Archaeological Impact Assessment

For the proposed Kotulo Tsatsi CSP 3 Facility, located close to Kenhardt in the Northern Cape.

Prepared For

Savannah Environmental (Pty) Ltd

By

HERITAGE
Contracts and Archaeological Consulting

TEL: +27 82 373 8491. E –MAIL JACO.HERITAGE@GMAIL.COM

VERSION 1.2
5 February 2015

Revised

August 2015

CLIENT: Savannah Environmental (Pty) Ltd

CONTACT PERSON: **Steven Ingle**
Cell: 072 386 9815,
E – mail: steven@savannahsa.com

SIGNATURE: _____

LEADING CONSULTANT: Heritage Contracts and Archaeological Consulting CC (HCAC)

CONTACT PERSON: Jaco van der Walt
Heritage Contracts and Archaeological Consulting
Professional Member of the Association of Southern African Professional Archaeologist (#159)

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.

SIGNATURE: _____

EXECUTIVE SUMMARY

Site name and location: SolarReserve Kotulo Tsatsi Energy proposes to establish three Concentrating Solar Power (CSP) Facilities using tower technology as well as Photovoltaic (PV) facilities together with grid connection and associated infrastructure including water storage. This report focusses on CSP 3[1] and the field assessment was conducted on the farms Stynsvlei 280 and Kopjesvley 281 located approximately 73 km south west of Kenhart, Northern Cape Province.

1: 50 000 Topographic Map: 2920 DC

EIA Consultant: Savannah Environmental (Pty) Ltd.

Developer SolarReserve Kotulo Tsatsi Energy

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

Contact person: Jaco van der Walt Tel: +27 82 373 8491 E –mail jaco.heritage@gmail.com.

Date of Report: 5 February 2015

Findings of the Assessment:

Artefact density in the study area is so low 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 anywhere in the study area. No associated organic remains (such as bone or ostrich eggshell) were noted with any of the stone scatters. Based on the findings of the AIA the following conclusions are made:

- The absence of associated archaeological material, and lack of discrete individual sites reduces the significance of the isolated scatters overall;
- 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;
- Two water pipeline options were assessed at a desktop level. The option following the R 27 has at least two cemeteries in close proximity to the line and therefore the Railway option is the preferred route from a heritage point of view. If the correct mitigation measure are enforced both alternatives are acceptable from a heritage point of view.

The impacts to heritage resources by the proposed development are not considered to be highly significant and the impact on archaeological sites is acceptable if the recommendations made in section 7 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

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*

[1] Please note: CSP3 refers to SolarReserve Kotulo Tsatsi Concentrating Solar Plant

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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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
EMP: Environmental Management Plan
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 conduct an Archaeological Impact Assessment for the proposed Kotulo Tsatsi Solar Park a capacity of up to 1000MW as well as grid connection and associated infrastructure including water supply and storage. This report focuses on one of the proposed CSP facilities, namely Kotulo Tsatsi CSP Tower Plant 3.

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 study area on foot and by vehicle; Phase 3, reporting the outcome of the study.

During the survey a number of find spots (4) consisting of low density scatters of mainly LSA and MSA material were recorded. 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;
- » 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 EMP, to the PHRA if established in the province or to SAHRA. SAHRA will be ultimately responsible for the professional evaluation of Phase 1 AIA reports upon which review comments will be issued. 'Best practice' requires Phase 1 AIA reports and additional development information, as per the EIA, BIA/EMP, 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 reinterment 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

The study area is situated approximately 73 km south west of the town of Kenhart in the Northern Cape. The site is directly west of the R27 provincial road that links Kenhart and Brandvlei, access to the site is via a dirt road that also forms the northern boundary of the CSP facility. An existing power line borders the site to the south east. 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 farmhouses 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 sheep farming.

