

**Heritage impact assessment for the  
PROPOSED ESTABLISHMENT OF A PV SOLAR FACILITY  
BY SOUTH AFRICA MAINSTREAM RENEWABLE POWER MIERDAM (PTY) LTD  
ON THE FARM MIERDAM IN THE PRISKA REGION  
NORTHERN CAPE PROVINCE**

**HERITAGE IMPACT ASSESSMENT REPORT FOR THE PROPOSED ESTABLISHMENT OF A 75MW PV SOLAR FACILITY BY SOUTH AFRICA MAINSTREAM RENEWABLE POWER MIERDAM (PTY) LTD IN THE PRIESKA REGION, NORTHERN CAPE PROVINCE**

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**Declaration:**

I, J.A. van Schalkwyk, declare that I do not have any financial or personal interest in the proposed development, nor its developers or any of their subsidiaries, apart from the provision of heritage assessment and management services.



J A van Schalkwyk (D Litt et Phil)  
Heritage Consultant  
December 2011

## EXECUTIVE SUMMARY

### **HERITAGE IMPACT ASSESSMENT REPORT FOR THE PROPOSED ESTABLISHMENT OF A 75MW PV SOLAR FACILITY BY SOUTH AFRICA MAINSTREAM RENEWABLE POWER MIERDAM (PTY) LTD IN THE PRIESKA REGION, NORTHERN CAPE PROVINCE**

South Africa Mainstream Renewable Power Mierdam (Pty) Ltd (hereafter referred to as Mainstream) obtained an Environmental Authorisation (EA) for the construction of a 40MW Solar Photovoltaic (PV) Facility on Mierdam Farm near Prieska in the Northern Cape Province (DEA Reference 12/12/20/2320/2) on 06 September 2012.

Originally, Mainstream proposed a 40MW PV facility in order to allow the electricity generated at the facility to be fed directly into an existing power line traversing the site. Subsequently, Eskom advised that the electricity generated at the proposed PV facility would need to be fed into Kronos Substation via a new power line. As such, it is no longer required that the electricity output of the facility be limited to 40MW and Mainstream are proposing to increase the output to 75MW - the maximum capacity set by the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP).

In terms of section 39 of the Environmental Impact Assessment (EIA) Regulations promulgated on 18 June 2010, the holder of an EA can apply to the relevant competent authority for an amendment of the EA. As such, SiVEST (the independent environmental assessment practitioner) submitted an application for an amendment of the EA to the Department of Environmental Affairs (DEA) on 08 October 2012. In response, the DEA issued a letter dated 02 November 2012 advising SiVEST that the proposed increase in the output of the PV facility is a substantive amendment. SiVEST was requested to assess the impacts associated with the proposed increase and submit an assessment report to the DEA for decision making.

As part of the amendment application, the Heritage Impact Assessment Report has been updated taking into account the proposed increase in the output of the PV facility.

The aim of the survey was to locate, identify, evaluate and document sites, features and objects of cultural heritage significance found within the area in which it is proposed to develop a PV solar facility.

The cultural landscape qualities of the region essentially consist of one component. It is a rural area in which the human occupation is made up of a pre-colonial element (Stone Age) as well as a much later colonial (farmer) component.

The following sites, features and objects of cultural heritage significance have been identified (Section 5.4):

- A number of open sites with surface scatterings of stone tools dating to the Middle and Later Stone Age were identified. These are mostly located on small hills or at the foot of the hill.

Because of its location in the open, it is highly likely that there would be a physical impact on it arising from the development of the PV facility.

As first option it is recommended that these areas are avoided if possible. If that is not possible, it is recommended that systematic surface collections are made and that this material is housed at a museum. This can only be done under a permit from SAHRA.

- One old farmstead was identified. It dates to early part of the 20<sup>th</sup> century.

Because of its location it is highly unlikely that there would be a physical impact on it arising from the development of the PV facility.

In order to safeguard the identified sites, it is recommended that buffer zones are set out around each of the identified sites (Section 8.3).

Based on current information regarding sites in the surrounding area, is viewed to have Grade III significance and therefore would not prevent the proposed development for continuing after the implementation of the proposed mitigation measures and its acceptance by SAHRA.

Therefore, from a heritage point of view we recommend that the proposed development can continue. However, we request that if archaeological sites or graves are exposed during construction work, it should immediately be reported to a heritage practitioner so that an investigation and evaluation of the finds can be made.



J A van Schalkwyk  
Heritage Consultant  
December 2011

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## **GLOSSARY OF TERMS AND ABBREVIATIONS**

### **TERMS**

**Study area:** Refers to the entire study area as indicated by the client in the accompanying Fig. 1 & 2.

**Stone Age:** The first and longest part of human history is the Stone Age, which began with the appearance of early humans between 3-2 million years ago. Stone Age people were hunters, gatherers and scavengers who did not live in permanently settled communities. Their stone tools preserve well and are found in most places in South Africa and elsewhere.

Early Stone Age	2 000 000 - 150 000 Before Present
Middle Stone Age	150 000 - 30 000 BP
Late Stone Age	30 000 - until c. AD 200

**Iron Age:** Period covering the last 1800 years, when new people brought a new way of life to southern Africa. They established settled villages, cultivated domestic crops such as sorghum, millet and beans, and they herded cattle as well as sheep and goats. These people, according to archaeological evidence, spoke early variations of the Bantu Language. Because they produced their own iron tools, archaeologists call this the Iron Age.

Early Iron Age	AD 200 - AD 900
Middle Iron Age	AD 900 - AD 1300
Late Iron Age	AD 1300 - AD 1830

**Historical Period:** Since the arrival of the white settlers - c. AD 1840 - in this part of the country

### **ABBREVIATIONS**

ADRC	Archaeological Data Recording Centre
ASAPA	Association of Southern African Professional Archaeologists
BP	Before Present
CS-G	Chief Surveyor-General
EIA	Early Iron Age
ESA	Early Stone Age
LIA	Late Iron Age
LSA	Later Stone Age
HIA	Heritage Impact Assessment
MSA	Middle Stone Age
NASA	National Archives of South Africa
NHRA	National Heritage Resources Act
PHRA	Provincial Heritage Resources Agency
SAHRA	South African Heritage Resources Agency

# HERITAGE IMPACT ASSESSMENT REPORT FOR THE PROPOSED ESTABLISHMENT OF A 75MW PV SOLAR FACILITY BY SOUTH AFRICA MAINSTREAM RENEWABLE POWER MIERDAM (PTY) LTD IN THE PRIESKA REGION, NORTHERN CAPE PROVINCE

## 1. INTRODUCTION

South Africa Mainstream Renewable Power Mierdam (Pty) Ltd (hereafter referred to as Mainstream) obtained an Environmental Authorisation (EA) for the construction of a 40MW Solar Photovoltaic (PV) Facility on Mierdam Farm near Prieska in the Northern Cape Province (DEA Reference 12/12/20/2320/2) on 06 September 2012.

