

Archaeological Impact Assessment

For the Proposed Harmony Gold Eland PV facility in Welkom Free State Province.

Prepared For
Savannah Environmental (Pty) Ltd

By



HERITAGE



Contracts and Archaeological Consulting

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



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EXECUTIVE SUMMARY

Site name and location: The proposed Harmony Gold Eland PV facility at Harmony Gold, Welkom. The site falls within mining right properties owned by Harmony Gold close to Welkom, Free State.

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: 2726 DC

EIA Consultant: Savannah Environmental (Pty) Ltd

Developer: BBEntropie (Pty) Ltd

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

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Date of Report: 13 March 2015. Revised 5 May 2015. Revised 17 June 2015.

Findings of the Assessment:

The study area was assessed in terms of the archaeological component of Section 35 of the NHRA and considering that the study area has been highly disturbed mostly by mining activities it is highly unlikely that any significant heritage resources are still present within the study area. This was confirmed during the field survey of the study area and no surface indicators of archaeological (Stone or Iron Age) material was identified in the study area.

No standing structures occur within the study area although the demolished remains of mining related infrastructure occur throughout the study area. Due to the extent of the destruction of the features and the fact that these sites are most probably not older than 60 years these sites are of no heritage significance. Close to the demolished remains of these structures, various stone and brick cairns occur. These cairns are built using the rubble and bricks of the demolished structures and therefore post-date these structures.

After the fieldwork and reports was completed the location of the proposed PV facilities was moved and therefore the preferred site layout was not covered in detail as the survey covered an adjacent area where the facility was initially proposed. Hence the description and assessment of the facility stems from superficial observations and a desktop study only. The new layout does however cover an area that contains buildings as indicated on the 1: 50 000 maps of the site as well as Google images of the area. If these structures are still standing and are older than 60 years it is protected by the Heritage Act. It is recommended that if the preferred layout is chosen for the development that this area must be subjected to a phase 1 assessment prior to development.

Based on the results of the field survey of the proposed Eland PV facility there are no significant archaeological risks associated with the development. The stone/brick cairns might however indicate informal graves and this area should be preserved *in situ* unless it can be proven that these are not graves. If the recommendations made in section 7 of this report is adhered by, HCAC is of the opinion that from an archaeological point of view there is no reason why the development should not proceed based on approval from SAHRA.

General

Due to extensive grass cover and rubble dumping, ground visibility was low on portions of the site during survey. The possible occurrence of unmarked or informal graves and subsurface finds can thus not be excluded. If during construction any possible finds such as stone tool scatters, artefacts or bone and fossil remains are made, the operations must be stopped and a qualified archaeologist must be contacted for an assessment of the find.

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

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

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ABBREVIATIONS

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

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

GLOSSARY

Archaeological site (remains of human activity over 100 years old)

Early Stone Age (~ 2.6 million to 250 000 years ago)

Middle Stone Age (~ 250 000 to 40-25 000 years ago)

Later Stone Age (~ 40-25 000, to recently, 100 years ago)

The Iron Age (~ AD 400 to 1840)

Historic (~ AD 1840 to 1950)

Historic building (over 60 years old)

1 BACKGROUND INFORMATION

<i>Kind of study</i>	Archaeological Impact Assessment
<i>Type of development</i>	Photovoltaic solar energy facilities
<i>Rezoning/subdivision of land</i>	Rezoning
<i>Developer:</i>	BBEntropie (Pty) Ltd
<i>Consultant:</i>	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 Harmony Gold Eland up to 10MW facility at Harmony Gold, Welkom. The site falls within mining right properties owned by Harmony Gold close to Welkom, Free State.

The Archaeological Impact Assessment report forms part of the 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 desktop 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 the demolished remains of mining infrastructure was identified together with several stone and brick cairns. 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 peer review and comment.

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 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, 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 sections 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 Harmony Gold Eland up to 10MW facility is located on Eland Shaft on the Farm Rietpan RE/17 & Farm Tochgekregen RE/99 & Farm Wesselia 101. The site falls within mining right properties owned by Harmony Gold approximately 5 km north of Welkom, Free State (Figure 1). The site is located at 27° 55' 36.3726" S, 26° 42' 19.1504".

The study area falls within the bioregion described by Mucina et al (2006) as the Dry Highveld Grassland Bioregion with the vegetation described as Vaal-Vet Sandy Grassland within a Grassland Biome. Land use in the general area is characterized by mining and agriculture. The study area is characterised by deep sandy to loamy soils with no major landscape features like pans, rivers or hills.

