Archaeological Impact Assessment

For the proposed Wolmaransstad 75MW Solar Energy Facility close to the town of Wolmaransstad in the North West Province.

Prepared For

Savannah Environmental (Pty) Ltd

By

HERITAGE
Contracts and Archaeological Consulting

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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: The project is referred to as the Wolmaransstad 75MW Solar Energy Facility. The project is proposed to be located on the Remainder of Portion 2 of the Farm Wolmaransstad and Townlands 184, north-west of Wolmaransstad, within the Maquassi Hills Local Municipality and broader Dr Kenneth Kaunda District Municipality of the North West Province.

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: 2725 BB.

EIA Consultant: Savannah Environmental (Pty) Ltd

Developer: Bluewave Capital SA (Pty) Ltd
Heritage Consultant: Heritage Contracts and Archaeological Consulting CC (HCAC).

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Date of Report: 26 January 2015

Findings of the Assessment:

The impacts to heritage resources by the proposed development are considered to be low. The area was ploughed in the past and would have destroyed any surface indications of heritage sites or features. No archaeological remains were recorded during the survey and no buildings exist in the development footprint and no cultural landscape elements were noted.

An independent Palaeontological desktop study (Dr Almond 2015) 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 high grass cover, ground visibility was low on portions of the site during the 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.*

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

Kind of study	Archaeological Impact Assessment
Type of development	Photovoltaic solar energy facility
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 Wolmaransstad 75 MW Solar Energy Facility located close to Wolmaransstad in the North West Province.

The Archaeological Impact Assessment report forms part of the Environmental Impact Assessment (EIA) 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 proposed Wolmaransstad 75MW Solar Energy Facility is located on the Remainder of Portion 2 of the Farm Wolmaransstad and Townlands 184 located adjacent to the town of Wolmaransstad in the North West Province. An area of approximately 240 ha of the farm is intended to be utilised for the solar energy facility. The site occurs within the Maquassi Hills Local Municipality and broader the Dr Kenneth Kaunda District Municipality.

Siting of the proposed PV facility will be close to the existing Goat DS 132/88kV Substation, with an 88kV power line traversing the southern section of the site with the R505 provincial road bordering the site to the east and the R 504 bordering the site on the south. The site is located at S27 10 47.3 E25 58 06.8.

The study area falls within the Dry Highveld Grassland Bioregion as described by Mucina *et al* (2006) with the vegetation described as Klerksdorp thornveld. Land use in the general area is characterized by agriculture, dominated by cattle farming. The study area is characterised by sandy to loamy soil while the southern portion was previously disturbed by quarries and the northern section by old agricultural fields. Currently the site has been fallow for a number of years.

