
**Heritage Scoping Report for the proposed Sonnenberg Photovoltaic Plant near
Keimoes, Northern Cape**

Prepared For

Savannah Environmental (Pty) Ltd

By



HERITAGE

Contracts and Archaeological Consulting

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EXECUTIVE SUMMARY

Site name and location: The proposed Sonnenberg photovoltaic plant is located approximately 30 km west of Keimoes in the Northern Cape. The proposed project is located on the farm Baviaanz Kranz 471 within the Kai Garib Local Municipality and the Siyanda District Municipality.

1: 50 000 Topographic Map: 2820 DA.

EIA Consultant: Savannah Environmental (Pty) Ltd.

Developer: S28 Degrees Energy (Pty) Ltd

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

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Date of Report: 31 July 2011

Findings of the Assessment: This report attempted to give an account of the history of the farm Baviaanz Kranz 471 and general surrounds. By consulting various databases, maps, archival and secondary sources, it was possible to compile a brief history regarding human settlement in the Gordonia area and the Orange River irrigation systems. The development of the towns of Keimoes and Kakamas, which are both located in proximity to the farm and bears on the history of the area, was also briefly examined. The Stone Age background study indicates that an extensive range of Stone Age manifestations can be expected in the area demarcated for the potential photovoltaic plant. Those that are most sensitive are the potential Later Stone Age grave sites that may be recognised by variously shaped stone cairns. Where these have been disturbed, variations in the soil, including ashy or stony patches, could signify the locations of ancient graves. Stone circles or ovals could mark Later Stone Age activity sites, and engraved boulders or stones may occur in the area.

Based on the current information obtained for the area at a desktop level it is anticipated that any sites that occur within the proposed development area will have Grade III Significance. This scoping study revealed that a range of heritage sites occur in the larger region and similar sites can be expected within the study area. Every site is relevant to the Heritage Landscape, but it is anticipated that few if any has conservation value, therefore not fatal flaws are expected. This assumption must be verified by a field survey in the impact assessment phase.

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Abbreviations

<i>ASAPA</i> : Association of Southern African Professional Archaeologists	<i>ESA</i> : Early Stone Age
<i>SAHRA</i> : South African Heritage Resources Agency	<i>LSA</i> : Late Stone Age
<i>NHRA</i> : National Heritage Resources Act	<i>MSA</i> : Middle Stone Age
<i>CRM</i> : Cultural Resource Management	
<i>EIA</i> : Environmental Impact Assessment	
<i>AIA</i> : Archaeological Impact Assessment	
<i>HIA</i> : Heritage Impact Assessment	

Glossary

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

Early Stone Age (2 million to 300 000 years ago)

Middle Stone Age (300 000 to 30 000 years ago)

Late Stone Age (30 000 years ago until recent)

Historic (approximately AD 1840 to 1950)

Historic building (over 60 years old)

Lithics: Stone Age artefacts

1. INTRODUCTION

Heritage Contracts and Archaeological Consulting CC was contracted by Savannah Environmental (Pty) Ltd to conduct a Heritage Scoping Report for the proposed development of a 200 MW photovoltaic plant referred to as the Sonnenberg Photovoltaic Plant. The proposed project is located on the farm Baviazanz Kranz 471, 30 km west of Keimoes within the Kai Garib Local Municipality and the Siyanda District Municipality. The heritage scoping report forms part of the Scoping Report for the proposed project.

The aim of this scoping report is to conduct a desktop study to identify possible heritage resources within the project area and to assess their importance within a Local, Provincial and National context. The study furthermore aims to assess the impact of the proposed project on non - renewable heritage resources and to submit appropriate recommendations with regards 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, in order to protect, preserve and develop them within the framework provided by Heritage legislation.

The report outlines the approach and methodology utilised for the Scoping phase of the project. The report includes information collected from various sources and consultations. Possible impacts are identified and mitigation measures are proposed in the following report. It is important to note that no field work was conducted as part of the scoping phase but will be conducted as part of the Impact Assessment phase of the EIA.

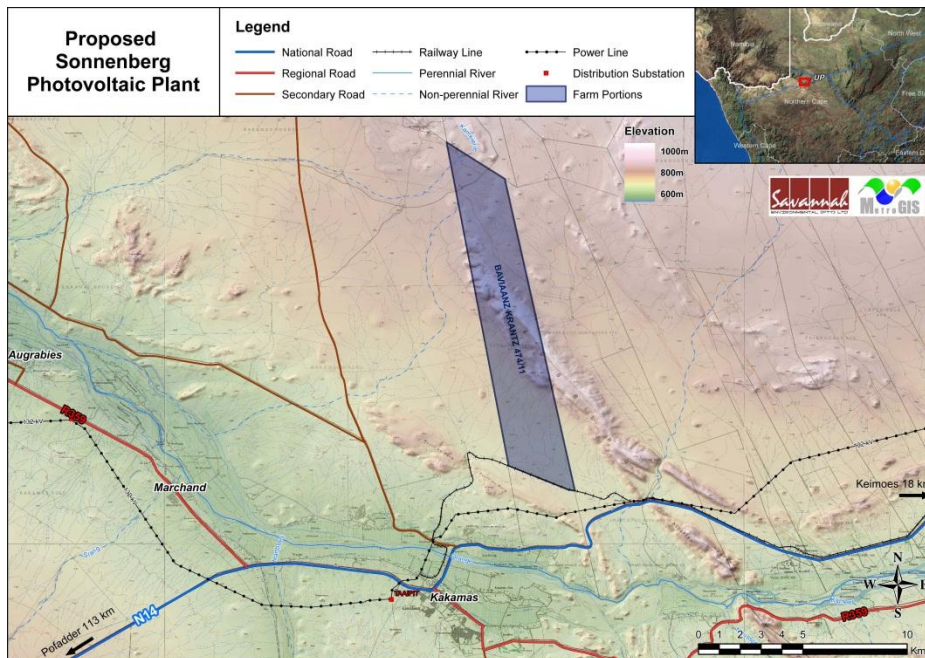


Figure 1: Locality map provided by Savannah Environmental

1.2 Terms of Reference

The main aim of this scoping report is to determine if any known heritage resources occur within the study area and to predict the occurrence of any possible heritage significant sites that might present a fatal flaw to the proposed project. The objectives of the scoping report were to:

» Conduct a desktop study:

- * Review available literature, previous heritage studies and other relevant information sources to obtain a thorough understanding of the archaeological and cultural heritage conditions of the area;
- * Gather data and compile a background history of the area;
- * Identify known and recorded archaeological and cultural sites;
- * Determine whether the area is renowned for any cultural and heritage resources, such as Stone Age sites, Iron Age sites, informal graveyards or historical homesteads.

» Report

The reporting of the scoping component is based on the results and findings of the desk-top study, wherein potential issues associated with the proposed project will be identified, and those issues requiring further investigation through the Impact Assessment Phase highlighted. Reporting will aim to identify the anticipated impacts, as well as cumulative impacts, of the operational units of the proposed project activity on the identified heritage resources for all 3 development stages of the project, i.e. construction, operation and decommissioning. Reporting will also consider alternatives should any significant sites be impacted on by the proposed project. This is done to assist the developer in managing the discovered heritage resources in a responsible manner, in order to protect, preserve and develop them within the framework provided by Heritage Legislation.

1.3 Nature of the development

The proposed photovoltaic plant will have a maximum generating capacity of 200 MW to be developed in phases on the farm Baviaanz Kranz 471.

The following associated infrastructure is part of the project proposal:

- » Numerous arrays of photovoltaic panels, which will be linked together to form individual strings.
- » Underground cabling of 33 kV in order to distribute the power to a central on-site substation.
- » A transformer together with the on-site substation to step-up the power from 33 kV – 132kV to be distributed between the photovoltaic plant and the Eskom grid.
- » Connection of each facility to the power distribution grid consisting of a loop-in/loop-out connection
- » Internal access roads for construction and maintenance purposes.
- » Maintenance, security buildings, and a workshop.

1.4 The receiving environment

The study area is located 30km west of Keimoes to the north of the Orange River. There are various drainage lines draining the study area all flowing in a southern direction to the Orange River. The topography of the area is relatively gentle sloping in a southern direction towards the Orange River, apart from a ridge aligning east to west almost in the middle of the farm.

The climate can be described as arid to semi-arid with rainfall occurring from November to April. Historical imagery on Google earth indicates that the land has been fallow for a number of years.