1.3.2. Location Map

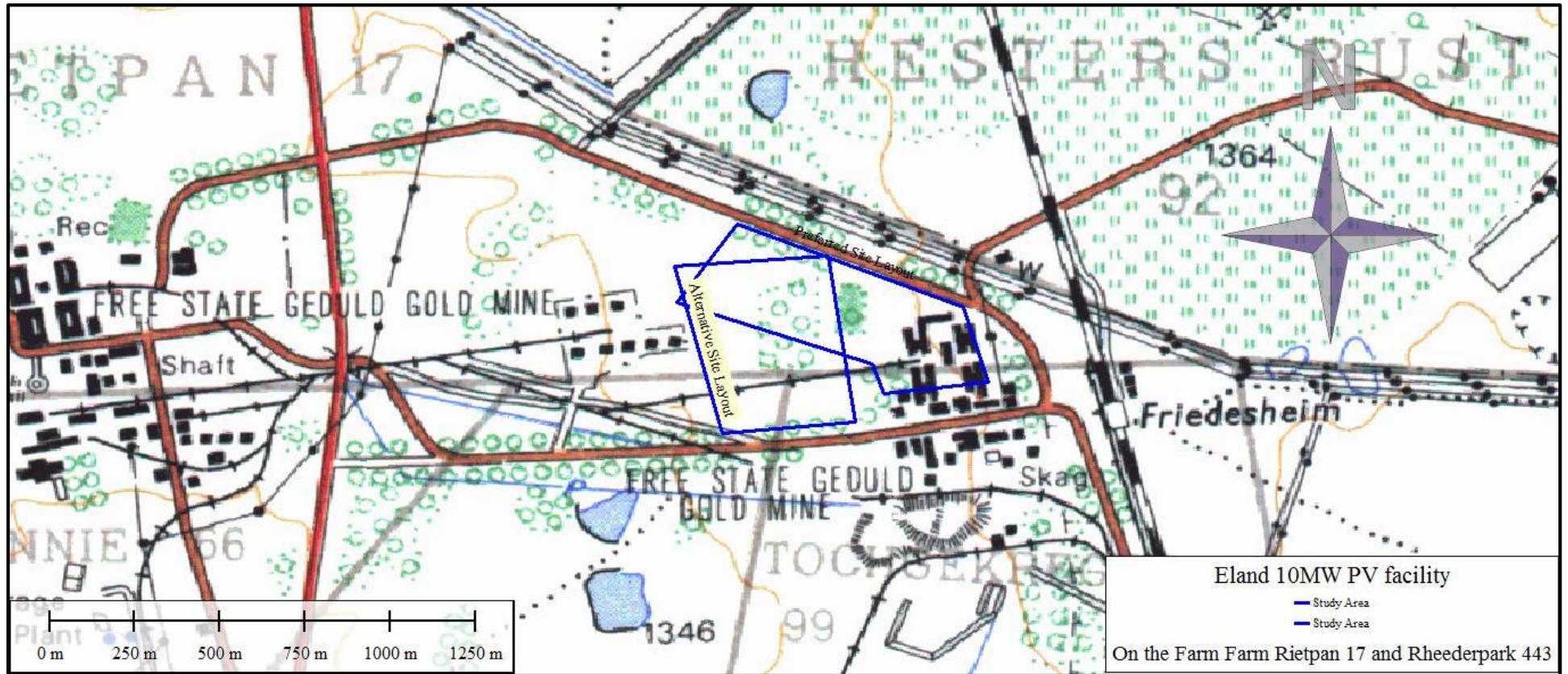


Figure 1: Location map.

1.3.3. Google Maps



Figure 2: Google Image showing the development footprint alternatives (blue) and track log (black) of the areas that were covered during the survey.

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.

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 sites, historical sites, graves, and ethnographical information on the inhabitants of the area.

2.1.1 Literature Search

In addition to the background study the actions indicated below were also taken.

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 was conducted by Savannah Environmental for this project. No heritage concerns were raised.

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 was conducted; focusing on drainage lines, outcrops, high lying areas and disturbances in the topography. The study area was surveyed by means of vehicle and extensive surveys on foot (Figure 2) by a professional archaeologist on the 3rd of March and again on the 22nd April 2015. 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. Low ground visibility of parts of the study area is due to high vegetation cover and dumping of rubble, and the possible occurrence of unmarked graves and other cultural material cannot be excluded. Only the surface infrastructure footprint areas were surveyed as indicated in the location map, and not the entire farm. This study did not assess the impact on the palaeontological component of the project. The description and assessment of the power line route stems from superficial observations and a desktop study only. 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 project includes the construction of the solar photovoltaic (PV) facility generating up to 10 MW with associated infrastructure within the Harmony Gold Mine mining area. Energy generated will be for internal consumption by Harmony Gold's Shaft operations.

4. HISTORICAL AND ARCHAEOLOGICAL BACKGROUND OF THE STUDY AREA

4.1 General Information

CRM reports on the area together with secondary source material, primary sources, maps and online sources the study area was contextualised. Several CRM projects were conducted within the greater study area (SAHRIS & SAHRA report mapping version 1) - Dreyer 2004, Dreyer 2008, Coetzee (2008) and Van der Walt (2013). None of these studies conducted recorded any significant heritage sites.

Google Earth and 1:50 000 maps of the area were utilised to identify possible places where archaeological and historical sites might be located. 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 \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 presence and significance of finds can be determined by a 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. Isolated MSA artefacts especially around pans can be expected but it is not anticipate that these finds will have conservation value.

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 is expected although isolated finds can be expected around pans.

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.