1.3.2. Location Map

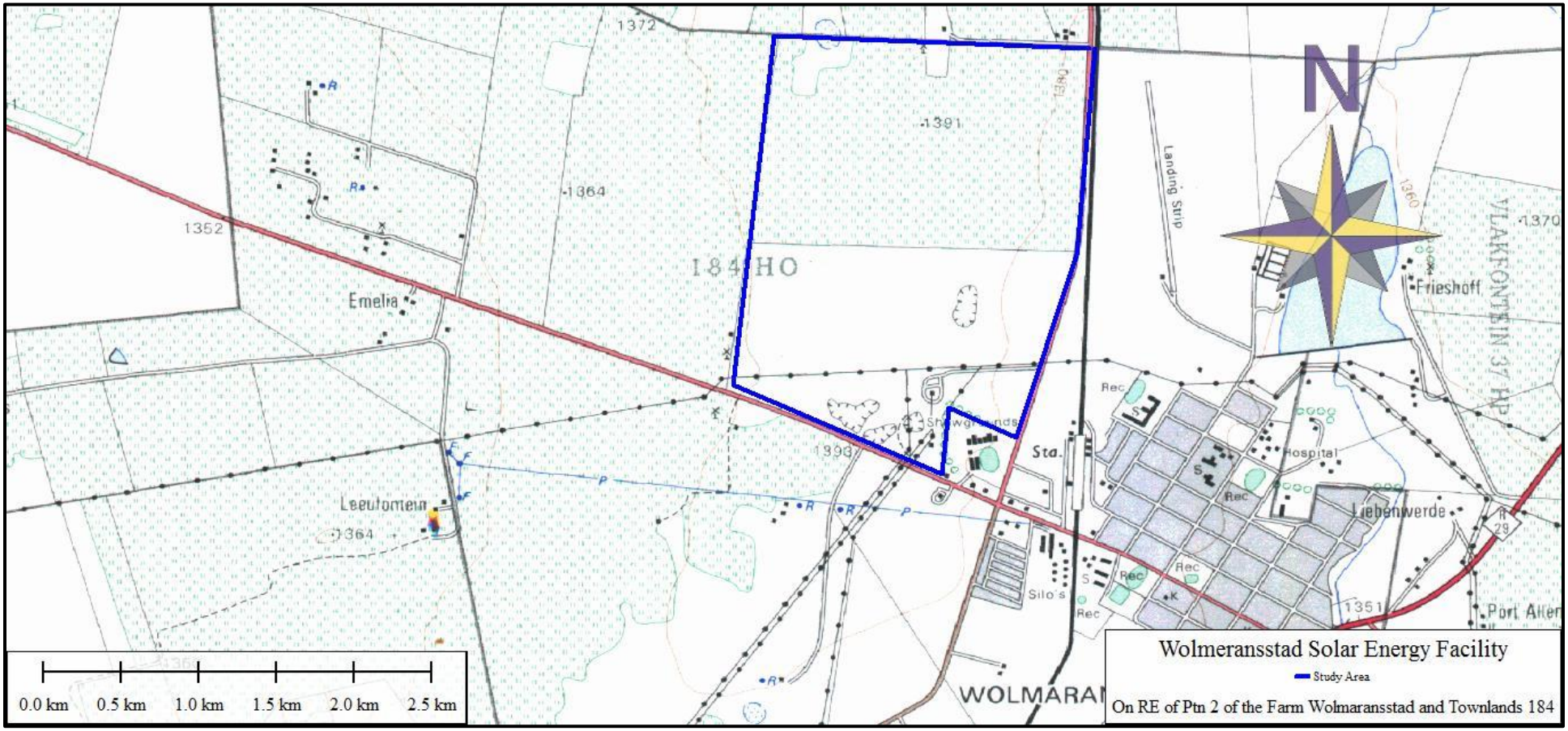

Figure 1: Locality Map.

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 and 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
Utilising data for information gathering stored in the archaeological database at Wits, previous CRM reports done in the area and a search in the National archives. 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.

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 450 ha was conducted, 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 over a period of 3 days.

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 proposed 75MW solar energy facility is proposed to comprise the following infrastructure to be situated within a development footprint of up to 240 hectares in extent:

- Photovoltaic (PV) panels of between 4m – 6m in height (fixed or tracking technology). Individual PV cells are linked and placed behind a protective glass sheet to form a photovoltaic panel.
- PV panel support structure - The PV panels will be attached to a steel support structure set at an angle so to receive the maximum amount of solar radiation. The angle of the panel is dependent on the latitude of the proposed facility and the angles may be adjusted to optimise for summer or winter solar radiation characteristics.
- Cabling between the project components, to be lain in trenches ~ 1-2m deep.
- Power inverters between the PV arrays (±4.5m^2) - The photovoltaic effect produces electricity in direct current. Therefore an inverter must be used to change it to alternating current.
- Construction laydown areas.
- Power lines to evacuate the generated power into the Eskom grid via the Goat DS substation.
- Internal access roads (up to 7m wide).
- Water storage facility/ reservoir (1 000 m^3).
- Office, workshop area for maintenance and storage (50m^2)

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. Dreyer (2007b) completed a survey in the Wolmaransstad area and identified two cemeteries in the area. Dreyer (2007a) also conducted a project for a power line to the east of Wolmaransstad but found no sites of significance close to the study area. Previous studies by van der Walt concurred with these findings (2014).

