McGregor Museum
Department of Archaeology

Heritage Impact Assessment of Agricultural Lot 2371 Kakamas South Settlement, near Kakamas, Northern Cape.

David Morris
McGregor Museum, Kimberley
October 2017

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David Morris, McGregor Museum, Kimberley
P.O. Box 316 Kimberley 8300
Tel 082 2224777 email dmorriskby@gmail.com
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1. INTRODUCTION

Environmental Compliance Consultancy CC. (attn. Mr Stephan Bezuidenhout – stephan@eccenvironmental.com, tel +264812627872 approached the McGregor Museum archaeology department to conduct a heritage impact assessment on the proposed Fruits du Sud agricultural development area known as Agricultural Plot 2371 Kakamas South Settlement, !Kai Garib Municipality, Northern Cape. The site was visited and inspected on 3 October 2017. This report accounts for findings made.

1.1. Focus and Content of Specialist Report: Heritage

This archaeology and heritage specialist study is focused on three adjoining portions of land which will constitute 12 ha of table grape production blocks, as shown in Figs. 1 and 2.

This study outlines:

- Introduction, explaining the focus of the report (1.1) and introducing the author in terms of qualifications, accreditation and experience to undertake the study (1.2)
- 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 or 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); and characterizing the overall significance of impacts (4.3).
- Summary of Significance of Impacts is stated in tabular form (4.3.1).
- Measures for inclusion in a draft Environmental Management Plan for the development are set out in tabular form (5).
- Conclusions (6).

1.2 The author of this report

The author of this report is a qualified archaeologist (PhD, University of the Western Cape) accredited as a Principal Investigator by the Association of Southern African Professional Archaeologists. The author has worked as a museum archaeologist in the Northern Cape since 1985 and has since the late 1980s carried out surveys in the general area of Upington-Kakamas (Morris 2002, 2005, 2006; Morris & Beaumont 1991; Morris & Seliane 2006). In addition, the author has a comprehensive knowledge of Northern Cape history and built environment, and received recent UCT-accredited training at a workshop on Architectural and Urban Conservation: researching and assessing local (built) environments (S. Townsend, UCT). He is also Chairman of the Historical Society of Kimberley and the Northern Cape.

The author is independent of the organization commissioning this specialist input, and provides this Specialist Report within the framework of the National Heritage Resources Act (No 25 of 1999).

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, objects and/or structures may not do so without a permit from the relevant heritage resources authority. This means that a Heritage Impact Assessment should be performed, resulting in a specialist report as required by the relevant heritage resources authority/ies to assess whether authorisation may be granted for the disturbance or alteration, or destruction of heritage resources.

2. DESCRIPTION OF THE AFFECTED ENVIRONMENT

The environment in question is in proximity to the Orange River which flows here through arid terrain. Lot 2371 is a currently uncultivated parcel of land within a fairly intensively cultivated riverside or close-to-river tract along the south bank of the Orange [Gariep] west of the town of Kakamas. Generally the terrain away from the river tends to be rocky or has shallow sandy soils with relatively to extremely sparse vegetation. Where archaeological materials might occur on the surface they would be highly visible. It is a setting where erosion generally features more strongly than deposition of sediment, so that there would be few places where archaeological materials would be expected to occur much below the current surface.

Most of the land to be inspected is already disturbed. This is fairly plainly visible in the Google Earth image included in Figure 3. Past disturbance includes

currently used and abandoned road-ways and portions of land where the surface has been scraped or trenched.

