

McGregor Museum Department of Archaeology



POFADDER SOLAR THERMAL FACILITY

SPECIALIST INPUT FOR THE SCOPING PHASE OF
THE ENVIRONMENTAL IMPACT ASSESSMENT FOR
THE PROPOSED POFADDER SOLAR THERMAL
FACILITY, NORTHERN CAPE PROVINCE

ARCHAEOLOGY

David Morris
April 2010

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Background

This scoping phase evaluation of the full site as indicated is a desk-top study which aims to provide high-level identification of potential areas of sensitivity together with a recommended methodology for the EIA process.

The study site is proposed on the Farm Scuit-Klip 92, portion 4, which is located east of Pofadder in the Northern Cape. It is noted that the proposed activities include the construction and operation of a Solar Thermal Plant (for power generation purposes), and associated infrastructure including a steam turbine and generator, a generator transformer and substation, overhead power lines, water supply lines to the facility and an extraction point on the Gariiep River, a water treatment plant, a blow down pond, workshops, storage areas and access roads.

Specialist

The author of this report is an archaeologist accredited as a Principal Investigator by the Association of Southern African Professional Archaeologists. I have previously carried out surveys in the vicinity of the proposed activity (Morris 1999a-b, 2000a-c, 2001, 2010).

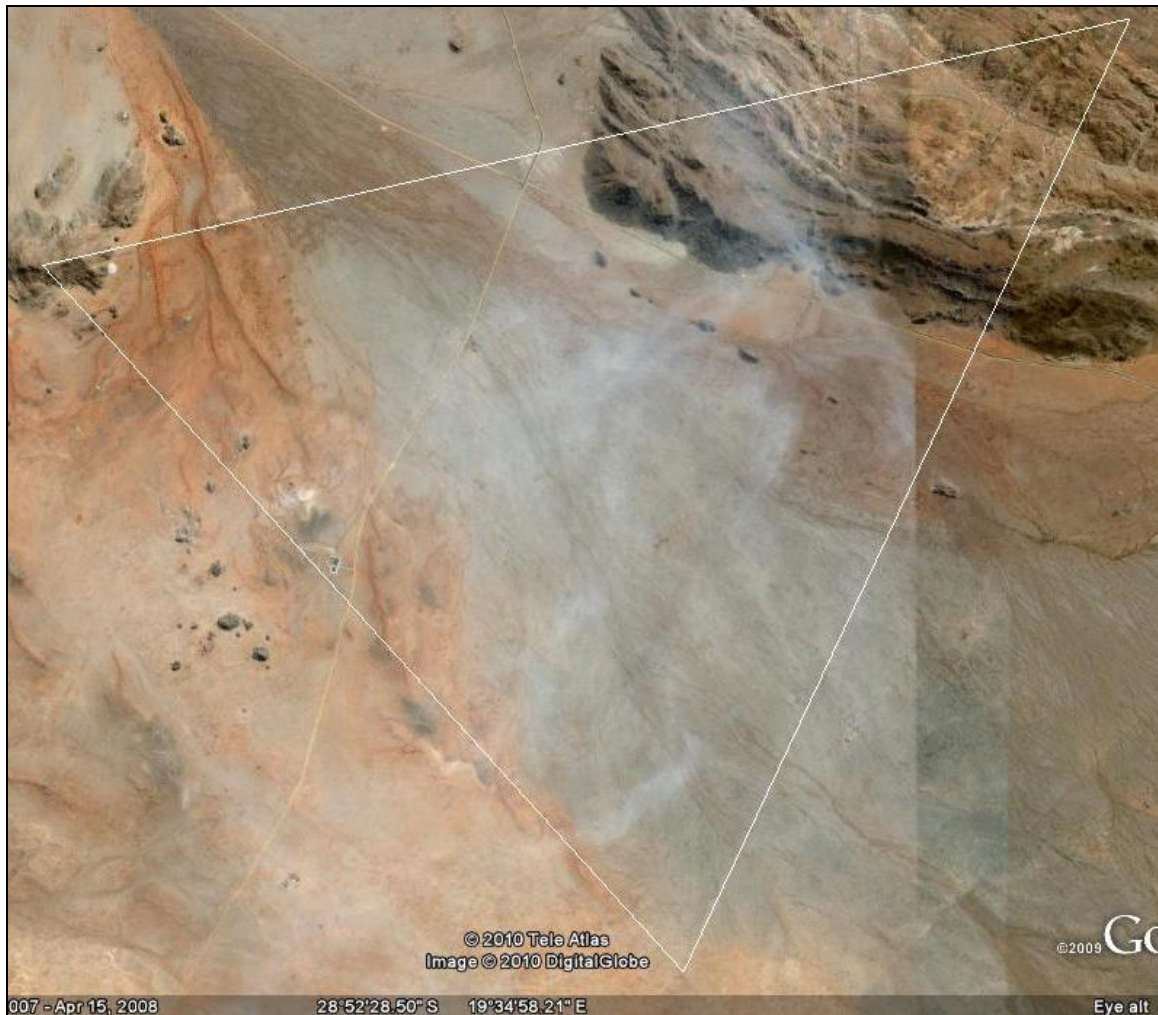
I work independently of the organization commissioning this specialist input, and I provide these preliminary scoping observations within the framework of the National Heritage Resources Act (No 25 of 1999).

