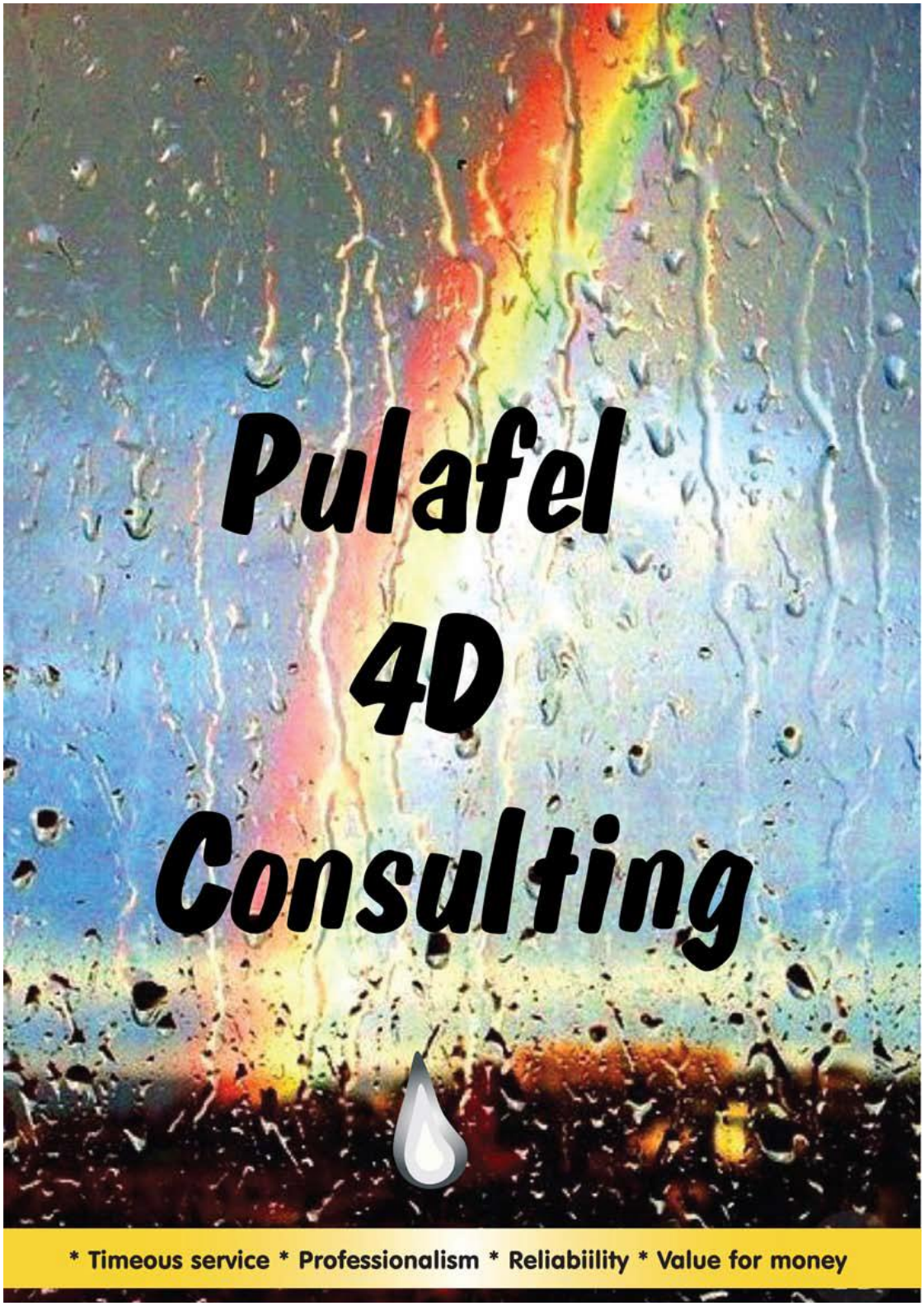
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Desktop Palaeontological Impact Assessment (PIA) of Application for a Prospecting Right for Cobalt, Diamond, Gold, Iron, Manganese, Platinum Group Metals and Zinc on Portion 32, Remaining Extent of Portion 59 and Portion 116 of the Farm 703, Hotazel, Kuruman District, Northern Cape Province.

6 March 2023

Report prepared for: Pulafel 4D Consulting.
By: Dr Sifelani Jirah and Dr Joseph Chikumbirike

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DECLARATION OF INDEPENDENCE

We, Sifelani Jirah and Joseph Chikumbirike, declare that we act as independent specialist consultants. We do not have or will not have any financial interest in the undertaking of the activity other than remuneration for work as stipulated in the terms of reference. We have no interest in secondary or downstream developments as a result of the authorization of this project.

6 March 2023

Executive Summary

At the request of Pulafel 4D Consulting, a Desktop Heritage Impact Assessment was carried out on Portion 32, remaining extent of Portion 59 and Portion 116 of the Farm 703, Hotazel, Kuruman District, Northern Cape Province**,** where Xhariep Plant and Mining (Pty) Ltd has applied for a prospecting right to prospect for Cobalt, Diamond, Gold, Iron, Manganese, Platinum Group Metals and Zinc. It is expected that the proposed prospecting activities could impact on early Proterozoic sedimentary strata which are not considered to be paleontologically sensitive. Given the scope of the proposed activities, the likelihood of palaeontological impact on early Proterozoic carbonate rocks is considered low, especially if prospecting by way of core drilling is considered. However, because of the thick sandy overburden (which are not considered to be palaeontologically significant in this case) and the lack of details regarding the position of the proposed prospecting localities, it is recommended that in the event of impact on fresh carbonate rocks that may result from prospecting, new exposures should require brief monitoring by a palaeontologist. It is considered unlikely that prospecting by way of drilling, trenching and pitting will have a detrimental effect on the Stone Age archaeological component and it is assigned a site rating of Generally Protected C (GP.C). There is a low to moderate chance that trenching and pitting into the sandy overburden especially within the vicinity of natural drainage areas may impact on intact Stone Age archaeological remains and should be avoided where possible, whereas prospecting by way of drilling is considered least likely to have a detrimental effect on potentially capped archaeological heritage resources. In this case, potential prospecting areas that are capped by well-developed wind-blown sand deposits are assigned a site rating of Generally Protected B (GP.B) and will require archaeological monitoring if trenching and pitting activities are to be conducted.