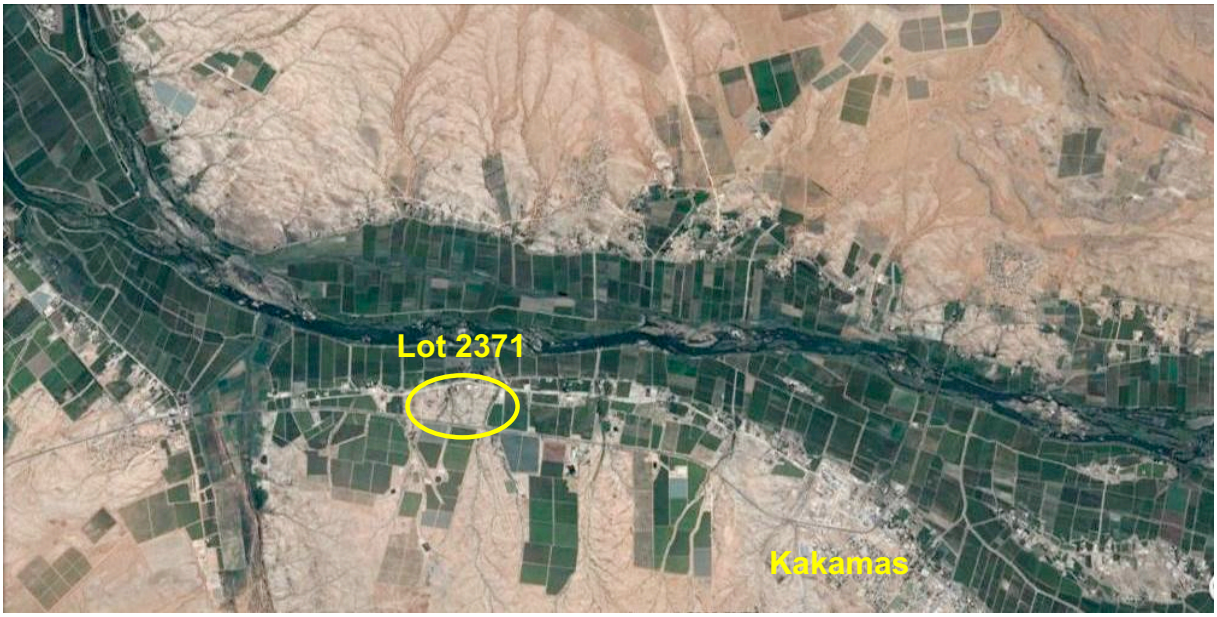

Figure 1. The location of the site of Kanonkop north of Kakamas.

Figure 2. Three adjoining parcels of land constituting approximately 12 ha intended to be developed as table grape blocks.

Figure 3. Google Earth image of Lot 2371 in which a certain degree of prior disturbance of the terrain is apparent. This includes abandoned road ways.

Figure 4. View across the western part of the development area with disturbed surfaces clearly apparent.

Figure 5. A further view across the western part of the development area with disturbed surfaces clearly apparent in the foreground.

Figure 6. View across the eastern part of the development area where substantial disturbed surfaces are clearly apparent.

One implication of the disturbed nature of much of the surface is that *in situ* archaeological/heritage traces would probably be found only in quite limited parts of the terrain.

2.1 Background to the development – description of proposed infrastructure

The blocks of land highlighted in Fig. 2 are intended to be developed for agricultural use. A configuration of blocks to be used for producing table grapes is being planned.

2.2. Heritage features of the region

No previous archaeological survey work had been carried out on this particular locality. In the wider landscape studies have been carried out at Steynmond Boerdery on Kakamas North Farm 339 (Beaumont 2007), and at the Cillie cemetery and township extensions (Dreyer 2013; vam Schalkwyk 2013). De Jong (2010; see also Morris 2016) assessed an area for similar agricultural development across the River at Kakamas North Settlement. At a general level the following summary statements provide pointers to potential heritage sensitivities in the local environment.

2.2.1 Colonial frontier

The eighteenth- and nineteenth-century records for this region (Penn 2005) pertain mainly to the areas south of and along the Orange River. The travellers Wikar and Gordon followed the river as far as and beyond this region in the 1770s, describing communities living along the river (see Morris & Beaumont 1991 for a summary).

Gordon, in 1779, noted a group of Bushmen living in the area whose encampments were on the north bank of the river, and who were known as *Khein eis* (= lean and thin people) (transcription of Gordon's Journal by Fredi Pheiffer nd:41, cf, Mossop 1935). Where the river was rocky, these people would subsist by fishing. There is reference to trapping of hippos (presumably in pits) near what is today Kakamas. Gordon refers to the inhospitable terrain with hillocks strewn with irregular chunks of hard loose rocks and smaller sharp pieces so that "one walks one's shoes through very quickly in this veld" (transcription of Gordon's Journal by Fredi Pheiffer nd:34).

Dunn and others describe the situation a century later (Robinson 1978). Frontiersmen such as the colourful Stephanos can be linked with particular places in the landscape – nearer to Keimoes (Morris 2002).

