

## **Archaeological Impact Assessment**

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**For the proposed Kotulo Tsatsi PV 2 Facility, located close to Kenhardt in the Northern Cape.**

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Prepared For

**Savannah Environmental (Pty) Ltd**

By



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I, Jaco van der Walt as duly authorised representative of Heritage Contracts and Archaeological Consulting CC, hereby confirm my independence as a specialist and declare that neither I nor the Heritage Contracts and Archaeological Consulting CC have any interest, be it business, financial, personal or other, in any proposed activity, application or appeal in respect of which the client was appointed as Environmental Assessment practitioner, other than fair remuneration for work performed on this project.



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## EXECUTIVE SUMMARY

**Site name and location:** SolarReserve South Africa and Kotulo Tsatsi Energy (Pty) Ltd proposes the construction and operation of a photovoltaic (PV) power plant ("PV 2") and associated infrastructure on Portion 2 and 3 of Farm Styns Vley 280. The PV 2 Project study area is approximately 516 ha within the larger 20 700 ha study area. The project site is located approximately 70km south west of Kenhardt within the Hantam Local Municipality which falls within the jurisdiction of the Namakwa District Municipality, near to the boundary with the Kai !Garib Local Municipality of the ZF Mgcau District Municipality. The project is to be known as the SolarReserve Kotulo Tsatsi Photovoltaic Power Plant 2 (hereafter referred to as the proposed PV 2 Solar Facility).

**1: 50 000 Topographic Map:** 2920 DC

**EIA Consultant:** Savannah Environmental (Pty) Ltd.

**Developer** Kotulo Tsatsi Energy (Pty) Ltd

**Heritage Consultant:** Heritage Contracts and Archaeological Consulting CC (HCAC).

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**Date of Report:** 11 November 2016.

### **Findings of the Assessment:**

For the Farm Styns Vley 280 isolated widely distributed Stone Artefacts were noted. Artefact density is so low within the study area that they do not represent individual sites but rather background scatter or find spots. All observations are on the surface and there are no indicators that would suggest deeply stratified material in the study area. No associated organic remains (such as bone or ostrich eggshell) were noted with any of the stone scatters. Most of the material observed associated with the background scatter can probably be ascribed to the Middle Stone Age although some can be ascribed to the LSA and are smaller in size (< 5 cm in length).

Although the description and assessment of the PV2 footprint stems from a high level scan of the larger area and a desktop study the impacts to heritage resources by the proposed development are not considered to be highly significant and the impact on archaeological sites can be mitigated. Subject to approval from SAHRA, HCAC is of the opinion that from an archaeological point of view there is no reason why the development should not proceed if the recommendations are implemented and that a heritage walkthrough of the final layout of the facility is conducted prior to construction.

## General

Due to the subsurface nature of archaeological material and unmarked graves, the possibility of the occurrence of such finds cannot be excluded. If during construction any possible finds such as stone tool scatters, artefacts or bone and fossil remains are made, the operations must be stopped and a qualified archaeologist must be contacted for an assessment of the find/s.

**Disclaimer:** *Although all possible care is taken to identify 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. Heritage Contracts and Archaeological Consulting CC and its personnel will not be held liable for such oversights or for costs incurred as a result of such oversights.*

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- The results of the project;
- The technology described in any report; and
- Recommendations delivered to the Client.

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**ABBREVIATIONS**

AIA: Archaeological Impact Assessment
ASAPA: Association of South African Professional Archaeologists
BIA: Basic Impact Assessment
CRM: Cultural Resource Management
ECO: Environmental Control Officer
EIA: Environmental Impact Assessment*
EIA: Early Iron Age*
EIA Practitioner: Environmental Impact Assessment Practitioner
EMPr: Environmental Management Programme
ESA: Early Stone Age
GPS: Global Positioning System
HIA: Heritage Impact Assessment
LIA: Late Iron Age
LSA: Late Stone Age
MEC: Member of the Executive Council
MIA: Middle Iron Age
MPRDA: Mineral and Petroleum Resources Development Act
MSA: Middle Stone Age
NEMA: National Environmental Management Act
PRHA: Provincial Heritage Resource Agency
SADC: Southern African Development Community
SAHRA: South African Heritage Resources Agency

*\*Although EIA refers to both Environmental Impact Assessment and the Early Iron Age both are internationally accepted abbreviations and must be read and interpreted in the context it is used.*

**GLOSSARY**

- Archaeological site (remains of human activity over 100 years old)
- Early Stone Age (~ 2.6 million to 250 000 years ago)
- Middle Stone Age (~ 250 000 to 40-25 000 years ago)
- Later Stone Age (~ 40-25 000, to recently, 100 years ago)
- The Iron Age (~ AD 400 to 1840)
- Historic (~ AD 1840 to 1950)
- Historic building (over 60 years old)

## **1 BACKGROUND INFORMATION**

Heritage Contracts and Archaeological Consulting CC (HCAC) was appointed to comment on the potential impacts of the proposed Solar Reserve South Africa and Kotulo Tsatsi PV2 on heritage resources within the study area. The proposed PV2 Solar Facility will have a capacity of up to 100MW.

The aim of the study is to identify cultural heritage sites, document, and assess their importance within local, provincial and national context. It serves to assess the impact of the proposed project on non-renewable heritage resources, and to submit appropriate recommendations with regard to the responsible cultural resources management measures that might be required to assist the developer in managing the discovered heritage resources in a responsible manner. It is also conducted to protect, preserve and develop such resources within the framework provided by the National Heritage Resources Act of 1999 (Act 25 of 1999).

The report outlines the approach and methodology utilized before and during the survey, which includes: Phase 1, a desktop study (van der Walt 2014) that includes collection from various sources and consultations; Phase 2, the physical surveying of the larger study area on foot and by vehicle; Phase 3, reporting the outcome of the study.

General site conditions and features on sites were recorded by means of photographs, GPS locations, and site descriptions. Possible impacts were identified and mitigation measures are proposed in the following report.

This report must also be submitted to the SAHRA for review.



## **1.1 Terms of Reference**

### **Desktop study**

Conduct a brief desktop study where information on the area is collected to provide a background setting of the archaeology that can be expected in the area.

### **Field study**

Conduct a field study to: a) systematically survey the proposed project area to locate, identify, record, photograph and describe sites of archaeological, historical or cultural interest; b) record GPS points identified as significant areas; c) determine the levels of significance of the various types of heritage resources recorded in the project area.

