

**McGregor Museum
Department of Archaeology**



**ARCHAEOLOGY SPECIALIST INPUT ON THE SITE OF THE PROPOSED KALKBULT
PHOTOVOLTAIC CONSTRUCTION SITE NORTH OF DE AAR, NORTHERN CAPE**

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1. INTRODUCTION

This report serves as a supplement to the heritage impact assessment compiled by Jean Beater, but can serve as a stand-alone report (as per the EIA Regulations).

1.1 Focus and Content of Specialist Report: Archaeology

The archaeology specialist study is focused on the development footprint options for the Kalkbult Photovoltaic construction site. It incorporates the following information:

- » Introduction (1)
 - Focus and content of report (1.1)
 - Archaeology specialist (1.2)
- » Description of the affected environment (2)
 - Heritage features of the area (2.1)
 - Description and evaluation of environmental issues and potential impacts identified in the scoping phase (2.2)
- » Methodology (3)
 - Assumptions and limitations (3.1)
 - Potentially significant impacts to be assessed (3.2)
 - Description and evaluation of environmental issues (3.3)
 - Determining archaeological significance (3.4)
- » Observations and assessment of impacts (4)
 - Fieldwork observations (4.1)
 - Characterising the archaeological significance (4.2)
- » Conclusions (5)
- » References (6)

1.2 Archaeology Specialist

The author of this report is an archaeologist accredited as a Principal Investigator by the Association of Southern African Professional Archaeologists, having previously carried out surveys and fieldwork on sites in the region (Beaumont & Morris 1990; Morris & Beaumont 2004).

The author works independently of the organization commissioning this specialist input, and I provide observations 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 a Karoo landscape adjacent to the railway north of De Aar consisting of a relatively flat plain with low relief. Shallow soil over a mostly calcrete substrate supports Karoo scrub and limited grass cover, affording high relative visibility of surface archaeological traces. Underlying dolerite outcrops in low ridges locally, with shale in evidence in places. Stone Age traces occur at and just beneath the surface of the shallow soil.

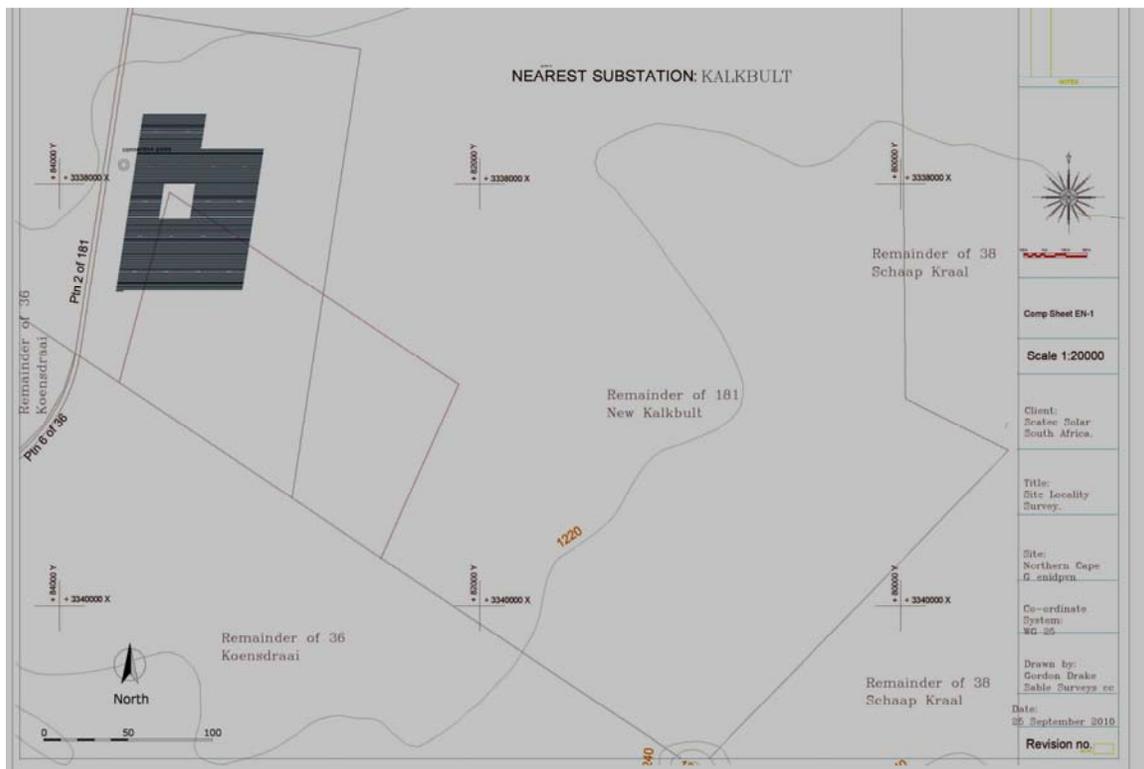


Figure 1. Location of proposed Kalkbult PV construction (from diagram by Scatec Solar). Further locality maps are provided in the Heritage Report compiled by Jean Beater.

2.1. Heritage features of the area

No archaeological survey work has been carried out in the immediate vicinity of the proposed PV plant. The surrounding Karoo landscape is known for its richness of Stone Age archaeological traces, both in the form of surface and sub-surface scatters of stone tools and of rock engravings on dolerite outcrops.

The proximity of the railway means that material traces may exist alongside relating to its construction (the line was pushed through to reach Kimberley in 1885), maintenance and use, and its protection by way of blockhouses, as the main supply line for British forces further inland during the Anglo-Boer War.

