

**Heritage scoping assessment for  
THE PROPOSED PERSEUS-KRONOS 765KV TRANSMISSION POWER LINE  
AND SUBSTATIONS UPGRADE, NORTHERN CAPE AND  
FREE STATE PROVINCES**

**HERITAGE SCOPING ASSESSMENT FOR THE PROPOSED PERSEUS-KRONOS  
765KV TRANSMISSION POWER LINE AND SUBSTATIONS UPGRADE,  
NORTHERN CAPE AND FREE STATE PROVINCES**

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**Declaration:**

I, J.A. van Schalkwyk, declare that I do not have any financial or personal interest in the proposed development, nor its developers or any of their subsidiaries, apart from the provision of heritage assessment and management services.



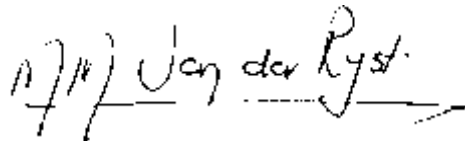
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## EXECUTIVE SUMMARY

### **HERITAGE SCOPING ASSESSMENT FOR THE PROPOSED PERSEUS-KRONOS 765KV TRANSMISSION POWER LINE AND SUBSTATIONS UPGRADE, NORTHERN CAPE AND FREE STATE PROVINCES**

Eskom Holding SOC Limited proposes to construct a 765kV transmission power line for the "Proposed Northern Alignment 765kV Power Line Project". A section of this line is to run from the existing Perseus Substation near Dealsville in the Free State Province to the Kronos substation south of the town of Copperton in the Northern Cape Province. The total length of the power line would be approximately 370km. For this purpose three alternative alignments have been identified, one of which will be selected as the most viable proposition.

South Africa's heritage resources, also described as the 'national estate', comprise a wide range of sites, features, objects and beliefs. According to Section 27(18) of the National Heritage Resources Act (NHRA), No. 25 of 1999, no person may destroy, damage, deface, excavate, alter, remove from its original position, subdivide or change the planning status of any heritage site without a permit issued by the heritage resources authority responsible for the protection of such sites.

Power lines on the scale required for a project such as this put particular constraints on heritage resources. It is anticipated that overall the impact of the development would largely be indirect, as it might only pass over or in close proximity of a heritage site or feature. The impact therefore would largely be visual. In other cases the impact will be direct as it would focus on a particular node, i.e. tower positions or access/ inspection roads. This would give rise to the physical disturbance of the material and its context.

In accordance with Section 38 of the NHRA, an independent heritage consultant was appointed by **Mokgope Consulting** on behalf of the applicant, Eskom, to conduct a Heritage Scoping Assessment to determine if there are any fatal flaws that would prevent the proposed development from taking place in any of the three corridors where it is proposed to develop the electricity transmission line.

The cultural landscape qualities of the region essentially consist of a three components. The first is a rural area in which the human occupation is made up of a pre-colonial (Stone Age and Iron Age) occupation and a much later colonial (farmer) component. This rural landscape has always been sparsely populated. The second component is an urban one consisting of a number of smaller towns, most of which developed during the last 150 years or less. The third component is made up of a number of battlefields which, although spread out over a large part of the landscape, are still linked to each other.

The following heritage sites were identified in the larger region:

- Pre-colonial archaeological sites dating to the Stone Age have been identified to occur in the region of study area. In most known cases the impact of the development would only be indirect, e.g. the power line crossing some distance from the site, thereby having only a visual impact. However, when more detailed information is available, e.g. the exact position of the different towers and access/inspection roads, which will give rise to physical disturbance of the material and its context, it might be determined that specific development aspects might have a direct disturbance, which would result in irreplaceable loss of heritage resources.
- Colonial period or historic period heritage manifest in a wide variety – farmsteads, infrastructure, cemeteries and battlefields. As the power line is to cross a rural landscape for the most part, the impact would only be indirect, e.g. the power line crossing some distance from the site, thereby having only a visual impact. However, when more detailed

information is available, e.g. the exact position of the different towers and access/inspection roads, which will give rise to physical disturbance of the material and its context, it might be determined that specific development aspects might have a direct disturbance, which would result in irreplaceable loss of heritage resources.

It is our opinion that from a heritage point of view, although there are no fatal flaws that would prevent the proposed development from taking place in any of the corridors it is a highly sensitive region due to the occurrence of a large number of battle field sites. It must be remembered that heritage sites are not only fixed features in the environment, occurring within specific spatial confines, but they are also finite in number. Avoiding of impacts on sites is therefore the preferred form of mitigation. In areas where a high density of sites occurs, if at all possible, exclusion zones where no development is to take place, should be set aside. If that is not possible, mitigation can only be achieved through archaeological investigation.

