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# **HERITAGE IMPACT ASSESSMENT REPORT**

## **ENVIRONMENTAL IMPACT ASSESSMENT PHASE**

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Proposed establishment of the Prieska Solar Energy Facility located East of Prieska on Portion 3 of the Farm Holsloot 47, Northern Cape Province.

Prepared By:



## **Credit Sheet**

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**Disclaimer;** Although all possible care is taken to identify all sites of cultural importance during the investigation of study areas, it is always possible that hidden or sub-surface sites could be overlooked during the study. G&A Heritage and its personnel will not be held liable for such oversights or for costs incurred as a result of such oversights.

## Statement of Independence

As the duly appointed representative of G&A Heritage, I Stephan Gaigher, hereby confirm my independence as a specialist and declare that neither I nor G&A Heritage have any interests, be it business or otherwise, in any proposed activity, application or appeal in respect of which the Environmental Consultant was appointed as Environmental Assessment Practitioner, other than fair remuneration for work performed on this project.

Signed off by S. Gaigher

A handwritten signature in black ink, appearing to read 'S. Gaigher', with a stylized flourish at the end.

**Site name and location:** Proposed establishment of the Prieska Solar Energy Facility, on a Portion of the Farm Holsloot 47, located east of Prieska in the Northern Cape Province.

**Municipal Area:** Siya Themba Municipal area.

**Developer:** Ventusa Energy (PTY) Ltd.

**Consultant:** G&A Heritage, PO Box 522, Louis Trichardt, 0920, South Africa. 38A Vorster Str. Louis Trichardt, 0920

**Date of Report:** 05 November 2012

## **Management Summary**

The purpose of the management summary is to distil the information contained in the report into a format that can be used to give specific results quickly and facilitate management decisions. It is not the purpose of the management summary to repeat in shortened format all the information contained in the report, but rather to give a statement of results for decision making purposes.

This study focuses on the development of the Prieska Solar Energy Facility. This will entail the construction of a 75MW solar generation plant as well as a power line for grid integration.

This study forms part of the Environmental Impact Assessment phase of the environmental management process and is described as a First Phase Heritage Impact Assessment.

The purpose of this phase of the study is to determine the possible occurrence of sites with cultural heritage significance within the study area and the evaluation of the heritage significance of these sites as well as the possible impacts on such sites by the proposed developments.

## **Findings**

The area investigated for the proposed facility was rich in surface finds of MSA and LSA stone tools. Due to a lack of research into open-air sites in the Northern Cape it is advised that the finds are not dismissed as surface scatters.

## **Recommendations**

It is recommended that a specialist in Stone Age archaeology be contracted to perform a surface collection of stone tools before construction commences. It is further recommended that any excavations on site be monitored during the construction phase by a suitably experienced heritage practitioner, preferably with local Stone Age knowledge.

## **Fatal Flaws**

No fatal flaws were identified.

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## List of Abbreviations

Bp	Before Present
EIA	Early Iron Age
ESA	Early Stone Age
GPS	Geographic Positioning System
HIA	Heritage Impact Assessment
LIA	Late Iron Age
LSA	Late Stone Age
MYA	Million Years Ago
MSA	Middle Stone Age
NHRA	National Heritage Resources Act no 22 of 1999
SAHRA	South African Heritage Resource Agency
S&EIR	Scoping & Environmental Impact Reporting
WGS 84	World Geodetic System for 1984



# Heritage Impact Assessment Report for the Proposed Prieska Solar Energy Project

## Introduction

### Legislation and methodology

G&A Heritage was appointed by Savannah Environmental cc to undertake a heritage impact assessment for the proposed Prieska Solar Energy Project. Section 27(1) of the South African Heritage Resources Act (25 of 1999) requires that a heritage study is undertaken for:

- (a) construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300 m in length;
- (b) construction of a bridge or similar structure exceeding 50 m in length; and
- (c) any development, or other activity which will change the character of an area of land, or water –
  - (1) exceeding 10 000 m<sup>2</sup> in extent;
  - (2) involving three or more existing erven or subdivisions thereof; or
  - (3) involving three or more erven, or subdivisions thereof, which have been consolidated within the past five years; or
  - (d) the costs of which will exceed a sum set in terms of regulations; or
  - (e) any other category of development provided for in regulations.

A heritage impact assessment is not limited to archaeological artefacts, historical buildings and graves. It is far more encompassing and includes intangible and invisible resources such as places, oral traditions and rituals. A heritage resource is defined as any place or object of cultural significance i.e. of aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance. This includes the following:

- (a) places, buildings, structures and equipment;
- (b) places to which oral traditions are attached or which are associated with living heritage;
- (c) historical settlements and townscapes;
- (d) landscapes and natural features;
- (e) geological sites of scientific or cultural importance;
- (f) archaeological and paleontological sites;
- (g) graves and burial grounds, including –
  - (1) ancestral graves,
  - (2) royal graves and graves of traditional leaders,
  - (3) graves of victims of conflict (iv) graves of important individuals,
  - (4) historical graves and cemeteries older than 60 years, and
  - (5) other human remains which are not covered under the Human Tissues Act, 1983 (Act No.65 of 1983 as amended);
- (h) movable objects, including ;
  - (1) objects recovered from the soil or waters of South Africa including archaeological and paleontological objects and material, meteorites and rare geological specimens;
  - (2) ethnographic art and objects;
  - (3) military objects;
  - (4) objects of decorative art;
  - (5) objects of fine art;
  - (6) objects of scientific or technological interest;
  - (7) books, records, documents, photographic positives and negatives, graphic, film or video material or sound recordings; and
  - (8) any other prescribed categories, but excluding any object made by a living person;
- (i) battlefields;
- (j) traditional building techniques.