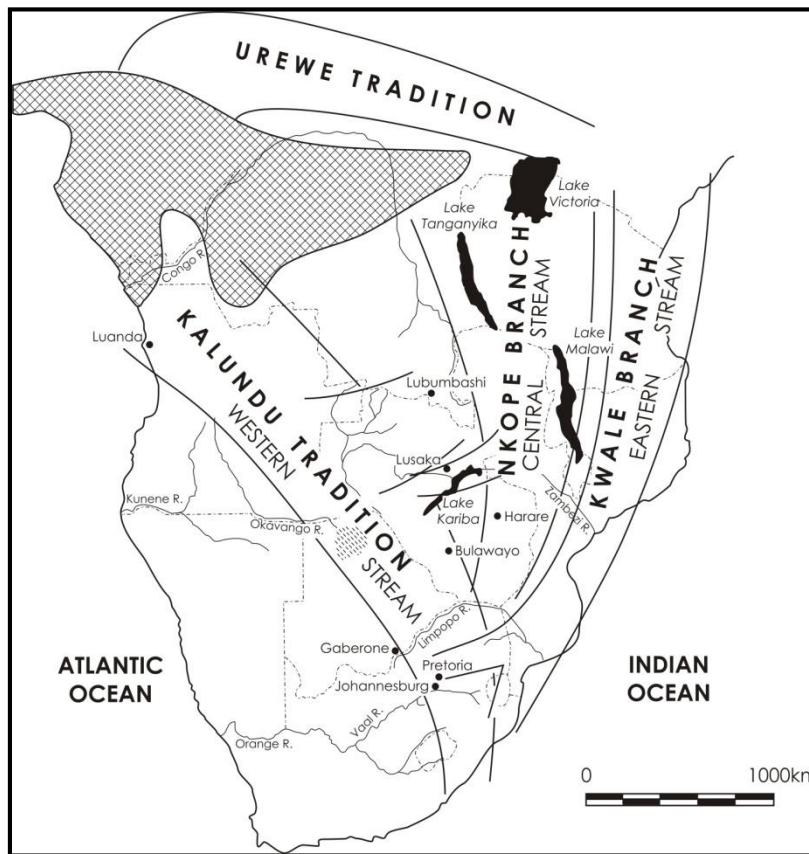


Figure 3: Movement of Bantu speaking farmers (Huffman 2007)

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 western periphery of distribution of Late Iron Age settlements in the Free State. However to the north of the study area, ceramics from the Thabeng facies belonging to the Moloko branch of the Urewe tradition were recorded at Oxf 1 and Platberg 32/71 (Maggs 1976, Mason 1986). Similarly to the east Makgwareng ceramics belonging to the Blackburn

Branch of the Urewe tradition was recorded (Dreyer 1992 and Maggs 1976). There are however a low likelihood of finding sites dating to this period in the study area.

4.3 Historical Background

4.3.1. Historiography and Methodology

It was necessary to use a range of sources in order to give an account of the history of the area. Sources included secondary source material, primary sources, maps and online sources.

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

The study area is located within the northern part of the Free State province. The land surface of South Africa can be divided into 22 physiographic regions, depending on the altitude and surface form. The farm area forms part of the Highveld zone. Together the Upper Karoo and the Highveld cover most of the interior of the country. For about 10% to 15% of the year, the northern Highveld area experiences rainfall of less than 75% of the average. This means that rains are frequent enough that only a small percentage of farmland in the area is under irrigation. The main agricultural produce of the northern Free State is cereals, and the farm area under investigation falls under some of the main wheat and maize producing districts in South Africa. (Readers Digest 1984: 13, 21, 62-63)

In order to understand the history of an area, one should seek knowledge regarding its early inhabitants. The Bushmen were the earliest inhabitants of the Northern Free State. These people were aboriginal foragers, as well as hunters, and roamed the area for hundreds of years. Bantu-speaking tribes later moved into the area and the combined stress of white and black migration led to the expulsion of the Bushmen from this area over time. (Coplan 2008: 118, 130-131)

The first Europeans arrived in the Cape in 1652, and expansion to the north only started in the late 1820s. The Great Trek of 1837, as this northern movement of white people from the Cape Colony was called, resulted in a mass migration of white people into the northern areas of South Africa. (Ross 2002:39) By 1941 the farm area was located in the Boer republic of Winburg, which was established in 1837. The black tribe that was prominent in that area at the time was the Tlokwa. In 1848 the new British Governor at the Cape, Sir Harry Smith, annexed the independent Boer territories between the Orange and the Vaal rivers and called it the Orange River Sovereignty. (Readers Digest 1984: 31)

The discovery of diamonds and gold in the Northern provinces between 1867 and 1886 had very important consequences for South Africa. After the discovery of these resources, the British, who at the time had colonized the Cape and Natal, had intentions of expanding their territory into the northern Boer republics. This eventually led to the Anglo-Boer War, which took place between 1899 and 1902, and which was one of the most turbulent times in South Africa's history. Even before the outbreak of war in October 1899 British politicians, including Sir Alfred Milner and Mr Chamberlain, had declared that should Britain's differences with the Z.A.R. result in violence, it would mean the end of republican independence. This decision was not immediately publicized, and as a consequence republican leaders based their assessment of British intentions on the more moderate public

utterances of British leaders. Consequently, in March 1900, they asked Lord Salisbury to agree to peace on the basis of the status quo ante bellum. Salisbury's reply was, however, a clear statement of British war aims. (Du Preez 1977)

