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APPLICATION FOR PROSPECTING RIGHTS

HERITAGE BASELINE REPORT

DESKTOP STUDY

FOR THE PROPOSED MINERAL EXPLORATION ON FARMS, PLAAS 503, PLAAS 532, MAKUKUWE 522, THABA LETSELE 643 AND SEREMONENE 642 WITHIN Z.T. MGCAWU DISTRICT (FORMALLY SIYANDA DISTRICT)

NORTHERN CAPE PROVINCE

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PROFESSIONAL DECLARATION

I the undersigned, Mr. Ndivhuho Eric Mathoho hereby declare that we are Professional archaeologists accredited with the Association for South African Professional Archaeologists (ASAPA) and that Vhufahashu Heritage Consultants is an independent consultants with no association or with no any other interest what so ever with any institution, organization, or whatever and that the remuneration earned from consulting work constitute the basis of company livelihood and income.

Mr. Mathoho Ndivhuho Eric

Archaeologist and Heritage Consultants for Vhufahashu Heritage Consultants ASAPA Members

LIST OF FIGURES

AIA	Archaeological Impact Assesment
PIA	Palaeontological Impact Assesment
EIA	Environmental Impact Assesment
EIA	Early Iron Age
EMP	Environmental Management Plan
VHHC	Vhufahashu Heritage Consultants
NEMA	National Environmental Management Act, 1998 (Act No.107 of 1998)
NHRA	National Heritage Resources Act, 1999 (Act No.25 of 1999)
SAHRA	South African Heritage Resources Agency
ICOMOS	International Council of Monuments and Sites
ESA	Early Stone Age
MSA	Middle Stone Age
LSA	Late Stone Age
IA	Iron Age
LIA	Late Iron Age
UNESCO	United Nations Educational, Scientific and culturural Organization
WHC	World Heritage Conventions of 1972

Contents

EXECUTIVE SUMMARY

Note: This report follows minimum standard guidelines required by the South African Heritage Resources Agency (SAHRA and South African Provincial Heritage Authorities) for compiling a baseline assessment report

The study area is located in the Northern Cape Province within Z.T. Mgcawu District formally known as Siyanda District. The municipality forms the northern frontier boundary with Botswana. The vast land consists of private farm land and is scarcely populated due to its predominant agricultural characteristics. The province is known owing to the extremely presence of Khoisan people who were also the first permanent inhabitants of South Africa.

Results of the potential direct and indirect impacts of the proposed mineral prospecting

Based on an interdisciplinary methodology, that combined ICOMOS methodology with several techniques from various disciplines, the impacts of the proposed mineral exploration on various farms were considered. The following conclusions were reached:

- The proposed mineral exploration is scheduled to take place several kilometers south west of the palaeontological and archaeological rich sites of Kathu Pan in the Northern Cape where significant Palaeo environmental, sedimentological and archaeological sites that host early stone tools were recovered. The overall deposit represents landscape draw from hominids and animal as well as many other potential sources of Palaeoenvironments, this discovery cannot be underestimated and are the best sequence from the Kalahari Basin.

- It is important to understand the relationship between the proposed mining activities and the history of the earmarked farms since the study areas are located on private property and are farmland that encompasses animal husbandry, game farming and cultivations. There are possibilities to encounter historical farm homesteads houses, Anglo Boer War Monuments and

associated Block houses, burial grounds and grave yards of pre 18 and 20th century marked or unmarked graves.

- Should the proposed mineral exploration be open cast visual impacts assessment should be conducted to determine what will emanate from the proposed activities?
- There is no specific detailed palaeontological studies conducted yet, however there are no records of fossils known within the demarcated area.

- Cumulatively, the only impacts that are possible are largely indirect but they must be monitored in the short to long term.

Management recommendations

- It is strongly recommended that the proposed mineral exploration take place on a ground that is already disturbed such as cultivated lands, near access gravel roads and exposed rocky outcrops. Mining or drilling of core sample activities should be restricted to depressed areas, river banks and fountains as these sites host paleontological and archaeological deposits. Drilling and mineral exploration on disturbed area must be managed and monitored to ensure that archaeological sites that convey scientific significance are not disturbed.

- A phase 1 Heritage Impact Assessment (HIA) and Palaeontological Impact Assessment (PIA) is strongly recommended. These field assessments should be undertaken before the commencement of mining activities. The exploration phase may entail several substantial excavations into the underlying bedrock. These excavations may disturb damage or destroy sites with scientific valuable archaeological or fossil heritage exposed at the surface or buried below ground.

- The above mentioned studies would be the prelude for the development of a monitoring and management plan used to manage direct and indirect impacts during the envisaged mining process. The monitoring process would ensure that should any fossils, archaeological or human remains be disturbed during excavations, immediate remedial rescue and salvage work would be actioned without delay.

- Drilling of mineral core sample and the construction of access gravel roads should not impact structures currently in existence on farmland these include farm homestead, burial ground and

cemeteries (Historical sites). From the topographical and Google earth program there are isolated individual farm homesteads visible through the entire study area.

Conclusions relating to Baseline Impact Assessment

All archaeological, paleontological and burial grounds and graves have general protection under the National Heritage Resource Act- Act 25 of 1999. As such, all sites known or unknown situated within study area may not be disturbed or destroyed without authorisation from the compliance agency, SAHRA (South African Heritage Resources Agency). In brief, the following overall recommendations apply:

- Should any new roads be constructed in areas outside the already disturbed area, the process must be monitored for archaeological and paleontological materials.
- In the chance finds event, should archaeological materials or human burials remains be exposed during subsurface construction work on any section of the mine lay down sites, operations should cease on the affected area and the discovery must be reported to the heritage authorities immediately so that an investigation and evaluation of the finds can be made. The overriding objective, where remedial action is warranted, is to minimize disruption in mining and construction scheduling while recovering archaeological and any affected cultural heritage data as stipulated by the PHRA and NHRA regulations.
- A professional paleontologist and archaeologist must be retained to monitor all significant earth moving activities that may be implemented. Subject to the recommendations herein there are no significant cultural heritage resources barriers to the proposed mineral exploration. The Heritage authority may approve the proposed development to proceed as planned with special commendations to implement the recommendations here in made.