2. APPROACH AND METHODOLOGY

The assessment is to be undertaken in two phases, a desktop study as part of the Scoping phase and an Archaeological Impact Assessment as part of the Environmental Impact Assessment phase. This report concerns the scoping phase. The aim of the scoping phase is to extensively cover all archaeological and cultural heritage data available to compile a background history of the study area. In order to identify possible heritage issues or fatal flaws that should be avoided during development.

This was accomplished by means of the following phases:

2.1 Literature search

Utilising data for information gathering stored in the archaeological database at Wits University and the McGregor Museum in Kimberly, published articles on the archaeology and history of the area and a search in the National archives. The aim of this is to extract data and information on the area in question, looking at archaeological sites, historical sites, graves, architecture, oral history and ethnographical information on the inhabitants of the area.

2.2 Information collection

The SAHRA report mapping project (Version 1.0) was consulted to further collect data from Cultural Resource Management (CRM) practitioners who undertook work in the area to provide the most comprehensive account of the history of the area where possible.

2.3 Public consultation

No public consultation was conducted during this phase.

2.4 Google Earth and mapping survey

Google Earth and 1:50 000 maps of the area were utilised to identify possible places where archaeological sites might be located.

2.5 Genealogical Society of South Africa

The database of the genealogical society was consulted to collect data on any known graves in the area.

3. LEGISLATION

For this project the National Heritage Resources Act, 1999 (Act No. 25 of 1999) is of importance and the following sites and features are protected:

- a. Archaeological artefacts, structures and sites older than 100 years
- b. Ethnographic art objects (e.g. prehistoric rock art) and ethnography
- c. Objects of decorative and visual arts
- d. Military objects, structures and sites older than 75 years
- e. Historical objects, structures and sites older than 60 years
- f. Proclaimed heritage sites
- g. Grave yards and graves older than 60 years
- h. Meteorites and fossils
- i. Objects, structures and sites of scientific or technological value.

The national estate that includes the following:

- a. Places, buildings, structures and equipment of cultural significance
- b. Places to which oral traditions are attached or which are associated with living heritage
- c. Historical settlements and townscapes
- d. Landscapes and features of cultural significance
- e. Geological sites of scientific or cultural importance
- f. Archaeological and palaeontological importance
- g. Graves and burial grounds
- h. Sites of significance relating to the history of slavery
- i. Movable objects (e.g. archaeological, palaeontological, meteorites, geological specimens, military, ethnographic, books etc.)

Section 34 (1) of the act deals with structures which is older than 60 years. Section 35(4) of this act deals with archaeology, palaeontology and meteorites. Section 36(3) of the National Heritage Resources Act, deals with human remains older than 60 years. Unidentified/unknown graves are also handled as older than 60 until proven otherwise.

3.1 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. 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. National and Provincial Monuments are recognised for conservation purposes. The following interrelated criteria were used to establish site significance:

- » The unique nature of a site;
- » The integrity of the archaeological/cultural heritage deposit;
- » 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 or is known);
- » The preservation condition of the site;
- » Potential to answer present research questions.

The criteria above will be used to place identified sites with in SAHRA's system of grading of places and objects which form part of the national estate, and which distinguishes between at least three categories—

(a) Grade I: Heritage resources with qualities so exceptional that they are of special national significance;

(b) Grade II: Heritage resources which, although forming part of the national estate, can be considered to have special qualities which make them significant within the context of a province or a region; and

(c) Grade III: Other heritage resources worthy of conservation.

Sites with no significance do not require mitigation; low to medium sites may require limited mitigation; while high significance requires extensive mitigation. Outstanding sites should not be disturbed at all. Recognisable graves and living heritage sites have high social value regardless of their archaeological significance.

4. REGIONAL OVERVIEW

4.1 General Information

4.1.1. Literature search

No previously recorded sites exist with the Archaeological databases at Wits University or McGregor Museum Kimberley.

4.1.2. Information collection

Several unpublished CRM projects were conducted in the general study area (.Beaumont 2005 & 2008, Van Ryneveld 2007a & 2007b, Dreyer, 2006). These studies identified Early and Middle Stone Age assemblages as well as historical structures.

4.1 3. Public consultation

No public consultation was conducted during the scoping phase.

4.1.4. Google Earth and mapping survey

Google Earth and 1:50 000 maps of the area was utilised to identify possible places where archaeological sites might be located.

4.1.5. Genealogical Society of South Africa

No grave sites are indicated within the study area.

5. HISTORIC PERIOD

The following section is authored by Liesl du Preez and Cornelis Muller.

The following section will endeavour to give an account of the history of the farm Baviaanz Kranz 474 and also a brief overview of the history of the area and district in which the farm 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 on the farms
- » The development of the Gordonia Area, especially with regards to the Orange River irrigation systems, and the towns of Keimoes And Kakamas
- » A history of specific land ownership of the farm where this could be traced

» The development of the farm

5.1. Historiography and methodology

It was necessary to use a wide range of sources in order to give an accurate account of the history of the area in which the farm Baviazkranz 471 is located. Sources included secondary source material, maps and archival documents. While it was possible to compile a more detailed history of the Gordonia area, there was limited information available on the history of the actual farm under investigation. Thus, although many sources exist on the general history it is difficult to compile histories that focus on very specific parts of the area, such as individual farms. No documents could be found in the National Archives of South Africa that specifically refer to this farm.

Unfortunately, due to the limited time in which the report was written, not all of the sources that were found could be incorporated into the report. The following are relevant sources that can be consulted in the future, if a more thorough investigation is done on the history of the farm area:

- Anderson, E. A history of the Xhosa of the Northern Cape, 1795-1879. Cape Town, 1987.
- Hocking, A. Kaias and cocopans: the story of mining in South Africa's Northern Cape. Johannesburg, 1983.
- Kotzé, H. N. Oorlog sonder oorwinning: die Anglo-Boereoorlog in die omgewing van Kakamas, Kenhardt, Keimoes en Upington. Hermanus, 1999.
- Naudé, C. P. Fertilizer and irrigation experiments at the Upington agricultural research station, 1942-1952. Pretoria, 1956.
- Oosthuysen, G. W. Karakoelboerdery in Gordonia. Pretoria, 1966.
- Skead, C. J. *Historical plant incidence in southern Africa*. Pretoria, 2009.
- South Africa. Railways And Harbours Board. Report of the Board of the South African Railways and Harbours on a proposed line of railway from Prieska to Upington. Cape Town, 1914.
- Van Aarde, I. M. Gedenkboek van die Ned. Geref. Gemeente Keimoes: 'n kort geskiedenis van die gemeente gedurende die jare 1916-1966. Roodepoort, 1966.

