

A vertical image showing raindrops on a window pane. A bright rainbow is visible in the center, with colors transitioning from red at the top to purple at the bottom. The background is a mix of blue, green, and yellow, reflecting the light from the rainbow and the wet surface.

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**Heritage Impact Assessment for proposed Prospecting
Right, including bulk sampling, for Iron Ore and Manganese
Ore over Remaining Extent,
Remaining Extent of Portion 1 and Portion 2 of the Farm
Bulls Run 164 and the Remaining Extent of
the Farm Hartfell 172, Hay District, Northern Cape Province.**

Prepared by Pulafel 4D Consulting (Pty) Ltd

Report prepared for M and S Consulting (Pty) Ltd on behalf of GEJ Resources (Pty) Ltd

6 February 2023

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EXECUTIVE SUMMARY

Table 1: Project summary

Item	Description
Proposed development and location	<i>Prospecting Right, including bulk sampling, for Iron Ore and Manganese Ore over Remaining Extent, Remaining Extent of Portion 1 and Portion 2 of the Farm Bulls Run 164 and the Remaining Extent of the Farm Hartfell 172, Hay District, Northern Cape Province.</i>
Purpose of the study	<i>To carry out a Desktop-based Heritage Impact Assessment to determine the presence/absence of cultural heritage sites and the impact of the proposed project on heritage resources within the area demarcated for the prospecting activities.</i>
1:50 000 Topographic Map	<i>2922DB Prieska, 2922AC Marydale, 2923AB Witberg, 2923BB Douglas etc.</i>
Municipalities	<i>Hay District, Northern Cape Province</i>
Predominant land use of surrounding area	<i>Agriculture (livestock keeping) and game farms</i>
Developer	<i>GEJ Resources (Pty) Ltd</i>
Contact Person	<i>Tanja Jooste</i>
Contact Details	<i>Tel: 053 861 1765, Email: joostetanja@gmail.com</i>
Heritage Consultant	<i>Pulafel 4D Consulting</i>
Date of Report	<i>6 February 2023</i>

Pulafel 4D Consulting (Pty) Ltd. was commissioned by M and S Consulting (Pty) Ltd to do a desktop based HIA on behalf of GEJ Resources (Pty) Ltd. The proposed prospecting activities for which this desktop HIA covers is for the Remaining Extent, Remaining Extent of Portion 1 and Portion 2 of the Farm Bulls Run 164 and the Remaining Extent of the Farm Hartfell 172, near Duikersdal, Northern Cape Province

(NC 30/5/1/1/2/13159 PR). In terms of Section 38(3), 38(8) of the National Heritage Resources Act (Act 25 of 1999) a field survey should be conducted to record the heritage in the project area and around that is likely to be impacted by the proposed development. Owing to challenges around access, it was not possible to conduct a field survey in the above-mentioned farms. The SAHRA Archaeology, Palaeontology and Meteorites (APM) Unit noted and acknowledged the access issues and that mandated heritage **desktop assessments** be conducted as part of the EIA process. The desktop study notes that there are well developed aeolin sands and sand dunes. Thus, the area falls within the Kalahari sands that, together with several ancient sand dunes, overlay the hard calcrete layers of the study area. The desktop study revealed that precolonial archaeology is represented by Stone Age archaeological materials, sparsely scattered within the landscape. However, the Stone Age materials are of low impact (negligible) rating because of their isolated and their highly weathered nature. No other heritage resources in respect of built structures over 60 years old, sites of cultural significance associated with oral histories, burial grounds and graves, graves of victims of conflict, and cultural landscapes or viewsapes (NHRA 34 or 36), were recorded. Given the above the proposed development by GEJ Resources (Pty) Ltd is supported, noting the possible limitations of a desktop survey, and with full cognizance that buried archaeological remains may still occur and that chance findings reporting procedures must be followed when these are encountered.

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ABBREVIATIONS

AIA	Archaeological Impact Assessment
ASAPA	Association of South African Professional Archaeologists
EIA	Environmental Impact Assessment
EIA	Early Iron Age (<i>EIA refers to both Environmental Impact Assessment and the Early Iron Age but in both cases the acronym is internationally accepted. This means that it must be read and interpreted within the context in which it is used.</i>)
EIAR	Environmental Impact Assessment Report
ESA	Early Stone Age
GPS	Global Positioning System
HIA	Heritage Impact Assessment
ICOMOS	International Council of Monuments and Sites
LIA	Late Iron Age
LFC	Late Farming Community
LSA	Late Stone Age
MAA	Mineral Amendment Act, No 103 of 1993
MIA	Middle Iron Age
MPRDA	Mineral and Petroleum Resources Development Act 28 of 2002
MSA	Middle Stone Age
NEMA	National Environmental Management Act 107 of 1998
NHRA	National Heritage Resources Act 25 of 1999
NID	Notice of Intention to Develop
PHRA	Provincial Heritage Resource Agency
SAHRA	South African Heritage Resources Agency
ToR	Terms of Reference

DOCUMENT INFORMATION

Periodisation

Cultural epochs are divided by archaeologists according to the dominant material finds for the different time periods (Esterhuysen 2019; Delmas and De La Pena 2011; Underhill 2011). This periodization is usually region-specific, such that the same label can have different dates for different areas. This makes it important to clarify and declare the periodization of the area one is studying. These periods are nothing a little more than convenient time brackets because their terminal and commencement are not absolute and there are several instances of overlap.

In the present study, relevant archaeological periods are given below:

Early Stone Age (~ 2.6 million to 250 000 years ago)

Middle Stone Age (~ 250 000 to 40-25 000 years ago)

Later Stone Age (~ 40-25 000, to recently, 100 years ago)

Early Iron Age (~ AD 200 to 1000)

Late Iron Age (~ AD1100-1840)

Historic (~ AD 1840 to 1950, but according to the NHRA) (Act No. 25 of 1999), a Historic building is classified as over 60 years old)

Definitions

It is important to define key terms used in this study. According to Avrami et al. (2019), most of the terms derive from South African heritage legislation and its ancillary laws, as well as international regulations and norms of best practice. The following terms have a direct bearing on the investigation and the resulting report:

Cultural (heritage) resources are all non-physical and physical human-made occurrences, and natural features that are associated with human activity. These can be

singular or in groups and include significant sites, structures, features, ecofacts and artefacts of importance associated with the history, architecture or archaeology of human development.

