

HERITAGE DESKTOP REPORT

LENGANA HEALTH SA PROSPECTING APPLICATION, KOPPIES, FREE STATE PROVINCE.

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EXECUTIVE SUMMARY

Site name and location: The proposed Lengana Health Lithium Ore prospecting right/s application in respect of the farms Felix 318, Goedgunst 315, Kronenbloem 51, Ventersbloem 163, Oceaan 64, Oceaan 99, Broodkop 304, Enkelsbosch 31, Hooge Bult 542, Geluk 237, Verdeel 278, Goudlaagte 238, Ongegund 507. The properties are situated in the District Municipality of Ngwathe, Koppies in the Free State Province.

1: 50 000 Topographic Map: 2727 BA.

EIA Consultant: Greenmined Environmental

Developer: Lengana Health SA (Pty) Ltd

Heritage Consultant: Heritage Contracts and Archaeological Consulting CC (HCAC).

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Date of Report: 15 November 2019

Findings of the Assessment:

The scope of work comprises a heritage desktop report for a large prospecting right area of approximately 2195 ha. The proposed prospecting will consist of core drilling. The impact areas are relatively small in relation to the prospecting right area as each exploration site will disturb a minimum area of 40 m² in total and 5m² affected per individual borehole. At present about 8 boreholes will be drilled and is assessed in at desktop level in this report as the landowners denied access to the properties.

The archaeology of the larger region is well described and the importance of the Vaal Gravels are well known (Riet Lowe 1937, 1952; Butzer et al. 1973; Helgren 1978; Gibbon, *et al.* 2009). Similarly, the Iron Age signature of the Free State is well documented (Maggs 1976). Potential impacts for the study area are assessed against the available literature as well as aerial imagery and historical topographic maps.

The key findings include the following:

- Structures of unknown age occur within the prospecting right area. No structures are in close proximity to the proposed boreholes. No impact on the Built Environment is expected.
- Based on Lithology maps of the area no raw material suitable for the manufacturing of lithics occur in the prospecting area and no Stone Age sites of significance is expected.
- Iron Age settlements in the Free State is marked by extensive stone walled settlements easily visible on aerial imagery. No visible stone walled settlements occur on aerial images consulted.
- Based on the SAHRA paleontological sensitivity map the area is of moderate sensitivity and an independent paleontological assessment was conducted (Millstead 2019). This study concluded that no damage mitigation protocols are required to be enacted for this prospecting phase of the project.
- No known graves occur in the study area. It should be noted that graves can occur anywhere on the landscape and informal graves can expected in the study area.

It is anticipated that any sites that occur within the project area will have a Generally Protected B (GP.B) or lower field rating and all sites should be mitigatable and no red flags have been identified. It is therefore recommended that non-invasive exploration can commence (based on approval from SAHRA) with the following conditions of authorisation incorporated:

- Existing roads must be used for all activities as far as possible.
- Proposed drill points must be assessed for the presence of graves and to confirm the expectations of the desktop report of no archaeological significance.
- Inclusion of a chance find protocol in the EMPr.

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ABBREVIATIONS

AIA: Archaeological Impact Assessment
ASAPA: Association of South African Professional Archaeologists
BIA: Basic Impact Assessment
CRM: Cultural Resource Management
EAP: Environmental Assessment Practitioner
ECO: Environmental Control Officer
EIA: Environmental Impact Assessment*
EIA: Early Iron Age*
EMP: Environmental Management Plan
ESA: Early Stone Age
GPS: Global Positioning System
HIA: Heritage Impact Assessment
LIA: Late Iron Age
LSA: Late Stone Age
MEC: Member of the Executive Council
MIA: Middle Iron Age
MPRDA: Mineral and Petroleum Resources Development Act
MSA: Middle Stone Age
NEMA: National Environmental Management Act
PRHA: Provincial Heritage Resource Agency
SADC: Southern African Development Community
SAHRA: South African Heritage Resources Agency
SAHRIS: South African Heritage Resources Information System

**Although EIA refers to both Environmental Impact Assessment and the Early Iron Age both are internationally accepted abbreviations and must be read and interpreted in the context it is used.*

GLOSSARY

Archaeological site (remains of human activity over 100 years old)

Early Stone Age (2 million to 300 000 years ago)

Middle Stone Age (300 000 to 30 000 years ago)

Late Stone Age (30 000 years ago until recent)

Historic (approximately AD 1840 to 1950)

Historic building (over 60 years old)

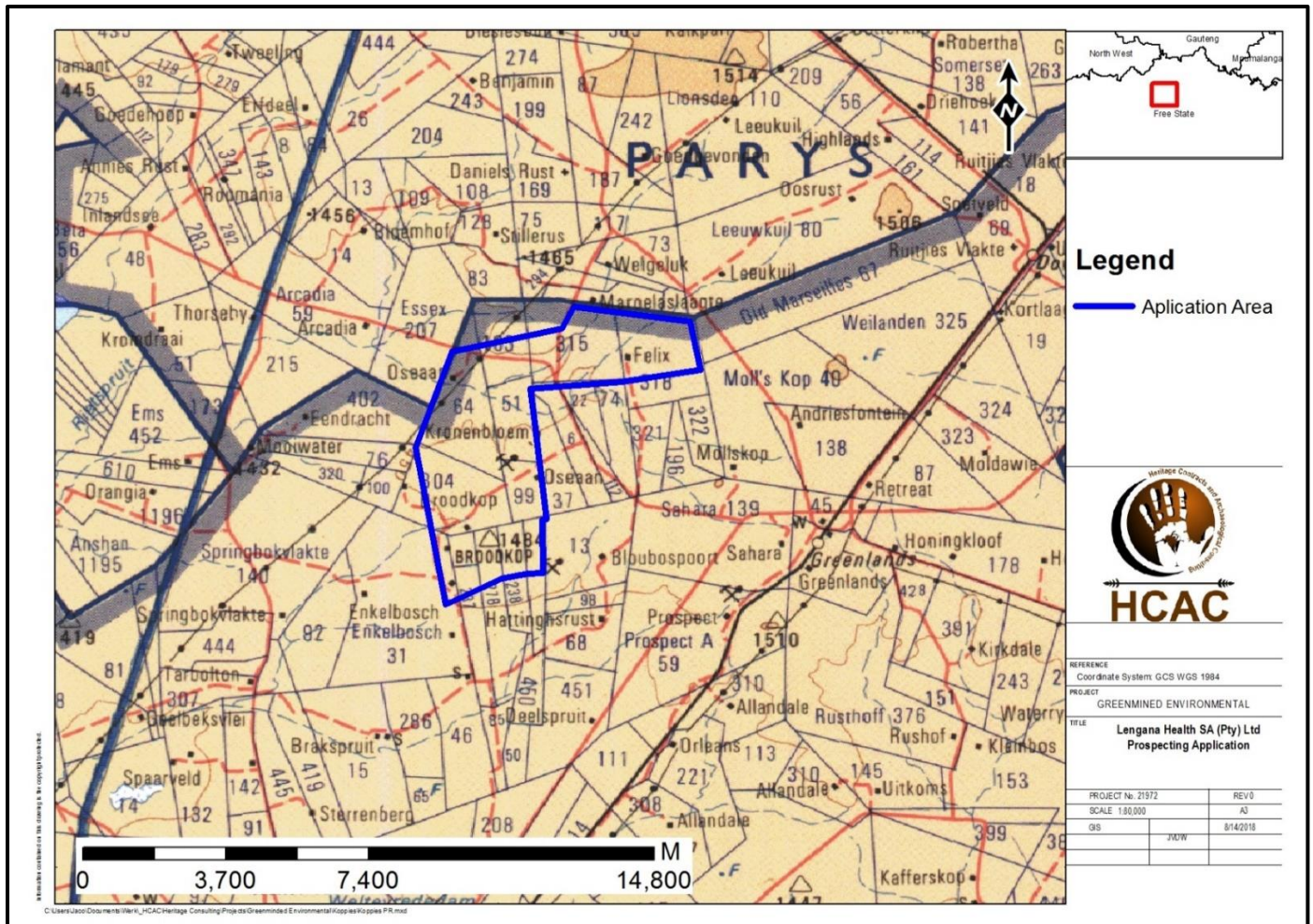
Lithics: Stone Age artefacts

1. INTRODUCTION

HCAC was contracted by Greenmined Environmental to conduct a heritage desktop study for the proposed Lengana Health-prospecting application. The proposed prospecting activities are located on Felix 318, Goedgunst 315, Kronenbloem 51, Ventersbloem 163, Oceaan 64, Oceaan 99, Broodkop 304, Enkelsbosch 31, Hooge Bult 542, Geluk 237, Verdeel 278, Goudlaagte 238, Ongegund 507. Access to the area is from the N1 National road turning east into the R723 in about 7km. The project area can be accessed from Sasolburg, Koppies or Parys (Figure 1 -3).

The aim of the desktop report is to conduct a desktop study to identify possible heritage resources within the project site. The study furthermore aims to assess the impact of the proposed project on non-renewable heritage resources and to submit appropriate recommendations with regards to the responsible cultural resources management measures that might be required to assist the developer in managing the discovered heritage resources in a responsible manner, in order to protect, preserve and develop them within the framework provided by Heritage legislation.

This report outlines the approach and methodology utilised for the desktop report. The report includes information collected from various sources and consultations. Possible impacts are identified and mitigation measures are proposed in the following report. It is important to note that no field work was conducted, as this will be done when the localities of the invasive exploration is fixed.



.Figure 1. Regional Locality map of the application area in blue.

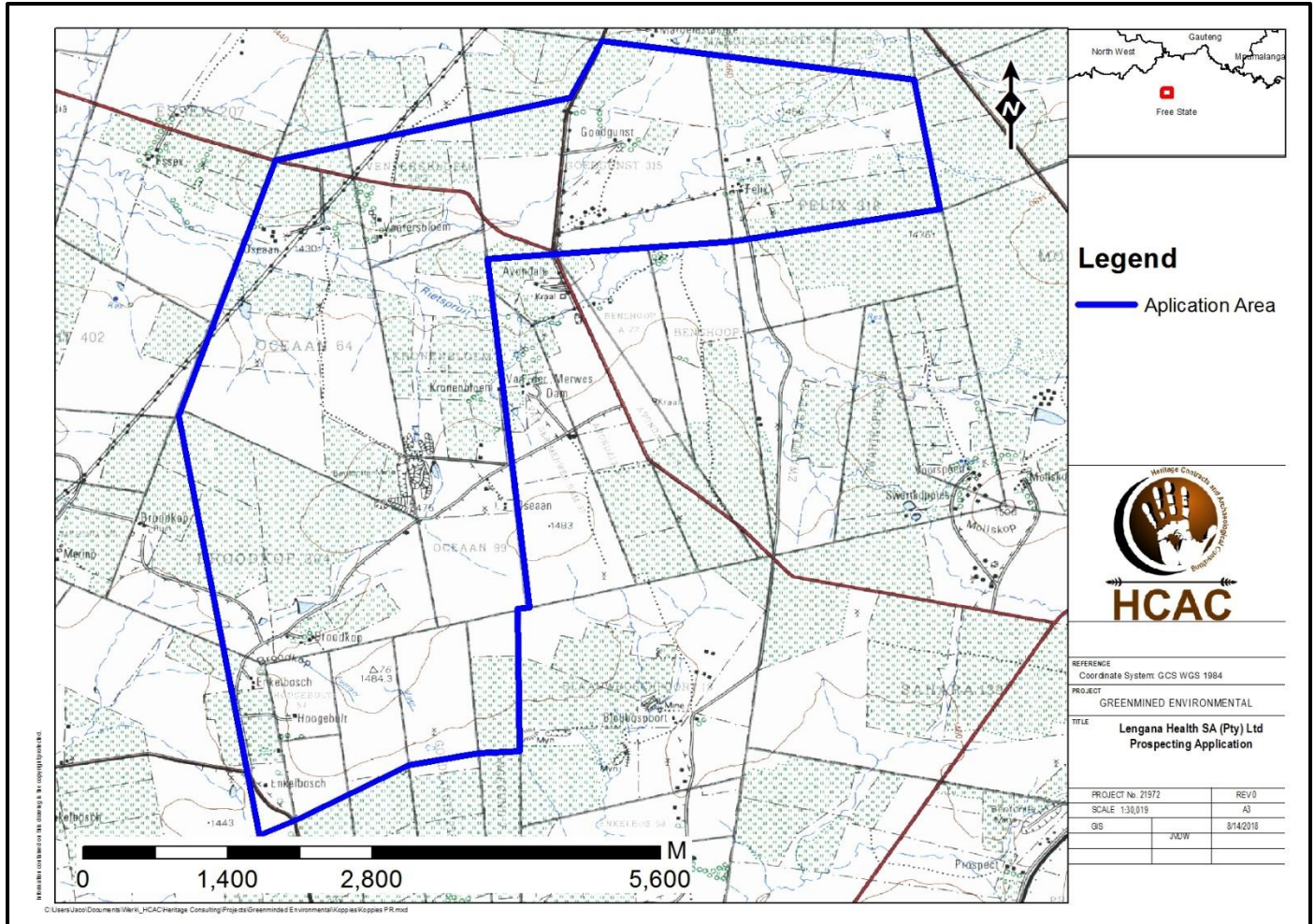


Figure 2. 1:50 000 Topographical map indicating the prospecting right boundary.