A **'place'** is defined as:

- (a) A site, area or region;

(b) A building or other structure (which may include equipment, furniture, fittings and articles associated with or connected with such building or other structure);  
(c) a group of buildings or other structures (which may include equipment, furniture, fittings and articles associated with or connected with such group of buildings or other structures);  
and (d) an open space, including a public square, street or park; and in relation to the management of a place, includes the immediate surroundings of a place.

**'Structures'** means any building, works, device, or other facility made by people and which is fixed to land and any fixtures, fittings and equipment associated therewith older than 60 years.

**'Archaeological'** means:

(a) material remains resulting from human activity which are in a state of disuse and are in or on land and are older than 100 years, including artefacts, human and hominid remains and artificial features and structures;  
(b) rock art, being a form of painting, engraving or other graphic representation on a fixed rock surface or loose rock or stone, which was executed by human agency and is older than 100 years including any area within 10 m of such representation; and  
(c) wrecks, being any vessel or aircraft, or any part thereof, which was wrecked in South Africa, whether on land or in the maritime cultural zone referred to in section 5 of the Maritime Zones Act 1994 (Act 15 of 1994), and any cargo, debris or artefacts found or associated therewith, which are older than 60 years or which in terms of national legislation are considered to be worthy of conservation;  
(d) features, structures and artefacts associated with military history which are older than 75 years and the sites on which they are found.

**'Paleontological'** means 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.

**'Grave'** means a place of interment and includes the contents, headstone or other marker of and any other structures on or associated with such place. The South African Heritage Resources Agency (SAHRA) will only issue a permit for the alteration of a grave if it is satisfied that every reasonable effort has been made to contact and obtain permission from the families concerned.

The removal of graves is subject to the following procedures as outlined by the SAHRA:

- Notification of the impending removals (using English, Afrikaans and local language media and notices at the grave site);
- Consultation with individuals or communities related or known to the deceased;
- Satisfactory arrangements for the curation of human remains and / or headstones in a museum, where applicable;
- Procurement of a permit from the SAHRA;
- Appropriate arrangements for the exhumation (preferably by a suitably trained archaeologist) and re-interment (sometimes by a registered undertaker, in a formally proclaimed cemetery);
- Observation of rituals or ceremonies required by the families.

The limitations and assumptions associated with this scoping study are as follows;

- Sites were evaluated by means of description of the cultural landscape and analysis of written sources and available databases.
- It was assumed that the power line and solar facility alignment/placement as provided by Savannah Environmental cc is accurate.
- We assumed that the public participation process performed as part of the Scoping process will be sufficiently encompassing not to be repeated in the Heritage Impact Assessment.

Table 1. Impacts on the NHRA Sections

Act	Section	Description	Possible Impact	Action
National Heritage Resources Act (NHRA)	34	Preservation of buildings older than 60 years	No impact	None
	35	Archaeological, paleontological and meteor sites	Possible Impact	HIA
	36	Graves and burial sites	Possible Impact	HIA
	37	Protection of public monuments	No impact	None
	38	Does activity trigger a HIA?	Yes	HIA

Table 2. NHRA Triggers

Action Trigger	Yes/No	Description
Construction of a road, wall, power line, pipeline, canal or other linear form of development or barrier exceeding 300m in length.	Yes	Various distribution power lines and access roads
Construction of a bridge or similar structure exceeding 50m in length.	No	N/A
Development exceeding 5000 m <sup>2</sup>	Yes	Prieska Solar Energy Facility
Development involving more than 3 erven or sub divisions	No	N/A
Development involving more than 3 erven or sub divisions that have been consolidated in the past 5 years	No	N/A
Re-zoning of site exceeding 10 000 m <sup>2</sup>	Yes	Re-zoning from agricultural to industrial
Any other development category, public open space, squares, parks or recreational grounds	No	N/A

## Background Information

### Proposed Prieska Solar Energy Facility

#### Project Description

An independent power developer of concentrating solar power plants, Jouren Solar (Pty) Ltd., is in the process of investigating the possible establishment of the Prieska Solar Facility, using concentrating solar generation technology, on a site located on portion 3 of the Farm Holsloot 47 in the Siyathemba Municipality in the Northern Cape.

The proposed site is technically preferred by virtue of climatic conditions (primarily as the economic viability of a solar energy facility is directly dependent on the annual direct solar irradiation values for a particular area), orographic conditions, relief and aspect and the availability of a grid connection (i.e. the point of connection to the National grid).

The facility is proposed to include several arrays of photovoltaic (PV) solar panels and/or concentrating photovoltaic solar panels with a generating capacity of approximately 75 Megawatts of electricity and includes the following associated infrastructure:

- Solar panels (single or double axis).
- An on-site inverter to step up the power and a substation to facilitate the connection between the solar energy facility and the Eskom electricity grid.
- Two alternatives are being considered to evacuate the electricity from the facility.

- a) Alternative 1 a loop-in and loop out power line to connect into the existing Burchell-Mooidraai 1 132kV power line which traverses the site;
- b) Alternative 2 to connect directly into the existing Eskom Mooidraai Substation located on the site.

- Internal access roads.
- Workshop area for maintenance and storage.

The proposed development inclusive of associated infrastructure can be appropriately located on the identified site, which covers a total area of approximately 7.5 - 8 km<sup>2</sup>. The extent of the broader site is larger than the space required for the facility's development footprint. Therefore, the PV panels and the associated infrastructure can be appropriately placed within the boundaries of the broader site while aiming to avoid any environmental sensitivity identified through the EIA process.

### Site Location

The site is located on the Remainder of the Farm portion 3 of the farm Holsloot 47 in the SiyatThemba Municipality in the Northern Cape. This is approximately 25km east of the town of Prieska in the Northern Cape.