Table 1: Project summary

Item	Description
Proposed development and location	*Proposed Prospecting Right Application and Environmental Authorisation (EA) Application for prospecting activities on Portion 32, Remaining Extent of Portion 59 and Portion 116 of the Farm 703, near Santoy, Northern Cape Province (NC 30/5/1/1/2/13295 PR).*
Purpose of the study	*To carry out a Desktop Palaeontological Impact Assessment to determine the presence/absence of fossil sites and the impact of the proposed project on palaeontological heritage resources within the area demarcated for the prospecting activities.*
1:50 000 Topographic Map	*2622 DA, DB, DC and DD*
Municipalities	*Kuruman District, Northern Cape Province*
Predominant land use of surrounding area	*Agriculture (livestock keeping)*
Developer	*Xhariep Plant and Mining (Pty) Ltd*
Contact Person	*Tanja Jooste*
Contact Details	*Tel: 053 861 1765, Email: joostetanja@gmail.com*
Heritage Consultant	*Pulafel 4D Consulting*
Date of Report	*6 March 2023*

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Introduction

At the request of Pulafel 4D Consulting (Pty) Ltd, a Desktop Heritage Impact Assessment was carried out on Portion 32, remaining extent of Portion 59 and Portion 116 of the Farm 703, Hotazel, Kuruman District, Northern Cape Province. Xhariep Plant and Mining (Pty) Ltd has applied for a Prospecting Right for Cobalt, Diamond, Gold, Iron, Manganese, Platinum Group Metals and Zinc.

The region's unique and non-renewable archaeological and palaeontological heritage sites are 'Generally' protected in terms of the National Heritage Resources Act (Act No 25 of 1999, section 35) and may not be disturbed at all without a permit from the relevant heritage resources authority.

A Palaeontological Impact Assessment was requested for the prospecting right application. To comply with the South African Heritage Resources Agency (SAHRA) in terms of Section 38(8) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA), a desktop Palaeontological Impact Assessment (PIA) was completed for the proposed project and is reported herein.

Table 1: Specialist report requirements in terms of Appendix 6 of the EIA Regulations (amended 2017)

Legislative framework

The primary legal trigger for identifying when heritage specialist involvement is required in the Environmental Impact Assessment process is the National Heritage Resources (NHR) Act (Act No 25 of 1999). The NHR Act requires that all heritage resources, that is, all places or objects of aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance are protected. Thus any assessment should make provision for the protection of all these heritage components, including archaeology, shipwrecks, battlefields, graves, and structures over 60 years of age, living heritage and the collection of oral histories, historical settlements, landscapes, geological sites, palaeontological sites and objects.

The Act identifies what is defined as a heritage resource, the criteria for establishing its significance and lists specific activities for which a heritage specialist study may be required. In this regard, categories of development relevant to this study are listed in

Section 34 (1), Section 35 (4), Section 36 (3) and Section 38 (1) of the NHR Act as follows:

34. (1) No person may alter or demolish any structure or part of a structure which is older than 60 years without a permit issued by the relevant provincial heritage resources authority.

35 (4) No person may, without a permit issued by the responsible heritage resources authority—

- destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or palaeontological site or any meteorite;
- *b)* destroy, damage, excavate, remove from its original position, collect or own any archaeological or palaeontological material or object or any meteorite;

36 36 (3) No person may, without a permit issued by SAHRA or a provincial heritage resources authority—

- (a) destroy, damage, alter, exhume or remove from its original position or otherwise disturb the grave of a victim of conflict, or any burial ground or part thereof which contains such graves;
- (b) destroy, damage, alter, exhume, remove from its original position or otherwise disturb any grave or burial ground older than 60 years which is situated outside a formal cemetery administered by a local authority; or
- (c) bring onto or use at a burial ground or grave referred to in paragraph *(a)* or *(b)* any excavation equipment, or any equipment which assists in the detection or recovery of metals.

38 (1) Subject to the provisions of subsections (7), (8) and (9), any person who intends to undertake a development categorised as—

- The construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;
- The construction of a bridge or similar structure exceeding 50m in length; • Any development or other activity which will change the character of the site

a) exceeding 5000 m^2 in extent; or

b) involving three or more existing erven or subdivisions thereof; or

c) involving three or more subdivisions thereof which have been consolidated within the past five years;

- The rezoning of a site exceeding 10 000 m²; or
- Any other category of development provided for in regulations by the South African Heritage Resources Agency (SAHRA).

A range of contexts can be identified which typically have high or potential cultural significance and which would require some form of heritage specialist involvement (**Table 1**). This may include formally protected heritage sites or unprotected, but potentially significant sites or landscapes (**Table 2**). The involvement of the heritage specialist in such a process is usually necessary when a proposed development may affect a heritage resource, whether it is formally protected or unprotected, known or unknown. In many cases, the nature and degree of heritage significance is largely unknown pending further investigation (e.g. capped sites, assemblages or subsurface fossil remains). On the other hand, it is also possible that a site may contain heritage resources (e.g. structures older than 60 years), with little or no conservation value.

Scope of Work

This is a Desktop Heritage Impact Assessment, including Archaeological, Cultural heritage, and Desktop Palaeontological Assessment to determine the potential of impacts on heritage resources within the study area.

The following are the required to perform the assessment:

• A desk-top investigation of the area;

• Identify possible archaeological, cultural, historic and palaeontological sites within the proposed development area through analysis of known information;

• Evaluate the potential of impacts occurring due to construction and operation of the proposed development on archaeological, cultural, historical resources; built and palaeontological resources; and

• Recommend mitigation measures in terms of detailed studies to determine and ameliorate any negative impacts on areas of archaeological, cultural, historical, built and palaeontological importance.

The purpose of this study is to determine the possible occurrence of sites with cultural heritage significance within the study area. The study is based on archival, and document combined with terrain evaluation. No fieldwork was performed.

Methodology

Archaeological and Palaeonontological significance was evaluated through a desktop study and carried out based on existing field data, database information and published literature.

Terms of reference:

- Identify and map possible heritage sites and occurrences using available resources.
- Determine and assess the potential impacts of the proposed development on potential heritage resources;
- Recommend mitigation measures to minimize potential impacts associated with the proposed development.

The study area is rated according to field rating categories as prescribed by SAHRA (**Table 3**).