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 proposed two alternatives. 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.

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. The Matlwase LSA site is on record close to Wolmaransstad (Geskiedenisatlas van Suid-Afrika 1999). Several sites with recorded rock engravings are to be found in the greater study area (Geskiedenisatlas van Suid-Afrika 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.

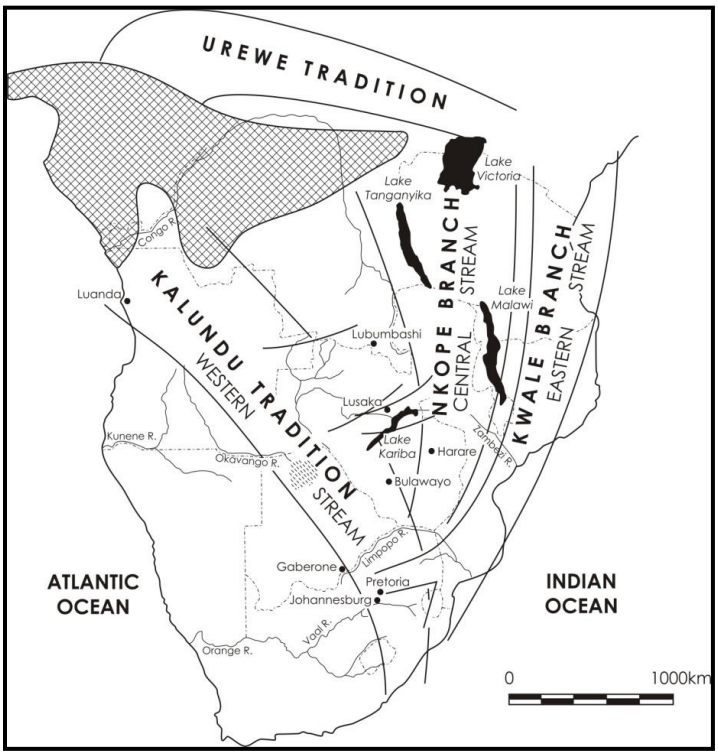

Figure 2: Movement of Bantu speaking farmers (Huffman 2007)

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 southern periphery of distribution of Late Iron Age settlements in the North West Province. However to the north west of the study area towards Zeerust and towards Mafikeng, the area is well known for Later Iron Age stone walled settlements archaeologically referred to as Molokwane settlements (Pistorius 1992, Booyens 1998, Huffman 2007). Geskiedenisatlas van Suid-Afrika (1999) recorded some 88 Late Iron Age sites to the West of the study area towards Klerksdorp. No sites dating to this period was recorded in the study area.

4.3 Palaeontology

An independent paleontological study by Dr John Almond for the area concluded in a recommendation for exemption from further studies for the area.

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 the general study area

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 of the study area in relation to Wolmaransstad, Klerksdorp and Potchefstroom.

5.3. A Brief History of the greater study area

Wolmaransstad is located close to the Makwassie River. The name Makwassie is a San word, and is derived from the vast number of aromatic wild spearmint bushes that grew alongside the river. Fourteen kilometers south of Wolmaransstad lay the village of Makwassie. It was the site of one of the first mission stations in the North-West Province, established by two Wesleyan missionaries, Thomas Hodgson and Samuel Broadbent in 1822. They embarked on mission work among the Seleka baRolong of Sefunelo.