As the exact coordinates for the power line and the individual tower structures are not yet available, it is difficult to determine what the final impact of the proposed development would be. Therefore, for the project to continue, we propose the following:

- Mitigation should be based on avoiding of sites rather than anything else. In order to achieve this, a full “walk down” of the selected corridor must be done prior to construction taking place, to document all sites, features and objects, in order to propose adjustments to the routes and thereby to avoid as many impacts as possible.
- In addition, the management measures, as set out in Section 7 of this report should be implemented prior to construction taking place.
- The corridors would pass through a highly sensitive region due to the occurrence of a large number of battle field sites. However, it is perceived that the impact of the proposed development on these sites would largely be visual in nature. This is specifically the case with the newly proposed Alternative 1A, which would have a visual impact on battle field sites at Roodelaagte and Belmont. It is therefore highly recommended that a visual impact assessment is done by a specialist for these power line route alternatives.
- No impact on heritage sites, features or objects can be allowed without a valid permit from SAHRA.



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May 2015

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## **GLOSSARY OF TERMS AND ABBREVIATIONS**

### **TERMS**

**Study area:** Refers to the entire study area as indicated by the client in the accompanying Fig. 1 & 2.

**Stone Age:** The first and longest part of human history is the Stone Age, which began with the appearance of early humans between 3-2 million years ago. Stone Age people were hunters, gatherers and scavengers who did not live in permanently settled communities. Their stone tools preserve well and are found in most places in South Africa and elsewhere.

Early Stone Age	2 000 000 - 150 000 Before Present
Middle Stone Age	150 000 - 30 000 BP
Late Stone Age	30 000 - until c. AD 200

**Iron Age:** Period covering the last 1800 years, when new people brought a new way of life to southern Africa. They established settled villages, cultivated domestic crops such as sorghum, millet and beans, and they herded cattle as well as sheep and goats. As they produced their own iron tools, archaeologists call this the Iron Age.

Early Iron Age	AD 200 - AD 900
Middle Iron Age	AD 900 - AD 1300
Late Iron Age	AD 1300 - AD 1830

**Historical Period:** Since the arrival of the white settlers - c. AD 1840 - in this part of the country

### **ABBREVIATIONS**

ADRC	Archaeological Data Recording Centre
ASAPA	Association of Southern African Professional Archaeologists
BP	Before Present
CS-G	Chief Surveyor-General
EIA	Early Iron Age
ESA	Early Stone Age
LIA	Late Iron Age
LSA	Later Stone Age
HIA	Heritage Impact Assessment
MSA	Middle Stone Age
NASA	National Archives of South Africa
NHRA	National Heritage Resources Act
PHRA	Provincial Heritage Resources Agency
SAHRA	South African Heritage Resources Agency

# HERITAGE SCOPING ASSESSMENT FOR THE PROPOSED PERSEUS-KRONOS 765KV TRANSMISSION POWER LINE AND SUBSTATIONS UPGRADE, NORTHERN CAPE AND FREE STATE PROVINCES

## 1. INTRODUCTION

Eskom Holding SOC Limited proposes to construct a 765kV transmission power line for the "Proposed Northern Alignment 765kV Power Line Project". A section of this line is to run from the existing Perseus Substation near Dealsville in the Free State Province to the Kronos substation south of the town of Copperton in the Northern Cape Province. The total length of the power line would be approximately 370km. For this purpose three alternative alignments have been identified, one of which will be selected as the most viable proposition. During the EIA phase in 2014 Deviation 1A was established to avoid the expansion area of Mokala National Park. This new alternative necessitated an update of the original report.

South Africa's heritage resources, also described as the 'national estate', comprise a wide range of sites, features, objects and beliefs. According to Section 27(18) of the National Heritage Resources Act (NHRA), No. 25 of 1999, no person may destroy, damage, deface, excavate, alter, remove from its original position, subdivide or change the planning status of any heritage site without a permit issued by the heritage resources authority responsible for the protection of such sites.

Power lines on the scale required for a project such as this put particular constraints on heritage resources. It is anticipated that overall the impact of the development would largely be indirect, as it might only pass over or in close proximity of a heritage site or feature. The impact therefore would largely be visual. In other cases the impact will be direct as it would focus on a particular node, i.e. tower positions or access/ inspection roads. This would give rise to the physical disturbance of the material and its context.

In accordance with Section 38 of the NHRA, an independent heritage consultant was appointed by **Mokgope Consulting** on behalf of the applicant, Eskom, to conduct a Heritage Scoping Assessment to determine if there are any fatal flaws that would prevent the proposed development from taking place in any of the three corridors where it is proposed to develop the electricity transmission line.

## 2. TERMS OF REFERENCE

### 2.1 Scope of work

The aim of this scoping assessment, broadly speaking, is to determine if any sites, features or objects of cultural heritage significance occur within the boundaries of the area where it is planned to develop the transmission line that could be considered as a fatal flaw which would lead to a specific alternative to be eliminated from further investigation.

