has been quarried previously and is characterised by extensive heaps of waste rock and little undisturbed areas remain. Areas between quarries and pits were used for haulage, services areas and storing of dimension stone product, or dumping of waste rock. Grazing potential in this area is very low and no agricultural land uses were identified.

Biodiversity Assessment

A biodiversity specialist assessment was undertaken and it was evident, based on the data recorded and observations made during the specialist fieldwork, that the prospecting right application area and surroundings – and specifically the blocks targeted for drilling of boreholes, had been extensively impacted upon by former dimension stone mining activities. Natural vegetation is restricted to the plains covered by vertic soils, and the remaining fragmented portions of ridges not mined or damaged by dimension stone mining already.

Faunal species richness has been reduced considerably when compared to the expected richness for the habitat types in their natural state. This reduction is probably linked to the removal, degradation fragmentation of habitats and secondary impacts related to mining and other anthropogenic activities involving uncontrolled use of natural resources, fire wood collection, hunting and poaching. These activities resulted in the displacement and absence of large-bodied mammal and bird taxa and the reduction and loss in important guilds (groups of species) such as hole-nesting birds, in the post-mining transformed landscape. Many of the habitats have been transformed to ecologically simple or non-complex habitats that are functionally constrained and colonised by opportunistic and un-specialised taxa with transient life histories.

The remaining untransformed habitats, both Marikana Thornveld and Norite Koppies Bushveld, are of moderate to high importance.

Due to the fact that extensive former dimension stone quarries, heaps of waste rock, and haul roads have redirected surface water flow towards various depressions in the landscape and some old quarry pits filled with water for most of the time. This has resulted in disruption of the biodiversity composition of the local aquatic ecological support areas as none of these areas showed any signs of wetness or periodical flooding or saturation. These changes to the movement of surface water through the landscape has also resulted in changes to the species composition. Within the aquatic ecological support areas, the biodiversity specialists observed that terrestrial species dominated rather than species with a preference for moist or wet conditions. Within the artificial depressions and quarry pits, some aquatic species have established where terrestrial species used to dominate. These disruptions and changes in biodiversity have impacted on local migration corridors and the ability of the drainage systems to support and maintain connectivity in the landscape.

There are no protected areas within 10 km from the prospecting right application area. Pilanesberg is located 25 km to the north-east.

Heritage Resource Assessment

A Phase I heritage assessment and field survey was conducted. It concluded that although various stone-walled sites used to occur in the area, most of these have been destroyed previously as a result of quarrying activities. Two stone-walled sites dating from the Late Iron Age and historical period (AD1600 to AD1840) remain in the central part of the prospecting right application area but these are located more than 1 km away from the blocks targeted for drilling of boreholes and would therefore not be affected by the planned prospecting activities. The two sites probably represent small villages or '*dikgoro'* which were occupied by a number of related family groups or '*masika',* under the authority of a headman or '*kgosana'*. The outer perimeter of the sites comprises homesteads or '*malapa'* where the inhabitants of the sites lived. Large and small stock such as cattle, sheep and goat were kept in enclosures in the central parts of the sites.

The blocks targeted for drilling of prospecting boreholes is located where quarrying activities have already occurred. This area is not pristine and is covered with the remnants of former mining activities, including access and haul roads, open pits and extensive heaps of waste rock. It is possible that remnants of stone walls may still exist between the old quarries and waste rock heaps but that these would be fragmented and of low significance due to damage already incurred.

IDENTIFICATION AND ASSESSMENT OF POTENTIAL IMPACTS AND RISKS

Due to the small footprint and short duration of the drilling operations, there are no significant environmental impacts or risks. A summary of impacts assessed are tabled below.

Category	With or Without Mitigation	Significance
Noise Disturbance	Unmitigated	Very Low
	Mitigated	Very Low
Dust Nuisance	Unmitigated	Low
	Mitigated	Very Low
Loss of topsoil **Land capability**	Unmitigated	Moderate (small footprint)
	Mitigated	Low
Hazardous excavations	Unmitigated	Low
	Mitigated	Very Low
Soil and Water Contamination	Unmitigated	Moderate
	Mitigated	Low
Biodiversity	Unmitigated	Moderate (small footprint)
	Mitigated	Low
Rivers and drainage lines	Unmitigated	Low
	Mitigated	Very Low
Agricultural Land Use, and Livelihoods	Unmitigated	None
	Mitigated	None
Social and Economic	Unmitigated	Very Low
	Mitigated	Very Low
Infrastructure	Unmitigated	Low
	Mitigated	Very-Low
Heritage Resources	Unmitigated	Moderate
	Mitigated	None
Visual Impacts	Unmitigated	Low
	Mitigated	Very-Low

The recommendations made by the biodiveristy and heritage specialists have been incorported into the EMP (refer Section 18). Implementation of the Environmental Management Programme (EMP) will ensure that no residual liabilities and acceptable impacts remain at the end of the prospecting period. All

GAPS AND ASSUMPTIONS

Information contained in this report is adequate for decision-making regarding the granting of an environmental authorisation for prospecting and there are no infromation gaps to hold back the decision-making process.

AUTHORISATION PERIOD

An environmental authorisation is required until the prospecting right is closed.

CONCLUDING RECOMMENDATION

Based on the fact that no significant impacts were identified and that the envisaged prospecting would provide valuable information about the ore body and the feasibility for economic extraction, it is recommended that an environmental authorisation be granted.

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ABBREVIATIONS AND TERMS

~	Approximately
BAR	Basic Assessment Report
BH	Borehole
BHP	Planned New Borehole
CBA	Critical Biodiversity Area
CBA1	Critical Biodiversity Area 1, also called 'CBA Irreplaceable'
CBA2	Critical Biodiversity Area 2, also called 'CBA Optimal'
DMR	Department of Mineral Resources
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
EMP	Environmental Management Programme
ESA	Ecological Support Area
ESA1	Ecological Support Area 1, ESA in good or fair ecological condition
ESA2	Ecological Support Area 2, ESAs in severely modified ecological condition
GA	General Authorisation
GN	Government Notice
IAP	Interested or Affected Party
MPRDA	Mineral and Petroleum Resources Development Act 28 of 2002
NEMA	National Environmental Management Act 107 of 1998
NW	North West (Province)
NWA	National Water Act 36 of 1998
RE	Remaining Extent
WUL	Water Use License

Critical Biodiversity Area (CBA)
Area required to meet biodiversity targets for ecosystems, species and ecological processes, is identified in a systematic biodiversity plan. Together with protected areas, CBAs ensures that a viable representative sample of all ecosystem types and species can persist. In most circumstances, a site will be designated as a CBA only if it is currently in good ecological condition. In some circumstances it may be necessary to select a site in fair ecological condition as a CBA. Only in exceptional circumstances will a site that is severely modified be selected as a CBA. The broad management objective is that the areas must stay in a largely natural ecological condition. The distinction between CBA1 and CBA2 is based on irreplaceability.

Critical Biodiversity Area 1 (CBA1 / CBA Irreplaceable)
Areas that are irreplaceable or near-irreplaceable for meeting biodiversity targets. There are no or very few other options for meeting biodiversity targets for the features associated with these areas.

Critical Biodiversity Area 2 (CBA2 / CBA Optimal)
Areas that present the best option for meeting biodiversity targets, based on complementarity, efficiency, connectivity and/or avoidance of conflict with other land or resources uses.

Ecological Support Area (ESA)
Area not essential for meeting biodiversity targets but that play an important role in supporting the ecological functioning of CBAs and/or in delivering ecosystem services. ESAs are designated to ensure the long-term ecological functioning of the landscape as a whole. ESAs could include sites in good, fair or even severely modified ecological condition, as long as the current ecological condition is compatible with fulfilling the purpose for which the ESA has been selected. The broad management objective is that the areas must retain ecological processes, which often requires at least semi-natural ecological condition. The distinction between ESA1 and ESA2 is based on ecological condition.

Ecological Support Area 1 (ESA1)
ESAs that are currently in either good or fair ecological condition, for which the objective is to retain the area in at least fair ecological condition.

Ecological Support Area 2 (ESA2)
ESAs that are currently in severely modified ecological condition (e.g. cultivated areas in riparian zones) but that nevertheless retain sufficient ecological functioning to fulfil the purpose for which the ESA was selected. The objective is to prevent further deterioration in ecological condition.

ENVIRONMENTAL ASSESSMENT PRACTITIONER

Name of Practitioner	Mari Wolmarans
Responsibility	Professional EAP Report Author and Reviewer
Qualification	BL Arch (UP, 1991)
Professional Registration	MSAIE&ES, EAPSA Certified
Contact Details	T: 041 583 1156 F: 086 562 0165 E: projects@ethicx.co.za
Experience	25 years in environmental planning, assessment and auditing, with 17 years extensively focused on all aspects of environmental management in the mining sector.
Expertise	Mari Wolmarans has managed numerous complex environmental studies, impact assessments, multi-disciplinary teams and all aspects related to the environmental legal and procedural requirements of mining projects and operations. Proof of professional registrations are attached.

2 INTRODUCTION AND BACKGROUND

2.1 Details of the Prospecting Right Application

K2018508700 (Pty) Ltd (the applicant) has applied for prospecting rights on Portions 12, 33 and 26 of the Farm Boschpoort 284 JQ. The application area covers 565.11 hectares of land. The landowner is the National Government of the Republic of South Africa, for the Royal Bafokeng Nation.

K2018508700 (Pty) Ltd is managed by The Royal Bafokeng Nation Development Trust that, through its subsidiary Boitshimololedi Proprietary Limited, will finance the prospecting and any environmental rehabilitation and closure costs.

The DMR accepted the application in February 2019 and instructed the applicant to consult with interested and affected parties, to submit to the DMR a basic assessment report by 2 April 2019 and submit the required information for DMR's decision-making (granting or refusal of the application).

2.2 Location

The prospecting right application area is located in the North-west Province, 2 kilometers east of Bospoort Dam and adjacent to Mosenthal and Ikageng villages. Lesung village is 1 km to the north, and Marakana village is 500 m to the north-east. Nearby large urban areas include, Phokeng, 21 km to the west, and Rustenburg, 16 km to the south-west (Figure 1).

2.3 Prospecting Right Application Area

This prospecting right application covers portions 12, 26 and 33 of the Boschpoort 284 JQ farm. Details of the land parcels are tabled below and illustrated on Figure 2 above.

Table 1: Details of Boschpoort 284 JQ Land within the Prospecting Right Application Area

Farm	Farm Portion	Parcel Number	21 Digit Code	Boreholes Planned	Landowner
Boschpoort 284 JQ	12	12 / 284	T0JQ00000000028400012	Yes	National Government of the Republic of South Africa, for the Royal Bafokeng Nation.
Boschpoort 284 JQ	33	33 / 284	T0JQ00000000028400033	Yes	
Boschpoort 284 JQ	26	26 / 284	T0JQ00000000028400026	No	

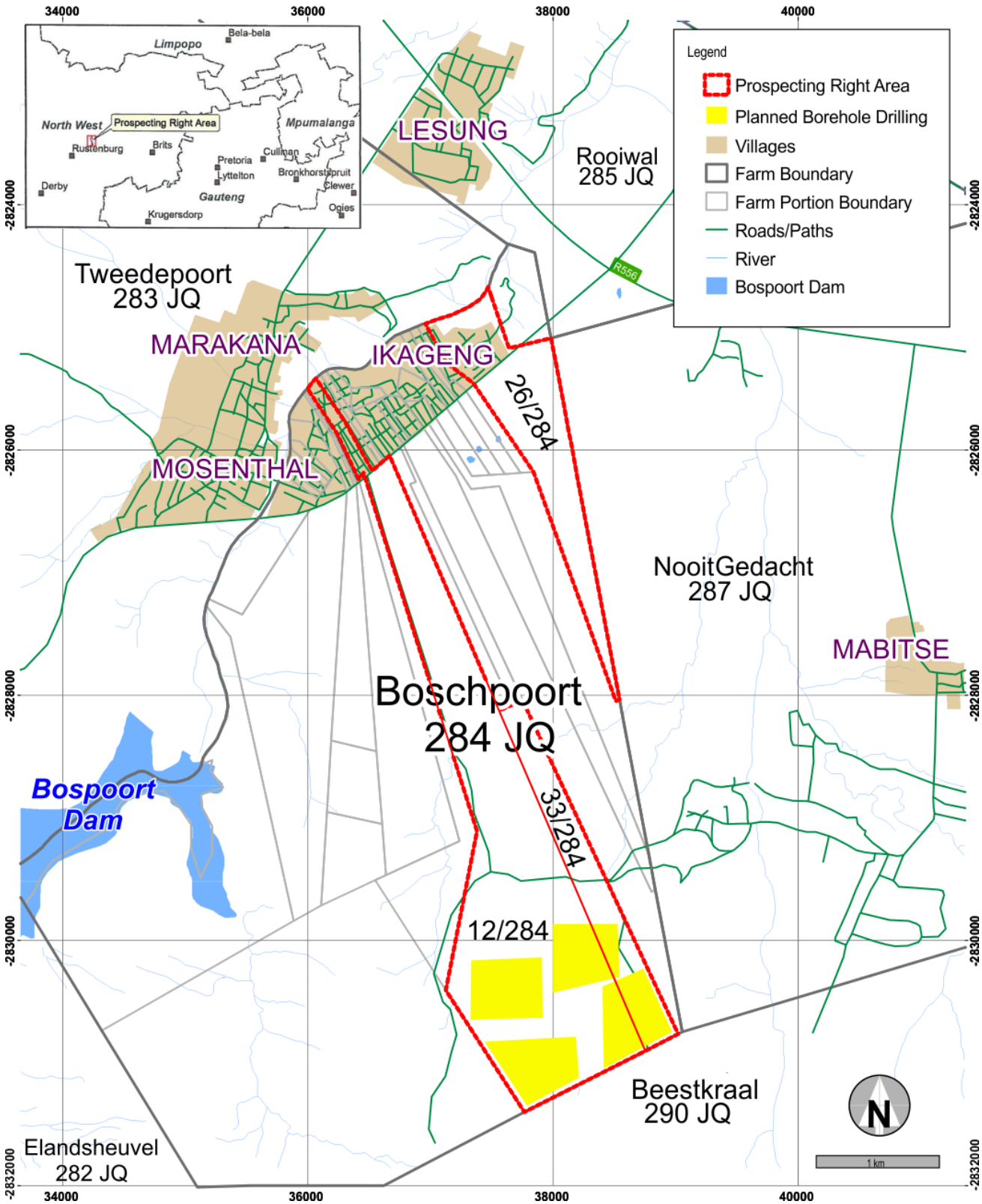


Figure 1: Locality Map

2.4 Mining within the Prospecting Right Application Area and Surroundings

Quarrying activities have taken place within the prospecting right application area and some areas were not adequately rehabilitated, as can be seen on Plate 1 below. Details of previous environmental approvals and management practices are not known. It is also uncertain when mining activities ceased. Extensive quarrying activities are still taking place in the broader area around the prospecting right application area. Remote imagery of the area indicates that dimension stone mining in the prospecting right application area commenced in the 1970s and most of the mining ceased by 2010.

Plate 1: View of previously quarried waste rock found scattered throughout the hilly areas (rock outcrops and koppies) within the prospecting right application area

2.5 Objectives and Scope of the Report

The objectives of the basic assessment study are as follows:

- 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
- Identify the alternatives considered, including the activity, location, and technology alternatives
- Describe the need and desirability of the proposed alternatives
- Through the undertaking of an impact and risk assessment process inclusive of cumulative impacts focused on determining the geographical, physical, biological, social, economic, heritage, and cultural sensitivity of the sites and locations within sites and the risk of impact of the proposed activity and technology alternatives on these aspects to determine:
    - The nature, significance, consequence, extent, duration, and probability of the impacts occurring
    - The degree to which these impacts can be reversed; may cause irreplaceable loss of resources; and can be managed, avoided or mitigated
- Ranking of the site sensitivities and possible impacts.
- Identify and assess development alternatives.

The basic assessment report covers the planned prospecting activities as described in Section 3, including the drilling of 13 boreholes in Year 2-3 of the five-year exploration period in the southern parts of farm portions 12 and 33. In addition, it provides comment on the existing status of the area in terms of old unrehabilitated quarry / mining areas.

3 DESCRIPTION OF THE PROSPECTING ACTIVITIES

K2018508700 (Pty) Ltd plans to conduct prospecting on the farm Boschpoort 284JQ Portions 12, 26 and 33, targeting gabbro-norite dimension stone. Prospecting will take place in three stages over a five-year period. Stage 1 will involve desktop studies and surface investigations in the first 2 years. Stage 2 will involve drilling of boreholes in years 3 to 5. Stage 3 will consist of laboratory analysis of the geological samples and geological modeling in year 4 and year 5.

The intrusive prospecting activities will be limited to the drilling of 13 boreholes in year 3 to 5. The main focus of the BAR and EMP is on the environmental impacts and environmental management during drilling operations.

All stages within the five-year prospecting period and the successive years' work will depend on the previous year's findings and interpretation. As such, the exact location of the boreholes will only be determined at the end of year 2.

3.1 Desktop studies, target generation and surface investigations

During years 1 to 2, non-invasive prospecting activities will be completed. Historical data will be reviewed to better understand the geological resource. Surface investigations will include survey work and geological mapping to measure and record relevant structural features, to construct a 3D model, and estimate the potential mineralization within the prospecting area. This phase of work will form the basis for refining the positions for drilling work planned for year 3 to 5.

3.2 Drilling of boreholes

Year 3 to 5 will entail drilling of approximately 13 diamond drilling boreholes in the southern parts of Portions 12 and 33 of Boschpoort 284JQ. At this stage, no boreholes are planned for Portion 26. Boreholes will be drilled in a 500m by 500m grid in relation to the strike and dip of the geological features and to an approximate depth of 50m.