Other material traces may relate to farming history.

2.2. Description and evaluation of environmental issues and potential impacts identified in the scoping phase

Heritage resources including archaeological sites are in each instance unique and non-renewable resources. Area and linear developments such as those envisaged can have a permanent destructive impact on such resources. The objective of an EIA would be to assess the sensitivity of heritage resources where present to assess the significance of potential impacts on them and to recommend mitigation or management measures where necessary.

Area impacts are possible in the case of the Kalkbult PV construction, while power lines and access roads would represent linear impacts.

2.2.1. 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 the 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.

With respect to the magnitude and extent of potential impacts, it has been noted that the erection of power lines would have a relatively small impact on Stone Age sites, in light of Sampson's (1985) observations during surveys beneath power lines in the Karoo (actual modification of the landscape tends to be limited to the footprint of each pylon – tower positions, once known, would need to be assessed for possible mitigation), whereas a road would tend to be far more destructive (modification of the landscape surface would be within a continuous strip), albeit relatively limited in spatial extent, i.e. width (Sampson compares such destruction to the pulling out of a thread from an ancient tapestry).

3. METHODOLOGY

A site visit was conducted on 6 September 2011 to inspect the terrain on foot, focusing on areas of expected impact. Heritage traces would be evaluated in terms of their archaeological significance.

3.1. Assumptions and limitations

It was assumed that, by and large in this landscape, with its sparse vegetation, some sense of the archaeological traces to be found would be readily apparent from surface observations.

A proviso is routinely given, that should sites or features of significance be encountered during construction (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).

3.2. Potentially significant impacts to be assessed in the EIA process

- » Where dolerite koppies occur there is a possibility that rock engravings might be found.
- » More or less rich spreads of Stone Age artefacts may occur across this Karoo landscape with localised 'sites' having higher densities.
- » More recent heritage features of note may exist in the vicinity of railway and farm infrastructure.

3.3. Description and evaluation of environmental issues and potential impacts identified in the scoping phase

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 of high significance 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 Ngwao Bošwa ya Kapa Bokone (the Northern Cape Heritage Authority).

Disturbance of surfaces includes any construction: of a road, erection of a pylon, or preparation of a site for a plant, or building, 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.

Some of the activities indicated here have a generally lower impact than others. For example, Sampson (1985) has shown that power lines tend to be less destructive on Stone Age sites than roads since access along the route of the line during construction and maintenance tends to be by way of a 'twee-spoor' temporary roadway (not scraped, the surface not significantly modified). Individual tower positions might be of high archaeological significance (e.g. a grave, or an engraving). The impact of a 'twee-spoor' could be far greater on Iron Age sites in other parts of South Africa, where (for example) stone walling might need to be breached.

3.4 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 settlement, but early 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 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 the proposed development 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 Fieldwork observations

The proposed development footprint area was visited on 6 September 2011. In summary the findings can be reported in relation to predictions made above (see 3.2):

4.1.1 *Possible engraving occurrences on dolerite koppies or exposures:*

Dolerite koppies occur as a major feature in the surrounding area but to a very limited extent within the study area (one low ridge with a small number of suitable rocks occurs within the area examined – as shown in the following image).



Figure 2. No rock engravings were found on the outcropping dolerite on low ridges.

4.1.2 *Occurrences of Stone Age artefacts:*

A variable density of stone artefacts, mostly of Pleistocene and possibly early Holocene age, was noted over most of the area examined. Such occurrences exist as 'noise' over almost all of the surrounding Karoo landscape and may represent, here, mostly off-site opportunistic knapping over long periods of time, with the traces probably displaced to some extent by environmental processes including collapsing of stratified sequences through erosion. Densities range from less than 1 artefact per 10x10 m to up to 3 or 4 per m².

No organic remains are preserved amongst the occurrences noted.

The presence of these artefacts testifies to the wealth of Stone Age material to be found in the Karoo (Sampson 1985) – but that not all of it is preserved in ideal situations, with taphonomy or site transformation processes having reduced their long term integrity and significance.

A localised scatter of Later Stone Age stone tools was noted on a slight rise east of the sub station (and east of the proposed layout), comprising a few microliths. No organic remains, e.g. ostrich eggshell, were found in association with it.



Figure 3. Stone Age occurrences (in yellow) as described in the text.



Figure 4. Stone tools from a dispersed scatter near the sub station.



Figures 5. Later Stone Age core and microlithic flakes.at 30.15897° S 24.13401° E.

4.1.3 Colonial heritage:

No details are given in this report as this aspect of the site is dealt with by the cultural heritage specialist.

It is merely noted that the farm owner indicated remains of what are considered to be gangers' huts a few kilometres northwards along the railway, in areas well beyond the proposed development. Their description is not relevant to this report but records were logged for inclusion in the heritage database at the McGregor Museum.

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, all of the archaeological observations fall under Landforms L3 Type 1. In terms of archaeological traces they fall under Class A3 Type 1. These ascriptions (Table 1) reflect poor contexts and likely low significance for these criteria.

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

On archaeological grounds, the occurrences observed can be said to be of generally low significance for the proposed development footprint. No archaeological mitigation is considered necessary.

5. CONCLUSIONS

Sparse archaeological traces were found across the area of proposed PV construction. These consist of variable density (mostly low density) surface scatters of Pleistocene or early Holocene stone tools which lack stratigraphic integrity and may be displaced spatially and vertically through deflation over long periods of time. No organic remains associated with this material survive. The finds may be characterised as of low significance and no mitigation measures are considered necessary.

6. REFERENCES

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