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.

Description of the receiving environment and potential impacts

The environment in question is arid, comprising relatively flat drainage plains with mountainous features at the north western and north eastern regions of the identified site. The landscape is sparsely vegetated, therefore making any surface archaeological traces highly visible.

There are several outcropping rocky features in the north west and north east of the plain.



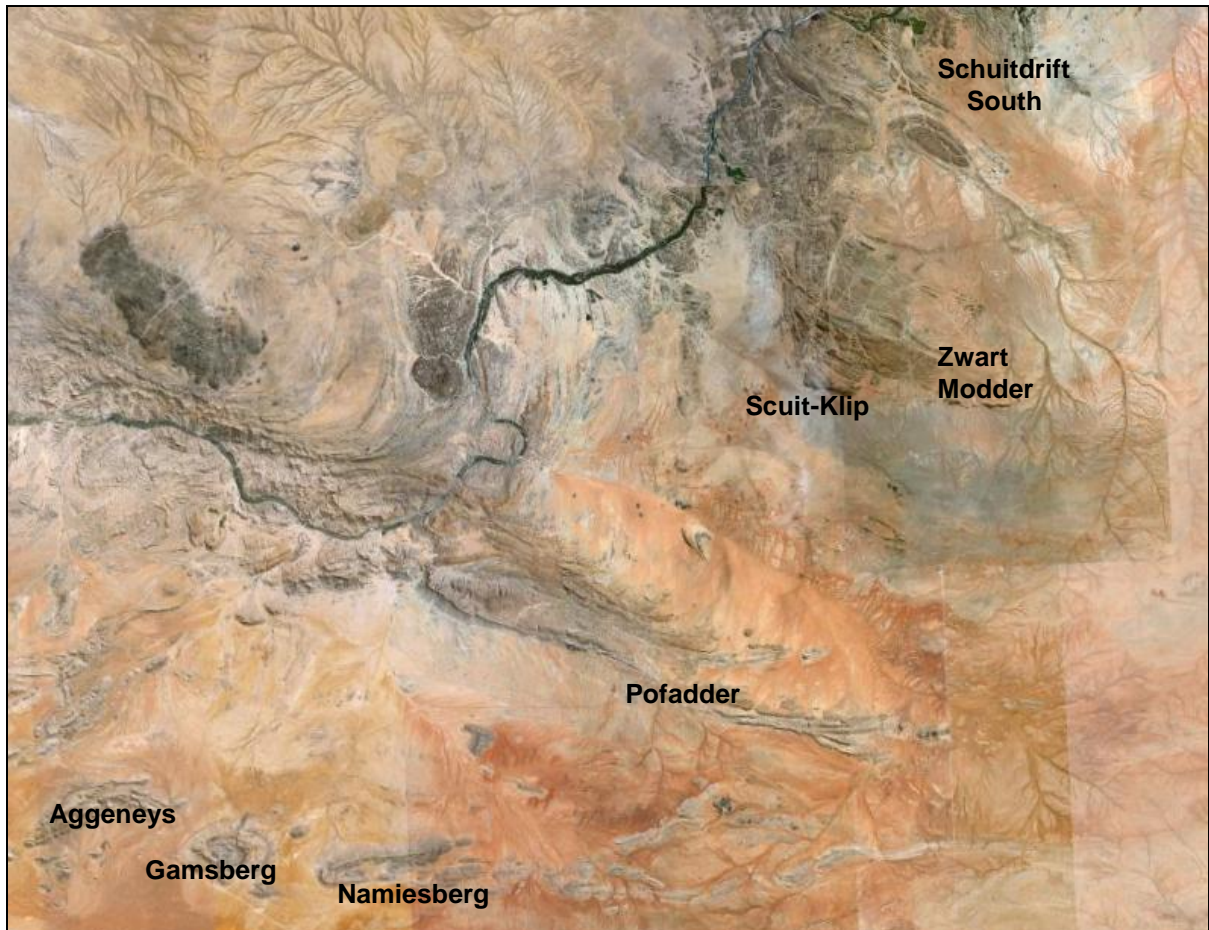
Google Earth image of the terrain (north at top) in which physical landscape features mentioned are clearly visible.