Drill rig pads will be established at each of the boreholes and a temporary drill camp will consist of a drill rig over drip trays and impermeable tarpaulin, parking for site vehicles, ablutions and chemical toilets, waste bins and skips, water tanks, sumps, storage of drilling fluids, equipment storage, accommodation and/or shelter, fuel and chemical storage on drip trays or liners, waste bins and skips, core storage and geologist logging area, topsoil stockpile, temporary fencing and a security control point. A typical example of a drill site is pictured in Plate 2. The drill rig will operate 24 hours a day for 3 to 6 months and the drill site area will be less than 500 m^2.

Access tracks will be required to reach each drill site. Existing roads, paths and tracks will be used wherever possible and the establishment of new tracks will be kept to a minimum. Tracks will be ≤ 4 m wide. During their field investigations planned for year 1 and 2, the geologists will determine the exact position of the drill sites as well as suitable routes to access the drill sites, based on the requirements of the EMP. The final positions of the drill sites and access routes will be agreed with landowner prior to drilling in year 3.

Generators will be used for power supply. Small quantities of general and hazardous waste will be generated and stored in bins or skips for off-site disposal at a suitable landfill site. No waste will be disposed on site. Chemical toilets will be provided.

Potential water supply sources include:

- Nearby old abandoned quarries filled with water (with appropriate permissions in place)
- Abstraction from existing boreholes (with appropriate agreements in place, only registered boreholes to be used, authorisation abstraction volumes not to be exceeded)
- Abstraction from the Hex River (with appropriate permissions in place)
- Municipal water supply

A lined sump will be established at each drill site to contain drilling fluids. On completion of drilling, the sump will be removed, the borehole will be sealed with a concrete or metal cap and the site will be cleared and reinstated in accordance with the EMP requirements (refer Section 17). The geologist and/or drilling contractor will consult with the landowner at the end of the drilling period to discuss reinstatement of the sites. An environmental performance assessment (audit) will be conducted to assess compliance with the approved EMP and to verify the success of rehabilitation after drilling is complete.

Plate 2: Example of a Drill Site

3.3 Analysis and geological modeling

Year 4 and 5 will entail the analysis of the drilling samples, quality assurance, data capture and data validation as well as data interpretation, construction of a geological model and estimation of a Mineral Resource over the prospecting right area. A geological scoping study will be conducted in Year 5.

3.4 Possible renewal of the prospecting right

If the prospecting work proves successful, an application for renewal of prospecting right will be prepared and submitted to the DMR for further work.

4 DEVELOPMENT ALTERNATIVES

4.1 Motivation for the development footprint

The location of the prospecting right application area is dictated by the mineral resource, in this case dimension stone in the Western Limb of the Bushveld, as well as land parcels over which there are no existing prospecting or mining rights, and the actual boundaries of these land parcels.

The local geology is comprised of a layered sequence of gabbro-norite under which the B Reef lighter coloured gabbro-norite zone of about 35m in thickness lies. This is underlain by a pyroxenite marker (i.e. thin pyroxenite bands within gabbronorite) of about 7m in thickness which, in turn, is underlain by the A Reef of darker coloured gabbro-norite about 68m in thickness. The sequence is underlain by the footwall Zebra zone. The gabbro-norite that is quarried for dimension stone has broadly spaced joints and other fractures. A key aspect of the rock is that there are planar ‘grains’ within it that allow for the rock to be broken into blocks. The main ‘grain’ is a sub-vertical one known as the ‘freeway’. Then there are two ‘grains’ at right angles to the ‘freeway’; i.e. a north–south ‘second way’ and an east-west ‘toughway’. The occurrence of these features determines the commercial interest and feasibility for future mining. It follows that no locality alternatives are being considered for the footprint of the prospecting right application area.

4.2 Motivation for the process followed to define the borehole positions and drill pads

The position of boreholes is dictated by the information required to develop an understanding of the targeted ore bodies within the prospecting right area. The boreholes need to be positioned in such a way as to provide additional and sufficient information required to enable the geologists to define a mineral resource with sufficient confidence to determine the feasibility of targeting to mineral resource for mining. It is anticipated that 13 boreholes will be needed to ensure sufficient information is available to accurately define the target ore body and any features that could limit the potential for economic extraction.

Consideration was given to avoiding water courses and known sensitive areas. Drill pads need to be established at each borehole position. As such, no locality alternatives are being considered for the boreholes and drill rig pads.

4.3 Motivation for the process followed to define the position of access routes

Existing paths and tracks will be used wherever possible and the establishment of new tracks will be kept to a minimum. Tracks will not more than 4 m wide. Based on the requirements of the EMP, the geologists will determine suitable routes to access drilling sites during their field investigations planned for years 1 to 2. The final routes will be agreed with the landowner prior to drilling in year 3. Therefore, no route alternatives are being assessed at this stage.

4.4 Motivation for technology used

Prospecting methods and technology options are dictated by the nature of the rock formations and depth of the target ore body below surface as well as the information needed to inform the geological mapping, modeling and test work. Drilling is required to recover core samples from the ore body for analysis and to determine the depth and extent of the ore body. It follows that there are no alternatives to drilling.

4.5 Layout of the drill sites

Boreholes are planned in the south of Portions 12 and 33 of Boschpoort. Here boreholes will be placed in a 500 m x 500 m grid. An example of a drill site is pictured in Plate 2. Drilling does not involve any extensive or long-term surface infrastructure to be developed, and the footprint is limited. Each drill site will consist of: a drill rig over drip trays and impermeable tarpaulin, parking for site vehicles, ablutions and chemical toilets, waste bins and skips, water tanks and sumps, storage of drill water, equipment storage, accommodation and/or shelter, drilling fuel and chemical storage on drip trays, waste bins and skips, core storage and geologist logging area, topsoil stockpile, temporary fencing and a security control point within an area of less than 500 m^2. The exact layout of each drill site and positioning of its components are dependent on the extent of previous mining, the terrain, accessibility and presence of large rocks, the outcome of the geological field investigations, discussions with the landowner, the presence of large shrubs and trees (damage to be avoided) and practical issues such as site drainage and the location of existing paths, tracks and cleared areas. It is therefore not practical or necessary to dictate or determine a fixed layout at this stage.

4.6 No-Go alternative

The No-Go development alternative implies that no listed activities under the EIA Regulations (refer Section 5) will be undertaken. The status quo will be maintained and environmental impacts as described in Section 13 will be avoided. It also implies that K2018508700 (Pty) Ltd will be unable to complete their planned exploration programme to define a Mineral Resource. The viability of mining the targeted ore body will never be determined. However, no significant impacts or risks were identified and there is no reason to enforce the No-Go alternative.

5 DESCRIPTION OF ACTIVITIES REQUIRING AUTHORISATION

Details of activities requiring authorisation are listed in Table 2. For details of the legislative context, see Section 7.

Table 2: Description of Activities Requiring Authorisation

Activity	Extent / Size	Environmental Authorisation Required, Listing Notice Details	Waste Management Licence Required	Water Authorisation and/or Registration Required
~13 boreholes will be drilled.	Each drill pad and associated activities will be ≤ 500 m^2. ≤ 6500 m^2 total footprint.	**YES** GN Regulation 327 Listing Notice 1 Activity 20 (activities requiring a prospecting right and activities associated with a prospecting right)	–	–
Access tracks will be cleared to provide access to the drill pads from existing roads, paths and tracks.	Average length of the access tracks is ~160 m, thus ~ 2.1 km total length. Tracks will be ≤ 4 m wide. ~ 8320 m^2 total footprint.			
Disturbance associated with all activities:	Total area of disturbance is ~14 820 m^2 (~1.482 hectare).			
It is estimated that ~6 drill pads are in natural vegetation and in an area classified as critical biodiversity area (CBA).	≤ 3000 m^2 total footprint for 6 drill sites.	**YES** GNR 324 Listing Notice 3 Activity	–	–

Activity	Extent / Size	Environmental Authorisation Required, Listing Notice Details	Waste Management Licence Required	Water Authorisation and/or Registration Required
The access tracks to these drill pads is in natural vegetation and an area classified as a CBA	Tracks are ~160 m each and ≤ 4 m wide, ~3840 m^2 footprint.	12 (clearance of indigenous vegetation, more than 300 m^2 in the specified geographical areas for North West Province based on environmental attributes)		
It is estimated that ~7 of the drill pads are located in an area that is not classified as a CBA. The access tracks (a linear activity) to these three drill pads are partially outside CBA	≤ 3500 m^2 total footprint for 7 drill sites. Tracks are ~160 m and ≤ 4 m wide, ~4480 m^2 footprint.	–	–	–
Chemical toilets will be provided at each drill pad.	≥100 m from potential water courses and aquatic critical biodiversity areas	–	–	–
Drilling activities near water courses not anticipated.	≥100 m from potential water courses and aquatic critical biodiversity areas			Not anticipated.
Diesel and chemicals (dangerous goods) storage on site would not exceed cumulative total 30 m^3. No dangerous goods will be stored closer than 100 m to the edge of a water courses.	Less than 30 m^3. Not within 100 m from edge of water course.	–	–	–
No waste will be disposed on site. All waste will be collected and stored in impervious covered bins or skips for removal to a waste disposal facility.	No waste disposal on site.	–	NO	–
On completion of the drilling, the drill sites will be decommissioned. All drilling equipment, waste, and temporary accommodation will be removed from site. Disturbed areas will be re-instated in accordance with the requirements of an approved EMP.	Total footprint of all activities is 14 820 m^2 (1.482 ha)	**YES** GN Regulation 327 Listing Notice 1 Activity 22 (decommissioning of prospecting right)	–	–
Water used on site for drilling purposes. Potential water supply sources include:	~ 10 m^3/day at drill site			
- Municipal water		–	–	–
- Old abandoned quarries filled with water (appropriate permissions to be in place)		–	–	Consultation with DWS to determine water authorisation process needed. Authorisations to be in place prior to abstraction from these sources.
- Abstraction from existing boreholes		–	–	Only registered boreholes to be used. Authorised abstraction volumes not to be exceeded.

6 NEED AND DESIRABILITY ASSESSMENT

The prospecting right application area lies within a known geological and mining dimension stone region and would appear to be prospective for the economic extraction of dimension stone within the western limb of the Bushveld Igneous Complex. The Dimension stone is associated with the 'B Reef' a lighter coloured gabbro-norite zone of about 35 m thick, which is the targeted reef. The prospecting area is surrounded by other mining

and prospecting activities, targeting similar ores. Prospecting is needed to collect geological data and define the Mineral Resource with sufficient confidence to eventually determine the feasibility for economic extraction.

Due to the nature of the targeted ore bodies, drilling is needed to recover core samples from the ore body for metallurgical analysis. An estimated 13 boreholes are needed to ensure sufficient information is available over the full extent of the target ore bodies to accurately define the target ore body and any features that could limit the potential for economic extraction.

The prospecting area is located in Bojanala Platinum District Municipality and the Rustenburg Local Municipality where mining is an integral part of the economy. The vision for the Rustenburg Local Municipality as outlined in the Integrated Development Plan links to the provision of an enabling environment for economic growth and job creation. The local mining activities form a vital part of this, where it not only creates more mining opportunities, and thus economic growth, but also enable more and better job opportunities with better quality of life for everyone.

The landowner is the National Government of the Republic of South Africa, for the Royal Bafokeng Nation. The applicant is K2018508700 (Pty) Ltd, managed by The Royal Bafokeng Nation Development Trust which through its subsidiary Boitshimololedi Proprietary Limited will finance the prospecting and any environmental rehabilitation and closure costs.

It is important to the Bafokeng Nation to investigate the occurrence of the various minerals on the land under their control, and where appropriate and in line with their Master Plan's long-term land use vision and objectives, and give effect to the economic benefits of the minerals – prospecting is essential for this. As can be seen in Figure 2, the prospecting right application area falls within in zone for 'Mining and Quarrying' on the Bafokeng Master Plan. The Bafokeng Master Plan has been incorporated into provincial planning frameworks and is therefore a recognized provincial planning tool.

Should the project progress to the level of a mining right, the Bafokeng National would benefit the local community through social projects. At this stage, it is envisaged that a small granite workshop could potentially be established where local community members will be trained to create products from the granite off-cuts. These products include but are not limited to gravestones, pillars, and small household and decorative items.

The area has been mined (quarried) before and there are large areas that have been degraded and where rehabilitation was not completed. Due to the extensive degradation, as well as the limited nature and scale of the prospecting activities, it will have no discernible impact on service delivery, spatial development plan, integrated development plan and the biodiversity management objectives of habitats in the prospecting area, as defined in the North West Biodiversity Sector Plan (2015).

Both the biodiversity and heritage resources specialist studies concluded that the prospecting would have very low environmental impacts if the EMP is implemented.

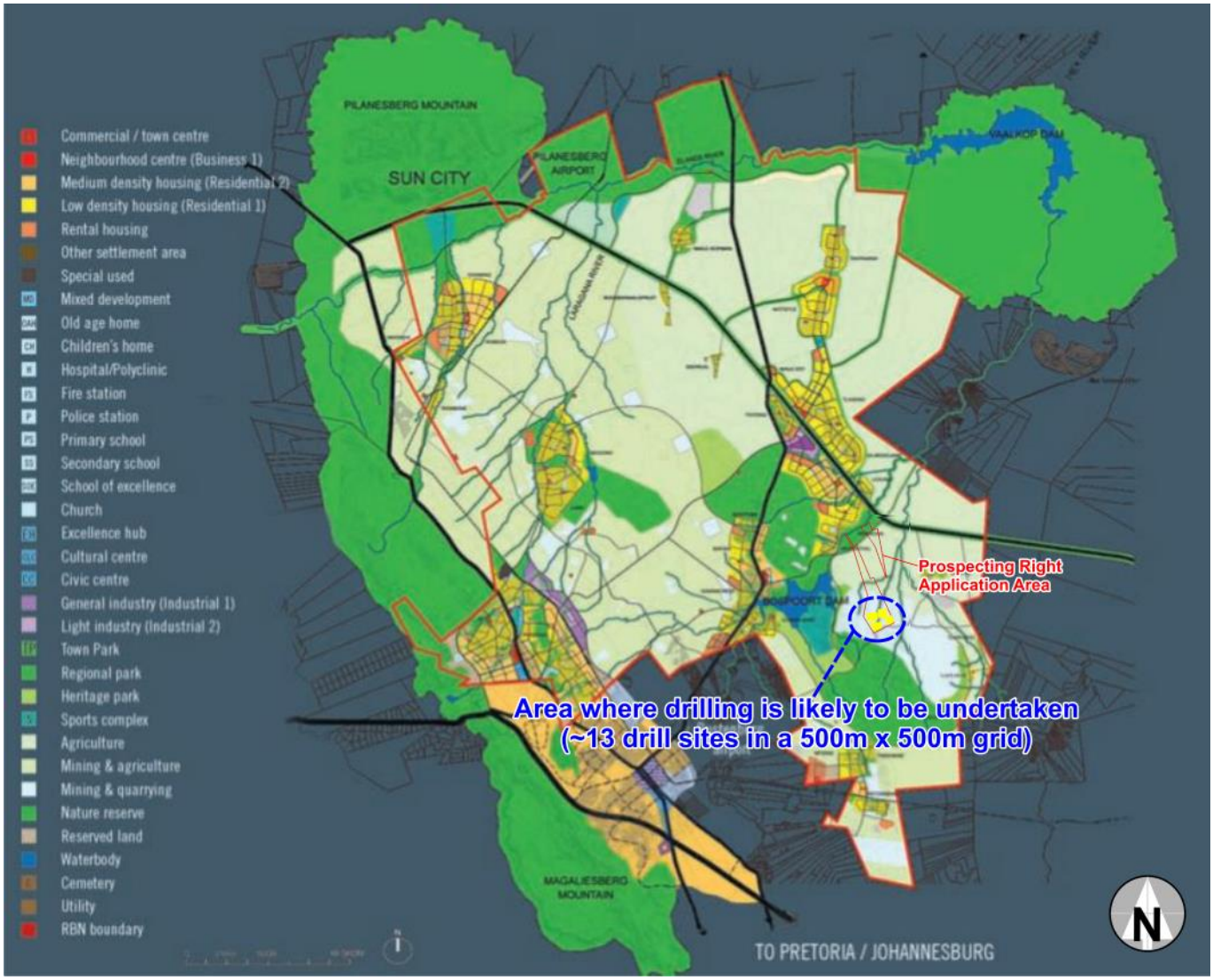


Figure 2: Bafokeng Master Plan (blocks targeted for borehole drilling falls within 'Mining and Quarrying' zone)

7 POLICY AND LEGISLATIVE CONTEXT

7.1 The Constitution of South Africa and the Environmental Legal Framework

The National Environmental Management Act 107 of 1998 (NEMA) and the National Water Act 36 of 1998 (NWA) form the environmental legal framework in South Africa that gives effect to the environmental rights entrenched in the Constitution of South Africa. Both the NEMA and the NWA impose a statutory duty of care to prevent pollution or degradation of the environment from occurring, continuing or recurring, or where such harm cannot reasonably be avoided or stopped, to minimize and rectify such pollution or degradation of the environment. This duty of care applies to past pollution that occurred before the NEMA commenced, to pollution that might arise at a different time from the actual activity that caused the contamination and to pollution that may arise following an action that changes pre-existing contamination. These Acts provide for the prosecution of offenders, issuing of fines equivalent to the monetary advantage gained by committing the offence, and for convicted offenders to be imprisoned and compensate the State or third parties for costs incurred and loss or damage suffered as a consequence of the offence and associated legal proceedings.

Applicability: Measures to prevent pollution and environmental degradation are incorporated into the EMP.

7.2 NEMA and the Mineral and Petroleum Resources Development Act 28 of 2002 (MPRDA)

The MPRDA prohibits prospecting without an approved EMP and consultation with the owner or lawful occupier of the land in question. Prospecting and related activities require impacts to be assessed, consultation with interested and affected parties, and an environmental authorisation (EA) from the DMR in terms of the 2014 EIA Regulations as amended on 07 April 2017 (GN 326) for all activities listed in the Listing Notices as amended on 7 April 2017 (GN 327, GN 325 and GN 324).