The northern Free State is located within the area where some of the main operations of the Boer General, Christiaan De Wet, took place between 1899 and May 1900 when the war ended. De Wet, among the other Boer generals, realized that they could not win the war by conventional means, and spread out into small hit-and-run groups that inflicted serious casualties on the British armies. This is known as Guerrilla warfare. The British Commander-In-Chief, Lord Kitchener, consequently turned to the destruction of Boer crops and built concentration camps where the wives and children of the Boer soldiers were interned. This "scorched earth" policy of the British finally resulted in the demoralisation of the Boers. (Readers Digest 1984: 33). Peace talks between the Boers and the British had started around April 1902, and culminated in the Peace of Vereeniging treaty on 31 May 1902. This event signalled the end of the Anglo-Boer War, as well as the temporary end of the Boer Republics' independence. (Geschiedenisatlas van Suid-Afrika 1999: 251)

Though segregation and apartheid would later be rife in South Africa, black and white relations were nonetheless at times also interdependent in nature. After the Great Trek, when white farmers had settled in various areas, wealthier farmers were often willing to lodge needy white families on their property in exchange for odd jobs and commando service. This *bywoner* often arrived with a family and a few cows. He would till the soil and pay a minimal rent to the farmer from the crops he grew. The farmer did not consider him a laborer, but mostly kept black workers for hard labour on the farm. After the Anglo-Boer War, many families were left destitute. Post war years of severe droughts and locust plagues did not ameliorate this state of affairs. All of these factors resulted in what became known as the 'poor white problem'. On the advent of commercial farming in South Africa, white landowners soon found bywoners to be a financial burden, and many were evicted from farms. In many cases, wealthier landlords found it far more profitable to rent their land to blacks than to bywoners. This enabled them to create reservoirs of black labour (for which mine recruiting agencies were prepared to pay handsome commissions), while it was also possible to draw more rent from their black tenants. This practice was outlawed by the 1913 Natives Land Act, which forbade more than five black families from living on white farms as peasant squatters. (Readers Digest 1992: 329-332)

Since the time that the early pioneers, or Voortrekkers, crossed the Orange River, the Free State developed steadily to the stage where it became an important contributor to South Africa's food supplies. Some of the commodities that are produced here is maize, wheat, oil-bearing seeds, dairy products and meat. The Free State has however only more recently become important for its mining potential. The goldfields in this province lie in the north western Free State, some 240 kilometres southwest of Johannesburg. These gold deposits are of the same geological age as those of the Witwatersrand and occur in the same geological system. It is believed that the reefs in which the Free State gold is found is an extension of the reefs of the Witwatersrand. (Anon 1954: 16)

The discovery of gold transformed the landscape of the north western Free State. By the 1954 three of the six mines surrounding Welkom had reached the production stage. These were Welkom, Western Holdings and St. Helena. The rest were expected to produce by the end of 1954. By 1941, when it became apparent that important gold discoveries had been made in the Free State, the Union Government established the Natural Resources Development Council, whose function it was to coordinate the development of new industrial areas. This was to ensure that the area would not develop haphazardly, as it did in the Witwatersrand. One of the first principles laid down was that several relatively small towns would be developed rather than one large city. As a result of this, Allanridge, in the north,

served the Jeannette and Loraine mines; Odendaalsrus, nine miles south of Allanridge, served the two Freddies mines; Welkom, a further nine miles south, served the six mines surrounding it and Virginia, twelve miles south of Welkom, served the three mines in the south eastern portion of the goldfield. (Anon 1954: 18-19)

A farm does not exist in isolation, and it is important to understand the social history of the surrounding area. Since the farms under investigation are located in proximity to Welkom and Odendaalsrus the history of the towns will be of interest for this report.