1.3.2. Location Map

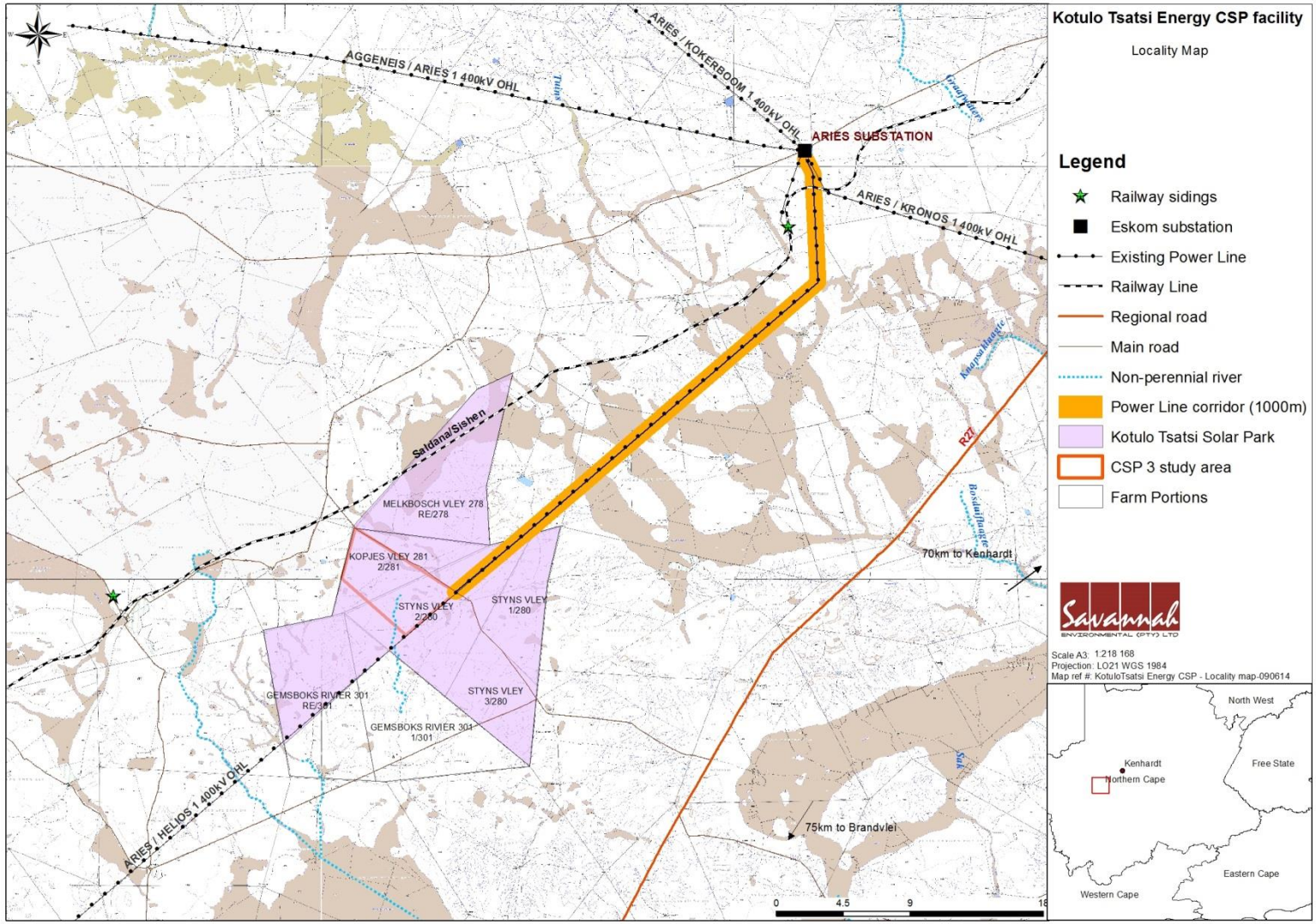

Figure 1: Location map

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 2013). The following approached 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 team did however consult with the farm manager Koos Zandberg regarding graves or sites of archaeological and historical significance.

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. Two sites are on record located in close proximity to the R27 option on the farm Stof Bakjes 303 and on the Farm 390, Vleikolk.

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 three CSP facilities and PV facility 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. The survey was aimed at covering the proposed infrastructure, 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. Track logs of the areas covered were taken (Figure 6).

Figure 2: Track logs of the areas surveyed indicated in black.

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 cannot be excluded. This report only deals with the footprint area of the proposed CSP 3[2] facility as indicated in the location map, and not power line corridors. The power line and other facilities will be assessed in a separate report. The options for the pipeline were only provided after the conclusion of the field studies, hence the description and assessment of these routes 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 area as thoroughly as possible, 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, bones or fossils, be exposed during the process of development.

3. NATURE OF THE DEVELOPMENT

The CSP Tower Plant 3 will generate up to 200MW and the facility will include the following infrastructure:

- Solar Collector Field - consists of all systems and infrastructure related to the control and operation of the heliostats.
- Molten Salt Circuit - includes the thermal storage tanks for storing low and high temperature liquid salt, a central solar-thermal tower receiver, pipelines and molten salt to steam heat exchangers.
- Power Block - consists of the steam turbine and generator, as well as the air-cooled condenser and associated feedwater system.
- Auxiliary facilities - consists of the switch yard, step-up transformers, facility start-up generators (gas or diesel-fired – dependent on detailed design) and including:
- an Eskom 132kV switching station
- an Eskom 400kV substation
- 132 kV power line up to 40km in length to connect to Eskom's existing Aries Substation assessed in a separate report (van der Walt 2014).
- Access roads (roads up to 6m wide)
- Water supply point located at the Kenhardt Reservoir
- Water supply pipeline within existing road reserves (up to 95km in length).
- Water storage reservoir and tanks (5 000m3).
- Lined evaporation ponds (approximately 8ha).
- Workshop and office buildings.
- Man camp (approximately 50ha).

Water supply and storage:

Approximately 250 000 m^3 of water is required during construction and operations phases of each facility. A 20,000 m^3 reservoir is proposed which will top up supply to individual 5,000 m^3 reservoirs for each CSP facility. Water will be sourced from one or a combination of the following alternatives:

- Municipal supply from the waste water works conveyed via a pipeline in existing road reserves
- Groundwater abstracted on/near the site from existing boreholes
- Water abstracted from the Orange River conveyed via a pipeline (not assessed during this report).

[2] Please note: CSP3 refers to SolarReserve Kotulo Tsatsi Concentrating Solar Plant

4. HISTORICAL AND ARCHAEOLOGICAL BACKGROUND OF THE STUDY AREA

A detailed scoping report was compiled for this project (van der Walt 2014). The scoping comprised a complete 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 Boksputs 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 intensions 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 Pelser 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;
- 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;
- 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.

FIELD RATING	***GRADE***	***SIGNIFICANCE***	***RECOMMENDED MITIGATION***
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 Pelser (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 in the area earmarked for the SCP 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. In fact no Stone Age sites (knapping, quarry or habitation site) were recorded. Stone Age Material was restricted to isolated widely dispersed low density scatters (less than 2 artefacts per m²) that was recorded as find spots (Figure 7).

The lack of Stone Age sites or even high density clusters in the CSP 3[3] footprint vs the area of Klein Swartbast to the north can possibly be attributed to the local geology. In the area of the CSP no locally available raw material exists suitable for knapping. The area is characterised by areas barren of vegetation on sedimentary surfaces (Figure 8 & 9) 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 and outcrops that have been utilised during Stone Age times were recorded and will be assessed in a separate report for the PV facility and power line servitude. The wealth of stone artefacts to the north can be attributed to the locally available Dwyka tillite, known to be a favourite source of raw materials in Early Stone Age times (Morris 2006).A Analysis of artefacts from this area by Lombaard(2012) indicated that LSA material was made mainly from Jasper, CCS and chert. MSA and ESA artefacts mainly from produced on quartzite. All of these are raw material that is almost absent from the SCP 3 study area.

In the study area there were only a few areas where surface material was noted. Artefact density is so low 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 anywhere 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 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, and retouch was present on some items. The most predominant raw material was grey/white quartzite, although hornfel, banded ironstone and quartz were also recorded.