### **Reporting**

Report on the identification of anticipated and cumulative impacts the operational units of the proposed project activity may have on the identified heritage resources for all 3 phases of the project; i.e., construction, operation and decommissioning phases. Consider alternatives, should any significant sites be impacted adversely by the proposed project. Ensure that all studies and results comply with Heritage legislation and the code of ethics and guidelines of ASAPA.

To assist the developer in managing the discovered heritage resources in a responsible manner, and to protect, preserve, and develop them within the framework provided by the National Heritage Resources Act of 1999 (Act 25 of 1999).

## **1.2. Archaeological Legislation and Best Practice**

Phase 1, an AIA or a HIA is a pre-requisite for development in South Africa as prescribed by SAHRA and stipulated by legislation. The overall purpose of a heritage specialist input is to:

- » Identify any heritage resources, which may be affected;
- » Assess the nature and degree of significance of such resources;
- » Establish heritage informants/constraints to guide the development process through establishing thresholds of impact significance;
- » Assess the negative and positive impact of the development on these resources; and
- » Make recommendations for the appropriate heritage management of these impacts.

The AIA or HIA, as a specialist sub-section of the EIA, is required under the National Heritage Resources Act NHRA of 1999 (Act 25 of 1999), Section 23(2)(b) of the NEMA and section S.39(3)(b)(iii) of the MPRDA.

The AIA should be submitted, as part of the EIA, BIA or EMPr, to the PHRA if established in the province or to SAHRA. SAHRA will be ultimately responsible for the professional evaluation of Phase 1 AIA report upon which review comments will be issued. 'Best practice' requires Phase 1 AIA report and additional development information, as per the EIA, BIA/EMPr, to be submitted in duplicate to SAHRA after completion of the study. SAHRA accepts Phase 1 AIA reports authored by professional archaeologists, accredited with ASAPA or with a proven ability to do archaeological work.

Minimum accreditation requirements include an Honours degree in archaeology or related discipline and 3 years post-university CRM experience (field supervisor level).

Minimum standards for reports, site documentation and descriptions are set by ASAPA in collaboration with SAHRA. ASAPA is based in South Africa, representing professional archaeology in the SADC region. ASAPA is primarily involved in the overseeing of ethical

practice and standards regarding the archaeological profession. Membership is based on proposal and secondment by other professional members.

Phase 1 AIAs are primarily concerned with the location and identification of sites situated within a proposed development area. Identified sites should be assessed according to their significance. Relevant conservation or Phase 2 mitigation recommendations should be made. Recommendations are subject to evaluation by SAHRA.

Conservation or Phase 2 mitigation recommendations, as approved by SAHRA, are to be used as guidelines in the developer's decision making process.

Phase 2 archaeological projects are primarily based on salvage/mitigation excavations preceding development destruction or impact on a site. Phase 2 excavations can only be conducted with a permit, issued by SAHRA to the appointed archaeologist. Permit conditions are prescribed by SAHRA and includes (as minimum requirements) reporting back strategies to SAHRA and deposition of excavated material at an accredited repository.

In the event of a site conservation option being preferred by the developer, a site management plan, prepared by a professional archaeologist and approved by SAHRA, will suffice as minimum requirement.

After mitigation of a site, a destruction permit must be applied for from SAHRA by the client before development may proceed.

Human remains older than 60 years are protected by the National Heritage Resources Act, with reference to Section 36. Graves older than 60 years, but younger than 100 years fall under Section 36 of Act 25 of 1999 (National Heritage Resources Act), as well as the Human Tissues Act (Act 65 of 1983), and are the jurisdiction of SAHRA. The procedure for Consultation Regarding Burial Grounds and Graves (Section 36[5]) of Act 25 of 1999) is applicable to graves older than 60 years that are situated outside a formal cemetery administrated by a local authority. Graves in this age category, located inside a formal cemetery administrated by a local authority, require the same authorisation as set out for graves younger than 60 years, in addition to SAHRA authorisation. If the grave is not situated inside a formal cemetery, but is to be relocated to one, permission from the local authority is required and all regulations, laws and by-laws, set by the cemetery authority, must be adhered to.

Human remains that are less than 60 years old are protected under Section 2(1) of the Removal of Graves and Dead Bodies Ordinance (Ordinance no. 7 of 1925), as well as the Human Tissues Act (Act 65 of 1983), and are the jurisdiction of the National Department of Health and the relevant Provincial Department of Health and must be submitted for final approval to the office of the relevant Provincial Premier. This function is usually delegated to the Provincial MEC for Local Government and Planning; or in some cases, the MEC for Housing and Welfare.

Authorisation for exhumation and reinternment must also be obtained from the relevant local or regional council where the grave is situated, as well as the relevant local or regional council to where the grave is being relocated. All local and regional provisions, laws and by-laws must also be adhered to. To handle and transport human remains, the institution conducting the relocation should be authorised under Section 24 of Act 65 of 1983 (Human Tissues Act).

### **1.3 Description of Study Area**

#### **1.3.1 Location Data**

SolarReserve and Kotulo Tsatsi Energy (Pty) Ltd proposes the construction and operation of a photovoltaic (PV) power plant 2 and associated infrastructure the following properties:

The site of the proposed PV2 Project is situated on the following properties:

- Portion 1, 2 and 3 Farm Styns Vley 280;
- Portion 1 of the Farm Melkbosch Vley 278;
- Portion 1 and the Remainder of the Farm Manier Tyds Kolkies 247;
- Portion 2 of the Farm Karree Boom Kolk 248;
- Portion 1 and the Remainder of the Farm Uitspan Kop 246;
- Portion 1 and 2 of the Farm Voren Toe Zyn Kolk 277;
- Portion 1, 2 and 4 of the Farm Klein Zwart Bast 188; and
- Portion 14 and 15 of the Farm Olyven Kolk 187.

The PV 2 Project study area is approximately 516ha within the larger 20 700 ha study area. The project site is located approximately 70km south west of Kenhardt within the Hantam Local Municipality which falls within the jurisdiction of the Namakwa District Municipality, near to the boundary with the Kai !Garib Local Municipality of the ZF Mgcawu District Municipality. The project is to be known as the Solar Reserve Kotulo Tsatsi PV 2 (hereafter referred to as the proposed PV 2 Solar Facility). The study area is characterised by a barren undulating surface bisected by a number of shallow drainage basins. Occupation in the area is scarce with a single farmhouse and associated buildings occurring within the study area.