5.2. The area under investigation

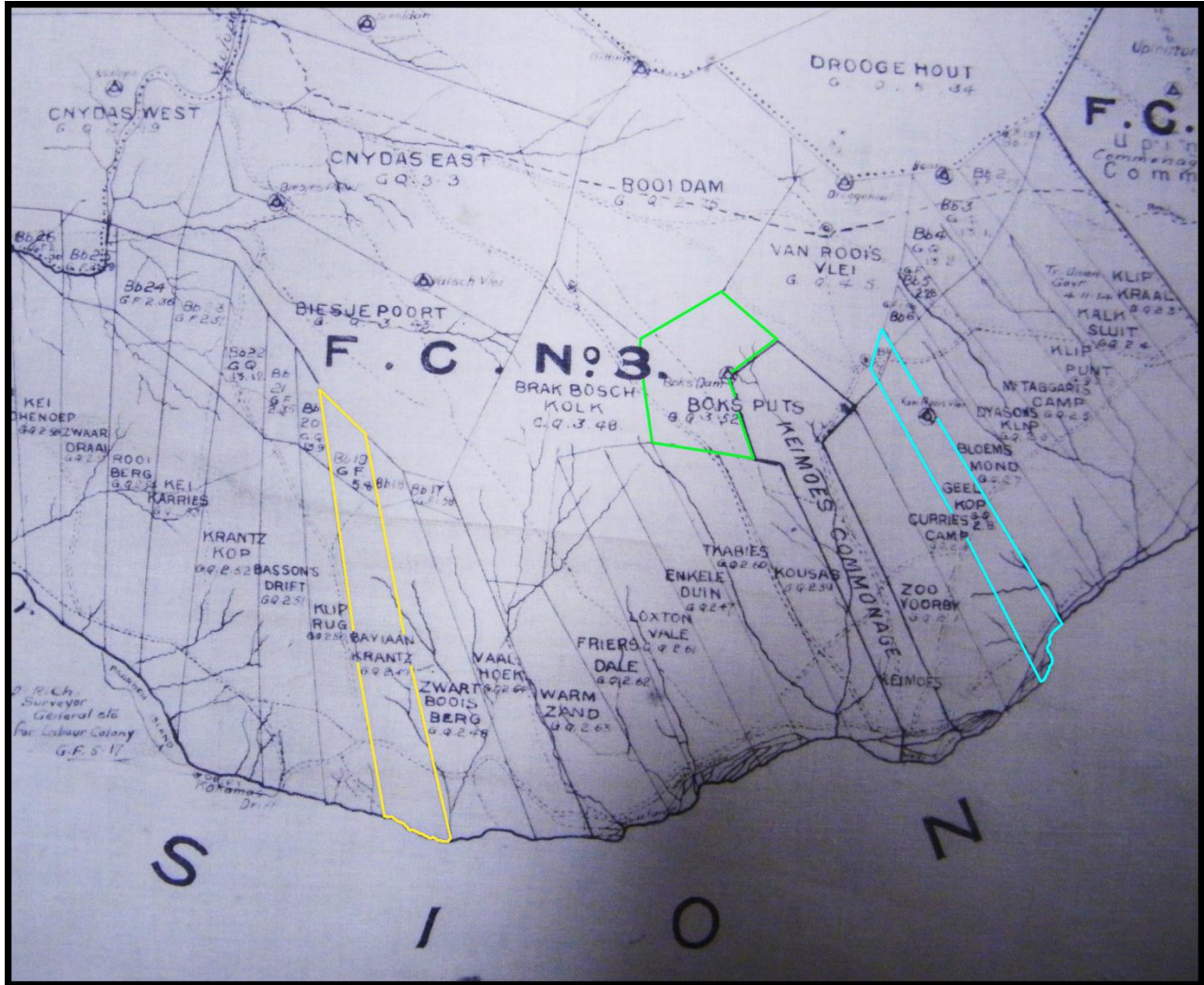


Figure 2: Gordonia District map dating to 1900. The farm Baviaans Krantz is indicated by a yellow outline.

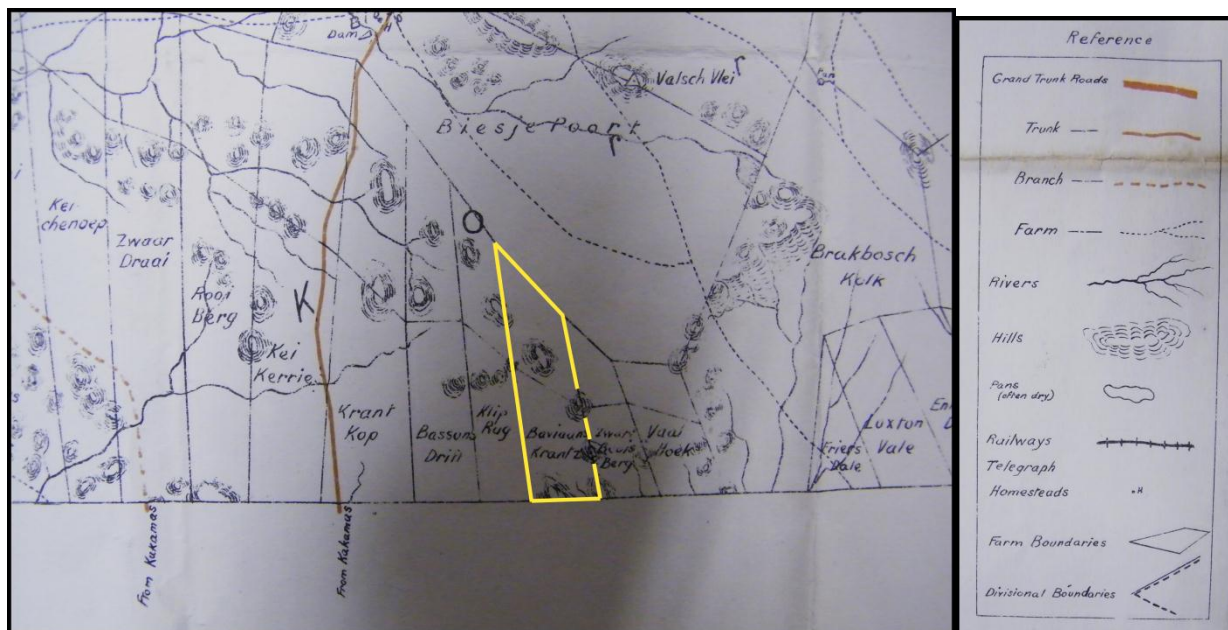


Figure 3: Upington district map dating to 1908.



Figure 3: Undated Kenhardt District Map, drawn up by the Intelligence Division at the time. This shows that Baviaans Krantz formed part of both the Gordonia and Kenhardt districts. One can see that Baviaans Krantz is a very hilly or mountainous area

5.3. A Brief History of Human Settlement And Black And White Interaction In The Gordonia Area

The discovery of human skeletons was one of the most important archaeological discoveries to be made in the area under investigation. T.F. Dreyer and A.J.D. Meiring excavated the so-called "Kakamas Burials" in June and July 1936. Dreyer and Meiring excavated an area stretching from the Augrabies Falls to Upington along the banks of the Orange River. They were, however, most active in the region between the falls and Kakamas. Eighty-two graves from the area were excavated and 56 skeletons were retained. From radiocarbon dating it is deduced that the Kakamas burials indicate an eighteenth century time span and some skeletons being interred at the beginning of the nineteenth century.

Some of the earliest known people to have lived in the Kakamas region were the Nameiqua people who lived at !Nawabdanas (today known as Renosterkop) during the late eighteenth century. In 1778 Hendrik Jacob Wikar and in 1779 Colonel R.J. Gordon came in contact with these people. The following descriptions of the Nameiqua and other groups of people that lived in this area are based on the accounts of Wikar and Gordon.

Although reference is made to the fact that Europeans started to move into this territory from at least the 1760s onwards, the first literate person to visit and describe the people living along the Orange River was H.J. Wikar. Wikar deserted the service of the Dutch East India Company and fled to the interior in 1775. He presented a report on his findings of the people he encountered in the interior to the Governor of the Cape with the hope that he would be pardoned and that he could return to live in the colony. In his report, Wikar, referred to the Khoi of the Orange River as Eynikko / Eynicqua. He divided them into four separate groups: the Namnykoa / Namikoa, who lived on the islands above the Augrabies Falls, the Kaukoa and the Aukokoa higher up the river close to Kanoneiland and the Gyzikoas in the vicinity near the present day Upington. Although these groups were closely related, the Gyzikoas were intermixed genetically and culturally with Bantu-speaking peoples from the northeast. Wikar also recorded the presence of a group of people who he called the "Klaare Kraal" people. This group of people was apparently "a strong Bushman Kraal of about twenty huts but with no cattle" (Morris, 1992)

Another European traveller that visited the same region was Colonel R.J. Gordon, who met a group of people called the Anoe Eys, roughly translated as "bright kraal" people. Gordon recorded that this group of "Bushmen catch fish and live by hunting, digging pits to trap rhinoceros at the side of the river." Morris feels it reasonable that Wikar's "Klaare Kraal" people and Gordon's "bright kraal" people are the same group (Morris, 1992). Gordon went on to describe other people living along the river too and although the spelling of the names of the various group differ between these two early travellers it can be assumed that they are indeed speaking and describing the same groups of people.

In 1813 Reverend John Campbell travelled down the Orange River and met a group of people near the Augrabies Falls but was surprised by the few inhabitants that now lived in the area. This was mainly because of a period of severe drought and there was very little water in the area to support large human settlements. In 1824 another traveller, George Thompson rode through the central Bushmanland and reached the confluence of the Hartebeest and Orange Rivers very close to the modern Kakamas. According to his writings the whole area was deserted except for a small group of !Kora close to the Falls (Morris, 1992).

The Renosterkop settlement was on one of the large islands in the Orange River. Geographically the area that the Orange River flows through from Upington to the Augrabies Falls is characterized by the river splitting into various loops thus forming islands in the river (Moolman, 1946). The settlement consisted of ten mat huts that housed about five to six people each. The Nameiqua herded cattle, sheep and to a lesser extent goats. Cattle were their most prized possession, both economically and ritually. They were also excellent hunters and would display the heads of rhino, hippo and buffalo in the centre of the settlement (Morris & Beaumont, 1991).