In terms of the built environment, no sites of significance were recorded. Apart from a few dams and wind pumps (Climax – still manufactured today) and the modern farm house complex (Figure 6 & 7) there are no elements relating to the build environment.

The route alignment for the pipeline to supply water to site from Kenhardt currently follows two alignment options. The Railway option follows the servitude of existing larger gravel roads from Kenhardt to the Sishen-Saldanha Railway and then again along the service roads of the rail to the proposed development site. Along the Railway, the route follows the railway gravel road servitude. The R27 option follows the servitude of the R27, and then the servitude of the existing gravel road to the proposed development site. The options for the pipeline were only provided after the conclusion of the field studies, hence the description and assessment of these routes stems from superficial observations and a desktop study only. As the proposed options are located within road reserves that are already disturbed it is assumed that very little remain of surface indicators of heritage sites. However two cemeteries are located close to R27 option. The first is located on the farm Stof Bakjes 303 dating to 1876 consisitng of approximately 5/6 graves. The second is located on the Farm 390, Vleikolk consisting of a single grave.

[3] Please note: CSP3 refers to SolarReserve Kotulo Tsatsi Concentrating Solar Plant

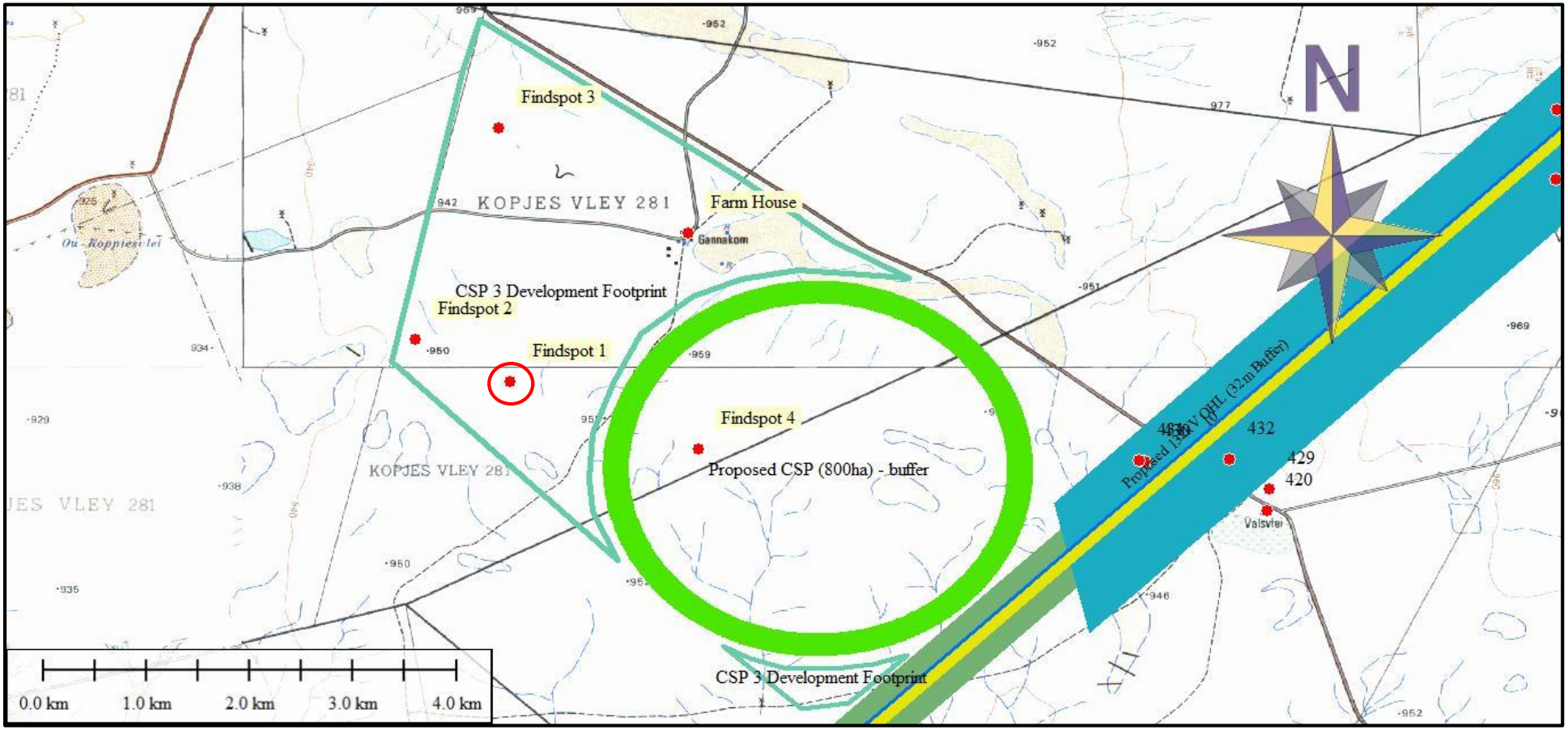

Figure 3: Stone Age Find spots in relation to the proposed development footprint

Figure 4. General site conditions.

Figure 5. General site conditions.

Figure 6. Farm house complex viewed from the north.

Figure 7. House viewed from the north west.

6.1. DESCRIPTION OF FINDS

6.1.1 Find Spots with Coordinates

Number	Type Site	Markers	Co ordinate
Find Spot 1	MSA/LSA	Predominantly MSA with a possible LSA component. Mostly miscellaneous flakes. Artefact recorded over an area of 170 meter x120 meter	S29.75264 E20.52299
Find Spot 2	MSA	Triangular flakes with faceted platforms.	S29.74786 E20.51451
Find Spot 3	MSA	Discoid core, 2 snapped blades. Total of 3 tools in an area measuring 25 x 30 meter with some dolerite boulders	S29.72936 E20.52179
Find Spot 4	MSA	Quartzite flakes and chunks. 1 artifact per m², over an area of 15 x 15 meter.	S29.75746 E20.53924
Farm House complex	Modern	Dwelling and store rooms	S29.73862 E20.53832

6.1.2 Cemeteries with Coordinates

Number	Type Site	Markers	Co ordinate
Stof Bakjes 303	Historical cemetery	Cemetery consisting of approximately 6 graves. Dating to at least 1876.	S29 48.878 E20 45.735
Farm 390, Vleikolk	Cemetery	Single grave dating to 1965	S29 43.390 E20 50.982

Figure 8: Artefacts from find spot 1.