The area is rugged and falls within the bioregion described by Mucina *et al* (2006) as the Bushmanland Bioregion with the vegetation described as Bushmanland basin shrub land. The knee high bushy vegetation is sparse and there is numerous exposed sedimentary (mud rock) pavements visible throughout the study area. Land use in the general area is dominated by grazing.

### 1.3.2. Location Map

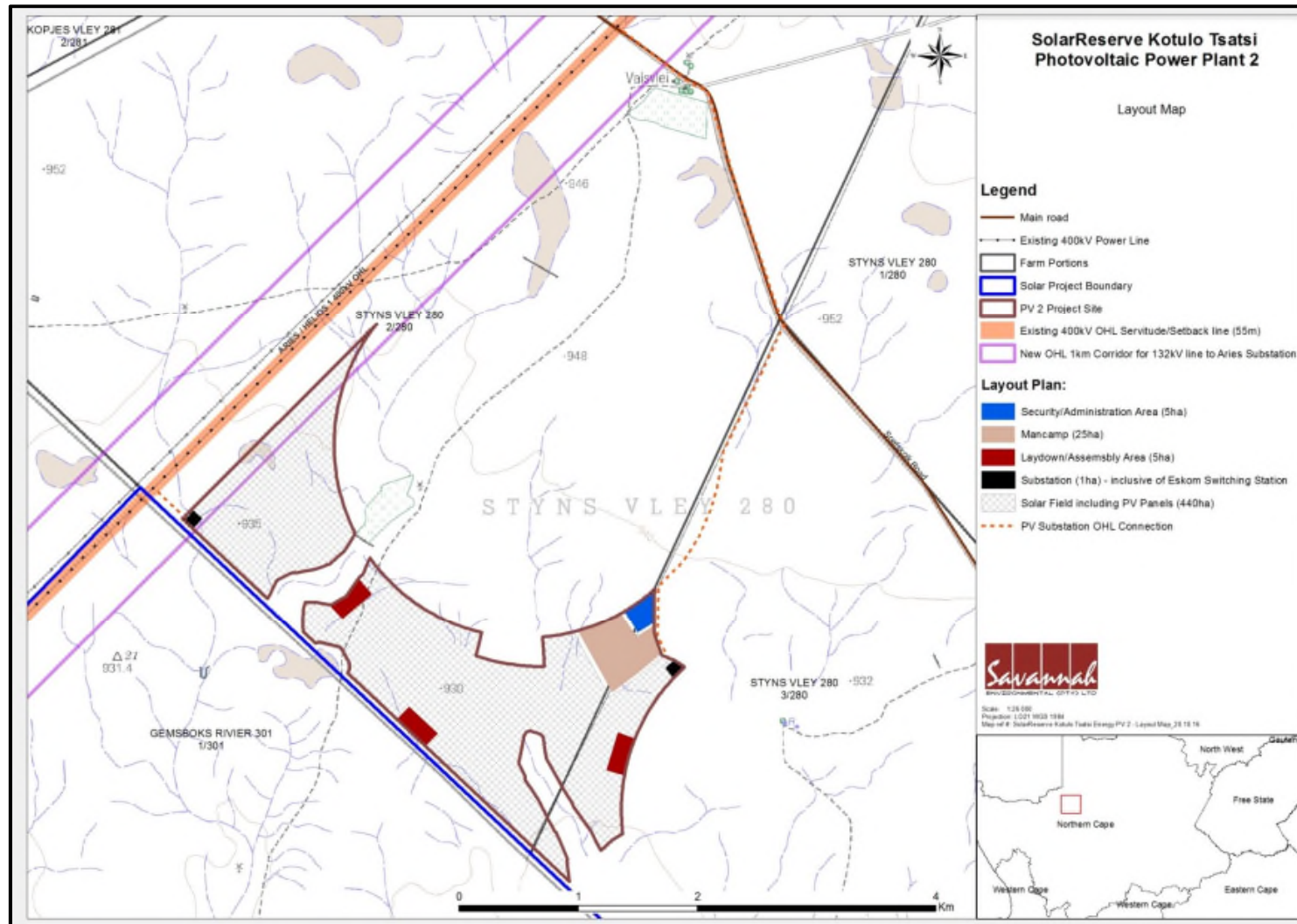


Figure 1: Location map provided by Savannah Environmental.

## **2. APPROACH AND METHODOLOGY**

The aim of the study is to cover archaeological databases to compile a background of the archaeology that can be expected in the study area followed by field verification; this was accomplished by means of the following phases.

### **2.1 Phase 1 - Desktop Study**

The first phase comprised a scoping study, scanning existing records for archaeological sites, historical sites, graves, architecture (structures older than 60 years) of the area (van der Walt 2014). The following approach was followed for the compilation of the scoping report.

#### **2.1.1 Literature Search**

Utilising data for information gathering stored in the national archives and published reports relevant to the area. The aim of this is to extract data and information on the area in question.

#### **2.1.2 Information Collection**

SAHRIS was consulted to collect data from previously conducted CRM projects in the region to provide a comprehensive account of the history of the study area.

#### **2.1.3 Consultation**

No public consultation was done by the author as this was done independently as part of the EIA. The heritage team did however consult with the farm manager Koos Zandberg regarding graves or sites of archaeological and historical significance. The author consulted with Richard Wadley a geologist who identified the raw material from the quarry site as well as Prof Lyn Wadley who advised on flakes from the quarry site.

#### **2.1.4 Google Earth and Mapping Survey**

Google Earth and 1:50 000 maps of the area were utilised to identify possible places where sites of heritage significance might be located.

#### **2.1.5 Genealogical Society of South Africa**

The database of the Genealogical Society was consulted to collect data on any known graves in the area. No graves are on record for the study area.