Originally, Mainstream proposed a 40MW PV facility in order to allow the electricity generated at the facility to be fed directly into an existing power line traversing the site. Subsequently, Eskom advised that the electricity generated at the proposed PV facility would need to be fed into Kronos Substation via a new power line. As such, it is no longer required that the electricity output of the facility be limited to 40MW and Mainstream are proposing to increase the output to 75MW - the maximum capacity set by the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP).

In terms of section 39 of the Environmental Impact Assessment (EIA) Regulations promulgated on 18 June 2010, the holder of an EA can apply to the relevant competent authority for an amendment of the EA. As such, SiVEST (the independent environmental assessment practitioner) submitted an application for an amendment of the EA to the Department of Environmental Affairs (DEA) on 08 October 2012. In response, the DEA issued a letter dated 02 November 2012 advising SiVEST that the proposed increase in the output of the PV facility is a substantive amendment. SiVEST was requested to assess the impacts associated with the proposed increase and submit an assessment report to the DEA for decision making.

As part of the amendment application, the Heritage Impact Assessment Report has been updated taking into account the proposed increase in the output of the PV facility. South Africa's heritage resources, also described as the 'national estate', comprise a wide range of sites, features, objects and beliefs. According to Section 27(18) of the National Heritage Resources Act (NHRA), Act 25 of 1999, no person may destroy, damage, deface, excavate, alter, remove from its original position, subdivide or change the planning status of any heritage site without a permit issued by the heritage resources authority responsible for the protection of such site.

In accordance with Section 38 of the NHRA, an independent heritage consultant was therefore appointed by **SiVest Environmental Division** to conduct a Heritage Impact Assessment (HIA) to determine if any sites, features or objects of cultural heritage significance occur within the boundaries of the area where it is planned to develop the PV facility, to assess the significance thereof and to consider alternatives and plans for the mitigation of any adverse impacts.

This HIA report forms part of the amendment application as required by the EIA Regulations in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) and is intended for submission to the South African Heritage Resources Agency (SAHRA).

## 2. TERMS OF REFERENCE

The aim of this HIA, broadly speaking, is to determine if any sites, features or objects of cultural heritage significance occur within the boundaries of the area where it is planned to develop the Photovoltaic solar facility and its associated infrastructure.

## 2.1 Scope of work

The scope of work for this study consisted of:

- Conducting of a desk-top investigation of the area, in which available literature, reports, databases and maps were studied;
- A visit to the proposed development area.

The objectives were to

- Identify possible archaeological, cultural and historic sites and features within the proposed development area;
- Evaluate the potential impacts of construction, operation and maintenance of the proposed development on archaeological, cultural and historical sites and features;
- Recommend mitigation measures to ameliorate any negative impacts on areas of archaeological, cultural or historical importance.

## 2.2 Limitations and assumptions

The investigation was influenced by the following factors:

- Archaeological sites, by their very nature, occur below ground and can in most cases only identified by surface indicators. The unpredictability of buried archaeological material therefore always remains a problem.
- As the exact layout of the proposed development and its required support infrastructure was not available at the time of writing this report, the approach taken here is one of negative mapping. In other words, areas where cultural heritage sites, features or objects have been identified are viewed as no-go areas and should be treated as such, until the necessary information is available so that recommendations on applicable mitigation measures can be made.

Table 1: Applicable category of heritage impact assessment study and report.

Type of study	Aim	SAHRA involved	SAHRA response
Heritage Impact Assessment	The aim of a full HIA investigation is to provide an informed heritage-related opinion about the proposed development by an appropriate heritage specialist. The objectives are to identify heritage resources (involving site inspections, existing heritage data and additional heritage specialists if necessary); assess their significances; assess alternatives in order to promote heritage conservation issues; and to assess the acceptability of the proposed development from a heritage perspective.  The result of this investigation is a heritage impact assessment report indicating the presence/ absence of heritage resources and how to manage them in the context of the proposed development.  Depending on SAHRA's acceptance of this report, the developer will receive permission to proceed with the proposed development, on condition of successful implementation of proposed mitigation measures.	Provincial Heritage Resources Authority	Comments on built environment and decision to approve or not
		SAHRA Archaeology, Palaeontology and Meteorites Unit	Comments and decision to approve or not



### 3. HERITAGE RESOURCES

#### 3.1 The National Estate

The NHRA (No. 25 of 1999) defines the heritage resources of South Africa which are of cultural significance or other special value for the present community and for future generations that must be considered part of the national estate to include:

- places, buildings, structures and equipment of cultural significance;
- places to which oral traditions are attached or which are associated with living heritage;
- historical settlements and townscapes;
- landscapes and natural features of cultural significance;
- geological sites of scientific or cultural importance;
- archaeological and palaeontological sites;
- graves and burial grounds, including-
  - ancestral graves;
  - royal graves and graves of traditional leaders;
  - graves of victims of conflict;
  - graves of individuals designated by the Minister by notice in the Gazette;
  - historical graves and cemeteries; and
  - other human remains which are not covered in terms of the Human Tissue Act, 1983 (Act No. 65 of 1983);
- sites of significance relating to the history of slavery in South Africa;
- movable objects, including-
  - objects recovered from the soil or waters of South Africa, including archaeological and palaeontological objects and material, meteorites and rare geological specimens;
  - objects to which oral traditions are attached or which are associated with living heritage;
  - ethnographic art and objects;
  - military objects;
  - objects of decorative or fine art;
  - objects of scientific or technological interest; and
  - books, records, documents, photographic positives and negatives, graphic, film or video material or sound recordings, excluding those that are public records as defined in section 1(xiv) of the National Archives of South Africa Act, 1996 (Act No. 43 of 1996).

#### 3.2 Cultural significance

In the NHRA, Section 2 (vi), it is stated that “cultural significance” means aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance. This is determined in relation to a site or feature’s uniqueness, condition of preservation and research potential.

According to Section 3(3) of the NHRA, a place or object is to be considered part of the national estate if it has cultural significance or other special value because of

- its importance in the community, or pattern of South Africa's history;
- its possession of uncommon, rare or endangered aspects of South Africa's natural or cultural heritage;
- its potential to yield information that will contribute to an understanding of South Africa's natural or cultural heritage;
- its importance in demonstrating the principal characteristics of a particular class of South Africa's natural or cultural places or objects;

- its importance in exhibiting particular aesthetic characteristics valued by a community or cultural group;
- its importance in demonstrating a high degree of creative or technical achievement at a particular period;
- its strong or special association with a particular community or cultural group for social, cultural or spiritual reasons;
- 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
- sites of significance relating to the history of slavery in South Africa.

A matrix was developed whereby the above criteria were applied for the determination of the significance of each identified site (see Appendix 1). This allowed some form of control over the application of similar values for similar sites.

#### **4. STUDY APPROACH AND METHODOLOGY**

##### **4.1 Extent of the Study**

This survey and impact assessment covers the area as presented in Section 5 and as illustrated in Figures 1 - 2.

##### **4.2 Methodology**

###### *4.2.1 Preliminary investigation*

###### **4.2.1.1 Survey of the literature**

A survey of the relevant literature was conducted with the aim of reviewing the previous research done and determining the potential of the area. The following sources were consulted – Aurecon 2011; Beaumont & Vogel 1984; Fagan 2008; Hocking, A. n.d; Humphreys 1976; Playne 1910-1911; Raper 2004; Rudner, J. & Rudner, I. 1968; Wilson & Anhaeusser 1998.

