

Archaeological Impact Assessment

For the Mareetsane Batho-Batho Solar PV Facility Power Line, North West Province.

Prepared For

SE Solutions

By



HERITAGE

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EXECUTIVE SUMMARY

Site name and location: The proposed 88kV power line route from the already approved Mareetsane Batho-Batho Solar PV Facility is located south of Mareetsane in the Stella district, North West Province. The study area falls within the Ratlou Local Municipality.

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 impact area of the proposed power line.

1:50 000 Topographic Map: 2625 AB

Environmental Consultant: SE Solutions

Developer: Kgatelopele Private Equity and Venture Capital (Pty) Ltd (KPEVC)

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

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Date of Report: 12 December 2014

Findings of the Assessment:

The new preferred power line route for the existing Mareetsane Batho-Batho PV Solar Facility was assessed over a period of one day and the proposed alignment with a corridor of 40 meter was surveyed on foot and by vehicle. During the survey no sites of archaeological significance (Iron Age or Stone Age) was noted although 3 cemeteries were recorded. Two of these cemeteries (Cemetery 2 & 3) was also recorded during the HIA for the Mareetsane Batho-Batho PV Solar Facility (Seliane 2013). Of the three recorded cemeteries only cemetery 2 is located within the 40 meter power line corridor (approximately 6 meters north of the centre of the line) and will require mitigation. The identified graves are ancestral graves that belong to the communities and farmers who used to reside in the area and are of importance to the community who might have direct links to sites. It is therefore recommended that cemetery 2 is preserved *in-situ* and fenced off (with a 2 meter buffer zone around the graves) with an access gate for family members and that no pylon is situated within 15 meters of the cemetery. It is also recommended that during the social study local informants point out graves within the proposed corridor as more grave sites can be expected. It is also recommended that a heritage walk down is conducted of the line prior to construction when the pylon positions are fixed.

If these recommendations are adhered to there is from an archaeological point of view no reason why the development cannot commence work based on approval from SAHRA.

General

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.

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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- Recommendations delivered to the Client.

CONTENTS

EXECUTIVE SUMMARY	3
GLOSSARY	7
1 BACKGROUND INFORMATION.....	7
1.1 Terms of Reference	9
1.2. Archaeological Legislation and Best Practice	9
1.3 Description of Study Area	11
1.3.1 <i>Location Data</i>	11
1.3.2. <i>Location Map</i>	12
2. APPROACH AND METHODOLOGY	13
2.1 Phase 1 - Desktop Study	13
2.1.1 <i>Literature Search</i>	13
2.1.2 <i>Information Collection</i>	13
2.1.3 <i>Consultation</i>	13
2.1.4 <i>Google Earth and Mapping Survey</i>	13
2.1.5 <i>Genealogical Society of South Africa</i>	13
2.2 Phase 2 - Physical Surveying.....	13
2.3. Restrictions.....	13
3. NATURE OF THE DEVELOPMENT	13
4. HISTORICAL AND ARCHAEOLOGICAL BACKGROUND OF THE STUDY AREA.....	14
4.1 Databases Consulted.....	14
4.2 Background Information for the study Area.....	15
4.2.1. The Stone Age.....	15
4.2.2. Iron Age (general)	15
4.2.3. Historical overview.....	16
4.2.4. A Brief History Of Human Settlement And Black And White Interaction In The Farm Area	17
5. HERITAGE SITE SIGNIFICANCE AND MITIGATION MEASURES.....	18
5.1. Field Rating of Sites	20
5.2. Impact assessment of finds.....	20
5.2.1 Nature of the impact	20
5.2.2 Scale/extent of the impact	20
5.2.3 Duration of the impact.....	21
5.2.4 Intensity or severity of the impact	22
5.2.5 The probability (or likelihood) of the impact occurring	23
5.2.6 Impact significance before mitigation	23
5.2.7 Impact significance after mitigation.....	24
5.2.8 Ascribing significance to cumulative impacts.....	24
6. BASELINE STUDY-DESCRIPTION OF SITES	24
7. RECOMMENDATIONS AND CONCLUSIONS.....	29
8. PROJECT TEAM	29
9. STATEMENT OF COMPETENCY	30
10. REFERENCES.....	31

FIGURES

Figure 1: Location map showing the study area in blue.	12
Figure 2: Movement of Bantu speaking farmers (Huffman 2007)	16
Figure 3: The location of cemetery 1 in relation to the proposed power line.	26
Figure 4: The location of Cemetery 2 & 3 in relation to the proposed power line.....	27
Figure 5. Thick vegetation in study area.....	28
Figure 6. Cultivated areas in the study area.....	28
Figure 7. General site conditions in the northern section of the study area.	28
Figure 8. Cemetery 1 viewed from the east.	28

Annexure A**Track logs of the Survey**

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	Power Line
Developer:	Kgatelopele Private Equity and Venture Capital (Pty) Ltd (KPEVC)

Consultant:

SE Solutions

The Archaeological Impact Assessment report forms part of the BIA 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 desktop study that includes collection from various published and unpublished sources; Phase 2, the physical surveying of the area on foot and by vehicle; Phase 3, reporting the outcome of the study.

