PHASE 1 ARCHAEOLOGICAL IMPACT ASSESSMENT REPORT FOR PROPOSED PROSPECTING ON THE FARM SOETFONTEIN 606, NEAR POSTMASBURG, TSANTSABANE LOCAL MUNICIPALITY (HAY), NORTHERN CAPE PROVINCE
NC 30/5/1/1/2/12685 PR

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March 2023

1. Introduction

The author, Honorary Research Associate of the McGregor Museum (archaeology department) was contacted by Mr Mosimanegape Setlogelo (setlogelo889@gmail.com) to conduct a Phase 1 Archaeological Impact Assessment ahead of proposed prospecting on the farm Soetfontein 606 near Postmasburg.

The Department of Mineral Resources and Energy (DMRE) had granted authorization for the Prospecting Right application (NC30/5/1/1/2/12685PR) on 9 December 2021, but because no Heritage Impact Assessment was conducted for the project SAHRA lodged an appeal against the Environmental Authorisation since the Heritage Authority was not given an opportunity "to provide comments on the EA application regarding the assessment of the impact to heritage resources within the proposed development area as per section 38(8) of the National Heritage Resources Act, Act 25 of 1999 (NHRA) and section 40(2)c of the NEMA EIA Regulations".

This Phase 1 Archaeological Impact Assessment report has been commissioned as part of the Heritage Impact Assessment (HIA).

1.1 Focus and Content of Specialist Report: Archaeology

The archaeological specialist study is focused on the property defined by farm Soetfontein 606 as indicated by boundary positions in a Google Earth image of the terrain. The property was inspected on foot over two days, 26-27 January 2023.

Study outline:

- Introduction to the specialist in terms of qualifications, accreditation and experience to undertake the study (1.2, below)
- description of the affected environment (2) providing background to the development and its infrastructural components (2.1); background to the heritage features of the area (2.2); and defining environmental issues and potential impacts (2.3)
- Methodology (3) including an assessment of limitations (3.1);statement of expectations and predictions (3.2) and outline of EIA procedures including criteria for assessing archaeological significance (3.3)
- Observations and assessment of impacts (4), including field observations (4.1); characterizing archaeological significance (4.2)
- Impact Assessment (5)
- Conclusions & Recommendations (6)
- References (7)
- Appendix 1.

1.2 Author of this Report

The author is independent of the organization commissioning this specialist input, and provides this heritage assessment (archaeology and cultural heritage of the specific locale; but not palaeontology) within the framework of the National Heritage Resources Act (No 25 of 1999).

The author is a professional archaeologist (PhD) accredited as a Principal Investigator by the Association of Southern African Professional Archaeologists. He has worked as a museum archaeologist and has carried out specialist research and surveys in the Northern Cape and western Free State since 1985, including surveys and fieldwork on sites in the Kathu area (Beaumont & Morris 1990; Morris & Beaumont 2004). In addition he has UCT-accredited training on Architectural and Urban Conservation: researching and assessing local (built) environments (S. Townsend, UCT). As Chairman of the Historical Society Kimberley and the Northern Cape (registered as a conservation organisation on SAHRIS and with the Northern Cape Provincial Heritage Authority) he also has broad experience pertaining to the heritage and history in the Northern Cape.

The National Heritage Resources Act no. 25 of 1999 (NHRA) protects heritage resources which include archaeological and palaeontological objects/sites older than 100 years, graves older than 60 years, structures older than 60 years, as well as intangible values attached to places. The Act requires that anyone intending to disturb, destroy or damage such sites/places, objects and/or structures may not do so without a permit from the relevant heritage resources authority.

Heritage is assessed in terms of a NEMA application, and must comply with section 38(3) of the NHRA. SAHRA would then comment and make recommendations on the potential impacts.

(Where archaeological sites and palaeontological remains are concerned, the South African Heritage Resources Agency (SAHRA) at national level acts on an agency basis for the Provincial Heritage Resources Agency (PHRA) in the Northern Cape. The Northern Cape Heritage Resources Authority (formerly called Ngwao Bošwa ya Kapa Bokone) is responsible for the built environment and other colonial era heritage and contemporary cultural values).

2. Description of the affected environment and potential impacts

The proposed prospecting site is the farm Soetfontein some 5 to 9 km south west of Postmasburg (Fig. 1).

Figure 1a. Location of the proposed prospecting area of Soetfontein south west of Postmasburg (defined by boundary points A-B-C-D-E-F).

