

**A PHASE 1 ARCHAEOLOGICAL IMPACT ASSESSMENT FOR THE PROPOSED  
ESTABLISHMENT OF THE WONDERHEUWEL SOLAR ENERGY FACILITY ON  
PORTION 7 OF FARM DAMFONTEIN 114, NEAR NOUPOORT, UMSOMBOMVU  
LOCAL MUNICIPALITY, NORTHERN CAPE PROVINCE.**

Prepared for: Savannah Environmental (Pty) Ltd  
Contact Person: Ms Ravisha Ajodhapersadh  
PO Box 148  
Sunninghill  
2157  
Tel: (011) 234-6621  
Fax: 086 0547  
Email: [ravisha@savannahsa.co.za](mailto:ravisha@savannahsa.co.za)

Prepared by: Ms Celeste Booth and Ms Sholeen Sanker  
Contact person: Ms Celeste Booth  
Department of Archaeology  
Albany Museum  
Somerset Street  
Grahamstown  
6139  
Tel: (046) 622 2312  
Fax: (046) 622 2398  
Email: [celeste.booth@ru.ac.za](mailto:celeste.booth@ru.ac.za)

October 2012

## **TABLE OF CONTENTS**

1. EXECUTIVE SUMMARY
2. BACKGROUND INFORMATION
3. BRIEF LEGISLATIVE REQUIREMENTS
4. BRIEF ARCHAEOLOGICAL BACKGROUND
5. DESCRIPTION OF THE PROPERTY
6. ARCHAEOLOGICAL INVESTIGATION
7. DESCRIPTION OF SITES
8. ASSESSMENT OF THE SIGNIFICANCE AND OF THE ARCHAEOLOGICAL HERITAGE RESOURCES FOR THE PROPOSED WONDERHEUWEL SOLAR ENERGY FACILITY
9. RECOMMENDATIONS
10. CONCLUSION
11. GENERAL REMARKS AND CONDITIONS
12. REFERENCES
13. APPENDIX A: GRADING SYSTEM
14. APPENDIX B: IDENTIFICATION OF ARCHAEOLOGICAL FEATURES AND MATERIAL FROM INLAND AREAS: guidelines and procedures for developers

# **A PHASE 1 ARCHAEOLOGICAL IMPACT ASSESSMENT FOR THE PROPOSED ESTABLISHMENT OF THE DAMFONTEIN SOLAR ENERGY FACILITY ON PORTION 7 OF FARM WONDERHEUWEL 114, NEAR NOUPOORT, UMSOMBOMVU LOCAL MUNICIPALITY, NORTHERN CAPE PROVINCE.**

**NOTE:** This report follows the minimum standard guidelines required by the South African Heritage Resources Agency (SAHRA) for compiling a Phase 1 Archaeological Impact Assessment (AIA).

## **1. EXECUTIVE SUMMARY**

### **1.1. Purpose of the Study**

The purpose of the study was to conduct and compile a phase 1 archaeological impact assessment (AIA) for the proposed establishment of the Wonderheuwel Solar Energy Facility, on Portion 7 of the Farm Damfontein, near Noupoort, Umsombomvu Local Municipality, Northern Cape Province. The survey was conducted to establish the range and importance of the exposed and *in situ* archaeological heritage material remains, sites and features; to establish the potential impact of the development; and to make recommendations to minimize possible damage to the archaeological heritage.

### **1.2. Brief Summary of Findings**

Surface scatters of mainly Middle Stone Age (MSA) stone artefacts were documented within the immediate and surrounding area as well as the access road for the proposed Wonderheuwel Solar Energy Facility area. A dense surface scatter of stone artefacts was documented in the mid-west area for the proposed solar energy facility site in comparison to the rest of the area. One site surrounding rocky outcrops and koppies was documented adjacent to the proposed access road to the site. No associated archaeological material or organic remains were documented with the stone artefact surface scatters. No other archaeological heritage remains, features or sites were observed within the area proposed for development.

### **1.3. Recommendations**

The area is of a medium-high cultural sensitivity, the following recommendations must be considered:

1. Once the final layout (including the positions of the solar panels; underground cabling; overhead power line; additional internal access roads, and the workshop area) of the proposed Wonderheuwel Solar Energy Facility has been finalised an archaeological ground-truthing should be conducted and further recommendation be made to protect the archaeological heritage within the area proposed for development; and / or

2. A professional archaeologist (with an already authorised collection and excavation permit) must be appointed during all construction and development activities including vegetation clearing and the excavation activities to monitor and identify possible archaeological material remains and features that may occur below the surface and make further appropriate recommendations on removing and / or protecting the archaeological material remains and features.
3. If concentrations of archaeological heritage material and human remains are uncovered during construction, all work must cease immediately and be reported to the Albany Museum (046 622 2312) and/or the South African Heritage Resources Agency (SAHRA) (021 642 4502) so that systematic and professional investigation/ excavation can be undertaken.
4. Construction managers/foremen should be informed before construction starts on the possible types of heritage sites and cultural material they may encounter and the procedures to follow when they find sites.

## **2. BACKGROUND INFORMATION**

This phase 1 archaeological impact assessment (AIA) report has been prepared as part of the basic environmental assessment phase focusing on the area for the proposed Wonderheuwel Solar Energy Facility.