During the survey three grave sites were identified within the proposed power line alignment. 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

Conducting 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 a legal body, 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 Mareetsane Batho-Batho Solar PV Facility will be located on Tribal Land approximately 10 km south-west of the Batho-Batho Village within the jurisdiction of the Ratlou Local Municipality (RLM), Ngaka Modiri Molema District Municipality (NMMDM) in the North West Province. The proposed 88KV power line consists of 40 m servitude on the following land portions Setlago Native Reserve, Duifenhoek, Jakkalsdans, Mooiplaas.

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 undulating and is characterised by deep sandy to loamy soils.

1.3.2. Location Map

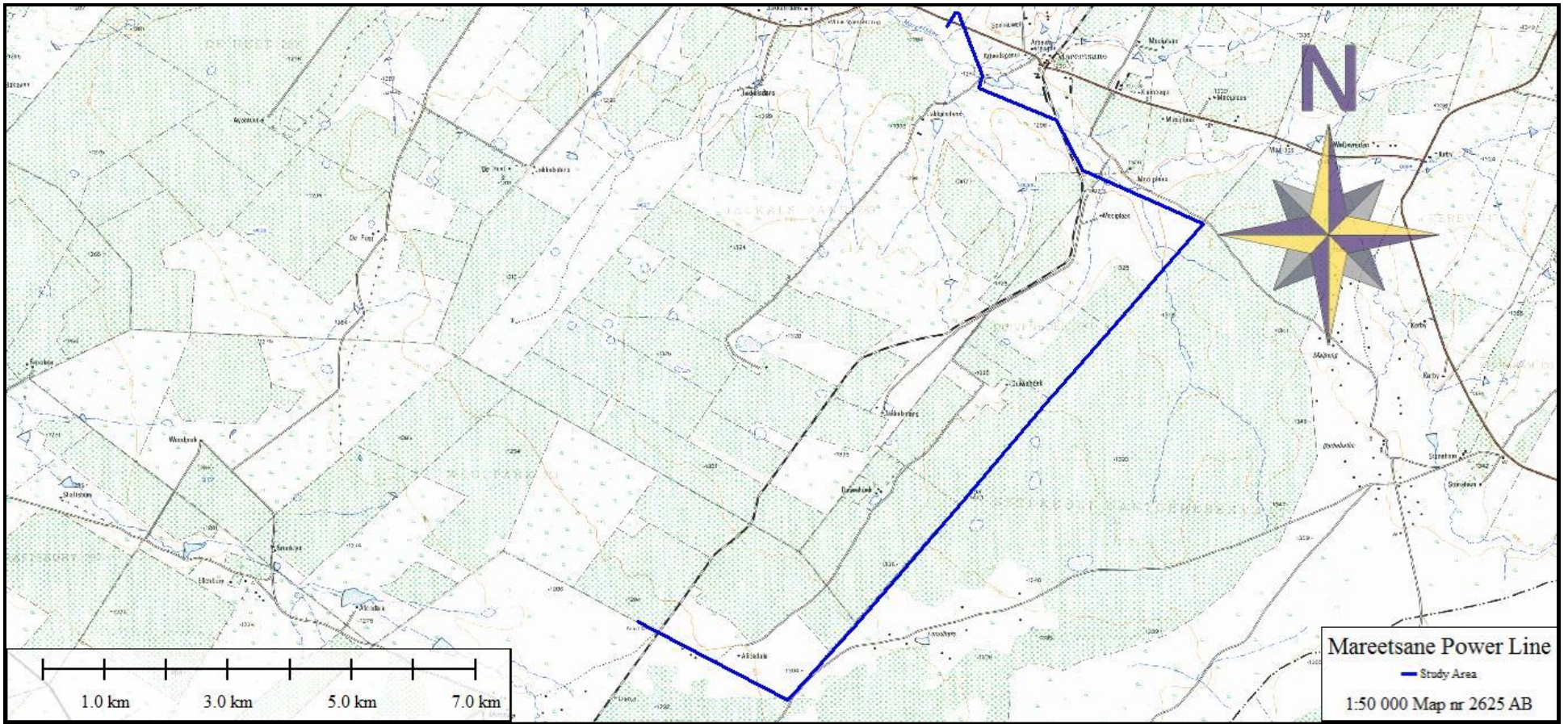


Figure 1: Location map showing the study area in blue.