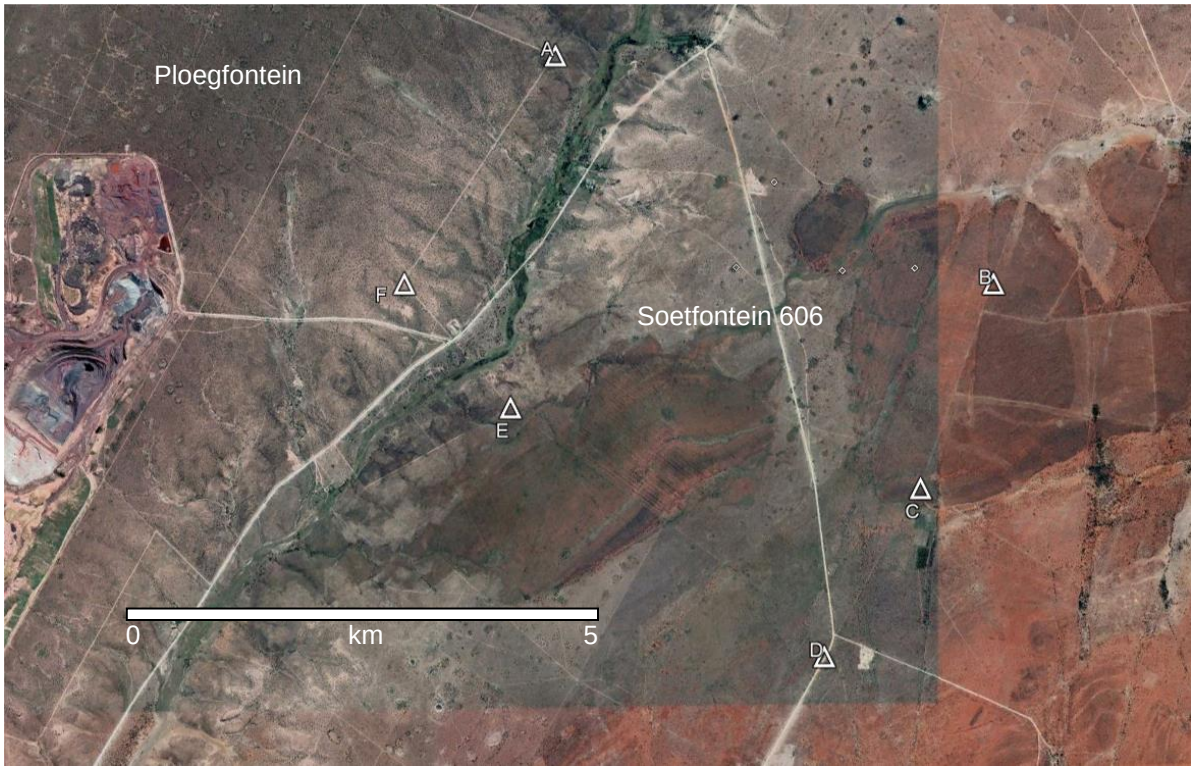


Figure 1b: Property for proposed prospecting, Soetfontein 606

In terms of bioregional context, the terrain is Savanna Biome with bushveld and thornveld vegetation types (Figures 2a-e) and straddles a broad non-perennial water course/valley with gently sloping sides and adjacent flat plains of calcrete and Banded Ironstone Formation. Except in the valley, soils are shallow with much rock exposure rendering visibility high for archaeological traces (which as will be shown comprises a generally ubiquitous low density background scatter of mainly Pleistocene age). The likelihood of subsurface archaeological materials being present is relatively low over the greatest part of the property.

Figure 2a Valley on west side of property. The eastern side of this valley has a steeper slope, rising to a calcrete scarp, as is visible in this image. (No shelters were found).

Figure 2b Valley on west side of property, Soetfontein homestead and guest farm infrastructure in the middle distance; R309 road south from Postmasburg.

Figure 2c Relatively flat terrain east of the valley – BIF rubble substrate.

Figure 2d. Slight depression on relatively flat area east of the valley – calcrete substrate.

Figure 2e. Gently sloping terrain defining the west side of the valley, west of the R309 road.

2.1. Project background

The author was contacted by Mr Setlogelo to conduct a Phase 1 Archaeological Impact Assessment ahead of proposed prospecting on the farm Soetfontein 606 near Postmasburg after SAHRA had appealed a DMRE prospecting right authorisation. SAHRA requested an opportunity to comment on the EA application regarding assessment of impacts to heritage resources within the proposed prospecting area (as per section 38(8) of the National Heritage Resources Act, Act 25 of 1999 (NHRA) and section 40(2)c of the NEMA EIA Regulations). An AIA and PIA were requested in light of potential sensitivities on the property.

2.2 Background to heritage features of the area

The Northern Cape has a wealth of archaeological sites and landscapes reflecting Stone Age to Colonial histories. Stone Age traces and colonial farming infrastructure have been reported from adjacent properties in the past (e.g. xxxx). The Soetfontein farm accommodation website, moreover, had referred to and illustrated a cave or cavern on the farm.

Adjacent to the Postmasburg commonage and at other sites in the area north of the town are significant specularite workings dating from the Later Stone Age, most notably at Tsantsabane (Blinkklipkop) and Doornfontein (summarised in Beaumont and Morris 1990). These sites show evidence of early mining of *sibilo* (Setswana) or *tto* (|xam), otherwise known as specularite, which is a sparkling mineral (decomposed haematite) documented as being used in cosmetic and ritual contexts in both Stone Age and later contexts (Bleek & Lloyd 1911; Beaumont 1973; Beaumont & Morris 1990).

In the wider region sites and site complexes have been investigated in some detail in the last quarter century and are subject to on-going research. This is especially true of the landscape in the vicinity of Kathu to the north, researched by Beaumont in 1979-1982 and with renewed investigations by an international team in partnership with the McGregor Museum from 2004 (Beaumont & Morris 1990; Beaumont 2004;

Morris & Beaumont 2004; Porat *et al*. 2010; Walker *et al*. 2014). Numerous Stone Age sites have been documented and excavated in what is now referred to as the Kathu Archaeological Complex, including sites Kathu Pan, Kathu Townlands and Bestwood (Beaumont and Morris 1990; Beaumont and Vogel 2006; Kaplan 2008; Beaumont 2013). Kathu Pan 1 preserves the longest lithostratigraphic and archaeological sequence of the sites, documenting a history of human occupation at the pan through the Earlier, Middle and Later Stone Ages, spanning at least 1 million years.

Wonderwerk Cave, over the Kuruman Hills to the north east of the study site, is a unique large 140 m-deep cave, also subject to a number of archaeological investigations since the first published description by Malan and Wells in 1943 (Thackeray et al. 1981) – by Beaumont with A. & J. Thackeray, 1978-1993, and by a project led by Chazan, Horwitz and Berna, 2004-present (reviewed by Horwitz & Chazan 2015).

This existing work suggests that further sites of significance may yet come to light in the region. Broadly speaking, the archaeological record of this region reflects the long span of human history from Earlier Stone Age times (about two million to about 270 000 years ago), through the Middle Stone Age (about 270 000 – 40 000 years ago), to the Later Stone Age (up to the protocolonial era). The last 2000 years was a period of increasing social complexity with the appearance of farming (herding and agriculture) alongside foraging, and of ceramic and metallurgical (Iron Age) technologies alongside an older trajectory of stone tool making. Of importance in this area, as noted, is evidence of early mining of specularite, used in cosmetic and ritual contexts in Stone Age and later contexts and known to have been traded over large distances (Beaumont 1973). Rock art is known in the form of rock engravings, occurring at Beeshoek north west of Postmasburg and at other sites in the region (Fock & Fock 1984; Morris 1992; Beaumont 1998).

At a regional level Wonderwerk Cave and the Kathu complex of sites provide important sequences against which to assess the age and significance of finds that may be made in other settings such as open air sites that might occur on Soetfontein.

2.3 Environmental issues and potential impacts

Heritage resources including archaeological sites are in each instance unique and non-renewable resources. Any area or linear, primary and secondary disturbance of surfaces in the development locales could have a destructive impact on heritage resources, where present. In the event that such resources are found, they are likely to be of a nature that potential impacts could be mitigated by documentation and/or salvage following approval and permitting by South Africa Heritage Resources Agency and, in the case of any built environment features, by Northern Cape Heritage authority (previously called Ngwao Boswa jwa Kapa Bokone). Although unlikely, there may be some that could require preservation in situ and hence modification of intended placement of development features.

In this instance, area and linear impacts/disturbances through prospecting may be expected where any traces occur.