Wonderheuwel Solar Energy (Pty) Ltd is proposing to establish five solar energy facilities and one substation and associated infrastructure on a site located within the Umsombomvu Local Municipality in the Northern Cape Province. Each facility will have the capacity of up to 20MW.

The proposed activity includes the development of a photovoltaic solar energy facility with a generating capacity of up to 20 MW. The solar energy facility would comprise the following infrastructure:

- Arrays of photovoltaic panels with a generation capacity of up to 20 MW;
- Inverter / Transformer enclosures;
- Cabling between the project components, to be lain underground where practical;
- Mounting structure to be either rammed steel piles or piles with pre-manufactured concrete footing to support the PV panels;
- An overhead power line feeding into the Eskom electricity network at Fontein Substation which is located on the site;
- Internal access roads; and
- Workshop area for maintenance, storage and offices.

**Developer:**

Terra Solar Energy

**Applicant:**

Wonderheuwel Solar Energy (Pty) Ltd

**Consultant:**

Savannah Environmental (Pty) Ltd

Contact Person: Ms Ravisha Ajodhapersadh

PO Box 148

Sunninghill

2157

Tel: (011) 234-6621

Fax: 086 0547

Email: ravisha@savannahsa.co.za

**Terms of Reference (ToR)**

- Provide an indication of the methodology used in determining the significance of potential environmental (archaeological heritage) impact by conducting and compiling the phase 1 archaeological impact assessment (AIA);
- Describe all environmental issues (archaeological heritage) that were identified during the phase 1 archaeological impact assessment (AIA);
- Assess the significance of direct, indirect and cumulative impacts on the environment (archaeological heritage);
- Describe and comparatively assess all of the alternatives identified during the environmental impact assessment process;
- Make recommendations regarding practical mitigation measures for potentially significant impacts;
- Provide an indication of the extent to which the issue could be addressed by the adoption of mitigation measures;
- Describe any assumptions, uncertainties and gaps in knowledge; and
- Provide an environmental impact statement.

**3. BRIEF LEGISLATIVE REQUIREMENTS**

Parts of sections 35(4), 36(3) and 38(1) (8) of the National Heritage Resources Act 25 of 1999 apply:

### **Structures**

34. (1) No person may alter or demolish any structure or part of a structure which is older than 60 years without a permit issued by the relevant provincial heritage resources authority

### **Archaeology, palaeontology and meteorites**

35 (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;
- (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.

### **Burial grounds and graves**

36. (3) (a) 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.

### **Heritage resources management**

38. (1) Subject to the provisions of subsections (7), (8) and (9), any person who intends to undertake a development categorized as –

- (a) the construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;
- (b) the construction of a bridge or similar structure exceeding 50m in length;
- (c) any development or other activity which will change the character of the site –

- (i) *exceeding 5000m<sup>2</sup> in extent, or*
  - (ii) *involving three or more erven or subdivisions thereof; or*
  - (iii) *involving three or more erven or divisions thereof which have been consolidated within the past five years; or*
  - (iv) *the costs of which will exceed a sum set in terms of regulations by SAHRA, or a provincial resources authority;*
- (d) *the re-zoning of a site exceeding 10 000m<sup>2</sup> in extent; or*
- (e) *any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority, must as the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development.*

#### **4. BRIEF ARCHAEOLOGICAL BACKGROUND**

Substantial Later Stone Age Research of the last 20 000 years has been conducted within the surrounding areas of the proposed area for development within the Seacow River Valley between Hanover and Richmond. Blydefontein Rock Shelter east of Noupoot has also been a focus of substantial Later Stone age research. Several recent archaeological impact assessments for wind and solar energy facilities have been conducted around Noupoot and towards Middelburg that have documented several surface scatters and archaeological sites as well as historical features.

##### ***EARLY STONE AGE (1.5 million – 250 000 years ago)***

Early Stone Age stone artefacts endure for long periods and generally occur as open air surface scatters either as isolated occurrences or in large quantities and very rarely in association with other archaeological heritage, plant and material remains. Significant South African sites include Wonderwerk in the Northern Cape near Kimberly, and Montagu Cave in the Western Cape Province situated on the outskirts of the small town of Montagu in the Western Cape, and Amanzi Springs near to the small town of Uitenhage close to Port Elizabeth in the Eastern Cape, whereby some bone and plant material was found to be *in situ* and associated with the stone artefacts. The Albany Museum database includes records of occurrences of Acheulian handaxes between Middelburg and the Camdeboo National Park near Graaff Reinet, as well as a collection of stone artefacts from the Cradock area. Sampson (1985) located a large number of sites to the west of the proposed area of development within the Seacow River Valley.

##### ***MIDDLE STONE AGE (250 000 – 30 000 years ago)***

The Middle Stone Age spans a period from 250 000 - 30 000 years ago and focuses on the emergence of modern humans by the change in technology, behaviour, physical appearance, art, and symbolism. Surface scatters of these flake and blade industries occur widespread across southern Africa although rarely with any associated botanical and faunal remains. It is also common for these stone artefacts to be found between the

surface and approximately 50 - 80cm below ground. Fossil bone may be associated with Middle Stone Age occurrences. These stone artefacts are usually observed in secondary context with no other associated archaeological material. The Albany Museum database holds records of the occurrence of Middle Stone Age stone artefacts around the Cradock area and has Middle Stone Age stone artefacts in its collection from the Cradock area including Highlands Rock Shelter excavated by H.J. Deacon during the 1970's. Sampson on the other hand reported many open-air MSA sites which he assigned to the Orangian Industry (dating between 128 000 - 75 000 years old), Florisbad and Zeekoegat Industries dating between 64 000 and 32 000 years old. Relevant archaeological impact assessments conducted by the Albany Museum have recorded surface scatters of Middle Stone Age stone artefacts in the Cradock vicinity, (Binneman & Booth 2008) as well as Middelburg (Booth 2012) and Noupoot (Booth 2011).