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 desktop study scanning existing records for archaeological and historical sites as well as graves of the area.

2.1.1 Literature Search

Utilising data for information gathering stored in the archaeological database at Wits and previous CRM reports done in the area. The aim of this is to extract data and information on the area in question.

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

No consultation was conducted by the heritage specialist.

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 proposed power line of approximately 18 km was conducted. The study area was surveyed by means of vehicle and extensive surveys on foot by a professional archaeologist on the 2nd December 2014.

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. Low ground visibility of parts of the study area is due to high vegetation, and the possible occurrence of unmarked graves and other cultural material cannot be excluded.

Only the power line alignment was surveyed as indicated in the location map, and not the entire farm. 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. At the time of the survey access roads and the location of construction camps was not known and was not surveyed.

3. NATURE OF THE DEVELOPMENT

The 88kv power line will include the following:

- » Construction of a contractor's camp and lay-down yard;

- » Clearing of servitudes to accommodate the new power line;
- » Construction of foundations and implementation of the 21 m high transmission poles; and
- » Installation of overhead lines.

4. HISTORICAL AND ARCHAEOLOGICAL BACKGROUND OF THE STUDY AREA

4.1 Databases Consulted

Through CRM reports on the area together with secondary source material, primary sources, maps and online sources the study is contextualised. Only 1 Previous CRM study was conducted in the general study area. Seliane (2013) conducted a HIA for the Mareetsani solar facility that is associated with the current project. 10 Cemeteries were recorded.

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.

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 in the study area.

4.2 Background Information for the study Area

4.2.1. The 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 \pm 2.5 million yrs. - \pm 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 \pm 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 \pm 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.

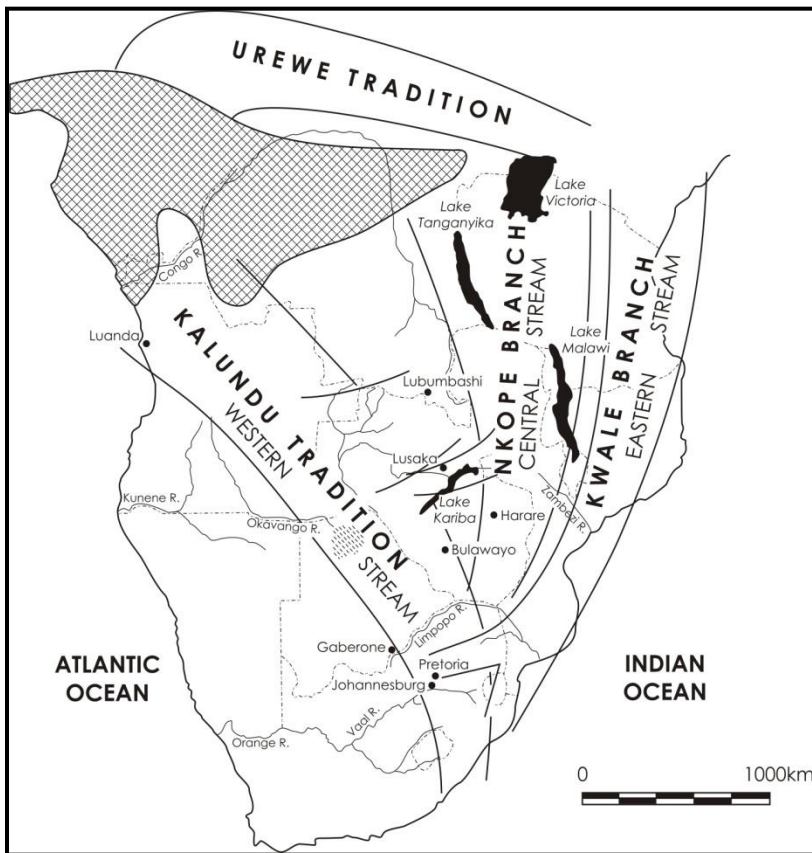


Figure 2: Movement of Bantu speaking farmers (Huffman 2007)

No Sites dating to the Iron Age have been recorded or is expected for the study area. 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.