Description of the Affected Area

Pulafel 4D Consulting (Pty) Ltd. was commissioned by M & S Consulting to do a desktop Palaeontological Impact Assessment (PIA) for a prospecting rights application on Proposed Prospecting Right Application and Environmental Authorisation (EA) Application for prospecting activities on Portion 32, Remaining Extent of Portion 59 and Portion 116 of the Farm 703, near Santoy, Northern Cape Province (NC 30/5/1/1/2/13295 PR). The project area is marked in Fig 1 below.

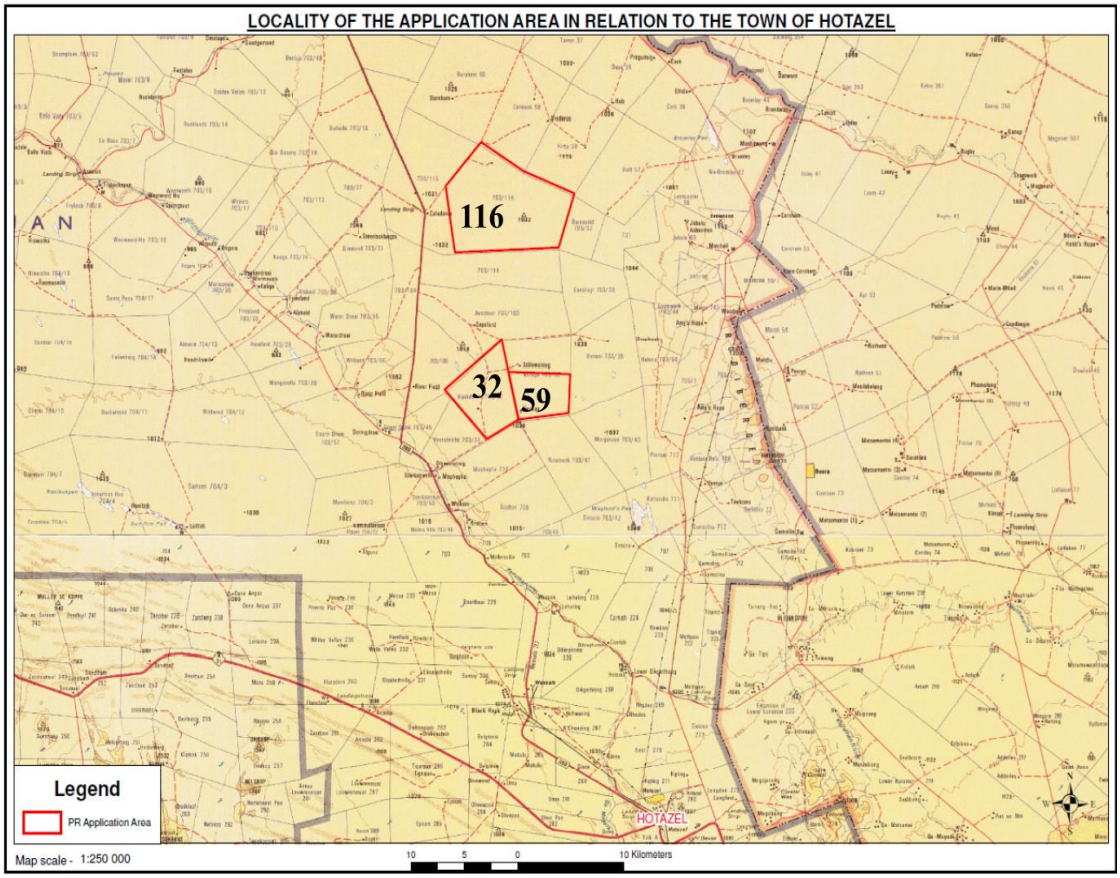

Fig. 1. Map showing the location (red outline) of the study area for the proposed the proposed prospecting right for Cobalt, Diamond, Gold, Iron, Manganese, Platinum Group Metals and Zinc on Portion 32, remaining extent of Portion 59 and Portion 116 of the Farm 703, Hotazel, Kuruman District, Northern Cape Province (Extract from 1: 250 000 topographical map 2622 Morokweng.

Fig.1- 1: 250 000 scale topographic map 2622 Marokweng

Geology

The area of interest is underlain by the following geological formations (**Fig. 2 & Fig. 3**) below.