The scope of work for this study consisted of:

- Conducting of a desk-top investigation of the area, in which available literature, reports, databases and maps were studied.
- A visit to the proposed development area.

The objectives were to



- Identify possible archaeological, cultural and historic sites within the proposed development area;
- Evaluate the potential impacts of construction, operation and maintenance of the proposed development on archaeological, cultural and historical resources;
- Recommend mitigation measures to ameliorate any negative impacts on areas of archaeological, cultural or historical importance.

## 2.2 Limitations

The investigation has been influenced by the following factors:

- Large sections of the study area have not yet been subjected to systematic archaeological surveys, creating huge gaps in available knowledge. Furthermore, most information that was generated in specific areas is based on impact assessments done for the purpose of development projects of some sort. It therefore covered these regions only selectively.
- During the field survey, access to the various properties was not possible.
- During the field survey the coordinates for the individual pole structures were not available.
- In some cases the proposed power line will have a visual impact, i.e. an indirect impact, on heritage sites. This is not addressed in this report as a separate report will be dealing with visual impacts.
- The unpredictability of buried archaeological remains.

## 3. HERITAGE RESOURCES

### 3.1 The National Estate

The NHRA (No. 25 of 1999) defines the heritage resources of South Africa which are of cultural significance or other special value for the present community and for future generations that must be considered part of the national estate to include:

- places, buildings, structures and equipment of cultural significance;
- places to which oral traditions are attached or which are associated with living heritage;
- historical settlements and townscapes;
- landscapes and natural features of cultural significance;
- geological sites of scientific or cultural importance;
- archaeological and palaeontological sites;
- graves and burial grounds, including-
  - ancestral graves;
  - royal graves and graves of traditional leaders;
  - graves of victims of conflict;
  - graves of individuals designated by the Minister by notice in the Gazette;
  - historical graves and cemeteries; and
  - other human remains which are not covered in terms of the Human Tissue Act, 1983 (Act No. 65 of 1983);
- sites of significance relating to the history of slavery in South Africa;
- movable objects, including-
  - objects recovered from the soil or waters of South Africa, including archaeological and palaeontological objects and material, meteorites and rare geological specimens;
  - objects to which oral traditions are attached or which are associated with living heritage;

- ethnographic art and objects;
- military objects;
- objects of decorative or fine art;
- objects of scientific or technological interest; and
- books, records, documents, photographic positives and negatives, graphic, film or video material or sound recordings, excluding those that are public records as defined in section 1(xiv) of the National Archives of South Africa Act, 1996 (Act No. 43 of 1996).

### 3.2 Cultural significance

In the NHRA, Section 2 (vi), it is stated that “cultural significance” means aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance. This is determined in relation to a site or feature’s uniqueness, condition of preservation and research potential.

According to Section 3(3) of the NHRA, a place or object is to be considered part of the national estate if it has cultural significance or other special value because of

- its importance in 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; and
- sites of significance relating to the history of slavery in South Africa.

A matrix was developed whereby the above criteria were applied for the determination of the significance of each identified site (see Appendix 1). This allowed some form of control over the application of similar values for similar sites.

## 4. STUDY APPROACH AND METHODOLOGY

### 4.1 Extent of the Study

This survey and impact assessment covers the area as presented in Section 5 and as illustrated in Figures 1 & 2.

### 4.2 Methodology

#### 4.2.1 Preliminary investigation

##### 4.2.1.1 Survey of the literature

A survey of the relevant literature was conducted with the aim of reviewing the previous research done and determining the potential of the area. In this regard, various

anthropological, archaeological, historical sources and heritage impact assessment reports were consulted – see list of reference below.

- Information on events, sites and features in the larger region were obtained from these sources.

#### 4.2.1.2 Data bases

The *Heritage Atlas Database*, the *Environmental Potential Atlas*, the *Chief Surveyor General (CS-G)* and the *National Archives of South Africa (NASA)* were consulted.

- Database surveys produced a number of sites located in the larger region of the proposed development.

#### 4.2.1.3 Other sources

Aerial photographs and topocadastral and other maps were also studied - see the list of references below.

- Information of a very general nature was obtained from these sources.

#### 4.2.2 Field survey

The site visit involved only a cursory overview of the region by accessing the proposed alternative routes by means of existing roads. This took place over a period of five days in May 2013.

## 5. DESCRIPTION OF THE AFFECTED ENVIRONMENT

### 5.1 Site location and description

Eskom Holding SOC Limited proposes to construct a 765kV transmission power line for the "Proposed Northern Alignment 765kV Power Line Project". A section of this line is to run from the existing Perseus Substation near Dealsville in the Free State Province to the Kronos substation south of the town of Copperton in the Northern Cape Province. The total length of the power line would be approximately 370km. For this purpose three alternative alignments have been identified, one of which will be selected as the most viable proposition. During the EIA phase in 2014 Deviation 1A was established to avoid the expansion area of Mokala National Park. This new alternative necessitated an update of the original report.