Cultural significance is determined means of aesthetic, historic, scientific, social or spiritual values for past, present or future generations.

Value is related to concepts such as worth, merit, attraction or appeal, concepts that are associated with the (current) usefulness and condition of a place or an object. Although significance and value are not mutually exclusive, in some cases the place may have a high level of significance but a lower level of value. Often, the evaluation of any feature is based on a combination or balance between the two.

Isolated finds are occurrences of artefacts or other remains that are not in-situ or are located apart from archaeological sites. Although these are noted and recorded, but do not usually constitute the core of an impact assessment, unless if they have intrinsic cultural significance and value.

In-situ refers to material culture and surrounding deposits in their original location and context, for example an archaeological site that has not been disturbed by farming.

Archaeological site/materials are remains or traces of human activity that are in a state of disuse and are in, or on, land and which are older than 100 years, including artifacts, human and hominid remains, and artificial features and structures. According to the National Heritage Resources Act (NHRA) (Act No. 25 of 1999), no archaeological artefact, assemblage or settlement (site) and no historical building or structure older than 60 years may be altered, moved or destroyed without the necessary authorization from the South African Heritage Resources Agency (SAHRA) or a provincial heritage resources authority.

Historic material are remains resulting from human activities, which are younger than 100 years, but no longer in use, including artefacts, human remains and artificial features and structures.

Chance finds means archaeological artefacts, features, structures or historical remains accidentally found during development.

A *grave* is a place of interment (variably referred to as burial) and includes the contents, headstone or other marker of such a place, and any other structure on or associated with such place. A grave may occur in isolation or in association with others where upon it is referred to as being situated in a cemetery (contemporary) or burial ground (historic).

A *site* is a distinct spatial cluster of artefacts, structures, organic and environmental remains, as residues of past human activity.

Heritage Impact Assessment (HIA) refers to the process of identifying, predicting and assessing the potential positive and negative cultural, social, economic and biophysical impacts of any proposed project which requires authorization of permission by law and which may significantly affect the cultural and natural heritage resources. Accordingly, a HIA must include recommendations for appropriate mitigation measures for minimizing or circumventing negative impacts, measures enhancing the positive aspects of the proposal and heritage management and monitoring measures.

Impact is the positive or negative effects on human well-being and / or on the environment.

Mitigation is the implementation of practical measures to reduce and circumvent adverse impacts or enhance beneficial impacts of an action.

Mining heritage sites refer to old, abandoned mining activities, underground or on the surface, which may date from the prehistorical, historical or the relatively recent past.

Study area or 'project area' refers to the area where the developer wants to focus its development activities (refer to plan).

Phase I studies refer to surveys using various sources of data and limited field walking to establish the presence of all possible types of heritage resources in any given area.

Assumptions and disclaimer

The investigation has been influenced by the unpredictability of buried archaeological remains (absence of evidence does not mean evidence of absence) and the difficulty in establishing intangible heritage values. Human burials can occur in unpredictable locations. It should be remembered that archaeological deposits (including graves and paleontological remains) usually occur below the ground level. Should this material be revealed during construction, such activities should be halted immediately, and a competent heritage practitioner and SAHRA must be notified for an investigation and evaluation of the find(s) to take place [cf. NHRA (Act No. 25 of 1999), Section 36 (6)]. Recommendations contained in this document do not exempt the developer from complying with any national, provincial and municipal legislation or other regulatory requirements, including any protection or management or general provision in terms of the NHRA. Pulafel 4D Consulting assumes no responsibility for compliance with conditions that may be required by the PHRA or SAHRA in terms of this report.

Terms of Reference (ToR)

Pulafel 4D Consulting Pty Ltd was engaged to do a Desktop-based Heritage Impact Assessment in terms of Section 38(3), 38(8) of the National Heritage Resources Act (Act 25 of 1999), as part of an Environmental Authorisation (EA) Application for the proposed prospecting activities on the Remaining Extent, Remaining Extent of Portion 1 and Portion 2 of the Farm Bulls Run 164 and the Remaining Extent of the Farm Hartfell 172, near Duikersdal, Northern Cape Province (NC 30/5/1/1/2/13159 PR).

The objectives for doing a HIA are to:

- Review applicable legislative requirements, identify all objects, sites, occurrences, and structures of an archaeological or historical nature (cultural heritage sites) located on the property,
- Assess the significance of the cultural resources in terms of their archaeological, historical scientific, social religious, aesthetic and tourism,
- Describe the possible impact of the proposed development on these cultural remains, according to standard set conventions,
- Where there is a need, recommend suitable mitigation measures

INTRODUCTION AND BACKGROUND TO THE PROJECT

Pulafel 4D Consulting (Pty) Ltd was appointed by M and S Consulting (Pty) Ltd to carry out an Archaeological and Heritage Impact Assessment for proposed Prospecting Right, including bulk sampling, for Iron Ore and Manganese Ore over Remaining Extent, Remaining Extent of Portion 1 and Portion 2 of the Farm Bulls Run 164 and the Remaining Extent of the Farm Hartfell 172, Hay District, Northern Cape Province (Fig 1), as part to an Environmental Authorisation (EA) Application for the proposed prospecting activities on Remaining Extent, Remaining Extent of Portion 1 and Portion 2 of the Farm Bulls Run 164 and the Remaining Extent of the Farm Hartfell 172, near Duikersdal, Northern Cape Province (NC 30/5/1/1/2/13159 PR). Though no detailed plans/location of the full project were provided, the summary briefly indicates that the proposed prospecting will include 30 boreholes (10 m x 10 m each), 30 trenches (30 m x 40 m x 21 m) blasting, mobile offices, processing plant, access roads, stockpiles, salvage yard, wash bay, waste rock dumps, weighbridge and weighbridge control room and workshop within an application area of 5 504.7223 ha. This assessment of the impact to heritage resources is conducted as part of the EA process that complies with section 38(3) of the National Heritage Resources Act, Act 25 of 1999 (NHRA) as required by section 38(8) of the NHRA and section 24(4)b(iii) of NEMA.