Applicability: This report is part of the process to obtain authorisation as required in terms of the NEMA and MPRDA. Activities requiring authorisation are listed in Section 5, Table 2.

7.3 National Water Act 36 of 1998 (NWA)

Section 21 of the NWA broadly defines 'water uses' to include: taking or abstraction of water; storing of water; activities which would impede, reduce or divert stream flow; controlled activities that could impact detrimentally on a water resource; disposing of waste or water containing waste, that may detrimentally impact on a water resource; and removing, discharging or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people (i.e. at excavations and workings).

7.3.1 Categories of water uses and water authorisations

Schedule 1 water uses are generally low volume, low-impact activities that are consistent with domestic use, livestock watering, recreational use and the use of water for emergencies. This water use is permissible and does not require licensing or registration.

Before the NWA was promulgated in 1998, water use was governed by the Water Act 54 of 1956. As a general rule, all water use commencing before 1998 is deemed to be an Existing lawful use (ELU) in terms of the NWA – if they were lawful at the time. Relevant records such as irrigation infrastructure designs need to be in place to prove the water use occurred before 1998 and the ELU must be verified and validated by the DWS. Existing lawful uses need to be registered.

There is a Government Notice (GN) for each water use activity which sets the limits and conditions for which a water use is permissible under general authorisation (GA). A GA replaces the need to apply for a licence in terms of Section 21 of the NWA. A GA is specific to location, with different limits set per quaternary catchment.

Section 21 of the NWA lists all water use activities that require a water use licence (WUL) and are subject to a WUL application process and is required if: the water use exceeds the parameters of Schedule 1; the water use took place or is planned to take place after 1998 (new water use); the water use exceeds the parameters set out in the GA.

7.3.2 Activities in the Regulated Area of a water course (river or wetland)

The NWA defines a 'water course' as: a river or spring; a natural channel in which water flows regularly or intermittently; a wetland, lake or dam into which, or from which, water flows; and any collection of water which the Minister [of Water] declare to be a water course, and a reference to a water course includes, where relevant, its bed and banks.

The Section 21 (c) or (i) GA (GN 509 of 2016) deals with activities that could impede or divert the flow of water in a water course, or alter the bed, banks, course or characteristics of a water course.
The Regulated Area of a water course for section 21 (c) or (i) water uses is:

a. The outer edge of the 1 in 100-year flood line and /or delineated riparian habitat, whichever is the greatest distance, measured from the middle of the water course of a river, spring, natural channel, lake or dam;
b. In the absence of a determined 1 in 100-year flood line or riparian zone, the area within 100 m from the edge of a water course where the edge of the water course is the first identifiable annual bank fill flood bench (subject to compliance to section 144 of the Act); or
c. A 500 m radius from the delineated boundary (extent) around any wetland or pan.

The Section 21 (c) or (i) GA applies to activities in the Regulated Area of a water course where the risk class is Low as determined in terms of the prescribed risk matrix completed by a suitably qualified and professionally registered wetland specialist. Activities where the risk class in Moderate or High are excluded from the GA and require a WUL and the GA is therefore possible within 500 m of wetlands based on the outcome of the risk assessment and completion of the risk matrix, provided the risk to the resource quality is Low.
Risk assessments need to consider

- DWS Guideline: Assessment of activities /developments affecting wetlands
- DWS Guideline for the determination of buffer zones for rivers, wetlands and estuaries
- Section 21(c) and (i) water use Risk Assessment Protocol

The aim of the GA is to take low risk activities out of the WUL process and to focus on compliance monitoring and registration. Activities within the Regulated Area of a water course needs to be registered. Registration forms, together with the completed risk matrix by a professionally registered scientist, needs to be submitted to DWS where after a certificate of registration is to be issued within 30 days of the submission. The low risk water use (activities within the Regulated Area of a water course) may commence upon written receipt of the registration certificate from DWS.

Applicability: It is not anticipated that drilling would occur within 100 metres of water courses. As such Section 21 (c) or (i) water uses would not be triggered.

7.3.3 Abstraction of water

The Section 21 (a) GA (GN 538 of 2016) covers abstraction of water within certain volume limits from a river or borehole for the following purposes: domestic use, irrigation, watering of livestock, industrial, mining, water bottling, etc. The GA requires registration of the water uses with the DWS prior to exercising the water use.

In terms of the GA, a person who is otherwise entitled to take water from a surface water resource may not take more water from a surface water resource on the property or piece of land than the total volume that the person is otherwise entitled to take from surface water resources on the property. Within the Crocodile Water Management Area, a maximum of 2 000 m^3/year and up to a maximum abstraction rate of 1 litre per second of the water so taken may be taken at any time during the whole year. No surface water that is taken in terms of this GA may be taken within a 500 m radius from the boundary (delineated edge) of a wetland, pan or estuary.

Applicability: In terms of groundwater, only registered boreholes may be used and the authorised volume of abstraction may not be exceeded. No groundwater that is taken in terms of this GA may be taken within a 500 m radius from the boundary of a wetland or estuary or within a 100 m radius from the delineated riparian edge of a water course.

In terms of old quarries filled with water, no abstraction will take place before consultation with DWS to determine water authorization process needed and the authorisations are in place.

7.4 National Environmental Management: Waste Act 59 of 2008 (NEMWA)

NEMWA provides for licensing of listed waste activities triggering specific thresholds.

Applicability: Since no waste will be disposed on site and none of the thresholds are triggered, a waste management license is not required.

7.5 National Environmental Management: Air Quality Act 39 of 2004 (NEMAQA)

The National Dust Control Regulations (GN Regulation 827, 1 November 2013) standards for dust-fall in residential and non-residential areas, and the requirements of monitoring and reporting to the air quality officer. The Ambient Air Quality Standards provide standards for particulate matter of aerodynamic diameter less than 10µm (PM10) and those less than 2.5µm (PM2.5) (GN 486, 29 June 2012).

Applicability: Prospecting operations must comply with the standards but due to the nature, location and limited scale of the activities, there should be no exceedances of the standards.

7.6 National Heritage Resources Act 25 of 1999 (NHRA)

The NHRA requires that a heritage assessment be undertaken for developments listed in the Act and prohibits; the alteration, disturbance, damage or demolishment of buildings and structures older than 60 years; archaeological and paleontological artefacts; cultural significant graves and burial sites; and public monuments, except for where a permit was issued by the relevant provincial heritage resources authority.

Applicability: A Phase 1 heritage assessment was completed and its recommendations to manage heritage sites located in the surrounding area, and the discovery and unearthing of graves and heritage artefacts are provided in the EMP.

7.7 National Environmental Management: Biodiversity Act (NEMBA)

The NEMBA provides for listing of threatened or protected ecosystems, in one of four categories: critically endangered; endangered; vulnerable; or protected. The purpose of listing threatened ecosystems is primarily

to reduce the rate of ecosystem and species extinction and to prevent further degradation and loss of the structure, function and composition of these ecosystems. In terms of the listing, the significance of impacts on biodiversity, (when there is a loss of natural habitats listed as either a critically endangered or an endangered ecosystem) would be regarded as highly significant and, in terms of the draft National Biodiversity Offset Policy published in March 2017, adverse residual impacts on critical or irreplaceable ecosystems would be regarded as a fatal flaw to a development.

Applicability: There are no listed critically endangered, endangered or protected ecosystems in the prospecting right area. Critical biodiversity areas were identified and activities in these areas that require authorisation are listed in Section 5, Table 2.

7.8 National Forest Act 84 of 1998 (NFA) and Provincial Conservation Ordinances and Acts

The NFA prohibits the cutting, disturbance, damage or destruction of trees in natural forests and trees included in the lists of protected tree species published in terms of the NFA, except where a license was issued by the Department of Forestry and Fisheries (DAFF). The removal of protected plants and the cutting or destruction of indigenous plants on private land, in nature reserves and near public roads is governed in terms of provincial ordinances and acts.

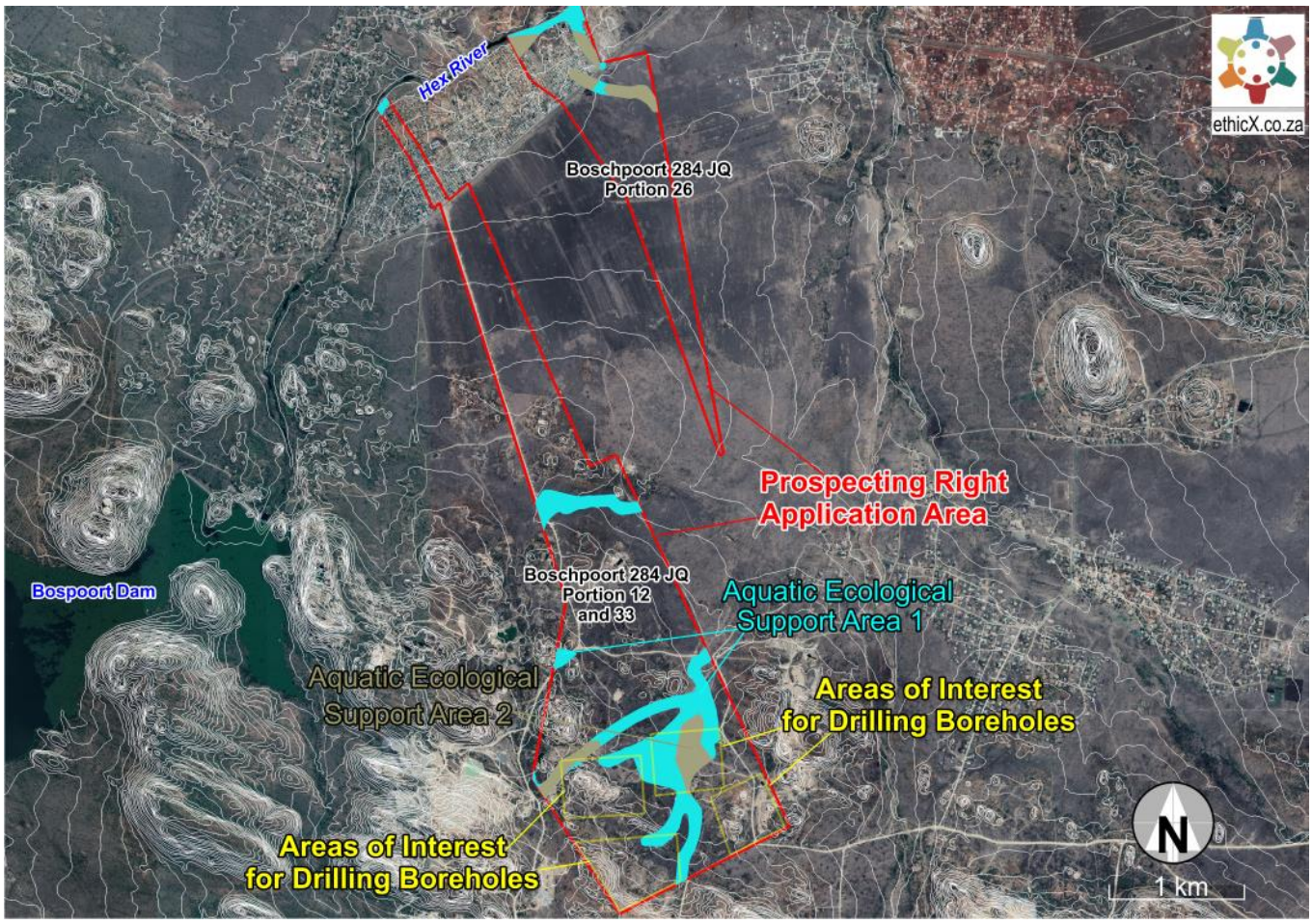
Applicability: A permit is required for removal of declared protected plants and permission from the landowner is needed for destruction of indigenous vegetation. No large shrubs or trees will be affected in the prospecting right area.

8 DESCRIPTION OF THE AFFECTED ENVIRONMENT

8.1 Topography and Water Courses

A topographical map, with 5 m contour lines, is provided in Figure 3 below. Most of the prospecting right application area is fairly flat to gently sloping towards the Hex River in the north. However, the blocks targeted for drilling of dimension stone prospecting boreholes, in the southern parts of prospecting right application area, is associated with rock outcrops and koppies (hills), as can be clearly seen on Plate 1 (page 12).

As part of the biodiversity specialist study, topographical low-lying areas were modeled using digital elevation data to identify areas where there is potential for surface water to flow and areas that could therefore be wet for periods of time (potential drainage lines and wetlands). The modeling results (refer Figure 11 in Appendix C). closely supported the delineation of aquatic ecological support areas as per the National Spatial Biodiversity Assessment and the 2015 North-West Biodiversity Plan, as indicated in Figure 3 and Figure 4. The aquatic ecological support areas as indicated on Figure 3, represent local low-lying areas in the landscape where there is 'theoretical' potential for surface water to flow and pool for periods of time (potential drainage lines and wetlands). However, during fieldwork, the biodiversity specialists found that extensive former dimension stone mining has dramatically altered the local topography and disrupted drainage patterns and the flow of surface water throughout the blocks targeted for drilling of boreholes. Extensive quarries, heaps of waste rock, and haul roads have redirected surface water flow towards various depressions in the landscape and some quarry pits that are filled with water for most of the time. No water courses are therefore noticeable within 100 m of the blocks targeted for the drilling of boreholes.



Note: Aquatic Ecological Support Areas as defined in the National Spatial Biodiversity Assessment and 2015 North-West Biodiversity Plan

Figure 3: Topography (5 m contour lines) and Local Aquatic Ecological Support Areas