Disturbance of surfaces includes any construction: of a road, a pipeline, erection of a pylon, or any other clearance of, or excavation into, land surface. In the event of archaeological materials being present such activity would alter or destroy their context (even if the artefacts themselves are not destroyed). Without context, archaeological traces are of much reduced significance. It is the contexts as much as the individual items that are protected by the legislation.

The destructive impacts that are possible in terms of heritage resources would tend to be direct, once-off events occurring during prospecting. In the long term, the proximity of operations in a given area could result in secondary indirect impacts resulting from the movement of people and vehicles in the immediate or surrounding vicinity.

3. METHODOLOGY

This study defines the archaeology/material culture component of the Heritage impact assessment for the proposed prospecting site. The landscape in question was examined on foot including more detailed focus on the terrain adjacent to valley which runs southwards through the western side of the property, and the vicinity of the so-called cave (in fact solution cavity with two outlets to the surface separated

by a few tens of metres). Heritage traces were evaluated in terms of their archaeological significance.

In preparation for this:

- A desktop assessment was done of the vicinity of the prospecting site relative to the known wider archaeological landscape.
- A search was done on SAHRIS database to determine what previous Archaeological and Heritage Impact studies existed for the area. Most relevant is work done on adjacent properties including Ploegfontein (Birkholtz & van der Ryst 2015; Morris 2012).
- Predictions were made which the study would test with observations made in the field.

3.1 Assumptions and limitations

It was assumed that, by and large in this landscape, with its mostly shallow soil profiles, that a reasonable sense of the archaeological traces to be found in the area would be readily apparent from surface observations. This was found to be the case, with some areas consisting of calcrete exposed at the surface or otherwise minimal mantling of sands, with archaeological traces in the form of stone artefacts widely distributed as fairly low density 'background scatter' (Orton 2016).

A proviso is routinely given, nevertheless, that should sites or features of significance be encountered during construction (these could include an unmarked burial, an ostrich eggshell water flask cache, or a high density of stone tools, for instance), specified steps are necessary (cease work, report to heritage authority).

This study does not address palaeontology.

3.2 Predictions/expectations

Against the archaeological background reviewed (2.2 above), it was expected that archaeological traces might occur in the following sets of circumstances:

- Landscape settings in which dolines occur might yield archaeological sites similar to those documented in the case of Kathu Pan.
- Rich raw material sources outcropping locally might be foci for 'workshop' knapping sites such as at Kathu Townlands.
- Settings close to streams or pans might support higher density site/artefact occurrences because of the affordances of proximity to water and associated ecologies.
- Exposure of bedrock in the form of boulders or smooth sheets of rock may support rock art in the form of engravings.
- Topographic features such as hills or rocky ridges may provide shelters with traces of precolonial Stone Age occupation/activity.
- Iron Age traces including pottery are known from ridges in the wider landscape as well as from sandy plains.

3.3 Determining archaeological significance

In addition to guidelines provided by the National Heritage Resources Act (Act No. 25 of 1999), a set of criteria based on Deacon (nd) and Whitelaw (1997) for assessing archaeological significance has been developed for Northern Cape settings (Morris 2000a). These criteria include estimation of landform potential (in terms of its capacity to contain archaeological traces) and assessing the value to any archaeological traces (in terms of their attributes or their capacity to be construed as evidence, given that evidence is not given but constructed by the investigator). These are included in Appendix 1 of this report.

4. OBSERVATIONS AND ASSESSMENT OF IMPACTS

The manner in which archaeological and other heritage traces or values might be affected by the proposed prospecting may be summed up in the following terms: it would be any act or activity that would result immediately or in the future in the destruction, damage, excavation, alteration, removal or collection from its original position, any archaeological material or object (as indicated in the National Heritage Resources Act (No 25 of 1999)). The most obvious impact in this case would be land surface disturbance associated with infrastructure construction.

4.1 Specific field observations

Relative to desktop predictions (3.2 above), it is noted that much of the area of proposed/possible prospecting lacks many of the aspects or features that might point to potentially significant archaeological sites being present. Exceptions to this observation are the banks of the non-perennial water course at the western side of the property, possible stone tool workshop contexts where BIF (banded ironstone) occurs, and at the vicinity of the solution cavity/cave noted in the guest farm website. Previous experience on adjacent properties, e.g. Ploegfontein, indicated the possibility of dolines/shallow depressions as features that could hold water and thus be a focus for activity in the past. On those adjacent farms no instances of rock surfaces likely to support rock engravings had been observed. No topographic features with rock shelters occur (other than the solution cavity referred to above).

In relation to the predictions made in 3.2, above, a general summing up can be stated as follows:

Much of the property consists of relatively homogeneous flat stony plains (calcrete over large areas and BIF rubble in others), without marked water source zones – with the exception of a few depressions in which there was a slightly higher density of stone artefacts, and in the valley sides settings on the west side of the property (see below).

Areas where BIF (banded ironstone) occurs provide sources for raw material (jaspilite) and localities with evidence of knapping were found but these tend to be low density and lack archaeological integrity, and are best considered as 'background scatter' (Orton 2016).

No rocky ridges/hills/features with potential for rock shelters nor suitable for rock engravings were found. The low scarp on the east side of the valley was the closest context to potentially provide small shelters, but none was found.

No ceramics were found or any stone-walled feature suggestive of Iron Age occupation.

Abandoned ruins of farm infrastructure and a stone kraal were found on the east side of the non-perennial watercourse/valley, and a farm cemetery was located.

Table 1: Archaeological observations

Observation Number (See Figs 2-4; and GPS waypoints, Fig 6)	**Latitude**	**Longitude**	**Comment**	**Significance**
1	28°23'01.5" To 28°21'47.2"	23°01'05.9" 23°02'00.5"	Low density ubiquitous 'background scatter' of mainly jaspilite artefacts occurring here and along the entire western slope of the valley on calcrete substrate. Pleistocene, Middle Stone Age. These surface finds lack archaeological context.	LOW
2	28°22'38.4"	23°01'58.6"	Traces of a collapsed mud brick house, nearby ash heap midden and a smaller tumbled structure – confirmed by far owner Albertus Viljoen to have been a former farm dwelling.	LOW
3	28°22'35.6"	23°02'04.3"	Low density Later Stone Age stone tool scatter on top of hill (part of a scarp) overlooking the valley. On eroded surface without context.	LOW
4	28°22'55.8"	23°01'48.1"	Large stone kraal on slope below the scarp, part of an abandoned earlier farming operation evidently associated with the ruin referred to in site #2.	MEDIUM
5	28°22'35.6"	23°02'04.3"	Scatter of artefacts on east bank of low-lying area of valley, but best characterised as 'background scatter' – probably in secondary erosional comtext.	LOW
6	28°22'34.3"	23°02'21.1"	Farm cemetery in thicket of trees, about 12 graves, all but	HIGH