### **2.2 Phase 2 - Physical Surveying**

Due to the nature of cultural remains, the majority of which occurs below surface, a field survey of the larger project area was conducted over 7 days. The study area was surveyed by means of vehicle and extensive surveys on foot during the week of 29 September 2015. The survey was aimed at covering the larger area, but also focused on specific areas on the landscape that would be more likely to contain archaeological and/or other heritage remains like drainage lines, rocky outcrops as well as slight elevations in the natural topography. These areas were searched more intensively, but many other areas were walked in order to confirm expectations in those areas. After the fieldwork was completed the location of PV 2 was provided and therefore the current proposed area was not covered in detail as the survey covered adjacent areas. Track logs of the areas covered were taken (Figure 2).

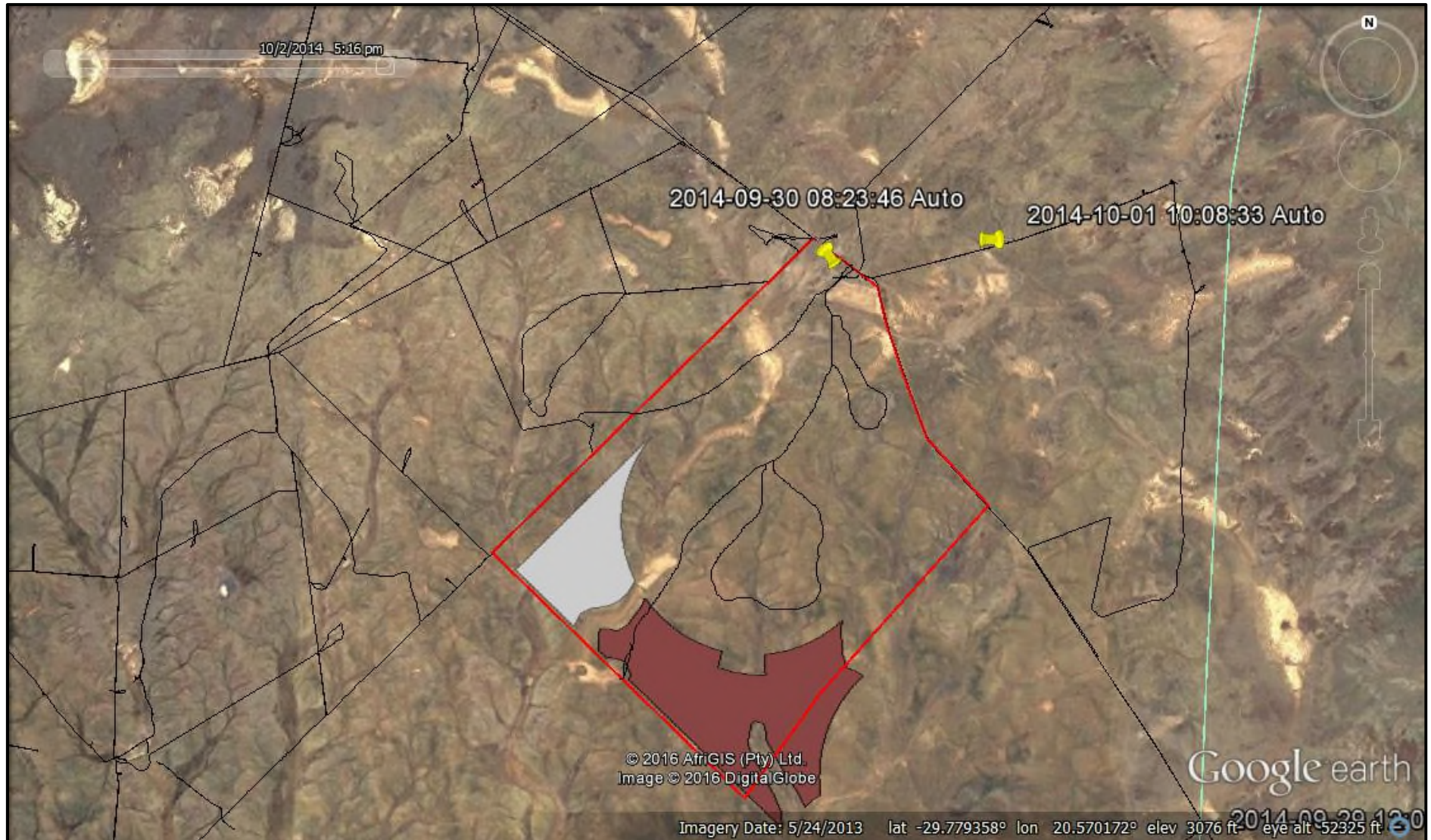


Figure 2: Track logs of the areas surveyed indicated in black with the development footprint indicated in brown and grey (filled area).

### 2.3. Restrictions

Due to the fact that most cultural remains may occur below surface, the possibility exists that some features or artefacts may not have been discovered/ recorded during the survey and the possible occurrence of unmarked graves and other cultural material have been excluded. This report only deals with the footprint area of the proposed PV 2 facility as indicated in the location map. The current location of PV 2 was determined after the conclusion of the field studies, hence the description and assessment of the PV footprint stems from superficial observations and a desktop study only.

It is assumed that information obtained for the wider region is accurate and applicable to this study. This report does not claim to have recorded every single artefact cluster due to the size of the area and the sparse occurrence of cultural material throughout. Sufficient information was recorded to establish the cultural sequence of the area and to mitigate the anticipated impacts resulting from the development.

Although HCAC surveyed the greater area, it is incumbent upon the developer to stop operations and inform the relevant heritage agency should further cultural remains, such as stone tool scatters, artefacts, informal graves, bones or fossils, be exposed during the process of development. It is recommended that the final footprint of this development should be subjected to a walkthrough survey prior to construction.

### 3. NATURE OF THE DEVELOPMENT

The PV2 Project will have a contracted capacity of 100MW AC. The site identified for the PV2 Project is proposed to accommodate both the solar PV panels as well as the associated infrastructure required for such a facility including, but not limited to:

- PV array comprising of the photovoltaic modules/panels, mounting structures and associated balance of system (tracking/fixed hardware, protection systems i.e. masts and electronica);
- Inverters and transformers with battery storage;
- An on-site project substation and Eskom switching/substation, and associated power line to facilitate the grid connection between the Project and the national grid at Aries MTS;
- Cabling between the project components;
- Project Built Infrastructure comprising of administration offices, security and guard houses, workshop areas for maintenance and storage;
- Temporary man-camp;
- Temporary laydown areas;
- Raw water tank;
- Project primary and/or secondary access road/s, associated access point/s, internal distribution roads and crossings; and
- Fencing around the project development footprint, and all other necessary related infrastructure.