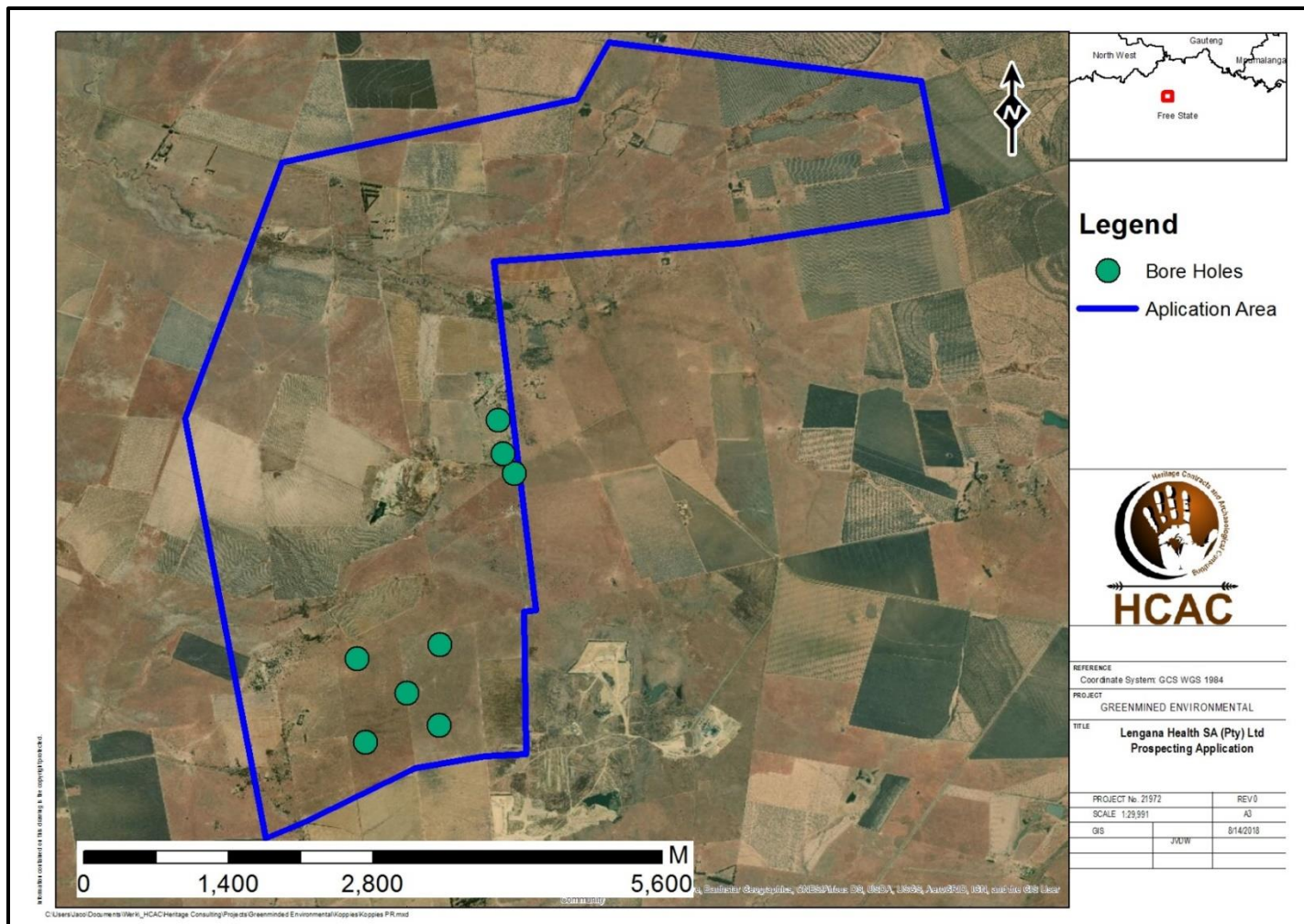


Figure 3. Aerial View of the study area showing the location of the proposed bore holes.

1.1 Terms of Reference

The main aim of this desktop report is to determine if any known heritage resources occur within the project site. The objectives of the desktop report were to:

- » Conduct a desktop study:
 - * Review available literature, previous heritage studies and other relevant information sources to obtain a thorough understanding of the archaeological and cultural heritage conditions of the area;
 - * Identify known and recorded archaeological and cultural sites; and
 - * Determine whether the area is renowned for any cultural and heritage resources, such as Stone Age sites, informal graveyards or historical homesteads.
- » Compile a specialist Heritage Desktop Report in line with the requirements of the EIA Regulations, 2014, as amended on 07 April 2017.

The reporting is based on the results and findings of a desktop study, wherein potential issues associated with the proposed project will be identified. Reporting will aim to identify the anticipated impacts of the proposed prospecting project.

Prior to invasive prospecting activities the following terms will apply:

Field study

Conduct a field study to: (a) locate, identify, record, photograph and describe sites of archaeological, historical or cultural interest; b) record GPS points of sites/areas identified as significant areas; c) determine the levels of significance of the various types of heritage resources affected by the proposed development

Reporting

Report on the identification of anticipated impacts the proposed prospecting activities. Ensure that all studies and results comply with the relevant legislation, SAHRA minimum standards and the code of ethics and guidelines of ASAPA.

The report will aim to assist the developer in managing heritage resources in a responsible manner, and to protect, preserve, and develop them within the framework provided by the National Heritage Resources Act of 1999 (Act No 25 of 1999).

1.2 Nature of the development

The proposed project will include prospecting and drilling programs which triggers a listed activity in terms of the Environmental Impact Assessment (EIA) Regulations, Listing Notice- Environmental Impact Assessment Regulations Listing Notice 2 of 2014, 08 December 2014 promulgated under the National Environmental Management Act (NEMA) (Act no 107 of 1998).

This will involve backfill and re-vegetation of all affected areas following the correct legislation. Closing of all holes created as a result of drilling will be backfilled and closed off, returned into their natural state as closely as possible.

The proposed activities onsite will include:

Non-invasive prospecting which will consist of:

Geophysical survey (thermal raster surveys) and surface sampling techniques will be used as well as geological mapping. Data will be extracted and plotted into geological maps. Areas of invasive prospecting will be identified for resource determination.

Invasive Prospecting:

Core drilling will then be targeted for areas identified through non-invasive techniques described above for reserve determination and mine planning. Each exploration site will disturb a minimum area of 40 m² in total and 5m² affected per individual borehole; however, the number of boreholes required can only be finalized once the non-invasive prospecting as details above is completed. At present about 8 boreholes will be drilled.

After drilling, the core will be sampled and assessed by the on-site geologists and cores logs will be maintained. As the area of prospecting is large and have an undulating topography, depth of the drilling will differ depending on the area. Drilling is expected to reach around 40m deep.

Existing farm roads and tracks will be utilized as far as possible. The drilling crew and Lengana Health staff will bring their own water on to site which will be mostly for consumption and domestic use. No water from the farms will be used or required.

1.3. The receiving environment

According to the BID provided *“the area is flat, slopping very gently. The area is part of the slightly undulating plains category of the terrain morphological class. The proposed area falls within the Ngwathe Municipality District, in the Free State Province, Koppies. The environment is mostly made up of farm land and grazing land with short grass. The project area is comprised mainly by the komatiitic basalts intruded by the spodumene-bearing pegmatites. Pegmatites are occurring as lensoidal bodies with a general NW-SE trending strike. The contact zone between the basalts and pegmatite is characterized by a narrow pegmatitic granite zone ranging from a few millimeters to 3m. This particular project area lies within the Greenland’s Greenstone Complex, which is principally comprised of meta-volcanic rocks, tholeiitic to komatiitic basalts. The Greenland’s Greenstone Complex is located in the south-eastern quadrant of the Vredefort Dome. To the east and southeast of this greenstone remnant are three isolated exposures of ferruginous shales and orthoquartzites of the Orange Grove Formation of the Lower Witwatersrand Super group1”* (BID Lengana Health 2019).

2. APPROACH AND METHODOLOGY

This desktop report was conducted as part of the first phase of the prospecting activities (non-invasive activities). The aim of the study is to cover available data regarding archaeological and cultural heritage to compile a background history of the study area in order to identify possible heritage issues or fatal flaws that could possibly be associated with the project and should be avoided during development.

This was accomplished by means of the following phases (the results are represented in section 4 of this report):

2.1 Literature review

A review was conducted from a range of sources on the archaeology and history of the area. The aim of this is to extract data and information on the area in question, looking at archaeological sites, historical sites and graves of the area.

2.2 Information collection

The South African Heritage Resources Information System (SAHRIS) was consulted to further collect data from CRM practitioners who undertook work in the area to provide the most comprehensive account of the history of the area where possible.

2.3 Public consultation

No public consultation was conducted during this phase by the author.

2.4 Google Earth and mapping survey

Google Earth and 1:50 000 maps of the area were utilised to identify possible places where archaeological sites might be located.

2.5 Genealogical Society of South Africa

The database of the genealogical society was consulted to collect data on any known graves in the area.

2.6. Restrictions

This study did not assess the impact on intangible resources of the project. Based on available data and resources as outlined in the report additional information that becomes available at a later stage might change the outcome of assessment. No field work was conducted.

3. LEGISLATION

For this project, the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA) is of importance and the following sites and features are protected:

- a. Archaeological artefacts, structures and sites older than 100 years;
- b. Ethnographic art objects (e.g. prehistoric rock art) and ethnography;
- c. Objects of decorative and visual arts;
- d. Military objects, structures and sites older than 75 years;
- e. Historical objects, structures and sites older than 60 years;
- f. Proclaimed heritage sites;
- g. Grave yards and graves older than 60 years;
- h. Meteorites and fossils; and
- i. Objects, structures and sites of scientific or technological value.

The national estate includes the following:

- a. Places, buildings, structures and equipment of cultural significance;
- b. Places to which oral traditions are attached or which are associated with living heritage;
- c. Historical settlements and townscapes;
- d. Landscapes and features of cultural significance;
- e. Geological sites of scientific or cultural importance;
- f. Archaeological and palaeontological importance;
- g. Graves and burial grounds;
- h. Sites of significance relating to the history of slavery; and
- i. Movable objects (e.g. archaeological, palaeontological, meteorites, geological specimens, military, ethnographic, books etc.).

Section 34 (1) of the Act deals with structures that are older than 60 years. Section 35(4) of this Act deals with archaeology, palaeontology and meteorites. Section 36(3) of the Act, deals with human remains older than 60 years. Unidentified/unknown graves are also handled as older than 60 years until proven otherwise.