- Information on events, sites and features in the larger region were obtained from these sources.

###### **4.2.1.2 Data bases**

The *Heritage Atlas Database*, the *Environmental Potential Atlas*, the *Chief Surveyor General (CS-G)* and the *National Archives of South Africa (NASA)* were consulted.

- Database surveys produced a number of sites located in the larger region of the proposed development. The original Title Deeds for the farms were accessed.

#### 4.2.1.3 Other sources

Aerial photographs and topocadastral and other maps were also studied - see the list of references below.

- Information of a very general nature was obtained from these sources.

#### 4.2.2 Field survey

The area that had to be investigated was identified by **SiVEST Environmental Division** by means of maps. The site was surveyed by walking transects over it. In addition, the current owners of the farms were interviewed as to the possibility of sites occurring on their properties.

### 5. DESCRIPTION OF THE AFFECTED ENVIRONMENT

#### 5.1 Site location and description

The study area consists of three irregular shaped sections of land located some distance to the west of Prieska and south of the town of Copperton in the Northern Cape Province (Fig. 1). It is located on parts of the farm Mierdam.

The geology is largely made up of tillite, with some granite intrusions occurring sporadically in the eastern section of the study area. The original vegetation is classified as Boesmanland Nama Karoo. The topography is classified as slightly irregular plains. No perennial river passes through the area. The current land use is farming, with the largest area used for grazing.

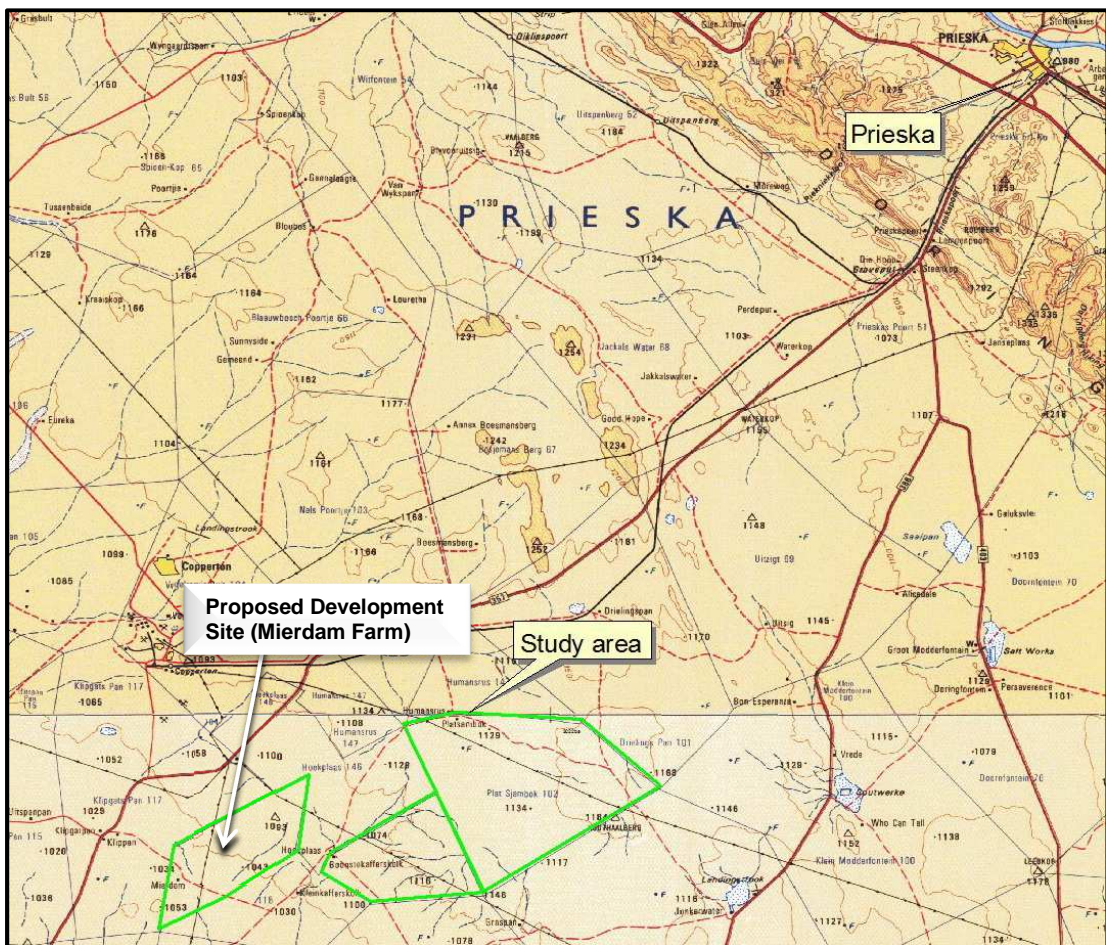


Fig. 1. Map showing the study area in regional context.



Fig. 2. Views over the study area.



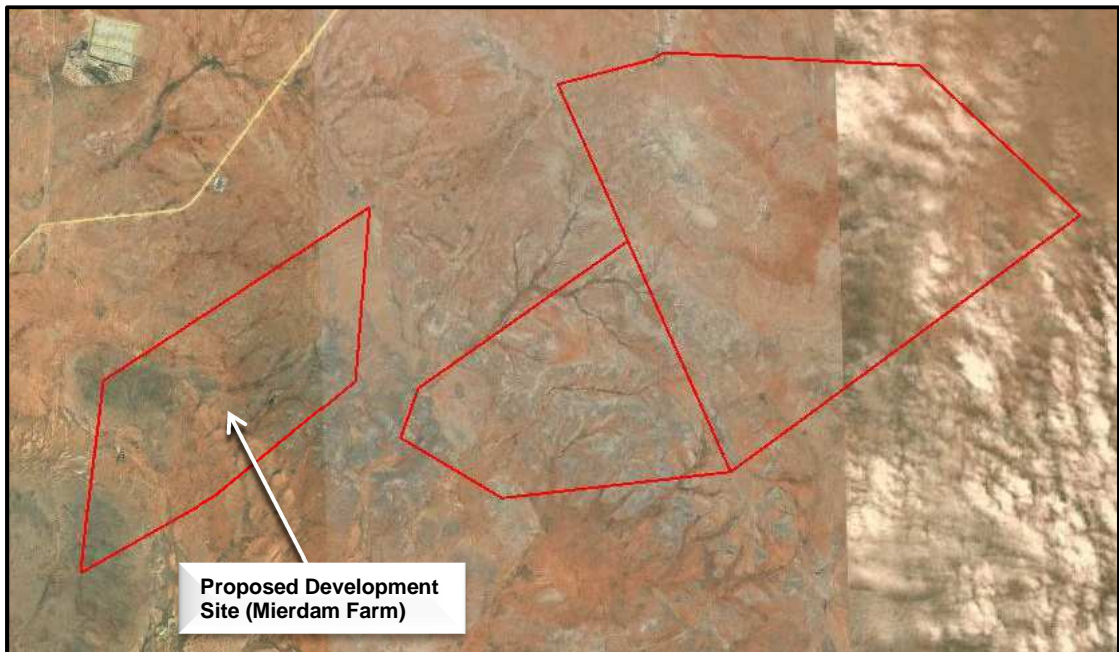


Fig. 3. Aerial view of the study area.  
(Photo: Google Earth)