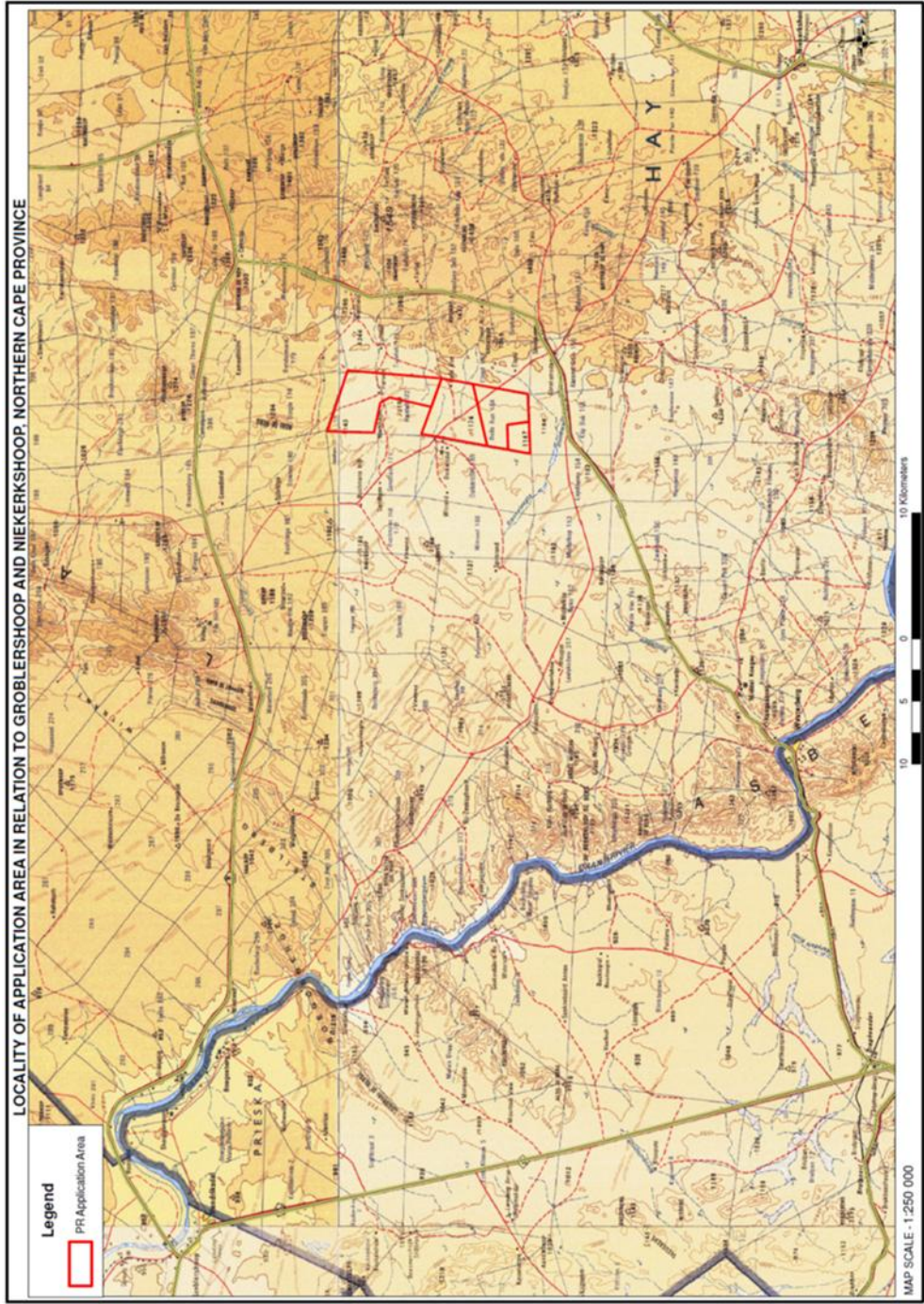


Figure 1. Extract from 1:250 000 topographical map 2922 Prieska showing the location of the application area in relation to Groblershoop and Niekerkshoop, Hay District, Northern Cape Province

Figure1: Location map of the study area (Jira and Chikumbirike 2023).

Vegetation and Current Land use

The project area is predominantly flat terrain with shallow pans and ancient sand dunes. The vegetation is mainly a grassy dwarf shrubland with some sparse low shrubs and grassy areas. The vegetation is comprised of *Acacia erioloba* and *Acacia Melifera*. The farms are currently being used for cattle ranching and game farming. They are divided into several paddocks. In terms of soils, the vegetation type is associated with aeolian red sand and surface calcrete and deep sandy soils of the Hutton and Clovelly soil forms. Apart from the above dominant trees, other common woody species present in the proposed project area include *Zizyphus mucronata*.

Geology of the Area

Previous Palaeontological Impact Assessments (PIA) reports, satellite images and previously published materials were used to inform the geology of the proposed study area which is in Bulls Rush. This part has largely been informed by reports generated by Almond (2103, 2016), Butler (2020) etc.

The geology of the area around indicates that it occurs within the early Proterozoic Ongeluk Vo (basaltic andesites) (Beukes 1978, 1980; Harding 2004; Erikson et al 2006). The geological map as well as recent field studies in the region (Almond 2011, 2012, 2013) show that the Kalahari sands here are extensively underlain by hardpan calcretes, some of which at least can be assigned to the Mokalanen Formation of the Kalahari Group (Fig 2). The geology of Hartfell 172 indicates older formations and siliciclastic rocks of Naragasa formation. Rooinekke Formation of the Koegas Subgroup have also been identified at Hartfell 172 (Fivaz and Engelbrecht 2020). Within the proposed project area, calcretes are expected here at depth beneath the cover sands.