The geology is mostly made up of sedimentary material and shale, with some tillite occurring sporadically in smaller deposits. The terrain is classified as plains in the southwest, changing to slightly irregular plains and pans in the northeast. The original vegetation is classified as Orange River Nama Karoo in the southwest, changing to Kimberley horn Bushveld in the northeast.

As a result of the above environmental factors the following aspects can be seen to dominate in the environment

- Plains which make up the largest section of the study area. Water sources and potential shelter is limited.
- A number of rivers cross through the area, some of which are perennial. These would have offered an attractive choice for settlement as the plains were largely denuded of trees, whereas in the vicinity of water trees grew in abundance, offering not only shelter, but firewood as well as material for house construction.

- A few areas where low mountains and ridges occur. These would also have been an attractive choice for settlement as it offered shelter, firewood as well as material for house construction.

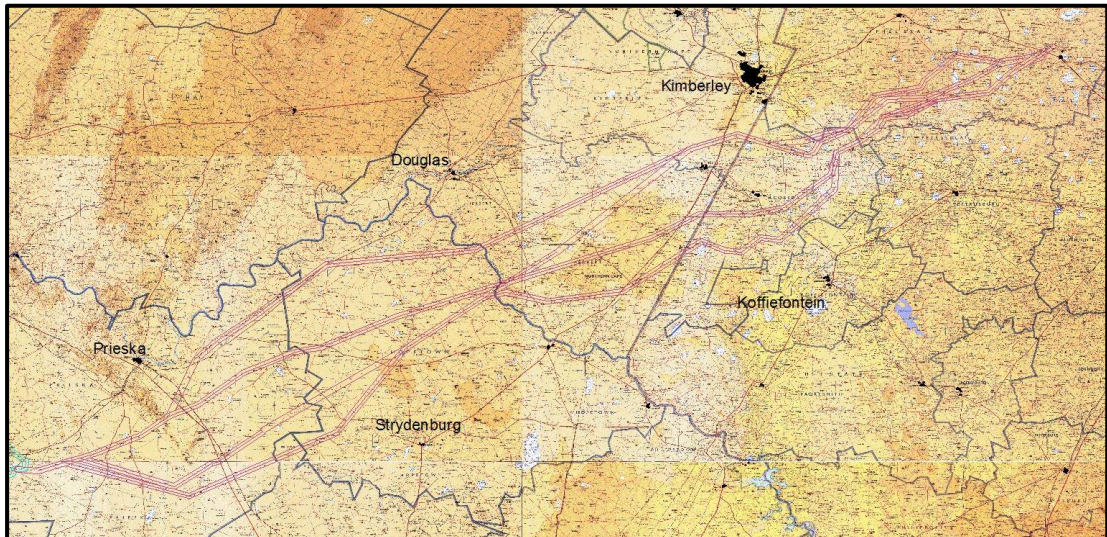


Fig. 1. Location of the study area in regional context.  
(Topocadastral maps: Chief Surveyor-General)

## 5.2 Regional overview

The aim of this section is to present an overview of the history of the larger region in order to eventually determine the significance of heritage sites identified in the study area, within the context of their historic, aesthetic, scientific and social value, rarity and representivity – see Section 3.2 and Appendix 1 for more information.

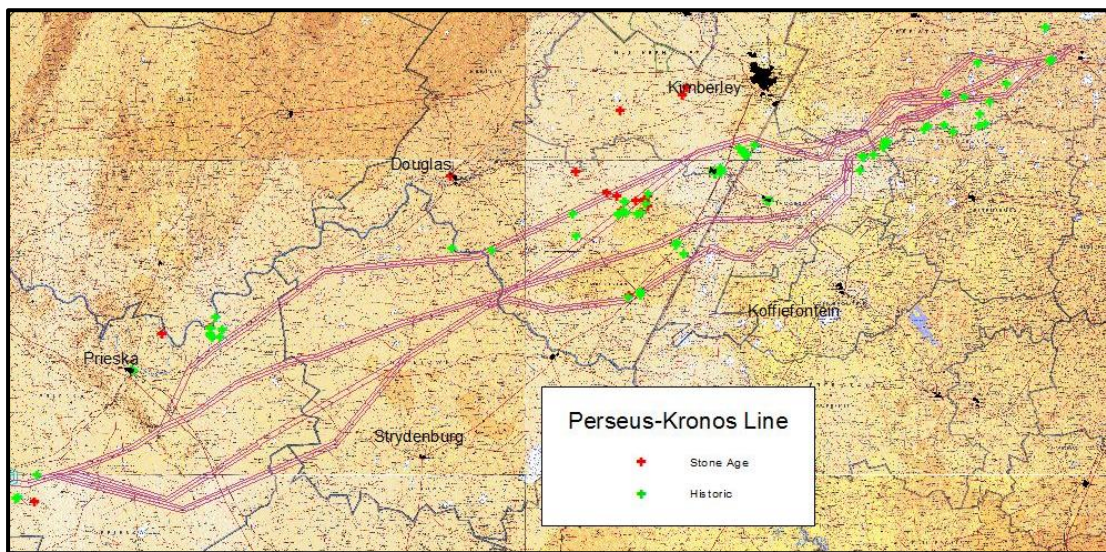


Fig. 2. Map showing the location of identified heritage site in the study area. (Corridor 1 = bottom; corridor 2 = middle; corridor 3 = top; Alternative 1A = red)