Figure 9: Artefacts from find spot 3.

Figure 10: Artefacts from find spot 4.

Impact evaluation of the proposed project on heritage resources

Find spot 1 - 4

Nature: 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.		
	Without mitigation	**With mitigation (Preservation/ excavation of site)**
Extent	Local (2)	Local (2)
Duration	Permanent (5)	Permanent (5)
Magnitude	Low (3)	Low (3)
Probability	Probable (2)	Probable (2)
Significance	**20 (Low)**	**20 (Low)**
Status (positive or negative)	Negative	Negative
Reversibility	Not reversible	Not reversible
Irreplaceable loss of resources?	Yes	Yes unless sites can be preserved.
Can impacts be mitigated?	No Further action required, sites are recorded in this report.	No Further action required, sites are recorded in this report.
Mitigation: No further pre construction mitigation recommended.		
Cumulative impacts: Archaeological sites are non-renewable and impact on any archaeological context or material will be permanent and destructive.		
Residual Impacts: Depletion of archaeological record of the area.		

Impact evaluation of the proposed pipelines on heritage resources

Nature: 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.		
	Without mitigation	**With mitigation (Preservation/ excavation of site)**
Extent	Local (2)	Local (2)
Duration	Permanent (5)	Permanent (5)
Magnitude	Low (3)	Low (3)
Probability	Probable (3)	Probable (2)
Significance	**30 (Medium)**	**20 (Low)**
Status (positive or negative)	Negative	Negative
Reversibility	Not reversible	Not reversible
Irreplaceable loss of resources?	Yes – and grave sites have high social significance.	Yes unless sites can be preserved.
Can impacts be mitigated?	Yes	Yes
Mitigation: Realignment of route R27 to ensure that the cemeteries are not impacted. The cemeteries will have to be fenced off with 15 m buffer zone to protect them from damage during road construction.		
Cumulative impacts: Archaeological sites are non-renewable and impact on any archaeological context or material will be permanent and destructive. Grave sites have high social significance.		
Residual Impacts: Depletion of archaeological record of the area.		

7. CONCLUSIONS AND RECOMMENDATIONS

A marked paucity of sites were noted during the survey of CSP 3[4] compared to the area of Klein Swartbast 18km north where studies by Jonathan Kaplan (2011), Halkett & Orton (2011), Webley & Halkett (2012) and Anton Pelser (2012) recorded vast quantities of ESA, MSA and LSA material. In the area earmarked for the proposed SCP 3 facility no Stone Age sites (knapping, quarry or habitation site) were recorded. Stone Age Material was restricted to isolated widely dispersed low density scatters (less than 2 artefacts per m^2) that was recorded as find spots.

The lack of Stone Age sites or even high density clusters in the CSP 3 footprint can possibly be attributed to the local geology. In the area of the CSP facility no locally available raw material exists suitable for knapping. The area is characterised by areas barren of vegetation on sedimentary surfaces 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 and dolerite outcrops that have been utilised during Stone Age times were recorded and will be assessed in a separate report for the PV facility and power line servitude.

Artefact density in the study area is so low 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 anywhere in the study area. No associated organic remains (such as bone or ostrich eggshell) were noted with any of the stone scatters. 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;
- 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.
- The options for the pipeline were only provided after the conclusion of the field studies, hence the description and assessment of these routes stems from superficial observations and a desktop study only. Two cemeteries (Anexure B)are on record located in close proximity to the R27 option The cemetery on the Farm 390, Vleikolk is located approximately 40 meters from the line but the cemetery on the farm Stof Bakjes 303 are located almost next to line and a direct impact is foreseen on the site by this option. Therefore the railway line option is the preferred option from a heritage point of view.

The impacts to heritage resources by the proposed CSP 3 facility and water pipeline routes are not considered to be highly significant and the impact on archaeological sites is acceptable. 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 CSP and PV 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.
- Although the water pipeline options (Annexure A) are acceptable from a heritage point of view it is clear that Stone Age manifestations, graves and possibly engravings can be expected in the

[4] Please note: CSP3 refers to SolarReserve Kotulo Tsatsi Concentrating Solar Plant

proposed corridors and it is therefore recommended that when the final option is determined that the alignment is subjected to a heritage walk through.

No heritage significant buildings exist on the site and 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 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.

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 300 AIAs since 2000.

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MAPS

Google Earth. 2012. (1) 30°*09'13.19" S 22°57'07.13" E elev 1064m. [Online]. [Cited 09 April 2012].*

