

Annex F

Heritage Specialist Report

**HERITAGE IMPACT ASSESSMENT: PROPOSED SOUTHDRIFT SOLAR FARM,
FREE STATE**

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Prepared for

Environmental Resources Management

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EXECUTIVE SUMMARY

The Archaeology Contracts Office cc was appointed by Environmental Resources Management Southern Africa Pty Ltd (ERM), on behalf of Intikon Energy, to undertake a Heritage Impact Assessment for the proposed development of the Southdrift Solar Power Farm located some 30 km north-west of Bloemfontein, in the Free State Province.

The Study Area includes portions of the farms Jedwater and Dennehof which are located 5 km west of the R64, connecting Bloemfontein and Dealesville. The PV solar panels will cover an area of approximately 400 ha in extent. They will be linked via an existing substation on Dennehof to the National Grid. In addition to access roads, there will also be a small office, storage facilities, site fencing, a lay-down area and possibly a small borrow pit.

The field survey was conducted on the 16th November 2010 by Dr Lita Webley and Dr Duncan Miller. There were no limitations to the survey. However, after the survey was completed, the boundaries of the Study Area were amended and enlarged. These changes do not compromise the results of the survey.

The Study Area is completely flat and covered in grassland. There is a small pan on the boundary between Dennehof and Jedwater, and a shallow stream bed which runs east-west along the southern perimeter of the site.

There are a number of places where sub-surface calcrete nodules are visible. Localised distributions of Tierberg mudstone also occur in the area. Dolerite boulders were observed along the southern boundary and in the wall of a small dam located on Dennehof.

No archaeological remains (either pre-colonial or colonial) were recorded during the survey and it seems unlikely that they will be recovered beneath the soil surface. There are no structures or buildings in the Study Area with the exception of an earthen dam on Dennehof and a concrete reservoir on Jedwater.

Historic settlements seem to have concentrated along the Modder River and it is unlikely that graves or burials will be uncovered in the Study Area. The 'Cultural Landscape' consists of flat pastureland used for the grazing of livestock. This type of landscape is very common in the Free State and the development will not have a significant impact.

If any of the following are uncovered during the construction phase:

- fossil bones;
- stone artefacts;
- cultural Material such as historic glass, ceramics, etc;
- sub-surface structures;
- graves;

then the appropriate Heritage Authorities (in this case SAHRA) should be notified immediately. They may stop work until mitigation has been undertaken.

1. Introduction

1.1 The Archaeology Contracts Office cc was appointed by Environmental Resources Management Southern Africa Pty Ltd (ERM), on behalf of Intikon Energy, to undertake a Heritage Impact Assessment as part of the Environmental Impact Assessment process for the proposed development of the Southdrift Solar Power Farm located some 30 km north of Bloemfontein, in the Free State Province.

The site is located approximately 5 km west of the R64 (linking Bloemfontein to Dealesville) and south of the S328 and comprises portions of Jedwater Farm (Farm 2920 - map shows it as 1472) and Dennehof farm (remaining extent of Bultfontein 26/2). The approximate site boundary is shown in Figure 1. Environmental Resources Management (ERM) has commissioned Dr Lita Webley and Dr Duncan Miller to carry out the Heritage Impact Assessment (including palaeontology) of the Study Area.