The Difaqane (Sotho), or Mfekane ("the crushing" in Nguni) was a time of bloody upheavals in Natal and on the Highveld, which occurred around the early 1820's until the late 1830's. (Geskiedenisatlas van Suid-Afrika 1999: 10) The greater study area also had its share of conflict with Ndebele attacks documented close by in 1826 and 1829 (Geskiedenisatlas van Suid-Afrika 1999). This movement came about in response to heightened competition for land and trade, and caused population groups like gun-carrying Griquas and Shaka's Zulus to attack other tribes. (Geskiedenisatlas van Suid-Afrika 1999: 14; 116-119)

During the difaqane the mission station was abandoned, after the baRolong were attacked by the Phuting.

Sefunelo returned to the Makwassie region in 1825, but was driven away once again, this time by the baTaung. Hodgson, who revisited Makwassie in August 1825, wrote that most of the houses which he had left occupied by inhabitants peacefully living together were burnt down, and the cattle kraals, gardens etc, were destroyed. Sefunela's people took up a migratory existence along the Vaal River.

During the time of the Difaqane, a northwards migration of white settlers from the Cape was also taking place. Some travellers, missionaries and adventurers had gone on expeditions to the northern areas in South Africa, some already as early as the 1720's. Travellers that moved through the Wolmaransstad area included: Bain in 1834 and Harris who travelled through the area to the east of where Wolmaransstad is today.

The Voortrekkers were the next whites to enter and to settle in the Wolmaransstad district in the forties. From 1845 onward they gradually moved westward from Potchefstroom to settle in the present Wolmaransstad district. This stage of settlement was completed around 1870 when all the farms available in the district had been occupied. Farming in the area had many challenges.

5.4 History of Wolmaransstad

Until 1876 when T.S. Leask opened a trading store at Makwassiespruit, farming was the only economic activity in the district. But this introduced a new era in which trading was practised in addition to farming. In effect the opening of the store was the establishment of the town. The store soon became a venue for traders, hunters, farmers and transport riders. Eventually a settlement grew around the store which by the outbreak of the Anglo-Boer War had become the town of Wolmaransstad. Among the landmarks in this process of development of the town and district were the proclamation of the town in 1891, being named after J.M. A. Wolmarans, a member of the Executive Council of the South African Republic (SAR).

The proclamation of Wolmaransstad as a separate magisterial district followed in 1894, the demarcation of district boundaries in 1895, the appointment of a magistrate in 1896 and the building of a gaol and police station in 1896 and 1897 respectively. The first hotel was erected in 1888 followed by the extension of postal amenities through the introduction of a telegraph office in 1889 and money-order facilities in 1891. A health committee was established in 1896 whilst a lawyer and a medical practitioner opened their practices in 1896 and 1899 respectively. In the religious field the people of the district had to rely upon the services of visiting parsons from the three Afrikaans denominations from Potchefstroom. They conducted religious services in the Makwassie area at least once per year to administer the baptism, the Holy Communion and the confirmation. The Rev. D. van der Hoff of the Hervormde Kerk at Potchefstroom played a prominent role in this connection (Coetzer 1986).

In 1905 the railway from Cape Town to Johannesburg was built. A station was established at Makwassie, which served as a junction as a branch line to Wolmaransstad and other towns to the north.

The town was predominantly established to serve an agricultural community which produced maize. Later ground-nuts were also cultivated. A branch of the South-Western Transvaal Agricultural Co-operative was established at Makwassie in the 1920s. It was an offshoot of the original Wolmaransstad Kooperative Landbou Vereeniging established in 1909. Most of the African population in the Wolmaransstad region in the twentieth century was tenants living on white farms. Few lived under powerful traditional leaders, and many became sharecroppers on white owned farms.