4.2.3. Historical overview

The following report will endeavour to give an account of the history of this farm and also 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
- A history of specific land ownership and development of the farm, where this could be traced

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. Owing to the constraints in time and resources, this study should be viewed as an introduction to the history of the Lichtenburg area and the specific farm under investigation.

The following sources may be of interest if a further study of the area

- Du Preez, G. 1960. *Stigter van Lichtenburg, Kommandant H.A. Greeff*. Lichtenburg: Die outeur.
- Breutz, P. L. 1957. *Die Stamme van die distrikte Lichtenburg en Delareyville*. Pretoria: Government Printer.
- Anon. 1973. *Weerlig in die weste: 'n geskiedenis van Lichtenburg*. Johannesburg: Perskor.

4.2.4. A Brief History Of Human Settlement And Black And White Interaction In The Farm Area

Since the mid 1800's up until the present, South Africa has been divided and re-divided into various different districts. Since 1839, the study area formed part of the Potchefstroom district. This remained the case up until 1883, when the Lichtenburg district was proclaimed. In 1977 South Africa was divided into various smaller Magisterial Districts, and Lichtenburg fell under the jurisdiction of the Lichtenburg Magisterial District. This was still the case by 1994. (Geskiiedenisatlas van Suid-Afrika 1999: 17, 20-27)

J. S. Bergh's historical atlas of the four northern provinces of South Africa is a very useful source for the writing of local and regional history. According to this source no signs of major Stone Age or Iron Age terrains are present in the vicinity of the farm area. (Geskiiedenisatlas van Suid-Afrika 1999: 4-5, 7)

At the beginning of the 19th century the Rolong was the prominent tribe in the area where Lichtenburg is located today. This tribe would however be displaced during the Difaqane. 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. It 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. (Geskiiedenisatlas van Suid-Afrika 1999: 10, 14; 116-119)

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. In 1821 the traveller Coenraad De Buys travelled close by Lichtenburg from the southern provinces in the direction of Lotsane, a black village. De Buys had apparently clashed with the authorities on the eastern border, and thereafter migrated across the Orange River with his black wives and colourer children. (Geskiiedenisatlas van Suid-Afrika 1999: 12, 118)

It was however only by the late 1820's that 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 under British rule 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)

As can be expected, the movement of whites into the northern provinces would have a significant impact on the black people who populated the land. Farms were surveyed in a large area, which included the present-day Rustenburg district, between 1839 and 1840. (Geskiiedenisatlas van Suid-Afrika 1999: 15) By 1860, the population of whites in the central Transvaal was already very dense and the administrative machinery of their leaders was firmly in place. Many of the policies that would later be entrenched as legislation during the period of apartheid had already been developed. (Geskiiedenisatlas van Suid-Afrika 1999: 170)

The Anglo-Boer War, which took place between 1899 and 1902 in South Africa, 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)

A battalion of British troops led by Lieutenant General A. Hunter marched through Lichtenburg on 3 June 1900, whereas the Boer war-hero General Jacobus Herculaaas de la Rey (more commonly known as Koos de la Rey) arrived in Lichtenburg on 10 October 1900. It is possible that De la Rey's troops moved through the farm area, or very close by. (Geschiedenisatlas van Suid-Afrika 1999: 51)

One of the Anglo-Boer War battles took place a short distance to the north of Lichtenburg. General De la Rey's Boer troops attacked the British battalion of General Money on 3 March 1901. (Geschiedenisatlas van Suid-Afrika 1999: 54)

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 quarry extension 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 assessment of finds

The potential impacts identified by specialists for the new preferred powerline route will be assessed in terms of the following criteria, specified in the EIA Regulations:

5.2.1 Nature of the impact

The nature of an impact refers to a description of the inherent features, characteristics and/or qualities of the impact. Thus, each impact will be comprehensively detailed and contextualised prior to being assessed.

5.2.2 Scale/extent of the impact

Extent refers to the impact footprint. What that means is that if a species were to be lost then the extent would be global because that species would be lost to the world. If human health is threatened then the impact is likely to be no more than local and possibly (in the case of a nuclear power station) regional.

Table 1: Listing of descriptors for the extent of an impact together with definitions that serve to assist in selecting the appropriate rating.