## 5.2 Project Description

The proposed development would include the following aspects:

- The area where the photovoltaic facility would be erected – a 75MW PV facility to be located on approximately 2 km<sup>2</sup>;
- Electrical connections – cables which will connect the PV arrays may be buried or pole mounted;
- Substations – a new substation will be developed which will supply the electricity to the Eskom grid;
- Access and internal roads – existing roads will be used and internal roads will be developed;
- Temporary construction area – will be a maximum 15 000m<sup>2</sup> temporary lay down area;
- Other infrastructure – which will include administration and warehouse buildings, borrow pits, fencing and panel maintenance.

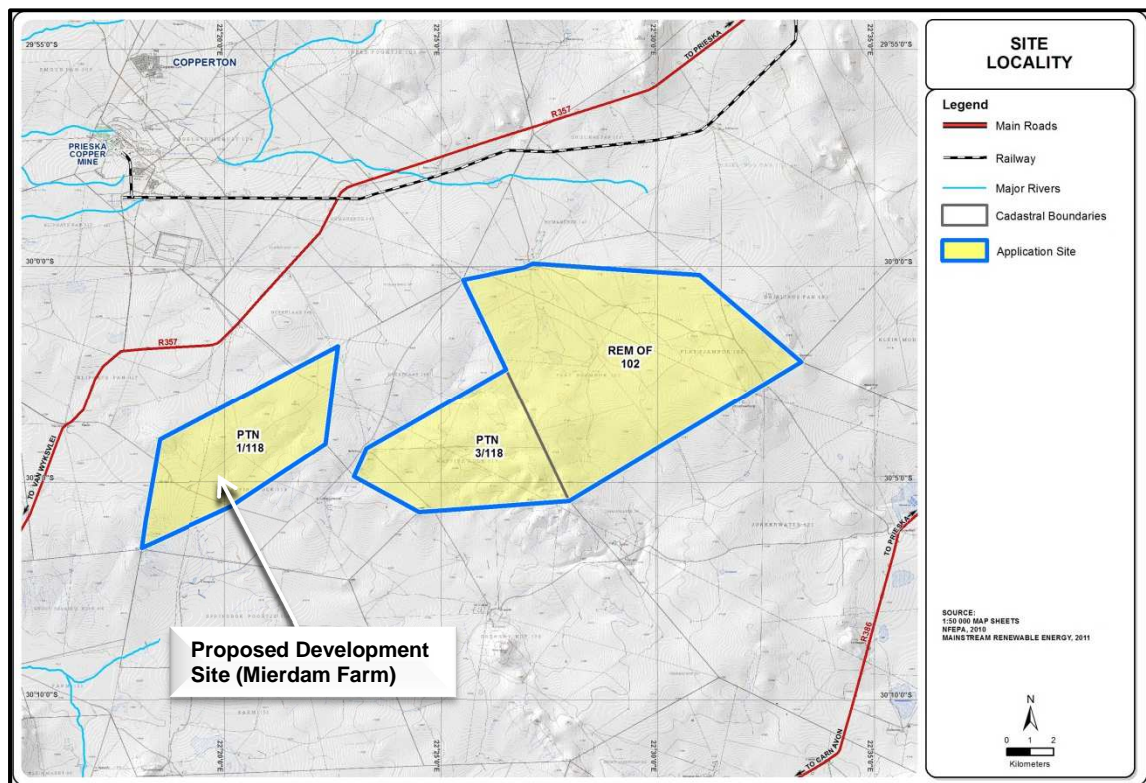


Fig. 4. Layout of the study area.

### 5.3 Regional overview

#### Stone Age

Most sites in the region dating to the Stone Age are open sites and no stratified sites are known. Similarly, no sites containing rock art are known from the region.

It seems as if finds of Early Stone Age material this far to the west is very limited and no report of any such finds in the study region could be found. This is a fact that has been commented on by various authors (see Morris 2000b).

Sites mostly contain material dating to the Middle Stone Age, although some Later Stone Age sites also occur. All of these are open sites, located in the beds of ancient rivers, or on small hills. In the former case, the material range from cores to flakes and tools. In the latter case it is mostly finished tools.



Fig. 5. Examples of typical stone tools.

*These stone tools are not from the region and are only used to illustrate the difference between Early (left), Middle (middle) and Later Stone Age (right) technology.*

By the 19<sup>th</sup> century some Dutch speaking trekboers moved into the region, grazing their stock. As they depended on water for their live-stock, these farmers would have stuck close to available water sources and it was only during the wetter parts of the rain season that they might have accessed other areas for short periods of time. An investigation of the Title Deeds of most of the farms under consideration indicated that they were surveyed during the early part of the twentieth century, implying that they would have been occupied since then.



Fig. 6. Typical farm cemetery.

The town of Prieska developed from a place to which farmers migrated when the pans were full of water after rains. It attained municipal status in 1892. The name is derived from Korana and means "place of a lost she-goat".

The one industrial activity that is practised in the region on a commercial basis is the mining of copper at nearby Copperton. The history of the development of mining activities at Copperton is graphically described by Hocking (n.d.). Although the existence of copper on the farm Vogelstruisbult was known since the early 20<sup>th</sup> century, little was done to exploit it. It was only during the late 1960s that the potential importance of the deposit was realised and a number of shafts were sunk: the Marais and Hutchings shafts. To house the workers at the mine a residential area was developed and named Copperton. The mine was closed down in 1991.

An investigation of the Title Deeds of most of the farms under consideration indicated that they were surveyed during the latter part of the nineteenth century, implying that they would have been occupied since then. Mierdam (Kaffirskolk) was first surveyed in 1891.

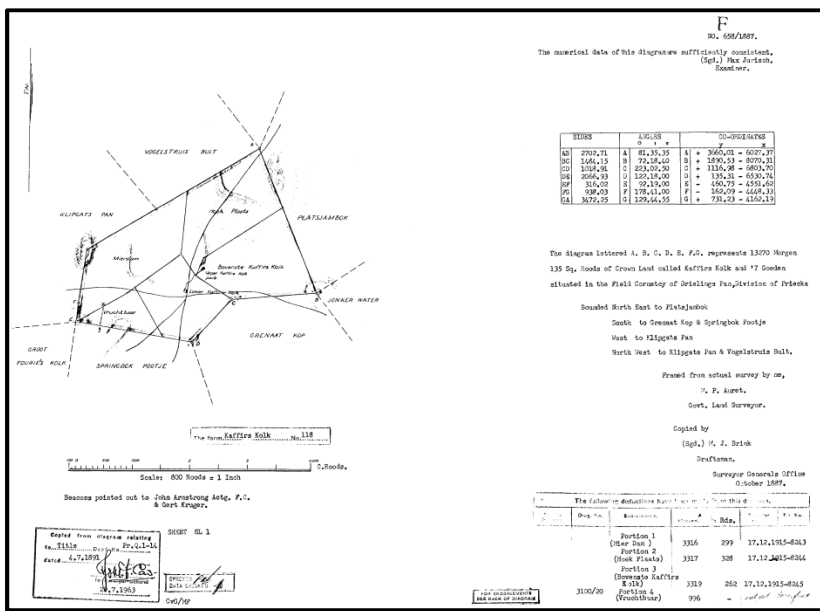


Fig. 7. Copy of the Title Deed for Mierdam (Kaffirs Kolk).