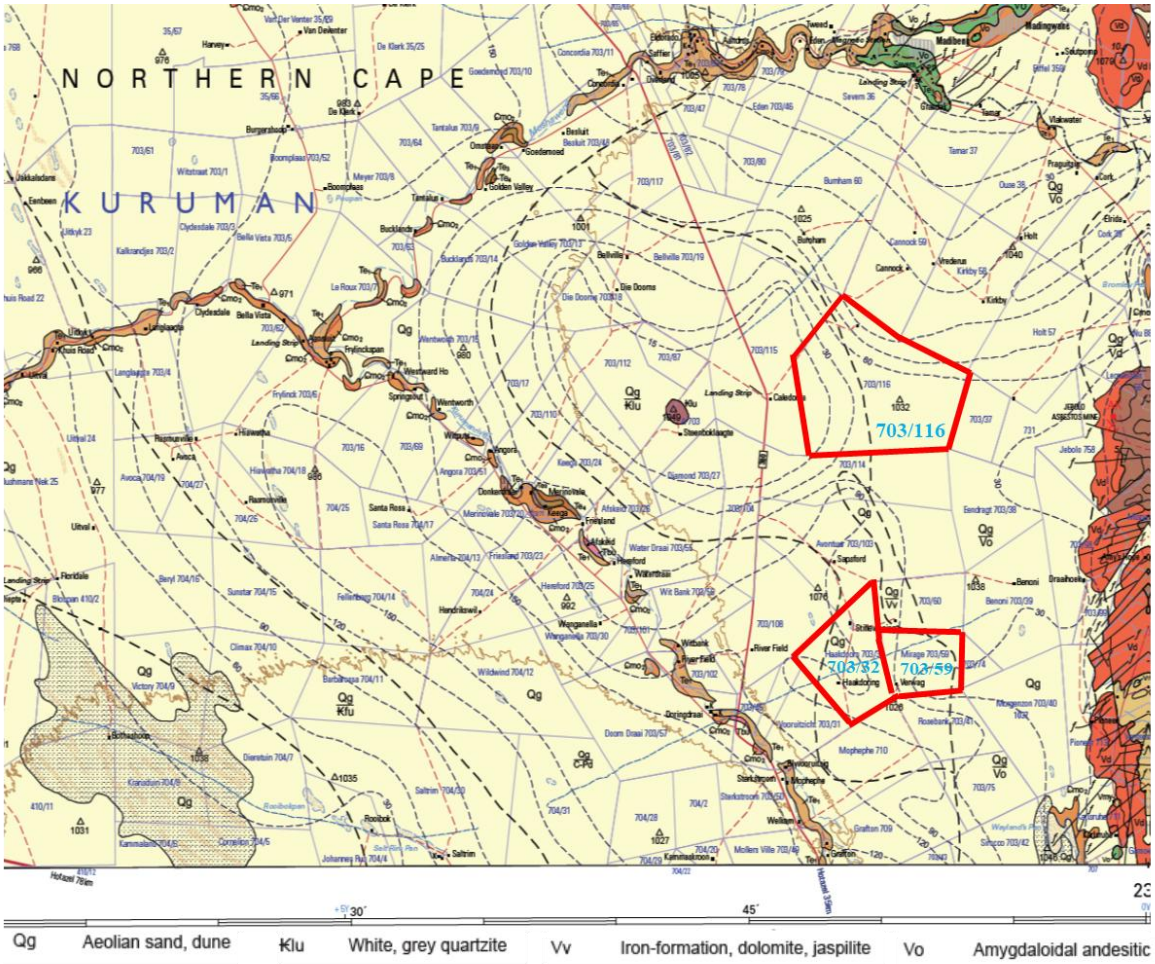

Fig. 2. Extract from 1: 250 000 geological map 2622 Morokweng (Council for Geoscience, Pretoria) showing the approximate location of the study area for the proposed prospecting right for Cobalt, Diamond, Gold, Iron, Manganese, Platinum Group Metals and Zinc on Portion 32, remaining extent of Portion 59 and Portion 116 of the Farm 703, Hotazel, Kuruman District, Northern Cape Province

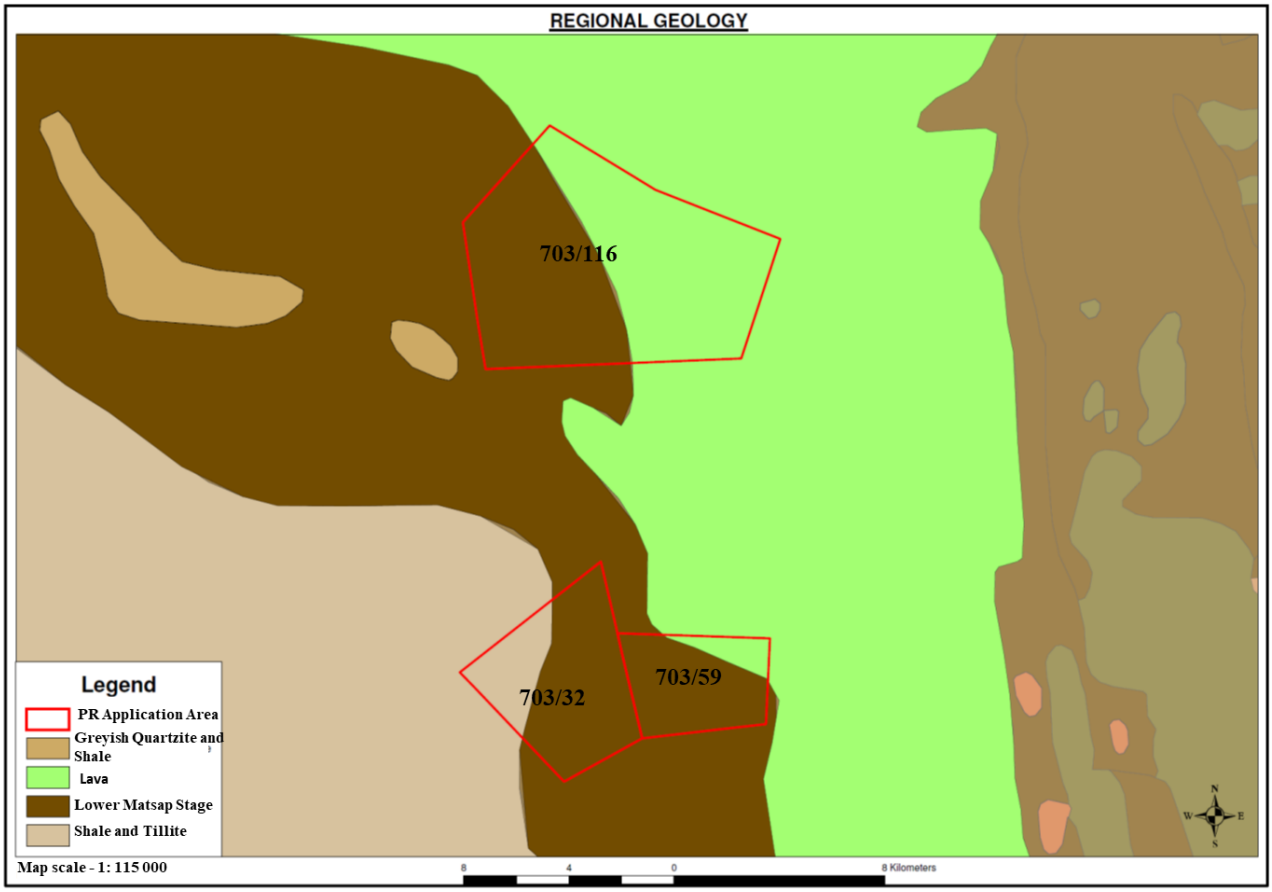

Fig. 3. Summarized schematic map of the study area showing the regional geology. (From the 1:250 000 geological map of Marokweng 2622).

Karoo System:

The Dwyka Series which consists mainly of dark shale and tillite has a wide distribution beneath the Kalahari Beds in the west. The thickness is not known but 610m were penetrated in a borehole on Bristol without reaching the base of the succession. According to gravity measurements the total thickness may be about 660m west of Heuningvlei.

In the eastern area, south-east of Morokweng several outliers occur on the granite. According to borehole data the thickness on Pepani may exceed 300m. The outlier on the banded iron-stone on Woodrow is about 120m thick.