### Archaeological context for the Stone Age of the Northern Cape, Bushmanland and Namaqualand

The Northern Cape and Namaqualand, that includes the area known as Bushmanland, are arid regions with limited sources of surface water (Mitchell 2002). The territory occupied by Bushmanland broadly lies south of the Orange/Gariep River stretching to the west of Kenhard and east of Springbok in Namaqualand. A widespread presence of hunting-gathering and herder groups within these regions has been documented by early travellers with the data often applied to identify historical territorial ranges (Burchell 1812; Campbell 1815, 1822; Stow 1872, 1910; Bleek & Lloyd 1911; Mossop 1935; Engelbrecht 1936; Arbousset & Daumas 1968; Lye 1975; Dunn 1978; Deacon 1996).

A remarkably large number of archaeological sites have been recorded, researched and published through archaeological impact (AIA) and heritage assessments undertaken in the Northern Cape and Namaqualand regions. Earlier (ESA) and Middle Stone Age (MSA) lithics occur over most of the surface area with a more recent presence of Later Stone Age (LSA) occupations (Beaumont et al. 1995). The region in general contains very numerous small shallow pans, also known as dolines, of 100 to 200 m in diameter but also many larger pans. Areas around pan environments tend to display higher densities of lithics (Morris 2005b; van der Ryst & Küsel 2011, 2012).

Stone circles have also been recorded in this area. These features may represent residential structures being the bases of huts or windbreaks, storage structures, stock enclosures or hunting blinds (Kinahan 1986; Noli & Avery 1987; Parsons 2004; Jacobson 2005; Veldman 2008; Orton 2012a-c). Stone circles in Namibia date to the last 800 years (Veldman 2008). These low structures are not well studied but some research has been undertaken further east along the Orange River (Sampson 1968), in the Seacow Valley in the eastern Karoo (Sampson 1986), at Bloubos northwest of Upington (Parsons 2004) and in Namibia (Veldman 2008). Stone circles have recently also been discovered at De Aar in the central Karoo (Orton 2011c).

Parsons (2003, 2004, 2007, 2008; Lombard & Parsons 2008) used lithic raw material, tool types and non-lithic material culture to assign assemblages from late-Holocene open-air and several shelter sites in the Northern Cape to hunting-gathering or pastoral herding groups. The distinction is, however, not so clear-cut (Orton 2002/3; Sadr 2003; Mitchell & Whitelaw

2005). The hunter-gatherer assemblages termed Swartkop contain grass-tempered ceramics (Beaumont & Vogel 1989; Parsons 2007) and are dominated by hornfels, but with the use of quartz for some lithics. Blades are said to be integral to the Swartkop, with high frequencies of backed blades (Parsons 2007, 2008). Two earlier pulses of occupation are associated with the Springbokoog Industry. Earlier assemblages have proportionally more blades and fewer potsherds (Beaumont & Vogel 1989; Parsons 2007). Nearby sites with engravings such as at Jagt Pan and neighbouring engraved localities are often situated close to water sources. The Doornfontein herder sites are marked by ceramics (sometimes with lugs and spouts). Differences in the geographical spread indicate a preference for the pastoral Doornfontein sites along rivers while Swartkop sites are usually found further from the river (Fauvelle-Aymar 2004; Orton 2012a). This apparent patterning for hunter-gatherer versus herder localities is substantiated by Beaumont et al. (1995). They noted that most of the recorded LSA localities in Bushmanland were ephemeral occupations by small groups 'in the hinterland on both sides of the [Orange] river' (1995:263 as quoted by Morris 2013a).

Pastoralist communities that herded sheep, goat and cattle and speaking Khoe languages were well-established in these regions (Mitchell & Whitelaw 2005). Substantial herder encampments occur along the Orange River floodplain (Morris 2013a). Hendrik Jacob Wikar during his travels in 1778 recorded the names of the Cape-Gariep herder groups who had settlements on both sides of the river (Mossop 1935). Morris and Beaumont (1991) excavated sites at Renosterkop east of Augrabies where they found a herder signature in the more recent occupation levels. Wikar on his visit in 1778/9 gave an account of an island across Renosterkop known as !Nawabdanas, also shown on his map, that was occupied by the †Nam-//neikwa or Karos-wearers (Mossop 1935: 122-123, 227; Morris & Beaumont (1991). Robert Jacob Gordon on his travels also visited this locality in 1779 (Cullinan 1992). Based on linguistic evidence Ehret (2008) estimates the spread of early Khoekhoe populations east into northern South Africa and south to the Gariep-Vaal confluence at around 2000 years ago or somewhat earlier. Four styles are recognized in the distinctive herder ceramics, and these also serve as rough chronological markers (Sampson 2010). Differences in herder ceramics and the fibre-temper bowls of hunter-herders assist in the identification of a herder or hunting-gathering presence at late Holocene archaeological localities.