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 of the proposed PV layout footprint, power line for connection to the grid and access routes as indicated in Figure 1 and 5. The study area consists of a featureless flat landscape with high grass cover after the summer rains and archaeological visibility is low (Figure 6 -9). The study area is disturbed by earthworks presumably for sand mining and the remaining area was extensively ploughed in the past and the contours are clearly visible on satellite imagery (Figure 4). Several stone cairns (Figure 4) occur throughout the project area. The cairns are attributed to clearing of the agricultural fields in order to plough the area (Figure 10, 11 and 12) and cut marks are visible on the stones. Some of these were mapped to provide the reader with an idea of the distribution and frequency of these cairns; however it is assumed that more occur in the area. One cluster of approximately 10 stone cairns occurs on the north western periphery of an abandoned quarry that could possibly be informal graves (Marked as possible graves on Figure 4). Some of these cairns are orientated north to south while others are orientated east to west. These cairns vary in size from the smallest measuring 700 x 650 cm and the largest 1.5 x 1 meter. The stone cairns are located at S27 10 42.4 E25 57 53.1 (Figure 4).

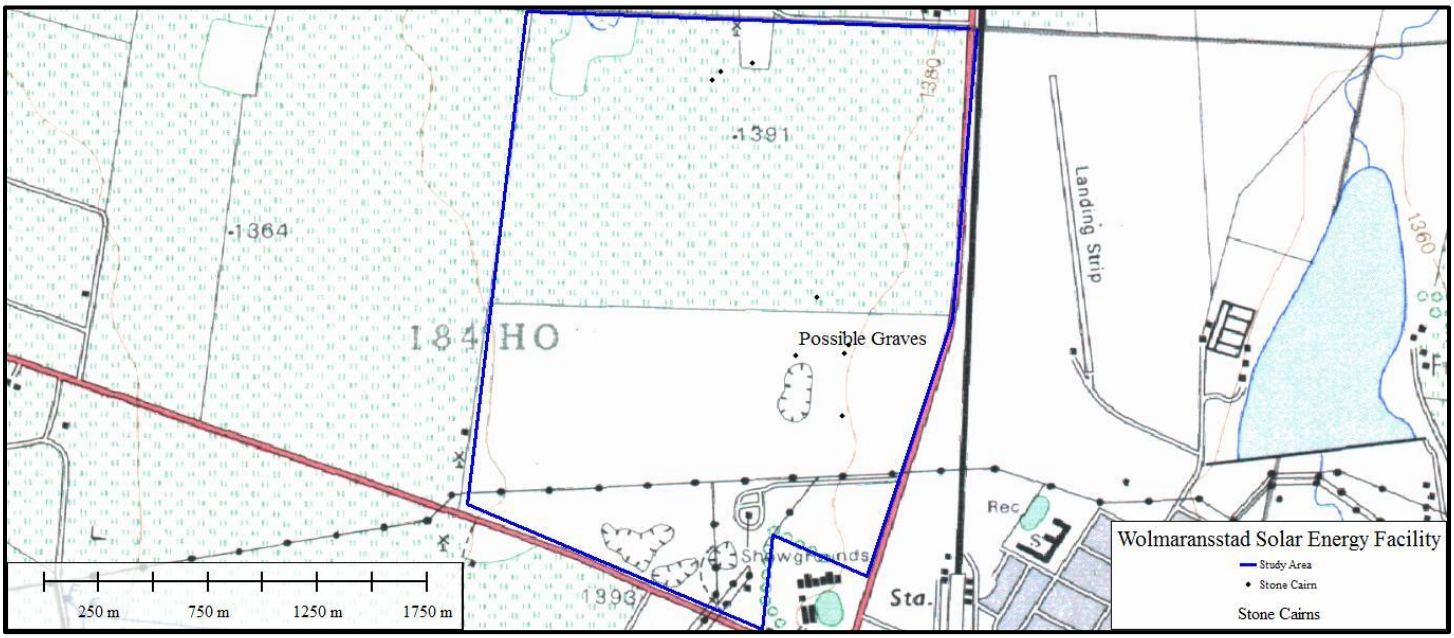

Figure 4: Distribution of stone cairns in the study area.