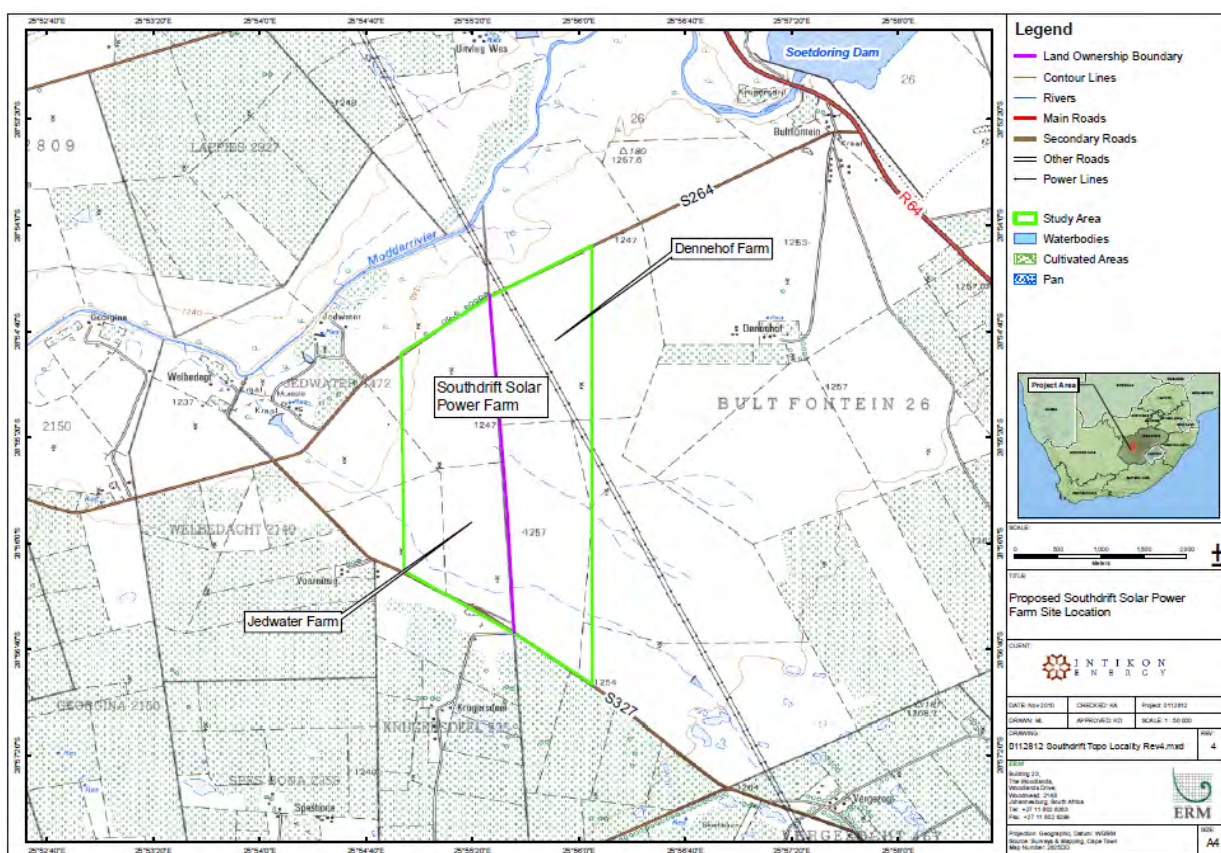


Figure 1: 1:50 000 map of 2825 DD Krugersdrif showing the position of the two farms. Map supplied by the client.

1.1 Development Proposals

- It is proposed to install and operate solar panels with a capacity of 160 MW of electricity.
- The PV solar panels will be arranged in rows of 1 km in length and will cover up to 400 ha (4 km²) in total. The panels will be connected to an internal electrical collection system via an overhead transmission line.
- The existing substation on the north-west corner of Dennehof will connect the facility to the National Grid via an existing 132 kV overhead line.

- There will in addition be a small office, storage facilities, site fencing, a lay-down area and possibly a small borrow pit.

1.2 Specialist Background

Dr Webley is an employee of the Archaeology Contracts Office cc. She has a PhD in Archaeology and has been active in archaeological and anthropological research in the Northern, Eastern and Western Cape as well as in Kwa-Zulu Natal over the last 30 years. She is an accredited Principle Investigator with the Association of Southern African Archaeologists for Stone Age, Shell Middens and Historical Archaeology and Field Director for Human Remains. She has been involved in more than 100 Heritage/Archaeological Impact Assessments.