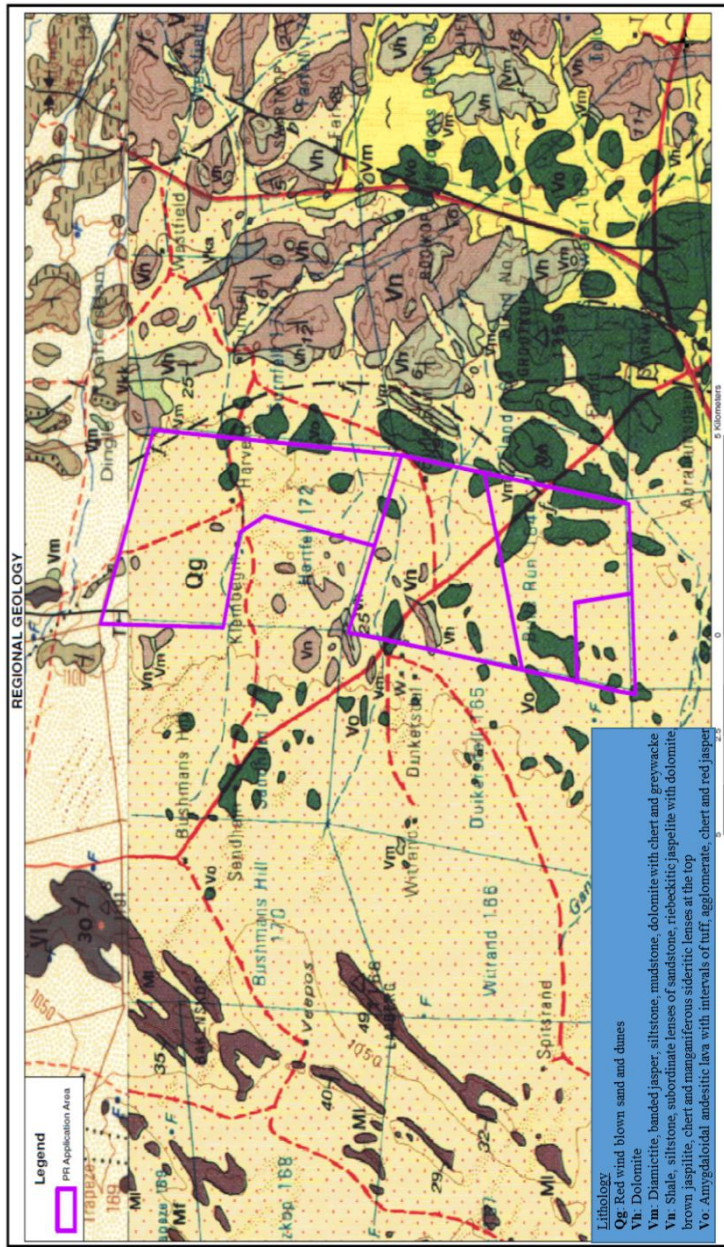


Figure 2. Extract from 1:250 000 geology sheet 2922 Prieska (Council for Geoscience, Pretoria) showing the geology underlying the study area for the proposed Prospecting Right, including bulk sampling for Iron Ore and Manganese Ore over the Remaining Extent of Portion a and Portion 2 of the Farm Bulls Run 164 and the Remaining Extent of the Farm Hartfell 172, Hay District, Northern Cape Province, South Africa

Figure 2: Geological map of the study area (Jira and Chikumbirike 2023)

SOUTH AFRICAN LEGISLATIVE REQUIREMENTS

Archaeological heritage is a finite resource. It is non-renewable and therefore it requires to be used in a sustainable way. The protective legislations that are in place ensure that sustainable utilization of heritage resources is achieved. For example, numerous Acts are incorporated into legislation to provide for the protection of archaeological and heritage resources in South Africa. Overarching these is the Constitution of South Africa Act No 108 of 1996. The National Heritage Resources Act (NHRA), Act 25 of 1999, the Mineral and Petroleum Resources Development Act 28 of 2002 (MPRDA), the National Environmental Management Act (NEMA) 107 of 1998 section 39 (3) (b) (iii) the National Environment Management Protected Areas Act No 57 of 2003 (NEMPAA), and the Human Tissues Act (HTA) 65 of 1983 as amended. The Environment Management Biodiversity Act of 2004, Act No 10 of 2004, is one of the pieces of legislation that help in the protection of the various forms of the South African heritage. The National Heritage Resources Act (NHRA) no 25 of 1999 is the most relevant of these as it provides for the protection of the following resources:

- a) palaeontological and archaeological deposits, objects and sites,
- b) built structures older than 60 years,
- c) burial grounds and graves which include graves younger than 60 years; graves older than 60 years; graves of victims of conflict and or graves of individuals of royal descent, as well as
- d) cultural landscapes.

The NHRA (No. 25 of 1999) is a piece of legislation that defines heritage resources of cultural significance or other special value for the present community and for the posterity that are considered part of the national estate such as “places, buildings, structures and equipment of cultural significance; places that are associated with oral traditions are attached, historical settlements, and townships landscapes and natural features of cultural significance; geological sites of scientific or cultural importance; archaeological and palaeontological sites; or graves and burial grounds, including

ancestral graves; royal graves and graves of traditional leaders; graves of victims of conflict; graves of individuals designated by the Minister by notice in the Gazette; historical graves and cemeteries; and other human remains which are not covered in terms of the Human Tissue Act, 1983 (Act No. 65 of 1983); sites of significance relating to the history of slavery in South Africa; movable objects, including objects recovered from the soil or waters of South Africa, including archaeological and palaeontological objects and material, meteorites and rare geological specimens; objects to which oral traditions are attached or which are associated with living heritage; ethnographic art and objects”

According to NHRA Act 1999, developments which alter the character of a site, and, which exceed prescribed limitations require specialist assessment. These activities trigger the need for Heritage Impact Assessments (HIA) and are listed in sections 34, 35 and 38. The limitations are listed below:

Section 34(1) No person may alter or demolish any structure or part of a structure which is more than 60 years old without permission by the relevant provincial 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.

Section 36(3) No person may, without a permit issued by SAHRA or the responsible provincial heritage resources authority, 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 bring onto or use at a burial ground or grave any excavation equipment or any equipment which assists in detection or recovery of metals.

Section 38 (1) of the National Heritage Resources Act, 1999: Requirements of heritage impact assessment Subject to the provisions of subsections (7), (8) and (9), any person who intends to undertake a development categorised as – (a) the construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier

exceeding 300m in length; (b) the construction of a bridge or similar structure exceeding 50m in length; (c) any development or other activity which will change the character of a site (i) exceeding 5 000 m² extent; or (ii) involving three or more existing erven or subdivisions thereof; or (iii) involving three or more erven or divisions thereof which have been consolidated within the past five years; or (iv) the cost of which exceed a sum set in terms of regulations b SAHRA or a provincial heritage resources agency; (d) the re-zoning of a site exceeding 10 000 m² in extent; or (e) any other category of development provided for in regulations by SAHRA or a provincial heritage resources agency, must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development.”