Extent Descriptors	Definitions	Rating
Site	The impact footprint remains within the cadastral boundary of the site	1
Local	The impact footprint extends beyond the cadastral boundary of the site, to include the immediately adjacent and surrounding areas	2
Regional	The impact footprint includes the greater surrounding area within which the site is located	3
National	The scale/ extent of the impact is applicable to the Republic of South Africa	4
Global	The scale / extent of the impact is global (or world-wide)	5

5.2.3 Duration of the impact

Duration is the period of time for which the impact would be manifest. Importantly the concept of reversibility is reflected in the duration scoring. In other words, the longer the impact endures the less likely is the reversibility of the impact.

Table 2: Listing of descriptors for the duration of an impact together with definitions that serve to assist in selecting the appropriate rating.

Duration Descriptors	Definitions	Rating
Construction/ Decommissioning period only	The impact endures for only as long as the Construction/ Decommissioning period of the proposed activity. This implies the impact is fully reversible.	1
Short term	The impact continues to manifest for a period of between 3 – 10 years. The impact is reversible.	2
Medium term	The impact continues to manifest for a period of 10-30 years. The impact is reversible with relevant and applicable mitigation and management actions.	3
Long term	The impact continues for a period in excess of 30 years. However, the impact is still reversible with relevant and applicable mitigation and management actions.	4
Permanent	The impact will continue indefinitely and is irreversible.	5

5.2.4 Intensity or severity of the impact

The concept of **intensity potential** is an important point of departure. This provides the acknowledgement at the outset of the potential significance of the impact.

The second important part of intensity potential is that it provides a measure for comparing significance across different specialist assessments. What this means is that specialists will have to select a potential intensity rating from the tables below that best describes the nature of the impacts identified by the specialist. Note that the EAP has defined the intensity/ severity descriptors together with their appropriate ratings, specialists are required to select the appropriate rating only when ascribing significance to various impacts. This will allow for efficient comparing of significance across specialist assessments to allow for an integrated assessment of the project as a whole.

Table 3: Listing of descriptors for the intensity/ severity of an impact together with definitions that serve to assist in selecting the appropriate rating.

Descriptors: potential consequence (negative)	Rating	Score
Human health – morbidity/mortality. Loss of species.	High	16
Reduced faunal populations, loss of livelihoods, individual economic loss,	Moderate-high	8
Reduction in environmental quality – air, soil, water. Loss of habitat, loss of heritage, amenity	Moderate	4
Nuisance	Moderate-low	2
Negative change – with no other consequences	Low	1

Descriptors: potential consequence (positive)	Rating	Score
Net improvement in human welfare	Moderate-high	8
Improved environmental quality – air, soil, water. Improved individual livelihoods	Moderate	4
Economic development	Moderate-low	2
Positive change – with no other consequences	Low	1

5.2.5 The probability (or likelihood) of the impact occurring

Likelihood is the likelihood of the impact intensity (consequence) manifesting so the 0.1, 0.2, 0.5, 0.75 and 1 serve to illustrate that if an impact is unlikely to manifest then its intensity/consequence score will be reduced and the resultant significance reduced. Although likelihood and probability may be considered interchangeable, the term likelihood is preferred as probability has a very specific mathematical and/ or statistical connotation. As such the expectation created by the term probability is that there will be an accurate empirically or mathematically defined expression of risk, which is not necessarily required.

Table 4: Listing of descriptors for the intensity/ severity of an impact together with definitions that serve to assist in selecting the appropriate rating

Likelihood/ Probability Descriptors	Definitions	Rating
Improbable	The possibility of the impact occurring is negligible and only under exceptional circumstances.	0.1
Unlikely	The possibility of the impact occurring is low with a less than 10% chance of occurring. The impact has not occurred before.	0.2
Probable	The impact has a 10-40% chance of occurring. Only likely to happen once every three or more years.	0.5
Highly Probable	It is most likely that the impact will occur. A 41 – 75% chance of occurring.	0.75
Definite	More than 75% chance of occurrence. The impact occurs regularly.	1

5.2.6 Impact significance before mitigation

Environmental impacts identified will be evaluated according to the above-mentioned criteria. The significance of impacts will be derived through a synthesis of ratings of all criteria in the following calculation:

(Extent + Duration + Potential Intensity) x Probability/Likelihood = Significance before Mitigation

The significance of a potential impact on decision-making is indicated through significance points. Significance points indicate the following:

Table 5: Listing of descriptors for the significance score of an impact.