Responsibilities in the Heritage Baseline Assessment

1. Manngwe Mining (PTY) LTD *(the Developer)* should ensure that no heritage sites are destroyed without permission from the relevant compliance authority and that chance finds are reported to archaeologist and the relevant authorities (SAHRA).
2. The South African Heritage Resources Agency should ensure that the developer complies with applicable sections of NHRA 25: 1999 on an on-going basis throughout the lifetime of the mine.

3. SAHRA *(custodians of heritage resources)* and the Management Authority should work with Manngwe Mining PTY (LTD) to ensure that attributes conveyed by paleontological and archaeological sites of the study area are not eroded.
4. The Management authority and other stakeholders must ensure that local community participates in the proposed mine development and also derives economic benefits.

1. INTRODUCTION

Manngwe Mining (PTY) LTD has identified the extent of farms Plaas 503, Plaas 532, Makukuwe 522, Thaba Letsele 643 and Seremonene 642 as suitable farms with Mineral deposit. For Manngwe to proceed with mineral exploration as required by relevant legislation they appointed Vhufahashu Heritage Consultants to conduct a heritage baseline report for the proposed prospecting or mining operation within the Z.T. Mgcawu District Municipality of the Northern Cape Province, South Africa. The proposed activities form part of the development process, where application for Environmental Management Plan must be completed. Heritage Baseline study report form part of a series of appendices prepared and submitted to the to the Department of Mineral Resources (DMR) as applicants for mineral prospecting right or mining permits are required, in terms of provision of section 29(a) section 39(5) regulation 52 of the Mineral and Petroleum Resource development Act (Act No 28 of 2002) which require submission of an Environmental Management Plan (EMP).

Information presented in this report form the basis of heritage baseline resources assessment of the proposed project as the proposal constitutes an activity, which may potentially be harmful to heritage resources that may occur in the proposed demarcated area. In order to comply with the legislation, the Applicant requires information on the heritage resources, and their significance that occur within or near the demarcated area. This will enable the Applicant to take pro-active measures to limit the adverse effects that the development could have on such heritage resources.

The objective of the study is to document the presence of archaeological and historical sites of significance in order to inform and guide planning on decision making. The studies serve as a statutory frame of reference on archaeology and heritage sites. The document enable the developer to align their functions and responsibilities in order to facilitate forward planning in minimizing impact on archaeological and heritage sites. Archaeological/ Heritage impact assessment is conducted in line with the National Heritage Resources Act of 1999 (Act No. 25 of 1999). The Act protects heritage resources through formal and general protection. The Act provides that certain developmental activities require consents from relevant heritage resources authorities. The South African Heritage Resources Agency developed minimum standards for impact assessment, In addition to these local principles and standards, the International Council of Monuments and Sites (ICOMOS) published guideline for assessing impacts. The Burra Charter of 1999, require a caution approach to the management of sites, it set out the need to understand the significance of heritage places, and the significance guide decisions.

The proposed study serve as framework tools which ensure that the National Heritage Resources Act (25 of 1999) and the ICOMOS standard principles are applied, in an effective and equitable manner in order to avoid loss and disturbance of heritage sites in the study area. This will enable applicant to take pro-active measures to limit the adverse effects that the development could have on such heritage resources. Information presented in this report form the basis of Archaeological resources assessment of the proposed project as the proposal constitutes an activity, which may potentially have direct or indirect impact to heritage resources that may occur in the proposed study area.

The National Heritage Resources Act (NHRA - Act No. 25 of 1999) protects all structures and features older than 60 years (Section 34), archaeological sites and material (Section 35) and graves and burial sites (Section 36). In order to comply with the legislation, the applicant requires information on the heritage resources, and their significance that occur in the demarcated area. This will enable the Applicant to take pro-active measures to limit the adverse effects that the development could have on such heritage resources.

2. RELEVANT LEGISLATION

Two sets of legislation are relevant for the study with regards to the protection of heritage resources and graves.

2.1. The National Heritage Resource Act (25 of 1999)

This Act established the South African Heritage Resource Agency (SAHRA) as the prime custodians of the heritage resources and makes provision for the undertaking of heritage resources impact assessment for various categories of development as determined by section 38. It also provides for the grading of heritage resources (section 7) and the implementation of a three-tier level of responsibly and functions from heritage resources to be undertaken by the State, Provincial and Local authorities, depending on the grade of heritage resources (section 8)

In terms of the National Heritage Resource Act 25, (1999) the following is of relevance:

Historical remains

Section 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.

Archaeological remains

Section 35(3) Any person who discover archaeological or Paleontological object or material or a meteorite in the course of development or agricultural activity must immediately report the find to the responsible heritage resource authority or the nearest local authority or museum, which must immediately notify such heritage resources authority.

Section 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;
- destroy, damage, excavate, remove from its original position, collect or own any archaeological or paleontological material or object or any meteorite;
- trade in ,sell for private gain, export or attempt to export from republic any category of archaeological or paleontological material or object or any meteorite; or
- bring onto or use at an archaeological or paleontological site any excavation equipment or any equipment which assist with the detection or recovery of metal or archaeological material or object or such equipment for the recovery of meteorites.

Section 35(5) When the responsible heritage resource authority has reasonable cause to believe that any activity or development which will destroy, damage or alter any archaeological or paleontological site is underway, and where no application for a permit has been submitted and no heritage resource management procedures in terms of section 38 has been followed, it may

- serve on the owner or occupier of the site or on the person undertaking such development an order for the development to cease immediately for such period as is specified in the order
- carry out an investigation for the purpose of obtaining information on whether or not an archaeological or paleontological site exists and whether mitigation is necessary;
- if mitigation is deemed by the heritage resources authority to be necessary, assist the person on whom the order has been served under paragraph (a) to apply for a permit as required in subsection (4); and
- recover the cost of such investigation from the owner or occupier of the land on which it is believed an archaeological or paleontological site is located or from the person proposing to undertake the development if no application for a permit is received within two week of the order being served.