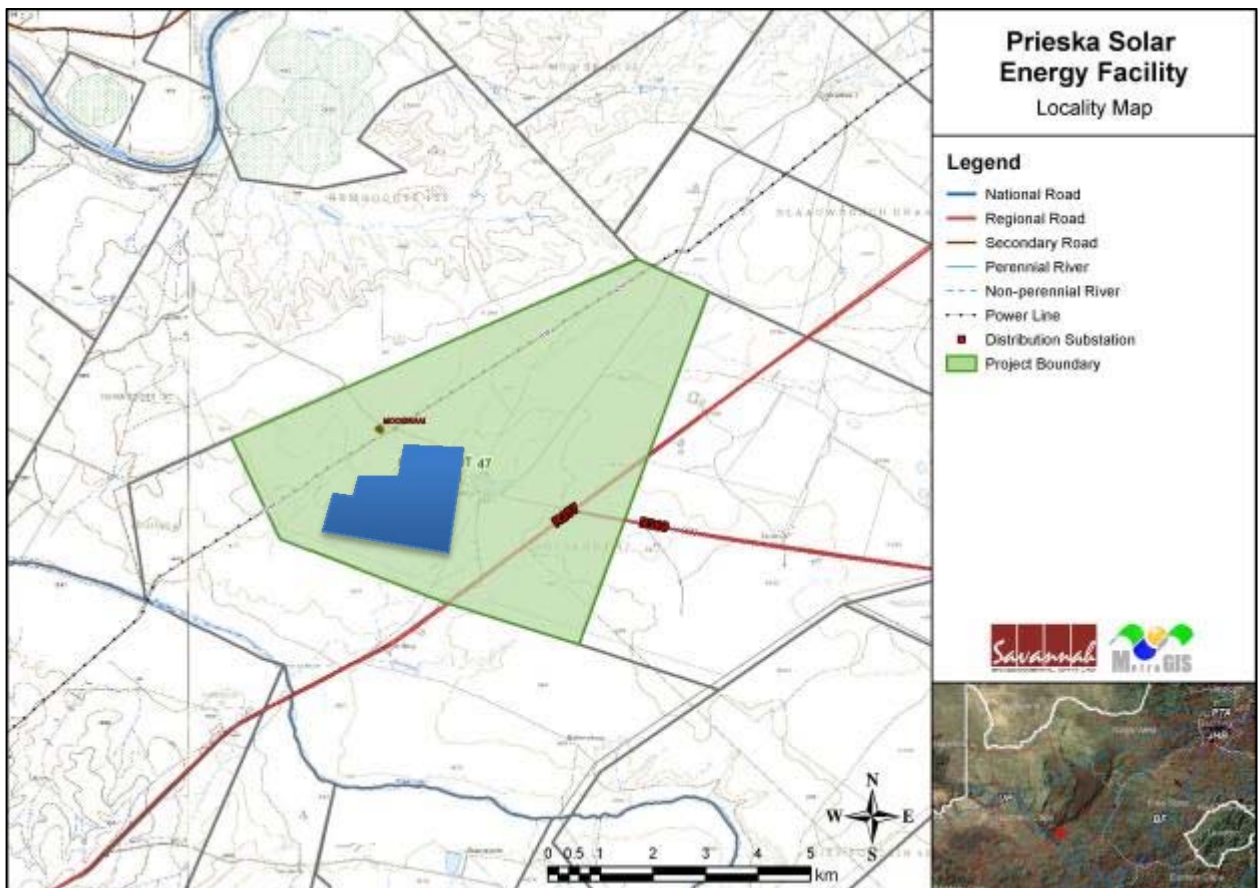


Figure 1. Proposed location with final layout of solar panels within the blue shaded area