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Annexure A

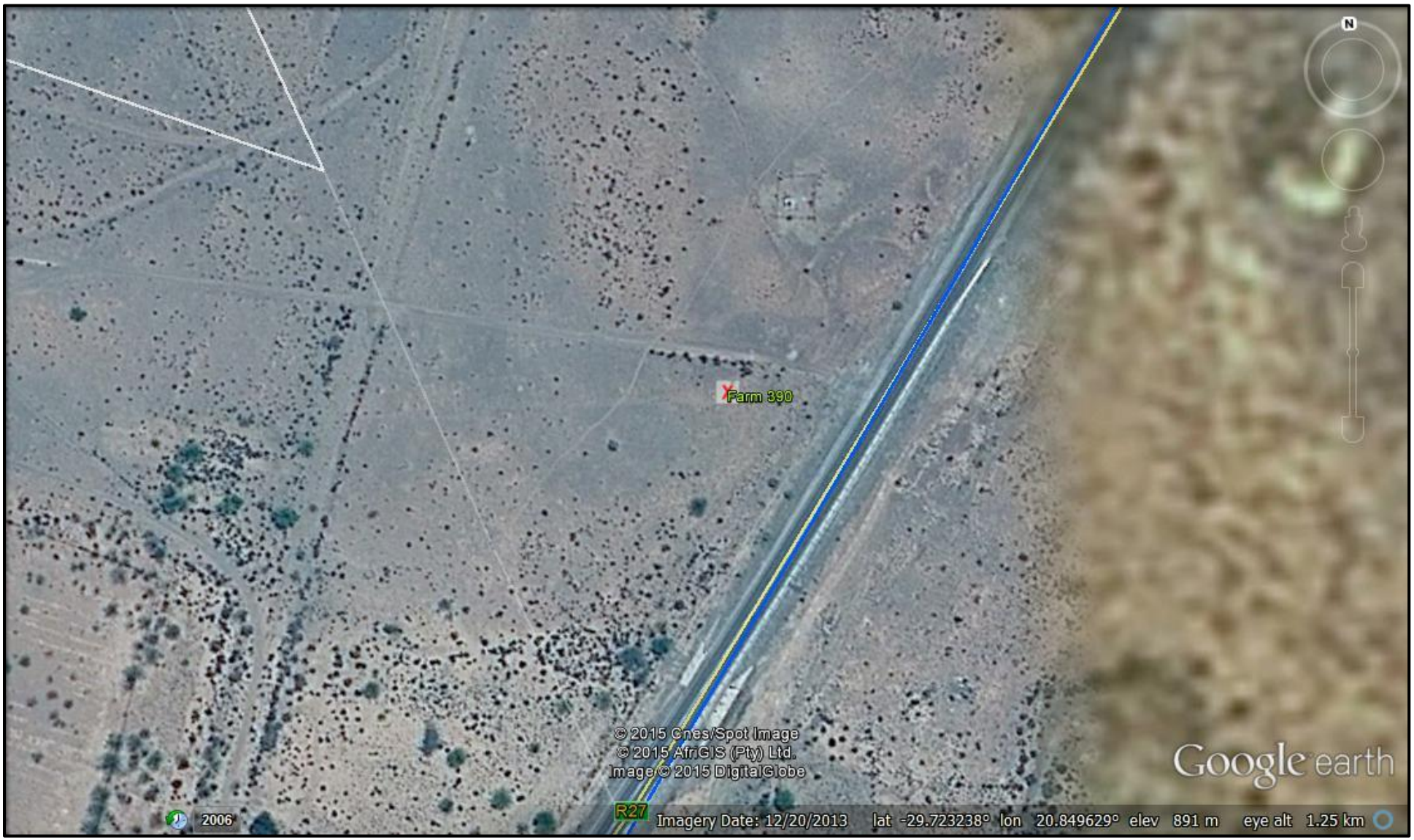
The Google image indicates the two pipeline options. The Railway option (turquoise) follows the servitude of existing larger gravel roads from Kenhardt to the Sishen-Saldanha Railway and then again along the service roads of the rail to the proposed development site.

The R27 option (blue) follows the servitude of the R27, and then the servitude of the existing gravel road to the proposed development site.


Kenhardt
R27
R361
N
Image Landsat
© 2015 AfriGIS (Pty) Ltd.
© 2015 Google
Google earth
Imagery Date: 4/10/2013 lat -29.593532° lon 20.891434° elev 945 m eye alt 92.73 km

Annexure B


Stof Bakjes 303
© 2015 AfriGIS (Pty) Ltd.
Image © 2015 DigitalGlobe
Google earth
2006
Imagery Date: 12/20/2013 lat -29.814736° lon 20.762646° elev 896 m eye alt 1.08 km
N


N
Farm 390
© 2015 Cnes/Spot Image
© 2015 AfriGIS (Pty) Ltd.
Image © 2015 DigitalGlobe
Google earth
2006
R27
Imagery Date: 12/20/2013 lat -29.723238° lon 20.849629° elev 891 m eye alt 1.25 km

Archaeological Impact Assessment

For the proposed Kutulo Tsatsi Power Line Corridor, located close to Kenhardt in the Northern Cape.

Prepared For

Savannah Environmental (Pty) Ltd

By

HERITAGE
Contracts and Archaeological Consulting

TEL: +27 82 373 8491. E –MAIL JACO.HERITAGE@GMAIL.COM

VERSION 1.0
1 December 2014

CLIENT: Savannah Environmental (Pty) Ltd

CONTACT PERSON: **Steven Ingle**

Cell: 072 386 9815,

E – mail: steven@savannahsa.com

SIGNATURE: _____

LEADING CONSULTANT: Heritage Contracts and Archaeological Consulting CC (HCAC)

CONTACT PERSON: Jaco van der Walt

Heritage Contracts and Archaeological Consulting

Professional Member of the Association of Southern African Professional Archaeologist (#159)

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.

SIGNATURE: _____

EXECUTIVE SUMMARY

Site name and location: SolarReserve Kotulo Tsatsi Energy proposes to establish three Concentrating Solar Power (CSP) Facilities using tower technology as well as Photovoltaic (PV) facilities together with grid connection and associated infrastructure including water storage. This report focusses on the power line corridor from the Aries substation based on a field assessment and desktop study. The proposed corridor is approximately 1 km in width and 39 km long, located south west of Kenhart, Northern Cape Province.

1: 50 000 Topographic Map: 2920 DA, DB and DC

EIA Consultant: Savannah Environmental (Pty) Ltd.

Developer: SolarReserve Kotulo Tsatsi Energy

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

Contact person: Jaco van der Walt Tel: +27 82 373 8491 E –mail jaco.heritage@gmail.com.

Date of Report: 1 December 2014

Findings of the Assessment:

The archaeology in the northern and southern portion of the proposed power line differs drastically. In the north several CRM surveys for renewable energy projects provides some insight as to the occupation of the area, including Jonathan Kaplan (2011), Halkett & Orton (2011), Webley & Halkett (2012) and Anton Pelser (2012). These studies recorded a widespread distribution of Early and Middle Stone Age material with a few Later Stone Age sites.