Descriptors	Definitions	Rating
None	The project can be authorised	< 3
Low	The project can be authorised with a low risk to of environmental degradation	3 - 4
Moderate	The project can be authorised but with conditions and routine	5 – 8

	inspections	
High	The project can be authorised but with strict conditions and high levels of compliance and enforcement in respect of the impact in question	9 – 15
Fatally Flawed	The project cannot be authorised	> 15

5.2.7 Impact significance after mitigation

In order to reduce the significant of negative impacts and increase the significance of positive impacts, mitigation measures will be identified and discussed for each impact. The degree to which the impact can be mitigated (if negative) or enhanced (if positive) will be a function of whether the mitigation changes the intensity/ severity and/or the likelihood of the impact. Thus, once the mitigation measure/s have been described, a new significance rating will be determined by following the same steps detailed above, however taking the mitigation and controls into account.

5.2.8 Ascribing significance to cumulative impacts

Impacts cannot be assessed in isolation and an integrated approach requires that cumulative impacts will be included in the assessment of individual impacts. The nature of the impact will be described in such a way as to detail the potential cumulative impact of the activity, if there is indeed a cumulative impact.

6. BASELINE STUDY-DESCRIPTION OF SITES

It is important to note that the entire farm was not surveyed but only the proposed power line corridor as indicated in Figure 1. Certain sections of the study area are marked by thick vegetation cover (Figure 5) most notably in the southern and northern sections of the line. The area within the Setlagoli native reserve is largely under cultivation (Figure 6) and the study area is characterised by deep sandy to loam soils and no rocky outcrops or locally available raw material for the manufacture of stone tools was identified within the 40 meter corridor. No archaeological sites were recorded. However three cemeteries were recorded (Figure 3 & 4). Two of these (Cemetery 2 & 3) were also recorded during the HIA for the Mareetsane Batho-Batho Solar PV Facility (Seliane 2013). Of these three cemeteries only Cemetery 2 are within the impact area of the proposed power line corridor.

Cemetery 1 (S26.16683 E25.43653)

The site is located approximately 169 meter to the south of the proposed line on the farm Mooiplaas. The cemetery is in a derelict state with most of the headstones broken. The graves are aligned east to west and consist of at least 10 graves. The oldest visible date on the broken headstones is 1906. There are at least two graves belonging to the Roodt family. These graves are older than 60 years and protected by the NHRA. The site is located well outside of the power line impact area and no direct impact is foreseen on the site. All graves are of high social significance.

Heritage significance: Generally Protected A (GP.A) - Grade 3B High significance
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Cemetery 2 (S26.22822 E25.36592)

This cemetery is located approximately 6 meters to the north of the proposed power line and a direct impact is expected on the site. The site is also located close to authorised Mareetsane Batho-Batho Solar PV Facility and corresponds to site 4 of the HIA for the project (Seliane 2013). According to this report the site consists of at least 5 graves marked by stone as grave dressings. All graves are of high social significance. EIA rating is also a high significance rating with a score of 8.25. Please refer to Section 7 for recommendations and mitigation measures.

Heritage significance: Generally Protected A (GP.A) - Grade 3B High significance
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Cemetery 3 (S26.23094 E25.36897)

This cemetery is located approximately 99 meters to the south of the proposed power line. The site is located close to authorised Mareetsane Batho-Batho Solar PV Facility and corresponds to site 5 of the HIA for the project (Seliane 2013). According to this report the site consists of at least 16 graves marked by stone as grave dressings. The site is located well outside of the power line impact area and no direct impact is foreseen on the site. All graves are of high social significance.