### ***THE LATER STONE AGE (30 000 – recent) and PASTORALISM***

The Later Stone Age spans a period from 30 000 years ago to the historical period (the last 500 years) until 100 years ago and is associated with the archaeology of San hunter-gatherers. The majority of archaeological sites date from the past 10 000 years where San hunter-gatherers inhabited the landscape living in rock shelters and caves as well as on the open landscape, inland and along the coast. The open sites are difficult to locate because they are in the open veld. The preservation of these sites is poor and it is not always possible to date them (Deacon & Deacon 1999). Caves and rock shelters, however, in most cases, provide a more substantial preservation record of pre-colonial human occupation. The Later Stone Age archaeology of the Karoo is rich and varied. Various studies (Beaumont & Morris 1990, Beaumont & Vogel 1984, Morris & Beaumont 1990, Sampson 1985) have shown that the general area has been relatively marginal regarding pre-colonial human settlement, but is in fact exceptionally rich in archaeological sites and rock art. Bifacial and tanged barbed arrow heads made on very fine-grained dark or black chalcedony are distributed over the southern two-thirds of the Free State, the Kimberly area in the west, Lesotho in the east and along the southern boundary of this area as far south as Britstown and Steynsburg (Humphreys 1969).

Some 2 000 years ago Khoekhoen pastoralists entered into the region and lived mainly in small settlements. They were the first food producers in South Africa and introduced domesticated animals (sheep, goats and cattle) and ceramic vessels to southern Africa. Often, these archaeological sites are found close to the banks of large streams and rivers and along the coast. Large piles of freshwater mussel shell (called freshwater middens) usually mark the large stream and river sites and large piles of marine shellfish middens mark the coastal sites.

One of the most complete archaeological research surveys in South Africa was conducted in the Agter Sneeuberg region (northern side of the Sneeuberg) in the central and upper Seacow River Area that covered an area of 734 square kilometres between Hanover, Richmond and Noupoot in the Northern Cape (Sampson 1985). Later Stone Age Lithics and rare Khoekhoe pottery sherds were uncovered during systematic surveys of the area



(Sadr & Sampson 1999). Several dense clusters of Smithfield settlement sites are concentrated among the lower dolerite hills and ridges in preference to flats and mountains. In the Free State, this particular stone artefact industry may be traced back to the 8<sup>th</sup> century AD, however, only occurs in the Northern Cape as late as the 14<sup>th</sup> century AD. Today the term Smithfield is only used for stone tool assemblages with backed bladelets and long end scrapers dating within the last 1000 years and replaces the term Smithfield B (Sampson 1988). Typical Smithfield assemblages contain flaked lithics (most commonly of unpatinated blue-black hornfels), grinding and pounding equipment, bored stones, and sherds of a highly characteristic bowl form decorated with stamp-impressed motifs and date within the last 1000 years (Sampson 1988). Endscrapers dominate the flaked stone artefact, the only other formal tools being reamers, single platform cores recycled as trimming hammers, and rare convex scrapers commonly called thumbnail scrapers. Almost 5000 Smithfield sites were recorded during the 1979-1981 survey. These predominantly open sites, were categorized according to size, setting and artefact and included categories such as camps, chipping stations (or factories / manufacture areas), lookouts, quarries (for hornfels raw material), and mussel camps. However, these sites may also be attributed to rock shelters that have been occupied. Waterholes or natural springs were attractive areas for settlement and three different kinds of camps emerge when associated with water holes such as camp-clusters near waterholes, camp-clusters occurring singly or in pairs within some strong and many weak site clusters more than 1km from water and isolated camps far from water (Sampson 1984). In the southern Seacow Valley the presence of Khoekhoen ceramics and stone circular kraals demonstrates a dense occupation by herders, 30 – 40km south west of the town of Noupoort and the proposed area for development. In addition, Blydefontein Rock Shelter, situated about within 15km to the west of the town of Noupoort in the upper reaches of the Oorlogspoort River drainage in the Kikvorsberg Mountain Range, has been excavated and researched extensively (Bousman 2005). Hunter-gatherers occupied Blydefontein Rock Shelter sporadically during the Late Pleistocene and throughout the Holocene. The stratigraphic profile and associated <sup>14</sup>C dates range between 11 850 ± 150 BP and 1810 ± 50 BP and include several stone artefact industries. The cultural sequence consists of the Robberg, Lockshoek, Interior Wilton, and Smithfield components. Discarded stone artefacts, lithic manufacturing debris, bone refuse and hearths scattered throughout the stratified rock shelter's deposits, as well as the occasional potsherd in the later components, represent the enduring record of hunter-gatherer settlement occupation. The majority of formal tools in the Blydefontein sequence consists of endscrapers and backed microliths.