3.1 Heritage Site Significance and Mitigation Measures

The presence and distribution of heritage resources define a Heritage Landscape. In this landscape, every site is relevant. In addition, because heritage resources are non-renewable, heritage surveys need to investigate an entire project area. In all initial investigations, however, the specialists are responsible only for the identification of resources visible on the surface.

This section describes the evaluation criteria used for determining the significance of archaeological and heritage sites. National and Provincial Monuments are recognised for conservation purposes. The following interrelated criteria were used to establish site significance:

- » The unique nature of a site;
- » The integrity of the archaeological/cultural heritage deposit;
- » The wider historic, archaeological and geographic context of the site;
- » The location of the site in relation to other similar sites or features;
- » The depth of the archaeological deposit (when it can be determined or is known);
- » The preservation condition of the site; and
- » Potential to answer present research questions.

The criteria above will be used to place identified sites within the South African Heritage Resources Agency's (SAHRA's) (2006) system of grading of places and objects that form part of the national estate. This system is approved by the Association of South African Professional Archaeologists (ASAPA) for the Southern African Development Community (SADC) region.

FIELD RATING	GRADE	SIGNIFICANCE	RECOMMENDED 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

4. REGIONAL OVERVIEW

4.1 General Information

4.1.1. Database search

Through secondary source material, primary sources, maps and online sources the study area is contextualised. The SAHRA electronic database is currently offline and could not be accessed. Few studies are on record for the larger area including the following studies:

Author	Year	Project	Findings
Dreyer, C.	2006	First Phase Archaeological and Cultural Heritage Assessment of The Proposed Animal Breeding Station at The Farms Rietkuil 110, Dampoort 327, Winkelhaakdam 455, Mt Sinai 292, Gibson 294 & Van Vuurenskop 457, Vredefort, Free State	No sites were identified.
Dreyer, C.	2006	First Phase Archaeological and Cultural Heritage Investigation of The Proposed Residential Developments on The Farms Denoon 808, Maara 618, Aasvogelrand 249, Bergplaats 240 & Union 440, Vredefort, Free State	Structures and historical finds including mining remains and also stone packed walls.
Dreyer, C.	2008	First Phase Archaeological and Cultural Heritage Assessment of The Proposed Residential Developments at The Farm Buffelskloof 511 IQ, Vredefort Dome, Potchefstroom, North-West Province	Iron Age Sites
Van der Walt, J.	2013	Archaeological Impact Assessment For the proposed Jumanji Estate Development, Parys, Free State Province	Structures and MSA artefacts
Van der Walt, J.	2018	Heritage Impact Assessment Aasvogelrand Tented Camp, Vredefort, Free State Province,	No Sites

The only historical battle on record for the area is the battle of Vechtkop (1836) 49 km east of the study area. Google Earth and 1:50 000 maps of the area were utilised to identify possible places where archaeological and historical sites might be located. No buildings or structures are located within the proposed two alternatives. The database of the Genealogical Society of South Africa indicated no known grave sites within the study area, but a concentration camp memorial site is indicated approximately 5 km South East of the study area. Numerous cemeteries are also on record including the Rhenoster Rivier Military Cemetery as well as a Jewish Cemetery amongst others in the town of Koppies. The Vredefort Road Concentration Camp is also located in the greater area (-27.152665° 27.652622°). All that remains of the camp is a cemetery. None of these sites will be impacted on by the development.

4.1 2. Public consultation

No public consultation was conducted by the heritage consultant.

4.1.3. Google Earth and mapping survey

Google Earth and 1:50 000 maps of the area were utilised to identify possible places where archaeological sites might be located.

4.1.4. Genealogical Society of South Africa

No grave sites are on record for the study area.

5. BACKGROUND INFORMATION AVAILABLE ON THE STUDY AREA

5.1. Palaeontology of the study area

An independent study was conducted by Prof Barry Millsted for this project (Millsted 2019). The study determined the following:

“The aerial extent of the Prospecting Right application area is underlain by a lithologically diverse assemblage of stratigraphic units consisting of Swazian (Archaean) greenstones of the Greenlands Formation (of the Johannesburg Dome), sandstone, mudstones and coals of the Vryheid and Volksrust Formations, and intrusive dolerite of the Karoo Dolerite Suite. It is interpreted that Cainozoic regolith forms the land surface over the majority of the Prospecting Right application area.

*Most of the exploration activities to be undertaken are non-invasive and will result in disturbance of the immediate land surface (<0.5 m in depth). The invasive phase of exploration will consist of the drilling of eight (8) diamond borehole. The excavation of eight (8) sumps to house drilling muds for the diamond drilling program will require excavation of small voids < 1.5 m deep and < 4 m² in area. These activities will impact predominantly upon the regolith cover; although in the case of the northern-most six (6) of the holes there may also be some impact upon the Greenlands Formation. The southern-most two (2) of the boreholes may impact upon the Volksrust Formation. The boreholes will impact upon the regolith, Greenlands Formation, and the Volksrust Formation (and there is a low possibility of the Vryheid Formation being impacted). The rocks comprising the Greenlands Formation, and the Karoo Dolerite Suite are unfossiliferous. It is also interpreted that the Cainozoic regolith is unfossiliferous. Any impacts upon these units caused by the progression of the prospecting operations will have **negligible to nil** probability of resulting in a negative impact upon their palaeontological heritage. The sediments of the Volksrust and Vryheid Formations are known to contain plant macrofossil assemblages of the *Glossopteris flora* (the former also containing trace fossil assemblages). The significance of the fossil assemblages contained in these two units was assessed as **high**, but the probability of any negative impact is **moderate to good** for the Volksrust Formation and **low** for the Vryheid Formation. Almost the entire extent of the project area appears to bear a significant Cainozoic regolith cover. The regolith itself is unfossiliferous. It is also the case that almost all of the area which is the subject of the Prospecting Right application area has been cultivated (ploughed). The implication of the heavily disturbed nature of the land surface is that any fossils that may have been existed it (either as syndepositional or inherited from the bedrock) and which would have been observable at surface will have been destroyed as a result of the historical ploughing. In addition, six (6) of the eight boreholes are planned to be collared upon the non-fossiliferous Greenlands Formation. So even if regolith is not present, the bedrock that will be impacted contains no fossils. Only the southern-most two (2) boreholes will be collared in potentially fossiliferous bedrock (the Volksrust Formation). However, as discussed above, it is most likely that the land surface will be the regolith. As almost all of the prospecting activities will only impact the land surface to a depth of < 1.5 m it will only be the regolith that will be affected. The boreholes will impact upon the Volksrust Formation (and possibly the Vryheid Formation) at depth, but as discussed above this impact of the boreholes upon the fossil heritage of the units will be unimportant.” (Millsted 2019)*

5.2. Archaeology of the area

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

The Stone Age

South Africa has a long and complex Stone Age sequence of more than 2 million years. The broad sequence includes the Later Stone Age, the Middle Stone Age and the Earlier Stone Age. Each of these phases contains sub-phases or industrial complexes, and within these we can expect regional variation regarding characteristics and time ranges. For Cultural Resources Management (CRM) purposes it is often only expected/ possible to identify the presence of the three main phases.

Yet sometimes the recognition of cultural groups, affinities or trends in technology and/or subsistence practices, as represented by the sub-phases or industrial complexes, is achievable (Lombard 2012). The three main phases can be divided as follows:

- Later Stone Age: associated with Khoi and San societies and their immediate predecessors. Recently to ~30 thousand years ago
- Middle Stone Age: associated with Homo sapiens and archaic modern humans. 30-300 thousand years ago.
- Earlier Stone Age: associated with early Homo groups such as Homo habilis and Homo erectus. 400 000-> 2 million years ago.

The Vaal Gravels are known to contain Early and Middle Stone Age Artefacts (van Riet Lowe 1937, 1952; Butzer et al. 1973; Helgren 1978; Gibbon, et al. 2009). Some important ESA sites relevant to the study area are included below:

Figure 4. Known ESA sites

Site Name	Period	Source
Pneil	Acheulean	Beaumont & Morris 1990
Power's Site	Acheulean	Power 1955; Beaumont & Morris 1990
Riverview Estate	Acheulean	van Riet Lowe 1945; Helgren 1978

Some Rock Engraving sites are on record around the greater study area. Directly to the northwest of current operations, the rock engraving site of Leeuwkuil is located. Hollmann (1999) described the sites as being located on a small island in the Vaal River. Engravings are concentrated on the south-eastern part of the peninsula.

The images are dominated by Eland and other antelope, which appeared to be in the San hunter-gatherer engraving tradition (Hollmann, 1999). Pistorius (2007) discusses the Redan rock engraving site which contains up to 244 rock engravings. These engravings depict animals, geometric designs as well as San weapons (Du Piesani 2014).

The Iron Age

The Iron Age as a whole represents the spread of Bantu speaking people and includes both the pre-Historic and Historic periods. It can be divided into three distinct periods:

- The Early Iron Age: Most of the first millennium AD.
- The Middle Iron Age: 10th to 13th centuries AD
- The Late Iron Age: 14th century to colonial period.

The Iron Age is characterised by the ability of these early people to manipulate and work Iron ore into implements that assisted them in creating a favourable environment to make a better living.

Almost no Iron Age Sites are on record close to the study area. The closest sites are towards the south east at Heilbron where Type N walling led to Type V named after Vegkop near Heilbron (Maggs, 1976). Type V consists of the standard core of cattle enclosures surrounded by beehive houses and grain bins, but outer walls are usually absent. Corbelled huts have been associated with this type. These low huts were originally occupied by herd boys but in some areas of the Free State they may have served as houses for adults.

5.3. Historical Overview

The first Europeans arrived in the Cape in 1652, and expansion to the north only started in the late 1820s. In 1836 on 16 October the Battle of Vechtkop (Vegkop), near present day Heilbron, FS, between the Voortrekkers and the Ndebele takes place. Kalipi attacks the laager with 6 000 warriors. 430 Ndebele and two Voortrekkers are killed. There is difference of opinion about the exact date of the attack, but it is certain that news of the campaign reached the Ndebele king at Kapain, Marico district, on 25 October.

The Great Trek of 1837, as this northern movement of white people from the Cape Colony was called, resulted in a mass migration of white people into the northern areas of South Africa. (Ross 2002:39) The discovery of diamonds and gold in the northern provinces between 1867 and 1886 had very important consequences for South Africa. After the discovery of these resources, the British, who at the time had colonized the Cape and Natal, had intentions of expanding their territory into the northern Boer republics. This eventually led to the Anglo-Boer War, which took place between 1899 and 1902, and which was one of the most turbulent times in South Africa's history. Even before the outbreak of war in October 1899 British politicians, including Sir Alfred Milner and Mr. Chamberlain, had declared that should Britain's differences with the Z.A.R. result in violence, it would mean the end of republican independence. This decision was not immediately publicized, and as a consequence republican leaders based their assessment of British intentions on the more moderate public utterances of British leaders. Consequently, in March 1900, they asked Lord Salisbury to agree to peace on the basis of the status quo ante bellum. Salisbury's reply was, however, a clear statement of British war aims. (Du Preez 1977). 19

The northern Free State is located within the area where some of the main operations of the Boer General, Christiaan De Wet, took place between 1899 and May 1900 when the war ended. De Wet, among the other Boer generals, realized that they could not win the war by conventional means, and spread out into small hit-and-run groups that inflicted serious casualties on the British armies. This is known as Guerrilla warfare. The British Commander-in-Chief, Lord Kitchener, consequently turned to the destruction of Boer crops and built concentration camps where the wives and children of the Boer soldiers were interned. This "scorched earth" policy of the British finally resulted in the demoralisation of the Boers. (Readers Digest 1984: 33)

Some skirmishes took place on towns in the vicinity of Koppies. Kroonstad was one of these towns. On 12 March 1900, on the eve of the occupation of Bloemfontein by Lord Roberts, President M. T. Steyn declared Kroonstad the new capital of the Free State government. It simultaneously became the organizing center for retreating Boer commandos and a depot for stores of all kinds. It was also at Kroonstad that it was decided in March 1900 to abolish wagon laagers and to employ mounted commandos instead. This heralded a new method of warfare with increased mobility, which later became known as guerrilla warfare. Kroonstad remained the Free State capital until 11 May 1900, when the British were victorious at Zand River. Kroonstad remained in British hands for the rest of the war, and housed concentration camps for both Boer civilians and black people. (Pretorius 2010: 225-226)

Lindley is another town located close to where some of the very few successful Boer sieges during the war took place here. Spagge's Battalion of 500 men reached Lindley from Kroonstad on 27 May 1900. The battalion had covered 90 miles in three days and only had rations for two days. As they approached Lindley, the battalion came under heavy rifle fire from a group of Boers. During five days of fighting the British casualties came to 468. The British finally gave in when they realized they were completely surrounded, and became the prisoners of war of General Piet de Wet. (Pretorius 2010: 244-245).