### 5.4 Identified sites

Based on the above sources and the field visit, the following heritage sites, features and objects were identified in the proposed development area:



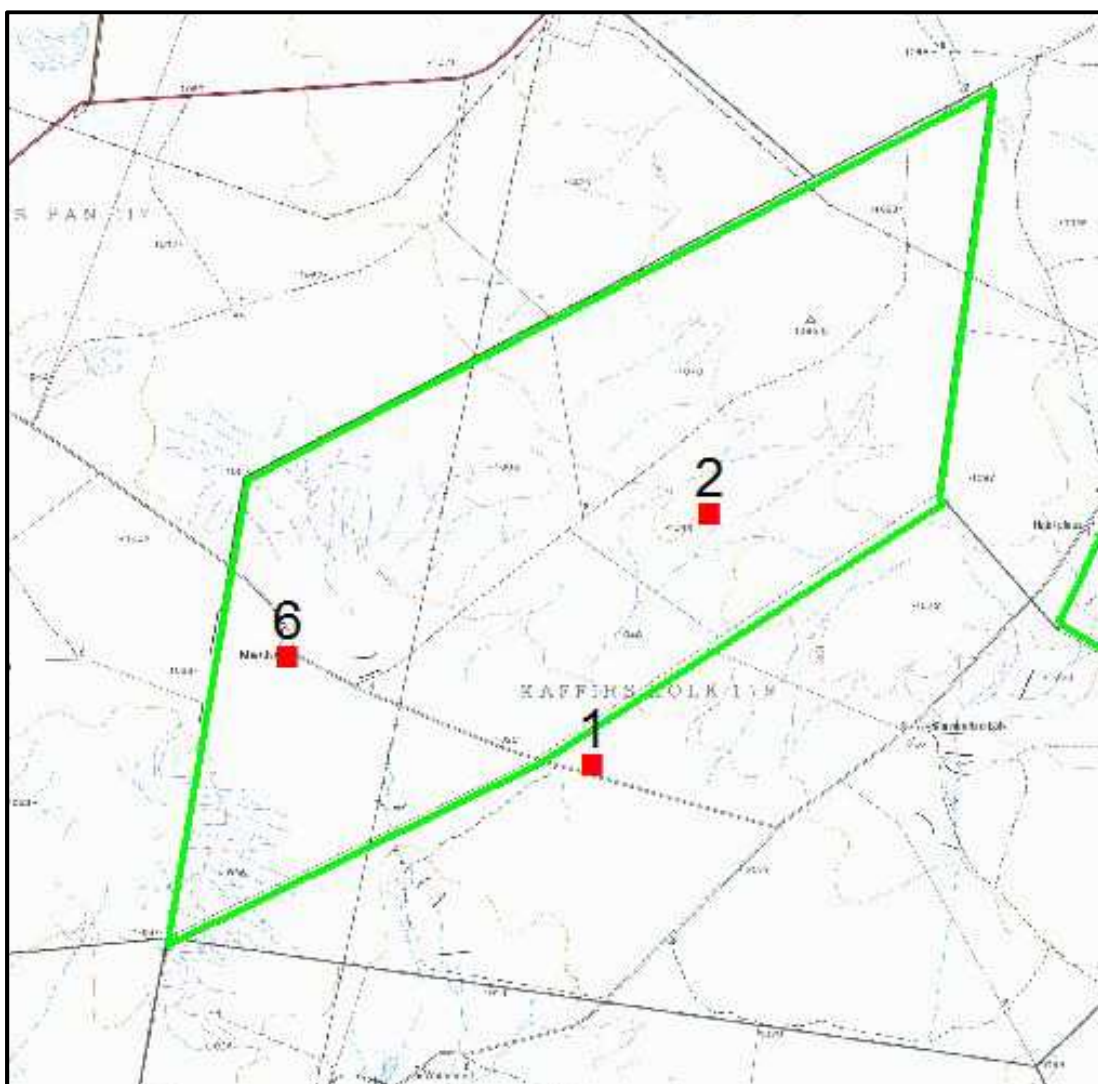


Fig. 8. Map showing the location of the identified sites

- Archaeological sites

Location	No. 1	S 30.09346	E 22.34082
	No. 2	S 30.07039	E 22.35148
<b>Description</b>			
Stone tools were identified to occur specifically in areas where there are outcrops or low hills and most commonly date to the Middle Stone Age, although one site also included material that can be dated to the Later Stone Age. None of the sites can be classified as quarry sites or factory sites and no indication of human settlement was found. Because of their location the sites are viewed to be lookout points where people watched for game. The material used for the production of the tools is hardened shale, chalcedony and quartzite and the tools include retouched flakes, blades and scrapers. One hammer stone was found with the LSA material. The density of the tool scatters varies between 1 artefact per 1m <sup>2</sup> to 10 artefacts per 1 m <sup>2</sup> . None of these areas are bigger than 20 x 20 metres.			
<b>Significance</b>	High on a regional level – Grade III		
<b>Mitigation</b>			
There must be hundreds of similar occurrences in the larger region. As they are all surface finds, their significance is judged to be low. However, as very little is known about the Stone Age occupation of the larger region, studying of these sites might contribute to a better understanding of the prehistory of the region. As first option it is therefore			

recommended that these areas are avoided if possible. If that is not possible, it is recommended that systematic surface collections are made and that this material is housed at a museum. This can only be done under a permit from SAHRA.

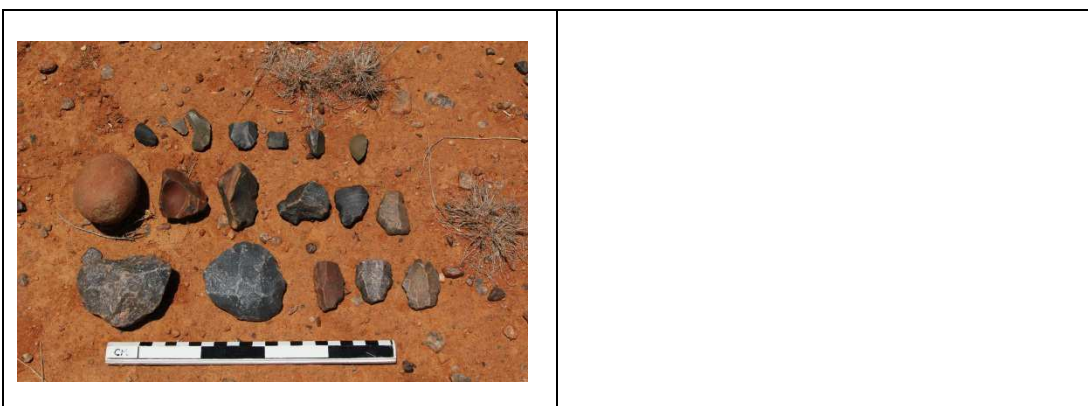


Fig. 9. The material identified on the various Stone Age sites.