Subsection 35(6) the responsible heritage resource authority may, after consultation with the owner of the land on which an archaeological or paleontological site or meteorite is situated; serve a notice on the owner or any other controlling authority, to prevent activities within a specified distance from such site or meteorite.

Burial grounds and graves

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

(i) 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

(ii) bring onto or use at a burial ground or grave any excavation equipment, or any equipment which assists in detection or recovery of metals.

Subsection 36 (6) Subject to the provision of any person who in the course of development or any other activity discover the location of a grave, the existence of which was previously unknown, must immediately cease such activity and report the discovery to the responsible heritage resource authority which must, in co-operation with the South African Police service and in accordance with regulation of the responsible heritage resource authority-

(I) carry out an investigation for the purpose of obtaining information on whether or not such grave is protected in terms of this act or is of significance to any community; and

if such grave is protected or is of significance, assist any person who or community which is a direct descendant to make arrangements for the exhumation and re-interment of the contents of such grave or, in the absence of such person or community, make any such arrangement as it deems fit.

Cultural Resource Management

Section **38(1)** Subject to the provisions of subsection (7), (8) and (9), any person who intends to undertake a development*…

- must at the very earliest stages of initiating such development notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development.

development means any physical intervention, excavation, or action, other than those caused by natural forces, which may in the opinion of the heritage authority in any way result in a change to the nature, appearance or physical nature of a place, or influence its stability and future well-being, including:

(i) Construction, alteration, demolition, removal or change of use of a place or a structure at a place;

(ii) Any change to the natural or existing condition or topography of land, and

(iii) Any removal or destruction of trees, or removal of vegetation or topsoil;

place means a site, area or region, a building or other structure

structure means any building, works, device or other facility made by people and which is fixed to the ground.

Various categories recognized as part of the national estate includes

I. Geological sites of scientific or cultural importance
II. Paleontological sites
III. Paleontological objects, natural, meteorites and rare geological specimen

2.2. The Human Tissue Act (65 of 1983)

This act protects graves younger than 60 years, these falls under the jurisdiction of the National Department of Health and the Provincial Health Department. Approval for the exhumation and reburial must be obtained from the relevant provincial MEC as well as relevant Local Authorities.

3. TERMS OF REFERENCE

The terms of reference for the study were to undertake a Baseline study for the proposed mineral exploration on five farms, namely Plaas 503, Plaas 535, Makukuwe 522, Thaba letesele and Seremonene in the Northern Cape and submit a specialist report, which addresses the following:

- Executive summary
- Methodology used to obtain supporting information
- Overview of relevant legislation
- Interpretation of information
- Mitigation measures and recommendations
- Conclusion
- References

4. TERMINOLOGY

The Heritage includes all human-made phenomena and intangible products that are result of the human mind. Natural, technological or industrial features may also be part of heritage resources, as places that have made an outstanding contribution to the cultures, traditions and lifestyle of the people or groups of people of South Africa.

The term ' pre –historical' refers to the time before any historical documents were written or any written language developed in a particular area or region of the world. The historical period and historical remains refer, for the project area, to the first appearance or use of 'modern' Western writing brought South Africa by the first colonist who settled in the Cape in the early 1652 and brought to the other different part of South Africa in the early 1800.
The term 'relatively recent past' refers to the 20th century. Remains from this period are not necessarily older than sixty years and therefore may not qualify as archaeological or historical remains. Some of these remains, however, may be close to sixty years of age and may in the near future, qualify as heritage resources.

It is not always possible, based on the observation alone, to distiqiush clearly between archaeological remains and historical remains or between historical remains and remains from the relatively recent past. Although certain criteria may help to make this distinction possible, these criteria are not always present, or when they are present, they are not always clear enough to interpret with great accuracy. Criteria such as square floors plans (a historical feature) may serve as a guideline. However circular and square floors may occur together on the same site.

The 'term sensitive remains' is sometimes used to distiqiush graves and cemeteries as well as ideologically significant features such as holy mountains, initiation sites or other sacred places. Graves in particular are not necessarily heritage resources if they date from the recent past and do not have head stones that are older than sixty years. The distinction between 'formal' and 'informal' graves in most instances also refers to graveyards that were used by colonists and by indigenous people. This distinction may be important as different cultural groups may uphold different traditions and values with regard to their ancestors. These values have to be recognized and honored whenever graveyards are exhumed and relocated.

The term ‘Stone Age’ refers to the prehistoric past, although Late Stone Age people lived in South Africa well into the historical period. The Stone Age is divided into an Early Stone Age (3Million years to 150 000 thousand years ago) the Middle Stone Age (150 000 years ago to 40 years ago) and the Late Stone Age (40 000 years to 200 years ago).
The term ‘Early Iron Age’ and Late Iron Age respectively refers to the periods between the first and second millenniums AD.

The ‘Late Iron Age’ refers to the period between the 17th and the 19th centuries and therefore includes the historical period.
Mining heritage sites refers to old, abandoned mining activities, underground or on the surface, which may date from the pre historical, historical or relatively recent past.
The term ‘study area’ or ‘project area’ refers to the area where the developers wants to focus its development activities (refer to plan)

Phase I studies refers to survey using various sources of data in order to establish the presence of all possible types of heritage resources in a given area.
Phase II studies includes in-depth cultural heritage studies such as archaeological mapping, excavating and sometimes laboratory work. Phase II work may include documenting of rock art, engravings or historical sites and dwellings; the sampling of archaeological sites or shipwrecks; extended excavation of archaeological sites; the exhumation of bodies and the relocation of grave yards, etc. Phase II work may require the input of specialist and require the co-operation and the approval of SAHRA.

5. ASSUMPTIONS AND LIMITATION

In adequate archaeological/Palaeontological studies conducted within the study area, sheet (maps) explanation poor locality information of the Northern Cape archaeological and palaeontological sites.