A central figure in the establishment of the town Koppies was Emily Hobhouse. Concerned about the economic and personal losses of the Boer people, throughout the Anglo Boer war, she promoted the idea of home-industry among the inhabitants of the town. Her vision and courage was manifested in the Lace school at Phillipolis.

Peace talks between the Boers and the British had started around April 1902, and culminated in the Peace of Vereeniging treaty on 31 May 1902. This event signalled the end of the Anglo-Boer War, as well as the temporary end of the Boer Republics' independence. (Geschiedenisatlas van Suid-Afrika 1999: 251)

In 1904, General C.R. de Wet established a settlement on the banks of the Renoster River for underprivileged whites. He donated his Farm "Rooipoort" in order to relieve the poverty caused by the war in the form of a few morgen irrigation land, and then a few morgen "dry" land for cultivating maize. Inhabitants were supplied with a few eggs and a paraffin lamp/hatcher for the eggs. In 1926 this settlement achieved municipal rights and became the town of Koppies.

By demand/pressure of General De Wet, the "Koppies Dam" was constructed to supply water for irrigation, and work to the local people who needed it badly.

WWI: At the start of the 1914-Rebellion (or "Armed protest" as it was called), it is decided in Koppies, OFS, that Gen. C.R. de Wet is to lead the rebels in the Free state (7 000 men), while Gen. C.F. Beyers (after whom "Oom Bey" was later named), is to lead the 3 000 rebels in the Transvaal (SA History 2013). About 2 000 take up arms in the Cape Province. This decision was made in the old NG-church, the Minister was C.R Ferreira. After the war, he returned to minister in Koppies. He passed away in 1932 and was buried in the church grounds.

5.3.1. Background of the study area

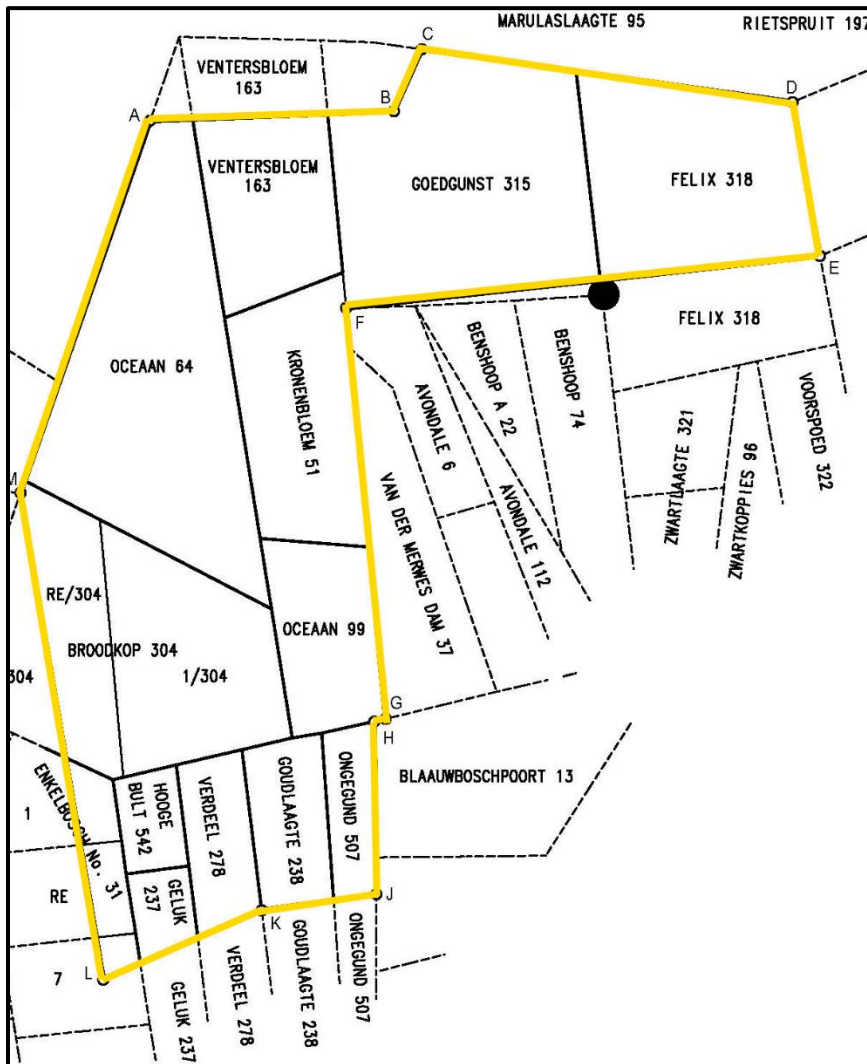


Figure 5. Map of properties that form part of the application area

The subject area consists of several farms as well as portions of farms. Where the name of the farm or portion thereof differs between the name stated on the map and the information located on Windeed, then the information as per the map is stated after the Windeed description below.

List of properties within the subject area:

1. Felix 318 RD
2. A portion of Goedgunst 315 RD
3. A portion of Ventersbloem 163 RD
4. Kronenbloem 51 RD
5. Oseaan 99 RD
6. A portion of Oseaan 64 RD
7. Portion 1 of Broodkop 304 RD (Broodkop 1/304)
8. A portion of portion 0 of Broodkop 304 RD (Broodkop RE/304)
9. A portion of Ongegund 7 RD (Ongegund 507)
10. A portion of Goudlaagte 238 RD
11. A portion of Verdeel 278 RD
12. Hooge Bult 54 RD (Hooge Bult 542)
13. A portion of portion 1 of Enkelbosch 31 RD (Enkelbosch No. 31/1)
14. A portion of portion 0 of Enkelbosch 31 RD (Enkelbosch No. 31/RE)
15. A portion of portion 7 of Enkelbosch 31 RD (Enkelbosch No. 31/7)

5.3.2. Maps of the area under investigation

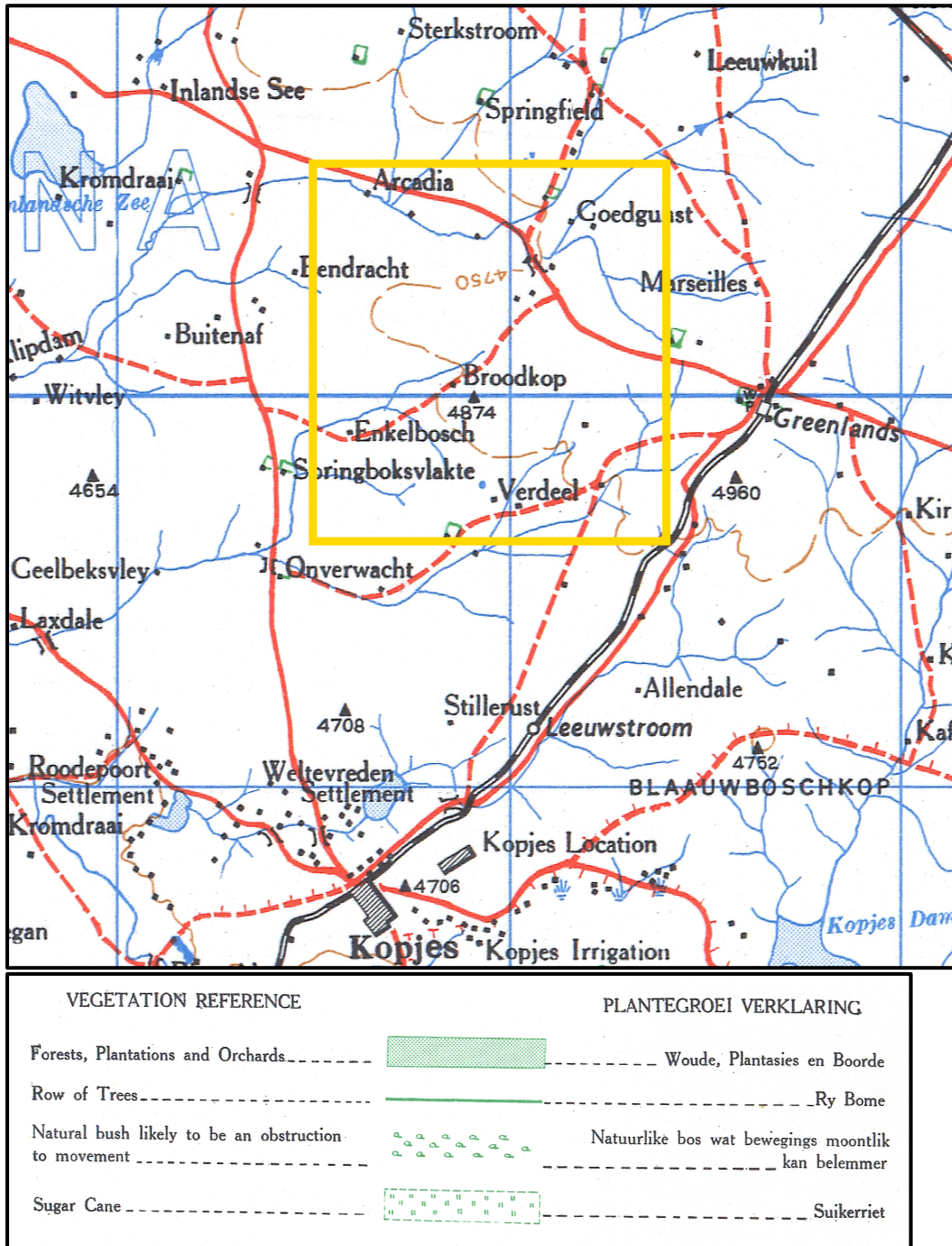


Figure 6. 1943 Topographical map of the subject area. The yellow border indicates the approximate location of the area under investigation. (Topographical map 1943)