- Farmstead

Farmsteads are complex features in the landscape, being made up of different yet interconnected elements. Typically these consist of a main house, gardens, outbuildings, sheds and barns, with some distance from that labourer housing and various cemeteries.

The architecture of these farmsteads can be described as an eclectic mix of styles modified to adapt to local circumstances. Farm buildings were generally single storied. Walls were thick and built in stone. The roof was either flat or ridged and thatched or with corrugated iron and was terminated at either end by simple linear parapet gables.

In some cases outbuildings would be in the same style as the main house, if they date to the same period. However, they tend to vary considerably in style and materials used as they were erected later as and when they were required.

<b>Location</b>	No. 6	S 30.08356	E 22.31290
<b>Description</b>			
The Mierdam farmstead dates to the 1940s, but burned down during the 1970s. Only one of the outbuildings remained, but has since been renovated and altered to some extent. It is rectangular, built with bricks, have a corrugated iron roof and wooden window frames.			
<b>Significance</b>	High on a regional level – Grade III		
<b>Mitigation</b>			
This building, although older than 60 years, is not viewed to have high significance. It is also unlikely that it will be impacted on by the proposed development and as a result no mitigation is necessary.			



Fig. 10. View of the farmstead.

## 6. SITE SIGNIFICANCE AND ASSESSMENT

### 6.1 Heritage assessment criteria and grading

The NHRA stipulates the assessment criteria and grading of archaeological sites. The following categories are distinguished in Section 7 of the Act:

- **Grade I:** Heritage resources with qualities so exceptional that they are of special national significance;
- **Grade II:** Heritage resources which, although forming part of the national estate, can be considered to have special qualities which make them significant within the context of a province or a region; and
- **Grade III:** Other heritage resources worthy of conservation on a local authority level.

The occurrence of sites with a Grade I significance will demand that the development activities be drastically altered in order to retain these sites in their original state. For Grade II and Grade III sites, the applicable of mitigation measures would allow the development activities to continue.

### 6.2 Statement of significance

A matrix was developed whereby the above criteria, as set out in Sections 3(3) and 7 of the NHRA, No. 25 of 1999, were applied for each identified site (see Appendix 1). This allowed some form of control over the application of similar values for similar sites. Three categories of significance are recognized: low, medium and high. In terms of Section 7 of the NHRA, all the sites currently known or which are expected to occur in the study area are evaluated to have a grading as identified in the table below.

Table 2. Summary of identified heritage resources in the study area.

<b>Identified heritage resources</b>	
<i>Category, according to NHRA</i>	<i>Identification/Description</i>
<b>Formal protections (NHRA)</b>	
National heritage site (Section 27)	None
Provincial heritage site (Section 27)	None
Provisional protection (Section 29)	None

Place listed in heritage register (Section 30)	None
<b>General protections (NHRA)</b>	
structures older than 60 years (Section 34)	Yes
archaeological site or material (Section 35)	Yes
palaeontological site or material (Section 35)	None
graves or burial grounds (Section 36)	Yes
public monuments or memorials (Section 37)	None
<b>Other</b>	
Any other heritage resources (describe)	None

### 6.3 Impact assessment

Impact analysis of cultural heritage resources under threat of the proposed development, were based on the following understanding of the proposed development.

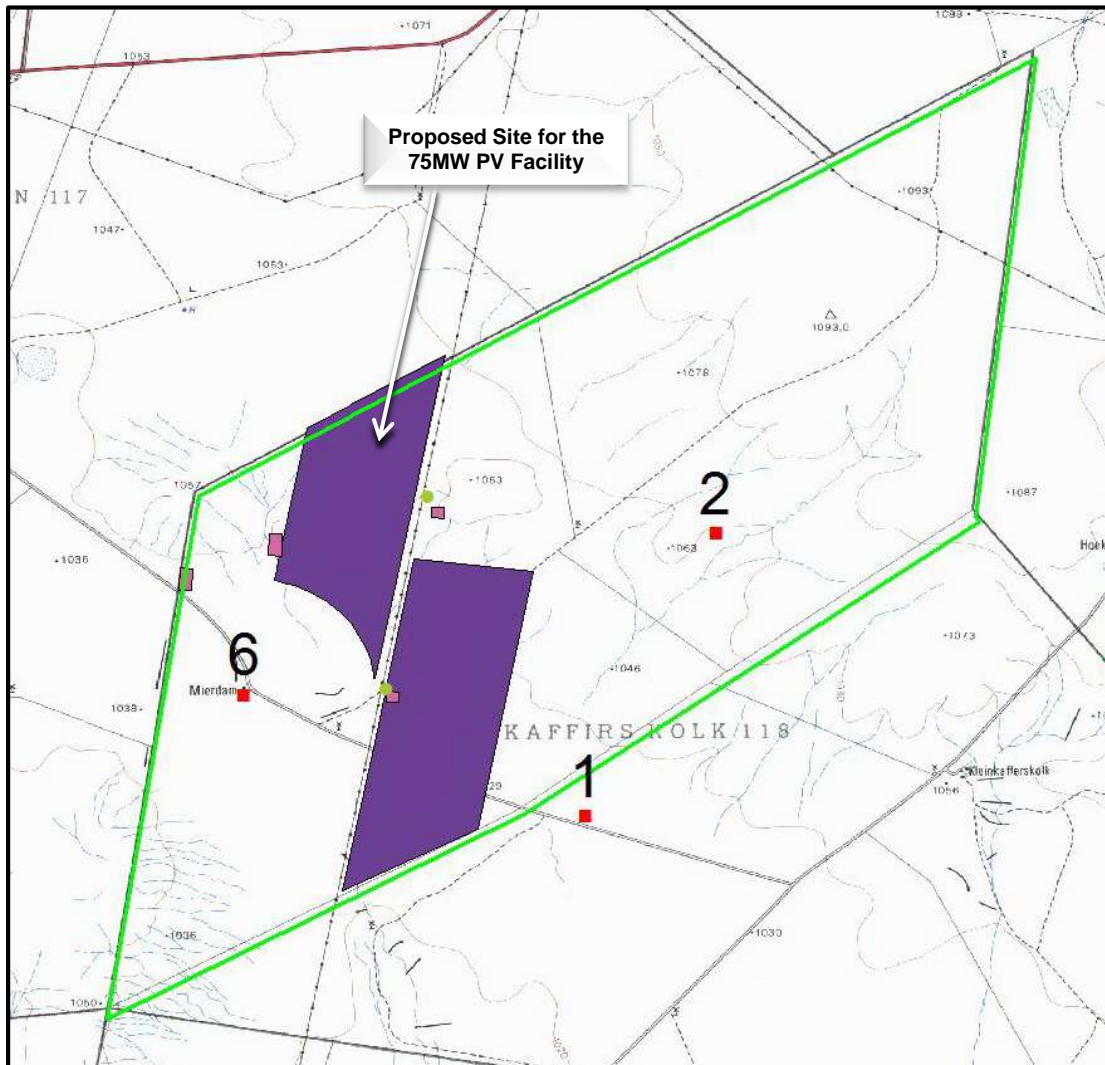


Fig. 11. Layout of the development in relationship to the heritage sites.