6. METHODOLOGY

6.1. Source of information

A multi-stepped methodology was used to address the terms of reference. The techniques used involved a robust dedicated library research to situate known sites in the region. To begin with, a literature survey was done to understand the archaeology and physical landscape of the area. Since this region has witnessed an upsurge of contract research over the years, the literature survey also included a dedicated study of the CRM reports archived at the SAHRA office in Cape Town. The library resources at the Universities such as UP and UCT and the South African History Museum in Pretoria were consulted. This included consulting the 1972 Convention, the operational guidelines of 2013, the ICOMOS (2011) guidelines on assessing impact. In conformity with the National Heritage Resources Act (Act 25 of 1999) the IUCN guidelines and standards of best practice were also consulted. Subsequently, a review of the paleontology and archaeology of the area was carried out using contract archaeology reports, research reports and academic publications. The information gathered covered not just the archaeology of the area but also its geological database.

Accordingly the specialist consulted the following data base sources:

- Published maps (Top Cadastral Maps)
- Google Earth, Google Maps and other Cartographic databases

The desktop study creates a list of known heritage resource sites, possible, and actual impacts as well as providing best practice.

7. THE PROPOSED STUDY AREA

The study area is located in the Northern Cape Province within Z.T. Mgcawu District. The area was formally known as Siyanda District. The municipality forms the northern frontier boundary with Botswana. The vast land consists of private farm land and is scarcely populated due to its predominant agricultural characteristics. The province is known owing to the extremely presence of Khoisan people who were also the first permanent inhabitants of South Africa.

The province is known due to the presence of significant prehistoric sites represented by archaeology and paleontological evidence. Some of the most prominent archaeological and paleontological sites have been investigated since the early 1970s.

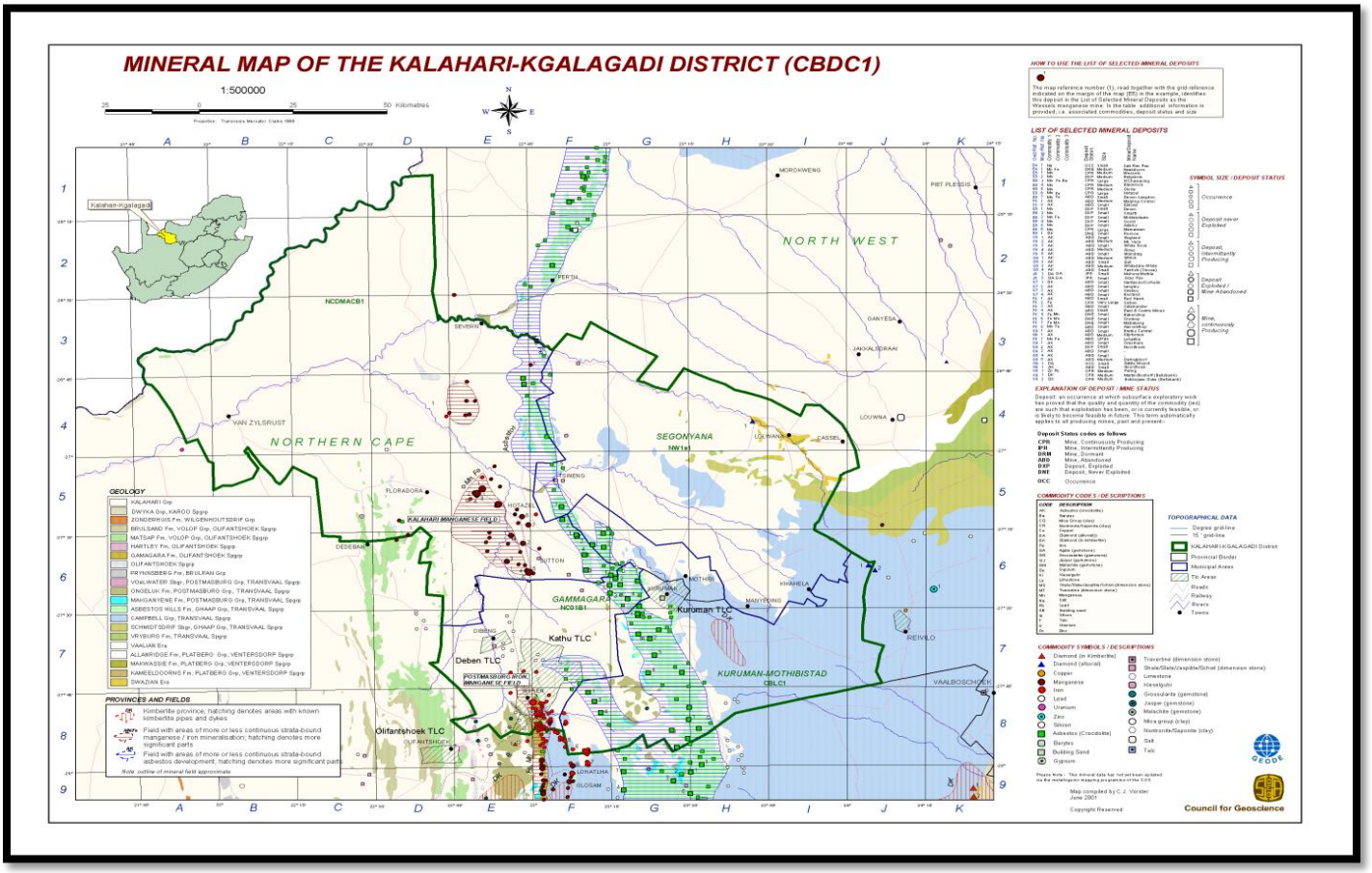

Figure 1: A map of Northern Cape and its Mineral deposit, adopted from the Internet.

8. DRAINAGE, GEOLOGY AND VEGETATION OF THE STUDY AREA

The geology and soil is characterized by colluvial sandy, gravelly and boulder, river alluvium, surface gravel of various origins, as well as spring and Pan Sediments. The geology falls within the Kalahari sediments. Its distribution stretches from Northern Cape to North West Provinces. The Kalahari sediments cover the Precambrian metamorphic crust with section of dry river beds by silt, sand and rocky outcrop deposit of poorly drained but rich in nutrients. The banks of these rivers beds can cut deep into duricust (calcrete or silcrete) and various transitions between end members could be observed. Some

places show fericrete, hematite, migmatite and banded ironstone (Werger, 1978, Thomas & Shaw 1991, Mucina & Rutherford, 2006).