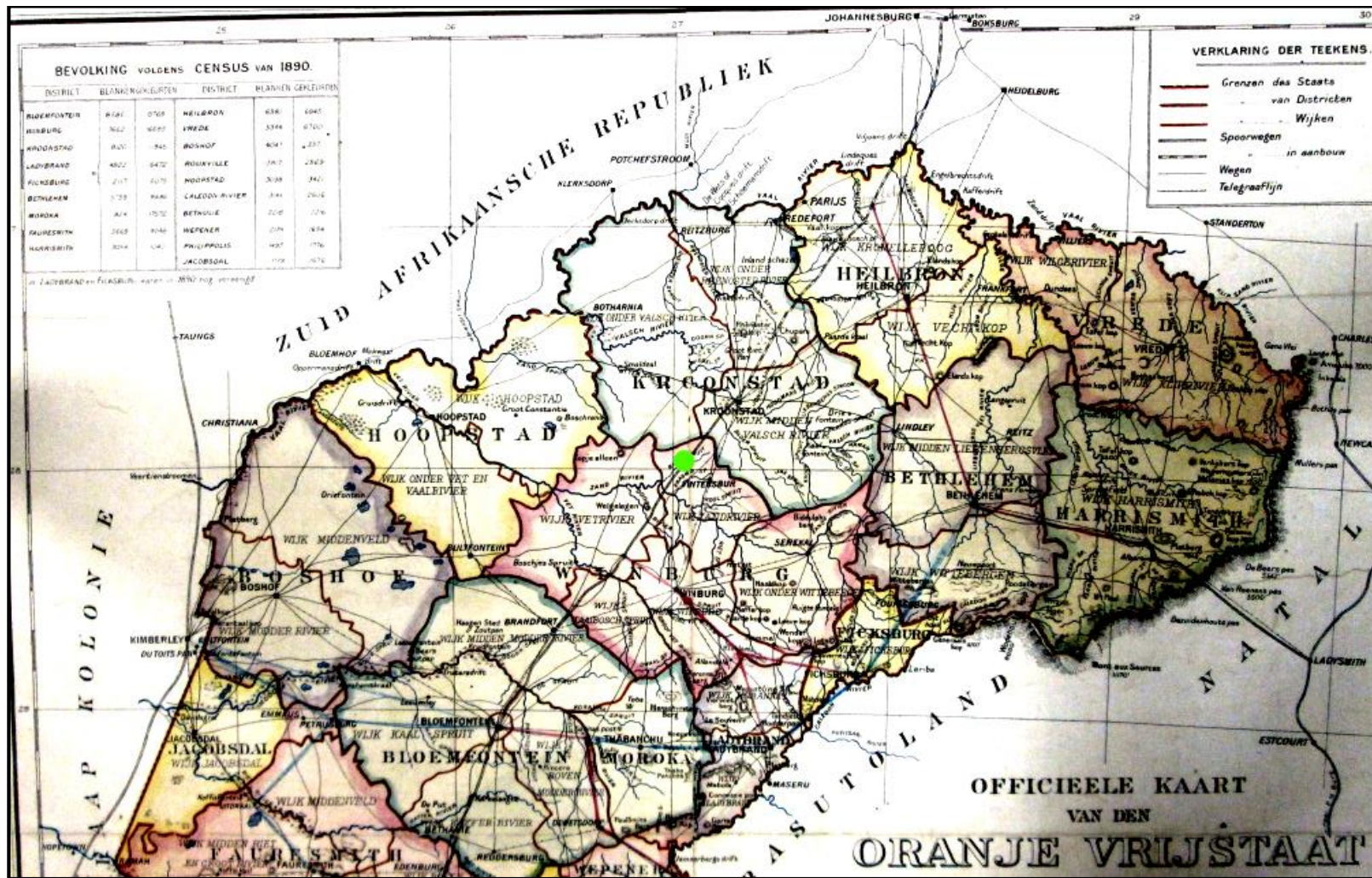


Figure 4: 1891 Map of the Free State, indicating the different districts. The green dot indicates the area in which the study area was more or less located. (NASA Maps: S. 3/1675)