One of the best-known sites in the region is the Wonderwerk Cave in the Kuruman Hills. The cave extends horizontally for 139 m and was formed by an ancient solution cavity in the dolomite formation (Beaumont 1990c). The lithic succession at Wonderwerk serves as a benchmark for the Stone Age sequence of the Northern Cape. It comprises an uppermost LSA sequence that contains Ceramic LSA, Wilton and Oakhurst (Humphreys & Thackeray 1983). Some of the cave deposit has been removed by guano diggers, which destroyed several important archaeological levels. The MSA levels that were still intact yielded blades and unifacial MSA points. The ESA sequence contains the usual large cutting tools and includes a transitional Fauresmith assemblage with blades, large scrapers and radially-prepared cores.

Excavations since the 1940s, which became more focussed as from 1976 to 1993, revealed a stratified series of deposits that accumulated up to a depth of about seven metres and are divided into nine Major Units (Beaumont & Vogel 2006). The application of a range of dating methods points to a complex cultural succession. Dates for the following cultural stages have been established at Wonderwerk: an LSA at 1-12.5 kyr (kyr = thousand years ago), the MSA at around ~70 to >220 kyr, the Fauresmith to ~270-500 kyr and an ephemeral Acheulean at >0.78 myr BP (Beaumont & Vogel 2006). An interdisciplinary project initiated in 2004 aims at dating the ESA deposits in particular, using a range of radiometric techniques, and will also focus on analysing the lithic faunal and botanical remains recovered from these strata (Chazan et al. 2008). The Wonderwerk deposits also contain portable stone slabs with anthropogenic markings (Chazan & Horwitz 2010; Jacobson et al. 2012; Beaumont & Bednarik 2013).

The paintings at Wonderwerk are in a poor state of preservation. While the region has some good painted sites, the Northern Cape is particularly known for its wealth of open-air rock engraving sites (Morris 1988, 2002, 2012a). The landscape settings of the engraved sites include the glaciated andesite pavements at Driekopseiland and also koppies and rock

outcroppings surrounded by extensive plains, often in close proximity to pans or springs such as Wildebeest Kuil, Driekopseiland and Rooipoort (Morris 1988, 1990, 2002, 2012) and the remarkable nested geometrics at Rooipoort/Klipfontein where thousands of engravings are clustered around a major spring (Morris 1990; Dowson 1992; Mitchell 2002). Differences in style are attributed to different time periods. Incised finelines are the oldest, while pecked and scraped engravings occur within the last 2000 years (Morris 1988). Scraped engravings occur between Kenhardt, Beaufort West and De Aar (Orton 2012a). The engraved locality Springbokoog constitutes a significant landscape where three stone circles cluster among the >80 boulders with fineline engravings (Deacon 1986, 1988, 1996). Other major engraved sites in the area are Keurfontein at Vosburg to the east of Springbok Oog (Morris 1990). The testimonies of the /Xam from Bushmanland underlie much of our interpretation of the beliefs and customs as expressed in the rock art of the Bushmen (Bleek & Lloyd 1911).

The Kathu sites contain significant ESA Acheulean and Fauresmith assemblages, and also a well-represented MSA (Beaumont 1990b, 2004; Chazan et al. 2012; Wilkins & Chazan 2012). Kathu Pan is formed by a shallow depression with an internal drainage and a high water table. Archaeological and palaeoenvironmental data from Kathu Pan and Kathu Townlands were used to reconstruct changes over time in the prehistoric environment (Beaumont 2004). Biostratigraphy or faunal correlation is often used to date the southern African sites and gives some indication of the approximate age of some of the associated assemblages. Associated faunal remains with some of the Acheulean include *Elephas recki recki*. These animals disappeared at sites in East Africa such as at Olorgesailie, Kenya, at around 600 000/800 000 years ago (Beaumont 2004; McNabb et al. 2004). The transitional Fauresmith at Kathu Pan has been dated to ca. 500 000 BP (Porat et al. 2010). A current research project at Kathu Pan 1 established a date of 500 000 years for a Fauresmith blade assemblage where blades were systematically removed from prepared cores (Porat et al. 2010; Wilkens & Chazan 2012).