The region was caught up in the Koranna War of 1879-1880, while further military activity in the area included the risings of rebels during the Anglo-Boer War and again in January-February 1915 when there was also an incursion of German troops some of whom were killed in the area (Hopkins 1978:128-129).

One of the most significant historical watersheds for the particular vicinity under consideration was the establishment of the agricultural settlement at Kakamas in 1898. The irrigation scheme set up by this community included canal construction, beginning at the upper end of Neus Island (Hopkins 1978). The Kakamas settlement is also known for its pioneering development of a hydro-electric power generator, brought into operation in 1924 (Hopkins 1978). The building which housed the generator has been ear-marked as a museum.

2.2.2 Later Stone Age

Late Holocene Later Stone Age (LSA) sites are frequently noted in surveys south of and west of the region, including along the Orange River (e.g. Morris & Beaumont 1991; Beaumont et al. 1995). These are generally short-duration occupations by small groups of hunter-gatherers. In contrast, there are substantial herder encampments along the Orange River floodplain itself (Morris & Beaumont 1991) and in the hills north of Kakamas (Parsons 2003). In a range of hills north east of Keimoes, on Zovoorby, a rock shelter and specularite working (a sparkling mineral with known cosmetic and ritual use in the precolonial past) has been excavated (Smith 1995). LSA sites are usually focused on a particular feature in the landscape such as a hill or rocky outcrop and in relation to resources like water and associated habitats richer in animals and plant foods. Gordon's account of 1779 seems to suggest that particular locales were inhabited with inhospitable terrain separating such favoured spots.

2.2.3 Pleistocene: Middle and Earlier Stone Age

Beaumont et al. (1995:240-1) note a widespread low density stone artefact scatter of Pleistocene age across areas of Bushmanland to the south where raw materials, mainly quartzite cobbles, were derived from the Dwyka glacial till. Similar occurrences have been noted north of Upington in situations where raw materials are abundant. Systematic collections of this material at Olyvenkolk south west of Kenhardt and Maans Pannen east of Gamoep could be separated out by abrasion state into a fresh component of Middle Stone Age (MSA) with prepared cores, blades and points, and a large aggregate of moderately to heavily weathered Earlier Stone Age (ESA) (Beaumont et al. 1995).

The ESA included Victoria West cores on dolerite and quartzite (a fine example has been found at Hondeblaf north of Upington), long blades, and a very low incidence of handaxes and cleavers. The Middle (and perhaps in some instances Lower) Pleistocene occupation of the region that these artefacts reflect must have occurred at times when the environment was more hospitable than today.

This is suggested by the known greater reliance of people in Acheulean times on quite restricted ecological ranges, with proximity to water being a recurrent factor in the distribution of sites.

2.3 Description and evaluation of environmental issues and potential impacts

Heritage resources including archaeological sites are in each instance unique and non-renewable resources. Area and linear developments can have a permanent destructive impact on these resources. The objective of an HIA would be to assess the sensitivity of such resources where present, to evaluate the significance of potential impacts on these resources and, if and where appropriate, to recommend no-go areas and/or measures to mitigate or manage said impacts.

In relation to the proposed development of Lot 2371 Kakamas South, principally area impacts would be expected.

2.3.1 Direct, indirect and cumulative impacts (in terms of nature, magnitude and extent)

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

3. METHODOLOGY

A site visit was carried out on 3 October 2017 to inspect the Lot 2371 site on foot. Heritage traces would be evaluated in terms of their archaeological and heritage significance (see tables below). A set of predictions was made which the study would test with observations made in the field. The McGregor Museum head of archaeology (D. Morris) was assisted by A. Henderson with archaeology intern J. Louw.

3.1 Assumptions and limitations

It was assumed that, by and large in this landscape, with its sparse vegetation and often shallow soil profiles, some sense of the archaeological traces to be found in the area would be readily apparent from surface observations (including assessment of places of erosion or past excavations that expose erstwhile below-surface features).

A proviso is routinely given, that should sites or features of significance be encountered during future development/construction on the site (this 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 comment on palaeontology.

3.2 Predictions

It may be predicted that:

In the broader landscape the riverine environment and topographic features close to the river would have provided places favoured for Stone Age encampments, particularly adjacent to shallower/rocky portions of the river (opportunities for fording as well as activities such as fishing – e.g. as noted by Gordon in 1779).