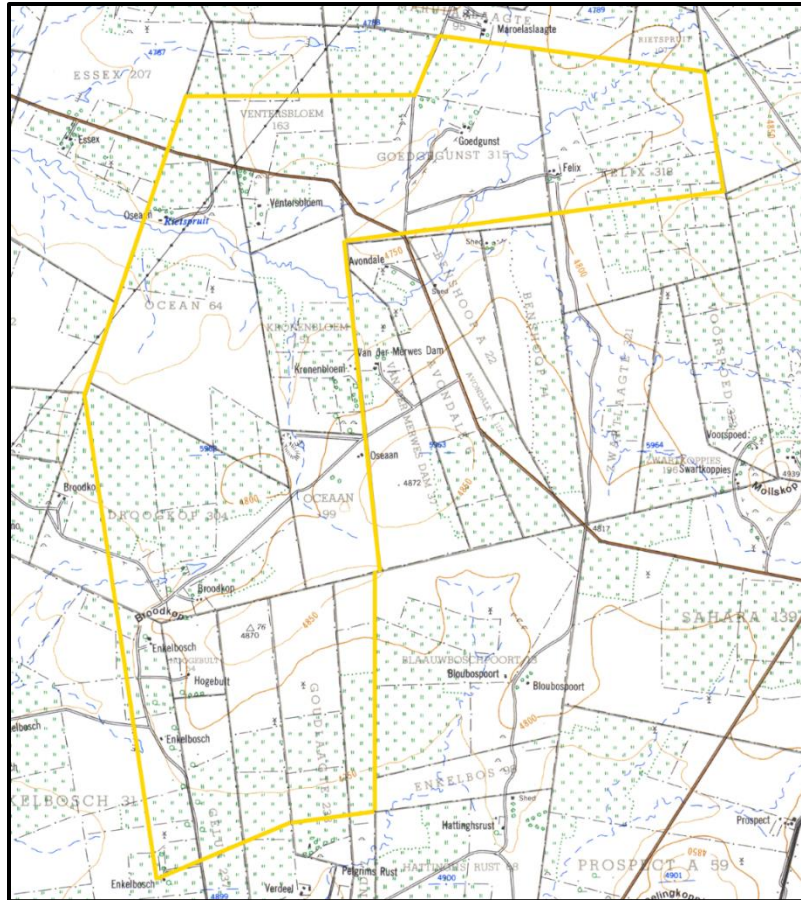
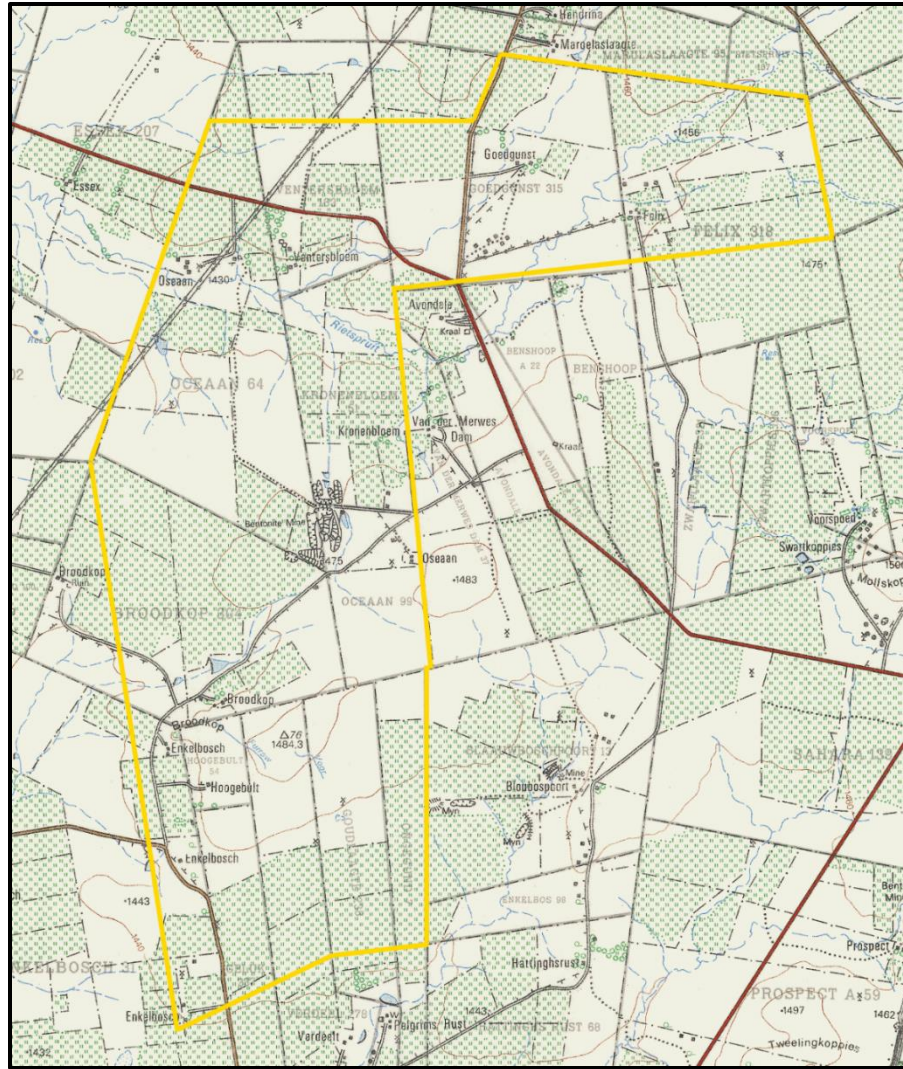
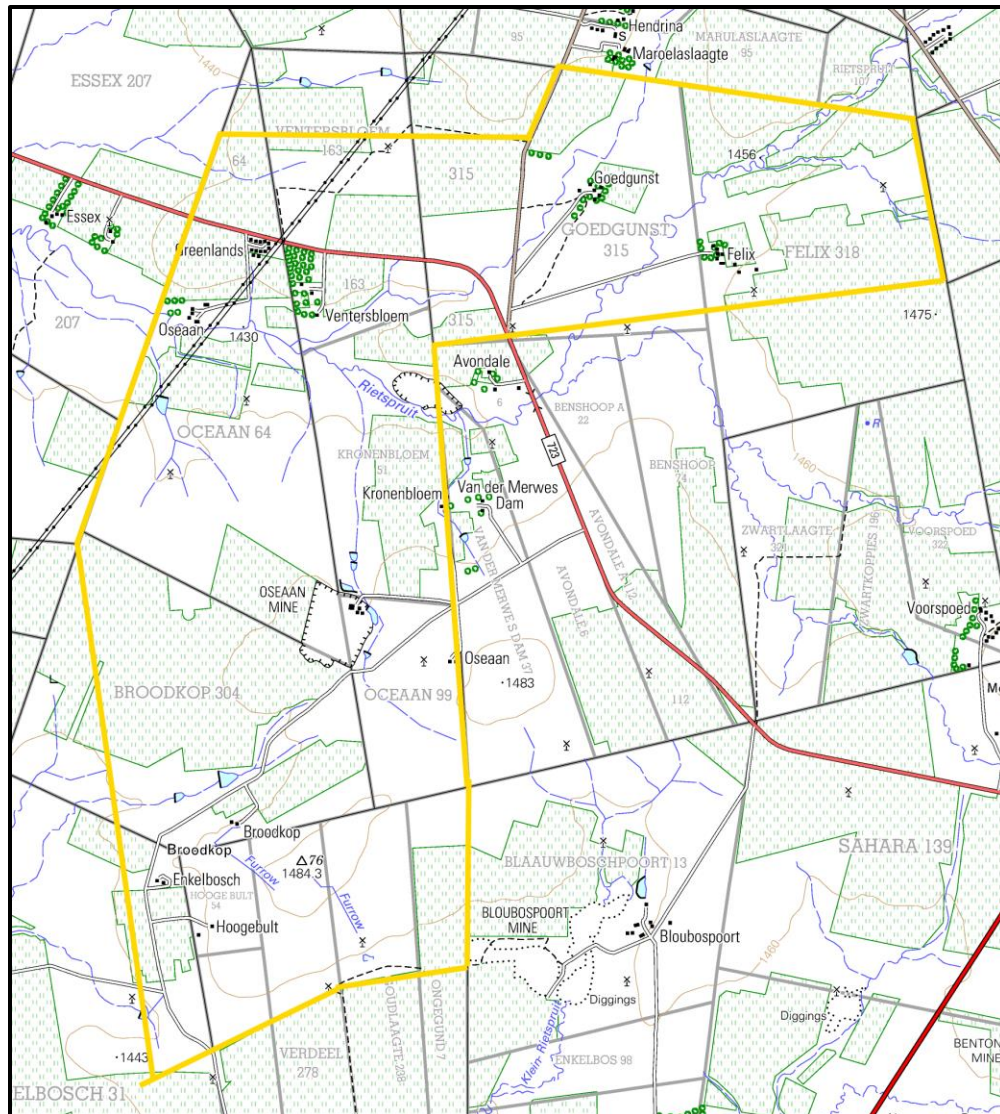


Figure 7. 1964 Topographical map of the subject area. The yellow border shows the estimated location of the area under investigation. Approximately half of the land is used for the cultivation of crops and the other half consists of unused land. Buildings falling within the subject area are erected on Felix 318 RD, Goedgunst 315 RD, Ventersbloem 163 RD, Ocean 64 RD, Kronenbloem 51 RD, Droogkop 304 RD (later known as Broodkop 304 RD), Enkelbosch 31 RD (later known as Portion 1 of Enkelbosch 31 RD and Portion 0 of Enkelbosch 31 RD) as well as on Hoogebult 54 RD. Several roads traverse the property with the 723 secondary road passing through the northern part of the property. The Rietspruit flows through much of the northern and central parts of the subject area. Limited excavation can be seen in the north western corner of the farm Oseaan 99 (Topographical Map 1964)



REFERENCE	VERKLARING	REFERENCE	VERKLARING
International Boundaries	Internasionale Grense	Magnetic Stations and Ground Signs	Magnetiese Stasies en Grondtekens
Provincial Boundaries	Provinsiale Grense	Huts	Hutte
Multiple Track Railways	Veelvoudige Spoorlyne	Monuments	Monumente
Single Track Railways	Enkelspoorlyne	Dipping Tanks	Dipbakke
Electrified Railways	Geelektreïseerde Spoorlyne	Windmills	Windpompe
Narrow Gauge Railways	SmalSpoorlyne	Walls	Mure
Service Railways	Dienspoorlyne	Anti-erosion Walls	Grondbewaringswalle
Arterial Roads	Hoofverkeerspaase	Excavations	Uitgrawings
Main Roads	Grooispaaie	Perennial Water	Standhoudende Water
Secondary Roads	Sekondêre Paais	Non-perennial Water	Nie-standhoudende Water
Other Roads	Ander Paais	Dry Pans	Droë Pansse
Tracks and Footpaths	Dowwe Paais en Voetspaais	Springs, Waterholes and Wells	Fonteinne, Watergate en Putte
Power Lines	Kraglyne	Marshes, Swamps and Vleis	Moerasse en Vleis
Telephone Lines	Telefoonlyne	Pipelines	Pyplyne
Post Offices, Police Stations and Posts	Poskantore, Polisestasies en -poste	Prominent Rock Outcrops	Prominente Klipbankse
Stores, Hotels, Schools and	Winkels, Hotelle, Skole en	Terraces	Terrasse
Places of Worship	Plekke van Afsbedding	Cultivated Lands	Bewerkte Lande
Lighthouses and Marine Lights	Vuurtorings en Seevaartligte	Orchards and Vineyards	Boorde en Wingerde
Marine Beacons	Seevaartbakens	Trees and Bush	Bome en Bos
Trig Beacons (Number to right and Height below)	Trig. Bakens (Nommer regs en hoogte onder)		

Figure 8. 1976 Topographical map of the subject area. The yellow border shows the estimated location of the area under investigation. Approximately half of the land is used for the cultivation of crops and the other half consists of unused land. Additional buildings have been erected on the properties where buildings were previously erected. Substantial excavations can be seen where the farms Oseaan 64, Oseaan 99 and Broodkop 304 meet. (Topographical map 1976)