Relevance of the current development

The proposed development proposed Prospecting Right, including bulk sampling, for Iron Ore and Manganese Ore over Remaining Extent, Remaining Extent of Portion 1 and Portion 2 of the Farm Bulls Run 164 and the Remaining Extent of the Farm Hartfell 172, Hay District, Northern Cape Province when fully implemented may impact on the archaeology and cultural heritage and natural heritage as well, therefore the need for an Archaeological and Heritage Impact Study. The proposed project has phases that include preliminary exploration work, exploratory drilling, based on the results of the geophysics and loam sampling. The proposed prospecting will include 30 boreholes (10 m x 10 m each), 30 trenches (30 m x 40 m x 21 m) blasting, mobile offices, processing plant, access roads, stockpiles, salvage yard, wash bay, waste rock dumps, weighbridge and weighbridge control room and workshop within an application area of 5 504.7223 ha. It is envisaged that more temporary access roads will be established for repeated access to the drilling sites if the identified drill sites cannot be access via existing roads and tracks.

METHODOLOGY

Desktop Assessment and Report compilation

The desktop analysis was employed to identify and locate possible heritage sites and their associated significance and impacts. The HIA study for the proposed project area was implemented through a desktop study. This was conducted to gain access to the following literature sources: academic literature, previous South African Heritage Resources Authority (SAHRA) impact assessment reports for the area, South African Heritage Resources Information System (SAHRIS) database and maps, the Genealogical society database, the South African archives database, the McGregor museum and Africana libraries, other digital collections, as well as previous HIA reports in the Northern Cape and specifically in the Hay District and surrounding areas. Information from these various sources and institutions was analyzed and synthesized into this report.

Table 1: Evaluation of the proposed development as guided by the criteria in NHRA, MPRDA and NEMA

<i>ACT</i>	<i>Stipulation for developments</i>	<i>Requirement details</i>
NHRA Section 38	Construction of road, wall, power line, pipeline, canal or other linear form of development or barrier exceeding 300m in length	No
	Construction of bridge or similar structure	No

	exceeding 50m in length	
	Development exceeding 5000 sq. m	No
	Development involving three or more existing erven or subdivisions	No
	Development involving three or more erven or divisions that have been consolidated within past five years	No
	Rezoning of site exceeding 10 000 sq. m	No
	Any other development category, public open space, squares, parks, recreation grounds	No
NHRA Section 34	Impacts on buildings and structures older than 60 years	Subject to identification during Phase 1
NHRA Section 35	Impacts on archaeological and paleontological heritage resources	Subject to identification during Phase 1
NHRA Section 36	Impacts on graves	Subject to identification during Phase 1
NHRA Section 37	Impacts on public monuments	No
Chapter 5 (21/04/2006) NEMA	HIA is required as part of an EIA	Yes
Section 39(3)(b) (iii) of the MPRDA	AIA/HIA is required as part of an EIA	Yes

HERITAGE ASSESSMENT AND REPORT COMPILATION

Assessing significance

The assessment of the heritage significance is the measure of value that the heritage carries to various stake holders. It is based on the importance that people attach to a physical object, or abstract concept attached to an event, landscape or people. The heritage significance is its worthiness to different stake holders. The intrinsic worth of cultural, or natural patrimony (sites and object) is linked to various sectors of the local, national and global population (Erica Avrami, Susan Macdonald, Randall Mason, And David Myers (eds). (2019).

For this survey, the types of significances or values as noted below are in accordance with SAHRA which is the national heritage authority in South Africa.

Type of Significance and definition

Aesthetic: the site or object are significant in exhibiting particular aesthetic characteristics valued by a community or cultural group.

Historical: Is its importance in the community, or pattern of history. It also reflects a strong or special association with the life or work of a person, group or organisation of importance in history. According to SAHRA heritage may demonstrate significances relating to the history of slavery.

Rarity: is when heritage possess uncommon, rare or endangered aspects of natural or cultural heritage.

Representivity: shows the principal characteristics of a particular class of natural or cultural places or objects, whether they indicate a range of landscapes or environments, the attributes of which identify it as being characteristic of its class. The other factor is that is whether it shows principal characteristics of human activities that include the way of life, philosophy, custom, process,

land-use, function, design or technique in the environment of the nation, province, region or locality.

Scientific/Technical: is the potential to yield information that will contribute to an understanding of natural or cultural heritage. It shows a high level of creative or technical achievement at a particular period.

Social: this when the heritage has a strong or special association with a particular community or cultural group for social, cultural or spiritual purposes

Tourism: this when the site or object carries a commercial value that is associated with tourism, thus the heritage does possess the potential to be used for education/economic benefits.

Site Grading

Assessment for heritage significances paves way for site grading. Site grading or weighting is contingent on the geographical extent (local/provincial/national) and the importance (low/medium/high) of the value. Based on these two elements, possible recommendations on future action on the sites are prescribed. These recommendations may include no further action, mitigation measures or destruction of a site. It is important to note that SAHRA is the one that approves to developers or any other interested and or affected parties the destruction of any heritage site. This may only take place upon SAHRA issuing a permit. The permit may also be issued by a provincial heritage resources authority (PHRA).

Table 2: Recommended grading as well as associated recommendation measures. In all the scenarios approval will be required from SAHRA.

South African Legislation (National Heritage Resources Act) Ranking	Sites within the study area	Sites immediately outside study area
National Heritage Sites (Grade 1)	None	None

National Heritage Sites (Grade 1), Grade 2 (Provincial Heritage Sites), burials	None	None
Grade 3a	None	None
Grade 3b	None	None
Grade 3c	None	1 (one)

BACKGROUND TO THE ARCHAEOLOGICAL AND HERITAGE HISTORY OF THE STUDY AREA

There are three progressive phases, namely the Palaeontological phase, the Archaeological phase and the Colonial/historical periods. The present study deals with the last two.