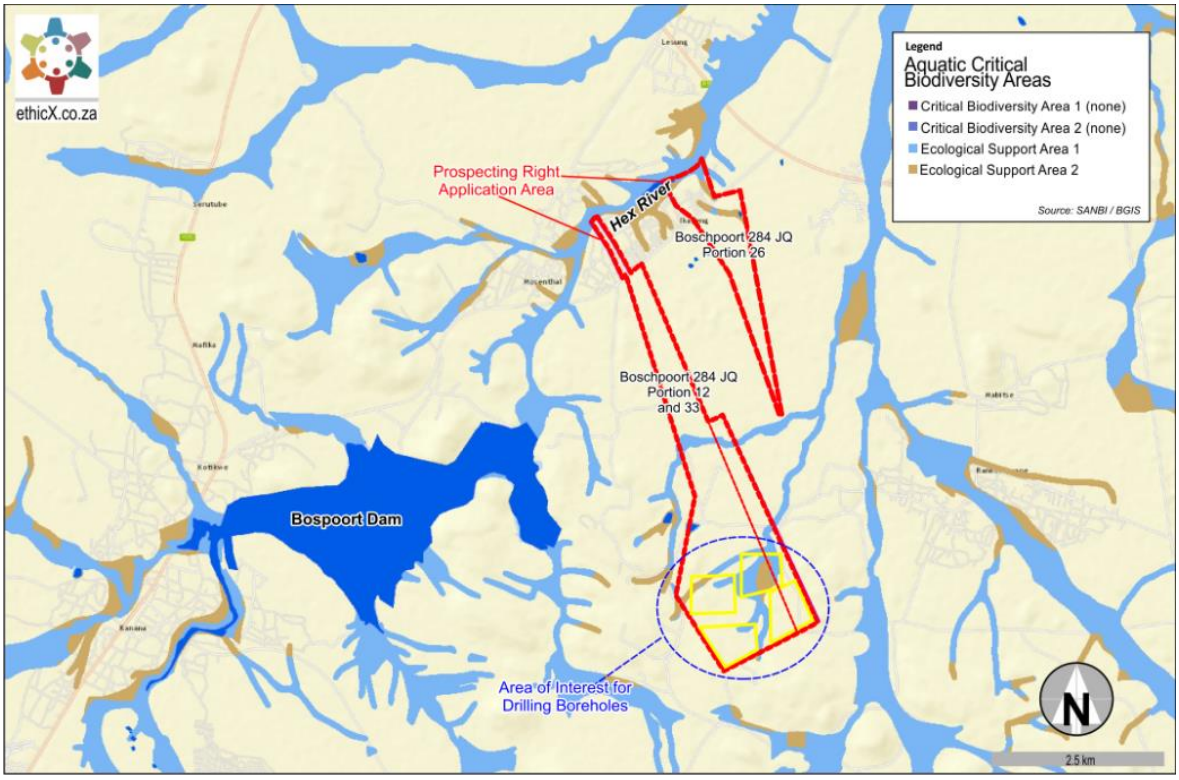


Figure 4: Regional Aquatic Ecological Support Areas

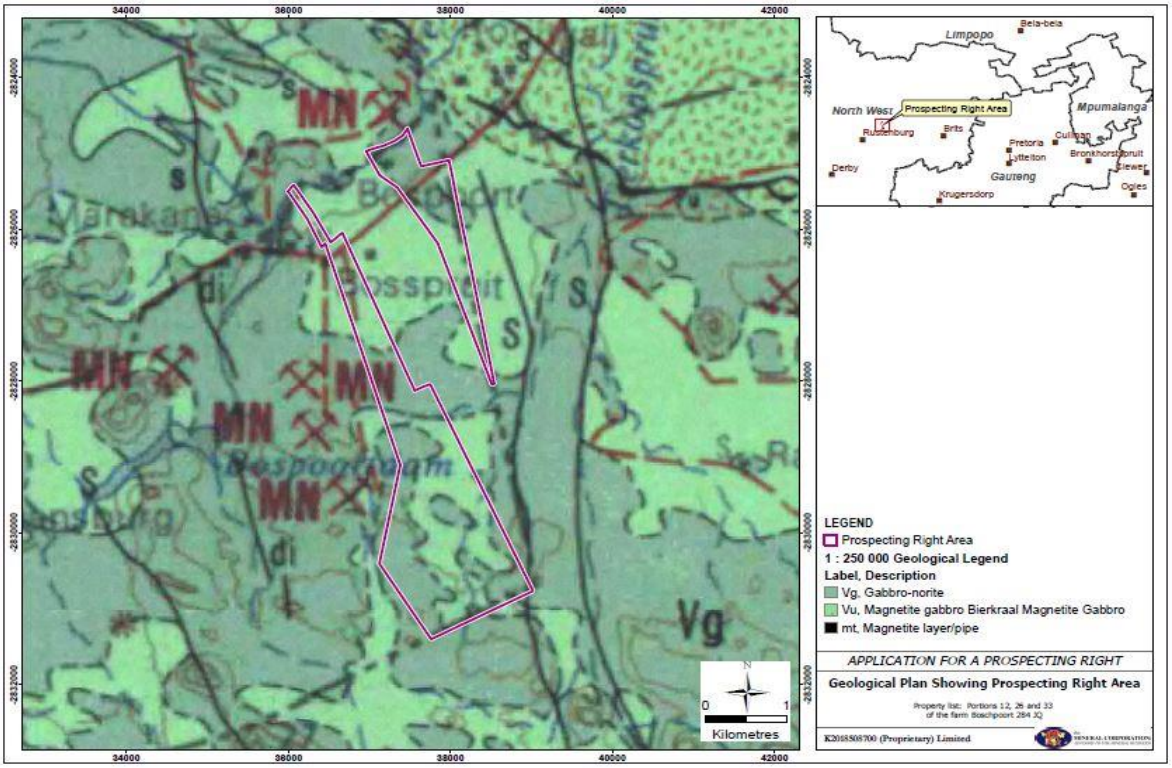
8.2 Geology and Mining

The Main Zone of the Western Limb of the Bushveld Complex is easily and logically subdivided into five sub zones which can be recognised in the field. Although not as dramatically layered as the Lower, Critical, and Upper Zones of the Complex, the Main Zone also displays significant layering. Subzone A is a noritic lithology which is well documented and has, at the top, an obvious transition to gabbro-norite in subzone B. Subzone B is characterised by the occurrence of glassy euhedral crystals of primary orthopyroxene, together with minor clinopyroxene, in a homogeneous gabbro-norite. This is separated from subzone C by the Zebra Unit, a layered package which is approximately 80 m thick. The Zebra marker is the geological indicator used by the dimension stone industry to identify areas of economically viable gabbro-norite. Subzone C, inverted pigeonite is present within relatively homogeneous gabbro-norite. The subzone is extensively exposed since the majority of the positive topographic relief in the area is of this rock type. Towards the top of this subzone is the Hexrivier Unit, comprising approximately 80 m of rhythmically layered gabbro-norites. Above this marker unit, the gabbro-norite grades over ~25 m vertically into a rhythmically layered micro-gabbro-norite which is approximately 75 m thick. This micro-gabbro-norite marks the transition from subzone C to D. Subzone D is characterised by the reappearance of primary orthopyroxene. At the base, euhedral crystals of primary orthopyroxene up to 1 cm in size characterise a porphyritic gabbro-norite facies which is interlayered with a gabbro-norite facies containing needle-like clinopyroxene crystals in a matrix of plagioclase feldspar. This facies at the base of subzone D is at least 25 m thick. Subzone E is mineralogically similar to subzone C and is characterised by the presence of inverted pigeonite within the micro-gabbro-norite and by the increasing occurrence of accessory magnetite. The textural and mineralogical difference between the five subzones is distinctive and is recognisable both in the field and in thin section.

The local geology is comprised of a layered sequence of gabbro-norite with an anorthosite marker 6 to 8 m thick zone under which the 'B Reef' lighter coloured gabbro-norite zone of about 35 m in thickness lies. This is underlain by a pyroxenite marker (i.e. thin pyroxenite bands within gabbronorite) of about 7 m in thickness which, in turn, is underlain by the 'A Reef' of darker coloured gabbro-norite about 68 m in thickness. The sequence is underlain by the footwall Zebra zone.

The gabbro-norite that is quarried for dimension stone has broadly spaced joints and other fractures. A key aspect of the rock is that there are planar 'grains' within it that allow for the rock to be broken into blocks. The main 'grain' is a sub-vertical one known as the 'freeway'. Then there are two 'grains' at right angles to the freeway; i.e. a north–south 'second way' and an east–west 'toughway'. (Figure 5).

For details on mining land use within the prospecting right application area and surroundings refer Section 2.4.



Source: The Mineral Corporation, Prospecting Works Programme

Figure 5: Geological map

8.3 Soils

Soils on the flat areas are strongly structured, mainly dark colored, dominated by swelling clays (vertic soils) and a cracking surface. Some melanic or red soils is also present. Between the rocky outcrops, the soils are shallow, stony and low in humus content due to superficial weathering. The relatively low rain fall levels tends to develop soils that slightly leach and produce high concentrations of salts in the soils.

8.4 Land use

8.4.1 Land use in the prospecting right application area

Two villages, Mosenthal and Ikageng, are located in the northern parts of the prospecting right application area, 4 km away from the blocks targeted for drilling of boreholes. These villages will not be affected by the planned drilling operations or potential future dimension stone mining (Plate 3 and Figure 1).

There are old storerooms / workshops located in the southern parts of farm portion 12 that are being leased by Bosspruit Transport. The structures are associated with previous quarrying activities and is located more than 100 m from the blocks targeted for drilling operations or potential future dimension stone mining.

Land use in the flatter areas of the prospecting right application area is agricultural, both in the form cropping areas and grazing (Plate 4).

Plate 3: Villages located in the northern parts of the prospecting right area (4 km from area targeted for drilling of boreholes)

Plate 4: Agricultural cropping areas in the northern parts of the prospecting right application area

8.4.2 Land use in the blocks targeted for drilling (area identified with potential for further dimension stone mining)

Only the southern parts of farm Boschpoort portions 12 and 33 are targeted for drilling of prospecting boreholes and therefore potential future dimension stone mining. This area has been quarried previously and is characterised by extensive heaps of waste rock (Plate 1 on page 12, Plate 5 and Plate 6 below).

As can be clearly seen from Figure 6, very little undisturbed areas remain. Areas between quarries and pits were used for haulage, services areas and storing of dimension stone product, or dumping of waste rock.

Grazing potential in this area is very low and no agricultural land uses were identified.

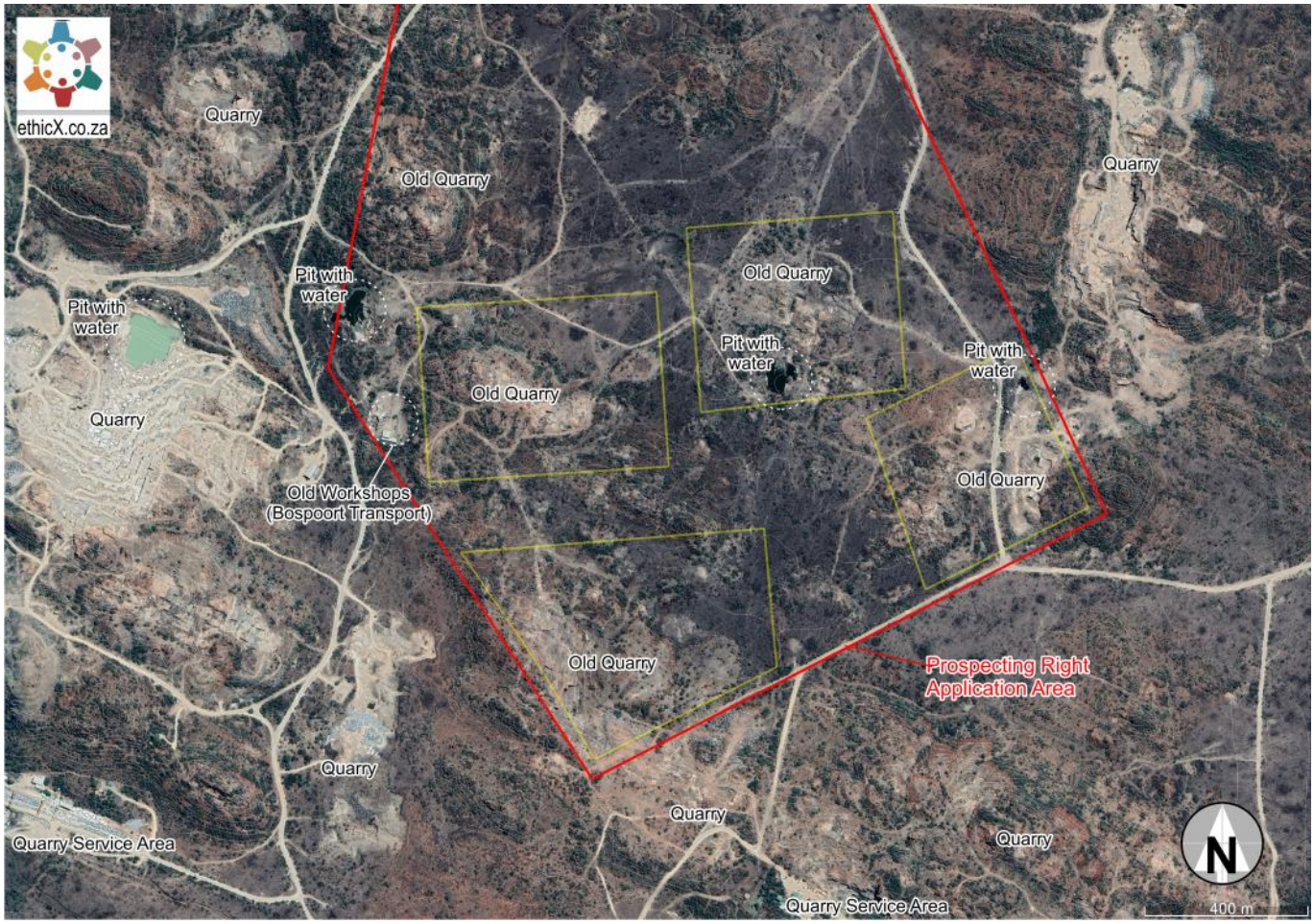


Figure 6: Close-up view of the four blocks (in yellow) comprising the blocks targeted for drilling

Plate 5: Former dimension stone mining in the area in the blocks targeted for drilling of prospecting boreholes

Plate 6: Entrance to one of the quarries that used to operate in the area

Plate 7: Remnant dimension stone blocks in the open areas between quarry pits

8.5 Habitats and Vegetation Types

The prospecting right application area covers both Marikana Thornveld and Norite Koppies Bushveld, part of the Savannah Biome. There are no Threatened or Endangered ecosystems but the Marikana Thornveld classified as a Vulnerable ecosystem (Figure 7).

The blocks targeted for drilling of boreholes is located largely within Norite Koppies Bushveld (Figure 7).

Norite Koppies Bushveld is confined to the series of rocky outcrops and koppies north of the Magaliesburg range and Rustenburg. It is a low, semi-open to closed woodland with dense trees and shrubs up to 5 m tall with little undergrowth. Some of the important tree species are *Combretum mole, Ficus abutifolia, Pappea capencis* and *Sclerocarya Birrea* with some succulent as *Euphorbia cooperi.* The shrub layer is characterized by plant species of different growth forms such as the semi-parasitic *Osyris lanceolata* and the succulent *Tetradenia brevispicata. Aristida congesta, Chrysopogon serrulatus* and *Setaria lindenbergiana* are the dominant species of the grass stratum. The two ferns *Pallaea calomelanos* and *Pallaea viridis* are common occurring geophytes. The conservation of the Norite Koppies Bushveld is considered as important as it is largely endemic to North-West Province and it is largely unprotected. The conservation target for Norite Koppies Bushveld is 24% and only 4% is conserved in the Onderstepoort Nature Reserve. The vegetation is severely transformed in places due to harvesting of woody species for fuel and building material, dimension stone mining and the spread of weeds and alien plant species.

Marikana Thornveld is an open *Acacia*-dominated thornveld which occurs on the plains between Rustenburg and Pretoria. It consists of open woodland and occurs in valleys, undulating plains and lowland hills. The shrub layers tend to be denser along drainage lines and rocky out crops. The important tree species that occur in this vegetation type include *Acacia nilotica, Acacia tortillis* subsp. *heteracantha, Ziziphus mucronata, Celtis Africana*

and more. Tall shrubs that can be found in the area include *Rhus pyroides* var. *pyroides, Grewia flava, Diospyros lycioides* subsp. *guerkei.* The Marikana Thornveld is classified as vulnerable with a conservation target of 19% but only 1% of the vegetation unit is officially conserved within the Magaliesberg Biosphere Reserve and the Onderstepoort Nature Reserve. This vegetation type is under pressure from human activities with nearly half transformed as a result of cultivation and urban or industrial and mining developments.

In terms of the National Spatial Biodiversity Assessment and the 2015 North-West Biodiversity Plan, there are no 'Irreplaceable' Critical Biodiversity Areas (CBA1) within the prospecting right area (Figure 8). There are pockets of 'Optimal' Critical Biodiversity Areas (CBA2) within the prospecting right area and the blocks targeted for drilling of boreholes. CBA2's are areas that present the best option for meeting biodiversity targets, based on complementarity, efficiency, connectivity and/or avoidance of conflict with other land or resources uses. There are also some Ecological Support Areas within the prospecting right area and the blocks targeted for drilling of boreholes.

As can be seen from Figure 9, the blocks targeted for drilling of boreholes has been mined extensively but is recognised as sensitive to mining in terms of the National Mining and Biodiversity Guidelines.

8.6 Biodiversity Assessment

A biodiversity specialist assessment was undertaken by EkoInfo and their report is attached as Appendix C. Their findings are presented below.

8.6.1 Terrestrial biodiversity assessment

8.6.1.1 Flora

It is evident based on the data recorded and observations made during the biodiversity specialist fieldwork that the prospecting right application area and surroundings – and specifically the blocks targeted for drilling of boreholes, had been extensively impacted upon by former dimension stone mining activities. Natural vegetation is restricted to the plains covered by vertic soils (outside the blocks targeted for drilling of boreholes), and the remaining fragmented portions of ridges not mined or damaged by dimension stone mining already.

Due to the overall intactness of the broader landscape, the vegetation effectively re-established itself on the disturbed heaps of overburden and waste rock, but only in areas where there was sufficient soil available for seed germination and plant growth. Alien invasive grass, *Pennisetum setaceum*, is found in places on the disturbed areas.

Only one nationally protected species in terms of the National Forest Act 84 of 1998 was recorded, namely *Sclerocarya birrea* subsp. *caffra*. A permit is required to destroy these trees. Three provincially protected plants in terms of the Transvaal Nature Conservation Ordinance 12 of 1983 were recorded, namely *Aloe marlothii* subsp. *marlothii*, a *Gladiolus* species, and *Scadoxus puniceus (*a paintbrush lily). It should be noted that all the species in the genera *Gladiolus* and *Scadoxus* are protected. If the developer is the owner of the land, no permit is required to destroy these plants, however a permit is required for commercial or transportation activities with these plants.

Twelve species with medicinal properties were recorded (listed in the Biodiversity Specialist Study).

Three declared alien invasive species in terms of the Conservation of Agricultural Resources Act 43 of 1983 (CARA) and National Environment Management Biodiversity Act 10 of 2004 Alien Invasive Species Regulations, namely: *Jacaranda mimosifolia* (CARA Category 3 / NEMBA Category 1b outside urban areas), *Pennisetum setaceum* (fountaingrass) (CARA Category 1 / NEMBA Category 1b) and *Solanum elaeagnifolium* ((silver-leaf bitter apple) CARA Category 1 / NEMBA Category 1b). CARA Category 1 NEMBA Category 1b needs to be eradicated and controlled, based on an alien invasive management plan. CARA Category 3 individuals outside controlled areas need to be eradicated.

8.6.1.2 Fauna

The biodiversity field survey found that faunal species richness has been reduced considerably when compared to the expected richness for the habitat types in their natural state. This reduction is probably linked to the removal, degradation fragmentation of habitats and secondary impacts related to mining and other anthropogenic activities involving uncontrolled use of natural resources, fire wood collection, hunting and poaching. These activities resulted in the displacement and absence of large-bodied mammal and bird taxa

and the reduction and loss in important guilds (groups of species) such as hole-nesting birds, in the post-mining transformed landscape.

Many of the habitats have been transformed to ecologically simple or non-complex habitats that are functionally constrained and colonised by opportunistic and un-specialised taxa with transient life histories.

The remaining untransformed habitats, both Marikana Thornveld and Norite Koppies Bushveld, are of moderate to high faunal importance. When combined, these habitat units hold fairly high numbers of bird and mammal species, although they also facilitate ecological connectivity with natural habitat units adjacent to the study area, thereby enhancing gene flow among sub-populations of the same species. The untransformed norite outcrops provide suitable roosting and foraging habitat for the vulnerable Lanner Falcon (*Falco biarmicus)* and the range-restricted scorpion *Hadogenes gracilis*.

The cultivated land and abandoned agricultural fields are considered to be of moderate faunal sensitivity even though they represent transformed landscapes. These habitat units provide ephemeral foraging for the near threatened Abdim's Stork (*Ciconia abdimii*) and the near threatened Yellow-throated Sandgrouse (*Pterocles gutturalis*). The latter will also attempt to breed on the farmlands provided that the croplands are left fallow for a season (one year) to allow for the regeneration of annual weeds/plants that are utilised as fodder by the sandgrouse.

Transformed landscapes (with the exception of cultivated land and fallow farmland), are regarded to be of low faunal importance. These include transformed and secondary mountain bushveld and the human settlement areas.

8.6.2 Aquatic biodiversity

As discussed in Section 8.1, extensive former dimension stone quarries, heaps of waste rock, and haul roads have redirected surface water flow towards various depressions in the landscape and some quarry pits that are filled with water for most of the time. This has resulted in disruption of the biodiversity composition of the local aquatic ecological support areas as delineated on Figure 3 as none of these areas showed any signs of wetness or periodical flooding or saturation. These changes to the movement of surface water through the landscape has also resulted in changes to the species composition. Within the aquatic ecological support areas (modeled low-lying areas on Figure 3), the biodiversity specialists observed that terrestrial species dominated rather than species with a preference for moist or wet conditions. Within the artificial depressions and quarry pits, some aquatic species have established where terrestrial species used to dominate.

