Archaeological Impact Assessment

For the proposed Stella - Helpmekaar 5MW Solar Energy Facility near the town of Stella, North West Province

Prepared For

Savannah Environmental (Pty) Ltd

By

HERITAGE
Contracts and Archaeological Consulting

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EXECUTIVE SUMMARY

Site name and location: Stella - Helpmekaar 5MW Solar Energy Facility is located approximately 45km north-west of the town of Stella in the North West Province, on Portion 2 of the Farm Helpmekaar 248 IN

Purpose of the study: Phase 1 Archaeological Impact Assessment to determine the presence of cultural heritage sites and the impact of the proposed project on these resources within the areas demarcated for the solar development.

1:50 000 Topographic Map: 2624 BC

EIA Consultant: Savannah Environmental (Pty) Ltd

Developer: Bluewave Capital SA (Pty) Ltd

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

Contact person: Jaco van der Walt Tel: +27 82 373 8491

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Date of Report: 20 November 2013

Findings of the Assessment:

The impacts to heritage resources by the proposed development are considered to be low. The study area consists of a ploughed agricultural field and no archaeological remains were recorded during the survey. No buildings exist in the development footprint and no cultural landscape elements were noted.

An independent Palaeontological desktop study (Dr Almond 2013) was conducted for the project area and recommended exemption from further palaeontological work or mitigation.

There is from a heritage point of view no reason why the development cannot commence work (based on approval from SAHRA).

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.

General

Due to extensive sand cover, ground visibility was low on portions of the site during survey. The possible occurrence of unmarked or informal graves and subsurface finds can thus not 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.

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

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

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ABBREVIATIONS

AIA: Archaeological Impact Assessment
ASAPA: Association of South African Professional Archaeologists
BIA: Basic Impact Assessment
CRM: Cultural Resource Management
ECO: Environmental Control Officer
EIA: Environmental Impact Assessment*
EIA: Early Iron Age*
EIA Practitioner: Environmental Impact Assessment Practitioner
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

Kind of study	Archaeological Impact Assessment
Type of development	Photovoltaic solar energy facilities
Rezoning/subdivision of land	Rezoning
Developer:	Bluewave Capital SA (Pty) Ltd
Consultant:	Savannah Environmental

Heritage Contracts and Archaeological Consulting CC has been contracted by Savannah Environmental (Pty) Ltd to conduct an Archaeological Impact Assessment for the proposed Stella Helpmekaar Solar Energy Facility is located approximately 45 km north-west of the town of Stella in the North West Province on Portion 2 of the Farm Helpmekaar 248 IN.

The Archaeological Impact Assessment report forms part of the Basic Assessment (BA) for the proposed project.

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 background study that includes collection from various sources and consultations; Phase 2, the physical surveying of the area on foot and by vehicle; Phase 3, reporting the outcome of the study.

During the survey no sites of heritage significance were identified within the development footprint. 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 SAHRA for review.

1.1 Terms of Reference

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 of 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 the relevant 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 of 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 38(1), Section 38(8) of the NEMA and 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.

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 site of the proposed Stella Helpmekaar Solar Energy Facility is located approximately 45km north-west of the town of Stella in the North West Province, on Portion 2 of the Farm Helpmekaar 248 IN. The site is traversed by the R377 and separates the site into eastern and western portions. An area has been identified for the siting of the proposed PV facility (approximately 10 ha) to the west of the R377. The proposed PV array occurs within 700m from the Edwardsdam 88/22kV substation. The coordinates of the centre point of the site are: 26◦ 16' 08'' S; 24◦ 34' 09'' E. The proposed project area occurs within the Naledi Local Municipality and broader Dr Ruth Segomotsi Mompati District Municipality.

The study area falls within the Eastern Kalahari Bushveld Bioregion in a Savannah Biome as described by Mucina *et al* (2006) with the vegetation described as Mafikeng Bushveld. Land use in the general area is characterized by agriculture, dominated by crops and cattle farming. The study area is flat with almost no grass or tree cover and is characterised by deep sandy to loamy soils. The site was extensively used for crop farming in the past (Figure 1).