The Nameiqua people were not the only people that stayed in the area. Away from the river in areas less suitable for pastoralism lived groups such as the Noeeis, Eieis and the /Xam. These groups lived mainly from hunting and gathering. The relationships between the various groups of people that lived in this area were "peripheral" and involved "varying degrees of clientship during certain seasons, with limited exchange in items such as pots". The Khoi peoples would sometimes also take San wives. Around the area of Upington lived the Geissiqua (Twin-folk) people. This was a mixed group of Korana-BaTlhaping (Tswana) group who were in regular contact with Tswana Iron Age communities to the northeast. This group of people would seemingly once a year trade with the tribes living along the river and who traded in items, such as, tobacco, ivory spoons, bracelets, knives, barbed assegais and smooth axes (Morris & Beaumont, 1991).

In the period leading up to the First Koranna War in 1869 the northwards trek of the Basters and the white farmers into the vicinity of the Orange River provided the Koranna (!Kora) people with opportunistic opportunities to steal cattle from these new settlers and flee to islands located in the river. It was inevitable that this would lead to armed conflict between these groups (De Beer, 1992). The First Koranna War was in 1869 and a second war took place from 1878 to 1879. After the second war many of the Basters went to settle north of the river. Reverend Schröder advocated for the Cape government to allow these Basters to go and settle in the area and form a buffer zone between the white settlers and the black tribes to the north of the Cape Colony (De Beer, 1992).

In 1995 there were only three Baster landowner families remaining in the Keimoes area, namely the Jansen family, the Loxtons and the Spangenberg. This fact can be attributed to the commercialisation of agricultural farming during the twentieth century and also the action taken by the state to support the capitalization of white farmers in the area (Legassick, 1996). It would seem that many of the Basters rather decided to sell their farms to emerging white farmers as their history and tradition was that of pastoralism and hunting. They were also used to being ousted by whites in the territories that they settled. Many of them did not want to be restricted by the laws and administrative regulations that came with colonial rule in the area. Thus as stated by one observer at the time "the Basters, who are good pioneers, but apparently unable to form of themselves a permanent settled community, will on the first favourable opportunity dispose of their ground and trek to some country where there will be no taxes, ... no boundary lines to farms, but on the contrary scope for unrestricted trekking and hunting, and no shops where they can run into debt and impoverish themselves by improvidence" (Legassick, 1996).

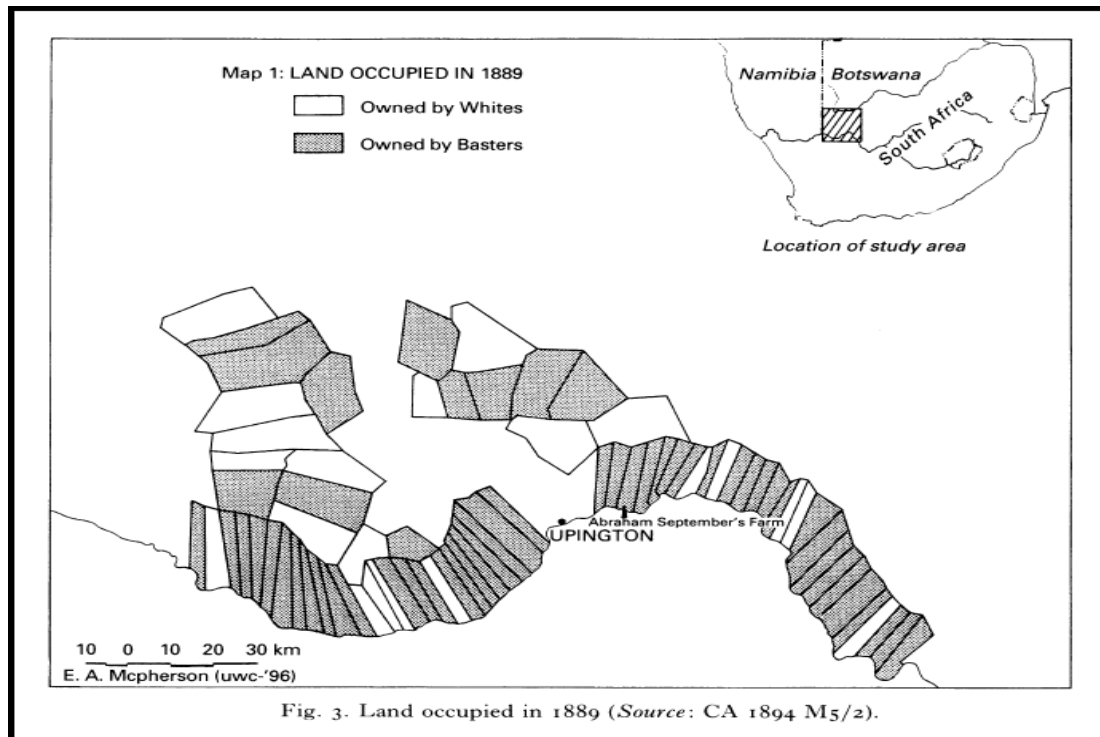


Figure 5. Showing land occupied in 1889

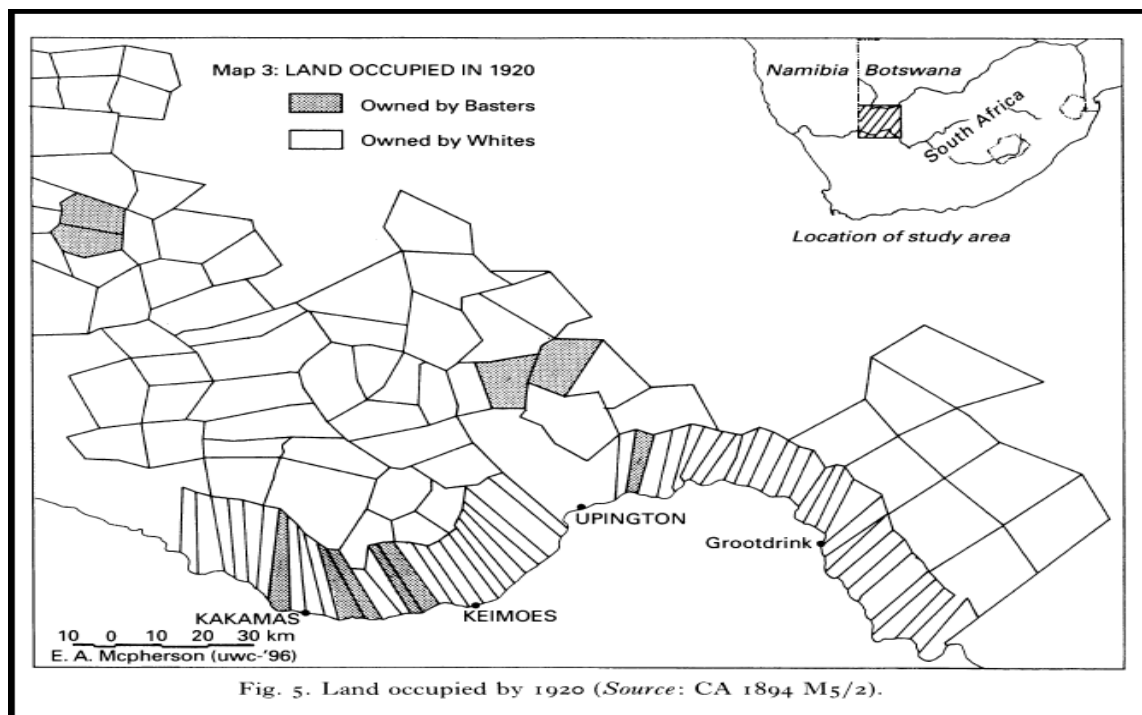


Figure 6: Showing land occupied in 1920

5.3.1 Figure 5 and 6

The above two maps indicate the transfer of land from Baster ownership to white ownership during the period 1889 to 1920. It is evident that the farm Baviaans Krantz No. 474 was occupied by Basters in 1889, but was under white ownership by 1920. Legassick notes in his article that most of these farms were lost by the Basters due to indebtedness, the social vice of alcoholic liquor drinking and also deliberate trickery and unfair dealing by manipulative whites (Legassick, 1996).

It is interesting to note the sudden growth in the number of coloured people who settled in the Gordonia area, and especially in the years between the 1936 and the 1970 census. By 1970, coloured people still made up the vast majority of the population of the Gordonia district, as they had done in 1911. By 1970 the smallest proportion of the population of Gordonia was black people. The following table provides population numbers for the Gordonia Census District between 1911 and 1970 (De Klerk, 1985).