2. Methodology

- A literature review was undertaken for the area.
- The SAHRA 2009 electronic database was examined for CRM reports from this area.
- The Surveyor General plans for the two farms were downloaded electronically.

2.1 Fieldwork

The Study Area consists of 2 portions of farms, the one named Dennehof is owned by Mr Richter, who runs Buffalo Ranch. The second is owned by Mr Key and is named Jedwater Farm.

The positions of the proposed solar panel arrays, substation and access roads were not available at the time of the survey. The boundaries of the Study Area were loaded onto handheld GPS receivers (set to the WGS84 datum) to facilitate the identification of the search area during field work. Fieldwork was undertaken by Lita Webley and Duncan Miller on 17 November 2010 and involved a combination of driving along access roads and foot surveys. Walk paths and site locations were recorded with GPS and finds were photographed and described.

We held brief discussions with Mr Richter and Mr Key. They were questioned about the history of their respective farms and the presence of any heritage resources on their properties. Both indicated that there were no heritage resources in the Study Area. Mr Key pointed out early settlement would likely have been along the margins of the Modder River at least 1 km to the north of the northern boundary of the Study Area.

2.1 Limitations

After completion of the fieldwork, an amended map was sent to the specialists. We were unable to examine the amended area but are of the opinion that this will not change the findings of this report.

3. Regulatory and Legislative Overview

The basis for all heritage impact assessment is the National Heritage Resources Act 25 (NHRA) of 1999, which in turn prescribes the manner in which heritage is assessed and managed. The National Heritage Resources Act 25 of 1999 has defined certain kinds of

heritage as being worthy of protection, by either specific or general protection mechanisms. In South Africa the law is directed towards the protection of human made heritage, although places and objects of scientific importance are covered. The National Heritage Resources Act also protects intangible heritage such as traditional activities, oral histories and places where significant events happened. Generally protected heritage which must be considered in any heritage assessment includes:

- cultural landscapes (described below),
- buildings and structures (greater than 60 years of age),
- archaeological sites (greater than 100 years of age),
- palaeontological sites and specimens,
- shipwrecks and aircraft wrecks,
- graves and grave yards.

Section 38 of the NHRA requires that Heritage Impact Assessments (HIAs) are required for certain kinds of development such as rezoning of land greater than 10,000 sq m in extent or exceeding three or more sub-divisions, or for any activity that will alter the character or landscape of a site greater than 5,000 sq m.

3.1 Cultural Landscapes

Section 3(3) of the NHRA, No 25 of 1999 defines the cultural significance of a place or objects with regard to the following criteria:

- (a) its importance in the community or pattern of South Africa's history;
- (b) its possession of uncommon, rare or endangered aspects of South Africa's natural or cultural heritage;
- (c) its potential to yield information that will contribute to an understanding of South Africa's natural or cultural heritage;
- (d) its importance in demonstrating the principal characteristics of a particular class of South Africa's natural or cultural places or objects;
- (e) its importance in exhibiting particular aesthetic characteristics valued by a community or cultural group;
- (f) its importance in demonstrating a high degree of creative or technical achievement at a particular period;
- (g) its strong or special association with a particular community or cultural group for social cultural or spiritual reasons;
- (h) its strong or special association with the life or work of a person, group or organisation of importance in the history of South Africa; and
- (i) sites of significance relating to the history of slavery in South Africa.

3.2 Scenic Routes

While not specifically mentioned in the NHRA, No 25 of 1999, Scenic Routes are recognised by DEA&DP as a category of heritage resources. In the DEA&DP Guidelines for involving heritage specialists in the EIA process, Baumann & Winter (2005) comment that the visual intrusion of development on a scenic route should be considered a heritage issue. This is also given recognition in the Notice of Intent to Develop (NID) application which is used by Heritage Western Cape.

3.3 Heritage Grading

Heritage resources are graded following the system established by Winter and Baumann (2005) in the guidelines for involving heritage practitioners in EIAs (Table 1).