The archaeology

- The archaeological phase of South Africa and in Southern Africa is generally subdivided into four categories, followed by the colonial/historical period:
- the earlier Stone Age (ESA), (3 Ma to 300 000ya)
- the Middle Stone Age (MSA), (c300 000 to 30 000 ya)
- the later Stone Age (LSA) (c30 000 to 2000 ya), and
- The Iron Age (AD200 and AD 1654)

Earlier Stone Age (ESA): The South African Earlier Stone Age (ESA) is dated between 2My and 200ky. According to Kuman (2001) and Dusseldorp *et al.* (2013) the ESA is preserved in a variety of contexts, both as 'sites' in the traditional sense, as extensive surface and geological assemblages, and even as buried deflated assemblages. The proposed study falls outside much of the documented ESA sites such as Kanteen Kopje in Barkly West and Kathu Pan 1, where large stone implements (Handaxes, Cores, flakes) are found (Beaumont 1990; Beaumont *et al.* 2006; Chazan *et al.* 2012).

The Middle Stone Age (MSA): dates around 250 000 years ago. According to Wadley (1993), the MSA is characterized by the presence of points, blade technology, basal thinning; blade tools, denticulates, unifacial and bifacial points as well as prepared cores. There are debates on the MSA centered around the emergence of *Homo sapiens* and the so-called the modern human behaviour (McBrearty & Brooks 2000). There are

various industries such as the Howiesons Poort, Pietersburg, Mossel Bay that are a characteristic of the MSA. Lombard (2012) classified these into MSA 1-V. Once again, the study area lies outside the core of MSA sites, with Wonderwerk Cave (near Kuruman) and Khatu Pan1-4 (near Kathu) being some of the best examples from further afield. Beaumont (1973, 1983, 1990); Beaumont et al. (1974, 1984, 2006); Humphrey et al. 1983; Thackery et al. 1981; Wilkins et al. 2012) did extensive research in the Northern Cape province and describe the Middle Stone Age in detail.

The Later Stone Age (LSA): According to Deacon (1984), the LSA dates between $\pm 40\,000$ BP and ± 2000 BP. The technology is consistent with implements that more 'complex' socio-economic behaviours compared to the MSA populations. The stone implements become smaller and function specific. The implements include specialised equipment for fishing and hunting, formal scrapers, and microlithics or micro- stone tools (Deacon 1984; Klein 2000). Prominent LSA sites are also located outside the study area (e.g., Canteen Kopje; and Wonderwerk Cave) were typical LSA lithics such as end and side scrapers, as well as bladelets were reported. These have been found scattered in isolation in the project area. The LSA is also recorded at sites much further afield from the study area in places such as Blinkklipkop and Doornfontein, where there is evidence of LSA mining practices and the introduction in the region by 1200 BP, of domesticated ovicaprids and possibly cattle as well as pottery.

The Iron Age: The Iron Age of South Africa records a prehistoric period where the Bantu farmer groups migrated from the West African region of the continent through and around eastern Africa into southern African region. Their movement or migration from the lacustrine region is dated between AD200 and AD 1654 (Huffman 1982, 1996, 2007). According to Huffman (1982, 1996, 2007), the Bantu people were farmers using metal who, by 500 years before present had occupied the eastern escarpment of southern Africa (Maggs 1972; 1976). Huffman (1982) argues that these groups varied from the Khoi-San hunter-gatherer communities in that they cultivated crops such as

sorghum, millet and beans, lived in semi-permanent settlements, smelted and foraged iron and produced pottery.

The LIA archaeological footprint north and northeast of Bulls Run is primarily represented by stone wall remnants of the early 19th century BaTlaping capital Dithakong, located in Tswalu Game Reserve and near the modern village of Dithakong (Morris 1990). At Dithakong, extensive stone wall enclosures are found on the adjacent hills and archaeological investigations during the 1980's have revealed that the ruins were built during the 15th century AD and possibly by sedentary Khoi groups. None of these stone walls occur in the study area where the geology would have posed an additional challenge in terms of finding the stones for building. Nonetheless, adjacent areas in Tswalu Game Reserve hosts remnants of this possible creolized LSA/LIA stone building culture. LIA sites in general are characterized by the presence of clay pots, bones metals and a settlement pattern which demonstrates organisation associated with the Central Cattle Pattern (Dreyer 1992).

The Colonial/historical phase (c1500-1994): it is the period that is associated with the arrival of European settlers up to the period of the emergence of democracy in South Africa. This period is characterized by various wars which led to the displacement of many in South Africa. The only possible historical material relates to the old farmhouses and the early water holes drilled by the farmers as part of the 20th century occupation of the area under study. These are located further afield from the proposed drilling points and would most likely be less impacted by the prospecting. However, if mining is to commence, they may need specific mitigation. Figure 7 below, shows the possible historical structures identified in the study area.

THE FINDS

Stone tools

The desktop study revealed isolated scatters of Stone Age materials in outcrops and current burial grounds one in Hartfell and the other one in Bulls Run Farm.

Burial grounds and Graves

Two burial sites were located by previous studies. One is reported to be located on the Hartfell Farm 172 and the second burial ground is located on Bulls Run Farm (Ubique Heritage Consultants 2020). Some graves maybe subsurface sites and it is probable that they are not identifiable above the ground. Therefore, should they be encountered during the mining construction process, or any other activity related to mining, the developer is advised that according to the NHR Act 25 of 1999, destruction or alteration of historical graves is prohibited by law. Any alteration or destruction of graves can only be undertaken through a permit issued by SAHRA or the Northern Cape Heritage Authority. However, the authorities will have to be satisfied that the applicant has followed due diligence for such an action to be approved.

SITE SIGNIFICANCE

GRADING

The significance rating for these Stone Age materials is low, however, the area with graves and burial grounds should be avoided at all cost. Should prospecting extend into the burial grounds localities then there will be a need for mitigation.

RECOMMENDATIONS

The scatter of heavily weathered stone tools found on outcrops in the study area require no further action (Ubique Heritage Consultants 2020). They are of **Low significance**, therefore, based on the desktop study presented in this assessment, the proposed prospecting right, including bulk sampling, for iron ore and manganese ore over

remaining Extent, Remaining Extent of Portion 1 and Portion 2 of the Farm Bulls Run 164 and the Remaining Extent of the Farm Hartfell 172, Hay District, Northern Cape Province is supported.