The LCT's from this area often contain very fine handaxes with some superb symmetrical examples produced on banded ironstone in c. 0.8–1.3-Ma-old stratum 4b at Kathu Pan 1 (Beaumont & Bednarik 2013). Lithics in some of the Acheulean deposits, but also in MSA levels, display a shiny silica skin. At Kathu Townlands an outcropping of banded ironstone that covers a large area of around 25 km contains enormous quantities of flaked items. This phenomenon is ascribed to the use of the high-grade bedrock jasper and ironstone as a source for raw materials and is supported by the high incidence of handaxe roughouts (Beaumont 2004). The prepared core technique was used to produce the spectacular small handaxes, long blades, convergent flakes/points and scrapers found in Fauresmith collections. MSA tools were also recovered from the Kathu localities (Beaumont 2004). Surface sites around Kathu exhibit a palimpsest of prehistoric utilization and may contain lithics from all periods in the Stone Age succession.

North-east of Kathu newly-found ESA sites with LCT's and an associated range of tools occur in sand quarries and on a hilltop at Uitkoms Farm and the Bestwood locality (Chazan et al. 2012). The new residential and commercial developments at Bestwood demonstrate the importance of Phase 2 heritage studies in the Kathu region.

Cave and shelter sites are not abundant in the region. An early MSA occupation and a more recent LSA utilization were recorded at Zoovoorbij Cave close to the Orange River 64 km east of Augrabies (Kaplan 2012a; Orton & Webley 2013). Rock shelters along the escarpment mostly contain LSA and herder occupation deposits (Humphreys & Thackeray 1983; Herries et al. 2007). The LSA of the Northern Cape is well researched (Humphreys & Thackeray 1983; Herries et al. 2007). A few of the small rock shelters with occupations dating to the Holocene along the Ghaap Escarpment have been excavated, including Burchell's Shelter (Humphreys 1975) and Dikbosch I and II (Humphreys & Thackeray 1983).

Burchell's Shelter has been occupied during historic times and travellers such as Burchell himself observed some of the Bushmen then present within this region (Humphreys 1975). Burchell, in describing their dress, wrote that they wore sandals and that their skin karosses were reddened with ochre (Humphreys 1975). It is evident from the archaeological investigations at Burchell's Shelter that only small groups occupied this locality and the

artefacts and food remains demonstrate that they exploited a wide range of animals and collected plant foods, snakes and lizards, ostrich eggshell (OES) eggs and harvested termite eggs. Empty ostrich eggs were used as containers for substances such as ochre and specularite, but in particular as water flasks. In the Northern Cape OES flasks are sometimes found with mastic-attached spouts (Morris 2005a; Humphreys 2006).

The shelters of Dikbosch I and the smaller locality of II are located on the edge of the Ghaap escarpment (Humphreys & Thackeray 1983). To the north of Dikbosch I is a stream bed below a waterfall that would have represented a good water source during prehistoric times. The occupational sequence at the bigger shelter shows a regular use of this locality throughout the major part of the Holocene. The preservation of organic materials is good and the artefactual remains demonstrate a range of hunting and gathering and also probably ritual activities. The excavations at Dikbosch II suggest intermittent and ephemeral occupations (Humphreys & Thackeray 1983). Excavations at two shelters at Limerock on the Ghaap Plateau uncovered deposits with LSA occupation materials including lithics, numerous decorated OES fragments and other decorative pieces as well as ceramics (Humphreys & Thackeray 1983).

In addition to the well-known Taung localities some important fossiliferous and lithic-bearing breccias have recently been found on the Ghaap Plateau (Johnson et al. 1997; Herries et al. 2007). A multi-disciplinary project involving Australian, British and South African researchers has been initiated to investigate the palaeoanthropological potential of the Ghaap escarpment (Herries et al. 2007; Curnoe 2012).

The use of earth pigments, and in particular ochre and specular haematite, is universal (Watts 2002). Pigments and the exceptional pieces of engraved and ground incised pieces of ochre from MSA contexts at sites such as Wonderwerk attest to the time-depth of such practices (Mitchell 2002). Soft red haematite manuports were found in association with an Acheulean ESA assemblage At Kathu Pan I in deposits that have been dated to ~540 ka ago (Beaumont 1990b, 2004; Porat et al. 2010; Beaumont & Bednarik 2013). At Wonderwerk, Kathu Pan and Canteen Koppie unmodified specularite and ochre lumps have been found in levels with transitional ESA/MSA Fauresmith lithics (Beaumont & Bednarik 2013).