### ***ROCK ART (Engravings and Paintings)***

Rock art is generally associated with the Later Stone Age period mostly dating from the last 5000 years to the historical period. It is difficult to accurately date the rock art without destructive practices. The southern African landscape is exceptionally rich in the distribution of rock art which is determined between paintings and engravings. Rock paintings occur on the walls of caves and rock shelters across southern Africa. Rock engravings, however, are generally distributed on the semi-arid central plateau, with

most of the engravings found in the Orange-Vaal basin, the Karoo stretching from the Eastern Cape (Cradock area) into the Northern Cape as well as the Western Cape, and Namibia. At some sites both paintings and engravings occur in close proximity to one another especially in the Karoo and Northern Cape. The greatest concentrations of engravings occur on the andesite basement rocks and the intrusive Karoo dolerites, but sites are also found on about nine other rock types including dolomite, granite, gneiss, and in a few cases on sandstone (Morris 1988). Maria Wilman recorded engraving sites between Colesburg and Middelburg (Parkington *et al.* 2008:33). Rock art of the Middelburg area includes a site with numerous styles such as fine-lined paintings of antelope and human figures, probably done by San individuals, as well as red, yellow, black, orange and white finger dots done in the Khoekhoen style. Other figures include medium-grained white chalky paints with red accents such as fat-tailed sheep; two horse-and riders; a black rhinoceros; and two stretched-out and spotted animal skins or aprons (Ouzman. 2005: 106).

## **HISTORICAL ARCHAEOLOGY**

In the early days of colonialism the Karoo was still a sparse and unknown area. It was only until the early travellers and pioneer European farmers ventured into this harsh landscape and documented their encounters with the San hunter-gatherers and Khoekhoen that had originally inhabited the landscape. Therefore, the towns of the Great Karoo were established much later. Between the years 1860 and 1875, there was an increase of travels through the Karoo between Graaff Reinet, Middelburg and Colesburg, due to the improvement of the Frontier Wagon Track or Public Roads Network (Neville *et al.* 1994).