1.3.2. Location Map

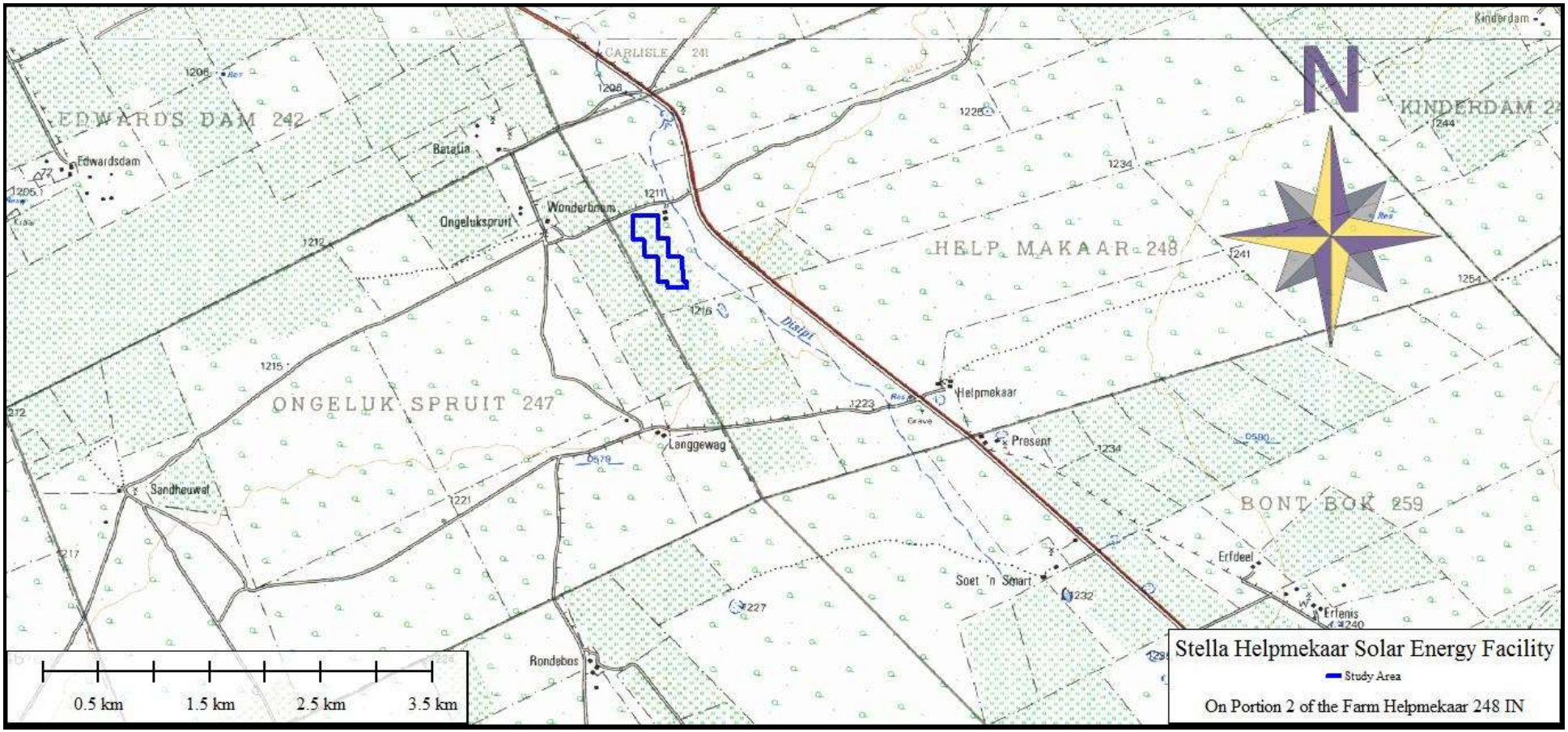

Figure 1: Locality Map.

2. APPROACH AND METHODOLOGY

The aim of the study is to cover archaeological databases and historical sources to compile a background history of the study area followed by field verification; this was accomplished by means of the following phases (the results are represented in section 4 & 5 of this report).

2.1 Phase 1 - Desktop Study

The first phase comprised a desktop study, gathering data to compile a background history of the area in question. It included scanning existing records for archaeological and historical sites in the area.

2.1.1 Literature Search
By utilising data from previous CRM reports done in the area and a search in the National archives the study area is contextualised. The aim of this is to extract data and information on the area in question, looking at archaeological sites, historical sites and graves of the area.

2.1.2 Information Collection
The SAHRA report mapping project (Version 1.0) and 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. Two studies were conducted in the larger study area by Dreyer (2007) and Coetzee (2008).