Some of the streams may stay without water and they normally flow in response to dramatic short term rainfall events. Vegetation and landscape features are characterized by sparse, patchy grass and sedge land. Some of the common dominant grass species include (*Panicum, Eragrostis, Euneapogon tragus, Chloris, Cenchrus)* on the bottom of mostly dry riverbeds occur low shrubs (Mucina & Rutherford, 2006). Taller shrubs often occur on the river bank and relatively dominated by *Acacia Erioloba* trees. Some of the rivers such as Kuruman must experience effective subsurface flow of water judging from the near continuous belt of trees. In certain areas the thick vegetation is fed by large reserve of underground waters that used to bubble to the surface.

9. BRIEF SYNTHESIS

Archaeology/historical classifications are more controversial but the broad outline is well established. The Archaeological and heritage studies in the region indicate that the area is of high pre- historic and heritage significance. It is in fact a cultural landscape where heritage understanding is supported by overwhelming recorded evidence represented by the presence of cultural material fingerprints (remains). Generally the archaeology of human occupation within the study area is made out of pre colonial elements (stone and Iron ages) as well as the colonial components.

9.1. STONE AGE SEQUENCE (ESA, MSA and LSA)

The Early Stone Age of the area is fairly well understood and stretches from 250 000 years ago. The earliest stone tools are known as the Acheulian industry and are dominated by heavy butchering tools. Inferential evidence suggests that these simple tools were used to chop and butcher meat, de- skin animals and probably to smash bones to obtain marrow (Phillipson 2005). The presence of cut marks from animal fossil bones dating to this period has led to the conclusion by researchers that human ancestors were scavengers and not hunters (Wadley 2007; Esterhuysen, 2007). They may have preyed on drowned or crippled animals or shared a kill by other predators, which explains why some ESA sites contain high proportions of bone from large and dangerous game (Wadley, 2007). The fossil site of Kathu pan yielded early Stone Age tools (Acheulian hand axes) that were dated to nearly 100 000 years ago (Walker, Chazan & Morris 2013).

The Acheulian industries are characterized by the presence of bifacial hand axes and cleavers. These bifacial tools emerged started around 1.5 million years ago (mya) at places such as Sterkfontein. The Acheulian techno-complex was characterized by a great deal of standardization of tools across widely separated areas from Africa to Eurasia (Sharon, 2009). Evidence presented from Sterkfontein cave, Kathu pan in the Kalahari shows that the first tool making hominids belong to either an early species of the Homo or an immediate ancestor which is yet to be discovered here in South Africa (Esterhuysen, 2007). The Acheulian industries are well represented in the archaeology of the Cradle of Humankind particularly at sites such as Sterkfontein and Kromdraai and Kathu pan (Walker, Chazan & Morris 2013).

The Middle Stone Age dating between roughly 250 000 years ago and 25 000 years before present succeeded the Early Stone Age. Comparatively, Middle Stone Age tools are smaller than those of the Early Stone Age period. They are characterized by smaller hand axes, cleavers, and flake and blade industries. The period is marked by the emergence of modern humans and is characterized by the appearance of fairly complex technology, modern human behavior, art, and symbolism (Thompson & Marean, 2008). A variety of MSA tools includes blades, flakes, scraper and pointed tools that may have been hafted onto shafts or handles and used as pear heads. Residue analyses on some of the stone tools indicate that these tools were certainly used as spear heads (Wadley, 2007). The presence of spear heads on some of the MSA assemblages is an indication that these group of people were hunters who targeted middle sized game such as hartebeest, wildebeest and zebra (Wadley, 2007), Some assemblages are show the presence of bone tools such as bone points. The Late Stone Age (LSA) which stretches from 25 000 years ago to about 2000 years ago is the last phase of the Stone Age. The LSA is characterized by the use of microlithic tools some of which were found in most sites around the region.

9.2. Iron Age Period

Documents suggest that the Iron Age communities moved into southern Africa by c. AD 200, entering the study area either by moving down into the Northern Cape via Botswana or via coastal plains route. Their movement followed various rivers inland. Being cultivators, they preferred the rich alluvial soils to settle on. These landscapes, drainage systems and good climatic conditions could have influenced diverse societies including wildlife and farming communities to settle within the region. It is indisputable that the natural environment has played the dominant part; nevertheless it is not deterministic (Katsamudanga, 2007). The introduction of farming communities in southern Africa early in the first millennium AD is characterised by the appearance of distinctive pottery wares (Huffman, 2007), metal working (Friede,

1979), agriculture and sedentism (Maggs, 1980; Phillipson, 2005). Mining and metallurgy were largely limited to the reduction of iron and copper ore for the manufacturing of utilitarian and decorative implements.

Iron Age occupation of the region seems to have taken place on a significant scale and at least three different phases of occupation have been identified, however the last period of pre-colonial occupation consisted of Korana, Batswana speaking people that settled on stone-walled sites and caves. At present it is not clear, but, judged on the pottery found; these sites might even date to early historic times. As this was a period of population movement, conflict and change, it in large part set the scene for the current population situation in the country. Considering the time period that they were occupied, they also feature in the early historic period. Preliminary archaeological investigation by the McGregor Museum revealed that early mining had contrary to the cited historical evidence, Charcoal sample submitted for Radio Carbon dating indicated that mining activities in the excavated portion range from 19th century to AD800 (Ibid 1981).

9.3. Historical/Colonial Period

The region was once occupied by the Bushman and later the Korana and the Griquas. The region became hunting grounds of the early European travelers and was made known from writers like Lichtenstein and Buchell, from the above mentioned writings the region was infiltrated by Missionaries such as Moffat.
Historically the region is known from the occurrence of ancient mine which is located approximately 5kilometers west of Postmanburg CBD. The Local Municipality derived its name from this famous ochre mine. This cave site was first described from historical records by P.B Borcherds who visited the area in the early 1801.The area was further examined by Dr. Somerville who was an interpreter during the expedition. Historical documents suggest that the site was characterized by a cave with red mixed mica and iron ore, which was mined by Tswana speaking groups and nearby local communities. According to Beaumont and Thackeray (1981) the locals besprinkle themselves with this powder after besmearing themselves with grease or fat, which gives their bodies a reddish shining colour (Beaumont and Thackeray, 1981).