These disruptions and changes in biodiversity have impacted on local migration corridors and the ability of the drainage systems to support and maintain connectivity in the landscape.

8.7 Protected Areas

There are no protected areas within 10 km from the prospecting right application area. Pilanesberg is located 25 km to the north-east.

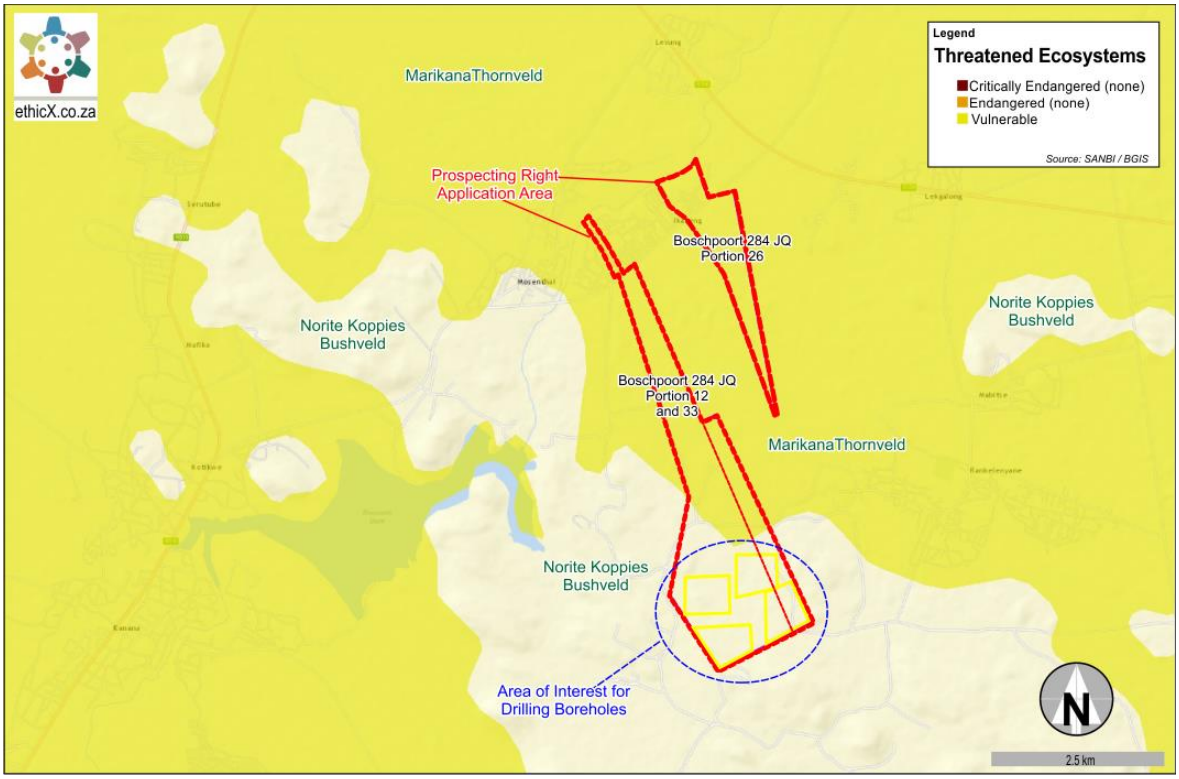


Figure 7: Vegetation Types and Ecological Status

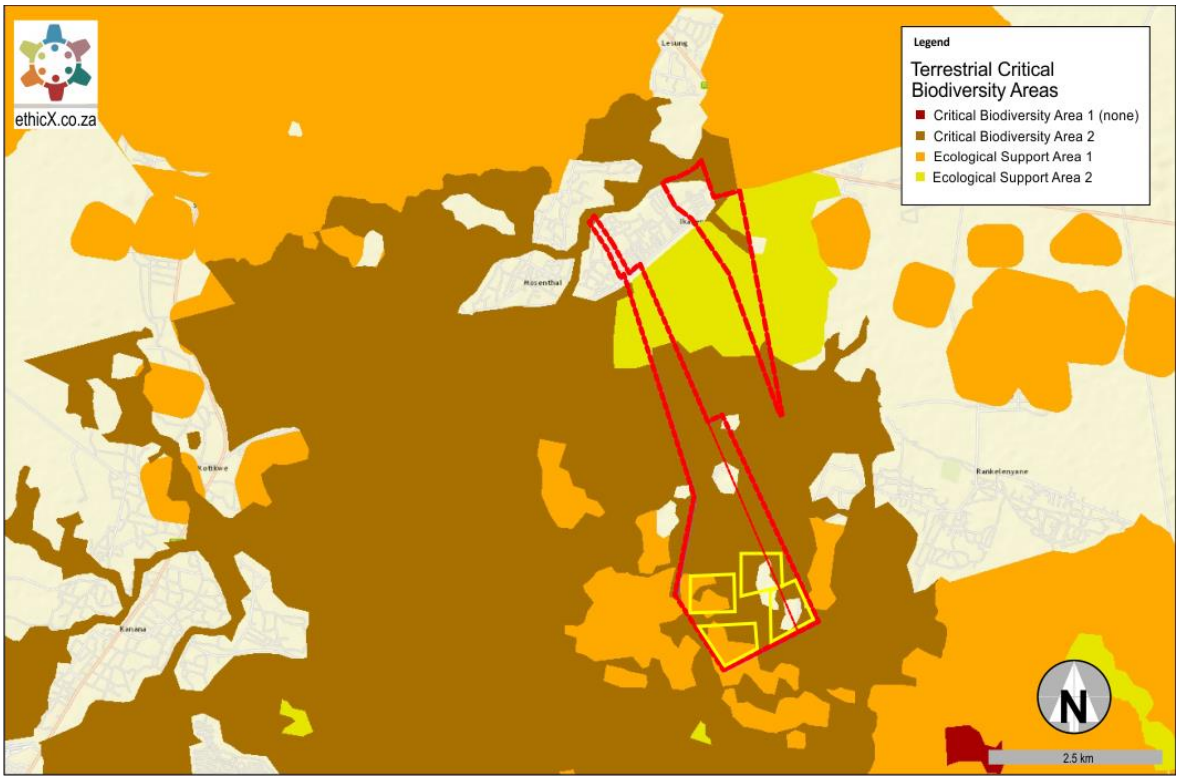


Figure 8: Terrestrial Critical Biodiversity Areas

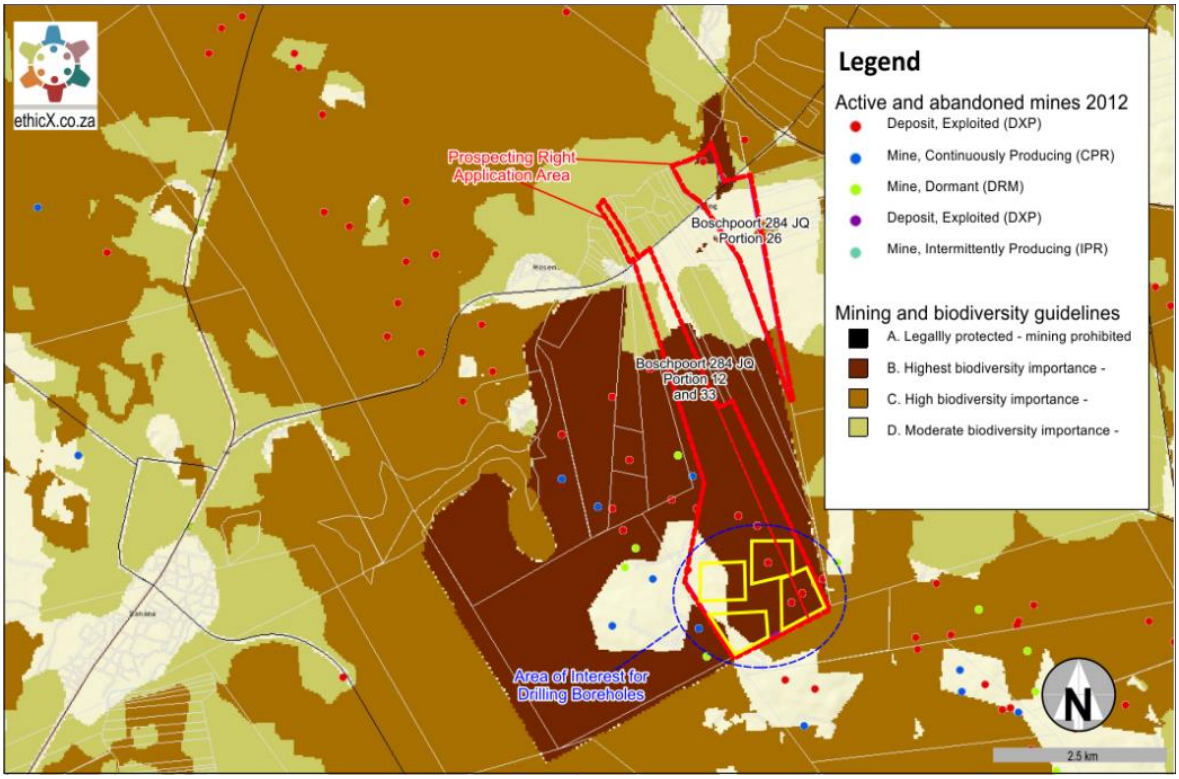


Figure 9: National Mining and Biodiversity Guideline Map

8.8 Heritage Resource Assessment

The prospecting area falls in an area known as the Central Bankenveld and is known for its rich and diverse range of heritage resources. According to oral records and documentary information the Bafokeng (also referred to as the 'Fokeng') arrived south of the Marico River in South Africa leadership of Nape, the earliest known Bafokeng chief, before AD1700. The group moved south-eastwards and settled on the banks of the Elands River (Kgetleng). Different branches of Bafokeng settled in the region and stone walls are therefore found spread throughout the region. These are generally associated with higher lying areas, rock outcrops and koppies.

A Phase I heritage assessment and field survey was conducted by Dr Julius Pistorius. His specialist report, with the results of his assessment and his management recommendations, is attached as Appendix D and is summarized below. The assessment considered previous surveys by Dr Pistorius in the region over many years.

Dr Pistorius concluded that, although various stone-walled sites used to occur in the area, most of these have been destroyed previously as a result of quarrying activities. Two stone-walled sites dating from the Late Iron Age and historical period (AD1600 to AD1840) remain in the central part of the prospecting right application area but these are located more than 1 km away from the blocks targeted for drilling of boreholes and would therefore not be affected by the planned prospecting activities. The two sites probably represent small villages or '*dikgoro'* which were occupied by a number of related family groups or '*masika',* under the authority of a headman or '*kgosana'*. The outer perimeter of the sites comprises homesteads or '*malapa'* where the inhabitants of the sites lived. Large and small stock such as cattle, sheep and goat were kept in enclosures in the central parts of the sites.

The blocks targeted for drilling of prospecting boreholes are located where quarrying activities have already occurred. This area is not pristine and is covered with the remnants of former mining activities, including access and haul roads, open pits and extensive heaps of waste rock. It is possible that remnants of stone walls may still exist between the old quarries and waste rock heaps but Dr Pistorius maintains that these would be fragmented and of low significance due to damage already incurred.

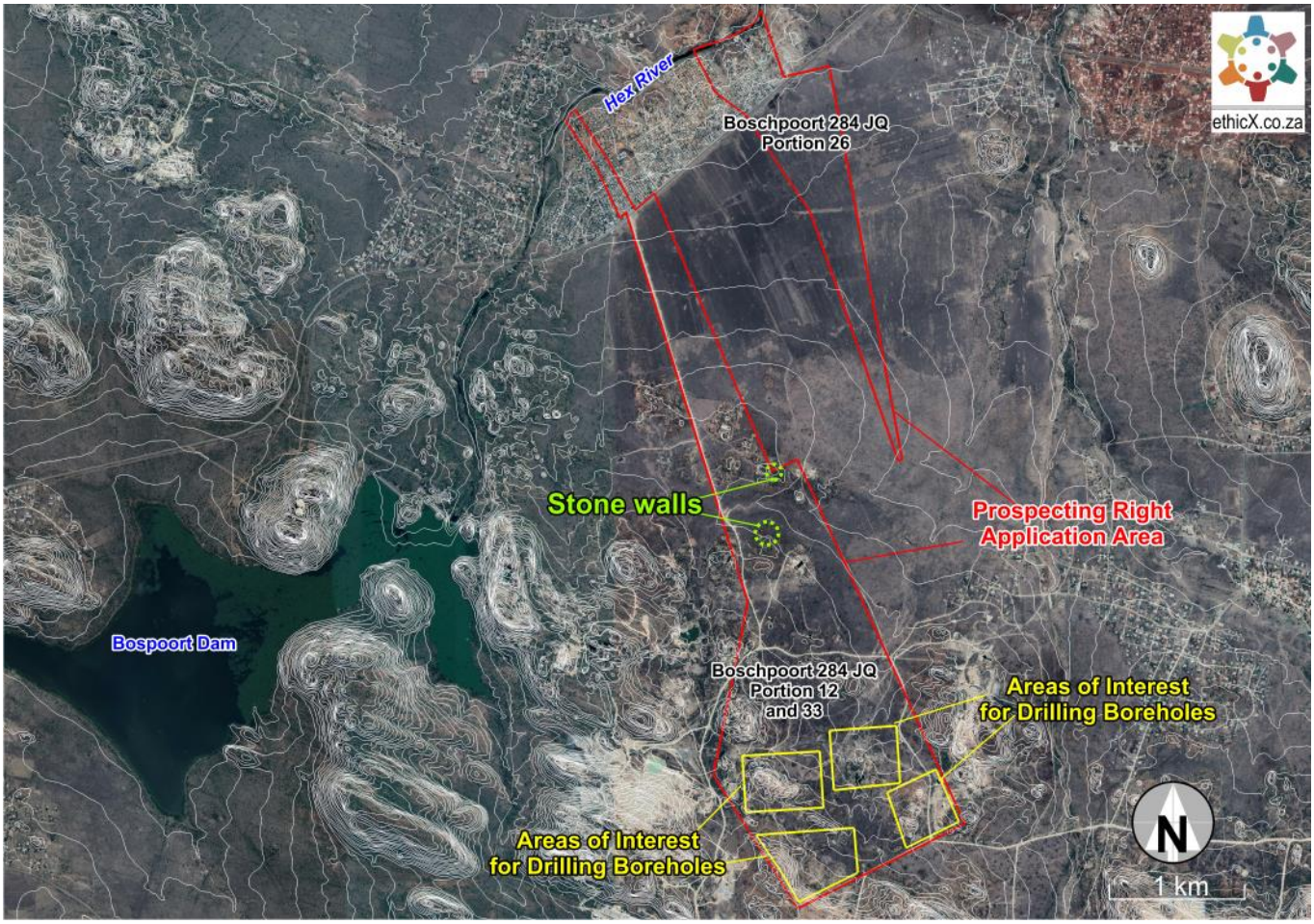


Figure 10: Location of Late Iron Age stone-walled sites (wihtin demarcated green circles), located 1 km away from blocks targeted for drilling of boreholes

Plate 8: Remains of an intact stone-walled site (more than 1 km from blocks targeted for drilling)

Plate 9: Remains of a second intact stone-walled site (more than 1 km from blocks targeted for drilling)

9 ASSESSMENT APPROACH AND METHODOLOGY

9.1 Details of the Public Participation Undertaken

9.1.1 Interested or Affected Party (IAP) identification

The landowner is the National Government of the Republic of South Africa, for the Royal Bafokeng Nation. Other stakeholders were identified through database and internet searches, discussions with the applicant, communication with the DMR, the landowner and a site visit. Written notices were handed to and sent to those identified (Appendix F). Further consultation will take place during prospecting Year 1 activities.

The DMR provided a list of stakeholders with a mining related right or interest in the prospecting right application are and local surrounds.

In February 2019, the DMR informed the applicant that the following entities have existing rights over and next to the prospecting right application area:

- Versatex Trading 500 (Pty) Ltd
- Kelgran Africa (Pty) Ltd
- Beestkraal Platinum Mines (Pty) Ltd
- Royal Bafokeng Resources (Pty) Ltd

Ethical Exchange used the contact information as provided by the DMR to consult with these entities as part of the public participation process. The information for Kelgran Africa (Pty) Ltd and Beestkraal Platinum Mines (Pty) Ltd were outdated and additional searches were undertaken to trace these entities. To date Kelgran Africa has not been contactable on any of the numbers listed in available databases (22/02/2019). The other three entities were contacted.

9.1.2 Consultative meetings

Informal meetings discussions and telephonic discussions were arranged with stakeholders.

DMR specifically required that a public meeting be held. Notices were sent to IAPs informing them of a planned meeting and that they needed to notify the public participation officer if they wished to attend the meeting. To date, nobody requested a meeting to be scheduled.

9.1.3 Notices and Background Information Letter

Notifications and a detailed background information letter were distributed to identified IAPs (Appendix F).

A notice was delivered to Bospoort Transport that operates from the old storerooms / workshops in the southern parts of the prospecting right application area.

9.1.4 Adverts

An advert was placed in the Platinum Weekly on 1 February 2019. Proof of placement is provided in Appendix F.

9.1.5 Notice Boards

Various notice boards were placed at locations along roads in and around the prospecting area (Appendix F).

9.1.6 Consultation with Competent Authority (DMR)

Ongoing during the basic assessment process.

9.2 Impact Assessment Methodology

The process used for rating of impacts and risks are outlined in Table 3. The process has aligned it to meet the requirements of 2014 EIA Regulations (as amended). It is rigorous, transparent and consistent, and thus it can be independently reviewed and audited.