## **5. DESCRIPTION OF THE PROPERTY**

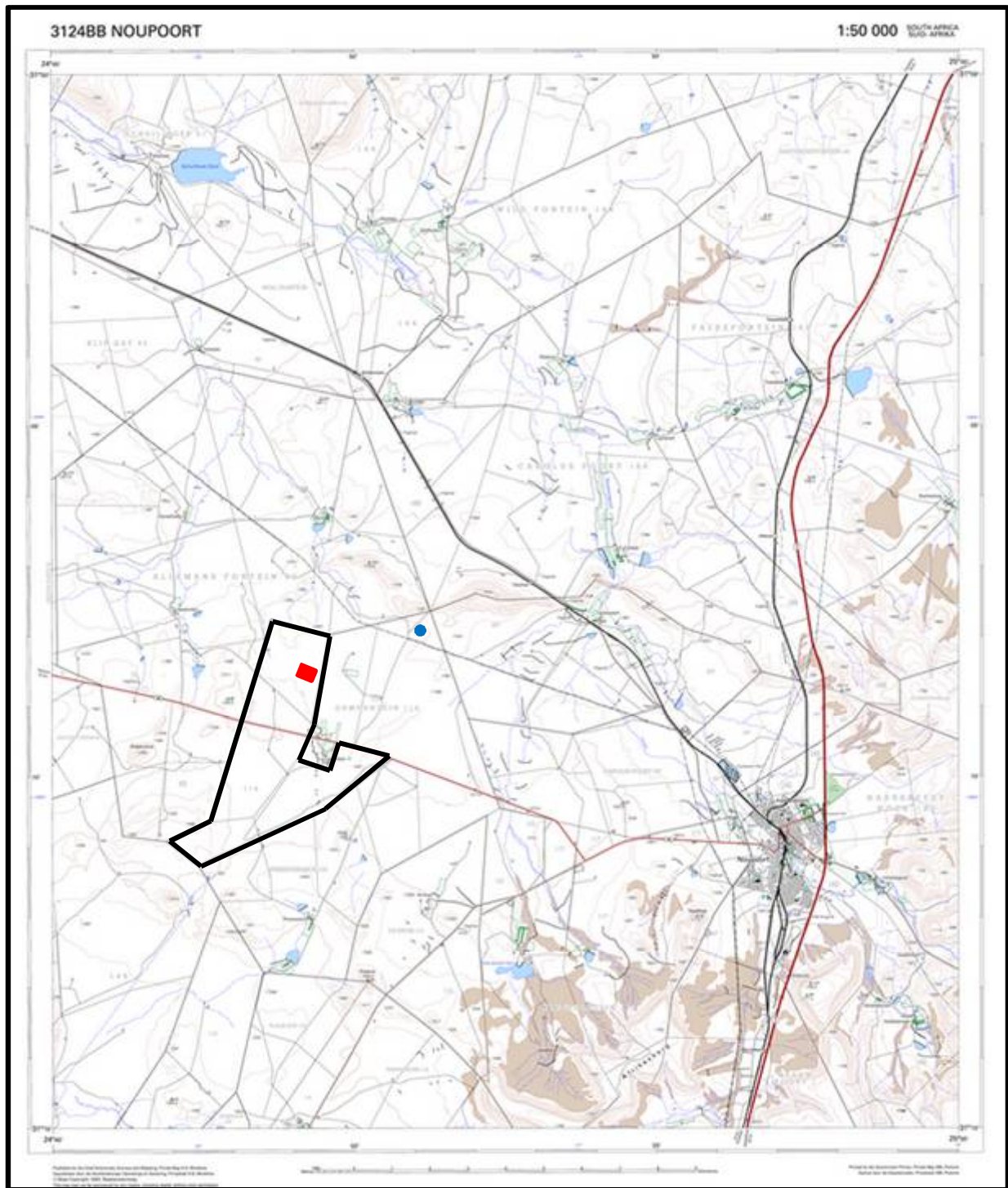
### **5.1. Area Surveyed**

The proposed area for the Wonderheuvel Solar Energy Facility is located on Portion 7 of the Farm Wonderheuvel situated about 15 km west of the small town of Noupoort along the R389 road to Hanover. The access road extends for 2 km north of the R389. The proposed area for development of the solar facility is approximately 20 ha in extent on a flat surface area. The vegetation cover is typical Karoo shrubs and grasses that allowed for relatively good archaeological visibility. No main waterways flow near to the site.

The Wonderheuvel Solar Energy Facility will connect to the proposed TSE Distribution Substation on Portion 8 of the Farm Damfontein 118

### **5.2. Map**

1:50 000 MAP: 3124 BB NOUPOORT



**Figure 1. 1:50 000 topographic map 3124BB NOUPOORT showing the location of the area proposed for the Wonderheuwel Solar Energy Facility (Black: farm boundary; Red: proposed area for the Wonderheuwel Solar Energy facility; Blue: location of the proposed TSE Distribution Substation).**



**Figure 2. Figure 2. Aerial view of the location for the proposed Wonderheuwel Solar Energy Facility and associated access road (red border and line shows areas surveyed). The proposed TSE Distribution Substation (connection point) is situated 3 km north-east of the Wonderheuwel SEF site.**

## 6. ARCHAEOLOGICAL INVESTIGATION

The archaeological investigation was conducted on foot focusing on the proposed area for the Wonderheuwel Solar Energy Facility and the immediate surrounding environment. The GPS co-ordinate readings and photographs were taken using a Garmin Oregon 550 unit.



**Figure 3. Close-up aerial view of the proposed area for the Wonderheuwel Solar Energy Facility and associated road showing the area surveyed (red) and distribution of stone artefacts (blue) as well as the site that occurs adjacent to the access road (WHS1).**

The proposed area is mainly covered in shrubs and sparse grass vegetation allowing for relatively good archaeological visibility (Figures 4-5). Little soil erosion occurs within the proposed area, however, several exposed surface areas as well as the proposed farm access road made it possible to investigate the possibility of the encountering archaeological material remains.

A relatively small rock outcrop and koppie is situated about 350 m north from the farm entrance on the R389 main road, west of the proposed access road (Figures 6-7). Several surface scatters of stone artefacts occurred between the rocky outcrop and small koppie and the proposed access road. Knapping / manufacture areas were also observed within this area.



**Figure 4. View of the general landscape.**



**Figure 5. View of the general landscape.**



**Figure 6. View of the koppie adjacent to the proposed access road.**



**Figure 7. Close-up of the small rocky outcrop adjacent to the proposed access road..**

Mainly isolated surface scatters of mainly Middle Stone Age stone artefacts occurred within immediate and surrounding area proposed for the development, however, a dense scatter of stone artefacts occurs was documented within the mid-east section of the proposed site for the solar energy facility, approximately 80 m x 20 m in extent. The stone artefacts were all manufactured on a fine-grained black (hornfels or lydianite) raw material and all similarly heavily weathered and patinated (Figures 8-12). The stone artefacts comprised mostly of varying small and large flakes and miscellaneous retouched pieces. Several of the flakes showed evidence of secondary retouch and some showed evidence of edge-damage that may indicate utilisation. Some prepared core or faceted platform flakes were also identified within the proposed area. Several stone artefacts also showed fresh flaking that may have been caused recently by trampling by domestic stock and/or human and farming activity.

It is unlikely that the stone artefacts would be *in situ* and are regarded as being in a secondary and out of context position as they have been washed into the exposed areas and have been disturbed by domestic animal and human activities. However, the stone artefacts that occurred between the shrubs and dense grass vegetation may be in a less disturbed position. It is also possible that stone artefact may occur below the vegetation cover between the surface and 50 – 80 cm below the ground.

The area surrounding the rocky outcrop and koppie is considered an archaeological site owing to the density of stone artefacts. Evidence of knapping / manufacture of stone artefacts was observed by the remains of cores and associated debris such as flakes, chunks, and chips.