The site was further investigated in the early 1805 by H Lichtenstein and later in 1812 by Williem Burchell who maintained that several Tswana people lost their lives after the mine roof

collapsed down while they were busy extracting ochre, He further maintained that incidences like this shows that there was no control of the mining activities in the area, entrance into the mine was open to every individual without restrictions. Investigations shows that the floor of the cave was scatted with animal bones, with sections of heath remains, an indication that fire was used possibly as the source of light inside the cave. Records also show that the cave was also used as refuge shelter during the time of war and there is evidence that suggest that san communities as well as wild animals used to stay inside the cave (Ibid 1981).

The area was regarded as the Mecca to the nations around Postman burg some travel from far to obtain fresh supply of the shining powder. From the early 19th century Boer farmers started expanding from the Cape and by the 1840s and 1850s had reached parts of the study area resulting in the establishment of the ZAR Republic. Availability of springs and fountains in the vicinity attracted nomadic trekboers who served as prospectors and miners working on the rich iron ore deposits near Sishen farm. The Boers had skirmishes with the British that are famously chronicled in the Anglo Boer War of 1901-2. Evidence of early settlements, Anglo-Boer War sites and early mines associated with the early colonial frontier are also found in the Northern Cape.

10.1. PALEONTOLOGICAL HERITAGE SENSITIVITIES

The Northern Cape Province and Kalahari region are rich in world renowned palaeoanthropological, palaeontological, Stone Age, Iron Age and historical sites. Within the study area there are at least more than 40 prominent Palaeecological and archaeological sites and their environs. Generally, the archaeology of human occupation within the study area stretches from the Early Stone Age up to the recent past (Calabrese, 1996; Huffman, 2007). As such, the Kathu pan and surrounding environs host significant evidence of the biological and cultural evolution of humanity as well as other animals (Walker, Chazan & Morris 2013).

This very rich cultural and natural landscape demands sustainable and effective management to ensure that the integrity and authenticity of attributes that convey its Outstanding Universal Value (OUV) is not eroded. Alongside and predating the hominid period of occupation is a sequence of fossil mammals, micro-mammals and invertebrates which provide a window onto faunal evolution, palaeobiology and

palaeoecology stretching back into the Pliocene. This record has come to play a crucial role in furthering our understanding of human evolution and the appearance of modern human behaviour. The fossil evidence contained within these sites proves conclusively that the African continent is the undisputed Cradle of Humankind. Collectively these components contain the necessary evidence of sites where abundant scientific information on the evolution of homo over the past 3.5 million years was uncovered. Furthermore, the nominated serial site covers an area big enough to constitute a vast reserve of scientific information, with enormous potential.

According to Almond (2012) Sishen and its surrounding falls within the superficial sediments of probable Late Caenozoic (i.e. Late tertiary or Neogene to recent) age, many of which are assigned to the Kalahari Group. The geology and soil is characterized by colluvial sandy, gravelly and boulder, river alluvium, surface gravel of various origins, as well as spring and Pan Sediments. The colluvial and alluvial deposit may be extensively concretized (i.e cemented with pedogenic limestone). The Gordonia formation dune sand are mainly active during cold drier interval of the Pleistocene Epoch that were inimical to most of Life, apart from hardy, desert adapted species. The porous dune sands are not generally conducive to fossil preservation. However, mummification of soft tissue may play a role and migrating lime rich ground water derived from the underlying bedrock (including for example, dolerite) may lead to the rapid concretizations of organic structures such as burrows and roots cast (Almond, 2012).

Occasional terrestrial fossil remains that might be expected within the proposed study area and the identified units included calcretized rhizoliths (roots cast), ostrich eggshells and shell of land snails. A wide spectrum of vertebrate and invertebrates remains, trace of fossil, plant fossil and Microfossil have been recorded from these Kalahari Group sediments (Almonds, 2008; Almonds and Pether, 2008; Almonds, 2012). They represent a succession of palaeo ecosystems. The caves, breccias and strata from which quantities of fossils or tools have been extracted, together with the landscape are generally intact, but are vulnerable to development pressures such as mining. Impacts on fossil heritage here are likely to be of low significance.

Table 1: Paleontological sensitive areas of the Northern Cape

SENSITIVE PALEONTOLOGICAL AREAS WITHIN THE REGION	**THE REGIONAL GEOLOGICAL DESCRIPTION**

GLOSAM, POSTMAN BURG, TSANTSABANE AND TREWIL	These areas are underlain by early Precambrian marine carbonates rocks of the Campbell and subgroup (Ghaap group, Transvaal super group) that are known for their prolific fossil records of stomatilites ie Laminated Microbial reef constructed by Cyanobacteria in some cases associated with well preserved microfossil (Almonds 2012).
WINCANTON, SISHEN, KURUMAN AND ULCO	These areas are underlain by late Caenozoic (probably Plio-pleistocene) calcrete, pedogenic lime stone at least some of which may be attributed to the Mokola2qcv en formation of the Kalahari group. This is characterized by Pleistocene Aeolian (Wind blown) sands of the Gordonia formation (Kalahari Group) A wide spectrum of vertebrates, invertebrates remains, trace fossils, plant fossils and microfossils have been recorded from these Kalahari groups sediments (Almonds 2012).

10.2. ARCHAEOLOGICAL HERITAGE SENSITIVITIES

The Northern Cape region is well known from its Stone Age phase, associated with the early of human development. According to Beaumont (1990) the pan is located just west of the current extent of Kathu, south of Sishen airport, on farms Marsh 467, Saccha 468, Kathu 465 and Sims 462. The pan has produced extremely significant archaeological and paleontological data since its discovery in 1974 (Anon, 1975, Butzer, et al. 1978, Burtzer 1982; Beaumont, 1983, Beaumont & Bednarik, 2013; Bednarik, 2013).