REFERENCE	VERKLARING	REFERENCE	VERKLARING
National Freeway; National Route	Nasionale Deurpad; Nasionale Roete	International Boundary and Beacon	Internasionale Grens en Baken
Arterial Route	Hoofverkeersroete	Provincial Boundary	Provinsiale Grens
Main Road	Hoofpad	Protected Area	Bewarings Gebied
Secondary Road; Bench Mark	Sekondêre Pad; Hoogteperk	Perennial River	Standhoudende River
Other Road; Bridge	Ander Pad; Brug	Non-perennial River	Nie-standhoudende Water
Track and Hiking Trail	Dowwe Pad en Voetslaanpad	Non-Perennial Water	Nie-standhoudende Water
Railway; Station or Siding	Spoorweg; Stasie of Sylyn	Dry Water Course	Droë Loop
Other Railway; Tunnel	Ander Spoorweg; Tunnel	Dry Pan	Moeras en Vlei
Embankment; Cutting	Opvulling; Deurgrawing	Marsh and Vlei	Moeras en Vlei
Power Line	Kraglyn	Pipeline (above ground)	Pyslyn (bo die grond)
Built-up Area (High, Low Density)	Beboude Gebied (Hoë, Laë Digtheid)	Water Tower; Reservoir; Water Point	Watersoring; Reservoir; Waterpunt
Buildings; Ruin	Geboue; Muur	Coastal Rocks	Kuslynrotse
Post Office; Police Station; Store	Poskantoor; Polisieostasie; Winkel	Prominent Rock Outcrop	Prominente Klipbank
Place of Worship; School; Hotel	Plek van Aanduiding; Skool; Hotel	Erosion; Sand	Erosie; Sand
Fence; Wall	Drascheining; Muur	Woodland	Beboste Gebied
Windpump; Monument	Windpomp; Monument	Cultivated Land	Bewerkte Land
Communication Tower	Kommunisiesoring	Orchard or Vineyard	Boord of Wingerd
Mine Dump; Excavation	Myrnhooi; Uitgraving	Restoration Ground	Ontspanningsterrein
Trigonometrical Station; Marine Beacon	Peilbaken; Seevaartbaken	Row of Trees	Rye Bome
Lighthouse and Marine Light	Vuurtoring en Seevaartlig		
Cemetery; Grave	Begraafplaas; Graf		

Figure 9. 1997 Topographical map of the subject area. The yellow border shows the estimated location of the area under investigation. Less than half of the land is used for the cultivation of crops and the other half consists of uncultivated land. Additional structures have been erected on the properties where buildings were previously erected. Excavations can be seen where the farms Oseaan 64, Oseaan 99 and Broedkop 304 meet as well as in the north east of Kronenbloem 51. (Topographical map 1997)

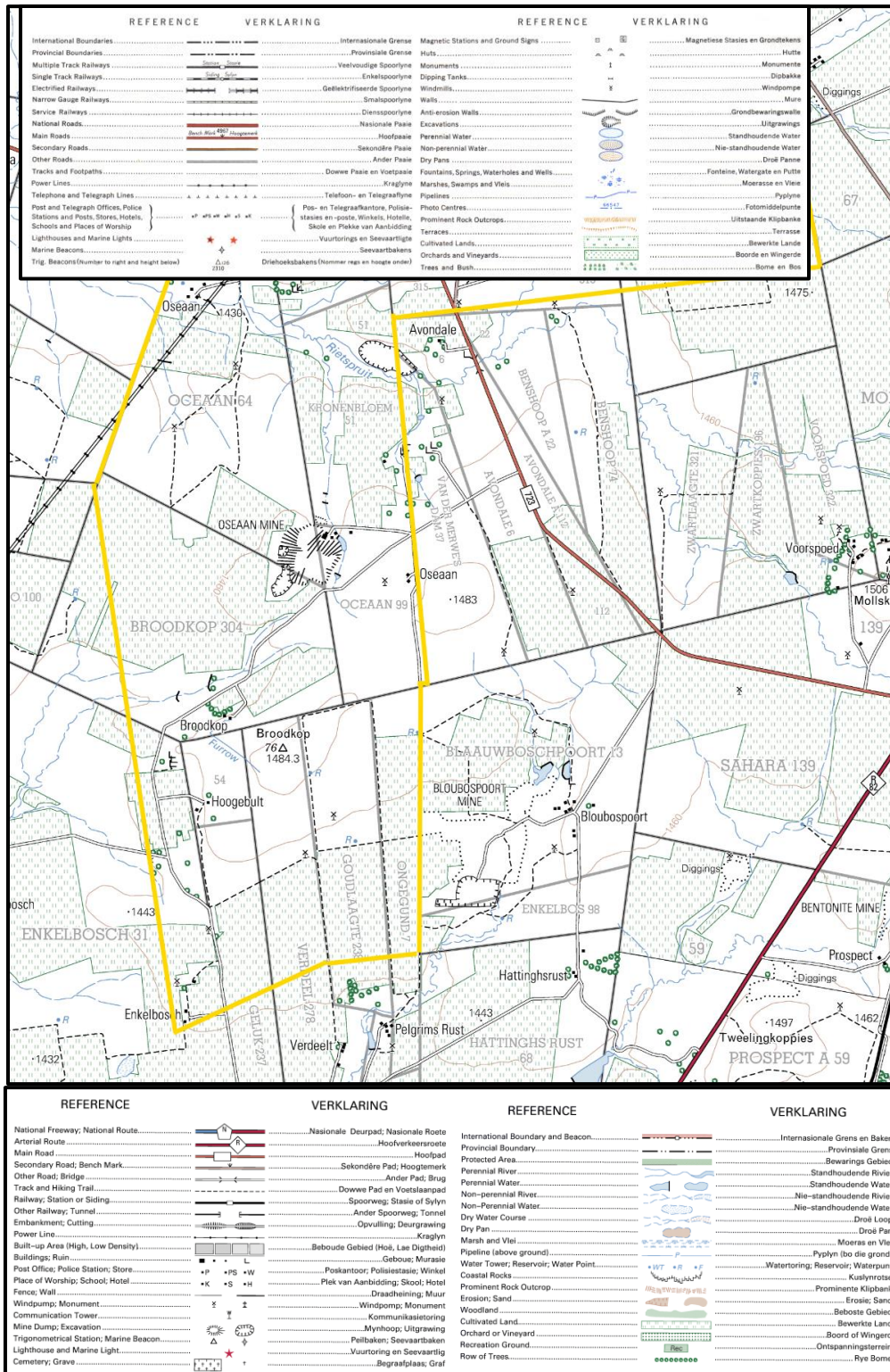


Figure 10. 2007 Topographical map of the subject area. The yellow border shows the estimated location of the area under investigation. Less than half of the land is used for the cultivation of crops and the other half consists of uncultivated land. The structures on Felix 318 RD and Ventersbloem 163 are now in ruins. Excavations on the farms Oseaan 64, Oseaan 99, Broodkop 304 and Kronenbloem 51 RD continue to expand. (Topographical map 2007)

5.3.3. Ownership Record

Ownership records were compiled using the Windeed Search Engine 2019 and can be added onto using additional sources.

Felix 318 RD

Date of transfer	Owner	Price
28/6/1979	Oosthuizen Hendrik Jacobus	-

(Windeed Search Engine 2019)

Goedgunst 315 RD

Date of transfer	Owner	Price
1988	Beckmann Bertha Wilhelmina	Unknown
2006	Blue Sands Trading 897 CC	R1 100 000
31/3/2011	World Focus 277 CC	R2 832 000

(Windeed Search Engine 2019)

Ventersbloem 163 RD

Date of transfer	Owner	Price
1988	Beckmann Herbert August	Unknown
22/9/2003	Oosthuizen Barend Daniel	R233 699

(Windeed Search Engine 2019)

Kronenbloem 51 RD

Date of transfer	Owner	Price
1989	Beckmann Laurimer	Unknown
1994	Vermeulen Jan Christoffel	R190 000
1994	Vermeulen Marthina Elsie Johanna	R190 000
2002	Celsum 1073 Pty Ltd	R216 600
17/5/2006	Rooipoort Trust	R700 000

(Windeed Search Engine 2019)

Ocean 99 RD

Date of transfer	Owner	Price
1959	Coller Johanna Margaretha van	Unknown
1991	Beckmann Laurimer	R75 000
1997	Herbst Johan Dawid	R110 000
1997	Herbst Elsie Maria Dorothea	R110 000
8/12/2004	G & W Base & Industrial Minerals Pty Ltd	R230 000

(Windeed Search Engine 2019)

Ocean 64 RD

Date of transfer	Owner	Price
19/9/1985	Loggenberg Leon	-

(Windeed Search Engine 2019)

Broodkop 304 RD

Date of transfer	Portion	Owner	Price
19/9/1985	0	Loggenberg Leon	-
1985	1	Loggenberg Cornelius Andries P	Unknown
1985	1	Loggenberg Jacob	Unknown
7/1/1991	1	Loggenberg Leon	-

(Windeed Search Engine 2019)

Ongegund 7 RD (Ongegund 507)

Date of transfer	Owner	Price
1962	Crause Gladys Maud	Unknown
1995	Herbst Johan Dawid	R100 000
1995	Herbst Magrietha Cornelia	R100 000
2001	Dawid Herbst Trust	R99 269
8/12/2004	G & W Base & Industrial Minerals Pty Ltd	R159 000

(Windeed Search Engine 2019)

Goudlaagte 238 RD

Date of transfer	Owner	Price
1979	Herbst Johan Dawid	Unknown
10/7/2001	Dawid Herbst Trust	R99 269

(Windeed Search Engine 2019)

Verdeel 278 RD

Date of transfer	Owner	Price
1977	Loggenberg Johannes Jurgens	Unknown
7/3/1996	Hannes Loggenberg Trust	R477 000

(Windeed Search Engine 2019)

Hooge Bult 54 RD (Hooge Bult 542)

Date of transfer	Owner	Price
1981	Loggenberg Johanna	Unknown
8/2/2001	Francois & Hannelie Smit Familie Trust	R40 000

(Windeed Search Engine 2019)

Enkelbosch 31 RD

Date of transfer	Portion	Owner	Price
1973	0	Swanepoel Jacobus Christoffel	Unknown
27/8/2001	0	Swanepoel David Abraham	Estate
1973	1	Swanepoel Jacobus Christoffel	Unknown
27/8/2001	1	Swanepoel David Abraham	Estate
1973	7	Swanepoel Jacobus Christoffel	Unknown
27/8/2001	7	Swanepoel David Abraham	Estate

(Windeed Search Engine 2019)

The consulted maps of the area under investigation, as well as the use of the land, do not appear to show any particular buildings of historical interest at the site. However, further investigation would be advisable especially since earlier developments on the farm could not be verified.

6. PROBABILITY OF OCCURRENCE OF SITES

Based on the above information, it is possible to determine the probability of finding archaeological and cultural heritage sites within the study area to a certain degree. For the purposes of this section of the report the following terms are used – low, medium and high probability. Low probability indicates that no known occurrences of sites have been found previously in the general study area. Medium probability indicates some known occurrences in the general study area are documented and can therefore be expected in the study area. A high probability indicates that occurrences have been documented close to or in the study area and that the environment of the study area has a high degree of probability for the occurrence of sites.

» Archaeological and Cultural Heritage Landscape

NOTE: *Archaeology is the study of human material and remains (by definition) and is not restricted in any formal way as being below the ground surface.*

Archaeological remains dating to the following periods can be expected within the study areas:

- » Stone Age finds
 - ESA: *Low Probability*
 - MSA: *Low to Medium Probability*
 - LSA: *Low to Medium Probability*
 - LSA –Herder: *Low Probability*

- » Iron Age finds
 - EIA: *Low Probability*
 - MIA: *Low Probability*
 - LIA: *Low to medium Probability*

- » Historical finds
 - Historical period: *Low to Medium Probability*
 - Historical dumps: *Low to Medium Probability*
 - Structural remains: *Medium Probability*

- » Living Heritage
 - For example, rainmaking sites: *Low Probability*

- » Burial/Cemeteries
 - Burials over 100 years: *Medium Probability*
 - Burials younger than 60 years: *Medium Probability*

Subsurface excavations including prospecting, ground levelling, landscaping, and foundation preparation can expose any number of these resources.

7. ASSUMPTIONS AND LIMITATIONS

The study area was not subjected to a field survey at this stage in the environmental process, it is recommended that this will be done when the actual exploration localities are fixed. It is assumed that information obtained for the wider area is applicable to the study area. Additional information could become available in future that could change the results of this report. It is assumed that the EAP will upload all relevant documents to the SAHRIS.