Population group	Area	1911	1921	1936	1946	1951	1960	1970
White	Urban	1096	1935	3194	4095	5258	6755	9288
	Rural	5066	5893	13607	13735	12683	11206	7035
	Subtotal	6162	7828	16801	17830	17941	17961	16323
Black	Urban	235	228	1006	2328	3405	5041	6355
	Rural	597	753	1296	2351	4574	5273	4092
	Subtotal	832	981	2302	4679	7979	10314	10447
Coloured	Urban	2157	1716	3985	5970	7269	11567	31877
	Rural	7595	7788	17059	21778	24390	32886	24770
	Subtotal	9752	9504	21044	27748	31659	44453	56647
Total population		16746	18313	40147	50259	57597	72728	83417

5.4. The Development Of The Gordonia Area: The Orange River Irrigation Systems, Keimoes And Kakamas

The irrigation of the Orange River has been central to the economic existence of the area in the vicinity of Upington since the 1880s. To the north of the river lies the Kalahari and to the south lies "Bushmanland", these two areas being some of the driest land in South Africa (Legassick, 1996). Moolman attributes the beginning of irrigation in this area to the Basters who he calls: "primitive pastoral people", who had "crude" ways to divert the river water to their "little gardens" (Moolman, 1946). According to Legassick the first person to irrigate the Orange River was one Abraham September, from whose lead the Dutch Reformed Church missionary Reverend C.H.W. Schröder and John H. Scott, the Special Magistrate for the Northern Border, stationed at Upington, would have gotten the idea to start irrigating the river on a much larger scale (Legassick, 1996).

The first 81 farms to be given out to the north of the Orange River from Kheis (opposite the present Groblershoop) to the Augrabies Falls were allocated almost exclusively to Basters in 1882. The term "Baster" refers to a group of people who have moved out of the Cape Colony to avoid social oppression and could refer to people of mixed parentage, particularly white and Khoikhoi or slave and Khoikhoi and also implies an economic category that implies the possession of property and who is culturally European (Morris, 1992). The farms bordering on the river measured in sizes ranging from 4000 to 10 000 morgen, these farms were "laid out on the basis of half an hour's ride along the river and two and a half hours' ride away from the river into the 'back country'". Once the irrigation canal was completed these farms were further divided into "water-erven" for irrigation and "dry-erven" for establishing buildings and the like (Legassick, 1996).

The district of Gordonias was established on 30 September 1885 and formed part of British Bechuanaland. It was only administrated as part of British Bechuanaland from April 1889. The Cape government instructed the Special Magistrate appointed for the area to settle the territory with "Baster farmers" living on the southern side of the Orange River. The area was soon settled with Basters, a few whites at first largely related to the Basters by marriage and some Kora, San and Xhosa people (Legassick, 1996). In 1891 the first census in the area recorded 735 whites, 1429 "aboriginal natives" and 3121 "other coloured persons" living in the area (Legassick, 1996).

When writing a history on the area in which Baviaans Krantz 474 is situated, it is necessary by implication to look at the histories of the surrounding towns. This farm is located very close to the town Keimoes, and is situated about 13 kilometres to the east of Kakamas and 24 kilometres to the west of Upington.

Christiaan H. W. Scröder was a missionary from the Nederduits Gereformeerde Kerk in Upington, and knew all the islands and areas alongside the Orange River, stretching from his missionary station, far to the east and the west along the riverbank. He was an important figure with regards to the foundation of both the towns of Keimoes and Kakamas. Interestingly, the name Keimoes means "large eye", and an eye appears on the coat of arms of the town, which was created in 1960 (De Beer, 1992). When Scröder first came to Upington in July 1883, there were already people in the area of Keimoes that used irrigation and planted fields. It is possible that the proficient Mr Scott, who was at that time the only person in "Basterland" who understood the art of channelling water to other areas, directed this irrigation project in 1882. By 1883 it was necessary to build a second furrow for irrigation, and this was done under the vigilance of C. H. W. Scröder. These furrows contributed to the advancement of the town and in the following years many families started moving to the area (De Beer, 1992).

By 1886, the committee in charge of the settlement realized the necessity of building a school for the inhabitants of Gordonia. In 1887 a school was opened, with Pieter Rossouw as its first teacher. The school was closed again in 1899, due to the start of the Anglo-Boer War (De Beer, 1992). The construction on the church at Keimoes was started in 1888 and was completed in 1889. During the construction of the church, Scröder lived in Keimoes. The church can still be seen next to the main street running through Keimoes (De Beer, 1992).

In the 1880's, white people moved to the Keimoes area for the first time. Among the first of the white farmers who lived in the area, was Robert Frier. Between 1889 and 1899, more and more white people started moving to the Gordonia area and by 1900 some 13 Afrikaner families had settled at Keimoes (De Beer, 1992). After the Anglo-Boer War, many farmers were forced to move to other areas, in search of greener pastures after their farms and livelihoods were destroyed during the war. Settling next to the Orange River was an obvious choice, due to the possibility of irrigating one's crops. Many of the farmers who came to the Gordonia area opted rather to settle in Keimoes than in Kakamas, since it was only possible to buy land in the former town. When farmers did not have the means to buy properties of their own, they often became *bywoners* to other landowners, paying a rent to live and work on the land. By 1910, Keimoes had its own hotel, prison, court and police service (De Beer, 1992). In 1951, Keimoes opened its own power station and candlelight was abruptly replaced by electricity (De Beer, 1992).

The town of Kakamas has an interesting origin. It was first developed as a labour colony to help uplift poor whites in the Gordonia area. This was possible due to the proximity of the town to the Orange River, which is one of the few rivers in the country that are large and regular enough to serve as a source for irrigation (Rossouw, 1939). One of the main players behind the foundation of what would at first be known as the Kakamas Labour Colony, was one Reverent B. P. J. Marchand. Marchand was a young preacher of the Nederduits Gereformeerde Kerk (NGK), and was especially concerned with the founding of schools for the children of poor white forestry workers in the Knysna area during the 1880's. Marchand realized that, in order to make it possible for more poor white children to attend school, these families would have to be concentrated into one area. At this time many white people in the Gordonia area had been impoverished due to a drought in 1896 and the outbreak of Rinderpest in 1897 in the Northern Cape Colony (Moolman, 1946). Hence the idea of the Kakamas Labour Colony was born. Despite criticism from some of the older leaders of the church, who described Marchand's ideas as "kasteelen van een onervaren enthusiast" (the dreams of an inexperienced enthusiast), he was able to gather support from the Northern Cape community. Marchand drew his inspiration for the creation of a labour colony from Germany, where the Government had used similar schemes to uplift their poor (Rossouw, 1939).

The missionary, Christiaan H. W. Scröder, from the NGK in Upington was able to indicate a place where it would be possible to build successful irrigation works, and to found the town of Kakamas (Rossouw, 1939).

In 1898, a notice appeared in the newspaper "De Kerkbode", that the irrigation works for the Kakamas Labour Colony would be opened on the 3rd of July of that year, on the farm Neus. Having heard of the new settlement, poor white families streamed in from the surrounding areas. Many of these families had been ruined by the droughts of the years before. By 1937, the Kakamas Labour Colony had developed into a settlement comprising a total area of 142 000 morgen, with 3 700 morgen under irrigation, 138 000 morgen of grazing and a total of 627 plots (Rossouw, 1939). The following is noted in the 1945 Report of the Commission of Enquiry into the Kakamas Labour Colony; "The pluck and tenacity of the original settlers were amazing. Without any training, working under difficulties of climate and without practically any means at their disposal, by the labour of their own hands they transformed a wilderness into a flourishing settlement".

6. HISTORICAL OVERVIEW OF THE OWNERSHIP AND DEVELOPMENT OF THE FARM BAVIAANS KRANTZ NO. 474

*Unfortunately, no archival evidence could be found with regards to the farm Baviaans Krantz No. 474. Therefore, no information can be given as to whom the owners of this farm were.

6.1 General features of the farm area

A map of the Upington district, dating back to 1908, could be found at the National Archives of South Africa. Some interesting information regarding roads, transport and other features of the Upington District was provided on the map. This gives one an interesting view of what life might have been like in the farm area at around the turn of the century. The following facts are provided:

- » Roads : Generally very sandy and bad. The frequented roads, owing to being cut up by traffic, are often worse than those shown as unfrequented. The roads crossing the main range of hills in the eastern part of the sheet are generally very rough and passable only with difficulty by lightly loaded wagons.
- » Drifts: The Orange River is impassable for wheeled transport except at the drifts shown. These drifts are only practicable when the river is low, i. e.: usually from May to October. When the river rises the only crossing is the "pont" at Upington.
- » Transport: Donkey and ox wagons. The former are by far the more common; usual span 18 animals.