The interconnection solution will evacuate the power generated by the PV2 Project via a 132kV power line from the Project Substation and Eskom switching/substation to the existing Eskom Aries Main Transmission Substation ("MTS") and/or via a connection to the proposed adjacent Eskom switching/substation of the Kotulo Tsatsi CSP Tower Plant (as authorised in 14/12/16/3/3/2/694). The project power line will run parallel to the existing Eskom Aries-Helios 1 400kV power line.

The PV2 Project's interconnection infrastructure will comprise of the following:

- PV2 Project substation and Eskom switching/substation;

- Tern power line or equivalent of a 132kV power line from the PV2 Project via the Eskom switching/substation of the Kotulo Tsatsi CSP Tower Plant and/or to the Eskom Aries MTS (including changes to Eskom infrastructure at the MTS);
- The grid connection solution;
- 48 core optical ground wire (OPGW) on the power line;
- 2 additional bay substations and switching station on the PV2 Project site;
- Cable trenches and cabling;
- 8 x 25m lighting/lightning masts;
- Access roads to the substations;
- Standard control room (5.5m x 12m) with top entry and cable racks. This will include a sewage system, air-conditioning and energy efficient lighting;
- 1 x 132kV line bay and 1 x 132kV metering bay;
- Control Plant, AC/DC, Metering, SCADA and Telecoms;
- V drain extension of substation for drainage purposes;
- Security fence with entrance gates.
- Additions required to the 132kV yard from the connecting Eskom Assets i.e. Aries MTS and/or Eskom switching/ substation of the Kotulo Tsatsi CSP Tower Plant.

The proposed power line will be an Eskom owned asset, and only constructed by the Applicant under a self-build agreement with Eskom.



## 4. HISTORICAL AND ARCHAEOLOGICAL BACKGROUND OF THE STUDY AREA

A scoping report was compiled for this project (van der Walt 2014). The scoping comprised a desktop study and below is a short summary of the findings.

### 4.1 Databases Consulted

#### ***SAHRA Report Mapping Project and SAHRIS***

Several previous heritage studies were conducted in the general study area (SAHRA report mapping project V1.0 and SAHRIS) mostly to the north of the study area (approximately 18 km) by Jonathan Kaplan (2011), Halkett & Orton (2011), Webley & Halkett (2012) and Anton Pelser (2012). Kaplan conducted a study on the farm Olyvenkolk 187/3 for a solar facility. Webley & Halkett and Pelser's study were conducted on the farm Klein Zwart Bast 188. To the north east of the study area a study by Van der Walt (2012) also recorded Middle Stone Age material. Further away studies by K van Ryneveld (2007) and Cobus Dreyer (2006) were also consulted. Van Ryneveld conducted a study on the farm Bokspuits 118 and Dreyer's study was conducted on the farm Tampansrus 294/295. Both these studies recorded isolated MSA artefacts scattered over the landscape.

#### ***Genealogical Society and Google Earth Monuments***

Neither the Genealogical Society nor the monuments database at Google Earth (Google Earth also include some archaeological sites and historical battlefields) have any recorded sites or graves in the study area.

### 4.2. A Brief History of Human Settlement and Black And White Interaction in The Greater Study area

Evidence has been found that the predecessors of today's Khoi-San Bushmen lived in the area thousands of years ago. According to Hocking (1938), the Khoikhoi, nomadic cattle herders, had their forbears in East Africa and lived in the Northern Cape for at least 3000 years and dominated the region until the eighteenth century when the Tswana tribe arrived from the west. The Tswana tribe settled around the present day Kuruman. Evidence of the Khoikhoi's existence in the Cape can for instance be seen in the form of Bushmen drawings at the Damfontein and Brandfontein sites in the Karoo. (Hocking 1983: 2; Marais 1977: 1)

It was in the early nineteenth century that the Griqua frontiersmen of the old Cape Colony crossed the Orange River from the south. The Griquas were half white and half Khoikhoi. These people dressed like Europeans and lived aboard wagons, much like the *Trekboere* who migrated northward from the Cape Colony. (Hocking 1983: 2)

The *Trekboer* movement had already begun by the end of the seventeenth century, as the quest for land, grazing and hunting inspired farmers to move into the central spaces of South Africa. These people were semi-nomadic, moving from fountain to fountain by ox wagon, without any desire to build a house or improve the land in which they were living. For more than a generation before the Great Trek, the first migration led to settlement across the Orange River. Trekboer families were however discouraged by the scarcity of surface water in the Northern Cape, and therefore advancement into the area was slow. The first Europeans to settle in the Northern Cape were missionaries, but there was a larger influx of white men into the province during the 1860s and 1870s when diamonds were discovered in Griqualand. (Wagenaar 1984: 122, 128; Hocking 1983: 2).

When Willem Adriaan van der Stel issued grazing licences to stock farmers and lifted the ban on the bartering of cattle in the early eighteenth century, this opened up a new world of possibilities for white farmers. A new attitude was acquired among the stock farmers; he was able to occupy greater areas of land, and would need more land to obtain farms for his children. (Wagenaar 1984: 122, 125)

By the late 1820's, a mass-movement of Dutch speaking people in the Cape Colony started advancing into the northern areas. This was due to feelings of mounting dissatisfaction caused by economical and other circumstances in the Cape. This movement later became known as the Great Trek. This migration resulted in a massive increase in the extent of that proportion of modern South Africa dominated by people of European descent (Ross 2002: 39).

The discovery of diamonds and gold in the Northern provinces had very important consequences for South Africa. After the discovery of these resources, the British, who at the time had colonized the Cape and Natal, had intentions of expanding their territory into the northern Boer republics. This eventually led to the Anglo-Boer War, which took place between 1899 and 1902 in South Africa, and which was one of the most turbulent times in South Africa's history. Even before the outbreak of war in October 1899 British politicians, including Sir Alfred Milner and Mr. Chamberlain, had declared that should Britain's differences with the Z.A.R. result in violence, it would mean the end of republican independence. This decision was not immediately publicized, and as a consequence republican leaders based their assessment of British intentions on the more moderate public utterances of British leaders. Consequently, in March 1900, they asked Lord Salisbury to agree to peace on the basis of the status quo ante bellum. Salisbury's reply was, however, a clear statement of British war aims (Du Preez 1977).