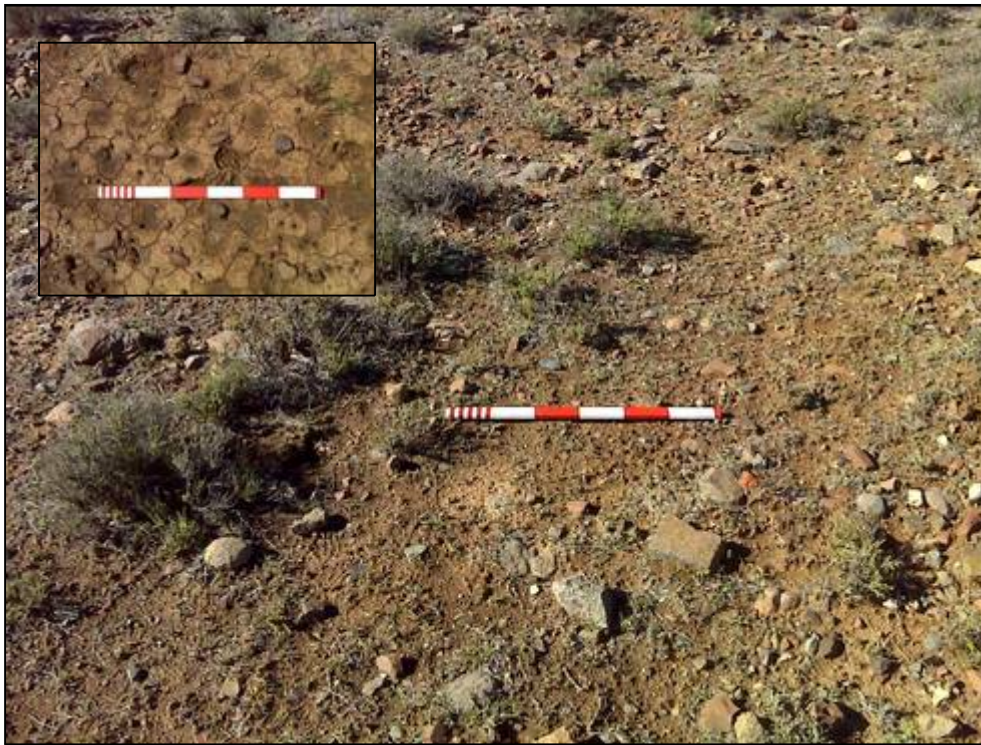


**Figure 8. Examples of the stone artefacts identified within the proposed area for development.**





**Figures 9-12. Examples of the stone artefacts identified within the proposed area for development.**



**Figure 13. Distribution of stone artefacts and knapping / manufacture debris between the small rocky outcrop and the proposed access road.**

## **7. DESCRIPTION OF SITES**

### **7.1. Stone Artefact Occurrences and Scatters:**

Mainly isolated surface scatters of Middle Stone Age (MSA) stone artefacts are distributed over the area proposed for the Wonderheuwel Solar Energy Facility on Portion 7 of the Farm Damfontein 114 and the proposed access road. GPS co-ordinate readings were taken to show the extent of the distribution (WH SA1-WH SA7) within the proposed solar energy facility. The stone artefacts were observed on the exposed surface area, the farm road, around the small rocky outcrop and koppie adjacent to the access road. The stone artefacts comprised mainly patinated and heavily weathered flakes and miscellaneous retouched pieces of varying sizes manufactured on a fine-grained (hornfels and lydianite) raw material. It is unlikely that the surface exposed stone artefacts occur *in situ* and are considered to be in a secondary and disturbed context. No other organic or material cultural remains were documented in association with the stone artefacts.

One site was documented around the small rocky outcrop and koppie adjacent to the access road. The site showed evidence of knapping / manufactures areas by the distribution of cores and associated debris such as chunks, flakes, and chips.

The stone artefact occurrences and scatters are considered as having a medium-high cultural significance.

The stone artefact occurrences and scatters has been allocated a heritage grading of General Protection (NHRA 25 of 1999).

**7.2. GPS CO-ORDINATES AND SITES FOR THE PROPOSED WONDERHEUWEL SOLAR ENERGY FACILITY.**

**TABLE 7.2.1: GPS CO-ORDINATES AND SITES FOR THE PROPOSED WONDERHEUWEL SOLAR ENERGY FACILITY.**

<b>REFERENCE</b>	<b>DESCRIPTION</b>	<b>CO-ORDINATES</b>	<b>HERITAGE RATING</b>
WH SA1	Middle Stone Age stone artefact occurrence	31°08'31.50"S; 24°49'20.10"E	General Protection
WH SA2	Middle Stone Age stone artefact occurrence	31°08'32.20"S; 24°49'21.50"E	General Protection
WH SA3	Middle Stone Age stone artefact occurrence	31°08'32.80"S; 24°49'22.80"E	General Protection
WH SA4	Middle Stone Age stone artefact occurrence	31°08'38.80"S; 24°49'05.00"E	General Protection
WH SA6	Middle Stone Age stone artefact occurrence	31°08'32.30"S; 24°49'04.90"E	General Protection
WH SA7	Middle Stone Age stone artefact occurrence	31°08'25.70"S; 24°49'05.00"E	General Protection
WH S1	Site between koppie and internal farm road	31°09'17.10"S; 24°49'17.70"E	General Protection

**8. ASSESSMENT OF THE SIGNIFICANCE AND OF THE ARCHAEOLOGICAL HERITAGE RESOURCES FOR THE PROPOSED WONDERHEUWEL SOLAR ENERGY FACILITY.**

**TABLE 3: ASSESSMENT OF THE SIGNIFICANCE THE PROPOSED WONDERHEUWEL SOLAR ENERGY FACILITY: The destruction stone artefact occurrences and scatters.**