2.1.3 Consultation
A public participation process is facilitated by the Environmental Consultant for the project.

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
A field survey of the study area measuring less than 20 ha was conducted over a period of one day, focusing on drainage lines, hills and outcrops, high lying areas and disturbances in the topography. The study area was surveyed by means of vehicle and extensive surveys on foot by a professional archaeologist in November 2013.

All sites discovered inside the proposed development area was plotted on 1:50 000 maps and their GPS co-ordinates noted. Digital photographs were taken at all the sites.

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. Only the surface infrastructure footprint areas were surveyed as indicated in the location map, and not the entire farm.. Although Heritage Contracts and Archaeological Consulting CC 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 solar energy facility will have a development footprint of less than 20 ha, within which the following typical infrastructure will be established:

- » PV array
- » Cabling between the project components, to be lain in trenches ~ 1-2m deep.
- » Power inverters between the PV arrays (±4.5m2).
- » Power lines to evacuate the power into the Eskom grid via the Edwardsdam substation.
- » Internal access roads (up to 7m wide).
- » Water storage facilities/ reservoirs (1 000 m3).
- » Office, workshop area for maintenance and storage (50m2).
- » During construction (temporary infrastructure) such as temporary housing for workers and a laydown area (~1 hectare in extent) will also be required.

4. REGIONAL OVERVIEW

4.1 General Information

Through CRM reports on the area together with secondary source material, primary sources, maps and online sources the study is contextualised. Two previous CRM studies were conducted in the general study area. Coetzee (2008) completed a survey directly east of the current project area and recorded one historical building and 2 cemeteries, Dreyer (2007) conducted his study in Stella to the south of the current study area and found no sites of significance during his survey.

Google Earth and 1:50 000 maps of the area were utilised to identify possible places where archaeological and historical sites might be located. No buildings or structures are located within the development footprint. The database of the Genealogical Society of South Africa indicated no known grave sites within the study area.

4.2 Archaeological Background

The archaeological background and timeframe of the study area can be divided into the Stone Age and Iron Age.

4.2.1. Stone Age

The Stone Age is divided in Early; Middle and Late Stone Age and refers to the earliest people of South Africa who mainly relied on stone for their tools.

Early Stone Age: The period from ± 2.5 million yrs. - ± 250 000 yrs. ago. Acheulean stone tools are dominant. No Acheulean sites are on record near the project area, but isolated finds may be possible. However, isolated finds have little value. Therefore, the project is unlikely to disturb a significant site. The lack of any ESA sites was confirmed during the field investigation.

Middle Stone Age: The Middle Stone Age includes various lithic industries in SA dating from ± 250 000 yrs. – 25 000 yrs. before present. This period is first associated with archaic Homo sapiens and later Homo sapiens sapiens. Material culture includes stone tools with prepared platforms and stone tools attached to handles. MSA are found scattered widely across southern Africa but no significant sites are on record for the immediate study area.

Late Stone Age: The period from ± 25 000-yrs before present to the period of contact with either Iron Age farmers or European colonists. This period is associated with Homo sapiens sapiens. Material culture from this period includes: microlithic stone tools; ostrich eggshell beads and rock art. Sites in the open are usually poorly preserved and therefore have less value than sites in caves or rock shelters. Since there are no caves in the study area no LSA sites of significance were recorded and no isolated finds or

occurrences were recorded. For the wider region an important LSA site is located to the North West of Stella at Thaba Sione and later used by Tswana people as a rainmaking site with several engraved boulders.To the west and south east of Stella are various rock engraving sites with a rock painting site to the north of the study area close to Setagole (Bergh 1999).

4.2.2. Iron Age (general)

The Iron Age as a whole represents the spread of Bantu speaking people and includes both the pre-Historic and Historic periods. It can be divided into three distinct periods:

The Early Iron Age: Most of the first millennium AD.

The Middle Iron Age: 10th to 13th centuries AD

The Late Iron Age: 14th century to colonial period.

The Iron Age is characterised by the ability of these early people to manipulate and work Iron ore into implements that assisted them in creating a favourable environment to make a better living.