Away from the river the terrain becomes frequently inhospitable in terms of arid, rocky ground. Gordon encountered no encampments in these latter kinds of settings when moving through the area in October 1779.

Lot 2371 straddles the close-to-river/away-from-river setting so that it is conceivable that significant sites may be found.

3.2.1 Potentially significant impacts to be assessed in the HIA process

Any area or linear, primary and secondary, disturbance of surfaces in the development locale 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 the South African Heritage Resources Agency and, in the case of any built environment features, by the Northern Cape Heritage Resources Authority. Although unlikely, there may be some that could require preservation in situ and hence modification of intended placement of development features.

Disturbance of surfaces includes any construction: of a road, a pipeline, erection of a pylon, or preparation of a site for a sub-station, or plant, or building, or agricultural block, or any other clearance of, or excavation into, a 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, which is also obviously possible). Without context, archaeological traces are of much reduced significance. It is the contexts as much as the individual items that are protected by the heritage legislation.

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).

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

Class	Landform	Type 1	Type 2	Type 3
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 previously excavated	Little deposit remaining	More than half deposit remaining	High profile site
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

4. OBSERVATIONS AND ASSESSMENT OF IMPACTS

The manner in which archaeological and other heritage traces or values might be affected by any proposed use of Lot 2371 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 any proposed infrastructure construction.

4.1 Fieldwork observations

The site was visited on 3 October 2017. It was found that the surface of the area intended for agricultural development was already severely disturbed by various previous interventions including road-ways and possibly some previous form of agricultural activity (this is also clearly visible in Google Earth images). Only limited areas were found to be relatively intact and it was on those limited portions that archaeological traces could potentially have been preserved in situ. During fieldwork no artefacts were noted in disturbed zones.

On the undisturbed surfaces of the site, very sparsely dispersed stone artefacts were found. Every individual artefact that was found was plotted at the following specific points:

Table 3. Plotted artefacts and observations made.

	Latitude (S)	Longitude (E)	Comment	Significance
1	28°45'29.7"	20°345'09.7"	Two jaspilite flakes	LOW
2	28°45'28.7"	20°34'08.3"	Two jaspilite flakes	LOW
3	28°45'29.0"	20°34'08.0"	Jaspilite flake	LOW
RG	28°45'30.6"	20°34'05.5"	Rock Gong	MEDIUM-HIGH
4	28°45'29.9"	20°34'05.8"	Jaspilite core	LOW
5	28°45'29.4"	20°34'08.3"	Jaspilite flake	LOW
6	28°45'32.8"	20°34'12.9"	Jaspilite flake	LOW

Figure 7. Plotting of archaeological observations as tabulated in Table 3.

Summary findings in relation to predictions made in section 3.2 above can be reported as follows:

4.1.1 Occurrence of Stone Age traces:

4.1.1.1 Stone artefacts

Only very sparsely scattered (i.e. essentially isolated) artefacts were found. Previous studies had mentioned similar landscapes in the surrounding terrain as being virtually entirely bereft of Stone Age traces (Beaumont 2007; de Jong 2010; Dreyer 2013; van Schalkwyk 2013), so that this finding was not completely surprising. Artefacts do occur (cf. Morris 2016) although only as a very ephemeral trace. From the small sample it is difficult to comment definitively in terms of typology: they may be Middle Stone Age, with comparable material having been noted previously at sites east of Kakamas (Morris 2011) where flakes with facetted platforms suggested a Middle Stone Age ascription). Raw material used is preponderantly jaspillite, derived from the Orange River gravels.

Figure 8 a) and b). Examples of jaspilite artefacts, from surface observations 2 and 5 at Lot 2371.

4.1.1.2 Rock Gong

Of higher significance was the unexpected finding of a rock gong (Figs. 9-12) on a rocky granite-gneiss outcrop near the western edge of the proposed agricultural development. Rock gongs (or lithophones) are rocks that ring when beaten, and by definition, have beating marks that reflect ancient use. Often it is found that recent generations have noticed the effect and old beating marks bear signs of recent use. This is the case here. The significance of this example is that it is the first rock gong to be identified from this part of the Northern Cape and on granite-gneiss. They are relatively common in the Karoo, on dolerite; have been

documented near Vryburg, on diabase or andesite; and one was recently located near Kuruman, on dolomite.