			one of them unmarked except by a cairn of calcrete cobbles. One grave has a barely decipherable inscription which was inscribed into wet cement.	
7	28°23'05.7"	23°03'01.6"	What is referred to on the Soetfontein guestfarm website as a 'cave' is a solution cavity in calcrete, opening to the surface within a small depression in the landscape. About 50 m south west of it is a further cavity (sinkhole?) which is plugged with trees growing out of it. It was not possible to descend a ladder which had been built into the first of the cavities since wild bees occupied the entrance at the time of the visit. The farm owner doubted that there were artefacts within it, mentioning that water flushes through it in times of heavy rain. The immediate surrounds were examined closely and although some stone artefacts were found these were not in greater density than in the wider landscape as described e.g. for observation #1 above.	HIGH
	28°23'05.7"	23°03'01.3"	However a nodule of specularite was noted.	
	28°23'07.0"	23°03'00.4"	Second cavity/sinkhole. This cluster is assigned HIGH significance on account of its topographic singularity. It is likely to have had intangible significance in the past (and possibly in the present). Although there is limited material trace of possible	

			inhabitation in the past, the presence of a nodule of specularite may be an indicator of ritual performance.	
8	28°23'02.05"	23°02'44.6"	Higher density of probably MSA artefacts in a depression, yet lacking context/integrity	LOW
9	28°22'24.4"	23°03'23.2"	Isolated flakes on calcrete plain.	LOW
10	28°22'24.4"	23°03'23.2"	Background scatter in higher density of flaked stone, Earlier Stone Age (ESA) including a few rude bifaces, in an extensive area of BIF rubble. Lacks context.	LOW
11	28°22'24.4"	23°03'23.2"	Background scatter of flaked stone, ESA large flakes, in an extensive area of BIF rubble.	LOW
12	28°23'42.8"	23°03'01.1"	Background scatter of flaked stone in an extensive area of BIF rubble.	LOW

Figure 3. Observation 1. Artefacts from an area of about 10 x 10 m reflecting a widespread background scatter in a scree slope setting.

Figure 4. Observation 1 – slope scree/rubble amongst which a low density of artefacts occur along the west side of the valley.

Figure 5a & b. Observation 2 – collapsed mud brick building and ash heap.

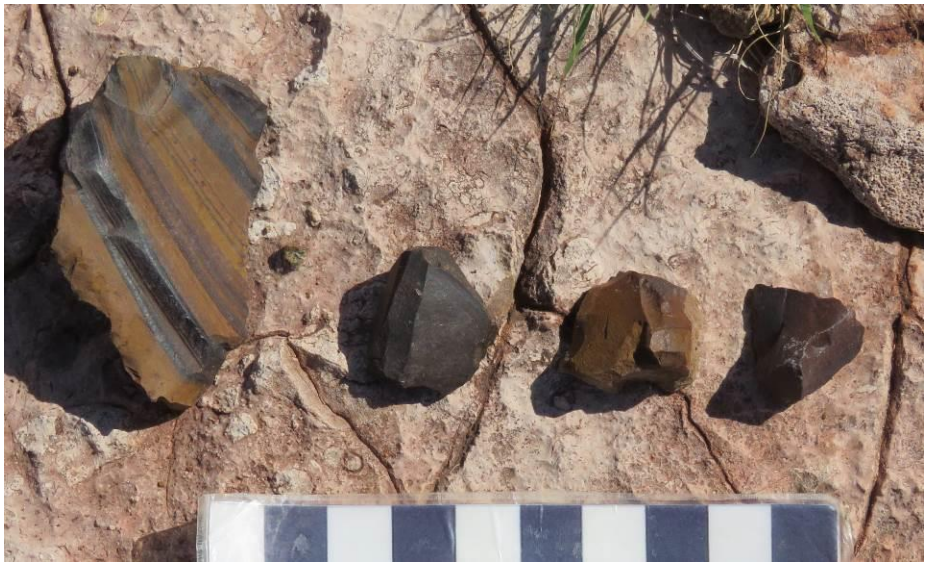


Figure 6. Observation 3. Probably Later Stone Age, dispersed on the stony top of the rise east of and overlooking the valley.