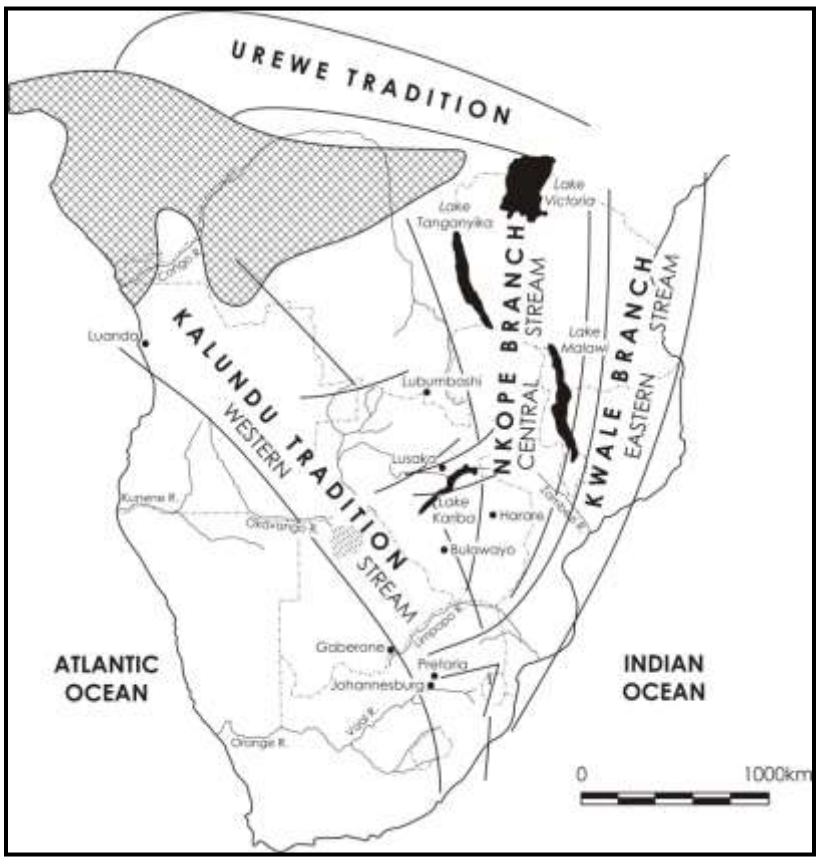

Figure 2: Movement of Bantu speaking farmers (Huffman 2007)

No Sites dating to the Early or Middle Iron Age have been recorded or is expected for the study area. The same goes for the Later Iron Age period where the study area is situated outside the eastern periphery of distribution of Late Iron Age settlements in the North West Province. To the north east of the study area the area is well known for Later Iron Age stone walled settlements archaeologically referred to as Molokwane settlements (Pistorius 1992, Booyens 1998, Huffman 2007), to the east towards Klerksdorp and Potchefstroom some 88 stone walled settlements are recorded (Bergh 1999). No sites dating to this period was recorded in the study area.

4.3 Palaeontology

A paleontological study commissioned by Heritage Contracts and Archaeological Consulting CC by Dr John Almond. He indicated the following:

"*The study area of the proposed Stella Helpmekaar Solar Energy Facility near Stella, North West Province, is entirely underlain by unfossiliferous to sparsely fossiliferous aeolian sands of the Gordonia Formation (Kalahari Group) of probable Pleistocene age. The underlying Precambrian granite bedrocks are unfossiliferous.*

The impact significance of the solar project development on local fossil heritage resources is considered to be LOW.

It is therefore recommended that, pending the discovery of substantial new fossil remains during construction, exemption from further specialist palaeontological studies is granted for the proposed Stella Helpmekaar Solar Energy Facility.

Any substantial fossil remains (e.g. stromatolites, fossil shells, petrified wood or plant remains, vertebrate bones, teeth) encountered during excavation should be reported to SAHRA"

5. HISTORICAL BACKGROUND

The following section will endeavour to give a brief overview of the history of the area and district in which it is located. The report has been divided into several sections that will focus on the following aspects:

- General history of human settlement in the area
- The history of black and white interaction in the area
- The history of Stella

5.1. Historiography And Methodology

It was necessary to use a range of sources in order to give an accurate account of the history of the area in which the study area is located. Sources include secondary source material, maps, electronic sources and archival documents. This study is by no means all-inclusive, and there are doubtlessly still sources to be found on the history of the property and area researched in this study.