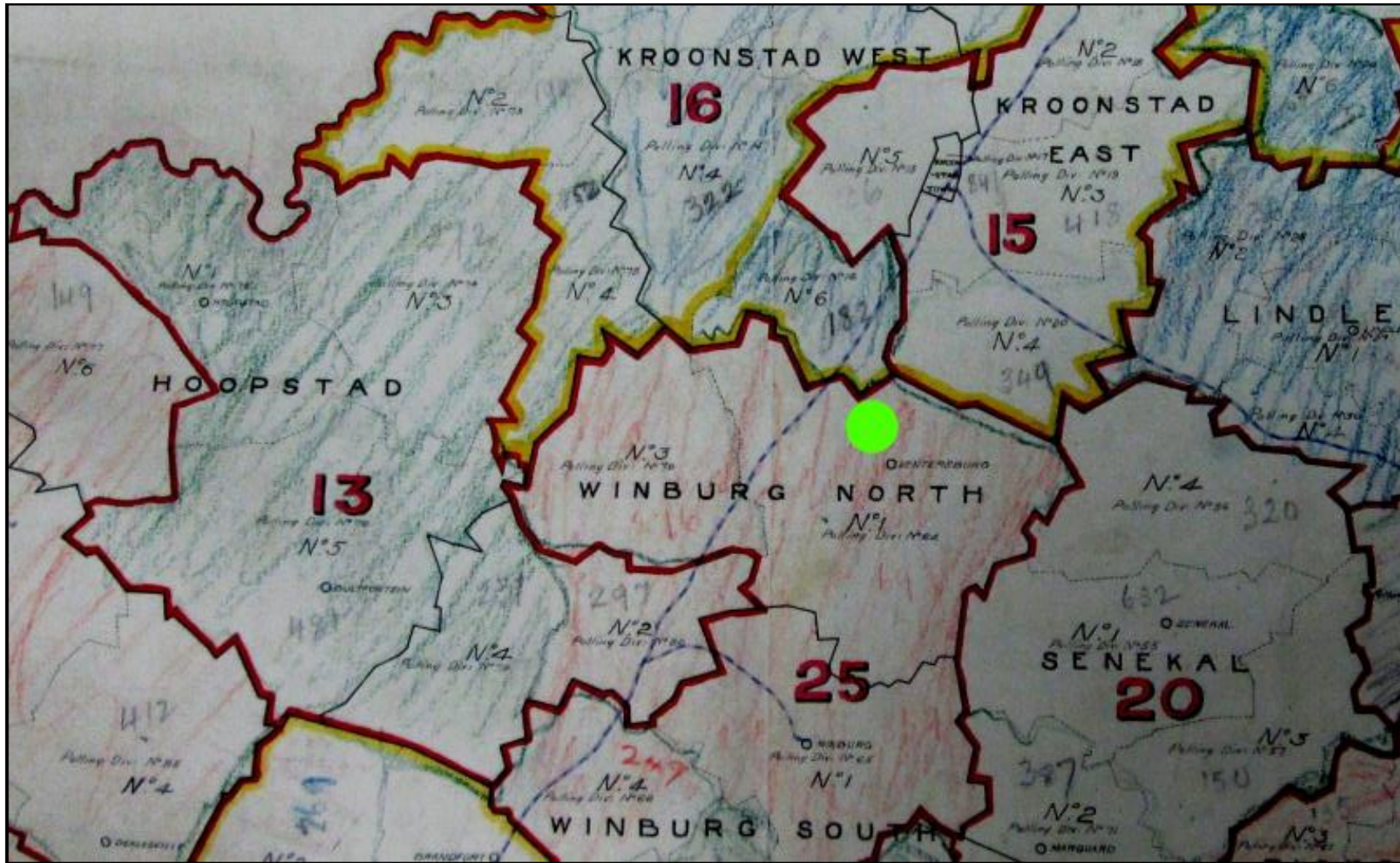


Figure 5: 1910 Map of the districts of the Orange Free State. The farm area is located in the area of the green dot, in the Winburg North District. (NASA Maps: 1/54)

4.3.1.1. Welkom

One of the earliest monuments at Welkom is located at the place where the Voortrekkers established a lookout post on the bank of the Sand River in the 1800s. This was in order to protect the Voortrekkers from Matabele cattle marauders. The establishment of the town was approved in 1946, and it developed very quickly thereafter. The town was named after one of the farms on which it was established. By the 1980s Welkom was a well-developed city. By 1982 13 large goldmines were located in a circumference of 23 kilometres from Welkom. (Niehaber et al. 1982: 71-72)



Figure 6: Welkom in the 1950s. (Oberholser et al. 1954: 153)

4.3.1.2. Odendaalsrus

The town Odendaalsrus is located some 17 kilometres from Allanridge, in the heart of the Free State gold fields. The farm on which the town was originally established was owned by the Odendaal family, and hence the name of the town. Odendaalsrus was already established in 1899, and had municipal status by 1912. It however started out as a poor and struggling town. This however changed when gold was discovered in the area, and Odendaalsrus had developed into a well-developed modern complex by the 1980s. The town was serviced by a railway line that was extended from Allanridge to Odendaalsrus in 1953. (Niehaber et al. 1982: 74; Oberholser et al. 1954: xx)