Heritage significance: Generally Protected A (GP.A) - Grade 3B High significance
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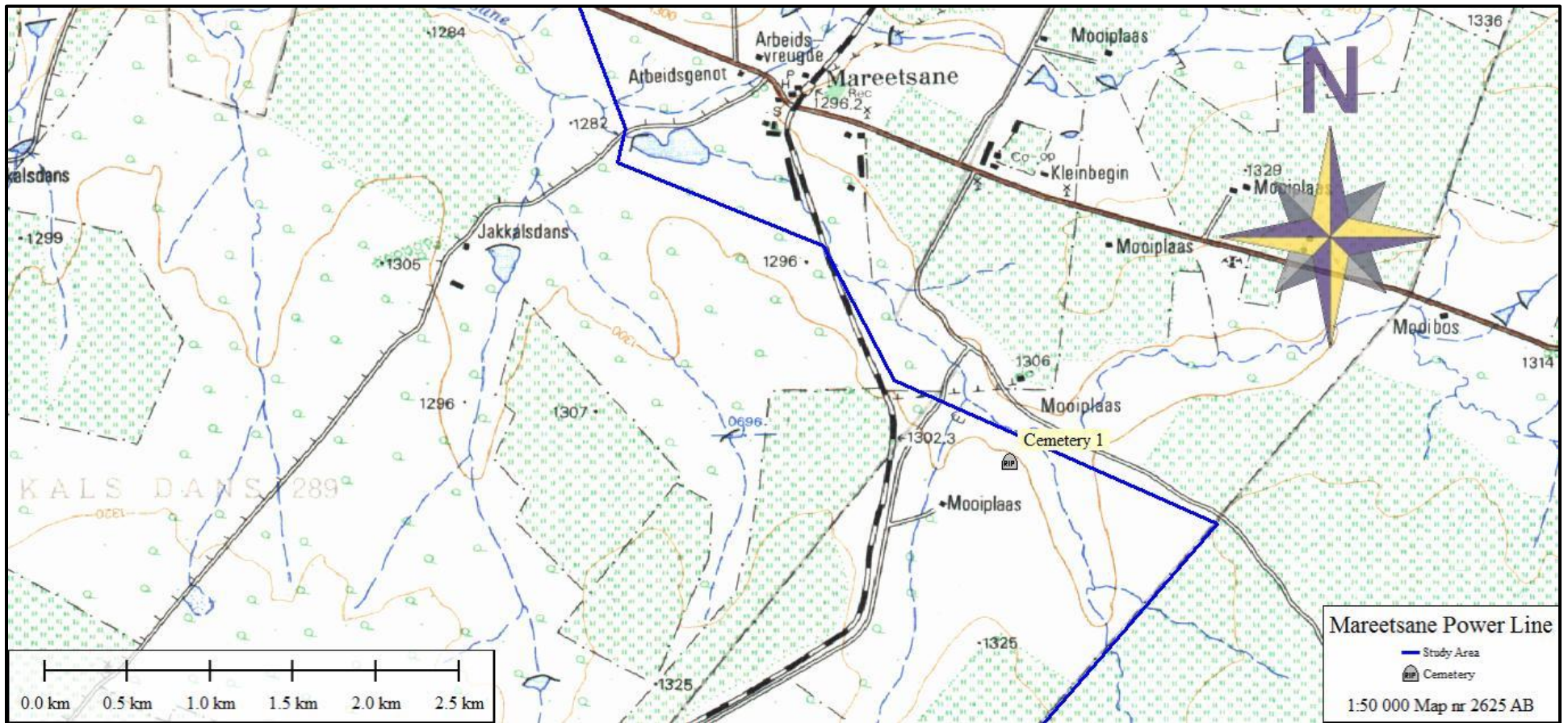


Figure 3: The location of cemetery 1 in relation to the proposed power line.