5.2. Maps Of The Area Under Investigation

Figure 3: Google Earth image showing the project area in relation to Stella and Vryburg (Google Earth 2013)

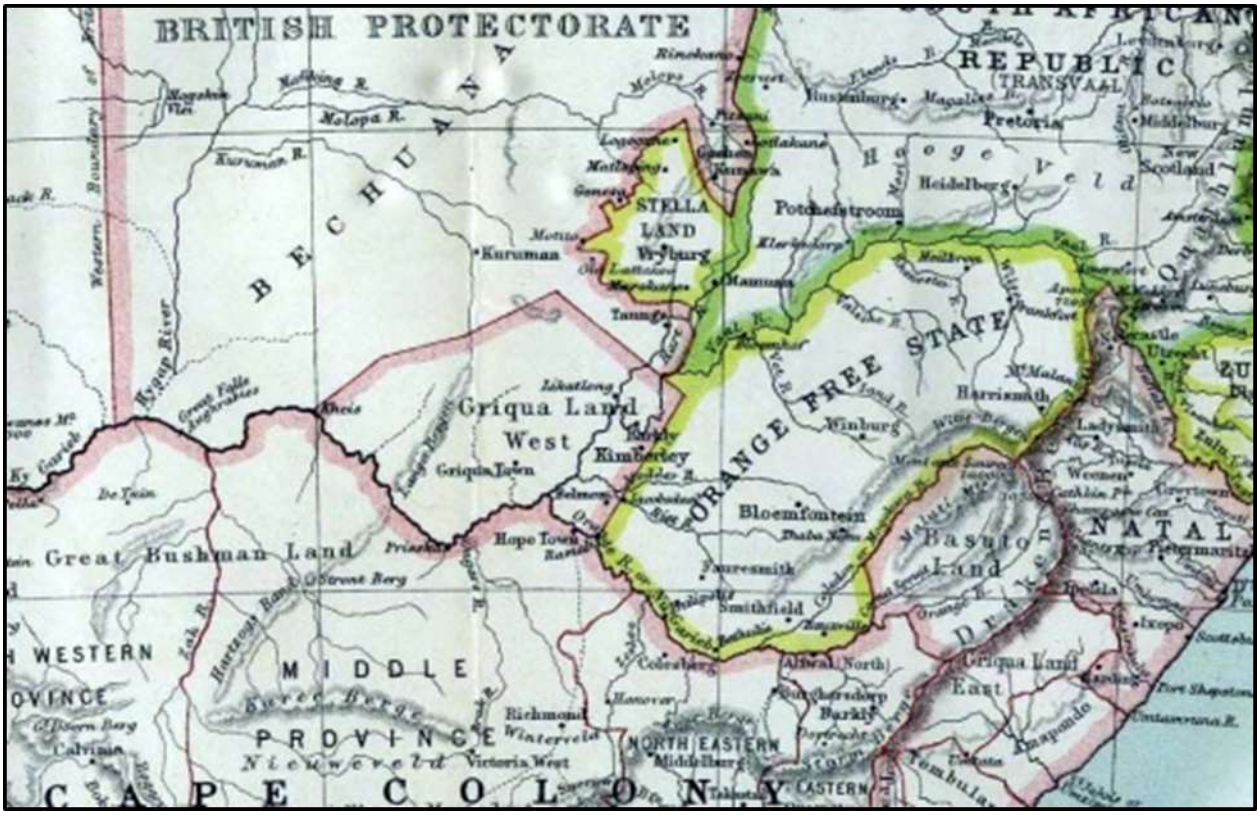

Figure 4: 1885 Map showing the area of Stellaland, Stella and the farm area were located in this district. The map indicates Stellaland before unification with Goshen to the North East (The British Empire 2011)

5.3. A Brief History of Human Settlement and Black And White Interaction In The greater study Area

A farm does not exist in isolation, and it is important to understand the social history of the surrounding area. It is essential to consider the history of towns in the vicinity of the property under investigation, since these social centres would have affected those individuals living in the rural areas. In the case if Stella it is interesting to note that this area was once part of an independent republic – Stella Land.

The area was initially under the control of competing Griqua and Tswana groups, while the United Kingdom laid claim to it as part of the emerging protectorate of British Bechuanaland. One of the indigenous groups was under the leadership of chief Mankoroane of the Thlaping who were loyal to the British and another one under the leadership of chief Massouw of the Korana (they were loyal to the Boers). When a feud erupted between Mankoroane and Massouw, each side resorted to recruiting volunteers, promising them land in return for their assistance. More than 300 Boer Soldiers joined Massouw, with the promise of being paid in land for their services as mercenaries. Massauw and his army soon had the overhand and subsequently a peace agreement was signed by Mankoroane on 26 June 1882. The Boer volunteers would as per this agreement be granted land and the boundaries of their areas would be determined by both Mankuroane and Massouw. In September 1882 the town of Vryburg was laid out. Work was halted as Makuroane did not name a representative but the town was nonetheless laid out by the end of 1882. The Republic of Stellaland was proclaimed by GJ van Niekerk on 6 August 1883.