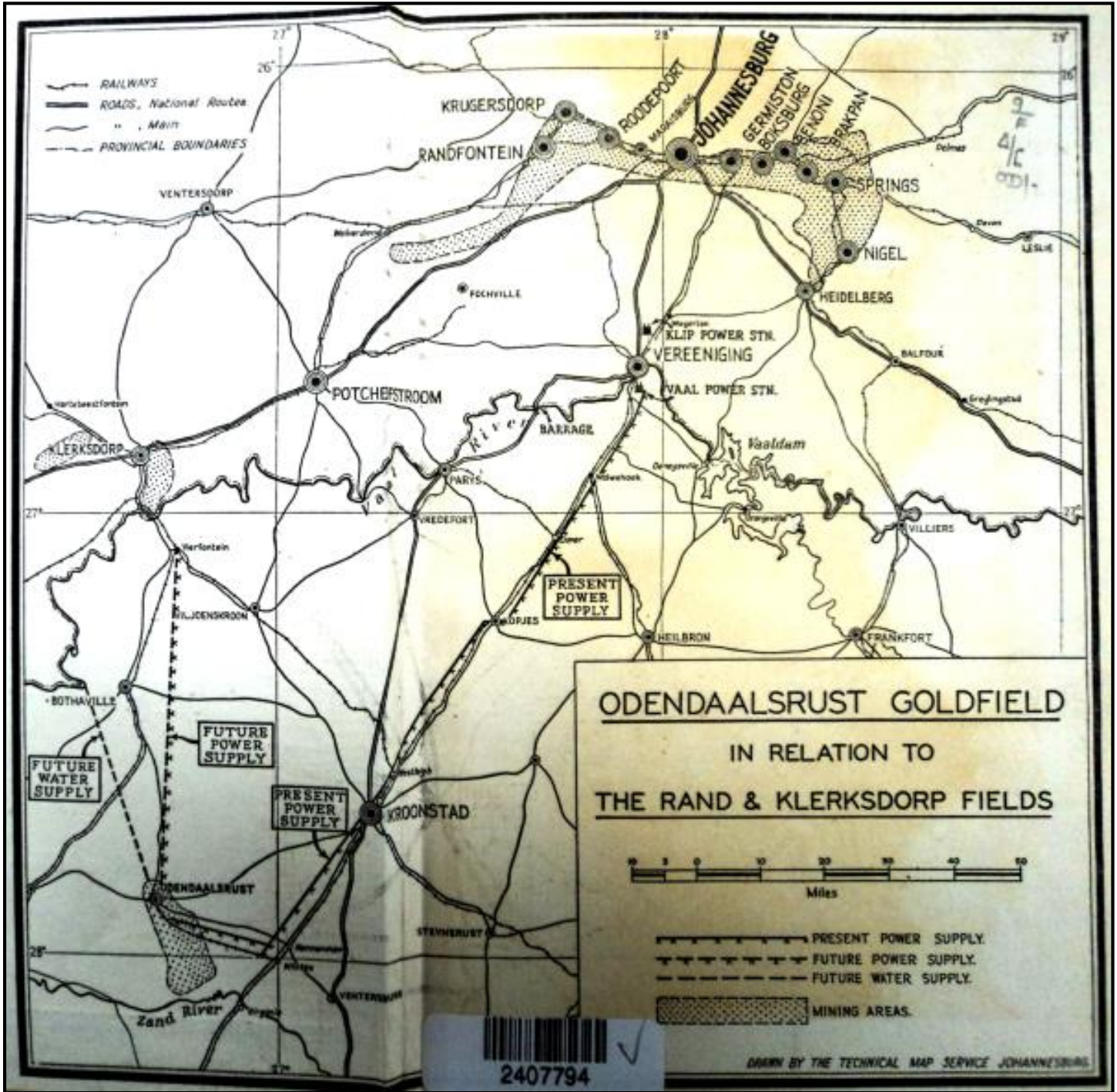


Figure 7: Odendaalsrus Goldfield in relation to the Rand & Klerksdorp Fields. (Jacobsson 1882)



Figure 8: An aerial view of Odendaalsrus (looking south-east) taken in October, 1946. The outstanding building towards the right of the picture is the Dutch Reformed Church: two blocks away to the left is the market square with the municipal offices (the small building in front of the line of trees. (Jacobsson 1882)

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 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.

5.1. 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 9 of this report.

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

5.2 Impact Rating of Assessment

The criteria below are used to establish the impact rating of 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).

6. BASELINE STUDY-DESCRIPTION OF SITES

During the survey two PV alternatives of 39 ha was assessed in terms of the archaeological component of Section 35 of the NHRA. During the survey no surface indicators of archaeological (Stone or Iron Age) material was identified in the study area. Similarly other studies in the general area (Dreyer 2004, Dreyer 2008, Coetzee (2008) and Van der Walt (2013) also did not record any archaeological significant sites.

In terms of the built environment of the area (Section 34), no standing buildings occur in the initial lay out but remnants of the demolished remains of various mining infrastructure (Figure 10 & 11) is evident at the following localities 27° 55' 43.5788" S, 26° 42' 24.9070" E , 27° 55' 37.8860" S, 26° 42' 12.2013" E and 27° 55' 40.97" S, 26° 42' 19.11" E. Nothing is left of these structure apart from some rubble that is considered to be of little to no heritage significance. Grass cover is low within certain portions of the study area and archaeological visibility is high in these areas (Figure 12 & 13). After the initial survey the lay out of the proposed development was moved. The new layout does however cover an area that contains buildings as indicated on the 1: 50 000 maps of the site as well as Google images of the area. If these structures are still standing and are older than 60 years it is protected by the Heritage Act.

At least 4 stone and brick cairns were recorded during the survey of which the purpose is unknown. The cairns measure approximately a meter wide and between 1 and 2 meters long (Figure 13 - 16). These cairns are in no particular order or pattern and vary from a north south orientation to east west and south east to north west. The possibility exists that these cairns might represent informal graves. These cairns are located on the southern periphery of alternative 1 and almost in the middle of alternative 2 (Figure 17).

Feature Number	Co-Ordinate
Cairn 1	27° 55' 39.7993" S, 26° 42' 20.3005" E
Cairn 2	7° 55' 39.6876" S, 26° 42' 20.5057" E
Cairn 3	27° 55' 40.4939" S, 26° 42' 19.7353" E
Cairn 4	27° 55' 40.2745" S, 26° 42' 19.9224" E



Figure 9. Demolished remains.



Figure 10. Demolished remains.



Figure 11. Site conditions in the north western section.



Figure 12. Site conditions in the southern section.



Figure 13. Cairn 1.



Figure 14. Cairn 3.



Figure 15. Cairn 2.



Figure 16. Cairn 4.