Table 3: Impact Assessment Methodology

Impact Rating Criteria		**Explanation of Impact Rating Criteria and Assessment Process**	
Step 1:		Identify and Describe the Nature of the Impact	
Type of Impact	Existing Impacts	Current levels of degradation or pollution, associated with existing developments, or developments under construction.	
	Project Impacts	Impacts of the proposed project and associated activities and infrastructure (also known as incremental impacts).	
	Reasonably Anticipated Future Impacts	Impacts associated with developments where the impacts are known and defined in an approved EIA and where project implementation is eminent or reasonably expected. Impacts associated with developments where the impacts are known and have been defined in an approved EIA.	
	Cumulative Impacts	The combined effect of existing impacts, project impacts and reasonably anticipated future impacts.	
Environmental Aspect		Impact source. An 'element of an organisations activities, products and services which can interact with the environment'. The interaction of an aspect with the environment may result in an environmental impact.	
Phase		Site Establishment / Construction	
		Operation	
		Decommissioning and closure	
Impact Status		Negative	Impacts with a potential negative / adverse effect
		Neutral	Impact is not positive or negative / No impact
		Positive	Impacts with a potential positive / beneficial effect
Step 2:		Identify Mitigation / Impact Management Measures	
Mitigation Measures		Measures to avoid, reduce or remedy adverse impacts, or compensate for residual adverse impacts. Measures to expand and augment (enhance) the effect of positive impacts.	
Step 3:		Rating of Impact Consequence and Significance (using Impact Rating Matrix)	
Unmitigated		Impact rating assuming the proposed mitigation measures are not in place.	
Mitigated		Impact rating assuming the proposed mitigation measures are in place and project is implemented in accordance with the design parameters outlined in the assessment report.	
Intensity (Negative Impacts)	Eliminated	The impact was considered and assessed but found to be not applicable to the project site or surroundings.	
	Minor	Slight change, disturbance or nuisance. Targets, limits and thresholds of concern never exceeded. Impacts are rapidly and easily reversible. Require no or only minor interventions or clean-up actions if these impacts occur. No complaints expected when the impact takes place.	
	Moderate	Moderate change, disturbance or discomfort. Large enough to have a real effect. Targets, limits and thresholds of concern may occasionally be exceeded. Impacts are reversible but may require some effort, cost and time. Sporadic complaints can be expected when the impact takes place.	
	Major	Substantial change, disturbance or degradation. Real and prominent effects. May result in illness or injury. Targets, limits and thresholds of concern regularly exceeded. Regular complaints can be expected when the impact takes place.	
	Extreme	Extreme change, disturbance or degradation. Serious disruption to the functioning of a community or a society causing widespread human, material, economic or environmental losses which exceed the ability of the affected community or society to cope. Potentially catastrophic. Legal requirements and key EMP	

Impact Rating Criteria		Explanation of Impact Rating Criteria and Assessment Process
		targets, limits and thresholds of concern continually exceeded. Interest group or community mobilisation against project can be expected when the impact takes place. May result in legal action if impact occurs.
Intensity(Positive Impacts)	Eliminated	The impact was considered and assessed but found to be not applicable to the project site or surroundings.
	Minor	Slight change or improvement. Minor benefits.
	Moderate	Moderate change or improvement. Real but not substantial benefits.
	Major	Prominent change or improvement. Real and substantial benefits. General community support.
	Extreme	Considerable large-scale change or improvement compared to current conditions. Widespread benefit. Favourable publicity and/or widespread support expected.
Extent	Spatial (geographical) scale of the impact.	
	Site	Impact limited to within the boundaries of the project site. Not notable impact on receptors beyond the site boundary.
	Local	Impact notable in the immediate area (< 5 km) around the project site. Individual sensitive receptors may be affected. Does not affect an entire neighbourhood, habitat or community. Does not affect large numbers of people in nearby townships.
	Regional	Widespread impact within province / district or quaternary catchment. Large area or large numbers of sensitive receptors affected. May affect an entire community, neighbourhood or habitat. May affect large numbers of people in nearby residential areas.
	(Inter)national	National and or international (transboundary) impacts.
Duration	Risk or impact period. Total length of time (i.e. number of months or years) that the impact or risk will be present.	
	Short-term	Less than 5 years. Impact may occur for the first few years of the project, during construction, or for up to five years. Once the impact source has been removed, the effects are reversible within a one-year period.
	Medium-term	> 5 to 10 years. Impact may occur for up to ten years. Once the impact source has been removed, the effects are reversible within a three-year period.
	Long-term	> 10 years, and for < 10 years after decommissioning or rehabilitation. May occur throughout the operational life of the project, but will cease after operations ceases either because of natural processes or human intervention / remediation. Once the impact source has been removed (i.e. decommissioning and rehabilitation) the effects are reversible within a ten-year period.
	Permanent	Permanent. Irreversible (residual impacts will remain for more than 10 years after the impact source has been removed.
Probability	Likelihood that the impact will occur.	
	Eliminated	The impact was considered and assessed but found to be not applicable to the project site or surroundings.
	Highly Unlikely	Conceivable but will only happen in exceptional circumstances (<20% chance of happening).
	Possible	Plausible. Could happen and has occurred here or elsewhere (20 to 50% chance of happening).
	Highly Likely	Probable (>50 to 80 % chance of happening).
	(Near) Certain	Definite or expected. The impact cannot be prevented. (>80 % chance of happening).
Frequency	How often (number of occurrences) the impact would manifest over the impact duration period.	
	Sporadic	< 5% of the time. Once off occurrence. Effects only present for a short period of time, no residual effects.
	Occasional	5 to 30% of the time. Occurring from time to time without specific periodicity or pattern. Effects are reversed quickly and easily.
	Regular	> 30 to < 80% of the time.
	(Near) Always	> 80 to 100% of the time.
Significance	Significance = Consequence x (Probability + Frequency)	
	Negative Very High	Widespread negative effect. Negative impact that is of the highest order. Potential fatal flaw. Unacceptable impact / loss of a resource will occur.
	Negative High	Substantial negative impact.
	Negative Moderate	Negative impact that is real but not substantial.
	Negative Low	Low to negligible negative impact with little real effect.
	Positive Low	Low to insignificant positive impact.
	Positive Moderate	Positive impact that is real but not substantial.
	Positive High	Substantial positive impact.
	Positive Very High	Widespread/substantial beneficial effect.
Step 4:		Comment on Risks
Degree to which impact could cause irreplaceable loss of resources:	None	Risk considered and assessed but found to be not applicable to the project site or surroundings.
	Highly Unlikely	Conceivable but will only happen in exceptional circumstances (<20% chance of happening).
	Possible	Plausible. Could happen and has occurred here or elsewhere (20 to 50% chance of happening).

Impact Rating Criteria	Explanation of Impact Rating Criteria and Assessment Process	
	Highly Likely	Probable (>50 to 80 % chance of happening).
	(Near) Certain	Definite or expected (>80 % chance of happening).
Degree to which impact can be avoided, managed, or mitigated:	Can be fully mitigated	
	Can be partially mitigated	
	Mitigation not possible	
Degree to which impact can be reversed:	Can be fully reversed	
	Can be partially reversed	
	Cannot be reversed, permanent impact	
Likelihood of mitigation measures being implemented successfully (Mitigation reliability):	(Almost) Certain	
	Highly likely	
	Possible	
	Unlikely	
	Uncertain	
Assessment Confidence	High	
	Medium	
	Low	
Degree to which assessment supports decision-making:	Incomplete data for decision-making	
	Acceptable / adequate data for decision-making	
	Complete	

Step 5:		IAP interest based on comments and feedback received during the public participation process
IAP Interest	Negative Very High	Widespread concern and/or specific concerns of very high importance. Concerns difficult to be addressed to satisfaction of authorities or concerned parties. Various substantiated appeals against project anticipated / highly likely if issues are not resolved and addressed to the satisfaction of the concerned parties.
	Negative High	Several concerns and/or specific concerns of high importance. Real and substantial appeals against project possible if not addressed.
	Negative Moderate	Limited concerns. All concerns addressed. Unsubstantiated appeals possible.
	Negative Low	Minor concerns.
	Neutral	No interest.
	Not defined	Level of interest has not been tested.
	Positive Low	Very little support for project.
	Positive Moderate	Limited support for project.
	Positive High	General support. May be associated with high community expectations.
	Positive Very High	Widespread support. May be associated with extremely high community expectations.

Impact Rating Matrix

CONSEQUENCE = Intensity + Duration + Extent	INTENSITY:	DURATION:	EXTENT: Site	Local	Regional	(Inter)national
	Extreme	Permanent	High	Very High	Very High	Very High
		Long-term	High	High	Very High	Very High
		Medium-term	High	High	High	Very High
		Short-term	Medium	High	High	High
	Major	Permanent	High	High	Very High	Very High
		Long-term	High	High	High	Very High
		Medium-term	Medium	High	High	High
		Short-term	Medium	Medium	High	High
	Moderate	Permanent	Medium	Medium	High	High
		Long-term	Medium	Medium	Medium	High
		Medium-term	Low	Medium	Medium	Medium
		Short-term	Low	Low	Medium	Medium
	Minor	Permanent	Low	Low	Medium	Medium
		Long-term	Low	Low	Medium	Medium
		Medium-term	Low	Low	Low	Low
		Short-term	Low	Low	Low	Low
	Eliminated	Permanent	None			
		Long-term				
		Medium-term				
		Short-term				

Impact Rating Criteria		Explanation of Impact Rating Criteria and Assessment Process					
SIGNIFICANCE = Consequence x Probability + Frequency	PROBABILITY:	FREQUENCY:	CONSEQUENCE:				
			None	Low	Medium	High	Very High
	(Near) Certain	Regular / Always	None	Low	Medium	High	Very High
		Occasional	None	Low	Medium	High	Very High
		Sporadic	None	Very Low	Low	Medium	High
	Highly Likely	Regular / Always	None	Low	Medium	High	Very High
		Occasional	None	Very Low	Low	Medium	High
		Sporadic	None	Very Low	Very Low	Low	Medium
	Possible	Regular / Always	None	Very Low	Low	Medium	High
		Occasional	None	Very Low	Very Low	Low	Medium
		Sporadic	None	Very Low	Very Low	Very Low	Low
	Highly Unlikely	Regular / Always	None	Very Low	Low	Medium	High
		Occasional	None	Very Low	Very Low	Low	Medium
		Sporadic	None	Very Low	Very Low	Very Low	Low
	Eliminated	N/A	None				
Precautionary Weighting		The significance of negative impacts may be increased when there is, based on professional judgment by the specialists and EAP, a potential understatement of the significance of negative impacts.					

9.3 Information Gaps and Assumptions

Information contained in this report is adequate for decision-making regarding the granting of an environmental authorization for prospecting. It is also assumed that the drill sites to be identified by the applicant represents technically suitable sites for the prospecting (to be confirmed by specialised study)

Based on a desktop study of available satellite images and regional biodiversity databases, it appears that there have been previous small-scale mining operations in the area. However, a geological and ecological assessment is required, and findings will be submitted as part of the registration documentation, prior to drilling in Years 2- 3.

Conclusions of studies assume that any potential impacts on the environment associated with the proposed prospecting activities will be avoided, mitigated or offset.

10 SUMMARY OF ISSUES AND CONCERNS RAISED DURING PUBLIC PARTICIPATION PROCESS

No comments have been received to date. Comments received during the review of the draft basic assessment report will be incorporated into the final basic assessment report as a Comments and Response Report (Appendix E).

11 SUMMARY OF SPECIALIST REPORT FINDINGS

The following two specialist studies were undertaken:

- Willem De Frey (flora specialist) from EkoInfo, in association with Lukas Niemand (fauna specialist) from Pachnoda Consulting, undertook the Biodiversity Specialist Impact Assessment (Appendix C). A field survey was conducted on 6 to 8 February 2019. The results are summarised Section 8.6 and their management recommendations were all incorporated into the EMP as reflected in Section 17.

- Dr Julius Pistorius was responsible for a Phase I Heritage Specialist Assessment (Appendix D). A field survey was conducted by Dr Julius Pistorius on 1 and 4 February 2019. His findings are summarised in Section 8.8 and his management recommendations were all incorporated into the EMP as reflected in Section 17.

The assessment of potential impacts and risks as presented below incorporated the specialists report findings.

12 IDENTIFICATION AND ASSESSMENT OF POTENTIAL IMPACTS AND RISKS

Category	Impact	Mitigation	With or Without Mitigation	Significance
Noise Disturbance	Noise generation during site establishment and clearance will only last a day or two per drill site. A drill rig will operate 24 hours a day for a number of months at each of the ~13 drill sites. There are no residences within 400 m of any of the drill sites so exposure of sensitive receptors is low. The impact is unavoidable, short-term, local, and of low consequence. Vehicular traffic is minimal and noise generated by vehicles is very low.	Operation of the drill rig is unavoidable but no special noise mitigation required due to the distance to sensitive receptors of more than 400 m.	Unmitigated	Very Low
			Mitigated	Very Low
Dust Nuisance	Dust generation during site establishment and clearance will only last a day or two per drill site. The impact is limited to a small affected area and the limited duration (a number of days). During the drilling operations, vehicular traffic is minimal and thus the dust generated by vehicles on gravel roads would be minimal but could be a nuisance near residences. The impact is short-term, local, and of moderate consequence.	Vehicles travelling to/from the drill site to keep to speed limits of the roads and reduce speed on unsurfaced roads. The cleared area at drill sites to be kept as small as practically possible. Grading of new access tracks to be kept to a minimum.	Unmitigated	Low
			Mitigated	Very Low
Loss of topsoil **Land capability**	Loss of topsoil due to site clearance and disturbance at the drill sites, and subsequent impacts on land capability. The impact is limited to a small affected area and it can be mitigated with appropriate topsoil management and rehabilitation measures.	Topsoil management as per the EMP.	Unmitigated	Moderate (small footprint)
			Mitigated	Low
Hazardous excavations	There will be no hazardous excavations. A small sump for containing drilling water will be required next to the drill rig, but it will be within the fenced drill site. The sump will be removed at the end of the drilling operations and no hazards would remain.	Reinstatement and clearance of the site as per the EMP.	Unmitigated	Low
			Mitigated	Very Low
Soil and Water Contamination	Water used during drilling will contain sediments and mud and traces of drilling fluids and additives. Fuels and lubricants will be used at the drill site. Soil and groundwater contamination could occur if drilling water and hazardous substances are allowed to infiltrate into the soil. The impact is short-term, local, and can be mitigated with appropriate management of drilling water and hazardous substances.	Contain and re-circulate drilling water. Avoid contaminated drilling water infiltrating into the soil. Spill prevention and management as per the EMP.	Unmitigated	Moderate
			Mitigated	Low

Category	Impact	Mitigation	With or Without Mitigation	Significance
Biodiversity	Habitats have been disturbed due to former mining activities. Remaining natural habitats are of moderate to high importance. Habitat disturbance at some of the drill sites and along its access track falls within a classified terrestrial Critical Biodiversity Area and an aquatic Ecological Support Area. There are sufficient open areas to establish a drilling site without having to remove any large shrubs or trees. The impact is unavoidable but very limited in extent and it can be reversed through proper topsoil management during site clearance and drilling operations, and rehabilitation of the site once drilling is complete.	The cleared area at the drill site to be kept as small as practically possible, and large scrubs and trees to be avoided. Grading of a new access track to be kept to a minimum. Topsoil management as per the EMP. Reinstatement and clearance of the site as per the EMP. Select drill sites to avoid protected flora species.	Unmitigated	Moderate (small footprint)
			Mitigated	Low
Rivers and drainage lines	Drainage patterns and water flow have been altered due to former mining activities. Water flow to low-lying areas has been re-directed towards man-made depressions and old quarry pits. As such, there are no visible natural water courses in the vicinity of the blocks targeted for drilling boreholes. Although disturbed and non-functional, some areas are delineated as aquatic Ecological Support Areas. It is assumed that no Section 21 (c) and (i) water uses would be triggered (GN 609 of 2016). Impacts and risks are low.	Layout of drill sites to be planned to minimise impacts on aquatic Ecological Support Areas. Spills and erosion to be managed as per the EMP Consultation with DWS before drilling in Year 2.	Unmitigated	Low
			Mitigated	Very Low
Agricultural Land Use **Livelihoods**	There are no agricultural land uses in the blocks targeted for drilling. No impacts expected on tenants using old workshops / storerooms near the blocks targeted for drilling.	None required.	Unmitigated	None
			Mitigated	None
Social and Economic	Minimal impacts due to the small scale and short duration of the planned activities. Drilling contractor is likely to use their existing personnel and opportunities for temporary employment are limited.	None required.	Unmitigated	Very Low
			Mitigated	Very Low
Infrastructure	There are various old haul roads to be used. Minimal traffic expected. Impacts would be minimal.	Management measures in the EMP.	Unmitigated	Low
			Mitigated	Very-Low

Category	Impact	Mitigation	With or Without Mitigation	Significance
Heritage Resources	The region is known for stone-walled heritage sites but all the local sites within and immediately around the blocks targeted for drilling have been destroyed due to former mining. Two intact stone-walled sites are located ~1 km from the blocks targeted for drilling but these would not be affected by the planned drilling operations.	The heritage specialist recommended that the two intact stone-walled sites located ~1 km from the planned drilling operations be demarcated with tape and warning signs be put up while drilling takes place. Follow the EMP requirements should any heritage resources will be unearthed during clearing of the site.	Unmitigated	Moderate
			Mitigated	None
Visual Impacts	Visual character and landscape of area around blocks targeted for drilling have been severely altered. No sensitive receptors.	No special mitigation required. The distance from settlements and major transport routes will limit impact. Good housekeeping to be maintained at the drill sites.	Unmitigated	Low
			Mitigated	Very-Low

13 RANKING OF POTENTIAL SIGNIFICANT IMPACTS AND RISKS

Potential impacts were identified and rated in Section 12. Due to the very small footprint, none of the impacts identified are potentially significant. As such, there was no need to apply the undertake ranking of the impacts and risks. For completeness sake, all impact with unmitigated high potential impacts are ranked below.