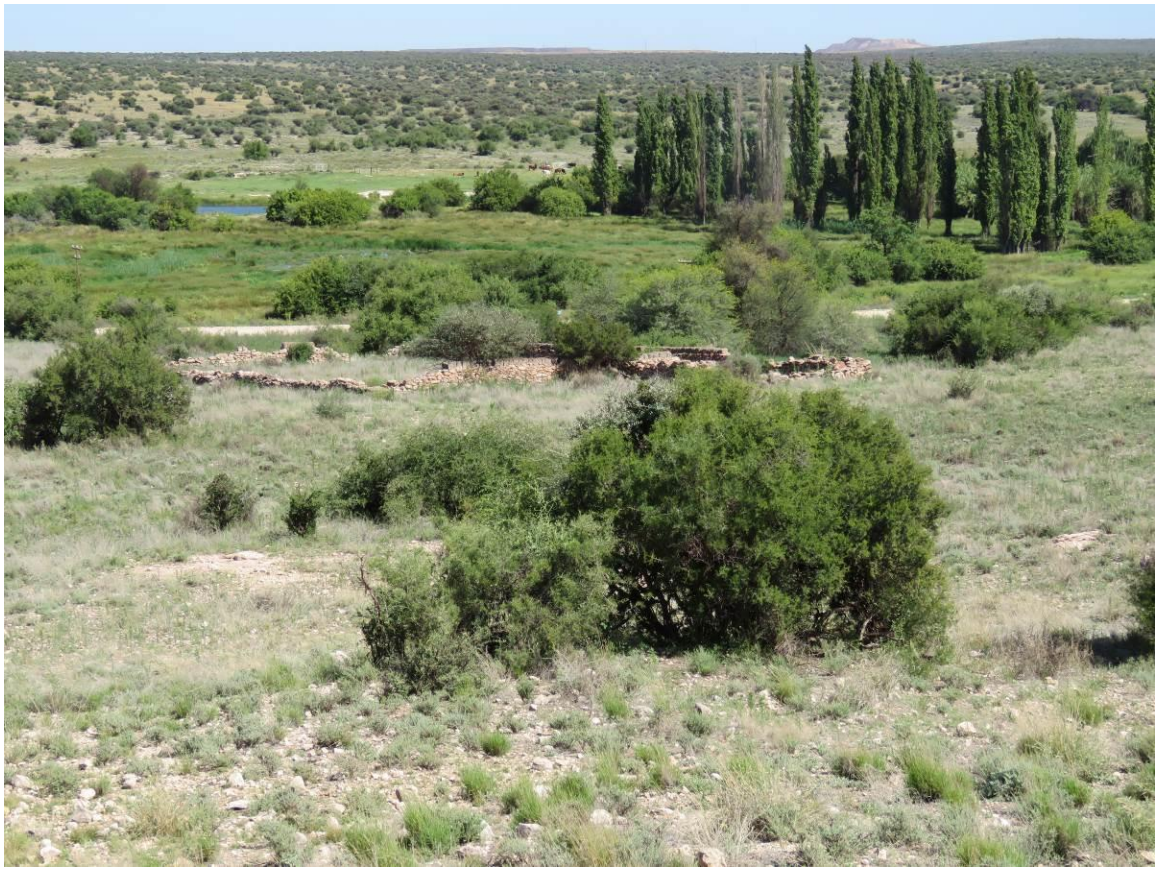


Figure 7a. Observation 4. Stone kraal complex.

Figure 7b. Observation 4. Stone kraal complex.

Figure 8. Observation 5. Artefacts on silt bank at the valley floor.

9a

9b

Figure 9a-c. Observation 6. Farm burial ground. Unmarked except for cairns of calcrete cobbles; one grave has inscription, "… HARTZENBERG 1961"

Figure 10a

Figure 10b

Figure 10a-b. Observation 7. The “cave”, evidently a solution cavity with walkway into it (not accessible on account of bees at the time of the author’s visit).

Figure 10c. Observation 7. Second sinkhole/solution cavity site 50 m south west of the first.

Figure 10d. Observation 7. Nodule of sibilo (specularite) adjacent to the solution cavity site.

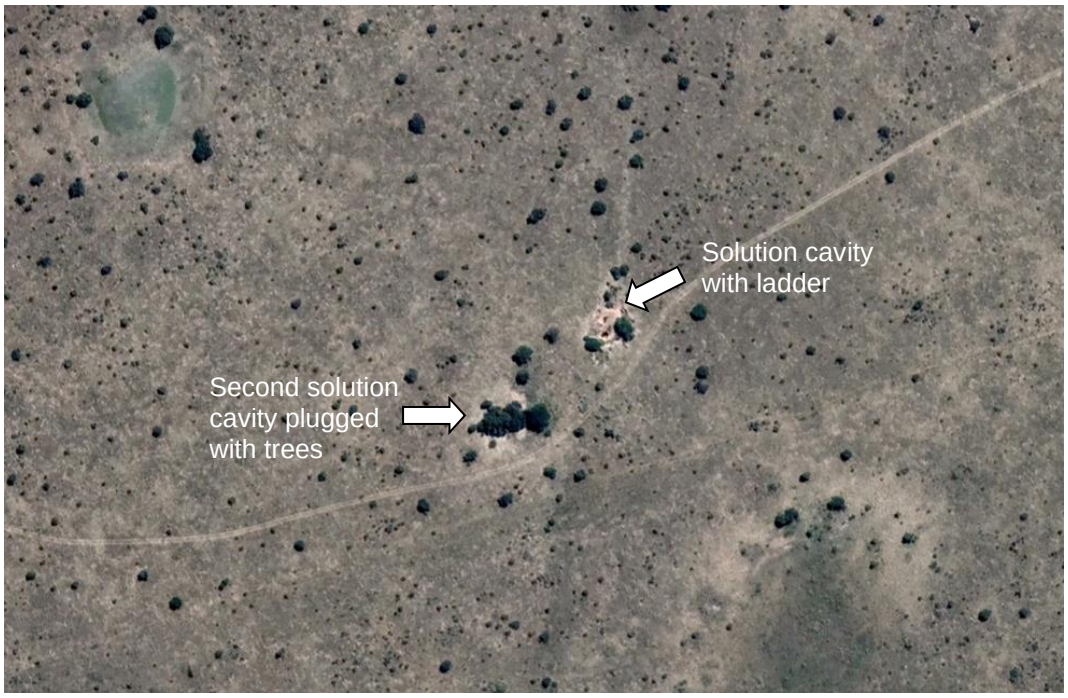


Figure 10e. Two solution cavities/sinkhole – about 50 m apart

Figure 11. Observation 8. Artefact from depression. Slightly higher density of lithics.

Figure 12. Observation 9. Low density/isolated artefacts on a calcrete substrate near the northern boundary of the farm.


Figure 13. Observation 10. Earlier Stone Age in an area of BIF rubble.

Figure 14. Observation11. Earlier Stone Age in an area of BIF rubble.

Figure 15. Observation 12. Large flakes including Earlier Stone Age in an area of BIF rubble.

Figure 16. Observations 1 – 12 plotted on Google Earth.

Figure 7. Track log – survey routes on Soetfontein.

4.2 Characterizing archaeological significance

In terms of the significance matrices in Tables 1 and 2 in Appendix 1 (see 3.3 above), most of the palaeo-archaeological observations fall under Landforms L1 and L3 Type 1 or 2. In terms of archaeological traces they all fall under Class A1 Type 1. All of these ascriptions (Table 1 in Appendix 1) reflect poor contexts and likely low archaeological significance for these criteria.

For site attribute and value assessment (Table 2 in Appendix 1), all of the observations noted fall under Type 1 for Classes 1-7, again reflecting low significance, low potential and absence of contextual and key types of evidence.

High significance is ascribed to the burial ground, which has existing protection being within the current farm compound (and adjacent to a shooting range – hence the name of *skietbaan begrafplaas* given to the burial ground).

High significance is also recommended for the solution cavity/sinkhole site. Although no indications of focused past human activity/inhabitation were found (e.g. in terms of increased density of artefacts at or around the site), the finding of a nodule of sibilo potentially hints at ritual significance which is often associated with natural features such as holes in the ground. It could not be determined if archaeological traces exist in the cavity due to bees occupying the entrance.

Apart from these two instances, archaeological significance is reckoned by the above criteria to be generally low. In the next section significance is determined using criteria and methodology generated in terms of nature, extent, duration, magnitude and probability of impact.