Some of the recorded archaeological sites have been represented by caves with rock art some are associated with rocky outcrops or water sources. Collectively these sites have produced abundant scientific information on the evolution of modern humans over the past. They constitute a vast reserve of scientific information, with enormous potential. These sites contain within their deposits all of the key interrelated and interdependent elements in their archaeological relationships.

Kathu Pan form one of the eleven localities excavated between 1978 and 1990 by Peter Beaumont. The Pan is a geological formation formed by a shallow depression with an internal drainage and a fluctuating

high water table. In 1974 archaeological stone hand axes and faunal remains were observed in the wall of the sinkhole or depression near the home stead of the farm manager Mr. Nass Viljoen (Beaumont 1990). Butzer (1983, 1984) described these deposit as "perhaps the best Paleoenvironmental sequence from Kalahari basin comes from Kathu Vlei".

The Kathu Pan Stone hand axes were reported in the *Diamond field Advertiser* (Kimberly) News paper. The first archaeologist to conduct fields work at the pan was A.J.B Humphreys in 1975. The initial work was followed by the McGregor Museum under the auspice of Peter Beaumont in 1978. According to Beaumont (1990) the archaeological deposit observed are important and unique because they contain both the early Stone Age artefacts and fauna in association with each other in primary context. Kathu pan contain stratified deposit from both early to the Middle Stone Age. Evidence of pigment utilization and transportation was noted on site (Beaumont & Bednarik, 2013, Bednarik 2013, Beaumont & Vogel 2006; Beaumont 1990,)

The above is an indication that Stone Age people occupied the Northern Cape long way back as represented by the fauresmith industries at Kathu. The fauresmith industries is represented by the presence of Levallois point and hand axes with prepared cores, blades and side scrapers, all about 500000 years ago. The identified stone tool were characterized by prepared cores, where blades has been removed, they also have distinctive shape and form. The technology associated with the production of the stone tools is known as the Acheulian and was associated with the *Homo erectus* in Africa.

10.3. ROCK ART SENSITIVITIES

Bushman (San) rock art paintings are part of remarkable religious tradition which is at least 27,500 years old .These represent unique example of the survival of human cultural endeavor. This distinctive prehistoric art and the cultural landscapes in which they are situated are very fragile by their nature. The art includes Petroglyphy (engravings) common in the Northern Cape Province and rock painting (Pictographs), once damaged, or destroyed; they can never be repaired or replaced. Within the South African context rock art is protected by law. The art, sites and landscape provide links with important elements to our past Bushman rock art paintings, there are several different traditions that can be correlated with the cosmology of the San hunter gathering, such as Iron Age farmers.

The rock art is one of the rare arts done in the San tradition, together with the ethnography, and the history of the Sotho/Tswana in the area provides a valuable commentary by which the indigenous people themselves within these villages relates their history and the processes attached to the rock art sites.

Historical records relate that people of mixed San and Sotho descent were living in the wider area as they were engaged in rain making, a practice that was carried on by San people in many parts of southern Africa. The rock paintings tradition is characterized by the earliest tradition of finely detailed images that reflect belief and san cosmology, most of the paintings are in red ochre; survey shows animal figures are more common than any other categories, followed by items such as lines, dots and animal figures etc. This is usually in the South African context where painting of animal and human images pre dominates. As such rock art sites generally have tremendous cultural significance. Furthermore, the sites were used for traditional and religious ceremonies for the creator of the art as well as the recent northern Sotho/ Tswana descendants.

Rock art sites have considerable historical significance as material records of transition between cultural eras. Finally, the sites have great educational value as places where lecturers and students can visit to learn about the history and cultural heritage of the area. Although some research has been conducted in the wider area, there is still potential for archaeological, ethnographic and historical research which can provide additional information to enhance the interpretation of the rock art.

10.4. HISTORICAL HERITAGE SENSITIVITIES

Most of the historical sensitivity area is represented by a period associated with the development farm homestead as well as infrastructure (e.g. roads) many of these farms have been in the ownership of families for generations. As a result they possess a large corpus of information with regarding to the area and its history. A significant numbers of battles and skirmishes took places in the region. There are remains of blockhouses that should be anticipated during the full heritage impact assessment program on the ridges and at river crossings. Most of these sites are currently known and could be avoided by new developments.

10.5. CEMETERY, BURIAL GROUNDS HERITAGE SENSITIVITIES

Just like anywhere in the south Africa , burial grounds are clearly marked by the presence of grave dressings in a form of parked stones and granite tombstones, however there are grave marked by certain type of trees. Informal and formal grave yards (Cemeteries) can be considered to be of high significance and are protected by various laws. Legislation with regard to graves includes the

National Heritage Resources Act (no 25 of 1999) this act applies whenever graves are older than sixty years. The act also distinguishes various categories of graves and burial grounds. Other legislation with regards to graves includes those which apply when graves are exhumed and relocated, namely the Ordinance on exhumation (Ordinance no 12 of 1980) and the Human Tissue Act (Act no 65 of 1983 as amended) (Pistorius, 2010).

11. TOPOGRAPHICAL/ GOOGLE EARTH MAP SYNTHESIS.

11.1 Farm 503 (Map sheet 2723DD&2823BB)

- The farm is characterized by small scale agricultural activities, an old mine exist outside the proposed development corridors
- Scattered isolated boreholes represented by steel wind mill structures
- Existence of natural vegetation with few surface disturbances
- Animal husbandry or game farming activities.
- High chance to find built environment such as old farm houses and associated burial grounds

11. 2. Farm 535 (Map sheet 2723DD&2823BB)

-the area is characterized by natural vegetation and the presence of stream across the section of the farm. The area could be possibly used for animal husbandry. The presence of streams in this farm could have triggered or influence settlement in close proximity to the river bank. There is high chance find of archaeological and historical settlements such as Block houses constructed during the Anglo Boer war.