Chance findings procedures

It has already been highlighted that sub-surface materials may still be lying hidden from surface surveys. Therefore, absence (during surface survey) is not evidence of absence all together. The following monitoring and reporting procedures must be followed in the event of a chance find, in order to ensure compliance with heritage laws and policies for best practice. This procedure applies to the developer's permanent employees, its subsidiaries, contractors and subcontractors, and service providers. Accordingly, all construction crews must be properly inducted to ensure they are fully aware of the procedures regarding chance finds.

- If during the drilling 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, work must cease at the site of the find and this person must report this find to their immediate supervisor, and through their supervisor to the senior on-site manager.
- The senior on-site Manager must then make an initial assessment of the extent of the find and confirm the extent of the work stoppage in that area before informing SAHRA/PHRA.
- If a human grave/burial is encountered, the remains must be left as undisturbed as possible before the local police and SAHRA or PHRA are informed. If the burial is deemed to be over 60 years old and no foul play is suspected, an emergency exhumation permit may be issued by SAHRA for an archaeologist to exhume the remains.

CONCLUSIONS

Pulafel 4D Consulting (Pty) Ltd. was commissioned by M and S Consulting (Pty) Ltd to do a desktop based HIA on behalf of GEJ Resources (Pty) Ltd. The proposed prospecting activities for which this desktop HIA covers is for the Remaining Extent, Remaining Extent of Portion 1 and Portion 2 of the Farm Bulls Run 164 and the Remaining Extent of the Farm Hartfell 172, near Duikersdal, Northern Cape Province (NC 30/5/1/1/2/13159 PR). The desktop study conducted revealed the presence of isolated scatters of Stone Age materials that are heavily weathered which are of low significances. Based on the desktop findings, there is therefore, no heritage grounds to halt the prospecting activities. Chance findings are still possible and reporting procedures have been outlined to the developer.

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BIBLIOGRAPHY

Almond, J.E. 2011. Proposed Solar Thermal Energy Power Park on Farm Arriesfontein, near Danielskuil, Potsmasburg District, Northern Cape Province. Palaeontological specialist study: desktop assessment, 14pp. Natura Viva cc, Cape Town.

Almond, J.E. 2012. Proposed westerly extension of Sishen Iron Ore Mine near Kathu, Kalagadi District Municipality, Northern Cape. Palaeontological specialist desktop study, 18 pp. Natura Viva cc, Cape Town.

Almond, J.E. 2013. Palaeontological specialist assessment: desktop study. Proposed 16 MTPA Expansion of Transnet's existing manganese ore associated infrastructure between Hotazel and the Port of Ngqura, Northern and Eastern Cape

Almond, J.E. & Pether, J. 2008. Palaeontological heritage of the Northern Cape. Interim SAHRA technical report, 124 pp. Natura Viva cc., Cape Town.

Avrami, Erica Susan Macdonald, Randall Mason, And David Myers (eds). (2019) *Values in Heritage Management: Emerging Approaches and Research Directions*. Getty Conservation Institute, Los Angeles.

Beaumont, P. 1990. Kathu Pan. Guide to archaeological sites in the Northern Cape. *Southern African Association of Archaeologists Post-Conference Excursion*: 9-13 September 1990.

Beaumont, P.B. 1990. Kathu Townlands 1, in: Beaumont, P.B. & Morris, D. (Eds.), *Guide to archaeological sites in the Northern Cape*. McGregor Museum, Kimberley, pp. 96-97.

Beaumont, P.B., 1983. Dithakong. *South African Archaeological Soc. Newsletter* 6 (2).

Beaumont, P.B., 1990. Kathu Pan. In: Beaumont P.B., Morris D. (Eds.). *Guide to the Archaeological Sites in the Northern Cape*. McGregor Museum, Kimberley, pp. 101-134.

Beaumont, P.B., 1990. Wonderwerk cave; Kathu. In: Beaumont, P.B., Morris, D. (Eds.), *Guide to Archaeological Sites in the Northern Cape*. McGregor Museum, Kimberley, pp. 75–101.

Beaumont, P.B., Van Zinderen Bakker, E.M., Vogel, J.C., 1984. Environmental changes since 32,000 BP at Kathu Pan, Northern Cape. In: Vogel, J.C. (Ed.), *Late Cenozoic Palaeoclimates of the Southern Hemisphere*. Balkema, Rotterdam, pp. 329– 338.

Beaumont, P.B., Vogel, J.C., 2006. On a timescale for the past million years of human history in central South Africa. *South African Journal of Science* 102, 217–228.

Beaumont, P. and Boshier, A. 1974. Report on test excavations in a prehistoric pigment mine near Postmasburg. Northern Cape. *South African Archaeological Bulletin* 29(113/114): 41-59.

Beaumont, P. B. 1973. The ancient pigment mines of Southern Africa. *South African Journal of Science* 69: 140-146.

Bosch, P.J.A. 1983. Die geologie van die gebied Kimberley. Explanation to 1:250 000 geology Sheet 2824 Kimberley, 60 pp. Council for Geoscience, Pretoria.

Butler, E. 2020. Palaeontological Desktop Assessment For The Proposed Groblershoop Township Expansion, !Kheis Local Municipality, ZF Mgcau District Municipality, Northern Cape Province. Unpublished report. Banzai Environmental: Bloemfontein.

Chazan, M., et al. 2012. The Oldowan horizon in Wonderwerk Cave (South Africa): archaeological, geological, paleontological and paleoclimatic evidence. *Journal of Human Evolution* 63(6):859-66.

Chazan, M., Wilkins, J., Morris, D. & Berna, F., 2012. Bestwood 1: a newly discovered Earlier Stone Age living surface near Kathu, Northern Cape Province, South Africa, *Antiquity* 86: 331.

Deacon, J. (1984). The Later Stone Age of Southernmost Africa. *Cambridge Monographs in African Archaeology* 12. Oxford: BAR

DELMAS, A & DE LA PEÑA, P. 2019. INTRODUCTION: TOWARDS A HISTORY OF ARCHAEOLOGY FROM SOUTH AFRICA. South African Archaeological Society Goodwin Series 12: 1–7, 2019

Dusseldorp, G., Lombard, M. and Wurz, S. 2013. Pleistocene Homo and the updated Stone Age sequence of South Africa. *South African Journal of Science* 109: 01-07.