- » Water: Rainfall very uncertain and usually very small. Pans and dams do not last for more than three months after rains. Water is generally scarce in the south west corner of the sheet but elsewhere a good supply is generally obtainable at all farmhouses.
- » Fuel: Generally scarce except along the banks of the Orange River.
- » Grazing: Generally scarce except on the sand dunes, where there is good grazing after rain.

One can therefore conclude that the area in which the farm Baviaans Krantz No. 474 was located, was a dry and inhospitable area to settle in by 1908, and especially in areas further away from the Orange River.

7. HISTORICAL CONCLUSION

This report attempted to give an account of the history of the farm Baviaans Krantz No. 474. By consulting various primary and secondary sources, it was possible to compile a brief general history regarding human settlement in the Gordonia area, and especially with regards to the interaction between different racial groups. The development of the Gordonia Area, particularly with regards to the Orange River irrigation systems, was also discussed. The development of the towns of Keimoes And Kakamas, which are both located in proximity to the farm and bears on the history of the area, was also examined.

8. STONE AGE BACKGROUND

The following section is authored by Dr Marlize Lombard, Department of Anthropology and development studies, University of Johannesburg.

8.1 Introduction

South Africa has a long and complex Stone Age sequence of more than 2 million years. The broad sequence includes the Later Stone Age, the Middle Stone Age and the Earlier Stone Age. Each of these phases contains sub-phases or industrial complexes, and within these we can expect regional variation regarding characteristics and time ranges. For Cultural Resources Management (CRM) purposes it is often only expected/ possible to identify the presence of the three main phases. Yet sometimes the recognition of cultural groups, affinities or trends in technology and/or subsistence practices, as represented by the sub-phases or industrial complexes, is achievable. Such finer-grained identifications may help to highlight the importance of some archaeological sites in a specific region. Table 1 provides a brief overview of the Stone Age phases and sub-phases/industrial complexes of South

Africa, based on our current knowledge. The information is aimed at assisting the identification of Stone Age occurrences in the field by providing the main associated characteristics, and it provides the broadly associated age estimates. Users of this document should, however, remember that the outlines are broad, and any field interpretations can only be considered preliminary observations until further research is conducted.

Table 1. *Outline of the Stone Age cultural sequence of South Africa. The information presented here provides a basic, simplified interpretation for the Stone Age sequence. Details may vary from region to region and from site to site. Most of the criteria such as dating, transitional phases, technological phenomena and recursions are currently being researched, so that the information cannot be considered static or final*

Cultural sequence	~ Associated ages	Associated characteristics
Later Stone Age; associated with Khoi and San societies and their immediate predecessors		
See sub-phases below for more detailed chronology	Recently to ~30 thousand years ago	<ul style="list-style-type: none"> • Include stone tools mostly < 25 mm, bored stones, grinding stones, grooved stones, ostrich eggshell beads, bone tools sometimes with decoration, decorated ostrich eggshell flasks and fishing equipment <p>These are the general characteristics for the Later Stone Age. In the sub-divisions below I highlight differences or characteristics that may be used to refine interpretations depending on context.</p>
Broad overview of Later Stone Age sub-phases/industrial complexes		
Hunters-with-livestock/herders (e.g. Mitchell 2002; Lombard & Parsons 2008; Sadr 2008)	Mostly less than 2 thousand years ago	<ul style="list-style-type: none"> • Regular occurrence of blades and bladelets, but formal stone tools are rare, backed pieces mostly absent, grindstones are common, stone bowls and boat-shaped grinding grooves may occur • Sheep, goat, cattle and dog bones along with wild species • Pottery is mostly well-fired, thin-walled, sometimes with lugs, spouts and coned bases, sometimes with comb-stamping
Post-Wilton (includes some Smithfield phases) (e.g. Deacon & Deacon 1999; Lombard &	~1 hundred -3 thousand years ago	<ul style="list-style-type: none"> • Mostly macrolithic (stone tools > 20 mm) and informal sometimes with blades and bladelets • Characterised by large untrimmed flakes • At some sites there are also small backed tools, scrapers and adzes • Sometimes includes thick-walled, grass-tempered

Parsons 2008)		potsherds
Wilton (includes some Smithfield phases) (e.g. Deacon & Deacon 1999; Wadley 2007)	~4-8 thousand years ago	<ul style="list-style-type: none"> • Microlithic (stone tools < 20 mm) • High incidence of backed bladelets and geometric shapes such as segments • Include borers, small scrapers, double scrapers, polished bone tools
Oakhurst (includes Albany and Lockshoek) (e.g. Deacon & Deacon 1999; Wadley 2007)	~8-12 thousand years ago	<ul style="list-style-type: none"> • Characterised by round, end and D-shaped scrapers, adzes and a wide range of polished bone tools • Few or no microliths
Robberg (Deacon & Deacon 1999; Wadley 2007)	~12-22 thousand years ago	<ul style="list-style-type: none"> • Characterised by few backed tools, few scrapers, significant numbers of unretouched bladelets
Early Later Stone Age	~30-40 thousand years ago	Described at some sites, but as yet unclear whether this represents a real archaeological phase or a mixture of LSA/MSA artefacts
Middle Stone Age; associated with <i>Homo sapiens</i> and archaic modern humans		
See sub-phases below for more detailed chronology	~30-300 thousand years ago	<ul style="list-style-type: none"> • Mostly based on prepared core techniques, and the production of triangular flakes with convergent dorsal scars and faceted striking platforms • Most pieces are in the region of 40-100 mm • Often includes the deliberate manufacture of parallel-sided blades and flake-blades • Sometimes produced using the Levallois technique • Occasionally includes marine shell beads, bone points, engraved ochre nodules and engraved ostrich eggshell fragments <p>These are the general characteristics for the Middle Stone Age. In the sub-divisions below I highlight differences or characteristics that may be used to refine interpretations depending on context</p>
Broad overview of Middle Stone Age sub-phases/industrial complexes		
Final Middle Stone Age	~30-40	<ul style="list-style-type: none"> • Could include bifacially retouched, hollow-based

(informal designation partly based on the Sibudu sequence) (Jacobs et al. 2008; Wadley, 2005, 2010)	thousand years ago	points <ul style="list-style-type: none"> • Small bifacial and unifacial points • Could include backed geometric shapes such as segments, as well as side scrapers
Late Middle Stone Age (informal designation partly based on the Sibudu sequence) (Jacobs et al. 2008; Wadley 2010)	~45-50 thousand years ago	<ul style="list-style-type: none"> • Most formal retouch aimed at producing unifacial points • Sometimes includes bifacially retouched points
Post-Howieson's Poort (also referred to as MSA III at Klasies River or MSA 3 generally) (e.g. Soriano et al. 2007; Jacobs et al. 2008:734)	~47-58 thousand years ago	<ul style="list-style-type: none"> • Most points are produced using Levallois technique, and many are unifacially retouched • Some side scrapers are present • Backed pieces are rare
Howieson's Poort Industry (e.g. Jacobs et al. 2008:734)	~58-66 thousand years ago	<ul style="list-style-type: none"> • Characterized by blade technology and the presence of small (< 4 cm) backed tools (made on blades), including segments, trapezes and backed blades.
Still Bay Industry (e.g. Jacobs et al. 2008; Lombard et al. 2010; Henshilwood & Dubreuil 2011)	~70-77 thousand years ago	<ul style="list-style-type: none"> • Characterised by thin (< 10 mm), bifacially worked foliate or lanceolate points with either a semicircular or wide-angled pointed butt • Could include finely serrated points
Mossel Bay Industry (also referred to as MSA II at Klasies River or MSA 2b generally) (e.g. Wurz 2010, in press)	~85-105 thousand years ago	<ul style="list-style-type: none"> • Characterised by a unipolar Levallois-type point reduction • Products have straight profiles, percussion bulbs are prominent and often splintered or ring-cracked • Formal retouch is infrequent, restricted to sharpening the tip or shaping the butt
Klasies River sub-stage (also referred to as MSA I at Klasies river or MSA 2a generally) (e.g. Wurz 2010, in press)	~105-115 thousand years ago	<ul style="list-style-type: none"> • Mostly large blades, pointed flakes are elongated and thin, often with curved profiles • Platforms are often diffuse and lack clear percussion marks • Low frequencies of retouch, few denticulated pieces