Heritage features of the region

Colonial frontier

The eighteenth- and nineteenth-century records for this region (Penn 2005) include the travelogues of George Thompson (1827) and E.J. Dunn (1931, Robinson 1978), who

visited the area in 1824 and 1872 respectively. Place names were becoming fixed in this colonial frontier period (in a cadastral sense, on maps and in farm names), many such names having Khoe-San origins encapsulating vestiges of precolonial/indigenous social geography. A much more prominent appreciation now emerging concerning the history of genocide against the Bushmen in this area (Anthing 1863), with certain mountainous areas (like Gamsberg near Aggeneys) being likely massacre sites, referred to by Dunn in 1872 (Robinson 1978) and, more obliquely, by Anthing (1863; Jose Manuel de Prada-Samper pers. comm. 2009). Dunn refers to conflict at Zwart Modder, the farm adjoining Scuit-Klip, where he recorded an isolated grave of a member of the Northern Border Police, which has yet to be relocated. Immediately below the Ysterberg ridge, located on the Farm Scuit-Klip, there is a road-side twentieth century grave (Morris 1999a).



Regional focus: the study area relative to Aggeneys and some other places mentioned.

Later Stone Age

Late Holocene Later Stone Age (LSA) sites are the predominant archaeological trace noted in surveys in the Aggeneys-Pofadder region (Morris 1999a-b, 2000a-c, 2001, 2010). Beaumont *et al.* (1995) have shown, with reference to the LSA, that “virtually all the Bushmanland sites so far located appear to be ephemeral occupations by small groups in

the hinterland on both sides of the [Orange] river” (1995:263). This was in sharp contrast to the substantial herder encampments along the Orange River floodplain itself (Morris & Beaumont 1990), which reflected the “much higher productivity and carrying capacity of these bottom lands.” “Given choice, the optimal exploitation zone for foragers would have been the Orange River.” The appearance of herders in the Orange River Basin, Beaumont *et al.* argue, led to competition over resources and ultimately to marginalisation of hunter-gatherers, some of whom then occupied Bushmanland, probably mainly in the last millennium, and focused their hunting and gathering activities around the limited number of water sources in the region. Surveys have located signs of human occupation mainly in the shelter of granite inselbergs, on red dunes which provided clean sand for sleeping, or around the seasonal pans (Beaumont *et al.* 1995:264). Possibly following good rains, herders moved into the Orange River hinterland, as attested archaeologically at sites with ample pottery near Aggeneys and, east of Pofadder, at Schuifdrift South – Morris 1999a). However, Thompson (1824) refers to herder groups settled at the stronger springs such as Pella dispersing during periods of drought to smaller springs in the region, which could equally well account for the traces referred to here. Dunn, in 1872, refers to a place at Schuif Klip (i.e. Scuit-Klip) where water collected following rains and was still available after a year of no rain in the vicinity (Robinson 1978:60-61). At such times competition between groups over resources and stress within an already marginalised hunter-gatherer society, must have intensified.