In March 1900 Boer forces had taken Prieska, Kenhardt, Kakamas and Upington, attracting rebel support in the process. British columns were able to recapture the towns and the invasion had ended by June 1900. Local militias, including the Border Scouts (Upington), Bushmanland Borderers (Kenhardt) and Namaqualand Border Scouts (from the west) were established and patrolled the area.

### **4.3. Pre-colonial background to the study area**

South Africa has a long and complex Stone Age sequence of more than 2 million years. The broad sequence includes the Later Stone Age, the Middle Stone Age and the Earlier Stone Age. Each of these phases contains sub-phases or industrial complexes, and within these we can expect regional variation regarding characteristics and time ranges. For Cultural Resources Management (CRM) purposes it is often only expected/ possible to identify the presence of the three main phases.

Yet sometimes the recognition of cultural groups, affinities or trends in technology and/or subsistence practices, as represented by the sub-phases or industrial complexes, is achievable (Lombard 2011). The three main phases can be divided as follows;

- » Later Stone Age; associated with Khoi and San societies and their immediate predecessors. Recently to ~30 thousand years ago
- » Middle Stone Age; associated with Homo sapiens and archaic modern humans. 30-300 thousand years ago.
- » Earlier Stone Age; associated with early Homo groups such as Homo habilis and Homo erectus. 400 000-> 2 million years ago.

The archaeology of the Northern Cape is rich and varied covering long spans of human history. According to Beaumont et al (1995) “thousands of square kilometres of Bushmanland are covered by a low density lithic scatter”. CRM surveys in the immediate vicinity provide some insight as to the occupation of the area (such as Portions 14 and 15 of Olyven Kolk 187 (Halkett & Orton 2011), Olyvenkolk 187/3 (Jonathan Kaplan 2011), Portion 1 of Klein Swart Bast 118 (Pelser 2011), remainder of Klein Swart Bast 118 (Webley & Halkett 2012), and in the wider region (Beaumont et al 1995), provides a good basis for understanding the local archaeology. Collection of surface samples by Beaumont and Pelsler means that stone artefacts north of the study area have been analysed and indicates the presence of humans in the area for the last two million years. The larger area also probably represented a rich source of rocks for knapping.

Previous work therefore suggests that the study area could contain a widespread distribution of Early and Middle Stone Age material with perhaps a few Later Stone Age sites, depending on topography and proximity to water.

## **5. HERITAGE SITE SIGNIFICANCE AND MITIGATION MEASURES**

The presence and distribution of heritage resources define a ‘heritage landscape’. In this landscape, every site is relevant. In addition, because heritage resources are non-renewable, heritage surveys need to investigate an entire project area, or a representative sample, depending on the nature of the project. In the case of the proposed project the local extent of its impact necessitates a representative sample and only the footprint of the areas demarcated for development were surveyed. In all initial investigations, however, the specialists are responsible only for the identification of resources visible on the surface.

This section describes the evaluation criteria used for determining the significance of archaeological and heritage sites. The following criteria were used to establish site significance:

- » The unique nature of a site;
- » The integrity of the archaeological/cultural heritage deposits;
- » The wider historic, archaeological and geographic context of the site;
- » The location of the site in relation to other similar sites or features;
- » The depth of the archaeological deposit (when it can be determined/is known);
- » The preservation condition of the sites; and
- » Potential to answer present research questions.

Furthermore, The National Heritage Resources Act (Act No 25 of 1999, Sec 3) distinguishes nine criteria for places and objects to qualify as ‘part of the national estate’ if they have cultural significance or other special value. These criteria are:

- » Its importance in/to 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.

### 5.1. Field Rating of Sites

Site significance classification standards prescribed by SAHRA (2006), and acknowledged by ASAPA for the SADC region, were used for the purpose of this report. The recommendations for each site should be read in conjunction with section 7 of this report.

<b>FIELD RATING</b>	<b>GRADE</b>	<b>SIGNIFICANCE</b>	<b>RECOMMENDED MITIGATION</b>
National Significance (NS)	Grade 1	-	Conservation; national site nomination
Provincial Significance (PS)	Grade 2	-	Conservation; provincial site nomination
Local Significance (LS)	Grade 3A	High significance	Conservation; mitigation not advised
Local Significance (LS)	Grade 3B	High significance	Mitigation (part of site should be retained)
Generally Protected A (GP.A)	-	High/medium significance	Mitigation before destruction
Generally Protected B (GP.B)	-	Medium significance	Recording before destruction
Generally Protected C (GP.C)	-	Low significance	Destruction

## 5.2 Impact Rating of Assessment

The criteria below are used to establish the impact rating of sites as per the impact rating methodology employed by Savannah environmental:

- » 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).

## 6. BASELINE STUDY-DESCRIPTION OF SITES

Previous work to the north of the study area (approximately 18 km) by Jonathan Kaplan (2011), Halkett & Orton (2011), Webley & Halkett (2012) and Anton Pelsler (2012) recorded vast quantities of ESA, MSA and LSA material scattered in the respective study areas, and was thought to provide a good comparison for what can be expected in the area earmarked for the PV 2 facility during the scoping phase of the project. However contrary to the expectations in the scoping report a marked paucity of sites were noted during the survey of the larger area. In fact only a few Stone Age sites (quarry sites) were recorded in the larger area surrounding the proposed location of the PV 2 Solar Facility. Apart from these sites Stone Age Material was restricted to isolated widely dispersed low density scatters (less than 2 artefacts per 3m<sup>2</sup>).

The lack of Stone Age material/sites or even high density clusters in the area surrounding the Farm Styns Vley 280 vs the area of Klein Swartbast to the north can possibly be attributed to the local geology. In the area of the PV 2 facility no locally available raw material exists suitable for knapping apart from a few granite outcrops that were utilized. The study area is characterised by areas barren of vegetation on sedimentary surfaces (Figure 3 - 5) consisting of mud rock and possibly shale, belonging to the Karoo Supergroup, these are sometimes mantled by alluvium and pane sediments. The Karoo Supergroup sediments have been locally intruded and baked by intrusive sheets or sills of the Karoo Dolerite Suite. The wealth of stone artefacts further north can be attributed to the locally available Dwyka tillite, known to be a favourite source of raw material in Early Stone Age times (Morris 2006). An analysis of artefacts from this area by Lombard (2012) indicated that LSA material was made mainly from Jasper, CCS and Chert. MSA and ESA artefacts were mainly produced from quartzite. All of these are raw material that is almost absent from the PV 2 study area.