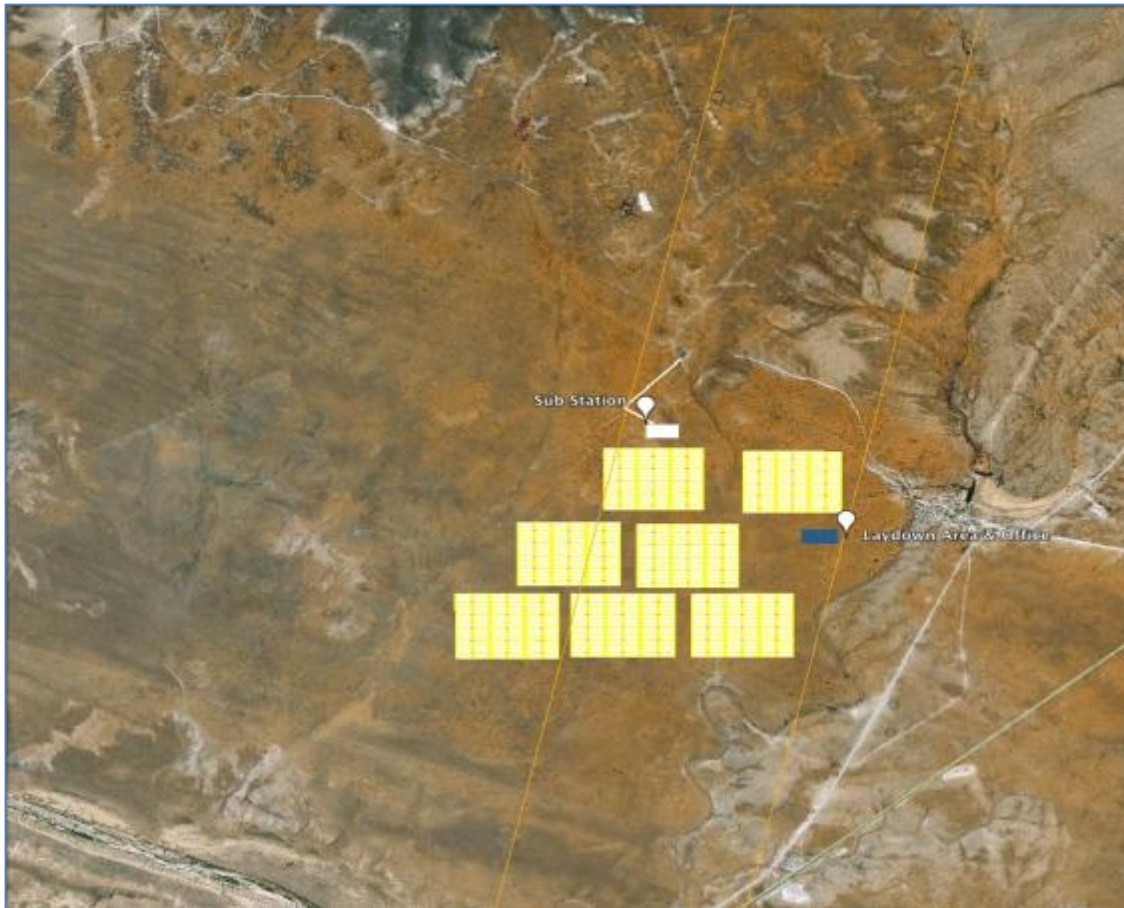


Figure 2. Aerial view of the site at the proposed Prieska Solar Energy Facility



Figure 3. General Landscape and local sub-station

## **Alternatives Considered.**

Alternative alignments for the connecting power lines were investigated..

## **Methodology**

This study defines the heritage component of the Environmental Impact Assessment process being undertaken for the Proposed Prieska Solar Energy Facility. It is described as a Heritage Impact Assessment (HIA). This report attempts to evaluate the accumulated heritage knowledge of the area as well as the heritage sensitivity of proposed development areas.

## **Evaluating Heritage Impacts**

This Heritage Impact Assessment relies on the analysis of written documents, maps, aerial photographs and other archival sources combined with the results of site investigations and interviews with effected people. Site investigations are not exhaustive and often focus on areas such as river confluence areas, elevated sites or occupational ruins.

The following documents were consulted in this study;

- South African National Archive Documents
- SAHRA Database of Heritage Studies
- McGregor Museum Information
- Internet Search
- Historic Maps
- 1936 and 1952 Surveyor General Topographic Map series
- 1952 1:10 000 aerial photo survey
- Google Earth 2011 & 2003 imagery
- Published articles and books
- JSTOR Article Archive

## **Assumptions and Restrictions**

- It is assumed that the SAHRA database locations are correct
- It is assumed that the social impact assessment and public participation process of the Basic Assessment phase will result in the identification of any intangible sites of heritage potential.
- It is assumed that the visual impact assessment performed as part of the EIA phase will be encompassing enough not to be repeated in the HIA.
- As much of the site as possible was investigated; however a 100% coverage was not possible due to heavy plant growth.

## **Heritage Indicators within the Receiving Environment**

### **Regional Cultural Context**

#### **Stone Age**

This area is home to all three of the known phases of the Stone Age, namely: the Early- (2.5 million – 250 000 years ago), Middle- (250 000 – 22 000 years ago) and Late Stone Age (22 000 – 200 years ago). The Late Stone Age in this area also contains sites with rock art from the San and Khoi San cultural groups. Early to Middle Stone Age sites are less common in this area, however rock-art sites and Late Stone Age sites are much better known.

The Early Stone Age (also referred to as the Acheulean or ESA) in the Prieska area, as in most other areas, is little known and largely under researched. The reason for this is the lack of stratigraphically preserved sites (such as found in caves). According to Richard Klein, less than 20 sealed ESA sites have been found in southern Africa (Klein, 2000). For this reason, most of what we know about the ESA in southern Africa is based on the study of similar, stratified sites from East Africa. The one area according to Deacon, where stratified



ESA sites could be found in the fluvial deposits of the Vaal-Orange drainage (Deacon 1975). There is therefore a possibility of such sites being found sub-surface in the study area and although small, it is a possibility that should be investigated.

While the main characteristic of the Acheulean artifact assemblages were the occurrence of large bi-facial hand axes and cleavers (although the contemporary Oldowan Industry lacked these in East Africa), the Middle Stone Age (MSA) shows a distinct lack of these (Leakey 1971, 1975). It is suggested by Clark that the reason for the disappearance of the bi-facial hand axe is that MSA peoples devised a technique for hafting stone flakes to make more efficient tools (Clark 1993). The term MSA has also been contentious since its first use as many academics campaign for its inclusion in either the ESA or LSA. The identification and research on MSA sites are therefore of paramount importance, and areas where these might occur should probably be investigated.

During the Middle Stone Age, 200 000 years ago, modern man or *Homo sapiens* emerged, manufacturing a wider range of tools, with technologies more advanced than those from earlier periods. This enabled skilled hunter-gatherer bands to adapt to different environments. From this time onwards, rock shelters and caves were used for occupation and reoccupation over very long periods of time. In areas where such structures were not readily available (such as the study area) it seems *A priori* that temporary shelters should have been used, however these were probably too flimsy to have survived for any significant length of time.

It is suggested by Klein that both Acheulean and MSA people were closely tied to standing water sources, possibly because they lacked impermeable water containers (Klein 2000). For this reason, possible sources of standing water (pans and creeks) were investigated for possible MSA or ESA deposits.

The Late Stone Age (LSA), considered to have started some 20 000 years ago, is associated with the predecessors of the San and Khoi Khoi. Stone Age hunter-gatherers lived well into the 19th century in some places in SA. Stone Age sites may occur all over the area where an unknown number may have been obliterated by mining activities, urbanisation, industrialisation, agriculture and other development activities during the past decades especially associated with the town of Prieska.

It is suggested that the LSA could be widely ascribed to one of two possible origins, hunters and herders. Beaumont identifies two broad categories described as the *Swartkop Industry*, associated with hunters and the *Doornfontein Industry*, associated with herders (Beaumont 1995). This distinction seems clearer in the Bushmanland and Northern Cape than in the Western Cape. Both of these types of sites are associated with ceramic industries.