13.1 Soil and water contamination

Nature of Impact:	Water used during drilling will contain sediments, mud and traces of drilling fluids and additives. Fuels and lubricants will be used at the drill site. Soil and groundwater contamination could occur if drilling water and hazardous substances are allowed to infiltrate into the soil. The impact is short-term, local, and can be mitigated with appropriate management of drilling water and hazardous substances.								
Mitigation:	• Contain and re-circulate drilling water. • Avoid contaminated drilling water infiltrating into the soil. • Spill prevention and management as per the EMP.								
Impact Raking:	Mitigation	Intensity	Duration	Extent	Consequence	Probability	Frequency	Impact Status	Significance
	Not Mitigated	**Major**	**Short**	**Site**	**High**	**Highly likely**	**Sporadic**	**Negative**	**Moderate**
	Mitigated	**Minor**	**Short**	**Site**	**Low**	**Highly unlikely**	**Sporadic**	**Negative**	**Low**

Likelihood of mitigation measures being implemented successfully (mitigation reliability)	Highly likely
Degree to which impacts can be avoided, managed, or mitigated	Can be avoided and mitigated
Degree to which impacts can be reversed	Can be reversed
Degree to which impacts could cause irreplaceable loss of resources	Highly unlikely
Assessment confidence	High
Gaps and Limitations	Information adequate for EA decision-making

13.2 Heritage resources

Nature of Impact:	The region is known for stone-walled heritage sites but all the local sites within and immediately around the blocks targeted for drilling have been destroyed due to former mining. Two intact stone-walled sites are located ~1 km from the blocks targeted for drilling but these would not be affected by the planned drilling operations.
Mitigation:	Heritage Specialist Recommendations: • The heritage specialist recommended that the two intact stone-walled sites located ~1 km from the planned drilling operations be demarcated with tape and warning signs be put up while drilling takes place.

	Mitigation	Intensity	Duration	Extent	Consequence	Probability	Frequency	Impact Status	Significance
Impact Raking:	**Not Mitigated**	**Major**	**Short**	**Site**	**High**	**Highly likely**	**Sporadic**	**Negative**	**Moderate**
	Mitigated	**None**	**Short**	**Site**	**None**	**Highly unlikely**	**Sporadic**	**Negative**	**None**

Likelihood of mitigation measures being implemented successfully (mitigation reliability)	Highly likely
Degree to which impacts can be avoided, managed, or mitigated	Can be avoided
Degree to which impacts can be reversed	Cannot be reversed
Degree to which impacts could cause irreplaceable loss of resources	Highly unlikely
Assessment confidence	High
Gaps and Limitations	Information adequate for EA decision-making

13.3 Biodiversity

Nature of Impact:	Habitat disturbance at some of the drill sites and along its access track falls within a classified terrestrial Critical Biodiversity Area and an aquatic Ecological Support Area. Habitats have been disturbed and fragmented due to former mining activities. Remaining natural habitats are of moderate to high importance. There are sufficient open areas to establish a drilling site without having to remove any large shrubs or trees. The impact is unavoidable but very limited in extent and it can be reversed through proper topsoil management during site clearance and drilling operations, and rehabilitation of the site once drilling is complete.

Mitigation:	• The cleared area at the drill sites to be kept as small as practically possible, and large scrubs and trees to be avoided. • Grading of a new access tracks to be kept to a minimum. • Select drill sites to avoid protected flora species. • Topsoil management as per the EMP. • Reinstatement and clearance of the site as per the EMP. <u>Biodiversity Specialist Recommendations</u>: • Open areas or any area that is not part of the designated drill sites must be perceived as no-go areas. • If vertic top soils have to be removed, it should be stored separate from the subsoils and placed back as soon as the activity had been completed. • The introduction of alien invasive species or non-regional indigenous species should be prevented. If areas need to be rehabilitated, then locally indigenous species should be re-introduced. • Driving across or on agricultural lands, farmland or any abandoned agricultural field should not be allowed during the austral winter season (mainly May to August) when Yellow-throated Sandgrouse (*Pterocles gutturalis)* are breeding. • Intentional killing of any faunal species (in particular invertebrates and snakes) by the drilling workforce should be avoided by means of awareness programmes. The workforce should be made aware of the conservation issues pertaining to the taxa occurring on the study site. Any person found deliberately harassing any animal in any way should face disciplinary measures. • Since snaring and hunting is already a problem in the area, in particular at the former mining areas, the biodiversity specialists recommended that illegal hunting activities be monitored and snares be removed on a continual basis – this is a matter for the landowner to consider and implement and is beyond the scope of the drilling contractor and prospecting right applicant.

Impact Raking:	Mitigation	Intensity	Duration	Extent	Consequence	Probability	Frequency	Impact Status	Significance
	Not Mitigated	**Major**	**Short**	**Site**	**High**	**Highly likely**	**Sporadic**	**Negative**	**Moderate**
	Mitigated	**None**	**Short**	**Site**	**Low**	**Highly unlikely**	**Sporadic**	**Negative**	**Low**

Likelihood of mitigation measures being implemented successfully (mitigation reliability)	Highly likely
Degree to which impacts can be avoided, managed, or mitigated	Can be mitigated
Degree to which impacts can be reversed	Can be reversed. The biodiversity specialist concluded that the habitats are dynamic and will re-instate themselves, if left with sufficient topsoil for seed germination and plant growth.
Degree to which impacts could cause irreplaceable loss of resources	Highly unlikely
Assessment confidence	High
Gaps and Limitations	Information adequate for EA decision-making

14 AUTHORISATION PERIOD

An environmental authorisation is required until the prospecting right is closed.

15 CONCLUDING RECOMMENDATION

Based on the fact that no significant impacts were identified and that the envisaged prospecting would provide valuable information about the ore body and the feasibility for economic extraction, it is recommended that an environmental authorisation be granted.

16 EAP UNDERTAKING

I, Mari Wolmarans declare that –

General declaration:

- I act as the independent environmental practitioner in this application
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting environmental impact assessments, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I will take into account, to the extent possible, the matters listed in regulation 8 of the Regulations when preparing the application and any report relating to the application;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- I will ensure that information containing all relevant facts in respect of the application is distributed or made available to interested and affected parties and the public and that participation by interested and affected parties is facilitated in such a manner that all interested and affected parties will be provided with a reasonable opportunity to participate and to provide comments on documents that are produced to support the application;
- I will ensure that the comments of all interested and affected parties are considered and recorded in reports that are submitted to the competent authority in respect of the application, provided that comments that are made by interested and affected parties in respect of a final report that will be submitted to the competent authority may be attached to the report without further amendment to the report;
- I will keep a register of all interested and affected parties that participated in a public participation process; and
- I will provide the competent authority with access to all information at my disposal regarding the application, whether such information is favourable to the applicant or not
- all the particulars furnished by me in this form are true and correct;
- will perform all other obligations as expected from an environmental assessment practitioner in terms of the Regulations; and
- I realise that a false declaration is an offence in terms of regulation 48 of the Regulations and is punishable in terms of section 24F of the Act.

Disclosure of Vested Interest (delete whichever is not applicable)

- I do not have and will not have any vested interest (either business, financial, personal or other) in the proposed activity proceeding other than remuneration for work performed in terms of the Regulations;

- ~~I have a vested interest in the proposed activity proceeding, such vested interest being:~~

Signature of the environmental assessment practitioner:

ETHICAL EXCHANGE SUSTAINABILITY SERVICES (PTY) LTD

Name of company:

15 November 2018

Date:

17 ENVIRONMENTAL MANAGEMENT PROGRAMME

The EMP incorporates the recommendations made in the Biodiversity Specialist Assessment and Strategy developed by Ekoinfo in February 2019 and the Heritage Assessment completed by Dr Julius Pistorius.

17.1 Planning, Drill Site Establishment (Construction) and Drilling Operational Phases

Management Category *Impacts to Manage*	Aspects to be Managed	Management Outcome Commitments	Impact Management Action Statements	Timing / Phase
Responsibility *Prevent legal non-compliance and legal action*	Implementation of the EMP.	The applicant ensures implementation of the EMP. Overall environmental legal compliance.	The ultimate responsibility for implementing the EMP lies with the applicant.	All phases Ongoing
Site establishment *Prevent damage to private property and impacts on third party livelihoods*	Access to private property. Establishment of a drill sites. Establishment of new access tracks. Damage to natural vegetation.	Impacts on third-party livelihoods and damage to property are avoided. Impacts that could not be avoided are adequately mitigated. No negative residual impacts on third-party property and livelihoods remain at the end of prospecting.	Upfront agreement with landowner on: access routes used to drill sites, areas to be cleared, new tracks to be created, and how damage to crops, property improvement and infrastructure, irrigation systems will be avoided, and mitigated where impacts could not be avoided. Upfront agreement with landowner on security matters such as entry points to properties and access control.	Planning Site Establishment
			Keep photographic records of areas around access tracks and drill sites as evidence of the scale and nature of impacts, the condition of crops, property improvements and infrastructure, site clearance, and site reinstatement before drilling operations. Access tracks to be located, as far as practically possible, on existing paths and tracks and previously disturbed areas, without affecting any infrastructure.	Site establishment
			Reinstate sites as per Decommissioning and Closure section of the EMP.	Decommissioning
Security *Managing security risks*	Security of third parties and drill site.	Appropriate measures in place to manage security.	Emergency contact details to be readily available. Upfront agreement with landowner on security matters including points of access to their property, access control, and opening and closing of gates. Drill sites are to be fenced. Drill site gate to be locked if site is unattended. Safety warning signs to be installed on the fence and at the entrance to the site.	Operational
Natural vegetation management *Prevent habitat loss and habitat degradation*	Establishment of a drill sites and access tracks	Removal and degradation of natural vegetation minimized. Introduction to and spread of alien and invasive vegetation into both Marikana Thornveld and Norite koppies bushveld to be prevented.	Grading of a new access tracks to be kept to a minimum. Existing roads should be utilized whenever possible to reduce the need to create new tracks. The cleared area at the drill site to be kept as small as practically possible, and damage to large scrubs and trees to be avoided. Open areas or any area that is not part of the designated drill sites must be perceived as no-go areas.	Site Establishment

Management Category *Impacts to Manage*	Aspects to be Managed	Management Outcome Commitments	Impact Management Action Statements	Timing / Phase
		No residual impacts on the condition of vegetation at the end of prospecting.	Keep photographic records of the drill site and access track as evidence of the scale and nature of current degradation and disturbance due to former mining, the condition of vegetation cover, presence of alien and invasive vegetation, site clearance, and site reinstatement and rehabilitation before and after drilling operations (rehabilitation measures elsewhere in EMP). Reinstate and rehabilitate site as per Decommissioning and Closure section of the EMP. Where there are vertic clay soils, restrict the activities to the dry season (winter) months, from April/May to August/September. The introduction of alien invasive species or non-regional indigenous species should be prevented. If areas need to be rehabilitated, then locally indigenous species should be re-introduced.	
	Collection of firewood and medicinal plants.		No ingenious trees or shrubs to be felled or damaged for the purpose of obtaining firewood or for medicinal purposes.	Site Establishment Operational
	Off road driving.		Vehicles to stick to pre-identified tracks to be used. No off-road driving through the veld allowed unless agreed with the geologist responsible for overseeing the exploration programme.	Site Establishment Operational
Topsoil management *Protect natural seedbed and enable regrowth*	Operation of drill sites, where there is a likelihood of spills and soils becoming compacted and degraded.	Loss of topsoil prevented. No residual impacts on land capability remain at the end of prospecting.	Topsoil to be stored away from contamination sources and for use during site remediation. Topsoil not to be stored within the flood lines. If vertic top soils have to be removed, it should be stored separate from the subsoils and placed back as soon as the activity had been completed. Topsoil not to be used to contain contaminated water and materials or to fill excavations (subsoil to be used). A marker to be placed on the topsoil heaps to avoid it being used for purposes other than rehabilitation. Weeds not to be allowed to proliferate on the topsoil. Once drilling is complete, the sump excavations have been filled, and the site has been leveled, topsoil to be applied on surface to areas from where it was stripped.	Site Establishment Operational End of operations
Wildlife management *Prevent disturbances to and killing of wildlife*		No residual impacts on land capability remain at the end of prospecting.	No hunting, snaring or poaching of any animal is be allowed. The killing of wildlife, whether problem animals or not, is illegal without the permission of the land owner. Problem animals may only be controlled according to specific methods. The workforce should be made aware of the conservation issues pertaining to the taxa occurring on the study site. Any person found deliberately harassing any animal in any way should face disciplinary measures.	Site Establishment Operational

Management Category *Impacts to Manage*	Aspects to be Managed	Management Outcome Commitments	Impact Management Action Statements	Timing / Phase
			Open areas or any area that is not part of the designated drill sites must be perceived as no-go areas. Care should be taken while driving at night, as wildlife is more active at night in agricultural landscapes. Reduce speeds while driving at night to below 40 km/hour on farm roads and 20 km/hour on tracks, to lower the risk of road kill. Unnecessary noise and light pollution should be kept to the minimum, to allow organisms which are sensitive to human activities, to remain in the area. Driving across or on agricultural lands, farmland or any abandoned agricultural field should not be allowed during the austral winter season (mainly May to August) when Yellow-throated Sandgrouse (Pterocles gutturalis) are breeding. *Recommendation for landowner: Since snaring and hunting is already a problem in the area, in particular at the former mining areas, the biodiversity specialists recommended that illegal hunting activities be monitored and snares be removed on a continual basis – this is a matter for the landowner to consider and implement and is beyond the scope of the drilling contractor and prospecting right applicant.*	
Ensure water uses are correctly registered and authorised *Appropriately authorised and registered water uses as per requirements of GN 609 of 2016 and GNR 704.Prevent legal non-compliance and legal action*	Actvities within <100 m of water courses not anticpated.	It is anticpated that there would not be water uses within the Regulated Area around water courses.	Consultation with DWS to agree on risk level and applications required.	Planning Once final drill site locations have been determined.
Waste management *Prevent pollution and environmental degradation*	Waste generation at drill sites.	No disposal of waste on site.	All waste to be collected and stored in impervious, covered bins or skips for removal to a landfill facility. No food waste or organic matter to be placed outside the fence or in open bins where it could attract feral or wild animals. Chemically or hydrocarbon contaminated materials or soils to be collected and disposed of at a relevant disposal facility. Documentation with proof of appropriate waste disposal this to be kept on record.	Site Establishment Operational
Dust management *Prevent nuisance impacts to people in the area*	Vehicles traveling to/from drill sites. Windblown dust over areas where vegetation is cleared or damaged.	Dust generation and deposition onto surrounding environment effectively controlled.	Vehicle speeds to be controlled to avoid deterioration of roads, excessive dust and dangerous conditions due to low visibility. Clearance of and damage to vegetation at drill sites and along new access tracks to be kept to a minimum and undue surface damage and erosion at drill site and along access tracks to be repaired.	Site Establishment Operational
Hazardous excavations	No hazardous excavations are planned.		Sump for containing drilling fluids to be located within the fenced drill site.	Planning Site Establishment

Management Category *Impacts to Manage*	Aspects to be Managed	Management Outcome Commitments	Impact Management Action Statements	Timing / Phase
Prevent harm to people and animals	Small sump for containing drilling fluids.	Hazardous excavations are demarcated and access is controlled. No hazardous excavations remain at the end of prospecting.	Access to the site to be controlled at all times. Sump to be removed at the end of the drilling operations.	Operational
Fire prevention *Prevent harm to people and animals, property and natural vegetation*	Cooking fires (braai). Risk of veld fires.	Appropriate measures to prevent and control fires are in place.	Fires only allowed in designated areas specifically designed to avoid fire hazards and positioned away from flammable substances and vegetation. Discuss the need for a fire break around the drill site with the land owner and affected third parties. Establish a fire break as required. Adequate fire extinguishers to be available and personnel trained in the use thereof.	Operational
Spill control **Emergencies** *Prevent pollution and environmental degradation*	Storage and use of diesel and hazardous chemicals. Hazardous wastes generated.	Contamination of soils and water prevented. Adequate corrective actions implemented where impacts could not be avoided. Contaminated water prevented from flowing off the drill site. No residual impacts remain at the end of prospecting.	Cumulative volume of diesel and chemicals (dangerous goods) stored on site not to exceed the regulated threshold (30 m^3) for which authorisation is required (GN Regulation 324). Avoid storage of dangerous goods in: Defined Critical Biodiversity Areas, and the Regulated Area around water courses, and if unavoidable, include in DWS prescribed risk matrix (as discussed above).	Planning Operational
			Position dangerous good storage areas and waste areas to ensure that any spills and the substances used for cleaning up spills can be contained and prevented from affecting clean storm water or runoff to water courses. Install berms in high-risk areas. All personnel dealing with hazardous substances (including fuel) to be adequately trained to identify a potential risk and how to respond in case of a spill. Fuels and chemicals to be stored in accordance with industry best practice and standards. Material safety data sheets (MSDS) for all hazardous substances to be available on site to all staff exposed to the hazardous substances.	Site Establishment Operational
			Access to and use of hazardous substances must be controlled by an appropriately trained individual. Impermeable traps for hydraulic fluids, fuel and oils or other hazardous substances must be in place under chemical containers, fuel tanks, drill rig and other vehicles and equipment with oil leaks. Chemical containers, fuel tanks and refueling area to be bunded in accordance with industry best practice and standards. On-site refueling of vehicles and equipment to be kept to a minimum, i.e. only for vehicles and equipment that stay on site for the duration of the prospecting period.	Operational