The archaeological context of rock gongs includes a frequent association with rock art (but this is not present here), and they are thus thought to be a feature of the Later Stone Age, probably with ritual connotation.

Figures 9-11. Rock Gong – a ringing rock with evidence of it's having been used to elicit a ringing sound.

No stone artefacts or other archaeological traces were found in association with this rock gong. The area around the rocky outcrop on which it occurs is disturbed.

Figure 12. Rock gong, viewed from the south.

It is recommended that if possible this rocky outcrop (and particularly the one with the rock gong on it) should not be destroyed.

4.1.2 Colonial era traces

No colonial era traces were found other than twentieth century disturbance of surfaces, road-ways, and waste dumping.

4.2 Characterising the archaeological significance (Refer to 3.4 above)

In terms of the significance matrices in Tables 1 and 2 under 3.4 above, the archaeological observations fall under Landform L1, generally Type 1 or 2, i.e. of low or very low potential. In terms of archaeological traces they all fall under Class A3 Type 1. These ascriptions (Table 1) reflect low potential for these criteria.

For site attribute and value assessment (Table 2), the observations may be characterised as:

Stone Age remains – based on Table 2 above

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 over most of the are examined.**	Present	**A significantly unusual feature at the western end of the site is the rock gong.**
3	Organic preservation	**Absent**	Present	Major element
4	Potential for future archaeological investigation	**Low**	**Medium with respect to the rock gong.**	High
5	Potential for public display	**Low**	**Medium with respect to the rock gong.**	High
6	Aesthetic appeal	**Low**	**Medium with respect to the rock gong.**	High
7	Potential for implementation of a long-term management plan	**Low**	**Medium with respect to the rock gong.**	High

On archaeological grounds, the Stone Age occurrences, extremely sparse, can be said to be of generally low significance, even further diminished by the previous disturbance of the area.

Significant, however, is the finding of a rock gong.

For colonial era context, the site has minimal significance relating essentially only to roads and agricultural activity.

4.3 Characterising the significance of impacts

The criteria on which significance of impacts is based include **nature**, **extent**, **duration**, **magnitude** and **probability of occurrence**, with quantification of significance being grounded and calculated as follows:

- The **nature**, namely a description of what causes the effect, what will be affected, and how it will be affected.

- The **extent**, indicating the geographic distribution of the impact:
    - 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;
    - impact is regional – assigned a score of 3;
    - impact is national – assigned a score of 4; or
    - impact across international borders – assigned a score of 5.

- The **duration**, measuring the lifetime of the impact:
    - very short duration (0–1 years) – assigned a score of 1;
    - 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:
    - 0 is small and will have no affect on the environment;
    - 2 is minor and will not result in an impact on environmental processes;
    - 4 is low and will cause a slight impact on environmental processes;
    - 6 is moderate and will result in environmental processes continuing but in a modified way;
    - 8 is high (environmental 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 environmental processes.

- The **probability of occurrence**, indicating the likelihood of the impact actually occurring (scale of 1-5)
    - 1 is highly improbable (probably will not happen);
    - 2 is improbable (some possibility, but low likelihood);
    - 3 is probable (distinct possibility);
    - 4 is highly probable (most likely); and
    - 5 is definite (impact will occur regardless of any prevention measures).

- The **significance**, determined by a synthesis of the characteristics described above and expressed as low, medium or high. Significance is determined by the following formula:
  S= (E+D+M) P; where S = Significance weighting; E = Extent; D = Duration; M = Magnitude; P = Probability.

- The **status**, either positive, negative or neutral, reflecting:
    - 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 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).

4.3.1 SUMMARY OF THE SIGNIFICANCE OF IMPACTS

Table 4. Significance of Impacts, with and without mitigation – based on the worst case scenario – for all areas investigated *except the rock gong*.

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 or other heritage material or object (what affected). The following assessment refers to impact on physical archaeological/heritage traces.		
	Without mitigation	**With mitigation**
Extent	1	Not needed
Duration	5	Not needed
Magnitude	2	Not needed
Probability	3	Not needed
Significance	**24**	
Status (positive or negative)	WEAKLY NEGATIVE	
Reversibility	No	
Irreplaceable loss of resources?	Very low density and significance.	Loss of context but possible to mitigate.
Can impacts be mitigated?	Not needed	Not needed
Mitigation: Not needed.		