<b>Nature: The destruction of the stone artefact occurrences and scatters.</b>		
	<b>Without mitigation</b>	<b>With mitigation</b>
<b>Extent</b>	Regional (5)	Low (1)
<b>Duration</b>	Permanent (5)	Permanent (5)
<b>Magnitude</b>	Very High (10)	Moderate (6)
<b>Probability</b>	Highly Probable (4)	Probable (3)
<b>Significance</b>	High (80)	Medium (36)
<b>Status (positive or negative)</b>	Negative	Negative
<b>Reversibility</b>	None	Low
<b>Irreplaceable loss of resources?</b>	Yes	Low
<b>Can impacts be mitigated?</b>	Yes	Yes
<b>Mitigation:</b>		
<ul style="list-style-type: none"> <li>• A professional archaeologist (with an already authorised collection permit) must be appointed during the various phases of development including vegetation clearing and the excavation activities to monitor and identify possible archaeological material remains and features that may occur below the surface and further make appropriate recommendations on removing and / or protecting the archaeological material remains and features.</li> <li>• If concentrations of archaeological heritage material and human remains are uncovered during construction, all work must cease immediately and be reported to the Albany Museum (046 622 2312) and/or the South African Heritage Resources Agency (SAHRA) (021 642 4502) so that systematic and professional investigation/ excavation can be undertaken.</li> <li>• Construction managers/foremen should be informed before construction starts on the possible types of heritage sites and cultural material they may encounter and the procedures to follow when they find sites.</li> </ul>		
<b>Cumulative impacts:</b>		
<ul style="list-style-type: none"> <li>• Irreplaceable loss of archaeological heritage resources.</li> </ul>		
<b>Residual impacts:</b>		
<ul style="list-style-type: none"> <li>• Irreplaceable loss of archaeological heritage resources.</li> </ul>		

## **9. RECOMMENDATIONS**

The area is of a medium cultural sensitivity, the following recommendations must be considered:

1. Once the final layout (including the positions of the solar panels; underground cabling; overhead power line; additional internal access roads, and the workshop area) of the proposed Wonderheuwel Solar Energy Facility has been finalised an archaeological ground-truthing should be conducted and further recommendation be made to protect the archaeological heritage within the area proposed for development.
2. The site (WH S1) must be clearly demarcated and cordoned off during all the proposed development activities to avoid further disturbance to the area.
3. A professional archaeologist must be appointed during all construction and development activities including vegetation clearing and the excavation activities to monitor and identify possible archaeological material remains and features that may occur below the surface and make further appropriate recommendations on removing and / or protecting the archaeological material remains and features.
4. If concentrations of archaeological heritage material and human remains are uncovered during construction, all work must cease immediately and be reported to the Albany Museum (046 622 2312) and/or the South African Heritage Resources Agency (SAHRA) (021 642 4502) so that systematic and professional investigation/ excavation can be undertaken.
5. Construction managers/foremen should be informed before construction starts on the possible types of heritage sites and cultural material they may encounter and the procedures to follow when they find sites.

## **10. CONCLUSION**

The survey for the Wonderheuwel Solar Energy Facility was conducted on foot by investigating the exposed surface and disturbed areas as well as the small rocky outcrop and koppie. Mainly isolated surface scatters of Middle Stone Age stone artefacts were observed within the proposed solar energy facility area and were found to be distributed over the extent of the proposed development area. It is unlikely that the stone artefact surface scatters that occur on the exposed surface areas are positioned *in situ*, however, stone artefacts may occur between 50 – 80 cm below the surface.

The site (WH S1) that was documented contained evidence of stone knapping and manufacture debris and must be protected as to avoid further disturbance.

The proposed development would have negative implications on the archaeological heritage remains documented within the proposed area during all phases of the development. The negative implications include the destruction of the surface scatters of stone artefacts and further occurrences that are not immediately visible. The recommendations must be considered as appropriate mitigation measures to protect and conserve the archaeological heritage remains observed within the proposed development area and further archaeological remains that may occur and are not immediately visible on the surface.

## **11. GENERAL REMARKS AND CONDITIONS**

**NOTE:** This report is a phase 1 archaeological impact assessment (AIA) only and does not include or exempt other required specialist assessments as part of the heritage impact assessments (HIAs).

The National Heritage Resources Act (Act No. 25 of 1999, Section 35 [Brief Legislative Requirements]) requires a full Heritage Impact Assessment (HIA) in order that all heritage resources including all places or objects of aesthetics, architectural, historic, scientific, social, spiritual, linguistic, or technological value or significance are protected. Thus any assessment should make provision for the protection of all these heritage components including archaeology, shipwrecks, battlefields, graves, and structures older than 60 years, living heritage, historical settlements, landscapes, geological sites, palaeontological sites and objects.

It must be emphasized that the conclusions and recommendations expressed in this phase 1 archaeological impact assessment (AIA) are based on the visibility of archaeological remains, features and, sites and may not reflect the true state of affairs. Many archaeological remains, features and, sites may be covered by soil and vegetation and will only be located once this has been removed. In the event of such archaeological heritage being uncovered (such as during any phase of construction activities), archaeologists or the relevant heritage authority must be informed immediately so that they can investigate the importance of the sites and excavate or collect material before it is destroyed. The onus is on the developer to ensure that this agreement is honoured in accordance with the National Heritage Resources Act No. 25 of 1999 (NHRA 25 of 1999).

Archaeological Specialist Reports (desktops and AIA's) will be assessed by the relative heritage resources authority. The final decision rests with the heritage resources authority that may confirm the recommendations in the archaeological specialist report and grant a permit or a formal letter of permission for the destruction of any cultural sites.