Isabelle Parsons suggests that too little focus has been lent to open-air sites and these might prove to contain much more information than previously suggested (Parsons 2003).

A limited number of Rock-Art sites are located in this area, mostly due to the lack of suitable shelter sites.

### **Iron Age**

Due to the variable definition of the term Iron Age, its occurrence in the Northern Cape is contentious. Traditionally the Iron Age is associated with agricultural people who made use of a ceramic industry (Cobbing 1988). The occurrence of metal working within these industries was not considered essential. As can be seen from the Doornfontein LSA Industry in the Northern Cape, this Stone Age industry has all the characteristics of an Iron Age society, however it is still regarded as a Stone Age Industry, due to its heavy reliance on stone age technologies. Traditional Iron Age societies are therefore only found in this area in association with the historic era and no contemporary Iron Age communities inhabited this region with the Stone Age communities.

### **The Historic Era**

The name Prieska is most probably derived from the Korana words "*beris*" and "*ga*", combined meaning: "*...where the she-goat was lost*". The reason for this name is however unclear.

While Prieska only became a municipality in 1878, it was used as a fording place for the Orange River for many years before.

Prieska is also associated with the minor Cape Afrikaner revolt of 1900, which was finally suppressed by Lord Kitchener, where after the people involved, moved to the Transvaal. Current reminders of this action are the British built fort on the hill outside of Prieska as well as the British Military Memorial Gardens in town.

The area is also known for zinc, copper and asbestos mining. Most of the mines have become unprofitable and have closed down. The study area is used mainly for livestock farming at the moment.

### **Built Environment**

The study area consists mainly of agricultural grazing land with few manmade structures visible on site. There are some recently built labour houses near the access road off the provincial asphalt road.



Figure 4. Labour housing on site

The building style as well as building materials used in the labour houses suggests that these are of recent construction. These structures will not be affected by the proposed development.



Furthermore there are some homesteads and agricultural buildings on the portion of the property that will be un-affected by the proposed development. These are however not indicated in the 1859 property act and are also not of such historic significance that the development will have a visually negative impact on them.

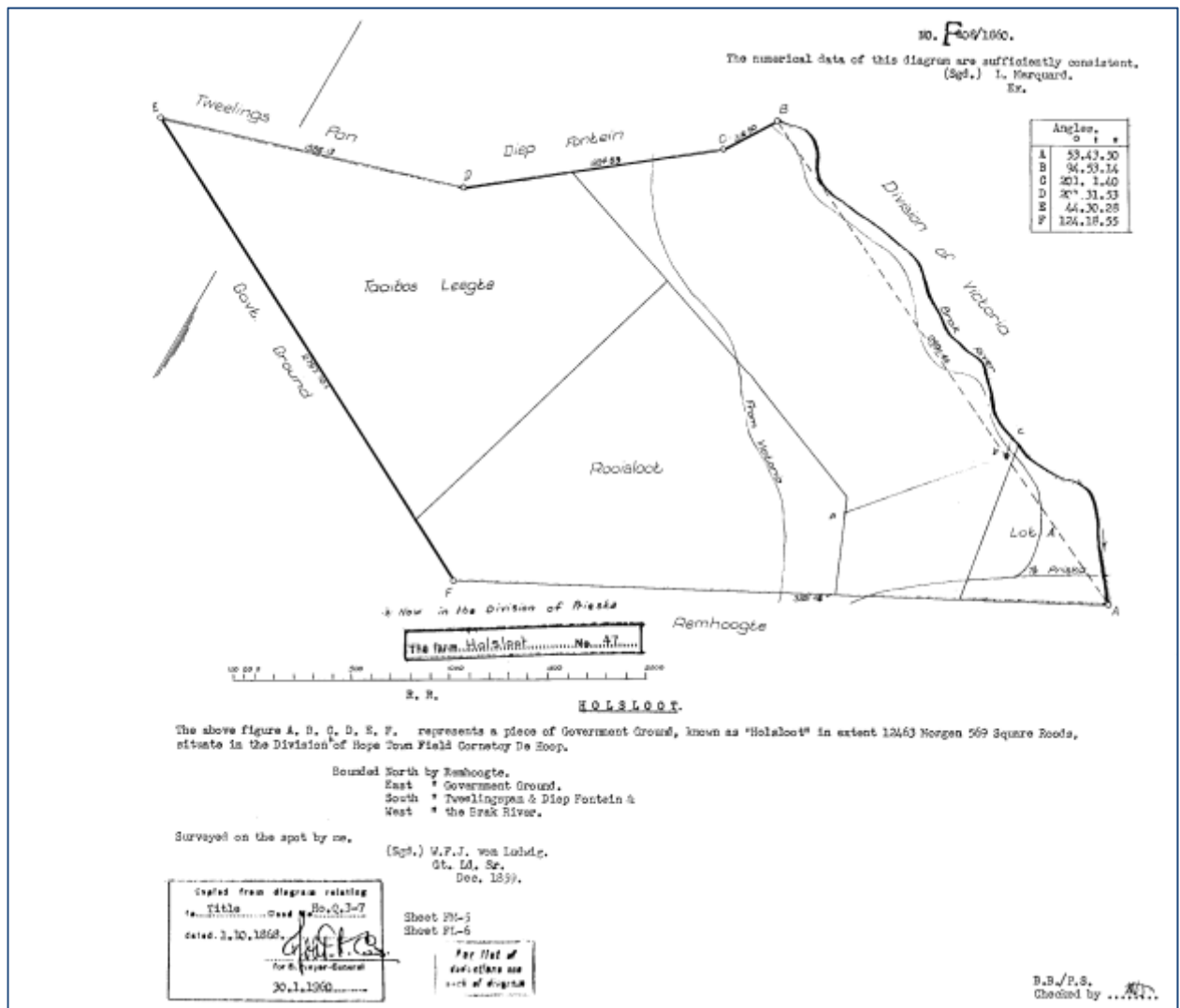


Figure 5. 1859 Property Act for Holsloot 47

### Previous Studies in the Area

Several heritage related studies have recently been performed in this area, among these are;