Table 1: Grading of heritage resources (Source: Winter & Baumann 2005: Box 5).

Grade	Level of significance	Description
1	National	Of high intrinsic, associational and contextual heritage value within a national context, i.e. formally declared or potential Grade 1 heritage resources.
2	Provincial	Of high intrinsic, associational and contextual heritage value within a provincial context, i.e. formally declared or potential Grade 2 heritage resources.
3A	Local	Of high intrinsic, associational and contextual heritage value within a local context, i.e. formally declared or potential Grade 3A heritage resources.
3B	Local	Of moderate to high intrinsic, associational and contextual value within a local context, i.e. potential Grade 3B heritage resources.
3C	Local	Of medium to low intrinsic, associational or contextual heritage value within a national, provincial and local context, i.e. potential Grade 3C heritage resources.

4. Description of the Affected Environment

The Modder River lies at least 1 km to the north of the site's northern boundary and is therefore outside of the Study Area. Mr Key, the owner of Jedwater, reported finding fresh water mussel shell along the Modder River.

The Study Area is flat and covered in grassland (Plate 1). The vegetation type is referred to as the Highveld Grassland bioregion. The land is currently used for pastoral production and game farming. There is a small ephemeral pan on the boundary between Jedwater and Dennehof, and a natural water course that flows west-east through the southern part of the site (Plate 2). It is clearly visible on aerial photographs. Access roads to these two properties follow the farm fences. There is already an existing substation in the corner of Dennehof with transmission lines running down the length of the western boundary of Dennehof (Plate 3).



Plate 1: View of the Study Area showing the flat landscape covered in grasslands.



Plate 2: View of the shallow stream bed in the southern section of the Study Area.



Plate 3: View of the transmission lines which run down the length of Dennehof farm, on the boundary with Jedwater.

4.1 Pre-colonial

Some 20 km to the north-east of the study area is Florisbad, an open air spring site with 7 m of archaeological deposit (Kuman *et al.* 1999). Best known for the discovery of an archaic hominid cranium in 1932, more recent excavations have uncovered an extensive sequence of Middle Stone Age artefacts and Middle Stone Age fauna (including extinct giant buffalo).

Pre-colonial archaeological research has concentrated on the eastern Free State and the Caledon River valley with excavations at Rose Cottage Cave providing evidence for Middle Stone Age occupation. There are numerous caves and rock shelters in the mountainous areas containing Later Stone occupation and rock art (Esterhuysen *et al.* 1994; Klatzow 1994). These types of sites are absent in the western areas of the Free State.

There is archaeological evidence for the settlement of the Free State during the Later Iron Age. The absence of wood in the Grassland Biome meant that people used dung for firewood and that they also used stone rather than wood in the construction of their

dwelling. Thousands of stone-walled settlements are known to be scattered across the Highveld of the Free State (Maggs 1976a and b). Maggs has described four basic settlement types. Three of these settlement types (N, V and Z) are found on locally elevated situations in the north-eastern, north-western and eastern Free State, reflecting the Nguni and Sotho preference for higher places (Mitchell 2002).

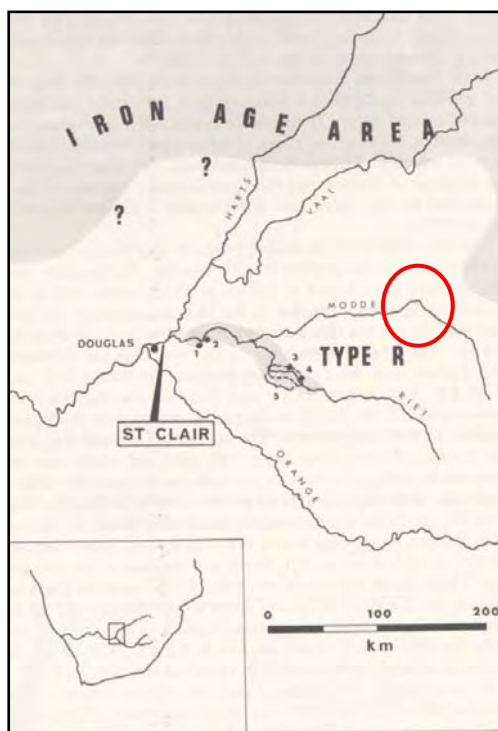


Figure 2: Map of the area (after Humphreys 1982) showing the position of the Type R settlements on the Riet River with respect to the Study Area (circled in red).