Environmental Parameter	<b>Pre-colonial: Stone Age sites</b>	
Issue/Impact/Environmental Effect/Nature	Many sites are still unknown. Their potential and significance therefore unknown. The impact will be the physical disturbance of the material and its context. Impact will be focused on a particular node, i.e. tower positions or access/inspection roads.	
Extent	Local	
Probability	Can occur	
Reversibility	Irreversible	
Duration	Permanent	
Cumulative effect	High	
Intensity/Magnitude	Moderate	
Significance Rating	Sites have a low significance on a region level – viewed as NHRA Grade III sites. Distinguish from find spots, which have low significance	
	<b>Pre-mitigation impact rating</b>	<b>Post mitigation impact rating</b>
Extent	2	2
Probability	2	2
Reversibility	4	4
Irreplaceable loss	4	3
Duration	4	4
Cumulative effect	4	4
Intensity/magnitude	2	2
Significance rating	-40 (medium negative)	-38 (medium negative)
Mitigation measures	Once sites are identified, if the location is to be used for development purposes, then mitigation of the site will be necessary. This could require excavation, or at least mapping and collection of surface material.	

Environmental Parameter	<b>Colonial Period: Farmsteads</b>	
Issue/Impact/Environmental Effect/Nature	The various features are subject to damage. Easier to identify and therefore easier to avoid. Variety of interconnected elements makes up the whole. Impact on part therefore implies an impact on the whole.	
Extent	Local	
Probability	Can occur	
Reversibility	Reversible with human intervention	
Duration	Permanent	
Cumulative effect	High	
Intensity/Magnitude	Moderate	
Significance Rating	Sites have a high significance on a region level – viewed as NHRA Grade III sites.	
	<b>Pre-mitigation impact rating</b>	<b>Post mitigation impact rating</b>
Extent	2	2
Probability	2	1
Reversibility	2	1
Irreplaceable loss	4	1
Duration	54	4
Cumulative effect	4	1
Intensity/magnitude	2	1

Significance rating	-36 (medium negative)	-10 (low negative)
Mitigation measures	Mitigation should take the form of isolating known sites and declare them as no-go areas with sufficient large buffer zones around them for protection. In exceptional cases mitigation can be implemented after required procedures have been followed.	

## 7. RECOMMENDED MANAGEMENT MEASURES

Heritage sites are fixed features in the environment, occurring within specific spatial confines. Any impact upon them is permanent and non-reversible. Those resources that cannot be avoided and that are directly impacted by the proposed development can be excavated/recorded and a management plan can be developed for future action. Those sites that are not impacted on can be written into the management plan, whence they can be avoided or cared for in the future.

### 7.1 Objectives

- Protection of archaeological, historical and any other site or land considered being of cultural value within the project boundary against vandalism, destruction and theft.
- The preservation and appropriate management of new discoveries in accordance with the NHRA, should these be discovered during mining activities.

The following shall apply:

- Known sites should be clearly marked in order that they can be avoided during construction activities.
- The contractors and workers should be notified that archaeological sites might be exposed during the construction activities.
- Should any heritage artefacts be exposed during excavation, work on the area where the artefacts were discovered, shall cease immediately and the Environmental Control Officer shall be notified as soon as possible;
- All discoveries shall be reported immediately to a heritage practitioner so that an investigation and evaluation of the finds can be made. Acting upon advice from these specialists, the Environmental Control Officer will advise the necessary actions to be taken;
- Under no circumstances shall any artefacts be removed, destroyed or interfered with by anyone on the site; and
- Contractors and workers shall be advised of the penalties associated with the unlawful removal of cultural, historical, archaeological or palaeontological artefacts, as set out in the National Heritage Resources Act (Act No. 25 of 1999), Section 51. (1).

### 7.2 Control

In order to achieve this, the following should be in place:

- A person or entity, e.g. the Environmental Control Officer, should be tasked to take responsibility for the heritage sites and should be held accountable for any damage.
- Known sites should be located and isolated, e.g. by fencing them off. All construction workers should be informed that these are no-go areas, unless accompanied by the individual or persons representing the Environmental Control Officer as identified above.
- In areas where the vegetation is threatening the heritage sites, e.g. growing trees pushing walls over, it should be removed, but only after permission for the methods proposed has

been granted by SAHRA. A heritage official should be part of the team executing these measures.

### 7.3 Safe guarding sites

It is recommended that buffer areas are set out around the identified sites:

- The Stone Age open sites should be demarcated with a buffer of a radius of at least 20 metres from the centre point of the site (see coordinates supplied in Section 5.4).

## 8. CONCLUSIONS

The aim of the survey was to locate, identify, evaluate and document sites, features and objects of cultural heritage significance found within the area in which it is proposed to develop a PV solar facility.

The cultural landscape qualities of the region essentially consist of one component. It is a rural area in which the human occupation is made up of a pre-colonial element (Stone Age) as well as a much later colonial (farmer) component.

The following sites, features and objects of cultural heritage significance have been identified (Section 5.4):

- A number of open sites with surface scatterings of stone tools dating to the Middle and Later Stone Age were identified. These are mostly located on small hills or at the foot of the hill.

Because of its location in the open, it is highly likely that there would be a physical impact on it arising from the development of the PV facility.

As first option it is recommended that these areas are avoided if possible. If that is not possible, it is recommended that systematic surface collections are made and that this material is housed at a museum. This can only be done under a permit from SAHRA.

- One old farmstead was identified. It dates to early part of the 20<sup>th</sup> century.

Because of its location it is highly unlikely that there would be a physical impact on it arising from the development of the PV facility.

In order to safeguard the identified sites, it is recommended that buffer zones are set out around each of the identified sites (Section 8.3).

Based on current information regarding sites in the surrounding area, is viewed to have Grade III significance and therefore would not prevent the proposed development for continuing after the implementation of the proposed mitigation measures and its acceptance by SAHRA.

Therefore, from a heritage point of view we recommend that the proposed development can continue. However, we request that if archaeological sites or graves are exposed during construction work, it should immediately be reported to a heritage practitioner so that an investigation and evaluation of the finds can be made.



## 9. REFERENCES

### 9.1 Data bases

Chief Surveyor-General  
Environmental Potential Atlas, Department of Environmental Affairs and Tourism.  
Heritage Atlas Database, Pretoria.  
National Archives of South Africa  
SAHRA Archaeology and Palaeontology Report Mapping Project (2009)

### 9.2 Literature

Acocks, J.P.H. 1975. *Veld Types of South Africa*. Memoirs of the Botanical Survey of South Africa, No. 40. Pretoria: Botanical Research Institute.