Cumulative impacts: Cumulative Impacts: where any archaeological contexts occur, direct impacts are once-off permanent destructive events. Secondary cumulative impacts may occur with the increase in development and operational activity associated with the life of the proposed hydropower station and the distribution line from it.
Residual Impacts: -

Table 5. Significance of Impacts, with and without mitigation – based on the worst case scenario – with respect to the rock gong.

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 or other heritage material or object (what affected).
The following assessment refers to impact on physical archaeological/heritage traces.

	Without mitigation	**With mitigation**
Extent	3	3
Duration	5	5
Magnitude	8	8
Probability	3	1
Significance	**48**	**16**
Status (positive or negative)	NEGATIVE	NEUTRAL
Reversibility	No	Yes
Irreplaceable loss of resources?	Yes: this is the first (i.e. only) rock gong identified for this region of the Northern Cape.	Preserving the rock gong from destruction would neutralise the impact.
Can impacts be mitigated?	YES	

Mitigation: If possible, mitigation could take the form of avoiding the destruction of the rocky outcrop that includes the rock gong.

Cumulative impacts: Cumulative Impacts: where any archaeological contexts occur, direct impacts are once-off permanent destructive events. Secondary cumulative impacts may occur with the increase in development and operational activity associated with the life of the proposed hydropower station and the distribution line from it.

Residual Impacts: -

5. MEASURES FOR INCLUSION IN THE DRAFT ENVIRONMENTAL MANAGEMENT PLAN

The 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 highly likely to be subject to destruction, damage, excavation, alteration, or removal. The objective is to limit such impacts to the primary activities associated with the development and hence to limit secondary impacts during the medium and longer term operational life of the facility.

Project component/s	Any road or other infrastructure construction over and above what is outlined in respect of the proposed site development.
Potential Impact	The potential impact if this objective is not met is that wider areas or extended linear developments may result in further destruction, damage, excavation, alteration, removal or collection of heritage objects (minimal as they are) from their current context along the route.
Activity/risk source	Activities which could impact on achieving this objective include deviation from any planned development 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 extensions of infrastructure. For most of the area in question, mitigation (based on present observations) is not considered to be necessary. ***For the site with the rock gong it is recommended that destruction of the rocky outcrop be avoided if possible.***

Mitigation: Action/control	Responsibility	Timeframe
Provision for on-going heritage monitoring in an environmental management plan which also provides guidelines on what to do in the event of any major heritage feature being encountered during	Environmental management provider with on-going monitoring role set up by the developer for the	Environmental management plan to be in place before commencement of development.

any phase of development or operation.	development phase and for any instance of periodic or on-going land surface modification thereafter.	
Should unexpected finds be made (e.g. precolonial burials; ostrich eggshell container cache; or localised Stone Age sites with stone tools, pottery; military remains), the relevant Heritage Authority should be contacted.	Environmental Control Officer should become acquainted at a basic level with the kinds of heritage resources potentially occurring in the area and should report to the Heritage Authority as needed (see next column).	In the event of finding any of the features mentioned in column 1, reporting by the developer to relevant heritage authority should be immediate. Contact: SAHRA Mr P Hein 021-4624502 or NC Heritage Resources Authority Mr Andrew Timothy 053-8312537/8074700.
Avoid destruction of the rocky outcrop with the rock gong.	***Environmental Control Officer be aware of the existence of the rock gong and supervise avoidance of its destruction if possible.***	***In the event of destruction of the rock gong becoming unavoidable, seek advice on further mitigation measures; and obtain destruction permit.***

Performance Indicator	Inclusion of further heritage impact consideration in any future extension of infrastructural elements. ***Avoidance of destruction of the rocky outcrop with the rock gong. If this becomes unavoidable, seek advice on further mitigation measures; and obtain destruction permit.***
Monitoring	Officials from relevant heritage authorities (National, Provincial or Local) to be permitted to inspect the site at any time in relation to the heritage component of the management plan.

6. CONCLUSIONS

Precolonial/Stone Age material noted at Lot 2371 was found to be generally of low significance, where present at all. Part of the property was already disturbed. Criteria used here for impact significance assessment for archaeological traces rate the impacts as not worthy of further mitigation.

More significantly, however, a rock gong was found, being the first one ever found in this part of the Northern Cape. Recommendation is made that it be preserved if possible by avoiding destruction of the rocky outcrop on which it occurs.

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