Dolerite sheets are intrusive into Dwyka strata on Moorcroft's Pan, De Dwaal, Uitkyk and Botley.

Transvaal System:

The Tillite Sub-stage of the Daspoort Stage of the Pretoria Series lies unconformably on the jaspilite of the Banded Iron-stone Stage and crops out in the south, between Gamodisa and Pioneer and farther north in the Kgokgole River.

Rocks of this sub-stage have been struck in boreholes as far north as Exeter and are mainly tillite and with subordinate quartzite and conglomerate. The total thickness is about 90m in the south. The quartzite and conglomerate are nowhere more than 24m thick.

Waterberg System:

The only outcrops of the Lower Matsap Stage are on Skimmel Koppies south of Severn and on Lover's Leap on the Molopo River. They consist of white and gray quartzite, reddish shale, interbedded lava bands and a basal conglomerate. The shale, lava and conglomerate are known only from boreholes and lie unconformably on the Daspoort Stage. The Stage was struck beneath shale of the Dwyka Series in boreholes as far north as Lester, north-west of Severn. The upper contact on the map is very approximate.

The Lower Matsap Stage is correlated with the clastic sediments (upper part) of the old Upper Griquatown Stage and those of the Loskop System. Later, in the Annals of the Geological Survey they were included in the Magaliesberg Series.

The Upper Matsap Stage does not crop out and is encountered only in boreholes in the south-eastern part of the area. It consists mainly of brown, purplish, and gray quartzite.

Assumptions and Limitations

The proposed prospecting localities have not been finalized prior to the archaeological field assessment and it is likely that an apparently well-developed aeolian sand overburden may hamper Stone Age archaeological visibility within the study area.

Planned activities

The application is for a prospecting right for Cobalt, Diamond, Gold, Iron, Manganese, Platinum Group Metals and Zinc. It is planned to determine the mineral

resource and distribution for this project by means of non-invasive as well as invasive prospecting methods. The information obtained during the initial non-invasive field survey and evaluation process of the geological maps and data, will then be used to determine the target area and planned positions of the intended invasive prospecting. Invasive prospecting will take place via:

Drilling

Percussion drilling will be applied in the exploration program. Depending on the results from reconnaissance and geological mapping the drill holes will be laid out in a grid fashion to cover prospective ground. The position of the holes will be planned only after field reconnaissance on the property and detailed studying of geological information available on the area is completed. The current road infrastructure on the properties will be utilized as far as possible for gaining access to the drill-hole positions. A significant amount of well traversed roads currently exists on the properties and as a result the disturbance of the surface area will be kept to a minimum.

On completion of each drilled hole, it will be rehabilitated during the closing and rehabilitation of the nearby trench by means of filling the hole with the original excavated material.

Description of the activities to be undertaken:

Xhariep's prospecting activities shall be conducted as follows:

Non-invasive prospecting:

Phase 1: a site investigation of the application area will be undertaken to identify infrastructure and determine any potential problems that may need to be addressed.

Phase 2: In order to direct the exploration programme in an efficient manner, there will be a review of all available information and data. A desktop study will be undertaken of the metal potential of the area. Any anomalous features identified will be mapped in detail. The various rock types and the contacts will also be mapped.

Phases 4, 6 and 8: Drill samples will be collected in one-meter intervals and logging will be done by a qualified Geologist who will record the lithology, mineralogy,

degree of mineralization and structural features. Mineralized samples will be analysed at an internationally recognized (ISO certified) laboratory.

Phase 9: All the drill sampling data will then be modelled to obtain a final interpretation of the portion of the deposit. A detailed feasibility report will be complied after drilling operations have been completed to evaluate the economic viability of the project.

Invasive prospecting:

Phase 3, 5 and 7: Percussion drilling will be used to identify the position of a suspected base metal deposit. The position of the boreholes is dependent on the results of the review of historical activities, geological mapping, desktop study and geophysical survey.

Eighty boreholes, approximately 50m deep each (can be more or less depending on results) are planned. The collar position of all boreholes will be surveyed. All drilling will be short term and undertaken by a contractor using truck-mounted equipment.

Angles percussion holes are planned to locate and intersect the mineralization. A traverse line or grid drilling is used to identify and define the extent of any mineralization. The sizes of the boreholes drilled will be determined by such factors as cost, proposed sampling, availability of drilling machines and the volume of sample required, among others.

Each drill site will be rehabilitated. The boreholes will be filled with drill chips and covered with topsoil.

Closure Objectives:

• The main closure objective of Xhariep's planned prospecting operation is to restore the site to its current land capability in a sustainable matter.

• To prevent the sterilization of any ore reserves.

• To prevent the establishment of any permanent structures of features.

• To manage and limit any impact to the surface and groundwater aquifers in such a way that an acceptable water quality and yield can still be obtained when a closure certificate is issued.

• To establish a stable and self-sustainable vegetation cover.

• To limit and manage the visual impact of the prospecting activities.

• To safeguard the safety and health of humans and animals on the site.

• To close the prospecting operation efficiently, cost effectively and in accordance with Government Policy.

Graves: Places of interment including the contents, headstone, or other marker of and any other structures on or associated with such place. This may include any of the following:

1) Ancestral graves,

2) Royal graves and graves of traditional leaders

3) Graves of victims of conflict i.e., graves of important individuals

4) Historical graves and cemeteries older than 60 years

5) Other human remains, buried or otherwise.

The removal of graves is subject to the following procedures:

- Notification of the impending removals (using local language media and notices at the grave site).

- Consultation with individuals or communities related or known to the deceased;

- Satisfactory arrangements for the curation of human remains and / or headstones in a museum, where applicable;

- Procurement of a permit from the relevant controlling body;

- Appropriate arrangements for the exhumation (preferably by a suitably trained archaeologist) and re-interment (sometimes by a registered undertaker, in a formally proclaimed cemetery);

- Observation of rituals or ceremonies required by the families.

Palaeontology

Impact Statement and Recommendation

It is expected that the proposed prospecting activities could impact on early Proterozoic sedimentary strata (c. 2.2 Ga) that are represented by siliciclastic rocks, volcanic lavas and ironstones which are not considered to be paleontologically sensitive. Given the scope of the proposed activities, the likelihood of palaeontological impact on early Proterozoic carbonate rocks is considered low, especially if prospecting by way of core drilling is considered. However, because of the thick sandy overburden (which is not considered to be palaeontologically significant in this case) and the lack of details regarding the position of the proposed prospecting and campsite localities, it is recommended that in the event of impact on fresh carbonate rocks that may result from trenching and pitting, new exposures should require brief monitoring by a palaeontologist. The superficial aeolian (Kalahari Group) overburden within the study area is not considered to be, palaeontologically significant.