Table 1. Co-ordinates of stone cairns

S27° 10.683' E25° 58.015'
S27° 10.703' E25° 58.005'
S27° 10.857' E25° 58.000'
S27° 10.565' E25° 57.938'
S27° 09.991' E25° 57.779'
S27° 10.010' E25° 57.701'
S27° 10.033' E25° 57.679'
S27° 10.707' E25° 57.885'

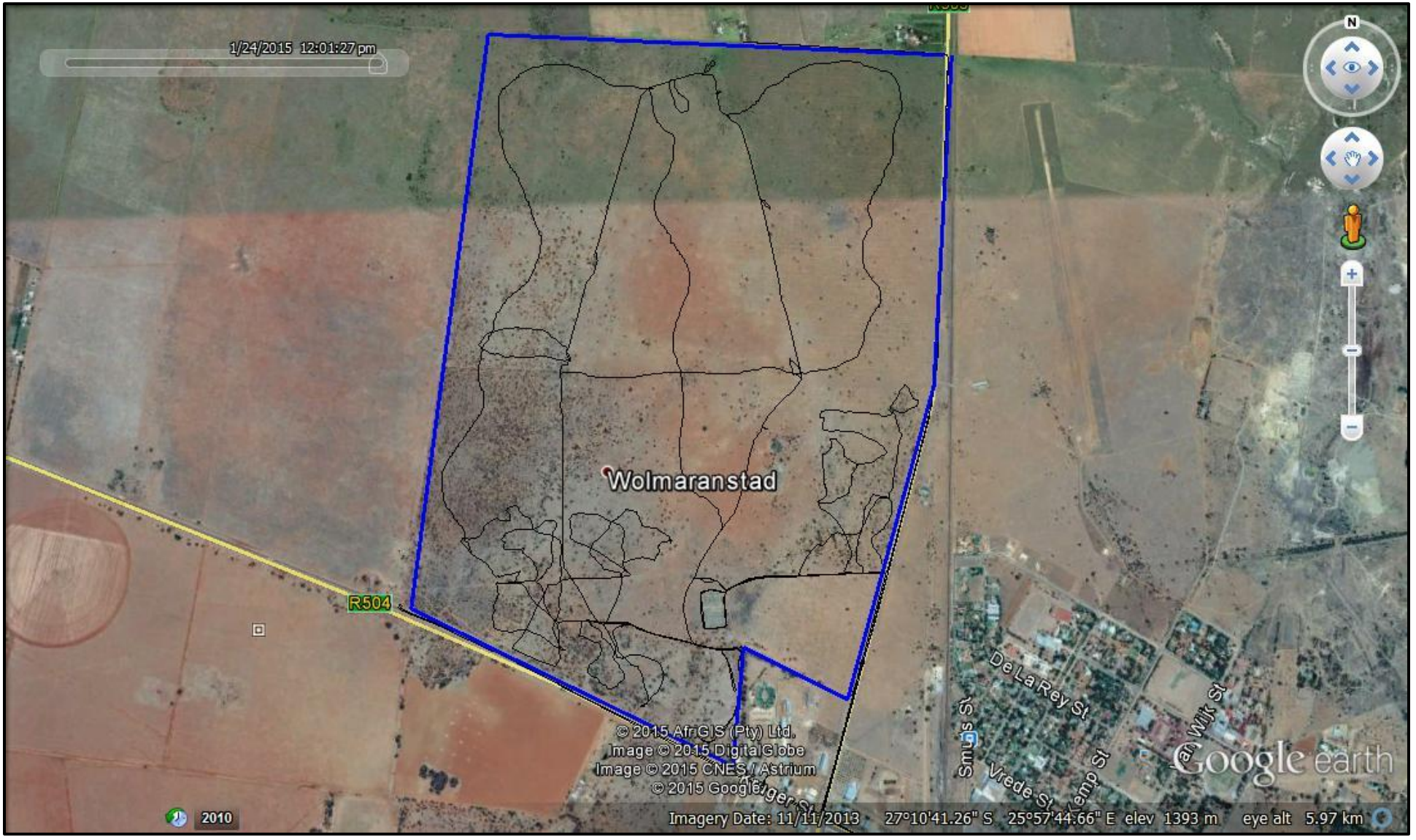

Figure 5: Google Image showing the study area (blue) and track log (black) of the areas that were covered during the survey.