MSA 1 (tentative, informal designation) (Volman 1984; Thompson et al. 2010)	Suggested age OIS 6 (~130-195 thousand years ago)	<ul style="list-style-type: none"> • Platforms are mostly plain • Very little formal retouch • Flakes are mostly short and broad, few have denticulate retouch • Rare scraper retouch
Sangoan Sometimes observed between MSA and ESA deposits, some researcher place this phase under the Middle Stone Age, others under the Earlier Stone Age, the designation is thus not yet clear (e.g. Kuman et al. 2005)	> 200 thousand years ago, but few sites in southern Africa have been dated	<ul style="list-style-type: none"> • Contains small bifaces (< 100 mm), picks, heavy- and light-duty denticulated and notched scrapers
Earlier Stone Age; associated with early <i>Homo</i> groups such as <i>Homo habilis</i> and <i>Homo erectus</i>		
Fauresmith (e.g. Porat et al. 2010)	~400-600 thousand years ago	<ul style="list-style-type: none"> • Generally includes small handaxes, long blades and convergent/pointed pieces
Acheulean (e.g. Kuman 2007; Mitchell 2002)	~300 thousand-1.5 million years ago	<ul style="list-style-type: none"> • Bifacially worked handaxes and cleavers, large flakes > 10 cm • Some flakes with deliberate retouch, sometimes classified as scrapers • Give impression of being deliberately shaped, but could indicate result of knapping strategy • Sometimes shows core preparation • Mostly found in disturbed open-air locations
Oldowan (e.g. Kuman 2007; d'Errico & Backwell 2009; Mitchell 2002)	~1.5 -> 2 million years ago	<ul style="list-style-type: none"> • Cobble, core or flake tools with little retouch and no flaking to predetermined patterns • Hammerstones, manuports, cores • Polished bone fragments/tools

The focus of this background study is limited to the Kakamas/Keimoes and directly surrounding area. Its purpose is to provide information regarding Stone Age cultural heritage or archaeological features that may occur on the farm bordering on the N14

between Upington and Kakamas that may be affected by the proposed photovoltaic plant. In general, many low density lithic (stone tool) scatters can be expected as well as boulders or rocks with engravings. Other possible archaeological occurrences are organised according to the sequence in Table 1.

8.2 The Later Stone Age

8.2.1 Hunters-with-livestock/herders

The region is well-known as one that produced the largest sample (n = 56) of prehistoric skeletons in South Africa (Morris 1995). Excavated in 1936, known as the 'Kakamas Skeletons', and currently housed in the National Museum in Bloemfontein, they are considered the 'type' specimens of Khoi morphology (1992). Grave locations can be expected along the Gariep (perhaps up to 35 km from its shore), and on the Gariep Islands between Upington and the Augrabies Falls. They are often marked with stone burial cairns, dug into the alluvial soil or into degraded bedrock above the alluvial margin. Graves can be isolated or grouped in small clusters, sometimes containing up to eight graves (Morris 1995).

Burial cairns can be elaborately formed, some with upright stones in their centres, but they are often disturbed. Cairns from near the Gariep Islands are often characterised by their high conical shapes, and the grave shafts filled with stones. Those closer to Augrabies Falls, however, are low and rounded with ashes in the grave shaft (Dreyer & Meiring 1937; Morris 1984). The placing of specularite or red ochre over the body was common, but other grave goods are rare (Morris 1995).

Where dating was possible, most of the skeletons were dated to the last 200 years-or-so, but association with archaeological material from up to about 1200 years old is possible. The grave sites show parallels to those of recent Khoi populations (Morris 1995).

Apart from the grave locations, archaeological sites of this period in the region have been further divided into Swartkop and Doornfontein sites. Doornfontein sites are mostly confined to permanent water sources. The assemblages contain a consistently large complement of thin-walled, grit-tempered, well-fired ceramics with thickened bases, lugs, bosses, spouts, and decorated necks or rims. Lithics are often produced on quartz, and dominated by coarse irregular flakes with a small or absent retouched component (Beaumont et al. 1995; Lombard & Parsons 2008; Parsons 2008). Late occurrences contain coarser potsherds with some grass temper, a higher number of iron or copper objects, and large ostrich eggshell beads (Jacobson 1984, 1985). These assemblages are mostly associated with the Khoi (Beaumont et al. 1995).

» *Post-Wilton*

Swartkop sites can be almost contemporaneous with, or older than, the Doornfontein sites. They are usually characterised by many blades/bladelets and backed blades. Coarse undecorated potsherds, often with grass temper, and iron objects are rare. These sites are remarkably common throughout the region. They usually occur on pan or stream-bed margins, near springs, bedrock depressions containing seasonal water, hollows on dunes, and on the flanks or crests of koppies (Beaumont et al. 1995; Parsons 2008). Some of these sites are also associated with stone features, such as ovals or circles, that may represent the bases of huts, windbreaks or hunter's hides (Jacobson 2005; Lombard & Parsons 2008; Parsons 2004). These sites are linked to the historic /Xam communities of the area who usually followed a hunter-gatherer lifeway (Deacon 1986, 1988; Beaumont et al. 1995).

» *Wilton*

These assemblages are distinguished by a significant incidence of cryptocrystalline silicates (mainly chalcedony) and contain many formal tools such as small scrapers, backed blades and bladelets. A regional variation of the Wilton in the area is often referred to as the Springbokoog Industry (Beaumont et al. 1995).

» *Oakhurst*

A few heavily patinated Later Stone Age clusters, that include large scrapers, may represent Oakhurst-type aggregates (Beaumont et al. 1995).

8.3. The Middle Stone Age

Previous collections of stone tools in the region include artefacts with advanced prepared cores, blades and convergent flakes or points. Most of the scatters associated with the Middle Stone Age have a 'fresh' or un-abraded appearance. They appear to be mostly associated with the post-Howiesons Poort (MSA 3) or MSA 1 sub-phases (Beaumont et al. 1995).

Substantial Middle Stone Age sites seem uncommon. However, where archaeological sites were excavated, such as only two farms west of Geelkop 456, on Zoovoorbij 458, a Middle Stone Age assemblage was excavated beneath Later Stone Age deposits (Smith 1995). This shows that, although not always visible on the surface, the landscape was inhabited during this phase. The large flake component of the lower units of Zoovoorbij Cave has Levallois-type preparation on the striking platforms, reinforcing their Middle Stone Age context.

8.4. The Earlier Stone Age

Stone artefacts associated with this phase, based on their morphology, seem moderately to heavily weathered. Scatters may include long blades, cores (mainly on dolerite), and a low

incidence of formal tools such as handaxes and cleavers. Clusters with distinct Acheulean characteristics have been recorded in the area (Beaumont et al. 1995).

8.5. Concluding remarks

The brief background study above indicates that an extensive range of Stone Age manifestations can be expected in the area demarcated for the photovoltaic plant. Those that are most sensitive are the Later Stone Age grave sites that may be recognised by variously shaped stone cairns. Where these have been disturbed/removed variations in the soil, that may include ashy or stony patches, could signify the locations of ancient graves. Patches of soil, stained red with specularite or ochre, may also be an indication of the presence of a grave site. Stone circles or ovals demarcate Later Stone Age living or activity sites, and engraved boulders or stones may occur throughout the area. Concentrations of stone tools point to activities that took place at various stages over the past 1.5 million years, representing the different groups of people who inhabited or moved across the landscape over time.

9 PROBABILITY OF OCCURRENCE OF SITES

Based on the above information, it is possible to determine the probability of finding archaeological and cultural heritage sites within the study area to a certain degree. For the purposes of this section of the report the following terms are used – low, medium and high probability. Low indicates that no known occurrences of sites have been found previously in the general study area, medium probability indicates some known occurrences in the general study area are documented and can therefore be expected in the study area and a high probability indicates that occurrences have been documented close to or in the study area and that the environment of the study area has a high degree of probability having sites.

» Palaeontological landscape

Fossil remains. Such resources are typically found in specific geographical areas, e.g. the Karoo and are embedded in ancient rock and limestone/calcrete formations exposed by road cuttings and quarry excavation: *Unknown*.

» Archaeological And Cultural Heritage Landscape

NOTE: *Archaeology is the study of human material and remains (by definition) and is not restricted in any formal way as being below the ground surface.*

Archaeological remains dating to the following periods can be expected within the study area:

» Stone Age finds

ESA: *High Probability*

MSA: *High Probability*

LSA: *Medium- High Probability*

LSA –Herder: *Medium Probability*

» Historical finds

Historical period: *High Probability*

Historical dumps: *High Probability*

Structural remains: *High Probability*

Cultural Landscape: *Medium probability*

» Living Heritage

For example rainmaking sites: *Low Probability*

» Burial/Cemeteries

Burials over 100 years: *High Probability*

Burials younger than 60 years: *High Probability*

Subsurface excavations including ground levelling, landscaping, and foundation preparation can expose any number of these.