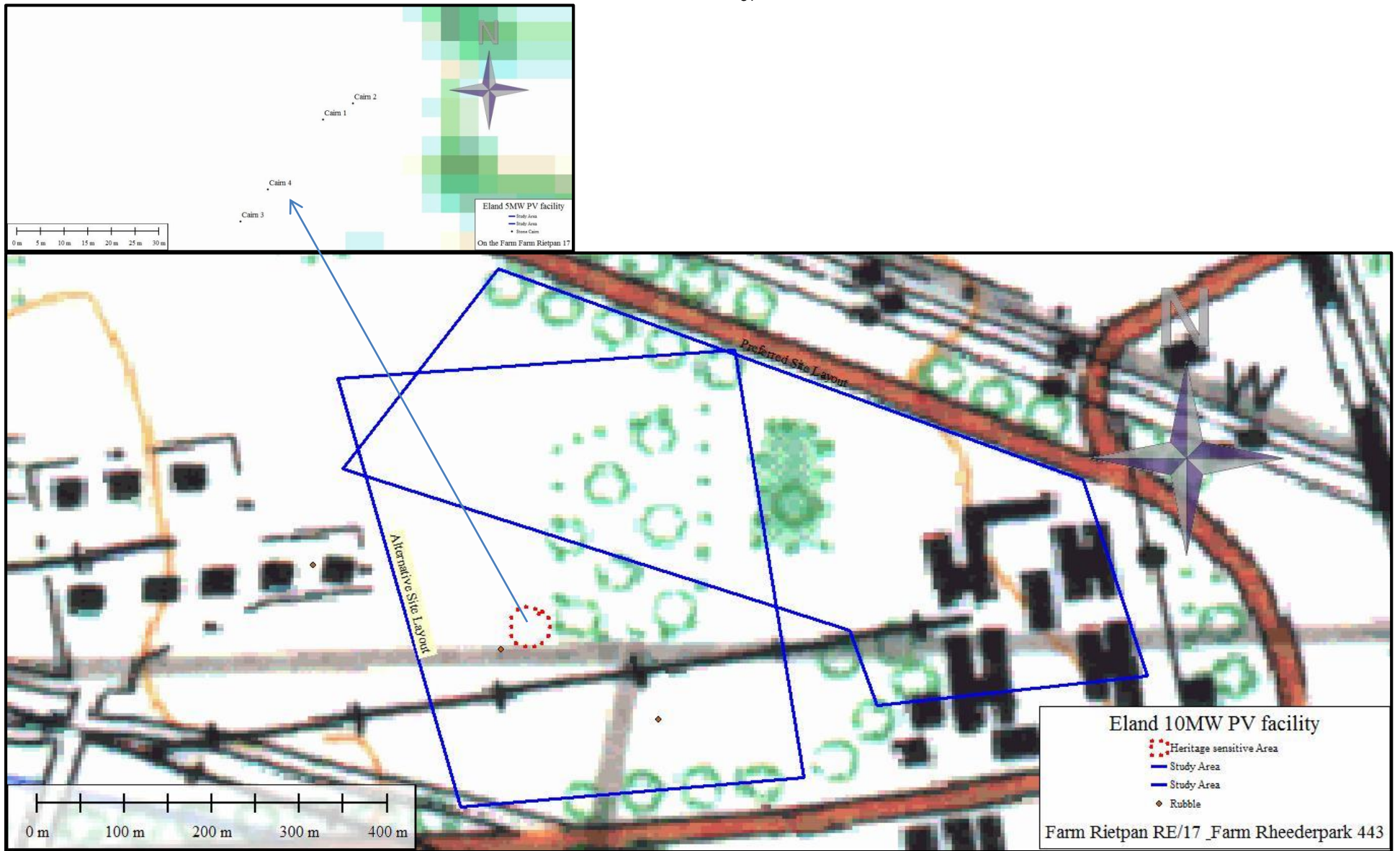


Figure 17: Map indicating the location of cairns in relation to rubble heaps.

Impact Rating

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	
<p>Mitigation: It is recommended that an area 20 meters around the cairns is not considered for the PV facility and fenced off with an access gate. Alternatively it should be determined whether the cairns are graves. If the cairns are confirmed to be graves relocation of the graves can be considered as a last resort.</p>		

7. CONCLUSIONS AND RECOMMENDATIONS

After the fieldwork and reports was completed the location of the proposed PV facilities was moved and therefore the preferred site layout was not covered in detail as the survey covered an adjacent area where the facility was initially proposed. Hence the description and assessment of the facility stems from superficial observations and a desktop study only.

Based on the results of the study there are no significant archaeological risks associated with the proposed solar energy facility. No structures occur within the area that was surveyed although the demolished remains of mining infrastructure were noted. Due to the extent of the destruction of the features and the fact that these sites are most probably not older than 60 years these sites are of no -low heritage significance.

The new layout does however cover an area that contains buildings as indicated on the 1: 50 000 maps of the site as well as Google images of the area. If these structures are still standing and are older than 60 years it is protected by the Heritage Act. It is recommended that if the preferred layout is chosen for the development that this area must be subjected to a phase 1 assessment prior to development.

No cultural landscape elements were noted and visual impacts to scenic routes and sense of place are also considered to be low due to the extensive mining in the area. No further mitigation is recommended for this aspect.

At least 4 cairns of stone, bricks and concrete were recorded in close proximity to the demolished remains of mining infrastructure. These cairns are built from the rubble of these demolished remains and therefore post-date these structures. These cairns also do not form any pattern representing a cemetery but the possibility that these represent informal graves cannot be excluded.

It is therefore recommended that the area where the cairns are situated is avoided by the development and preserved *in-situ*. The area around the cairns should be fenced off with a buffer zone of 20 meters. The cairns were recorded on the periphery of alternative one and can be easily avoided if this alternative is used. From a heritage point of view alternative 1 will be more favourable if small changes to the proposed lay out of the development can be made to ensure that the cairns are preserved as is. If the cairns can be preserved *in-situ* within alternative 2 this alternative is also viable from a heritage point of view. The area presents sufficient developable land to avoid the cairns. Therefore no costly and time consuming mitigation is recommended at this stage to mitigate the cairns. If however the area cannot be avoided there is an option to test whether the cairns are graves. If it is confirmed to be graves they will have to be relocated. This should be seen as a last resort.

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.

If these recommendations are implemented alternative 1 is the preferred option from a heritage point of view.

Due to the subsurface nature of archaeological material and 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 made in this report area adhered to and subject to approval from SAHRA there is from an archaeological point of view no reason why the development should not proceed.

8. PROJECT TEAM

Jaco van der Walt, Project Manager

Liesl Bester, Archival Specialist

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 and Tanzania as well as the DRC; and have conducted more than 300 AIAs since 2000.

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