Figure 6. Site conditions in the western portion of the study area.

Figure 7. Site conditions in the western portion of the study area.

Figure 8. South western portion of study area.

Figure 9. South Western portion of study area.

Figure 10: Stone cairn.

Figure 11: Stone cairn.

Figure 12: Stone cairn.

Figure 13: Stone cairn at possible grave site

Nature: Construction of PV Facility		
	Without mitigation	**With mitigation**
Extent	**Low (1)**	**Low (1)**
Duration	**Permanent (5)**	**Permanent (5)**
Magnitude	**Moderate (6)**	**Small (1)**
Probability	**Probable (3)**	**Probable (3)**
Significance	**Medium (36)**	**Low (21)**
Status (positive or negative)	**Negative**	**Negative**
Reversibility	**Low**	**Low**
Irreplaceable loss of resources?	**Yes**	**Yes**
Can impacts be mitigated?	**Yes**	
Mitigation: The social team should establish whether the cairns can be positively identified as graves. If this is confirmed it is recommended that this area is not considered for the PV facility and fenced off with an access gate for family member and a buffer zone of 20 meters. If the cairns cannot be confirmed to be graves a chance find procedure must be implemented during construction of the PV facility.		

8. RECOMMENDATIONS AND CONCLUSIONS

The impact to heritage resources by the proposed development are considered to be low and no further archaeological mitigation is proposed prior to construction. The study area is disturbed by earth works/borrow pits and was extensively ploughed in the past. These activities would have impacted on any surface indication of heritage sites. No sites of significance were identified during the survey and desktop study, and no red flags were identified. However several stone cairns are found throughout the study area possibly a result of clearing of agricultural fields for ploughing as most of these have cut marks on them. Although unlikely there is a possibility that some of these might represent informal graves especially the area marked as "possible graves" on figure 4. In order to avoid accidental damage to graves by the project it is recommend that the social consultation team should investigate whether the identified cairns could possibly be graves. If this is confirmed it is recommended that this area is not considered for the PV facility and fenced off with an access gate for family member and a buffer zone of 20 meters. If the cairns cannot be confirmed to be graves a chance find procedure must be implemented during construction of the PV facility.

It is also recommended that chance find procedures are put in place during the construction period to mitigate any accidental finds as described below.

Chance finds procedure

This procedure applies to the developer's permanent employees, its subsidiaries, contractors and subcontractors, and service providers. The aim of this procedure is to establish monitoring and reporting procedures to ensure compliance with this policy and its associated procedures. Construction crews must be properly inducted to ensure they are fully aware of the procedures regarding chance finds as discussed below.

- If during the construction, operations or closure phases of this project, any person employed by the developer, one of its subsidiaries, contractors and subcontractors, or service provider, finds any artefact of cultural significance, this person must cease work at the site of the find and report this find to their immediate supervisor, and through their supervisor to the senior on-site manager.
- It is the responsibility of the senior on-site Manager to make an initial assessment of the extent of the find, and confirm the extent of the work stoppage in that area.
- The senior on-site Manager will inform the ECO of the chance find and its immediate impact on operations. The ECO will then contact a professional archaeologist for an assessment of the finds who will notify the SAHRA.

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 study area. There are no buildings or other structures within the development footprint and therefore no impact on the built environment is expected.

An independent Palaeontological desktop study (Dr Almond 2015) was conducted for the project area and recommended exemption from further palaeontological work or mitigation.

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.

If the recommendations as made in section 8 of this report are adhered to (subject to approval from SAHRA) there is from an archaeological point of view no reason why the development should not proceed If any possible finds such as tool scatters, bone or fossil remains are exposed or noticed during construction, the operations must be stopped and a qualified archaeologist must be contacted to assess 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.

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