11.3. Makukuwe 522 (Map sheet 2723AA/AC&2822BB)

-The farm has been subdivided into plots possibly used for game or animal husbandry, still dominated by natural vegetation. Possibilities area that there might be the presence of archaeological sites, paleontological sites, burial grounds and farm homesteads that qualifies to be protected in terms of the National Heritage Resources Act, Act 25 of 1999.

11.4. Thaba Letsele (Map sheet 2723AA/AC&2822BB)

-The farm is dominated by a mountain range with natural and private game reserves on both side of the mountain. Several built environment has been noted alongside the mountain range. There is high chance

find of both archaeological and palaeontological remains. Possibilities are that there might be the presence of pioneer graves and burial sites and war monuments. Several disturbances could be noted from Google earth maps.
-Scattered farm homesteads and associated group of houses for farm workers are common throughout the demarcated study area. These houses may be of heritage significance.

11.5. Seremonene 642 (Map sheet 2723AA/AC&2823BB)

The farm is dominated by a mountain range with natural and private game reserves on both side of the mountain. Several built environment has been noted alongside the mountain range. There is high chance find of both archaeological and palaeontological remains. Possibilities are that there might be the presence of pioneer graves and burial sites and war monuments. Several disturbances could be noted from Google earth maps.
-Scattered farm homesteads and associated group of houses for farm workers are common throughout the demarcated study area. These houses may be of heritage significance.

12. Results of the potential direct and indirect impacts of the proposed mineral prospecting

Based on an interdisciplinary methodology, that combined ICOMOS methodology with several techniques from various disciplines, the impact of the proposed mineral exploration on the various farms was considered. The following conclusions were reached:

- The proposed mineral exploration is scheduled to take place several kilometers north of the palaeontological and archaeological rich sites of Kathu Pan in the Northern Cape where significant Palaeo environmental, sedimentological and archaeological sites that host early stone tools were recovered. The overall deposit represents landscape draw from hominids and animal as well as many other potential sources of Palaeoenvironments, this discovery cannot be underestimated and are the best sequence from the Kalahari Basin.

- It is important to understand the relationship between the proposed mining activities and the history of the earmarked farms since the study are located on private property and are farmland that encompasses animal husbandry, game farming and cultivations. There are possibilities to encounter historical houses, Anglo Boer War Monuments and associated Block houses, Pioneer graves, Grave yards and associated burial grounds of pre 18 and 20th period.

- Should the proposed mineral exploration be open cast visual impacts will emanate from the proposed activities.
- There is no detailed palaeontological study conducted within the identified farms however some of the studies conducted near Kuruman identified no fossils sites in the proposed project area.

- Cumulatively, the only impacts that are possible are largely indirect but they must be monitored in the short to long term.

13. Management recommendations

- It is strongly recommended that the proposed mineral exploration take place on a ground that is already disturbed such as cultivated lands, near access gravel roads and exposed rocky outcrops. Mining or drilling of core sample activities should be restricted to depressed areas, river banks and fountains as these sites host paleontological and archaeological deposits. Drilling and mineral exploration on disturbed area must be managed and monitored to ensure that archaeological sites that convey scientific significance are not disturbed.
- A phase 1 Heritage Impact Assessment (HIA) and Palaeontological Impact Assessment (PIA) is strongly recommended. These field assessments should be undertaken before the commencement of mining activities. The exploration phase may entail several substantial excavations into the underlying bedrock. These excavations may disturb damage or destroy sites with scientific valuable archaeological or fossil heritage exposed at the surface or buried below ground.

- The above mentioned studies would be the prelude for the development of a monitoring and management plan used to manage direct and indirect impacts during the mineral extraction process. The monitoring process would ensure that should any fossils, archaeological or human remains be disturbed during excavations, immediate remedial rescue and salvage work would be actioned without delay.

- Drilling of mineral core sample and the construction of access gravel roads should not impact structures currently in existence on farmland these include farm homestead, burial ground and cemeteries (Historical sites). From the topographical and Google earth program there are isolated individual farm homesteads visible through the entire study area.

14. Conclusions relating to Baseline Impact Assessment

All archaeological, paleontological and burial grounds and graves have general protection under the NHRA Act 25 of 1999. **Section 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;
- destroy, damage, excavate, remove from its original position, collect or own any archaeological or paleontological material or object or any meteorite;

As such, all sites known or unknown situated within study area may not be disturbed or destroyed without authorisation from the compliance agency, SAHRA.

In brief, the following overall recommendations apply:

- Should any new roads be constructed in areas outside the already disturbed area, the process must be monitored for archaeological and paleontological materials.
- In the chance finds event, should archaeological materials or human burials remains be exposed during subsurface construction work on any section of the mine lay down sites, operations should cease on the affected area and the discovery must be reported to the heritage authorities immediately so that an investigation and evaluation of the finds can be made. The overriding objective, where remedial action is warranted, is to minimize disruption in mining and construction scheduling while recovering archaeological and any affected cultural heritage data as stipulated by the PHRA (Provincial Heritage Authorities) and NHRA (National Heritage Resources Act - Act 25 of 1999) regulations.
- A professional paleontologist and archaeologist must be retained to monitor all significant earth moving activities that may be implemented. Subject to the recommendations herein there are no significant cultural heritage resources barriers to the proposed mineral exploration. The Heritage authority may approve the proposed development to proceed as planned with special commendations to implement the recommendations here in made.
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15. CONCLUSION

In conclusion there are no written documents on the previous archaeological investigations of the listed farms from the South African Heritage Resources database. It is felt that there is high chance to find scattered stone tools most probably from the middle to the latter periods. There

are also possibilities to find old farm homesteads (buildings) and associated burial grounds. It is strongly recommended that exploration team should avoid centering their drilling activities in close proximity of homesteads, ruins and cement floors in order to avoid impacts to such buildings. It is further recommended that a brief Paleontological and Archaeological field assessments should be undertaken before Mining activities commences within the proposed study area to asses impacts of the proposed mining activities development on the fossil and archaeological heritage and to make recommendations for any further mitigations that should take place before mining activities. These recommendations should also be incorporated into the Environmental Management Plan for the proposed mine development.

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