- John E. Almond, 2012. Proposed photovoltaic energy plant on Farm Klipgats Pan (Portion 4 of Farm 117) near Copperton, Northern Cape Province
- J, van Schalkwyk, 2011. Heritage Impact Assessment Report For The Proposed Establishment Of PV Solar Facilities By Mainstream Renewable Power In The Prieska Region, Northern Cape Province

While the palaeontological sensitivity of the study area will be discussed in a separate specialist report, the findings of the HIA by van Schalkwyk shows significant parallels with the current study. Open-air sites were identified and classed as either Middle or Late Stone Age. Unfortunately only one photograph was made available to compare sites and the description of these sites was very limited, also inhibiting comparison. The one photo of hornfels stone tools looked similar to some of the finds from the study area, although there

seems to be a higher percentage of blades, which could place the site more comfortably within the LSA. The author also gives a generalized description of all the identified sites together rather than individually making specific comparisons difficult. Overall the findings (although this study does not commit to specific sites) do compare favorably with each other.

It should be noted that due to the large amount of renewable energy projects currently underway in the Northern Cape, it is very likely that more studies will be available by the submission date of this report.

### Cultural Landscape

The following landscape types could possibly be present in the study areas.

Landscape Type	Description	Occurrence still possible?	Likely
1 Paleontological	Mostly fossil remains. Remains include microbial fossils such as found in Baberton Greenstones	Yes, sub-surface	Unlikely
2 Archaeological	Evidence of human occupation associated with the following phases – Early-, Middle-, Late Stone Age, Early-, Late Iron Age, Pre-Contact Sites, Post-Contact Sites	Yes	Likely
3 Historic Built Environment	<ul style="list-style-type: none"> <li>- Historical townscapes/streetscapes</li> <li>- Historical structures; i.e. older than 60 years</li> <li>- Formal public spaces</li> <li>- Formally declared urban conservation areas</li> <li>- Places associated with social identity/displacement</li> </ul>	No	No
4 Historic Farmland	<p>These possess distinctive patterns of settlement and historical features such as:</p> <ul style="list-style-type: none"> <li>- Historical farm yards</li> <li>- Historical farm workers villages/settlements</li> <li>- Irrigation furrows</li> <li>- Tree alignments and groupings</li> <li>- Historical routes and pathways</li> <li>- Distinctive types of planting</li> <li>- Distinctive architecture of cultivation e.g. planting blocks, trellising, terracing, ornamental planting.</li> </ul>	No	No
5 Historic rural town	<ul style="list-style-type: none"> <li>- Historic mission settlements</li> <li>- Historic townscapes</li> </ul>	No	No
6 Pristine natural landscape	<ul style="list-style-type: none"> <li>- Historical patterns of access to a natural amenity</li> <li>- Formally proclaimed nature reserves</li> <li>- Evidence of pre-colonial occupation</li> <li>- Scenic resources, e.g. view corridors, viewing sites, visual edges, visual linkages</li> <li>- Historical structures/settlements older than 60 years</li> <li>- Pre-colonial or historical burial sites</li> <li>- Geological sites of cultural significance.</li> </ul>	No	No
7 Relic	<ul style="list-style-type: none"> <li>- Past farming settlements</li> </ul>	No	No

Landscape Type	Description	Occurrence still possible?	Likely
Landscape	<ul style="list-style-type: none"> <li>- Past industrial sites</li> <li>- Places of isolation related to attitudes to medical treatment</li> <li>- Battle sites</li> <li>- Sites of displacement,</li> </ul>		
8 Burial grounds and grave sites	<ul style="list-style-type: none"> <li>- Pre-colonial burials (marked or unmarked, known or unknown)</li> <li>- Historical graves (marked or unmarked, known or unknown)</li> <li>- Graves of victims of conflict</li> <li>- Human remains (older than 100 years)</li> <li>- Associated burial goods (older than 100 years)</li> <li>- Burial architecture (older than 60 years)</li> </ul>	Yes,	Unlikely
9 Associated Landscapes	<ul style="list-style-type: none"> <li>- Sites associated with living heritage e.g. initiation sites, harvesting of natural resources for traditional medicinal purposes</li> <li>- Sites associated with displacement &amp; contestation</li> <li>- Sites of political conflict/struggle</li> <li>- Sites associated with an historic event/person</li> <li>- Sites associated with public memory</li> </ul>	No	No
10 Historical Farmyard	<ul style="list-style-type: none"> <li>- Setting of the yard and its context</li> <li>- Composition of structures</li> <li>- Historical/architectural value of individual structures</li> <li>- Tree alignments</li> <li>- Views to and from</li> <li>- Axial relationships</li> <li>- System of enclosure, e.g. defining walls</li> <li>- Systems of water reticulation and irrigation, e.g. furrows</li> <li>- Sites associated with slavery and farm labour</li> <li>- Colonial period archaeology</li> </ul>	No	No
11 Historic institutions	<ul style="list-style-type: none"> <li>- Historical prisons</li> <li>- Hospital sites</li> <li>- Historical school/reformatory sites</li> <li>- Military bases</li> </ul>	No	No
12 Scenic visual	<ul style="list-style-type: none"> <li>- Scenic routes</li> </ul>	No	No
13 Amenity landscape	<ul style="list-style-type: none"> <li>- View sheds</li> <li>- View points</li> <li>- Views to and from</li> <li>- Gateway conditions</li> <li>- Distinctive representative landscape conditions</li> <li>- Scenic corridors</li> </ul>	No	No

### Impacts Anticipated

In 2003 the SAHRA compiled the following guidelines to evaluate the cultural significance of individual heritage resources:

#### **TYPE OF RESOURCE**

- Place
- Archaeological Site
- Structure
- Grave
- Paleontological Feature
- Geological Feature

#### **TYPE OF SIGNIFICANCE**

##### **1. HISTORIC VALUE**

It is important in the community, or pattern of history

- o Important in the evolution of cultural landscapes and settlement patterns
- o Important in exhibiting density, richness or diversity of cultural features illustrating the human occupation and evolution of the nation, province, region or locality.
- o Important for association with events, developments or cultural phases that have had a significant role in the human occupation and evolution of the nation, province, region or community.
- o Important as an example for technical, creative, design or artistic excellence, innovation or achievement in a particular period.