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 till. Systematic collections of this material made at Olyvenkolk, south west of Kenhardt and Maans Pannen, and 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.* have shown that “substantial MSA sites are uncommon in Bushmanland” (1995:241): and those that have been documented thus far have generally yielded only small samples (Morris & Beaumont 1991; Smith 1995).

The ESA included Victoria West cores on dolerite, 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.

No substantial sites have been found previously in the survey area. Only very sparse localized scatters of stone tools have been seen in places, with limited traces in the hills or at the bases of hills. There is a roadside grave along one of the roads in the vicinity; however the area has not been investigated in its entirety.

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 such as those envisaged can have a permanent destructive impact on these resources. The objective of an EIA would be to assess the sensitivity of such resources where present to assess the significance of potential impacts on these resources and to recommend no-go areas and measures to mitigate or manage said impacts.

Impacts are possible in the case of the Pofadder Solar Thermal Plant with respect to the proposed substation; the power lines, water supply lines and access roads would represent linear impacts. Potentially associated with roads are borrow pits (although none are indicated) which – in the event of their use – could have a major impact if heritage resources are present.

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. This is 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), whereas a road or a water supply pipeline 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). A water pipeline, if sourcing water at the river, could traverse more sensitive terrain, i.e. impacting a potentially greater density of archaeological sites.

Statement of 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 (below) 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 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	Dispersed scatter	Deposit <0.5 m thick	Deposit >0.5 m thick

Class	Landform	Type 1	Type 2	Type 3
	visible			

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

Potential areas of sensitivity

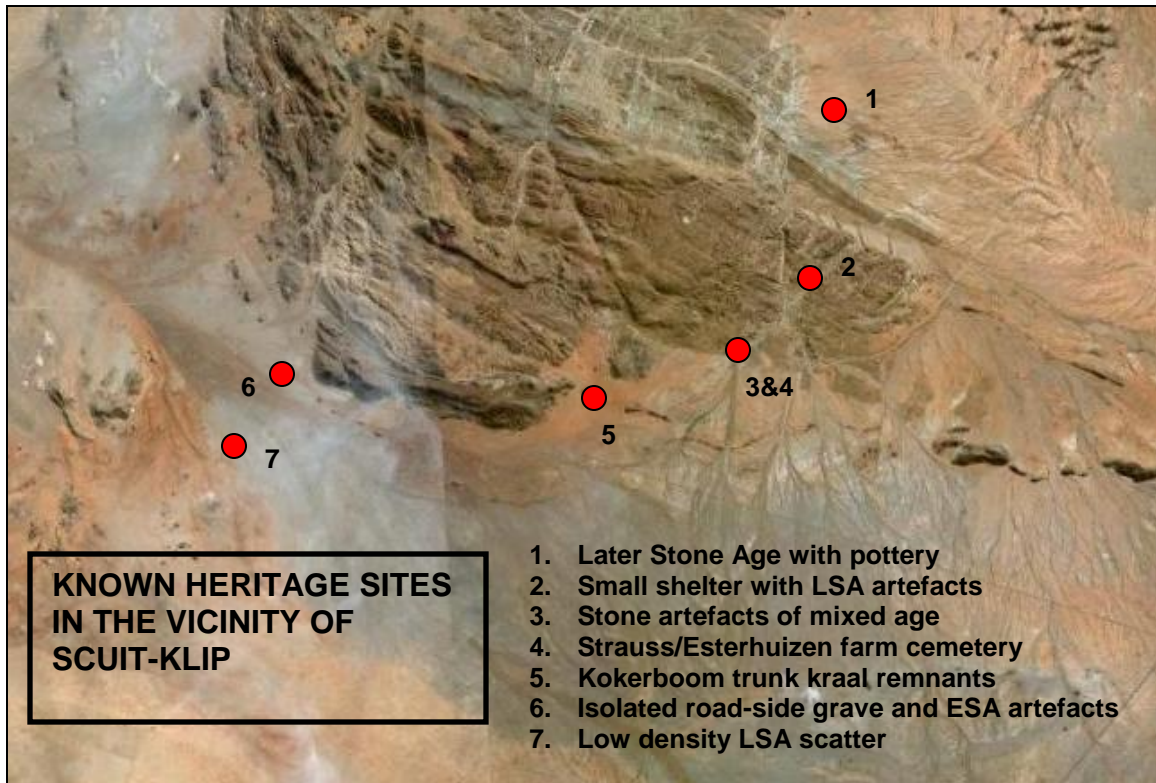
Based on previous experience in the area, it is estimated that the terrain close to hills or rocky features, particularly sandy spots near sheltering rocks, may tend to have traces of precolonial Stone Age occupation/activity. Such a site was previously documented on the adjoining farm Zwart Modder (Morris 1999a).