Maggs (1976) also identified a so-called Type R settlement pattern which occurs along restricted sections of the Riet River in the western Free State and parts of the Northern Cape. The Riet River is located to the south of the Modder River (*Figure 2*). The Type R settlements consist of stone walled enclosures. However, the pottery from the sites differs from the Iron Age as well as ceramics found with the Later Stone Age in the Karoo. Within the same area are many cairn-covered burials of Khoisan individuals. Grave goods from the burials suggest trade links, with copper jewellery from the Sotho/Tswana, seashells from coastal areas and specularite from the Postmasburg areas in the Northern Cape. Radiocarbon dates put the Type R settlements to between c. 1500-1830 AD.

4.2 Colonial History

European settlement in the Free State was likely to have been constrained by adequate water supplies and the Modder River therefore would have been an important focus for farmers. Dennehof originally formed part of the farm Bult Fontein No 26 (*Figure 3*), with the survey of the farm undertaken in 1854 (L.G. 2077/1899).

The farm Jedwater 1472 was initially part of the adjoining farm Krugersdeel 225 but was cut off from the parent farm in 1921.

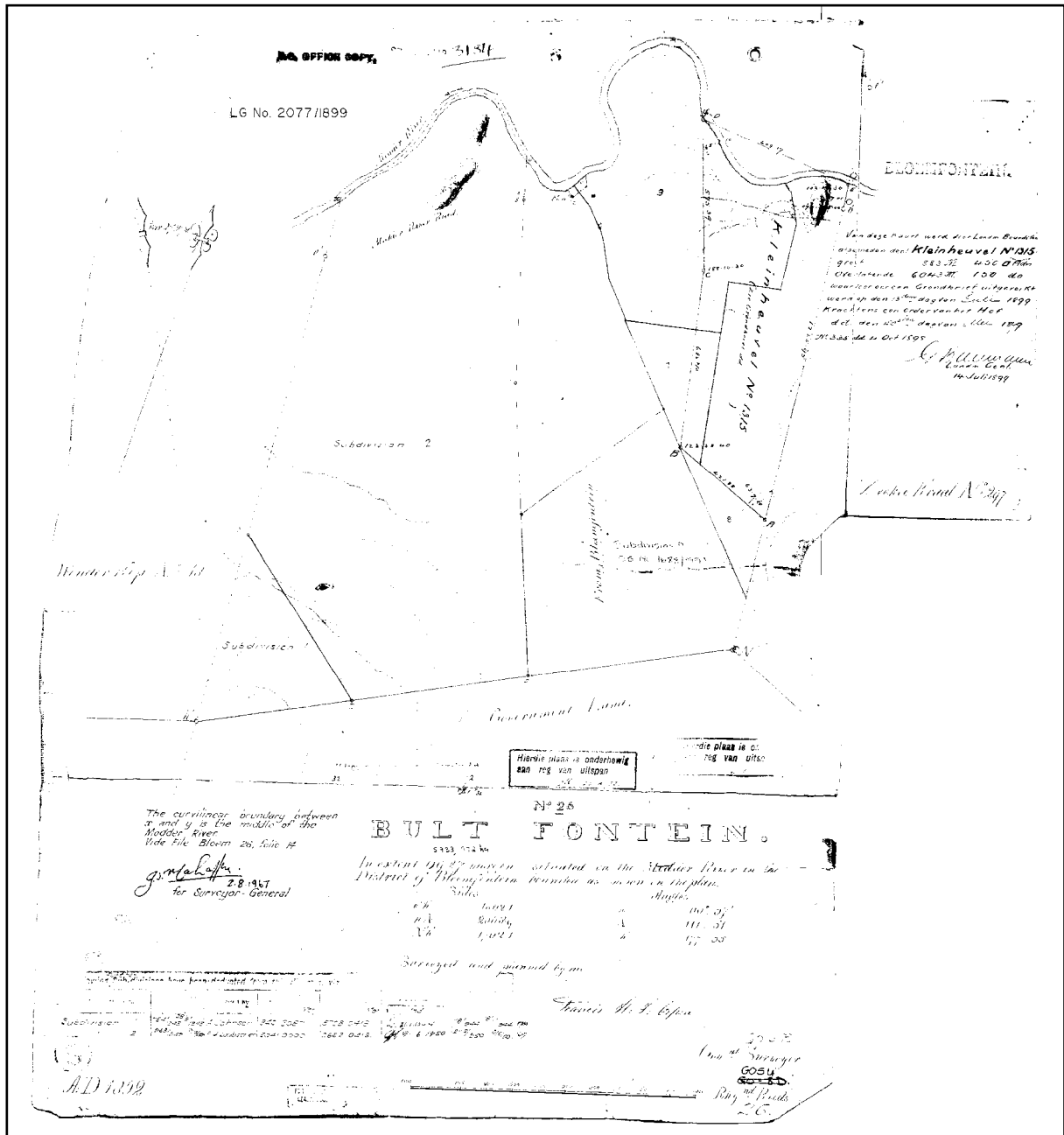


Figure 3: Survey diagram L.G. 2077/1899 shows the position of the first farms along the Modder River.

This part of the Free State was also the battleground of opposing forces during the Anglo-Boer War with the Battle of Paardeberg, one of the most significant battles of war, taking place down stream on the Modder River in 1900.

5. Results of the Survey

During the survey, we travelled along the existing farm roads along the boundaries of the Study Area. Deviations from the route were made to examine localities which might have attracted pre-colonial or colonial occupation, such as pans, water courses, raised areas etc.

The survey revealed a complete absence of stone which could be used to manufacture stone tools or to build structures. There are a number of locations on the farm where the calcrete substrate emerges at the surface and these were examined for stone tools. In addition, the farmer has excavated a trench for a water pipe in the centre of the Jedwater farm, revealing

calcrete (Miller 2010). There is no evidence for any archaeological material in the trench. Although there are a few locations where angular blocks of Tierberg mudstone occur on the surface, the volume of stone is very low and not suitable for building. While driving along the southern fence line, we noted rounded dolerite boulders outside of the fence. In places these boulders underlie the soil surface and also occur in the dam wall on Dennehof (Miller 2010).

Both sides of the dry water course in the southern section of the Study Area were examined for possible stone artefacts, but none were found.

There are no buildings on the land (with the exception of the Eskom sub-station on Dennehof) and no evidence for any graves.

The total absence of any pre-colonial or colonial material suggests that settlement in the past, as it is today, would have been concentrated along the Modder River.

5. Impact Identification and Assessment

The absence of any archaeological material, structures or graves indicates that the proposed solar power farm is unlikely to have any impact on the heritage resources of the Study Area. In the unlikely event that material (such as archaeology or graves) is uncovered during the construction phase, then due procedures (outlined below) should be followed.