It has strong or special association with the life or work of a person, group or organisation of importance in history

- o Importance for close associations with individuals, groups or organisations whose life, works or activities have been significant within the history of the nation, province, region or community.

It has significance relating to the history of slavery

- o Importance for a direct link to the history of slavery in South Africa.

##### **2. AESTHETIC VALUE**

It is important in exhibiting particular aesthetic characteristics valued by a community or cultural group.

- o Important to a community for aesthetic characteristics held in high esteem or otherwise valued by the community.
- o Importance for its creative, design or artistic excellence, innovation or achievement.
- o Importance for its contribution to the aesthetic values of the setting demonstrated by a landmark quality or having impact on important vistas or otherwise contributing to the identified aesthetic qualities of the cultural environs or the natural landscape within which it is located.
- o In the case of an historic precinct, importance for the aesthetic character created by the individual components which collectively form a significant streetscape, townscape or cultural environment.

##### **3. SCIENTIFIC VALUE**

It has potential to yield information that will contribute to an understanding of natural or cultural heritage

- o Importance for information contributing to a wider understanding of natural or cultural history by virtue of its use as a research site, teaching site, type locality, reference or benchmark site.
- o Importance for information contributing to a wider understanding of the origin of the universe or of the development of the earth.

- Importance for information contributing to a wider understanding of the origin of life; the development of plant or animal species, or the biological or cultural development of hominid or human species.
- Importance for its potential to yield information contributing to a wider understanding of the history of human occupation of the nation, Province, region or locality.
- It is important in demonstrating a high degree of creative or technical achievement at a particular period
- Importance for its technical innovation or achievement.

4. SOCIAL VALUE

- It has strong or special association with a particular community or cultural group for social, cultural or spiritual reasons
- Importance as a place highly valued by a community or cultural group for reasons of social, cultural, religious, spiritual, symbolic, aesthetic or educational associations.
- Importance in contributing to a community's sense of place.

**DEGREES OF SIGNIFICANCE**

1. RARITY

It possesses uncommon, rare or endangered aspects of natural or cultural heritage.

- Importance for rare, endangered or uncommon structures, landscapes or phenomena.

2. REPRESENTIVITY

- It is 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.

The table below illustrates how a site's heritage significance is determined

Spheres of Significance	High	Medium	Low
International			
National			
Provincial			
Regional			
Local			
Specific Community			

What other similar sites may be compared to this site?

**Impact Statement**

**Assessment of Impacts**

Direct, indirect and cumulative impacts of the issues identified through the EIA phase are assessed in terms of the following criteria:

- The nature, which shall include a description of what causes the effect, what will be affected and how it will be affected.
- The extent, wherein it will be indicated whether the impact will be local (limited to the immediate area or site of development) or regional, and a value between 1 and 5 will be assigned as appropriate (with 1 being low and 5 being high):
- The duration, wherein it will be indicated whether:
  - the lifetime of the impact will be of a very short duration (0–1 years) – assigned a score of 1;
  - the lifetime of the impact will be of a short duration (2-5 years) - assigned a score of 2;
  - medium-term (5–15 years) – assigned a score of 3;
  - long term (> 15 years) - assigned a score of 4; or
  - permanent - assigned a score of 5;
- The magnitude, quantified on a scale from 0-10, where 0 is small and will have no effect on the environment, 2 is minor and will not result in an impact on processes, 4 is low and will cause a slight impact on processes, 6 is moderate and will result in processes continuing but in a modified way, 8 is high (processes are altered to the extent that they temporarily cease), and 10 is very high and results in complete destruction of patterns and permanent cessation of processes.
- The probability of occurrence, which shall describe the likelihood of the impact actually occurring. Probability will be estimated on a scale of 1–5, where 1 is very improbable (probably will not happen), 2 is improbable (some possibility, but low likelihood), 3 is probable (distinct possibility), 4 is highly probable (most likely) and 5 is definite (impact will occur regardless of any prevention measures).
- The significance, which shall be determined through a synthesis of the characteristics described above and can be assessed as low, medium or high; and
- The status, which will be described as either positive, negative or neutral.
- The degree to which the impact can be reversed.
- The degree to which the impact may cause irreplaceable loss of resources.
- The degree to which the impact can be mitigated.

The significance is calculated by combining the criteria in the following formula:

$$S=(E+D+M)P$$

S = Significance weighting

E = Extent

D = Duration

M = Magnitude

P = Probability

The significance weightings for each potential impact are as follows:

- < 30 points: Low (i.e. where this impact would not have a direct influence on the decision to develop in the area),
- 30-60 points: Medium (i.e. where the impact could influence the decision to develop in the area unless it is effectively mitigated),
- > 60 points: High (i.e. where the impact must have an influence on the decision process to develop in the area).

## Archaeological Sites - Pre-Contact Heritage (Stone Age Sites)

*Nature of Impacts:* Placement of the solar power plant could negatively affect sites associated with the Middle to Late Stone Age.