10. ASSUMPTIONS AND LIMITATIONS

The study area was not subjected to a field survey as this will be done in the EIA phase. It is assumed that information obtained for the wider area is applicable to the study area.

11. FINDINGS

The heritage scoping study revealed that the following heritage sites, features and objects that can be expected within the study area.

11.1. Archaeology

11.1.1 Archaeological finds

There is a high likelihood of finding Stone Age sites scattered over the study area. There is an increased likelihood of finding material near the foot hills and on hill tops and in shelters if any occur within the study area.

11.1.2 Nature of Impact

The construction phase of the photovoltaic plant could directly impact on surface and subsurface archaeological sites.

11.1.3 Extent of impact

The construction of the photovoltaic plant could have a low to medium impact on a local scale.

11.2. Historical period

11.2.1 Historical finds

Including middens, structural remains and cultural landscape. The desktop study highlighted the fact that the area was occupied at least from the 1800's and features dating to this period associated with farming can be expected.

11.2.1 Nature of Impact

The construction of the photovoltaic plant can directly impact on both the visual context and sense of place of historical sites. There are few if any structures identified in the area. Due to the visual nature of photovoltaic plants it can also have a direct impact on the sense of place as well as the cultural landscape.

11.2.3 Extent of impact

The plant will have a low to medium local impact due to the general physical nature of photovoltaic plants. The sense of place of cultural sites and the cultural landscape will be impacted on a local scale and the impact will be medium.

11.3. Burials and Cemeteries

11.3.1 Burials and Cemeteries

Graves dating to the Stone Age can be expected especially close to the river with more recent formal and informal cemeteries anywhere else on the landscape.

11.3.2 Nature of Impact

The construction and operation of the photovoltaic plant could directly impact on marked and unmarked graves.

11.3.3 Extent of impact

The plant could have a low to medium impact on a local scale.

12. POTENTIAL SIGNIFICANCE OF HERITAGE RESOURCES

Based on the current information obtained for the area at a desktop level it is anticipated that any sites that occur within the proposed development area will have Grade III Significance.

13. CONCLUSIONS AND RECOMMENDATIONS

This scoping study revealed that a range of heritage sites occur in the larger region and similar sites can be expected within the study area. Every site is relevant to the Heritage Landscape, but it is anticipated that few if any sites in the area have conservation value. The following conclusions are applicable to the following sites:

» Archaeological sites

All sites could be mitigated either in the form of conservation of the sites with in the development or by a Phase 2 study where the sites will be recorded and sampled before the client can apply for a destruction permit for these sites prior to development.

» Historical finds and Cultural landscape

It is not anticipated that the built environment will be severely impacted upon as very little structures occur within the study area. However, indirect impacts like the visual impact on the cultural landscape and possible historical sitest can only be assessed during the survey of the area and suitable mitigation measures proposed. It is therefore recommended that the visual impact specialist and the heritage specialist work closely together.

» Burials and cemeteries

Formal and informal cemeteries as well as pre-colonial graves occur widely across Southern Africa. It is generally recommended that these sites are preserved with in a development. These sites can how ever be relocated if conservation is not possible, but this option must be seen as a last resort. The presence of any grave sites must be confirmed during the field survey and the public consultation process.

» General

It is recommended that as part of the public consultation process the history of the area as well as the oral history pertaining to the area must be recorded.

14. PLAN OF STUDY

In order to comply with the National Heritage Resources Act (Act 25 of 1999) a Phase 1 Archaeological Impact Assessment must be undertaken. During this study sites of archaeological, historical or places of cultural interest must be located, identified, recorded, photographed and described. During this study the levels of significance of recorded heritage resources must be determined and mitigation proposed should any significant sites be impacted upon, ensuring that all the requirements of SAHRA are met.

15. LIST OF PREPARERS

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16. STATEMENT OF COMPETENCY

The author of the report is a member of the Association of Southern African Professional Archaeologists and is also accredited in the following fields of the Cultural Resource Management (CRM) Section, member number 159: Iron Age Archaeology, Colonial Period Archaeology, Stone Age Archaeology and Grave Relocation.

Jaco serves as a council member for the CRM Section of the Association of Southern African Association Professional Archaeologists and is also an accredited CRM Archaeologist with SAHRA and AMAFA.

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2 August 2011

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Dear Tammy,

Proposed photovoltaic plant near Keimoes in the Northern Cape Province - Palaeontological Impact Assessment

I have undertaken a desk top palaeontological impact analysis for the area which will be affected by the proposed solar facility which will be sited on the farm Baviaanz Krantz 474/11 north east of Kakamas (Figure 1).

The entire farm is situated on the Namaqua-Natal Metamorphic Province comprising Precambrian igneous and metamorphic rocks of the Korannaland Group and the Riemvasmaak suite. These rocks are exposed in places but in turn are covered by Quaternary alluvial deposits.

The igneous and metamorphic rocks of the granites and gneisses of the Korannaland Group and the Riemvasmaak suite, which are Precambrian in age, are unlikely to contain fossils. Much of the area between the rock outcrops is covered by unconsolidated Quaternary deposits. There is a slight, but unlikely, possibility of fossils being present in the unconsolidated Quaternary alluvial deposits. It is unlikely that the proposed development will have an impact on palaeontological heritage, but it is essential that if fossils are uncovered in the process of development activities that a professional palaeontologist be bought in to access the situation.

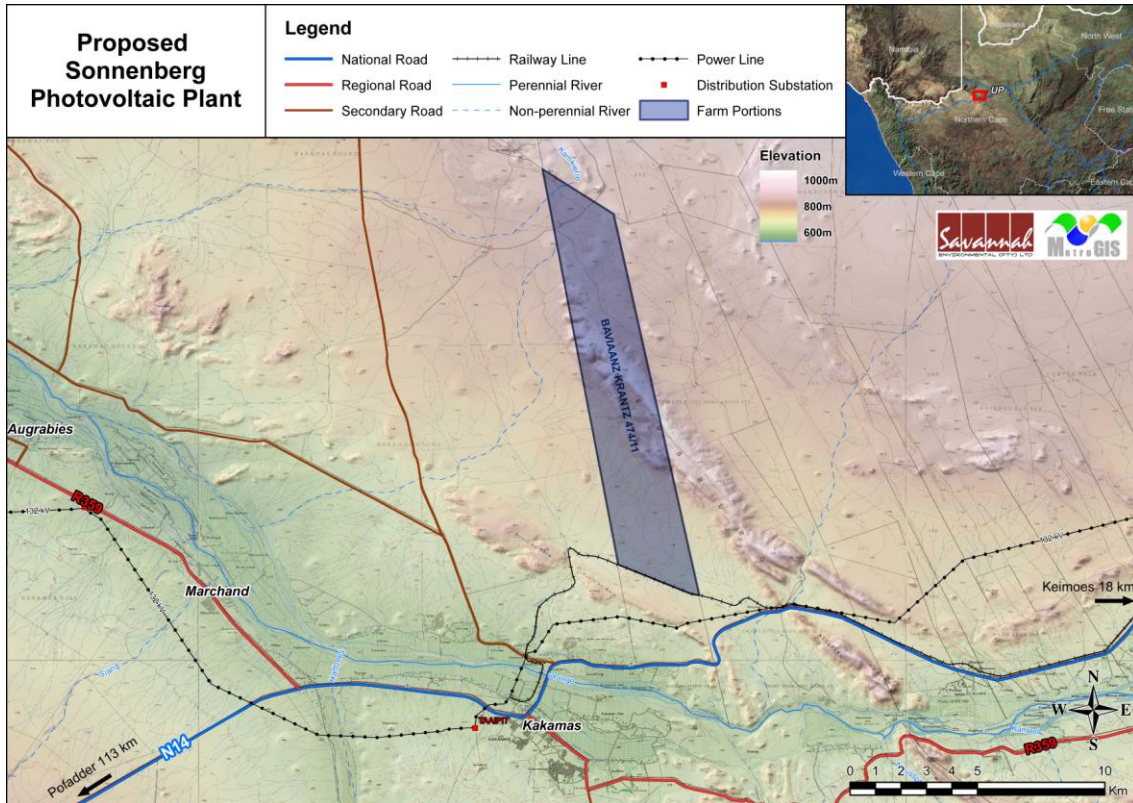


Figure 1: Locality map for the proposed development on Baviaanz Krantz 474/11

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Yours sincerely

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