While places in the open plains have been found to have sparsely scattered artefacts (such as at Konkonsies near the Paulputs Substation site – Morris 1999a), these areas are expected to be less significant. An exception to this is where rocky outcrops at the surface on the plains provide places where water pools exist after rains. Such places often attracted people in the past with traces of this including artificial grinding grooves in the bedrock and ample evidence of stone artefacts and pottery. A very good example of this is at Schuitdrift South. The name Scuit-Klip may refer to such a locale on this property, though not necessarily in that portion selected for the present project. It is in fact described in some detail by Dunn (Robinson 1978:60-61): “Two holes occur in the gneiss at the crest of a ridge ... when heavy thunder rains sweep over this arid country the water runs into and sometimes fills these most useful reservoirs, in which it is stored up and lasts many months.”

The sand dunes in the north western part of the area may also have been a focus for past human occupation.

Colonial era sites or features within the study area include the known road-side grave below Ysterberg, a presently unknown grave recorded by Dunn (see above) of a member of the Northern Border Police (near Zwart Modder), and a farm cemetery and

homestead/kraal ruins at the old Skuit-Klip farm between the study area and Zwart Modder. Strauss and Esterhuizen family graves in the cemetery date between 1914 and 1974.



Potentially significant impacts to be assessed within the EIA process

In view of the above, anticipated locations for both area and linear, primary and secondary, developments should be examined closely on foot. Any disturbance of surfaces in the development area could have a destructive impact on heritage resources. 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, Ngwao Bošwa ya Kapa Bokone (the Northern Cape Heritage Authority). There may be some that would require preservation *in situ* and hence modification of intended placement of development features.

Disturbance of any surface 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 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 powerlines 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). This does not mean that the route of the line should not be checked in the EIA process, as 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 stone walling might need to be breached.

Methodology for EIA assessments

A site visit would be necessary to inspect various parts of the terrain on foot, focusing on areas of expected impact (construction of plant, sub-station, and secondary infrastructure such as roads, pipelines and power lines). Some indications are given above of the kinds of terrain that might be (or are known to be) more sensitive in terms of the presence of precolonial archaeological sites and greater emphasis would be given to inspecting such zones. Of particular importance would be finding the actual Scuit-Klip which Dunn visited in 1872, for this is likely to have been a magnet for past human use of the landscape, and itself a remarkable natural feature.

Once sites are plotted they would be assessed in terms of the tables given above and relative to the known heritage of the region, providing a quantifiable measure for defining significance as a basis for recommendations to be made.

One assumption made in this scoping report is that, by and large in this landscape, some sense of the archaeological traces to be found in the area would be apparent from surface observations (including assessment of places of erosion or past excavations that expose erstwhile below-surface features). But a proviso is routinely inserted in any final report that should sites or features of significance be encountered during construction (this could include an unmarked burial, or a high density of stone tools, for instance), specified steps are necessary (cease work, report to heritage authority, and so on). It is not considered necessary to conduct excavations as part of the EIA to establish the potential of sub-surface archaeology.

Nineteenth- and twentieth-century cultural history and intangible heritage values attached to places would need to be assessed during EIA fieldwork but may be difficult to recover owing to the sparse population.

A preliminary assessment of the likelihood of fossils occurring here should be obtained from a palaeontologist. Miocene fossils are known from sites along the nearby Koa palaeoriver valley.

The manner in which archaeological traces might be affected by the proposed development has been indicated above, but can 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.

Given that places in this region are now in the process of being linked with specific accounts of nineteenth century genocide against the San, the heritage value of larger-scale landscapes may become more significant and it could be expected that there would be increased concerns in the future over the visual impacts of developments in the area.

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