8. FINDINGS

Based on the literature review the study area can have a cultural layering dating back to the Stone Age with scatters and sites dating to the ESA, MSA and LSA. Sites and artefacts dating to these periods are scattered over the landscape with MSA and LSA sites centred on pans, watercourses and sources of raw material for the manufacturing of lithics. Due to the importance of these environmental factors on the landscape that attracted human activity in antiquity, this was used as the main criteria for generating a four-tier sensitivity map of the study area (Figure 11).

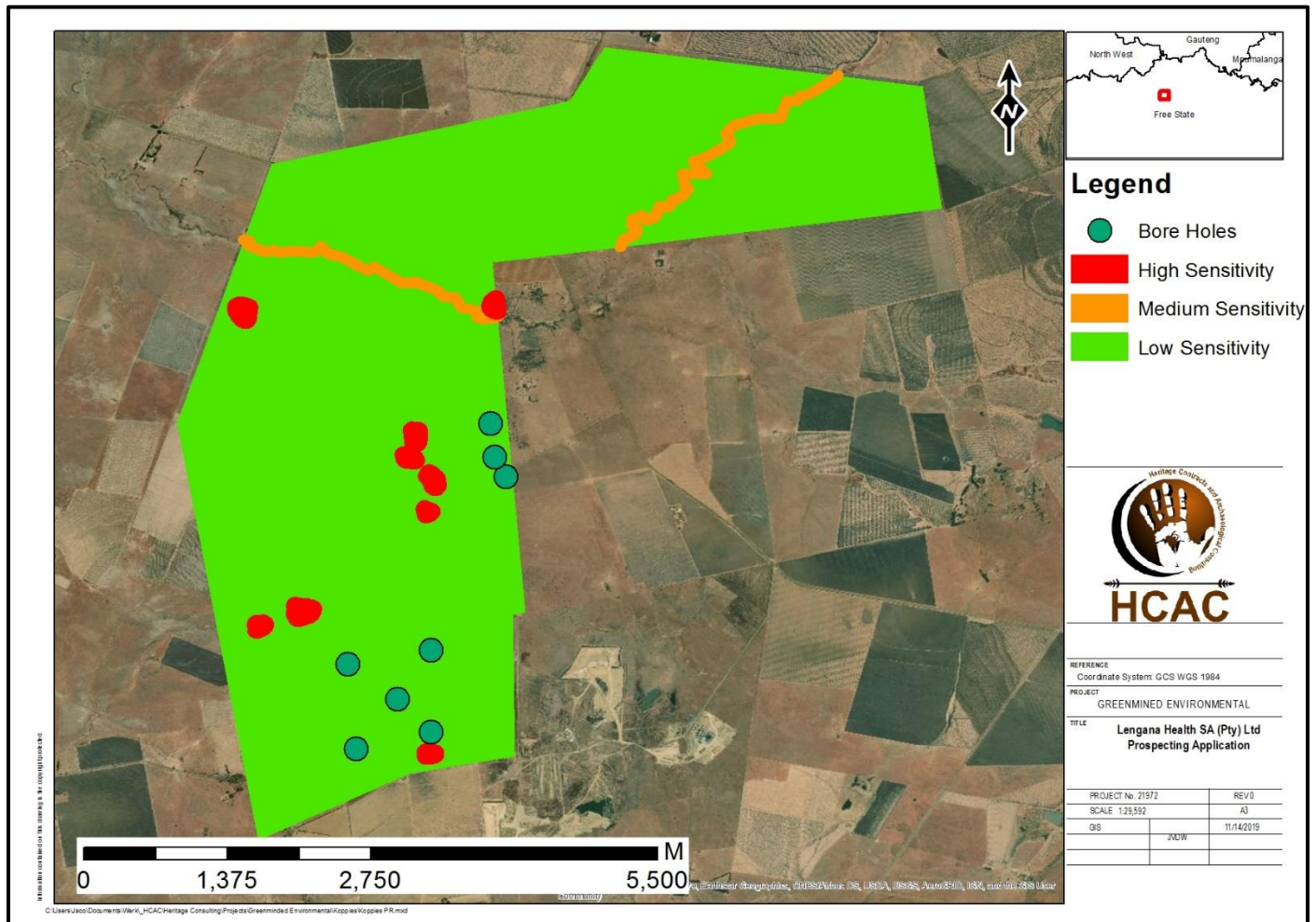


Figure 11. Sensitivity map of the study area.

8.1. Archaeology and Palaeontology

8.1.1 Archaeological finds

The archaeology of the larger region is well described and the importance of the Vaal Gravels are well known (Riet Lowe 1937, 1952; Butzer et al. 1973; Helgren 1978; Gibbon, *et al.* 2009). Based on Lithology maps (Figure 12) of the area no raw material suitable for the manufacturing of lithics occur in the prospecting area and no Stone Age sites of significance is expected. Although sandstone occurs in the area and is conducive to the formation of rock shelters. The typography of the area is flat and no shelters occur.

The Iron Age signature of the Free State is also well documented (Maggs 1976). Iron Age settlements in the Free State is marked by extensive stone walled settlements easily visible on aerial imagery. No visible stone walled settlements occur close to the proposed bore holes on aerial images consulted (Figure 13 and Figure 14).

No major impacts to archaeological resources are expected by this project.

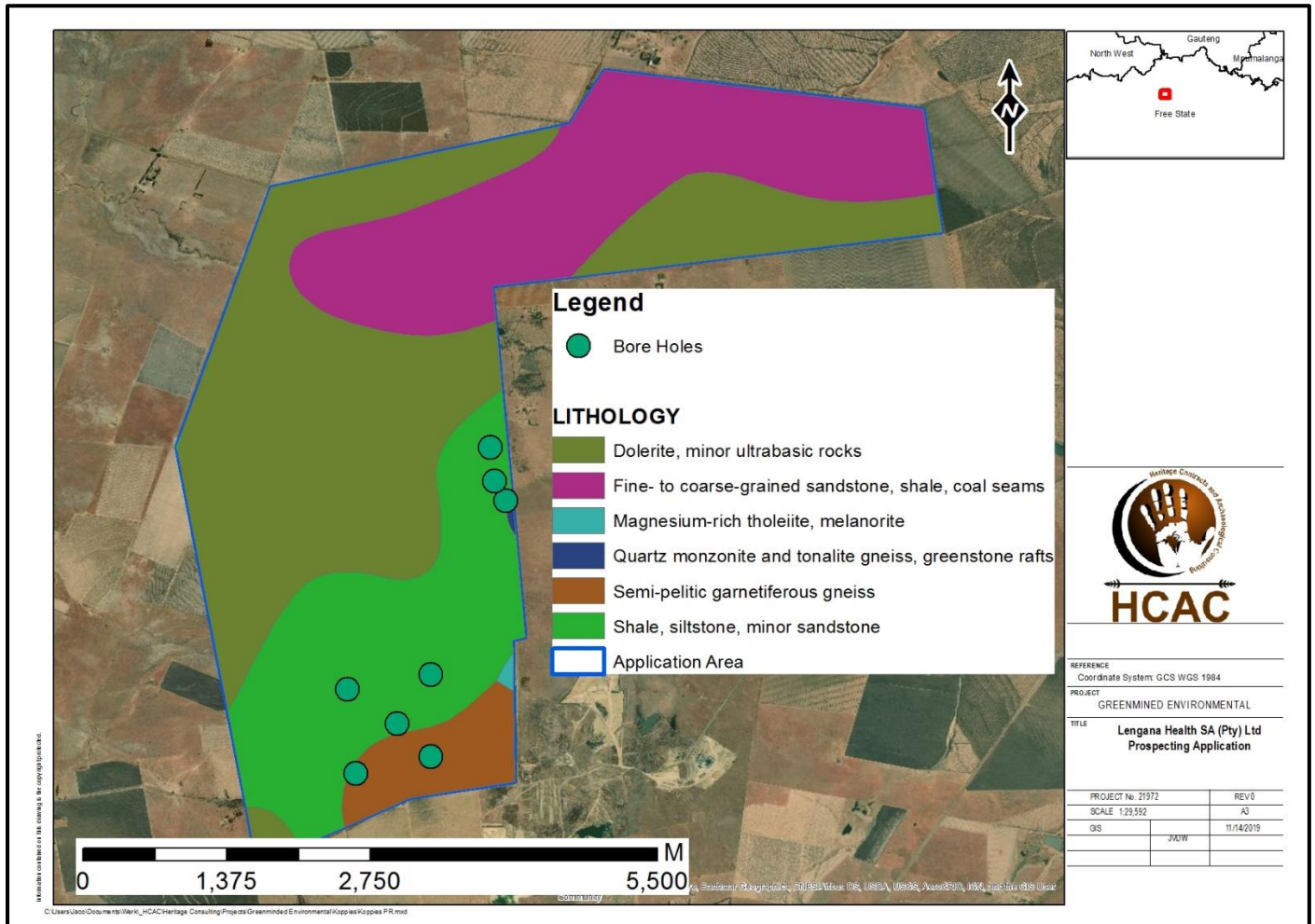


Figure 12. Lithology of the study area

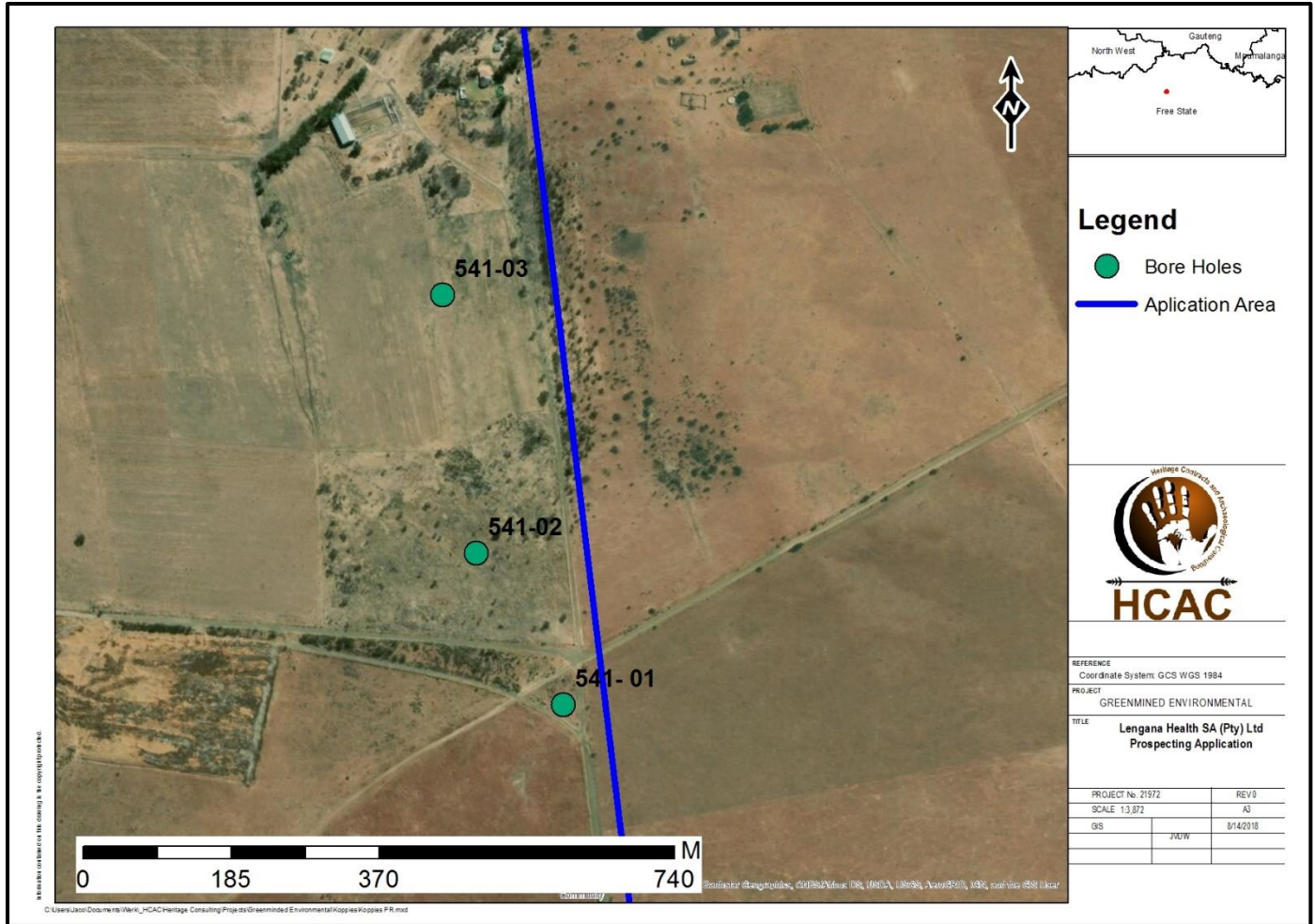


Figure 13. Zoomed in view of the proposed boreholes (541 -01, 541 -02 and 541-03).