5. IMPACT ASSESSMENT

Characterising the significance of impacts

The following criteria are used in this study to characterise the significance of direct, indirect and cumulative impacts:

- The **nature**, which shall include a description of what causes the effect, what will be affected, and how it will be affected.
- The **extent**, wherein it will be indicated whether the impact will be local (limited to the immediate area or site of development) or regional:
    - local extending only as far as the development site area – assigned a score of 1;
    - limited to the site and its immediate surroundings (up to 10 km) – assigned a score of 2;
    - will have an impact on the region – assigned a score of 3;
    - will have an impact on a national scale – assigned a score of 4; or
    - will have an impact across international borders – assigned a score of 5.
- The **duration**, wherein it will be indicated whether:
    - the lifetime of the impact will be of a very short duration (0–1 years) – assigned a score of 1;
    - the lifetime of the impact will be of a short duration (2-5 years) - assigned a score of 2;
    - medium-term (5–15 years) – assigned a score of 3;

    - long term (> 15 years) - assigned a score of 4; or
    - permanent - assigned a score of 5.
- The **magnitude**, quantified on a scale from 0-10, where a score is assigned:
    - 0 is small and will have no effect on the environment;
    - 2 is minor and will not result in an impact on processes;
    - 4 is low and will cause a slight impact on processes;
    - 6 is moderate and will result in processes continuing but in a modified way;
    - 8 is high (processes are altered to the extent that they temporarily cease); and
    - 10 is very high and results in complete destruction of patterns and permanent cessation of processes.
- The **probability** *of occurrence*, which shall describe the likelihood of the impact actually occurring. Probability will be estimated on a scale, and a score assigned:
    - Assigned a score of 1–5, where 1 is very improbable (probably will not happen);
    - Assigned a score of 2 is improbable (some possibility, but low likelihood);
    - Assigned a score of 3 is probable (distinct possibility);
    - Assigned a score of 4 is highly probable (most likely); and
    - Assigned a score of 5 is definite (impact will occur regardless of any prevention measures).
- the **significance**, which shall be determined through a synthesis of the characteristics described above (refer formula below) and can be assessed as low, medium or high.
- the **status**, which will be described as either positive, negative or neutral.
    - the degree to which the impact can be reversed.
    - the degree to which the impact may cause irreplaceable loss of resources.
    - the *degree* to which the impact can be *mitigated.*

The **significance** is determined by combining the criteria in the following formula:

S= (E+D+M) P; where

S = Significance weighting
E = Extent
D = Duration

M = Magnitude
P = Probability

The **significance weightings** for each potential impact are as follows:

- < 30 points: Low (i.e. where this impact would not have a direct influence on the decision to develop in the area),
- 30-60 points: Medium (i.e. where the impact could influence the decision to develop in the area unless it is effectively mitigated),
- > 60 points: High (i.e. where the impact must have an influence on the decision process to develop in the area).

***Impact table summarising the significance of impacts by proposed prospecting on Soetfontein* – excluding the burial ground and solution cavity/sinkhole site (no-go areas)**

Nature Acts or activities resulting in disturbance of surfaces and/or sub-surfaces containing artefacts (causes) resulting in the destruction, damage, excavation, alteration, removal or collection from its original position (consequences), of any archaeological material or object (what affected).		
	Without mitigation	***With mitigation***
Extent	Local (1)	Local (1)
Duration	Permanent (5) where archaeological material is impacted – but this has been rated as insignificant and not requiring mitigation	Permanent – but no mitigation regarded as necessary (5)
Magnitude	Minor (2)	Minor (2)
Probability	Improbable (2)	Improbable (2)
Significance	**Low (16)**	**Low (16)**
Status (positive or negative)	Negative	Negative
Reversibility	No	No
Irreplaceable loss of resources?	Generally low density and poor integrity/lack of context for artefacts across the greater part of Soetfontein.	
Can impacts be mitigated?	No high significance sites (apart from those noted above and excluded as no-go areas – burial ground	On-going management as per EMP

	and solution cavity/'cave'). Excepting the latter, it is not regarded as necessary to mitigate. Chance finds protocols apply (immediately cease work and consult heritage authority).	
Mitigation: Excepting for the burial ground and solution cavity site, recommended as no-go areas for prospecting, specific mitigation measures are not regarded as necessary. In the event of possible (unlikely) significant subsurface (or other) Stone Age archaeological traces being found, cease work and consult SAHRA.		
Cumulative Impacts: Where any archaeological contexts occur the impacts are once-off permanent destructive events. Future infrastructure development may lead to spatially extended impacts in the vicinity. EMP should provide for on-going monitoring.		
Residual Impacts: Depleted archaeological record if/where present.		

MEASURES FOR INCLUSION IN THE DRAFT ENVIRONMENTAL MANAGEMENT PLAN

OBJECTIVE: Archaeological or other heritage materials occurring in the path of any surface or sub-surface disturbances associated with any aspect of the development are likely to be subject to destruction, damage, excavation, alteration, or removal. The objective should be to limit such impacts to the primary activities associated with prospecting and hence to limit secondary impacts during the medium and longer term if further development occurs.

Project component/s	Any disturbance over and above what is necessary and any extension of other components.
Potential Impact	The potential impact if this objective is not met is that wider areas or extended linear developments may result in destruction, damage, excavation, alteration, removal or collection of heritage objects from their current context in the area.
Activity/risk source	Activities which could impact on achieving this objective include deviation from the planned prospecting without taking heritage impacts into consideration.
Mitigation: Target/Objective	An environmental management plan that takes cognizance of heritage resources in the event of any future expansion, access roads or other infrastructure.

Mitigation: Action/control	Responsibility	Timeframe
Provision for on-going heritage monitoring	Environmental	Environmental

in a facility environmental management plan which also provides protocols/guidelines on what to do in the event of any major heritage feature being encountered during any phase of development or operation. Localize prospecting activity and impacts	management provider with on-going monitoring.	management plan to be in place before commencement of development.

Performance Indicator	Inclusion of further heritage impact consideration in any future expansion or infrastructural elements. Immediate reporting to relevant heritage authorities of any heritage feature discovered during construction operations.
Monitoring	Officials from relevant heritage authorities (National and Provincial) to be permitted to inspect the operation at any time in relation to any heritage component of the management plan.

6. CONCLUSIONS AND RECOMMENDATIONS

The manner in which archaeological and other heritage traces would be affected by the proposed prospecting activity has been indicated above. In summary, it would be any act or activity that would result, immediately or in future, in the destruction, damage, excavation, alteration, removal or collection from its original position, of any heritage material, object or value (as indicated in the National Heritage Resources Act (No 25 of 1999).