Management Category *Impacts to Manage*	Aspects to be Managed	Management Outcome Commitments	Impact Management Action Statements	Timing / Phase
	Hydraulic fluids and additives. Drilling water and mud.		Where possible, drilling fluids and additives to be biodegradable and not cause pollution. Contain and recirculate drilling water. Avoid contaminated drilling water infiltrating into the soil.	Planning Operational
	Contaminated soil.		Soil contamination by hazardous substances such as oil, petrol or diesel must be removed from site and disposed-off in an environmentally-acceptable manner at a landfill site authorised to accept such waste.	Operational
	All hazardous areas.		Conduct regular inspections of dangerous good storage areas, the sump and drilling water and mud handling. Conduct regular inspections of parking areas and drill site for leaks and spills from vehicles, equipment, waste bins, sump, chemical toilets, soil drums, etc.	Contractor to check daily during drill site operations
	Chemical toilets.		Position chemical toilets to ensure that any spills can be contained and prevented from affecting clean storm water and runoff to water courses. Install berms in high-risk areas.	Planning
			Toilets to be serviced at appropriate intervals to ensure proper hygienic conditions are maintained. Sewage to be disposed of at a licensed Wastewater Treatment Works, and documentation with proof of this to be kept on record.	Operational
			Conduct regular inspections of chemical toilets. Spills to be cleaned-up as soon as possible to avoid undue infiltration into the soil.	Contractor to check daily during drill site operations Within 24 hours
	Hazardous spills.		Emergency contact details to be readily available. An appropriate spill kit to be available to clean up spills. In the case of a spill, measures to be put in in place to stop and contain the spills, prevent contamination of soil and water and clean-up the area. No contaminated material to be buried on site or be left in place and covered with soil. Contaminated material to be placed in suitable bins or skips and disposed of at a suitable landfill site, unless it is treated and remediated on site under the guidance of an environmental scientist. Remediation of contaminated areas to be carried out to under guidance of an environmental scientist and to the satisfaction of the DMR Regional Manager.	Operational
			Conduct regular inspections of parking areas and drill site for leaks and spills from vehicles, equipment, waste bins, sump, chemical toilets, soil drums, etc.	Contractor to check daily during drill site operations Within 24 hours

Management Category *Impacts to Manage*	Aspects to be Managed	Management Outcome Commitments	Impact Management Action Statements	Timing / Phase
			Spills to be cleaned-up as soon as possible to avoid undue infiltration into the soil.	
Heritage resources *Prevent damage to intact stone-walled sites.*	No hazardous excavations are planned. Small sump for containing drilling fluids.	The two intact stone-walled sites are demarcated with warning sites. No danage to the site occurred as a result of the prospecting actvities.	The heritage specialist recommended that the two intact stone-walled sites located ~1 km from the planned drilling operations be demarcated with tape and warning signs be put up for the duration of the drilling operations.	Planning Site Establishment

17.2 Decommissioning, Rehabilitation and Closure

Closure Objectives	Aspects to be Managed	Management Outcome	Management Actions	Timing / Phase
Drill sites and tracks to be adequately reinstated to previous state	Reinstatement of all drill sites.	Areas affected by prospecting are reinstated and rehabilitated to reflect pre-prospecting land use classes.	For all ~13 drill sites All structures, concrete slabs, sumps, machinery and equipment to be removed and the site cleared. No waste or rubble to be buried or disposed of on site or in the veld. Excavations to be filled and natural drainage patterns re-established. Compacted soil to be ripped. Topsoil to be applied on surface to areas from where it was stripped. There should be no need to re-seed the area with any seed mixture. Based on the findings of the biodiversity specialist, the area will recover sufficiently from the seedbank in the topsoil, as well as from the source of seeds in the surrounding landscape.	Decommissioning
	Drill sites and access tracks		Drill sites and access tracks Inspect all areas disturbed during drilling operations to verify that they have been adequately reinstated.	Decommissioning
No residual impacts on the condition of natural vegetation of areas affected by prospecting	Rehabilitation of drill sites and access tracks		Inspect areas disturbed during drilling operations to verify that they have been adequately reinstated and vegetation re-growth is sufficient and check for alien and invasive species. If a reasonable assessment indicates that the re-growth of vegetation from the natural seedbed contained in the topsoil is unacceptably slow, additional measures to be applied based on the advice of a registered, scientific professional specialising in vegetation science. Remove alien and invasive species introduced as a result of prospecting activities.	Decommissioning

17.3 Monitoring and record keeping

Management Category	Aspects to be Managed	Management Outcome	Management Actions	Timing / Phase
Monitoring	Drill sites and access tracks.	Appropriate measures are in place to detect environmental issues on site and verify ongoing compliance with the EMP.	Copies of the EMP and authorisations to be on site.	At all times during active drilling operations
			Inspection items outlined in the various sections of the EMP. The drilling contractor to inspect the sites daily during drilling operations.	Operational: Contractor to check active drill site operations daily
			The geologist to inspect the sites at least monthly during drilling operations and record observations made.	Geologist to inspect all active sites monthly
Record keeping	Drill sites and access tracks.	Appropriate measures are in place to detect environmental issues on site and verify ongoing compliance with the EMP.	Keep photographic records of areas around access tracks and drill sites as evidence of the scale and nature of impacts, the condition of crops, property improvements and infrastructure, site clearance, and site reinstatement before, during and after drilling operations.	Before, during and after drilling operations.
			The geologist to keep records of site inspections and observations made.	Geologist to maintain records of monthly inspections at all active sites
	Sewage and waste disposal.	Correct off-site disposal of sewage and waste.	Sewage to be disposed of at a licensed Wastewater Treatment Works, and documentation with proof of this to be kept on record. Documentation with proof of appropriate waste disposal this to be kept on record.	Operational

17.4 Auditing and reporting

Management Category	Aspects to be Managed	Management Outcome	Management Actions	Timing / Phase
Auditing and reporting	Drill sites and access tracks.	Appropriate measures are in place to achieve eventual closure of the prospecting operations.	Upon completion of drilling operations in Year 2-3, conduct a performance assessment (audit) of all disturbed areas to verify their status and identify residual impacts and outstanding matters. Implement corrective actions as required. Submit results of the audit to DMR as part of the annual prospecting progress report.	Operational, after completion of drilling and the rainy season
			At the end of the prospecting period, conduct a final risk assessment and performance assessment to prepare for closure. Submit results of the audit to DMR as part of closure.	At closure
	Hazardous spills.	Pollution and environmental degradation incidents reported.	Reportable environmental incidents recorded and reported as per the requirement of the NEMA and the NWA.	As and when required

17.5 Environmental awareness plan

Management Category	Aspects to be Managed	Management Outcome	Management Actions	Timing / Phase
Environmental awareness plan	Roles and responsibilities for EMP implementation.	Site staff understands the key environmental matters on site. Staff handing hazardous substances knows how to store and handle these correctly.	The ultimate responsibility for implementing the EMP lies with the applicant. The drilling contractor and geologist to be given a copy of the EMP. They will familiarise themselves with the full content of the EMP, including the consultation with affected parties and monitoring activities required before, during and after drilling takes place. All drill site staff to undergo induction training, where they will be informed about environmental control measures on the following topics: pollution prevention and spill control; protection of water courses; dust management; storage of hazardous substances; fire management; ban on firewood collection; and ban on driving through the veld. Staff handing hazardous substances will be trained on the correct handling and storage of the substances and will be trained to know how to deal with spills and leaks. Records of training to be kept. Environmental matters to be discussed at site meetings.	Planning Site Establishment Operational (for new staff)

17.6 Closure costs

17.6.1 Calculation of costs

Total closure costs inclusive of VAT are R349 893.33.

Table 4: Closure Cost Calculations

Item	Description	Quantity	Unit	Rate	Total
1	Sealing of boreholes (all boreholes)	13	item	R1 300,00	R16 900,00
2	Demolish and remove concrete drilling platforms (all drill sites)	13	item	R1 700,00	R22 100,00
3	Removal of portable ablution facilities and waste (all drill sites)	13	item	R800,00	R10 400,00
4	Demolish and backfill sumps (all drill sites)	13	item	R940,00	R12 220,00
5	General surface rehabilitation (all drill sites)	0,65	hectares	R111 000,00	R72 150,00
6	Access tracks rehabilitation (new access track in natural vegetation)	0,832	hectares	R111 000,00	R92 352,00
7	2 to 3 years of maintenance & aftercare of distrubed areas	1,482	hectares	R15 700,00	R23 267,40
	Total				**R249 389,40**
8	Preliminary and General (12 % of Items 1 to 7)		12%		R29 926,73
9	Contingencies (10 % of Items 1 to 7)		10%		R24 938,94
	Total				**R304 255,07**
10	VAT		15%		R45 638,26
	Grand Total				**R349 893,33**

17.6.2 Financial provisions

Bank deposit or guarantee once EMP upon granting of the prospecting right.

17.7 Environmental Assessment Practitioner Details

Name of Practitioner	Mari Wolmarans
Responsibility	Professional EAP Report Author and Reviewer
Qualification	BL Arch (UP, 1991)
Professional Registration	MSAIE&ES, EAPSA Certified
Contact Details	T: 041 583 1156 F: 086 562 0165 E: projects@ethicx.co.za
Experience	25 years in environmental planning, assessment and auditing, with 17 years extensively focused on all aspects of environmental management in the mining sector.
Expertise	Mari Wolmarans has managed numerous complex environmental studies, impact assessments, multi-disciplinary teams and all aspects related to the environmental legal and procedural requirements of mining projects and operations. Proof of professional registrations are attached.

APPENDICES

Appendix A: Basic Assessment Report Requirements

Appendix B: EAP Undertaking, Curriculum Vitae and Professional Registration

EAP Declaration (as it appeared in the EA application)
Mari Wolmarans CV
Mari Wolmarans Professional Documentation

Appendix C: Biodiversity Specialist Assessment

Report by EkoInfo, Willem De Frey

Appendix D: Heritage Specialist Assessment

Report by Dr Julius Pistorius

Appendix E: Comments and Response Report

Not appliable as no comments were received to date. This report will be attached to the final BAR for submission to DMR and distributed to IAPs who summitted commented.

Appendix F: Record of Public Participation Process

E1 Register of interested and affected parties (no private contact details published publicly to avoid spam)
E2 Written notices sent to IAPs at start
    Copy of text
    Emails sent
E3 Advertisements
    Proof of placement in Platinum Weekly on 1 February 2019
E4 Notice boards
    Copy of text
    Proof of placement on site
E5 Record of consultative meetings and discussions
E6 Record of communication to/from IAPs
E7 Follow up notices sent to IAPs regarding BAR and EMP review (only in final report to DMR)
    Copy of text
    Emails sent
E8 Distribution of comments and response report (only in final report to DMR)

Appendix G: Closure Costs

Appendix H: Maps of Prospecting Area Layout in relation to Sensitive Areas

See main report page 30 to 31 and Appendic C (various figures).

APPENDIX A: BASIC ASSESSMENT REPORT REQUIREMENTS

BAR requirement as per the DMR template	BAR requirements as per the 2014 NEMA regulations	Reference to Report Section
Part A of DMR report template	Appendix 1 of the EIA Regulations	
The EAP who prepared the report	Details of the EAP who prepared the report.	Front of report
Expertise of the EAP	Details of the expertise of the EAP, including curriculum vitae.	Front of report Appendix B
Description of the property	The location of the activity, including - the 21 digit Surveyor General code of each cadastral land parcel. Where available the physical address and farm name. Where the required information is not available, the coordinates of the boundary of the property or properties.	Section 2.3
Locality plan	A plan which locates the proposed activity or activities applied for as well as the associated structures and infrastructure at an appropriate scale, or, if it is a linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken or on land where the property has not been defined, the coordinates within which the activity is to be undertaken	Figure 1
Description of the scope of the proposed overall activity	A description of the scope of the proposed activity, including all listed and specified activities triggered.	Section 3 Section 5
Description of the activities to be undertaken	A description of the scope of the proposed activity, including all listed and specified activities triggered and being applied for and a description of the associated structure and infrastructure related to the development	Section 3 Section 5
Policy and legislative context	A description of the policy and legislative context within which the development is located and an explanation of how the proposed development complies with and responds to the legislation and policy context	Section 7
Need and desirability of the proposed activity	A motivation for the need and desirability for the proposed development including the need and desirability of the activity in the context of the preferred location.	Section 6
Motivation for the preferred development footprint within the approved site including	A motivation of the preferred development footprint within the approved site including	Section 4.1-4.3
A full description of the process followed to reach the proposed development footprint within the approved site	A full description of the process followed to reach the proposed development footprint within the approved site	Section 4.1-4.3

BAR requirement as per the DMR template	BAR requirements as per the 2014 NEMA regulations	Reference to Report Section
Details of the development footprint alternatives considered	Details of all the alternatives considered.	Section 4.1-4.3
Details of the public participation process followed	Details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs.	Section 9.1
Summary of issues raised by IAPs	A summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them.	Section 10
Environmental attributes associated with the development footprint alternatives	The environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects.	Section 8
Impacts and risks identified including the nature, significance, consequence, extent, duration and probability of the impacts including the degree of the impacts	The impacts and risks identified, including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts can be reversed, may cause irreplaceable loss of resources and can be avoided, managed and mitigated.	Section 12
Methodology used in determining the nature, significance, consequence, extent, duration and probability of potential environmental impacts and risks.	The methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks.	Section 9.2
The positive and negative impacts that the proposed activity (in terms of the initial site layout) and alternative will have on the environment and the community that may be affected.	Positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects.	Section 12
The possible mitigation measures that could be applied and the level of risk	The possible mitigation measures that could be applied and level of residual risk.	Section 12
-	The outcome of the site selection matrix	No alternatives (Section 4.1-4.3)
Motivation where no alternative sites were considered	If no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such.	No alternatives (Section 4.1-4.3)
Statement motivating the alternative development location within the overall site	A concluding statement indicating the preferred alternatives, including preferred location within the approved site.	No alternatives (Section 4.1-4.3)
Full description of the process undertaken to identify, assess and rank the impacts and risks the	A full description of the process undertaken to identify, assess and rank the impacts the activity and associated structure and infrastructure will impose on the preferred location through the life	Process described in Section 9.2

BAR requirement as per the DMR template	BAR requirements as per the 2014 NEMA regulations	Reference to Report Section
activity will impose on the preferred site (in respect of the final site layout) through the life of the activity	of the activity including a description of all environmental issues and risks that were identified during the environmental impact assessment process and an assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures.	
Assessment of each identified potentially significant impact and risk	An assessment of each identified potentially significant impact and risk including cumulative impacts, the nature, significant and consequence of the impact and risk, the extent and duration of the impact and risk, the probability of the impact and risk occurring, the degree to which the impact can be reversed, the degree to which the impact and risk may cause irreplaceable loss of a resources and the degree to which the impact and risk can be mitigated.	No significant impacts identified Section 12, Section 13
Summary of specialist reports	Where applicable the summary of the findings and recommendations of any specialist report complying with Appendix 6 of these Regulations and an indication as to how these findings and recommendations have been included in the final assessment report.	Section 10
Environmental impact statement	An environmental impact statement which contains a summary of the key findings of the environmental impact assessment, a map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers and a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives	In front of report Section 1
Proposed management outcomes for inclusion in the EMPr	Based on the assessment, and where applicable, recommendations from specialist reports, the recording of proposed management outcomes for the development for inclusion in the EMPr as well as for inclusion as conditions of authorisation	Section 17 EMP table column 3
Aspects for inclusion as conditions of authorisation	Any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation	None (all covered in EMP)
Description of any assumptions, uncertainties and gaps in knowledge	A description of any assumptions, uncertainties and gaps in knowledge which relate to the assessment and mitigation measures proposed	Section 9.3
Reasoned opinion as to whether the proposed activity should or should not be authorised	Reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation	Section 15

BAR requirement as per the DMR template	BAR requirements as per the 2014 NEMA regulations	Reference to Report Section
Period for which environmental authorisation is required	Where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required and the date on which the activity will be concluded and the post construction monitoring requirements finalised	Section 14
Undertaking	An undertaking under oath or affirmation by the EAP in relation to the correctness of the information provided in the reports, the inclusion of comments and inputs from stakeholders and IAPs, the inclusion of inputs and recommendations from the specialist reports where relevant and any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested or affected parties	Appendix B
Financial provision	Where applicable, details of any financial provisions for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts	Section 17.6
Other information required by the competent authority	Any specific information required by the competent authority.	None
Other matter required in terms of section 24(4)(a) and (b) of the Act.	Any other matter required in terms of section 24(4)(a) and (b) of the Act.	None
Part B of the DMR report template	Appendix 4 of the NEMA regulations	
Details of EAP	Details of the EAP who prepared the EMPr and the expertise of that EAP to prepare the EMPr, including a curriculum vitae	Section 0 Appendix B
Description of the aspects of the activity	A detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description	Section 17 EMP table column 2
Composite map	A map at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that any areas that should be avoided, including buffers	Figure 7 to Figure 9 (pages 30 to 31)
Description of impact management statements	A description of the impact management outcomes, including management statements, identifying the impacts and risks that need to be avoided, managed and mitigated as identified through the environmental impact assessment process for all phases of the development including planning and design, pre-construction activities, construction activities, rehabilitation of the environment after construction and where applicable post closure; and where relevant, operation activities	Section 17 EMP table column 4
The determination of closure objectives		Section 17.2 EMP table column 1

BAR requirement as per the DMR template	BAR requirements as per the 2014 NEMA regulations	Reference to Report Section
Volumes and rate of water use required for the mining		Section 5 (Table 2)
Has a water use license been applied for?		No WUL required GA and registration to be done before drilling in Year 2
Impacts to be mitigated in their respective phases		Section 17 EMP table column 1
Impact management outcomes	A description and identification of impact management outcomes required for the aspects contemplated in paragraph	Section 17 EMP table column 3
Impact management actions	A description of proposed impact management actions, identifying the manner in which the impact management outcomes be achieved, and must, where applicable, include actions to avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation; comply with any prescribed environmental management standards or practices; comply with any applicable provisions of the Act regarding closure,	Section 17 EMP table column 4
Financial provision	Where applicable comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable.	Section 17.6
Mechanism for monitoring compliance with and performance assessment against the environmental management programme and reporting thereon	The mechanism for monitoring compliance with the impact management actions A program for reporting on compliance, taking into account the requirements as prescribed by the Regulations	Section 17.3, 17.4
Environmental Awareness Plan	An environmental awareness plan describing the manner in which the applicant intends to inform his or her employees of any environmental risk which may result from their work; and risks must be dealt with in order to avoid pollution or the degradation of the environment	Section 17.5
Specific information required by the competent authority	Any specific information that may be required by the competent authority	None
Undertaking	-	Section 16 and Appendix B (refer Environmental Authorisation Application Form)

APPENDIX B