## 12. REFERENCES

- Beaumont, P. B. & Morris, D. 1990. *Guide to archaeological sites in the Northern Cape*. Kimberly: McGregor Museum.
- 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*. Oxford: BAR International Series 207.
- Binneman, J.N.F. & Booth, C. 2008. A phase 1 Archaeological Heritage Impact Assessment for the proposed construction and operation of an ethanol production plant on Erven 31, 32, 33 and the remaining extent of Erf 1, Cradock, Inxuba Yethemba local municipality, Eastern Cape Province
- Booth, C. 2012. A Phase 1 Archaeological Impact Assessment For The Proposed Establishment of the ACED Middelburg Solar Park (Park 1 And Park 2) On The Farm Tweefontein Remainder Of Farm 11 (Solar Park 1) and Tweefontein Portion 4 of Farm 11 (Solar Park 2), Middelburg, Eastern Cape Province. Prepared for Savannah Environmental (Pty) Ltd.
- Bousman, C. B. 2005. Coping with Risk: Later Stone Age technological strategies at Blydefontein Rock Shelter, South Africa. *Journal of Anthropological Archaeology* 24: 193-226.
- Deacon, J. 1974. Patterning in the radiocarbon dates for the Wilton/Smithfield complex in southern Africa. *The South African Archaeological Bulletin* 25:3-18.
- Deacon, H.J. & Deacon, J. 1999. *Human beginnings in South Africa*. Cape Town: David Phillips Publishers.
- Goodwin, A.J.H. & Lowe, C. van Riet. 1929. The Stone Age cultures of South Africa. *Annals of the South African Museum*.
- Humphreys, A.J.B. 1991. On the distribution and dating of bifacial and tanged arrowheads in the interior of South Africa. *The South African Archaeological Bulletin*, 46(153):41-43.
- Morris, D. 1988. Engraved in place and time: a review of variability in the rock art of the Northern Cape and Karoo. *South African Archaeological Bulletin*, Vol. 43:109-121.
- Morris, D. & Beaumont, P.B. 1990. Renosterkop: an archaeological impact assessment at the site of the proposed Trans Hex Tin Mine, Kakamas District, South Africa. Unpublished report submitted to Trans Hex Group Ltd and the National Monuments Council, November 1990.
- National Heritage Resources Act (NHRA) 25 of 1999
- Ouzman, S. 2005. The magical arts of a raider nation: Central South Africa's Korana rock Art. *South Africa Archaeological Society Goodwin Series* 9:101-113.
- Sadr, K & Sampson, G. 1999. Khoekhoe ceramics of the upper Seacow Valley. *South Africa Archaeological Bulletin*, 54:3-15.
- Sampson, C. G. 1984. Site clusters in the Smithfield settlement patterns. *Southern African Archaeological Bulletin* 39 (139): 5-23.
- Sampson, C. G. 1985. *Atlas of Stone Age Settlement in the Central and Upper Seacow Valley*. *Memoirs van die Nasionale Museum Bloemfontein*, Vol. 20:1-116.
- Sampson, C.G. 1988. Stylistic boundaries among mobile hunter-foragers. Washington: Smithsonian Institution Press



## **APPENDIX A: GRADING SYSTEM**

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 mitigation measures would allow the development activities to continue.

## **APPENDIX B: IDENTIFICATION OF ARCHAEOLOGICAL FEATURES AND MATERIAL FROM INLAND AREAS: guidelines and procedures for developers**

### 1. Human Remains:

All human remains exposed during all the phases of the construction activities must be reported to the archaeologist, nearest museum or relevant heritage resources authority. Construction must be halted until the archaeologist has investigated and removed the human remains. Human remains may be exposed when a grave or informal burial has been disturbed. In general, the remains are buried in a flexed position on the side and may also be buried in a sitting position with a flat stone capping the location of the burial. Developers are requested to be aware of the exposing human remains.

### 2. Stone Artefacts:

Stone artefacts are difficult for the layman to identify. Large accumulations of flaked stones that do not appear to have been distributed naturally must be reported. If the stone artefacts are associated with bone / faunal remain or any other associated organic and material cultural artefacts development must be halted immediately and reported to the archaeologist, nearest museum or relevant heritage resources authority.

### 3. Large Stone Features:

Large stone features occur in different forms and sizes, however, are relatively easy to identify. The most common features are roughly circular stone walls (mostly collapsed), usually dry packed stone, and may represent stock enclosures, the remains of wind breaks or, cooking shelters. Other features consist of large piles of stones of different sizes and heights are known as *isisivane*. These features generally occur near river and mountain crossings. The purpose and meaning of the *isisivane* are not fully understood, however, interpretations include the representation of burial cairns and symbolic value.

### 4. Freshwater Shell Middens:

Accumulations of freshwater shell middens comprising mainly freshwater mussel occur along the muddy banks of rivers and streams and were collected by pre-colonial communities as a food resource. The freshwater shell middens generally contain stone artefacts, pottery, bone and, sometimes even human remains. Freshwater shell middens may be of various sizes and depths, an accumulation that exceeds 1m<sup>2</sup> in extent must be reported to the archaeologist, nearest museum or, relevant heritage resources authority.

### 5. Historical Artefacts and Features:

These are relatively easy to identify and include the foundations and remains of buildings, packed dry stone walling representing domestic stock kraals. Other items include historical domestic artefacts such as ceramics, glass, metal and military artefacts and dwellings.

### 6. Fossil Bone:

Fossil bones may be embedded in geological deposits. Any concentrations of bone whether fossilized or not must be reported.