Archaeology

Archaeological and historical evidence suggest that the most southerly distribution of Late Iron Age Tswana settlements in the region during the 18th century AD ranged between the Langeberge and what is known today as Witsand (Humphreys 1976). The farm Nokanna, situated about 35 km north of Witsand, equates with the former BaTlaping capital of Nokaneng, the place where Chief Mothibi was born around 1775 (Maingard 1933).

Stone age

This area is home to all three of the known phases of the Stone Age, namely: The Early- (2.5 million – 250 000 years ago), Middle- (250 000 – 22 000 years ago) and Late Stone Age (22 000 – 200 years ago).

The Late Stone Age in this area also contains sites with rock art from the San and Khoi San cultural groups.

Early to Middle Stone Age sites are less common in this area, however rock-art sites and Late Stone Age sites are much better known (Clark 1959).

During the Middle Stone Age, 200 000 years ago, modern man or Homo sapiens emerged, manufacturing a wider range of tools, with technologies more advanced than those from earlier periods (Deacon 1984). This enabled skilled hunter-gatherer bands to adapt to different environments. From this time onwards, rock shelters and caves were used for occupation and reoccupation over very long periods of time.

The Late Stone Age, considered to have started some 20 000 years ago, is associated with the predecessors of the San and Khoi Khoi. Stone Age hunter-gatherers lived well into the 19th century in some places in SA. Stone Age sites may occur all over the area where an unknown number may have been obliterated by mining activities, urbanisation, industrialisation, agriculture and other development activities during the past decades. Specifically, The Wonderwerk Cave in the Kururman hills has provided much Stone Age information (Beaumont 1984, 2006).

Specularite mining is noted by Beaumont and Bashier (1974) at Doornfontein and Blinkklipkop between 800AD – 820AD.

A limited number of Rock-Art sites are located in this area, mostly due to the lack of suitable shelter sites.

Iron age

Although there is documentary evidence of the large Iron Age Tswana village, Dithakong, located in the general area of the site the occurrence of this is still hotly contested and the findings of Cobbing have been largely discredited (Cobbing 1988,

SAHRA ARC pers. comm). More recent research by Jacobs shows occupational Tswana sites to occur during the later "Bantu Expansion" and "Proto-Difiqane between c1750 and 1830 in the study area. Specifically, the Tlhaping and Tlharo chiefdoms are referred to here. It is even suggested that some Sotho-Tswana people might have preceded the Tlhaping and Tlharo in this region. This is however not a recent postulation since Ellenberger and MacGregor already proposed earlier Iron Age communities in these areas as early as 1912 (Ellenberger & MacGregor, 1912).

Tswana Industry groups might have continued the specularite mining noted in the Stone Age during the Iron Age in this area from 1600 on. According to Breutz (1963) Iron Age settlements could be found as far south as Gatlhose and Majeng, which are both within 25km of the study area. Such sites have also been identified at Danielskuil (Snyman, 1986). These groups were eventually driven from the area by the Kora (Snyman, 1986).

Impact Statement and Recommendation

The rocky areas show an overall paucity of stone tools. It is considered unlikely that prospecting by way of drilling will have a detrimental effect on this component, and it is assigned a site rating of Generally Protected C (GP.C). Furthermore, the extent and position of the prospecting localities within the study is not pinned down yet, so it is difficult to assess potential negative impact, if any, with regards to the occurrence of subsurface remains, especially since Stone Age archaeological visibility is hampered by the aeolian sand overburden that covers large parts of the valleys between the rocky outcrops within the study area. There is a L**ow to Moderate** chance that prospecting into the sandy overburden especially within the vicinity of natural drainage areas may impact on intact Stone Age archaeological remains and should be avoided where possible, whereas prospecting by way of drilling is considered least likely to have a detrimental effect on potentially capped archaeological heritage resources. In this case, potential prospecting areas that are capped by well-developed wind-blown sand deposits are assigned a site rating of Generally Protected B (GP. B) and will require archaeological monitoring if trenching and pitting activities are to be conducted.

Conclusions and Recommendations

The study area was found to be basically devoid of any documented heritage sites. There is a strong likelihood that sites associated with the Stone Age could be found in this area. Mountainous areas could be home to rock art and Stone Age shelters.

The palaeontological significance of the site is moderate and a stand-alone Desktop Palaeontological Impact Assessment (PIA) will be submitted in conjunction with the Desktop Heritage Impact Assessment (HIA).

Due to the small footprint of the proposed prospecting activities, it is not anticipated that this will have any **Significant Impact on heritage resources**.

Taking into consideration the findings this desktop study it is recommended that the plots identified for the prospect drilling be **Cleared** for the proposed prospecting activities. It is further recommended that the Chance Finds Protocol found in this report be incorporated in the Mining Development Management Plan and that it be made available to the site agent or Environmental Control Officer.

Chance Finds Protocol

It is important to note that, although unlikely, sub-surface remains of heritage sites could still be encountered during construction of the project. The following indicators of unmarked sub-surface sites could be encountered:

• Ash deposits (unnaturally grey appearance of soil compared to the surrounding substrate);

• Bone concentrations, either animal or human;

• Ceramic fragments such as pottery shards either historic or pre-contact;

• Stone concentrations of any formal nature.

The following recommendations are given should any sub-surface remains of heritage sites be identified as indicated above:

• All operators of excavation equipment should be made aware of the possibility of the occurrence of sub-surface heritage features and the following procedures should they be encountered.

• All construction in the immediate vicinity (50m radius of the site) should cease.

• The heritage practitioner should be informed as soon as possible.

• In the event of obvious human remains, all activities at the finds must be seized and the South African Police Services (SAPS) should be notified.

• Mitigation measures (such as refilling etc.) should not be attempted.

• The area in a 50m radius of the find should be cordoned off with hazard tape.

• Public access should be limited.

• The area should be placed under guard.

• No media statements should be released until such time as the heritage practitioner has had enough time to analyze the finds.

Palaeontological Sites:

• A site visit by a professional palaeontologist be commissioned by the developer well before the commencement of the invasive phases of the prospecting programme.