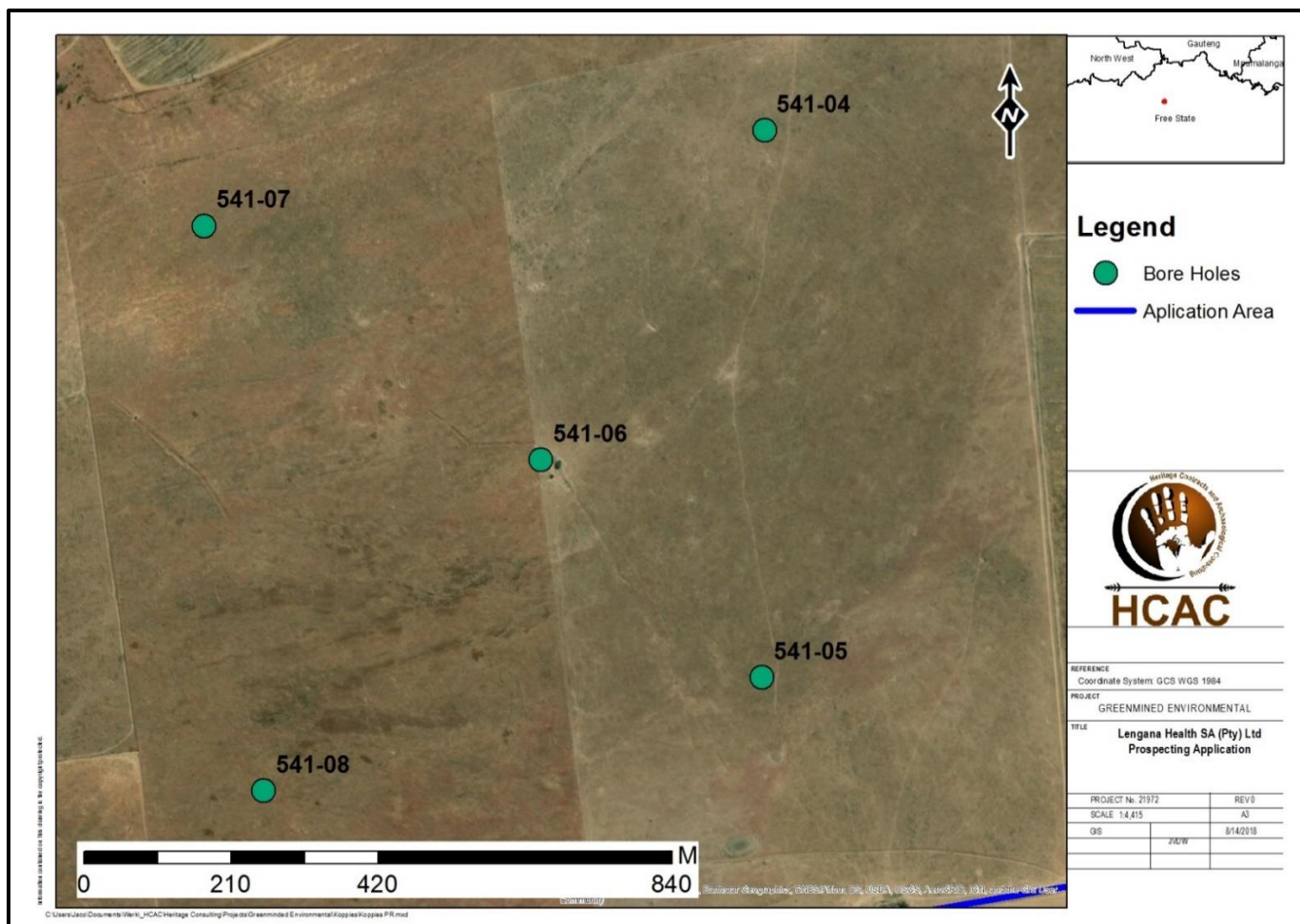


Figure 14. Zoomed in View of Borehole 541-04, 541-05, 541-06, 541- 07 and 541 -08.

8.1.2. Paleontological resources

Millstead (2019) conducted an independent paleontological study and did not identified any palaeontological reason to prejudice the progression of this exploration project. Please consult the full report for recommendations (Annexure A).

8.2. Historical period

Historical finds include middens, structural remains and the cultural landscape. Structures of unknown age occur within the prospecting right area. No structures are in close proximity to the proposed boreholes. No impact on the Built Environment is expected.

8.3. Burials and Cemeteries

There are no graves on record for the study area but graves and informal cemeteries can be expected anywhere on the landscape

<p>Impact on Heritage resources During the non-invasive prospecting no impacts are foreseen on heritage resources. Although unlikely the future invasive prospecting activities of the proposed project could impact on graves, archaeological sites and historical sites.</p>			
Issue	Nature of Impact	Extent of Impact	No-Go Areas
Disturbance and destruction of archaeological sites, historical sites and graves.	Invasive exploration activities could cause irreversible damage or destroy heritage resources and depletion of the archaeological record of the area.	Low on a local scale.	Not expected unless grave sites are recorded.
<p>Description of expected significance of impact No sites of significance are expected unless grave sites are recorded during the field visit.</p>			
<p>Gaps in knowledge & recommendations for further study Based on the literature review the study area has not been subjected to heritage resource surveys and it is assumed that information obtained for the wider region is applicable to the study area. It is recommended that prior to invasive prospecting, impact areas should subject to a field study to confirm the lack of heritage resources.</p>			

9. POTENTIAL SIGNIFICANCE OF HERITAGE RESOURCES

Based on the current information obtained for the area at a desktop level it is anticipated that any sites that occur within the proposed development area will have a Generally Protected B (GP. B) or lower field rating and all sites should be mitigatable. No red flags have been identified.

10. CONCLUSIONS AND RECOMMENDATIONS

The proposed prospecting will consist of core drilling. The impact areas are relatively small in relation to the prospecting right area as each exploration site will disturb a minimum area of 40 m² in total and 5m² affected per individual borehole. At present about 8 boreholes will be drilled and is assessed in at desktop level in this report

Potential impacts for the study area are assessed against the available literature as well as aerial imagery and historical topographic maps. Based on the literature review, the study area is considered to be of low heritage potential and the key findings include the following:

- Structures of unknown age occur within the prospecting right area. No structures are in close proximity to the proposed boreholes. No impact on the Built Environment is expected.
- Based on Lithology maps of the area no raw material suitable for the manufacturing of lithics occur in the prospecting area and no Stone Age sites of significance is expected.
- Iron Age settlements in the Free State is marked by extensive stone walled settlements easily visible on aerial imagery. No visible stone walled settlements occur on aerial images consulted.
- Based on the SAHRA paleontological sensitivity map the area is of moderate sensitivity and an independent paleontological assessment was conducted (Millstead 2019). This study concluded that no damage mitigation protocols are required to be enacted for this prospecting phase of the project.
- No known graves occur in the study area. It should be noted that graves can occur anywhere on the landscape and informal graves can expected in the study area.

It is anticipated that any sites that occur within the project area will have a Generally Protected B (GP.B) or lower field rating and all sites should be mitigatable and no red flags have been identified. It is therefore recommended that non-invasive exploration can commence (based on approval from SAHRA) with the following conditions of authorisation incorporated:

- Existing roads must be used for all activities as far as possible.
- Proposed drill points must be assessed for the presence of graves and to confirm the expectations of the desktop report of no archaeological significance.
- Inclusion of a chance find protocol in the EMPr.

10.1. Chance Find Procedure – Archaeology

The possibility of the occurrence of subsurface finds cannot be excluded. Therefore, if during construction any possible finds such as stone tool scatters, artefacts or bone and fossil remains are made, the operations must be stopped and a qualified archaeologist must be contacted for an assessment of the find and therefore chance find procedures should be put in place as part of the EMP. A short summary of chance find procedures is discussed below.

This procedure applies to the developer's permanent employees, its subsidiaries, contractors and subcontractors, and service providers. The aim of this procedure is to establish monitoring and reporting procedures to ensure compliance with this policy and its associated procedures. Construction crews must be properly inducted to ensure they are fully aware of the procedures regarding chance finds as discussed below.

- If during the pre-construction phase, construction, operations or closure phases of this project, any person employed by the developer, one of its subsidiaries, contractors and subcontractors, or service provider, finds any artefact of cultural significance or heritage site, this person must cease work at the site of the find and report this find to their immediate supervisor, and through their supervisor to the senior on-site manager.
- It is the responsibility of the senior on-site Manager to make an initial assessment of the extent of the find and confirm the extent of the work stoppage in that area.
- The senior on-site Manager will inform the ECO of the chance find and its immediate impact on operations. The ECO will then contact a professional archaeologist for an assessment of the finds who will notify the SAHRA.

11. PLAN OF STUDY

With cognisance of the recorded archaeological sites in the wider area as well as within the study area and in order to comply with the National Heritage Resources Act (Act 25 of 1999) it is recommended that once the impact areas for invasive prospecting activities has been confirmed these areas should be subjected to a field assessment to confirm the lack of significant resources. During this study sites of archaeological, historical or places of cultural interest must be located, identified, recorded, photographed and described. During this study, the levels of significance of recorded heritage resources must be determined and mitigation proposed should any significant sites be impacted upon, ensuring that all the requirements of the SAHRA are met.

11.1 Reasoned Opinion

If the above recommendations are adhered to, HCAC is of the opinion that the impact of non-invasive exploration on heritage resources is negligible. Once exploration sites are fixed the impacts resulting from this can be mitigated. This will be confirmed through the field visit in the next phase of the project.

If during the any stage of the project, any archaeological finds are made (e.g. graves, stone tools, and skeletal material), the operations must be stopped, and the archaeologist must be contacted for an assessment of the finds. Due to the subsurface nature of archaeological material and graves the possibility of the occurrence of unmarked or informal graves and subsurface finds cannot be excluded.

12. LIST OF PREPARERS

Jaco van der Walt (Archaeologist and project manager).

Dewald Nel (Archival Specialist)

13. STATEMENT OF COMPETENCY

The author of the report is a member of the Association of Southern African Professional Archaeologists and is also accredited in the following fields of the Cultural Resource Management (CRM) Section, member number 159: Iron Age Archaeology, Colonial Period Archaeology, Stone Age Archaeology and Grave Relocation. Jaco is also an accredited CRM Archaeologist with SAHRA and AMAFA.

Jaco has been involved in research and contract work in South Africa, Botswana, Mozambique, Zimbabwe, Tanzania and the DRC and conducted well over 300 AIAs since he started his career in CRM in 2000. This involved several mining operations, Eskom transmission and distribution projects and infrastructure developments. The results of several of these projects were presented at international and local conferences.

14. STATEMENT OF INDEPENDENCE

I, Jaco van der Walt as duly authorised representative of Heritage Contracts and Archaeological Consulting CC, hereby confirm my independence as a specialist and declare that neither I nor the Heritage Contracts and Archaeological Consulting CC have any interest, be it business, financial, personal or other, in any proposed activity, application or appeal in respect of which the client was appointed as Environmental Assessment practitioner, other than fair remuneration for work performed on this project.



SIGNATURE:

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