The neighbouring land Goshen had a similar tale – Moshwete and Montshiwa took up arms against each other in 1881. Moshwete also made use of Boer volunteer soldiers under leadership of Gey van Pittius. On 11 January 1882 they entered into a formal agreement with Moshwete where the volunteers would each receive a farm form their efforts. Two days later the volunteers declared themselves an independent community. The war against Montshiwa continued, but ended in a peace agreement on 24 October 1882. Both the independent community (they appointed a management body) and Montshiwa appointed commissions to establish boundaries of the new area. However due to a lack of cooperation between the commissions and the Rolang's negativity towards the Boer volunteers the final arrangements were never made. It was also clear that Moshwete was unwilling to cooperate.

The two states later unified and were known as the United States of Stellaland. In 1884 the existence of the two states were under threat from Britain as the Covention of Londen determined that the boundaries of the Transvaal were moved to such an extent that the western border of the Transvaal now went through the middle of both Stellaland and Goshen. Montshiwa also determined that due to this, he was no longer bound by the provisions of the peace agreement and there were some skirmishes between Montshiwa and his followers and the Goshenites. The future of the area was no longer in the hands of either party when in 1885 Sir Charles Warren and his army of 4000 men were sent to defend the Western border of the Transvaal. Without one shot being fired what remained of Goshen and Stellaland were reclaimed as part of British Bechuanaland and Warren proclaimed this on 30 September 1885.

The battle of Anlgo Boer War battle of Maritzani took place 66 km east of Stella.

5.4 History of Stella

There is very little information available on the town of Stella.

Stella, meaning "star", was named after the daughter of the owner of the farm Biesjesbult, which was often used for church gatherings in the early twenties and where the town was established in the 1920's.

6. 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 PV Solar Facility 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.

6.1. Field Rating of Sites

Site significance classification standards prescribed by SAHRA (2006), and approved 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 8 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

6.2 Impact Rating of Assessment

The criteria below are used to establish the impact rating of a site as provided by the client:

» 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).

7. BASELINE STUDY-DESCRIPTION OF SITES

It is important to note that the entire farm was not surveyed but only the footprint for the PV layout area (Figure 5), power line for connection to the grid and access routes as indicated in Figure 1. The study area consists of a featureless flat landscape with almost no vegetation or grass cover and archaeological visibility is high. The proposed footprint for the solar facility was extensively ploughed until recently and no heritage sites or features exist in the development footprint (Figure 6 -9).

Figure 5: Google Image showing the proposed development area (blue) and track logs (black) of the areas that were covered during the survey. The number 1 – 4 indicates where the pictures of the study area were taken to give the reader of the report a better indication of the context of the study area

Figure 6. Stella 1 – study area viewed from the North.

Figure 7. Stella 2 – Northern portion of the study area viewed from the north

Figure 8. Stella 3 – Central portion of the study area viewed from the north.

Figure 9. Stella 4 – Southern portion of the study area viewed from the north.

8. RECOMMENDATIONS AND CONCLUSIONS

The impacts to heritage resources by the proposed development are considered to be low and no further mitigation is proposed. No archaeological sites were identified during the survey and desktop study, and no red flags were identified. The study area is located well outside of the known distribution of Iron Age sites in the North West province and no Iron Age sites were recorded. No Stone Age material was recorded in the study area and this can be attributed to the lack of raw material suitable for knapping and also the lack of water sources (like pans) and landscape features like hills or rocky outcrops that would have attracted human activity in the past within the immediate study area. There are no buildings or other structures within the development footprint and therefore no impact on the built environment is expected. To the east of the proposed development site there is a dilapidated old farm house but it is well away from the proposed development and no impact is foreseen on the site. No cultural landscape elements (e.g windmills, water troughs etc) occur in the development footprint.

An independent Palaeontological desktop study (Dr Almond 2013) was conducted for the project area and recommended exemption from further palaeontological work or mitigation.

There is from a heritage point of view no reason why the development cannot commence work (based on approval from SAHRA).

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.

9. PROJECT TEAM

Jaco van der Walt, Project Manager and Archaeologist

Liesl Bester, Archival Specialist

10. 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 and Tanzania; having conducted more than 300 AIAs since 2000.

11. REFERENCES

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