To the south the artefact density drastically drops and is so low that individual sites are not represented but rather background scatter or find spots. However in this barren landscape several dolerite kopjes occur and some of these contain LSA and MSA material as well as quarry sites. Based on the findings of the AIA the following conclusions are made:

- The northern section of the power line is characterised by a widespread distribution of Early and Middle Stone Age material mostly on quartzite. Some Later Stone Age sites with ostrich eggshell are also recorded in this area.
- To the south predominantly MSA material is found scattered over the landscape. The absence of associated archaeological material, and lack of discrete individual sites reduces the significance of these isolated scatters overall. Thousands of square kilometres of Bushmanland are covered by these low density artefacts scatters (Beaumont et al 1995:240);
- Granite kopjes in the south should be avoided as it contains LSA material (the kopjes were probably used as look out points) as well as quarry sites;
- 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;

The impacts to heritage resources by the proposed development are not considered to be highly significant and the impact on archaeological sites is acceptable if the recommendations made in section 7 are adhered by. 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

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.*

CONTENTS

FIGURES

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
EMP: Environmental Management Plan
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 conduct an Archaeological Impact Assessment for the proposed power line corridor between Aries substation and the proposed Kotulo Tsatsi Solar Park. This report focuses only on the proposed power line corridor.

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 study area on foot and by vehicle; Phase 3, reporting the outcome of the study.

During the survey 6 heritage areas/sites were recorded. 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;
- » 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 39(3)(b)(iii) of the MPRDA.

The AIA should be submitted, as part of the EIA, BIA or EMP, to the PHRA if established in the province or to SAHRA. SAHRA will be ultimately responsible for the professional evaluation of Phase 1 AIA reports upon which review comments will be issued. 'Best practice' requires Phase 1 AIA reports and additional development information, as per the EIA, BIA/EMP, 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 reinterment 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

The southern tip of the proposed corridor at the proposed Kotulo Tsatsi Solar Park is situated approximately 73 km south west of the town of Kenhart in the Northern Cape. The solar park is directly west of the R27 provincial road that links Kenhart and Brandvlei. Access to the site is via a dirt road from the R27. For the most part the line follows the existing Aries/Helios power line. Occupation in the area is scarce with very few farmhouses in general 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 in the southern portion of the study area. The northern portion is characterised by extensive gravel pavements Land use in the general area is dominated by sheep farming.

1.3.2. Location Map

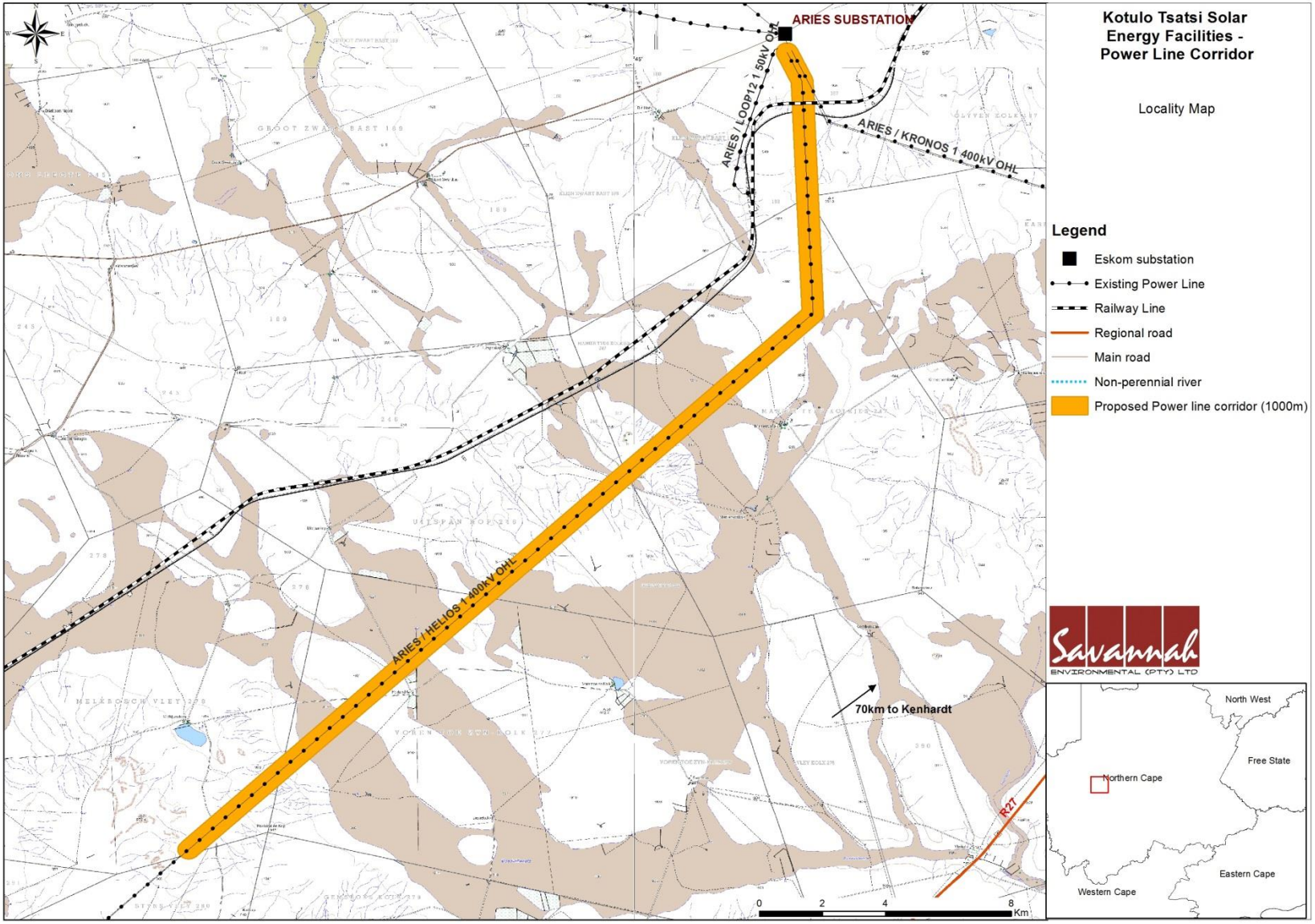


Figure 11: Location map

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 approached 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.