*Extent of Impacts:* Localised damage to the sites

Nature of Impact: Possible pre-contact Stone Age site could be damaged locally by excavation activities and associated activities		
	Without Mitigation	With Mitigation
Extent	<b>Local (2)</b>	<b>Local (2)</b>
Duration	<b>Long term (5)</b>	<b>Long term (5)</b>
Magnitude	<b>High (8)</b>	<b>Low (1)</b>
Probability	<b>Probable (3)</b>	<b>Improbable (1)</b>
Significance	<b>Medium (45)</b>	<b>Low (8)</b>
Status	<b>Negative</b>	<b>Positive</b>
Reversibility	<b>Irreversible</b>	<b>Irreversible</b>
Irreplaceable loss of resource	<b>Yes</b>	<b>No</b>
Can impacts be mitigated	<b>No</b>	<b>Yes</b>
Mitigation	<b>Surface collection of Stone Age material before construction commences</b>	
Cumulative impacts	<b>None</b>	
Residual impacts	<b>Loss of heritage related information</b>	

### Surface collection of artifacts as well as monitoring of excavations during construction phase Heritage Management Planning

#### Minimising the Impact on Archaeological Sites (as per the NHRA)

Objective 1: Minimising the impact on archaeological sites
The development of solar generation facility and associated infrastructure could impact on unidentified sites of archaeological importance.

Project Component	Solar Array, roads, power lines and construction camps
Potential Impact	Destruction of archaeological sites
Activity/Risk source	Solar array foundations, power lines and roads
Mitigation Target	Conserve archaeological sites

Mitigation: Action	Responsibility	Time Frame
It is recommended that a Stone Age specialist be contracted to perform a surface collection of stone tools as well as investigate any excavations.	Contracted Heritage Practitioner	Before construction commences, during construction phase.

Performance Indicator	No destruction of archaeological sites
Monitoring	During construction phase

#### Minimising the impact on Burial and Grave Sites (as per the NHRA)

Objective 1: Minimising the impact on burial and grave sites
The placement of solar sites could impact on unidentified burial or grave sites

Project Component	Solar array, power lines, roads and construction camps
Potential Impact	Destruction of grave and burial sites
Activity/Risk source	Solar array and associated infrastructure
Mitigation Target	Mitigate impacts on burial or grave sites

Mitigation: Action	Responsibility	Time Frame
On uncovering a possible grave or burial site it is imperative that construction be ceased immediately. The area should be marked and a heritage practitioner should be informed immediately.	Environmental control officer	Immediately

Performance Indicator	Mitigation of burial and grave sites
Monitoring	No monitoring is required

### Sites Identified

Although no one specific site could be isolated within the study area, the proliferous amount of stone tools that were noted in many areas, suggest that this area was subject to LSA or possibly even MSA occupation over an extended time.

### Stone Tools

#### Tool distribution

As stated previously, stone tools were widely distributed over the study area. No one area however produced a higher concentration of stone tools than 2 per M<sup>2</sup> resulting in no one area being identified as a site *per se*.





Figure 6. Stone tools *in situ*

Most of the stone tools identified were located in open areas, often with calcrete deposits. It is however not known if the tools were merely more visible in these areas with lower vegetation cover than in others.

The general area where most of these tools were noted is characterized by low karoo shrub with the occasional small tree. The area is relatively close to the Orange River valley and therefore vegetation is generally more dense and of larger varieties than in other surrounding areas.



Figure 7. Stone tools *in situ*



Figure 8. General landscape at finds

### **Tool Descriptions and Interpretation**

The absence of ceramic remains as well as the low amount of whole blades or bladelets suggests that the stone tools probably originate from either the late Middle Stone Age or the early Late Stone Age. Beaumont indicates the occurrence of ceramic in both the Swartkop and Doornfontein phases of the LSA, even on open-air sites (Beaumont 1995). As found by Parsons at Vlermuigat, the predominant material used in the manufacture of these tools was hornfels and chert (Parsons 2000). Sources of this stone are found widely in the surrounding area, especially in the Orange River valley.

While the blade occurrence seems limited in this area, as opposed to other LSA sites in the Northern Cape, the sample was not nearly big enough to place this site either in or outside of the parameters of the LSA. It has been postulated that artifact collections of less than 200 show little or no statistically consistent distribution pattern. A larger sample would therefore increase the possibility of classifying these artefacts exponentially.

LSA sites in this area also regularly contain ostrich eggshell beads (OEB). Although none were recorded during the investigation, this does not suggest that they are not present. Their absence could however be interpreted as a sign that the artefacts are possibly from the late MSA rather than the LSA. A larger sample would be needed.





















**Conclusion**

The area showed significant surface occurrences of MSA to LSA stone tools.

These stone tools seem to be spread throughout the study area without specific concentrations to be found. The variability and extent of the artefact types does however suggest that a manufacturing site could be located somewhere underneath the local alluvial deposits. It is a known characteristic of Northern Cape Stone Age Research that open-air sites of the Middle and Late Stone Age have in the past been neglected with researchers rather focusing on the few sealed shelter sites. Due to this we know very little of the distribution patterns of these open-air sites and even less of the surface indicators that would lead to the identification of sub-surface deposits. Even with the lack of manufacturing debris such as flakes and hammer stones, recent studies in these areas have tried to identify specific sites in order to facilitate their preservation through the mitigation of construction activities. These "sites" are based on the increase in surface density of stone artefacts and rely heavily on the subjective evaluation of the investigator.

It is therefore recommended in this report that rather than trying to narrow the focus of the of the preservation actions to a few subjectively identified sites, that we rather handle the whole area where the artefacts are found as sensitive and realize that any area might hold sub-surface deposits regardless of its surface indicators.

For this reason it is recommended that a Stone Age specialist be contracted to monitor any excavations and that they be allowed to perform a structured surface collection of material before the surface is disturbed. A permit will be needed for this.

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GPS Track Paths (GPX Files available on request)