• The resulting palaeontological heritage assessment report should make recommendations for any mitigation or monitoring measures to be followed during siting, drilling and rehabilitation of the boreholes as well as for conservation of sedimentary borehole core material for future palaeontological analysis.

• Chance Fossil Finds Procedure as outlined in the Specialist Report should be followed:

- Safeguarding of fossils.

- Reporting of all significant finds to SAHRA.

- Judicious sampling and recording of fossil material and associated geological data by a qualified palaeontologist.

- Any fossil material collected should be curated within an approved repository (museum / university fossil collection).

The above mitigatory measures are tried and tested over many years in the prospecting / mining industry.

Xhariep will monitor the potential impacts throughout the life of operation, and mitigate any deviations detected. This has been proven to be very effective in existing operations.

Extensive research into the SAHRIS database resulted in the observation that the area around Hotazel has been subject to extensive heritage investigations in the recent past. Only studies within a radius of 50km from the study area were considered. The following studies were picked up from the SAHRIS database:

• Rossouw, L. 2012. Phase 1 Archaeological Impact Assessment of three proposed borrow pits along the R31 between Kuruman and Hotazel.

• De Kock, S. 2019. Integrated Heritage Impact Assessment – Proposed Hotazel Solar and Grid Connection on Remaining Extent (Portion 0) of the Farm York A 279, Remainder of Far, Hotazel 280 and Portion 11 of Farm York A 279. District of Hotazel, Northern Cape Province.

• Pelser, A. 2012. A report on a Heritage Impact Assessment (AIA) for the Proposed photo-voltaic solar power generation plan on the Farm Adams 328 near Hotazel in the Northern Cape.

• Fourie, W., van der Walt, J. 2005. Hotazel Manganese Mines: Wessels Mine on Section of the Farms Wessels 227, Dibiaghomo 226 and Dikgathlong 268. Mamatwan Mine on Section of the Farms Goold 329 and Mamatwan 331, Heritage Assessment.

• Pistorius, J.C.C. 2008. A Phase 1 heritage impact assessment (HIA) study for a proposed new powerline for the United Manganese of Kalahari (UMK) mine near Hotazel in the Northern Cape Province.

• Kaplan, J. 2010. Archaeological Impact Assessment for the proposed 132 kV UMK loop-in powerline near Hotazel, Northern Cape.

• Webley, L. 2018. Archaeological Impact Assessment: Proposed construction of the Hotazel Solar Facility (100 mw) on Remainder Farm York A 279 and 132 kV grid connection on Remainder of Farm Hotazel 280 and Portion 11 of Farm York A 279, John Taolo Gaetsewe District Municipality, Northern Cape.

• Groenewald, G. 2011. PIA. Farms York 279, Devon 277 and Telele 312, near Hotazel town in the John Taolo Gaetsewe District Municipality in the Northern Cape Province.

• Almond, J., Orton, J. 2016. Scoping Heritage Impact Assessment for the Proposed Hotazel Solar Farm, Kuruman Magisterial District, Northern Cape.

• Almond, J.E. 2019. Palaeontological heritage: combined desktop and field-based assessment: Proposed Upgrading of the 66kV network between Hotazel and Kathu, Northern Cape.

• Butler, E. 2019. Palaeontological Desktop Assessment for the Proposed Updated Environmental Management Programme (EMPr) for the Assmang (Pty) Ltd. Black Rock Mining Operations, Hotazel, Northern Cape.

• Butler, E. 2019. Palaeontological Desktop Assessment for the Proposed new Railway Bridge and Railway Line between Hotazel and the Gloria Mine, Northern Cape Province.

• Butler, E. 2020. Palaeontological Desktop Assessment for the Proposed Nchwaning Rail Balloon turn outs at Black Rock Mine Operations near Hotazel, Northern Cape Province.

• Kruger, N. 2019. Archaeological Impact Assessment (AIA) on various portions of the Farm Rhodes 269, the Remainder and Portion 2 of the Farm East 270, the Farm Kipling 271, the Remainder of the Farm Hotazel 280, the Farm Umtu 281 and the Remainder of the Farm Olive Pan 282 for the Proposed Double Circuit 132kV Powerline for the Rhodes 1, Rhodes 2, East 3 and East PV Plants to the Umtu Substation near Hotazel, Joe Morolong Local Municipality, John Taolo Gaetsewe District Municipality, Northern Cape Province.

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The following guidelines could be extracted from these investigations;

- There is a likelihood of encountering Stone Age deposits especially from the Middle – to Late Stone Age epoch.

- Rock art sites could be encountered in areas with sufficient exposed rock formations

- Specularite mining was common in the area at the turn of the century.

- Burials were often encountered close to pre- and post-contact occupational areas.

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Tables and Figures

Table 1: Relationship between different heritage contexts, heritage resources likely to occur within these contexts, and likely sources of heritage impacts in the central interior of South Africa.

Heritage Context	Heritage Resources	Impact
Palaeontology	Precambrian shallow marine and lacustrine stromatolites, organic-walled microfossils, Ghaap Plateau (Transvaal Supergroup) Palaeozoic and Mesozoic fossil remains, e.g. Karoo Supergroup Neogene regolith	Road cuttings Quarry excavation Bridge and pipeline construction (Quaternary alluvial deposits)
Archaeology Early Stone Age Middle Stone Age LSA - Herder Historical	Types of sites that could occur in the Free State include Localized Stone Age sites containing lithic artifacts, animal and human remains found near *inter alia* the following: River courses/springs Stone tool making sites Cave sites and rock shelters Freshwater shell middens Ancient, kraals and stonewalled complexes Abandoned areas of past human settlement Burials over 100 years old Historical middens Structural remains Objects including industrial machinery and aircraft	Subsurface excavations including ground levelling, landscaping, foundation preparation, road building, bridge building, pipeline construction, construction of electrical infrastructure and alternative energy facilities, township development.
History	Historical townscapes, e.g., Kimberley Historical structures, i.e., older than 60 years Historical burial sites Places associated with social identity/displacement, e.g., Witsieshoek Cave, Oppermansgronde Historical mission settlements, e.g., Bethulie, Beersheba, Moffat Mission	Demolition or alteration work. New development.
Natural Landscapes	Formally proclaimed nature reserves Evidence of pre-colonial occupation Scenic resources, e.g. view corridors, viewing sites, Historical structures/settlements older than 60 years Geological sites of cultural significance.	Demolition or alteration work. New development.
Relic Landscape Context	Battle and military sites, e.g., Magersfontein Precolonial settlement and burial sites Historical graves (marked or unmarked, known or unknown) Human remains (older than 100 years) Associated burial goods (older than 100 years) Burial architecture (older than 60 years)	Demolition or alteration work. New development.