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.

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 three CSP facilities, PV facility and power line corridor 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. The survey was aimed at covering the proposed infrastructure, 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.

Figure 12: Google Image of the study 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 cannot be excluded. This report only deals with the general alignment corridor as indicated in the location map. The entire corridor was not surveyed due to access restrictions.

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 area as thoroughly as possible, 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, bones or fossils, be exposed during the process of development.

3. NATURE OF THE DEVELOPMENT

Grid connection: For the proposed ~ 1000MW Concentrated Solar Power (CSP) Energy Facility to connect to the Eskom grid, the following alternatives/options will be considered:

- The construction of a 132kV double circuit power line from each CSP facility on-site substation to the Eskom Aries Substation

A 500m corridor either side of the proposed power line is required to be assessed.

4. HISTORICAL AND ARCHAEOLOGICAL BACKGROUND OF THE STUDY AREA

A detailed scoping report was compiled for the larger solar park project (van der Walt 2014). The scoping comprised a complete 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. A study further away by K van Ryneveld (2007) was also consulted. Van Ryneveld conducted a study on the farm Boksputs 118 and 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 intensions 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 Pelser means that stone artefacts in the northern portion 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;
- 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;
- 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.

FIELD RATING	***GRADE***	***SIGNIFICANCE***	***RECOMMENDED MITIGATION***
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 around the Aries substation by Jonathan Kaplan (2011), Halkett & Orton (2011), Webley & Halkett (2012) and Anton Pelser (2012) recorded vast quantities of ESA, MSA and LSA material scattered in the respective study areas. Collection of surface samples by Beaumont and Pelser in this area means that stone artefacts from the area around the Aries substation (marked as KZB on Figure 3) have been analysed and indicates the presence of humans in the area for the last two million years. This area is characterised by extensive gravel pavements (Figure 6 & 7) that provides a rich source of raw material for the manufacturing of stone tools. An analysis of artefacts from this area by Lombard (2011) indicated that LSA material was made mainly from Jasper, CCS and chert. MSA and ESA artefacts are mainly from quartzite.

To the southern portion of the proposed corridor the geology changes and raw material for the manufacture of stone tools are scarce. The area is characterised by areas barren of vegetation on sedimentary surfaces (Figure 4 & 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 and dolerite outcrops and hills have been utilised during Stone Age times.

Most of the material observed in the southern portion can probably be ascribed to the Middle Stone Age with LSA material on top of dolerite hills with flat areas in association with ostrich egg shell fragments. Several quarries was recorded marked by large miscellaneous flakes and chunks and cannot be positively ascribed to the MSA or LSA.

In terms of the built environment, no sites of high significance were recorded in the proposed corridor, apart from a wind pump (Climax – still manufactured today) and a stone walled kraal.

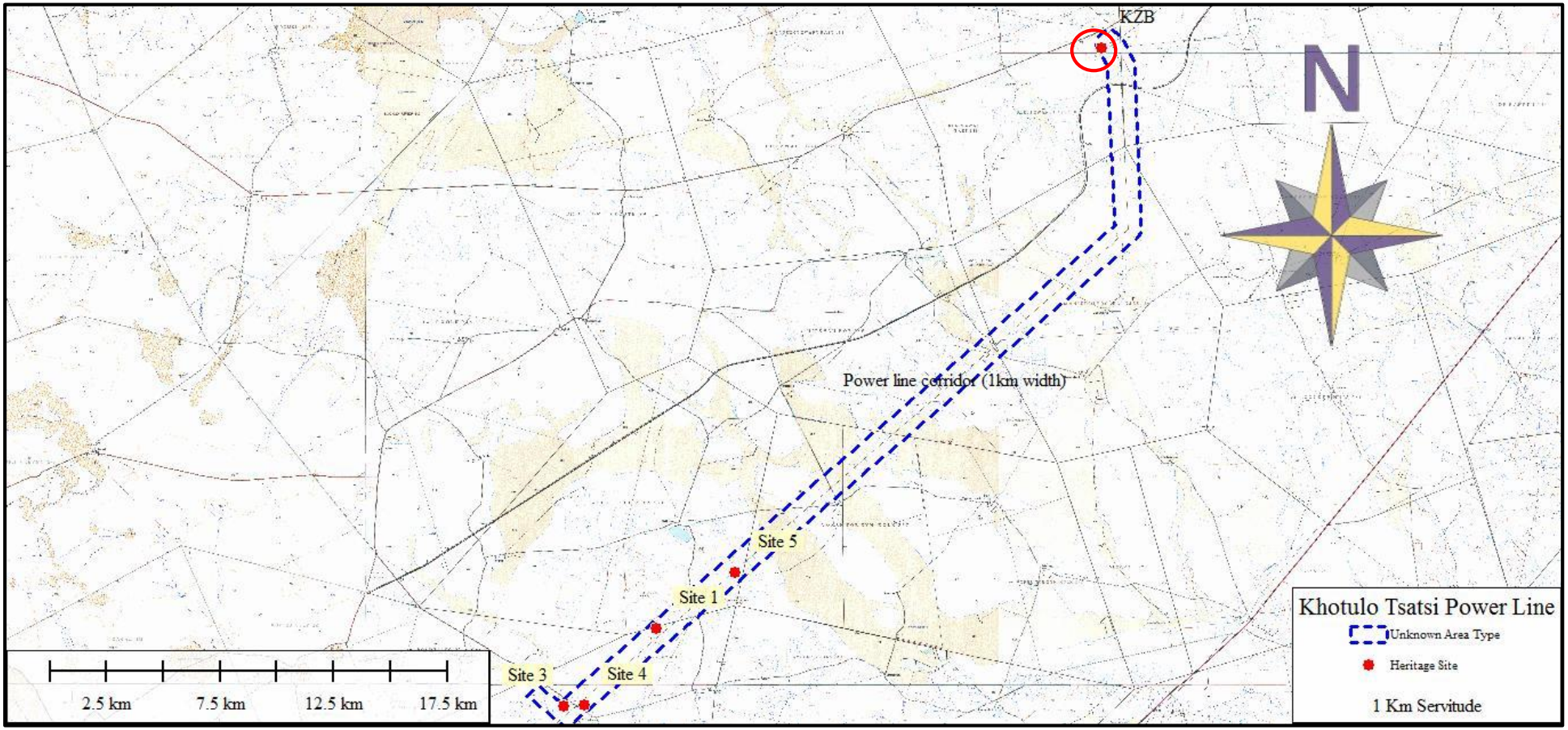


Figure 13: Recorded sites in relation to the proposed corridor

Figure 14. General site conditions in the southern portion.