For the Farm Styns Vley 280 isolated widely distributed Stone Artefacts were noted. Artefact density is so low within the study area that they do not represent individual sites but rather background scatter or find spots. All observations are on the surface and there are no indicators that would suggest deeply stratified material in the study area. No associated organic remains (such as bone or ostrich eggshell) were noted with any of the stone scatters. Most of the material observed associated with the background scatter can probably be ascribed to the Middle Stone Age although some can be ascribed to the LSA and are smaller in size (< 5 cm in length). Miscellaneous Flakes, blades and chunks make up the majority of the scatters (Figure 6). The most predominant raw material was grey/white quartzite, although hornfel, banded ironstone and quartz were also recorded.

A Single site is known for the farm Styns Vley referred to as site 3 from earlier reports (Van der Walt 2015). The site consists of a farm house (Figure 78) and associated outbuildings (29° 45' 46.1231" S, 20° 35' 20.1659" E). To the east of the farmhouse setup (approximately 34m) is a grave/memorial for Danie Taljaard who was born on the 26-01-1942 and passed away on the 16-11-2010 (Figure 8). The site is not located within the proposed development footprint of PV 2. The site is located approximately 4 km to the north of the development footprint. During the survey six heritage areas/sites were recorded including MSA and LSA material, as well as a rectangular dry stone-walled kraal (refer to Figure 9).

**Heritage significance:** Farmhouse Generally Protected B (GP.B). Grave/Memorial Generally Protected A (GP.A)

The development footprint was subjected to a high level scan and this assessment stems from superficial observations and a desktop study only and a detailed walk down of the development footprint will be required as part of the EMPr.



Figure 3. General site conditions.



Figure 4. General site conditions.



Figure 5. General site conditions.



Figure 6. Background scatter.





Figure 7: Farmhouse at Site 3.



Figure 8: View of grave/ memorial at Site 3.

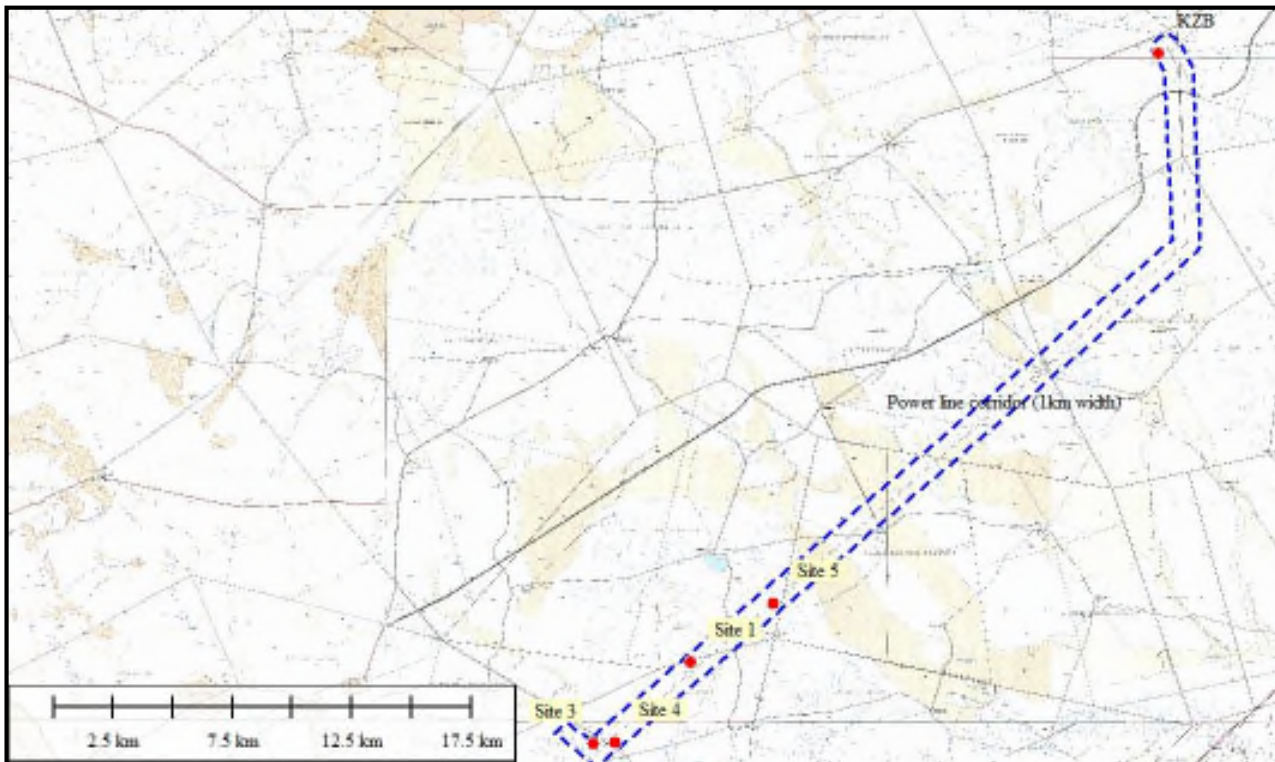


Figure 9: Stone Age find spots in relation to the proposed power line corridor (indicated by red dots)

### Impact evaluation of the proposed project on heritage resources

<b>Nature:</b> During the construction phase activities resulting in disturbance of surfaces and/or sub-surfaces may destroy, damage, alter, or remove from its original position archaeological and paleontological material or objects.		
	<b>Without mitigation</b>	<b>With mitigation (Preservation/ excavation of site)</b>
<b>Extent</b>	Local (2)	Local (2)
<b>Duration</b>	Permanent (5)	Permanent (5)
<b>Magnitude</b>	Low (3)	Low (3)
<b>Probability</b>	Probable (3)	Improbable (2)
<b>Significance</b>	<b>Low (30)</b>	<b>Low (20)</b>
<b>Status (positive or negative)</b>	Negative	Negative
<b>Reversibility</b>	Not reversible	Not reversible
<b>Irreplaceable loss of resources?</b>	Yes unless sites can be preserved.	Yes unless sites can be preserved.
<b>Can impacts be mitigated?</b>	Yes	Yes
<b>Mitigation:</b> A walk down of the final layout of the PV2 Project prior to construction. A conservation management plan should be drawn up for the PV2 Project. Construction crews should be informed of the identified sites and that these areas should be avoided to prevent accidental damage to the sites as well as the grave site.		
<b>Residual Impacts:</b> Depletion of archaeological record of the area.		