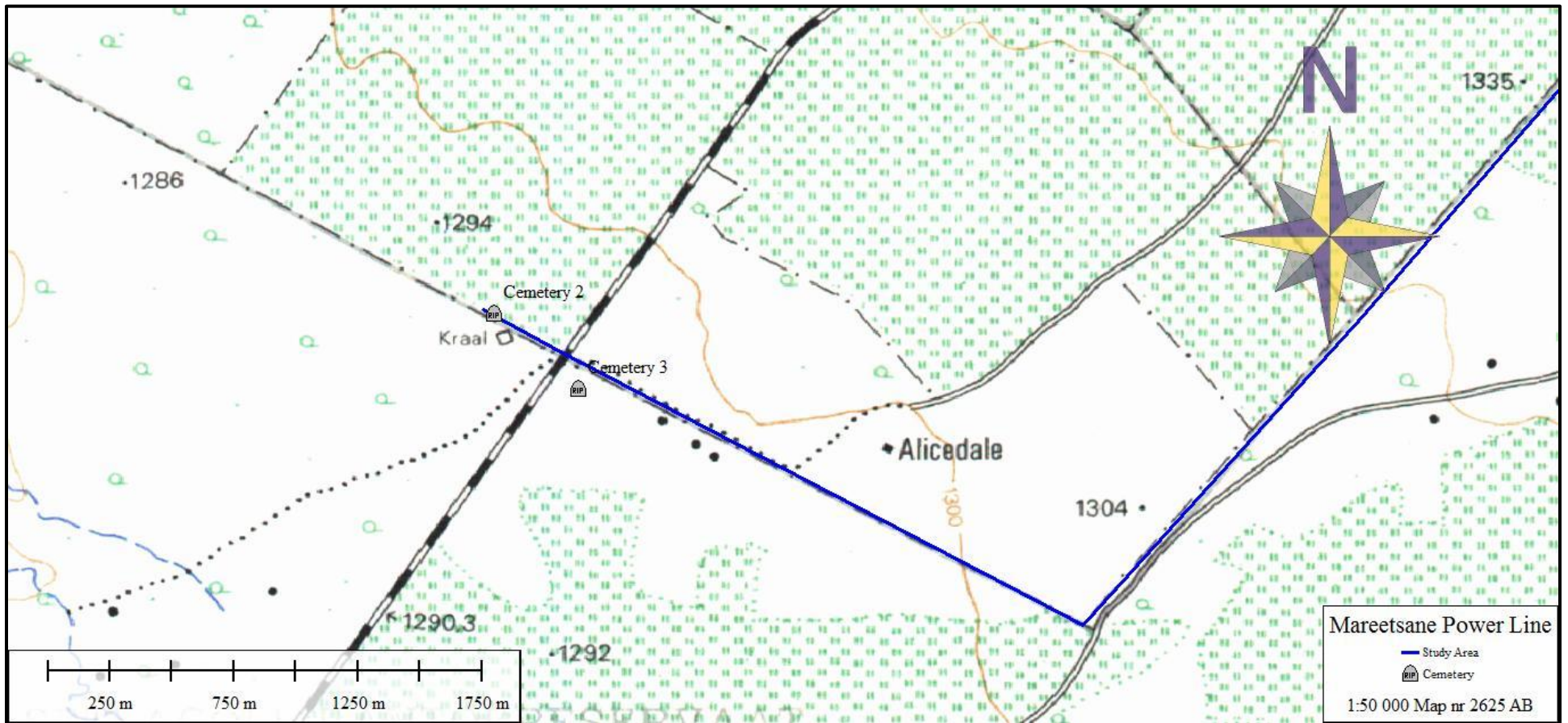


Figure 4: The location of Cemetery 2 & 3 in relation to the proposed power line



Figure 5. Thick vegetation in study area.



Figure 6. Cultivated areas in the study area.



Figure 7. General site conditions in the northern section of the study area.



Figure 8. Cemetery 1 viewed from the east.

7. RECOMMENDATIONS AND CONCLUSIONS

The new preferred power line route for the existing Mareetsane Batho-Batho PV Solar Facility was assessed for sites of archaeological significance. The site was visited over a period of one day and the proposed alignment with a corridor of 40 meter was surveyed on foot and by vehicle. During the survey no sites of archaeological significance (Iron Age or Stone Age) were noted although 3 cemeteries were recorded. Two of these cemeteries (Cemetery 2 & 3) were also recorded during the HIA for the Mareetsane Batho-Batho PV Solar Facility (Seliane 2013). Of the three recorded cemeteries only cemetery 2 is located within the 40 meter power line corridor (approximately 6 meters north of the centre of the line) and will require mitigation. The identified graves are ancestral graves that belong to the communities and farmers who used to reside in the area and are of importance to the community who might have direct links to sites. It is therefore recommended that cemetery 2 is fenced off (with a 2 meter buffer zone around the graves) with an access gate for family members and that no pylon is situated within 15 meters of the cemetery. It is also recommended that during the social study local informants point out graves within the proposed corridor as more grave sites can be expected. It is also recommended that a heritage walk down is conducted of the line prior to construction when the pylon positions are fixed.

It is further recommended that as part of the EMP the measures described in the table below are implemented to ensure that cemetery 2 is avoided during construction and protected *in situ*:

OBJECTIVE: Prevent disturbance and/or destruction of recorded cemetery.

Project component/s	All phases of construction.		
Potential impact	Damage/disturbance to cemetery (headstones, grave dressings etc).		
Activity risk/source	Construction workers and staff might unknowingly damage the site.		
Mitigation: target/objective	To retain cemetery in undisturbed condition.		
Mitigation: Action/control	Responsibility	Timeframe	
Ensure that workers and construction vehicles remain away from the cemetery on the current access road by demarcating the sites with danger tape and by fencing the sites.	Developer and ECO	Construction and Operation	
Performance indicator	Cemetery remains undamaged.		
Monitoring	No pedestrians or construction vehicles allowed inside the demarcated area.		

If these recommendations are adhered to there are from an archaeological point of view no reason why the development cannot commence work based on approval from SAHRA.

If during construction, any archaeological finds are made (e.g. stone tools, skeletal material), the operations must be stopped, and the archaeologist must be contacted for an assessment of the finds.

8. PROJECT TEAM

Jaco van der Walt, Project Manager

9. STATEMENT OF COMPETENCY

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

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

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Annexure A

Track logs of the survey