Aurecon, 2011. *Environmental Impact Assessment Process: Proposed Wind energy Facility Near Copperton, Northern Cape*. [aurecon.webfoundryza.com/.../Copperton%20Windfarm](http://aurecon.webfoundryza.com/.../Copperton%20Windfarm)

Beaumont, P.B. & Vogel, J.C. 1984. Spatial patterning of the ceramic Later Stone Age in the Northern Cape Province, South Africa. In Hall, M., Avery, G., Avery, D.M., Wilson, M.L. & Humphreys, A.J.B. *Frontiers: Southern African Archaeology Today*. Cambridge.

Hocking, A. n.d. *Kaias and Cocopans: the story of mining in South Africa's Northern Cape*. Johannesburg: Hollards.

Humphreys, A.J.B. 1976. Note on the southern limits of Iron Age settlement in the Northern Cape. *South African Archaeological Bulletin* 31(121/122):54-57

Mucina, L & Rutherford, M.C. (eds.) 2006. *The Vegetation Atlas of South Africa, Lesotho and Swaziland*. Strelitzia 19. Pretoria. South African National Biodiversity Institute.

Playne, E. (Ed.) 1910-1911. *Cape Colony (Cape Province): its History, Commerce, Industries and Resources*. London: The Foreign and Colonial Compiling and Publishing Co.

Raper, P.E. 2004. *South African place names*. Johannesburg: Jonathan Ball Publishers.

Richardson, D. 2001. *Historic sites of South Africa*. Cape Town: Struik Publishers.

Rudner, J. & Rudner, I. 1968. Rock-art in the Thirstland areas. *South African Archaeological Bulletin* 23:75-89.

Wilson, M.G.C. & Anhaeusser, C.R. 1998. *The Mineral Resources of South Africa*. Sixth Edition. Handbook 16. Pretoria: Council for Geosciences.

### 9.3 Maps and aerial photographs

1: 50 000 Topocadastral maps: 2922CD, 3022AB  
Google Earth

### 9.4. Interviews

Mr W.J. Human, Plat Sjambok 102  
Mr C.L. Viljoen, Kaffirs Kolk 118  
Mr H.G. Human, Kaffirs Kolk 118



## APPENDIX 1: CONVENTIONS USED TO ASSESS THE IMPACT OF PROJECTS ON HERITAGE RESOURCES

### Significance

According to the NHRA, Section 2(vi) the **significance** of heritage sites and artefacts is determined by its aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technical value in relation to the uniqueness, condition of preservation and research potential. It must be kept in mind that the various aspects are not mutually exclusive, and that the evaluation of any site is done with reference to any number of these.

Matrix used for assessing the significance of each identified site/feature

<b>1. Historic value</b>				
Is it important in the community, or pattern of history				
Does it have strong or special association with the life or work of a person, group or organisation of importance in history				
Does it have significance relating to the history of slavery				
<b>2. Aesthetic value</b>				
It is important in exhibiting particular aesthetic characteristics valued by a community or cultural group				
<b>3. Scientific value</b>				
Does it have potential to yield information that will contribute to an understanding of natural or cultural heritage				
Is it important in demonstrating a high degree of creative or technical achievement at a particular period				
<b>4. Social value</b>				
Does it have strong or special association with a particular community or cultural group for social, cultural or spiritual reasons				
<b>5. Rarity</b>				
Does it possess uncommon, rare or endangered aspects of natural or cultural heritage				
<b>6. Representivity</b>				
Is it important in demonstrating the principal characteristics of a particular class of natural or cultural places or objects				
Importance in demonstrating the principal characteristics of a range of landscapes or environments, the attributes of which identify it as being characteristic of its class				
Importance in demonstrating the principal characteristics of human activities (including way of life, philosophy, custom, process, land-use, function, design or technique) in the environment of the nation, province, region or locality.				
<b>7. Sphere of Significance</b>		High	Medium	Low
International				
National				
Provincial				
Regional				
Local				
Specific community				
<b>8. Significance rating of feature</b>				
1.	Low			
2.	Medium			
3.	High			

## APPENDIX 2. RELEVANT LEGISLATION

All archaeological and palaeontological sites and meteorites are protected by the National Heritage Resources Act (Act no 25 of 1999) as stated in Section 35:

(1) Subject to the provisions of section 8, the protection of archaeological and palaeontological sites and material and meteorites is the responsibility of a provincial heritage resources authority: Provided that the protection of any wreck in the territorial waters and the maritime cultural zone shall be the responsibility of SAHRA.

(2) Subject to the provisions of subsection (8)(a), all archaeological objects, palaeontological material and meteorites are the property of the State. The responsible heritage authority must, on behalf of the State, at its discretion ensure that such objects are lodged with a museum or other public institution that has a collection policy acceptable to the heritage resources authority and may in so doing establish such terms and conditions as it sees fit for the conservation of such objects.

(3) Any person who discovers archaeological or palaeontological objects or material or a meteorite in the course of development or agricultural activity must immediately report the find to the responsible heritage resources authority, or to the nearest local authority offices or museum, which must immediately notify such heritage resources authority.

(4) No person may, without a permit issued by the responsible heritage resources authority-

- (a) destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or palaeontological site or any meteorite;
- (b) destroy, damage, excavate, remove from its original position, collect or own any archaeological or palaeontological material or object or any meteorite;
- (c) trade in, sell for private gain, export or attempt to export from the Republic any category of archaeological or palaeontological material or object, or any meteorite; or
- (d) bring onto or use at an archaeological or palaeontological site any excavation equipment or any equipment which assist in the detection or recovery of metals or archaeological and palaeontological material or objects, or use such equipment for the recovery of meteorites.

In terms of cemeteries and graves the following (Section 36):

(1) Where it is not the responsibility of any other authority, SAHRA must conserve and generally care for burial grounds and graves protected in terms of this section, and it may make such arrangements for their conservation as it sees fit.

(2) SAHRA must identify and record the graves of victims of conflict and any other graves which it deems to be of cultural significance and may erect memorials associated with the grave referred to in subsection (1), and must maintain such memorials.

(3) No person may, without a permit issued by SAHRA or a provincial heritage resources authority-

- (a) destroy, damage, alter, exhume or remove from its original position or otherwise disturb the grave of a victim of conflict, or any burial ground or part thereof which contains such graves;
- (b) destroy, damage, alter, exhume, remove from its original position or otherwise disturb any grave or burial ground older than 60 years which is situated outside a formal cemetery administered by a local authority; or
- (c) bring onto or use at a burial ground or grave referred to in paragraph (a) or (b) any excavation equipment, or any equipment which assists in the detection or recovery of metals.

(4) SAHRA or a provincial heritage resources authority may not issue a permit for the destruction or damage of any burial ground or grave referred to in subsection (3)(a) unless it is satisfied that the applicant has made satisfactory arrangements for the exhumation and re-interment of the contents of such graves, at the cost of the applicant and in accordance with any regulations made by the responsible heritage resources authority.