There is potential, as noted above, for chance finds of material of significance occurring subsurface or outside of specific areas surveyed, which, if encountered during any phase of the proposed prospecting, should be brought to the immediate attention of the heritage authorities. Work should be halted and SAHRA be contacted to allow for further assessment and mitigation recommendations.

Generally low density/poor integrity heritage traces in the form of Stone Age 'background scatter' (Orton 2016) were found in all areas examined, conforming with observations in previous studies in the wider area. From an archaeological perspective the observed heritage resources are (with the exception of the burial ground and solution cavity site) regarded as being of low significance, with no mitigation measures considered necessary. Criteria used for impact significance assessment indicate the impacts of the proposed prospecting to be Low.

7. References

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

Beaumont, P.B. & Boshier, A.K. 1974. Report on test excavations in a prehistoric pigment mine near Postmasburg, Northern Cape. South African Archaeological Bulletin 29:41-59.

Beaumont, P. & Morris, D. 1990. *Guide to archaeological sites in the Northern Cape.* Kimberley: McGregor Museum

Beaumont, P.B. 1998. Report on preliminary fieldwork on the farm Beeshoek 448, Postmasburg District, Northern Cape. Unpublished report, McGregor Museum.

Beaumont, P.B. 2004. Archaeological sites in the Gamagara Municipal Area. Ms.

Beaumont, P.B. 2013. Phase 2 Archaeological Permit Mitigation Report on a 0.7 HA portion of the farm Bestwood 549, situated on the eastern outskirts of the Kathu, John Taolo Gaetsewe District Municipilaity, Northern Cape Province.

Birkholtz, P. & van der Ryst, M 2015. Kolomela Amendment Project: Amendment of Existing Mining Activities on the Farms Ploegfontein 487; Remainder of Leeuwfontein 485; Strydfontein 614; Remainder of Klipbankfontein 489; Portions 1, 2, 3, and the Remainder of Kapstevel 541; Wolhaarkop 485, Welgevonden 486 and Floradale 230 located South-west of Postmasburg, Northern Cape Province. Heritage Impact Assessment

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

Deacon, J. nd. Archaeological Impact Assessment - specialist input to planning and design. Unpublished notes compiled for the National Monuments Council.

Fock, G.J. & Fock, D.M.L. 1984. *Felsbilder in Südafrika: Kinderdam und Kalahari.* Köln: Böhlau Verlag.

Horwitz, L.K. & Chazan, M. 2015. Past and Present at Wonderwerk Cave (Northern Cape Province, South Africa). *African Archaeological Review* 32:595–612. DOI 10.1007/s10437-015-9208-5

Morris, D. 1992. An archaeological impact assessment of a rock engraving site on the mining property at Beeshoek. Unpublished report to the National Monuments Council and Associated Manganese Mines of South Africa.

Morris, D. 2000. Gamsberg Zinc Project environmental impact assessment specialist report: archaeology.

Morris D. 2005. Report on a Phase 1 Archaeological Assessment of proposed mining areas on the farms Ploegfontein, Klipbankfontein, Welgevonden, Leeuwfontein, Wolhaarkop and Kapstevel, west of Postmasburg, Northern Cape. Unpublished report by the McGregor Museum, Kimberley.

Orton, J. 2016. Prehistoric cultural landscapes in South Africa: a typology and discussion. *South African Archaeological Bulletin* 71: 119-129.

Porat, N. Chazan, M., Grűn, R., Aubert, M., Eisenmann, V. & Horwitz, L.K. 2010. New radiometric ages for the Fauresmith industry from Kathu Pan, southern Africa: implications for the Earlier to Middle Stone Age transition. *Journal of Archaeological Science* 37: 269–283.

Sampson, C. G. 1974. The Stone Age archaeology of South Africa. New York: Academic Press.

Thackeray, A.I., Thackeray, J.F. & Beaumont, P.B. 1983. Excavations at the Blinkklipkop specularite mine near Postmasburg, Northern Cape. *South African Archaeological Bulletin* 38:17-25.

Walker, S.J.H., Lukich, V. & Chazan, M. 2014. Kathu Townlands: A High Density Earlier Stone Age Locality in the Interior of South Africa. PLoS ONE 9(7): e103436. doi:10.1371/journal.pone.0103436

Whitelaw, G. 1997. Archaeological monuments in KwaZulu-Natal: a procedure for the identification of value. Natal Museum Journal of Humanities. 9:99-109.

Wilkins, J., Schoville, B.J., Brown, K.S., Chazan, M. 2012. Evidence for Early Hafted Hunting Technology. *Science* 338: 942-946.

Appendix 1: Tables for determining archaeological significance

Estimating site potential

Table 1 (below) is a classification of landforms and visible archaeological traces used for estimating the potential of archaeological sites (after J. Deacon nd, National Monuments Council). Type 3 sites tend to be those with higher archaeological potential, but there are notable exceptions to this rule, for example the renowned rock engravings site Driekopseiland near Kimberley which is on landform L1 Type 1 – normally a setting of lowest expected potential. It should also be noted that, generally, the older a site the poorer the preservation, so that sometimes *any* trace, even of only Type 1 quality, can be of exceptional significance. In light of this, estimation of potential will always be a matter for archaeological observation and interpretation.

Assessing site value by attribute

Table 2 is adapted from Whitelaw (1997), who developed an approach for selecting sites meriting heritage recognition status in KwaZulu-Natal. It is a means of judging a site's archaeological value by ranking the relative strengths of a range of attributes (given in the second column of the table). While aspects of this matrix remain qualitative, attribute assessment is a good indicator of the general archaeological significance of a site, with Type 3 attributes being those of highest significance.