Table 5.1 Summary Impact Assessment: Archaeology

Type	The excavation activities associated with the construction of the Southdrift Solar PV Facility have the potential to have a direct negative impact on heritage resources if these occur in the affected areas. However, the survey failed to identify any above-ground archaeological resources.
Magnitude	<i>Extent:</i> On-site <i>Duration:</i> Temporary <i>Intensity:</i> Low
Likelihood	Unlikely
Significance	Minor
Degree of confidence	Medium

Table 5.2 Summary Impact Assessment: Built Environment & Graves

Type	The excavation activities associated with the construction of the Southdrift Solar PV Facility have the potential to have a direct negative impact on heritage resources if these occur in the affected areas. However, the survey failed to identify any above-ground structures or graves.
Magnitude	<i>Extent:</i> On-site <i>Duration:</i> Temporary <i>Intensity:</i> Low
Likelihood	Unlikely
Significance	Minor
Degree of confidence	Medium

The cultural landscape of the Study Area may be defined as open grasslands which have been used as grazing for livestock and game. The cultural landscape is therefore of low

significance and the impact of the solar farm will be negligible. The Visual Impact of the solar PV panels on the landscape should be the subject of a separate study.

Table 5.3 Summary Impact Assessment: Cultural Landscape

Type	The construction of the Southdrift Solar PV Facility has the potential to impact negatively on the Cultural Landscape of the Study Area.
Magnitude	<i>Extent:</i> On-site <i>Duration:</i> Temporary <i>Intensity:</i> Low
Likelihood	Unlikely
Significance	Minor
Degree of confidence	Medium

The impact experienced during the Operational Phase of the Project is unlikely to differ from the Construction Phase or Decommissioning Phase. It is important that the PV panels are removed once the site has been decommissioned, to avoid a cumulative negative impact on the cultural landscape.

6. Conclusion and Recommendations

No archaeological remains (either pre-colonial or colonial) were recorded during the survey and it seems unlikely that they will be recovered beneath the soil surface. There are no structures or buildings in the Study Area with the exception of an earthen dam on Dennehof and a concrete reservoir on Jedwater.

Settlements seem to be concentrated along the Modder River and it is unlikely that graves or burials will be uncovered in the Study Area. The 'Cultural Landscape' consists of flat pastureland used for the grazing of livestock. This type of landscape is very common in the Free State and the development will not have a significant impact.

If any of the following are uncovered during the construction phase:

- fossil bones;
- stone artefacts
- cultural Material such as historic glass, ceramics, etc;
- sub-surface structures;
- graves;

then the appropriate Heritage Authorities (in this case SAHRA) should be notified immediately. They may stop work until mitigation has been undertaken.

7. List of Definitions and Abbreviations

Archaeology: *Remains resulting from human activity that are in a state of disuse and are in or on land and which are older than 100 years, including artefacts, human and hominid remains and artificial features and structures.*

Early Stone Age: *The archaeology of the Stone Age between 700,000 and 2,500,000 years ago.*

Fossil: *Mineralised bones of animals, shellfish, plants and marine animals. A trace fossil is the track or footprint of a fossil animal that is preserved in stone or consolidated sediment.*

Heritage: *That which is inherited and forms part of the National Estate (Historical places, objects, fossils as defined by the National Heritage Resources Act 25 of 1999).*

Holocene: *The most recent geological time period which commenced 10,000 years ago.*

Late Stone Age: *the archaeology of the last 20,000 years associated with fully modern people.*

Middle Stone Age: *The archaeology of the Stone Age between 200,000 - 300,000 years ago associated with early modern humans.*

National Estate: *the collective heritage assets of the Nation.*

Palaeontology: *Any fossilised remains or fossil trace of animals or plants which lived in the geological past, other than fossil fuels or fossiliferous rock intended for industrial use, and any site which contains such fossilised remains or trace.*

SAHRA: *South African Heritage Resources Agency – the compliance authority that protects national heritage.*

Structure (historic): *Any building, works, device or other facility made by people and which is fixed to land, and includes any fixtures, fittings and equipment associated therewith. Protected structures are those which are over 60 years old.*

Acronyms

BP	Before the Present
DEA	Department of Environmental Affairs
ESA	Early Stone Age
GPS	Global Positioning System
HIA	Heritage Impact Assessment
HWC	Heritage Western Cape
LSA	Late Stone Age
MSA	Middle Stone Age
NHRA	National Heritage Resources Act, No 25 of 1999
SAHRA	South African Heritage Resources Agency

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