Figure 15. General site conditions in the southern portion.

Figure 16. Gravel pavements in the northern portion.

Figure 17. General site conditions in the northern portion.

6.1. DESCRIPTION OF FINDS

6.1.1 Sites with Coordinates

Number	Type Site	Markers	Co ordinate
Site 1	MSA/LSA	MSA pointed flakes mostly on hornfells and quartzite. LSA microliths and ostrich eggshell fragments.	S29.72779 E20.61422
Site 2	MSA/LSA	MSA or possibly macrolithic LSA. Mostly blades on granite. Some ostrich eggshell fragments	S29.75855 E20.57819
Site 3	MSA or LSA	Quarry site with miscellaneous large flakes	S29.75840 E20.57771
Site 4	MSA or LSA	Quarry site with miscellaneous large flakes.	S29.75830 E20.58564
Site 5	Historic	Rectangular dry stone walled kraal	S29.70562 E20.64550
KZB	ESA/MSA/LSA	Large area with range of Stone Age material	S29.49807 E20.79047

Site 1

The site consists of 2 small hills with MSA artefacts scattered around the base of the hills and there are also LSA microlithic tools on a flat clearing on top of both hills. For the LSA component the site could have been a lookout point on the hill top with a concentration of microliths (mostly blades) on hornfells. Associated with the tools are fragments of ostrich egg shell, artefact density is less than 7 tools per m².

Heritage significance: Generally Protected A (GP.A)

Site 2

The site consists of an open area on a small dolerite outcrop that could have been man made. Very few tools are recorded here consisting of 4 blades in an area measuring 4 x 4 meter. Fragmented ostrich egg shell is scattered around the site.

Heritage significance: Generally Protected B (GP.B)

Site 3 and 4

Both sites consist of knapping/quarry sites where dolerite boulders were utilised resulting in dense concentration of large miscellaneous flakes. Artefact density is approximately 35 per m² over an estimated area of 7 x 5 meters (Figure 10).

Heritage significance: Generally Protected A (GP.A)

Site 5

The site consists of a rectangular stone wall enclosure measuring approximately 10x8 meters.

Heritage significance: Generally Protected B (GP.B)

KZB

This is an area where vast quantities of ESA, MSA and LSA material were recorded during CRM studies for renewable energy projects 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). Collection of surface samples by Beaumont and Pelser means that stone artefacts from this area have been analysed.

Heritage significance: Generally Protected B -C

Figure 18: Selection of artefact from Site 1.

Figure 19: General site conditions at site 2.

Figure 20: Ventral view of artefacts from Site 3.

Figure 21: Concentration of artefacts at Site 4.

Impact evaluation of the proposed project on heritage resources

Sites 1 - 6

Nature: 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.		
	Without mitigation	**With mitigation (Preservation/ excavation of site)**
Extent	Local (2)	Local (1)
Duration	Permanent (5)	Permanent (5)
Magnitude	Low (3)	Low (2)
Probability	Probable (3)	Not Probable (2)
Significance	**30 (Medium)**	**16 (Low)**
Status (positive or negative)	Negative	Negative
Reversibility	Not reversible	Not reversible
Irreplaceable loss of resources?	Yes	Yes unless sites can be preserved.
Can impacts be mitigated?	Yes	Yes, Micro adjustments of pylon positions can ensure in situ preservation of sites.
Mitigation: Micro adjustments of pylon positions can ensure in situ preservation of sites		
Cumulative impacts: Archaeological sites are non-renewable and impact on any archaeological context or material will be permanent and destructive.		
Residual Impacts: Depletion of archaeological record of the area.		

7. CONCLUSIONS AND RECOMMENDATIONS

A marked paucity of sites were noted during the survey of the southern portion of the line compared to the northern portion in the area of Klein Swartbast where Jonathan Kaplan (2011), Halkett & Orton (2011), Webley & Halkett (2012) and Anton Pelser (2012) recorded vast quantities of ESA, MSA and LSA material. In the southern portion MSA and LSA sites are recorded focussed around dolerite hills scattered across the landscape. In terms of the build environment a single rectangular stone walled kraal was recorded. Based on the findings of the AIA the following conclusions are made:

- The northern section of the power line is characterised by a widespread distribution of Early and Middle Stone Age material mostly on quartzite. Some Later Stone Age sites with ostrich eggshell are also recorded in this area. Collection of surface samples by Beaumont and Pelser in this area means that stone artefacts from this area have been analysed.
- To the south predominantly MSA material is found scattered over the landscape. The absence of associated archaeological material, and lack of discrete individual sites reduces the significance of these isolated scatters overall. Thousands of square kilometres of Bushmanland are covered by these low density artefacts scatters (Beaumont et al 1995:240);
- Granite kopjes in the south should rather be avoided as they contain LSA material (probably used as look out points) as well as quarry sites;
- 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;

The impacts to heritage resources by the proposed development are not considered to be highly significant and no red flags were noted in the proposed corridor. However the following recommendations are applicable for the proposed project:

- Although the power line corridor is acceptable from a heritage point of view it is clear that Stone Age manifestations, graves and possibly engravings can be expected in the proposed power line corridor and it is therefore recommended that when the final alignment is determined that the power line and specifically the pylon positions are subjected to a heritage walk through. If any sites occur they can be preserved through micro adjustments to pylon positions;
- 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.

No heritage significant buildings exist on the site and 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 section 7 of this 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.

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 300 AIAs since 2000.

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