### Power line corridor

<b>Nature:</b> During the construction phase activities resulting in disturbance of surfaces and/or sub-surfaces may destroy, damage, alter, or remove from its original position archaeological and paleontological material or objects.		
	<b>Without mitigation</b>	<b>With mitigation</b>
<b>Extent</b>	Local (2)	Local (2)
<b>Duration</b>	Permanent (5)	Permanent (5)
<b>Magnitude</b>	Low (3)	Low (2)
<b>Probability</b>	Probable (3)	Not Probable (2)
<b>Significance</b>	<b>Medium (30)</b>	<b>Low (16)</b>
<b>Status (positive or negative)</b>	Negative	Negative
<b>Reversibility</b>	Not reversible	Not reversible
<b>Irreplaceable loss of resources?</b>	Yes	Yes unless sites can be preserved.

<b>Can impacts be mitigated?</b>	Yes	Yes, Micro adjustments of pylon positions can ensure in situ preservation of sites.
<b>Mitigation:</b> Micro siting of power line tower positions to ensure in situ preservation of sites		
<b>Residual Impacts:</b> Depletion of archaeological record of the area.		

**Cumulative impact table:**

<b>Nature:</b> Heritage impacts associated with the establishment of Project on the archaeology of the area		
	<b>Cumulative Contribution of Proposed PV2 Project</b>	<b>Cumulative Impact without Proposed PV2 Project</b>
<b>Extent</b>	Low (2)	Low (2)
<b>Duration</b>	Permanent (5)	Permanent (5)
<b>Magnitude</b>	Low (4)	Low (4)
<b>Probability</b>	Not probable (2)	Not probable (2)
<b>Significance</b>	<b>Low (22)</b>	<b>Low (22)</b>
<b>Status (positive/negative)</b>	Negative	Negative
<b>Reversibility</b>	Irreversible	Irreversible
<b>Loss of resources?</b>	Yes	Yes
<b>Can impacts be mitigated?</b>	Yes	Unknown
<b>Confidence in findings:</b> High.		
<b>Mitigation:</b> It is recommended that heritage resources should be preserved.		

## 7. CONCLUSIONS AND RECOMMENDATIONS

A marked paucity of sites were noted during the survey of the PV 2 facility compared to the area of Klein Swartbast, 18 km north where studies by Jonathan Kaplan (2011), Halkett & Orton (2011), Webley & Halkett (2012) and Anton Pelsler (2012) recorded vast quantities of ESA, MSA and LSA material. In fact only a few Stone Age sites were recorded in the larger area surrounding the proposed location of PV 2 (Van der Walt 2015 a and b). Stone Age Material within the PV 2 footprint was restricted to isolated widely dispersed low density scatters (less than 2 artefacts per 3m<sup>2</sup>). In the larger study area quarry sites were recorded. These sites are directly related to the topography and found at rocky outcrops where the Granodiorite were exploited during Stone Age Times. These sites are marked by large miscellaneous flakes and chunks and cannot be positively ascribed to the MSA or LSA. If rocky outcrops occur within the development footprint more quarry sites could be found.

Based on the findings of the AIA the following conclusions are made:

- The absence of associated archaeological material, and lack of distinct individual sites reduces the significance of the isolated scatters overall in the study area;
- Thousands of square kilometres of Bushmanland are covered by these low density artefacts scatters (Beaumont *et al* 1995:240);
- Further mitigation of isolated find spots/ background scatter is considered unnecessary due to the lack of *in situ* archaeological surface sites or indications of stratified archaeological deposits and the fact that further mitigation of the small assemblage in the study area is unlikely to result in a greater understanding of the material and the various time periods;
- Discreet sites like knapping sites are concentrated around rocky outcrops where the Granodiorite were utilised; and
- The development footprint was subjected to a high level scan and this assessment stems from superficial observations and a desktop study only and a detailed walk down of the development footprint will be required as part of the EMPr.

The impacts to heritage resources by the proposed PV 2 facility are not considered to be highly significant and the impact on archaeological sites is can be mitigated. However the following recommendations are applicable for the proposed project:

- The study area is subjected to several renewable energy projects and these cumulated impacts on the archaeology of the area must be taken into account during the impact assessment of the other facilities where distinct sites do occur;
- Due to the subsurface nature of archaeological material and unmarked graves the possibility of the occurrence of unmarked or informal graves and subsurface finds cannot be excluded. If during construction any possible finds such as stone tool scatters, artefacts or bone and fossil remains are made, the operations must be stopped and a qualified archaeologist must be contacted for an assessment of the find. Therefore a chance find procedure must be implemented as part of the EMPr;
- A Conservation management plan must be compiled for the Kutolo Tstatsi solar development area; and
- A heritage walkthrough of the final layout of the PV 2 facility must be conducted prior to construction.

No cultural landscape elements were noted. Visual impacts to scenic routes and sense of place are not assessed to be high from a heritage perspective but are assessed independently by a visual specialist as part of the EIA process.

If the recommendations as made in this section of the report are adhered to (subject to approval from SAHRA) HCAC is of the opinion that from an archaeological point of view there is no reason why the development should not proceed.

### General

The description and assessment of the PV2 footprint stems from superficial observations and a desktop study only, it is therefore recommended that a heritage walkthrough of the final layout of the facility is conducted prior to construction.

## **8. PROJECT TEAM**

Jaco van der Walt, Project Manager

## **9. STATEMENT OF COMPETENCY**

I (Jaco van der Walt) am a member of ASAPA (no 159), and accredited in the following fields of the CRM Section of the association: Iron Age Archaeology, Colonial Period Archaeology, Stone Age Archaeology and Grave Relocation. This accreditation is also valid for/acknowledged by SAHRA and AMAFA.

I have been involved in research and contract work in South Africa, Botswana, Zimbabwe, Mozambique, Tanzania and the DRC; having conducted more than 400 AIAs since 2000.

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