Dingle, R.V., Siesser, W.G. & Newton, A.R. 1983. Mesozoic and Tertiary geology of southern Africa. viii + 375 pp. Balkema, Rotterdam.

Du Toit, A. 1954. The geology of South Africa. xii + 611pp, 41 pls. Oliver & Boyd, Edinburgh

Esterhuysen, A. 2019. Our time is not your time: periodization and archaeological practice. The South African Archaeological Society.

Groenewald, G. 2014. SAHRA Palaeotechnical Report. Palaeontological Heritage of Northwest.

Haddon, I.G. 2000. Kalahari Group sediments. In: Partridge, T.C. & Maud, R.R. (Eds.) The Cenozoic of southern Africa, pp. 173-181. Oxford University Press, Oxford.

Huffman, T. 1982. Archaeology and ethno history of the African Iron Age. *Annual Review of Anthropology* 11: 133-50.

Fivaz, H & Engelbrecht, J. 2020. Phase 1 HIA Report! Kheis Township Expansion Groblershoop, Northern Cape. Unpublished Report Ubique Heritage Consultants

Humphreys, A.J.B. & Thackeray, A. I. 1983. Ghaap and Gariep: Later Stone Age studies in the Northern Cape. *The South African Archaeological Society Monograph Series No 2*. Cape Town.

Humphreys, A.J.B. 1976. Note on the Southern Limits of Iron Age Settlement in the Northern Cape. *South African Archaeological Bulletin* 31(121&122): 54 – 57.

Humphreys, A.J.B. 1978. The re-excavation of Powerhouse Cave and an assessment of Frank Peabody's work on Holocene Deposits in the Taung area. *Ann. of the Cape Prov. Museums* 2 (12): 217 – 244.

Klein, R. 2000. Archeology and the evolution of human behavior. *Evolutionary Anthropology* 9: 17-36.

Kuman, K. 2001. An Acheulean factory site with prepared core technology near Taung, SA. *South African Archaeological Bulletin* 56(173&174): 8 – 22.

Lombard, M. 2012. Thinking through the Middle Stone Age of sub-Saharan Africa. *Quaternary International* 270: 140–155

Maggs, T.C. 1976. Iron Age communities of the southern Highveld. *Occasional Papers of the Natal Museum* No. 2.

Maggs, T.M. O’C. 1972. Bilobial dwellings: a persistent feature of Southern Tswana settlements. *SA Archaeological Soc. Goodwin Series* 1, 54 – 64.

Matenga, E. 2019. PHASE I HERITAGE IMPACT ASSESSMENT (INCLUDING PALAEOLOGICAL ASSESSMENT) REQUESTED IN TERMS OF SECTION 38 OF THE NATIONAL HERITAGE RESOURCES ACT NO 25/1999 FOR THE PROPOSED MINE PROSPECTING AND APPLICATION FOR MINING RIGHT ON THE FARM KATLANI 236 NEAR DOUGLAS, SIYANCUMA LOCAL MUNICIPALITY, NORTHERN CAPE PROVINCE. Unpublished HIA Report

McBrearty, S. and Brooks, A. S. 2000. The revolution that wasn't: A new interpretation of the origin of modern humans. *Journal of Human Evolution* 39: 453–563.

Morris, D. 1990. Blinkklipkop and Doornfontein: Specularite Mines. Guide to archaeological sites in the Northern Cape. *Southern African Association of Archaeologists Post-Conference Excursion*: 65-73. September 1990.

Morris, D. 1990. Dithakong: “the place of ruins”. In P. Beaumont and D. Morris (comp.) *Guide to Archaeological Sites in the Northern Cape*. McGregor Museum, Kimberley, pp. 148 – 154.

Mucina, L. & Rutherford, M.C., 2006, The vegetation of South Africa, Lesotho and Swaziland, South African National Biodiversity Institute, Pretoria.

Parsons, I. 2008. Five Later Stone Age artefact assemblages from the interior Northern Cape Province. *South African Archaeological Bulletin* 63 (187):51-60.

Partridge, T.C., Botha, G.A. & Haddon, I.G. 2006. Cenozoic deposits of the interior. In: Johnson, M.R., Anhaeusser, C.R. & Thomas, R.J. (Eds.) *The geology of South Africa*, pp. 585-604. Geological Society of South Africa, Marshalltown.

Thackeray, A.I., Thackeray, J.F., Beaumont, P.B., Vogel, J.C., 1981. Dated rock engravings from Wonderwerk Cave, South Africa. *Science* 214, 64-67.

THOMAS, M.J. 1981. The geology of the Kalahari in the Northern Cape Province (Areas 2620 and 2720). Unpublished MSc thesis, University of the Orange Free State, Bloemfontein, 138 pp.

Thomas, D.S.G. & Shaw, P.A. 1991. *The Kalahari environment*, 284 pp. Cambridge University Press, Cambridge.

Underhill, D. 2011. A history of Stone Age Archaeology study in South Africa. *South African Archaeological Bulletin*, 66 (193): 3-14

van der Walt, J .2022. HERITAGE IMPACT ASSESSMENT. For the Kiwano Solar PV Plant, Battery Energy Storage System, Substation and 132 KV Powerline near Upington, Northern Cape Province.

Visser, D.L.J. 1958. The geology and mineral deposits of the Griquatown area, Cape Province. Explanation of to 1:250 000 geology sheet 175 Griquatown, 72 pp. Council for Geoscience, Pretoria.

Wadley, L. 1993. The Pleistocene Later Stone Age south of the Limpopo River. *Journal of World Prehistory* 7: 243–296.

Webley, L. & Halkett, D. 2008. Phase 1 Heritage Impact Assessment: Proposed prospecting on the farms Adams 328 and Erin 316, Kuruman, Ga-Segonyana Municipality in the Northern Cape.

Wilkins, J. & Chazan, M., 2012. Blade production ~500 thousand years ago at Kathu Pan 1, South Africa: support for a multiple origins hypothesis for early Middle Pleistocene blade technologies, *Journal of Archaeological Science* 39, 1883-1900