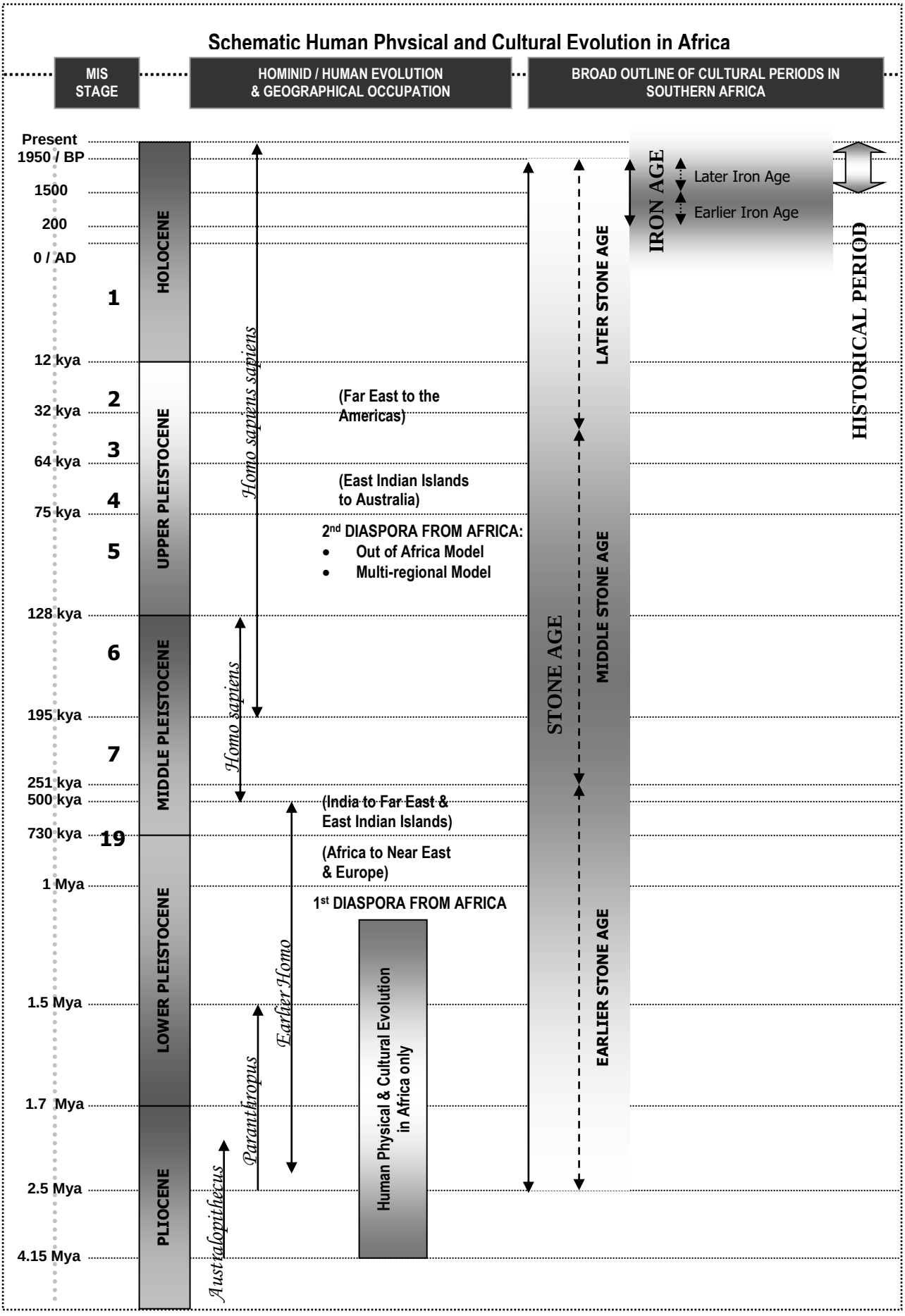
Table 1. Classification of landforms and visible archaeological traces for estimating the potential for archaeological sites (after J. Deacon, National Monuments Council).

Class	**Landform**	**Type 1**	**Type 2**	**Type 3**
L1	Rocky surface	Bedrock exposed	Some soil patches	Sandy/grassy patches
L2	Ploughed land	Far from water	In floodplain	On old river terrace
L3	Sandy ground, inland	Far from water	In floodplain or near feature such as hill	On old river terrace
L4	Sandy ground, Coastal	>1 km from sea	Inland of dune cordon	Near rocky shore
L5	Water-logged deposit	Heavily vegetated	Running water	Sedimentary basin
L6	Developed urban	Heavily built-up with no known record of early settlement	Known early settlement, but buildings have basements	Buildings without extensive basements over known historical sites
L7	Lime/dolomite	>5 myrs	<5000 yrs	Between 5000 yrs and 5 myrs
L8	Rock shelter	Rocky floor	Sloping floor or small area	Flat floor, high ceiling
Class	**Archaeo-logical traces**	**Type 1**	**Type 2**	**Type 3**
A1	Area	Little deposit	More than half	High profile site

Class	Landform	Type 1	Type 2	Type 3
	previously excavated	remaining	deposit remaining	
A2	Shell or bones visible	Dispersed scatter	Deposit <0.5 m thick	Deposit >0.5 m thick; shell and bone dense
A3	Stone artefacts or stone walling or other feature visible	Dispersed scatter	Deposit <0.5 m thick	Deposit >0.5 m thick

Table 2. Site attributes and value assessment (adapted from Whitelaw 1997)

Class	Attribute	Type 1	Type 2	Type 3
1	Length of sequence/context	No sequence Poor context Dispersed distribution	Limited sequence	Long sequence Favourable context High density of arte/ecofacts
2	Presence of exceptional items (incl regional rarity)	Absent	Present	Major element
3	Organic preservation	Absent	Present	Major element
4	Potential for future archaeological investigation	Low	Medium	High
5	Potential for public display	Low	Medium	High
6	Aesthetic appeal	Low	Medium	High
7	Potential for implementation of a long-term management plan	Low	Medium	High


Schematic Human Phvsical and Cultural Evolution in Africa
MIS STAGE
HOMINID / HUMAN EVOLUTION & GEOGRAPHICAL OCCUPATION
BROAD OUTLINE OF CULTURAL PERIODS IN SOUTHERN AFRICA
Present
1950 / BP
1500
200
0 / AD
12 kya
32 kya
64 kya
75 kya
128 kya
195 kya
251 kya
500 kya
730 kya
1 Mya
1.5 Mya
1.7 Mya
2.5 Mya
4.15 Mya
1
2
3
4
5
6
7
19
HOLOCENE
UPPER PLEISTOCENE
MIDDLE PLEISTOCENE
LOWER PLEISTOCENE
PLIOCENE
Homo sapiens sapiens
Homo sapiens
Earlier Homo
Paranthropus
Australopithecus
(Far East to the Americas)
(East Indian Islands to Australia)
2nd DIASPORA FROM AFRICA:
Out of Africa Model
Multi-regional Model
(India to Far East & East Indian Islands)
(Africa to Near East & Europe)
1st DIASPORA FROM AFRICA
Human Physical & Cultural Evolution in Africa only
STONE AGE
LATER STONE AGE
MIDDLE STONE AGE
EARLIER STONE AGE
IRON AGE
Later Iron Age
Earlier Iron Age
HISTORICAL PERIOD