Table 2. Examples of heritage resources located in the central interior of South Africa.

Historically, archaeologically, and palaeontologically significant heritage sites & landscapes	**Examples**
Landscapes with unique geological or palaeontological history	Karoo Basin Beaufort Group sedimentary strata Glacial striations on Ventersdorp andesites Vredefort Dome World Heritage Site. Taung World Heritage Site
Landscapes characterised by certain geomorphological attributes where a range of archaeological and palaeontological sites could be located.	Vaal, Modder and Riet River valleys Pans, pandunes and natural springs of the Free State panveld. Ghaap Plateau
Relic landscapes with evidence of past, now discontinued human activities	Wonderwerk Cave Stone Age deposits Cave sites and rock shelters in the Maluti Drakensberg region (rock art) Southern Highveld pre-colonial settlement complexes. Dithakong settlement complexes Rock engravings on Ventersdorp andesites
Landscapes containing concentrations of historical structures.	Concentration camps & cemeteries from the South African War.
Historical towns, historically significant farmsteads, settlements & routes	Batho historical township area in Mangaung (Bloemfontein). Kimberley
Battlefield Sites, burial grounds and grave sites older than 60 years.	Sannaspos Magersfontein

Table 3. Field rating categories as prescribed by SAHRA.

Field Rating	**Grade**	**Significance**	**Mitigation**
National Significance (NS)	Grade 1	-	Conservation; national site nomination
Provincial Significance (PS)	Grade 2	-	Conservation; provincial site nomination
Local Significance (LS)	Grade 3A	High significance	Conservation: mitigation not advised
Local Significance (LS)	Grade 3B	High significance	Mitigation (part of site should be retained)
Generally Protected A (GP. A)	-	High/medium significance	Mitigation before destruction
Generally Protected B (GP. B)	-	Medium significance	Recording before destruction
Generally Protected C (GP.C)	-	Low significance	Destruction

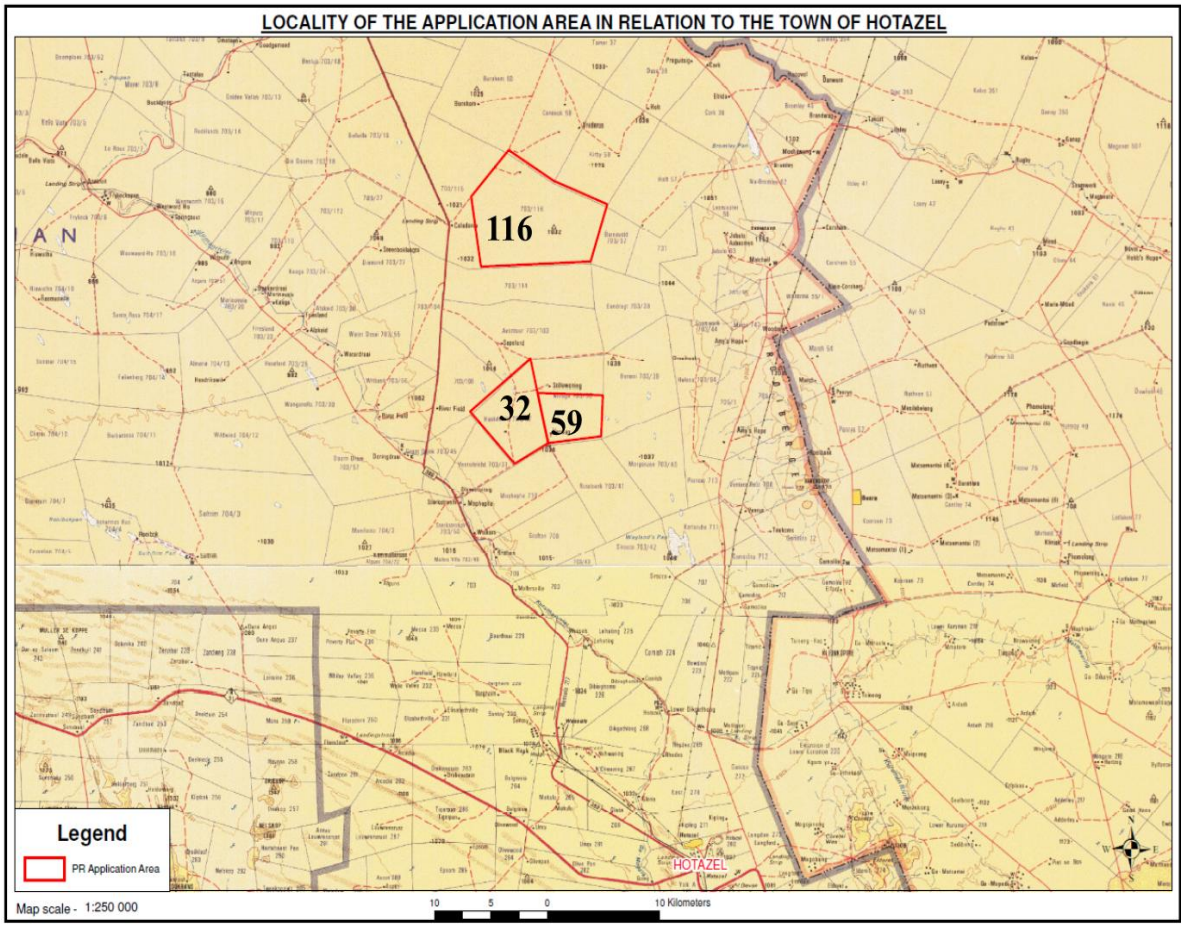

Fig. 1. Map showing the location (red outline) of the study area for the proposed the proposed prospecting right for Cobalt, Diamond, Gold, Iron, Manganese, Platinum Group Metals and Zinc on Portion 32, remaining extent of Portion 59 and Portion 116 of the Farm 703, Hotazel, Kuruman District, Northern Cape Province (Extract from 1: 250 000 topographical map 2622 Morokweng.