Quarrying of ore bodies often destroy earlier evidence for the utilization of the resource. Extensive mining of specular haematite by at least 40 000 BP has been documented at for example Ngwenya Mines, Swaziland (Nkambula 2011; Beaumont & Bednarik 2013). Investigations at Tsantsabane/Blinkklipkop established a date of AD 800 for the utilization of this particular rich source (Thackeray et al. 1983; Beaumont & Morris 1990). The specularite mines at Tsantsabane/Blinkklipkop and Doornfontein 1 near Postmasburg were rich and well-known ore sources that were quarried extensively over a long period of time (Beaumont & Thackeray 1981; Beaumont & Morris 1990; Mitchell 2002; Morris 2004). Dunn (1931:110) was told that 'it was from here that the Bushmen and other natives for hundreds of miles obtained their supplies of specular iron ore, which becomes red when burnt'. The pigment was bartered and exchanged for goods such as iron knives, assegais, axes, tobacco, copper and iron, and copper ornaments and beads (Campbell 1822 (Vol II); Burchell 1967; Arbousset & Dumas 1968). The mainly late Holocene lithic sequences at the mining localities are characterised by informal tool types with low frequencies of formal tools. Some of these were most likely to have been used in the mining and processing of pigments. Ceramics and items of European origin have also been recovered (Morris 1990; Couzens & Sadr 2010).

Namaqualand, a winter rainfall area, occupies the north-western corner of South Africa between the Olifants and Gariiep rivers and extends along the Atlantic coast. The territory occupied by Bushmanland includes parts of Namaqualand east of Springbok. It is an open undulating landscape with isolated koppies (inselbergs) and several generally low mountain ranges. The Knersvlakte is a large open plain to the north of the Olifants River and the uplands of Matsikammaberg and to the west of the Bokkeveld Escarpment (Mackay et al. 2010). Quartz gravelly patches and heuweltjies occur over large parts of the Knersvlakte. Heuweltjies are circular mounds associated with hardpan that show different vegetation patterns than the surrounding soils. They are a characteristic feature of the Succulent Karoo



biome of Namaqualand. Heuweltjies are most likely old termitaria of the harvester termite *Microhodotermes viator* (Francis et al. 2012; Halkett 2012; Kunza et al. 2012). Lithics are often found at heuweltjies but this phenomenon has not yet been researched in enough detail.

The arid landscape with sparse vegetation ensures that heritage remains are highly visible. The archaeology of Namaqualand is dominated by millions of stone tools that derived from the utilization of the resources of the region by hunter-gatherers and herders until the recent past. The west coast is particularly important for the study of pastoralism as it is one of the proposed routes of entry for herder groups into southern Africa (Orton et al. 2011). Early dates of more than 2000 years ago for sheep were acquired from directly-dated sheep bone from Spoeg River Cave in this region (Webley 1992). Some 1500 LSA, 90 MSA (that include both sealed and open living sites as well as quarries) and 50 ESA localities have been documented in Namaqualand (Dewar & Stewart 2012). Some of these represent important MSA and LSA open and shelter sites on the Knersvlakte in the southern part of Namaqualand that have been the focus of current research.

The ESA is usually represented by isolated examples of handaxes in Namaqualand. The MSA in sealed shelter sites has received particular attention (Dewar & Stewart 2012). Conversely, there is a lack of detail on open-air and surface MSA sites in Namaqualand (van der Ryst & Küsel 2012, 2013b). This is beginning to change with the publication of current research projects aimed at the collection of MSA material in both the northern and southern regions of Namaqualand (Mackay et al. 2010; Dewar & Stewart 2012). This period is of particular significance as the origins of modern culture and language are associated with the emergence of anatomically modern humans, *Homo sapiens*, during the MSA. The upland savannas of southern Africa are seen as a focal region of biological and cultural evolution during this time (Beaumont & Vogel 2006).

A recent project that is focussed on human adaptations in low-productivity environments known as Adaptations to Marginal Environments in the MSA (AMEMSA) aims to investigate the economics, technologies and social organization that populations in Namaqualand developed to cope with the stress of marginal environments (Dewar & Stewart 2012). The research project aims to test the hypothesis that pre-modern humans exhibit a pattern of mosaic settlement that is directly related to favourable climatic periods. According to these premises physical and cultural modernity were required to cope with the demands of marginal ecozones to enable *Homo sapiens* populations to maintain settlement in harsh environments on a more constant basis (Dewar & Stewart 2012). Subsistence resources are unpredictable and patchy in marginal environments so that flexible social and technological strategies with innovative behaviour were required to successfully cope with environmental constraints (van der Ryst & Küsel 2012, 2013b).

Research at Spitzkloof A (28°51.79' S; 17°04.65'E) in the Richtersveld documented deep MSA deposits, while LSA lithics were recorded on the talus slopes of the shelters (Dewar & Stewart 2012). Current research includes investigations at Spitzkloof B. Investigations at the inland locality of Swartkop Hill near Garies recorded extensive raw material extraction at a quarry site during the MSA (Webley, L & Halkett 2010; van der Ryst & Küsel 2012, 2013b). Morris (2013a) also found a MSA extraction quarry near Gamsberg.

During the LSA the resources of the region were more intensively utilized. Both terrestrial and marine resources were actively sourced and shell middens are conspicuous along the Namaqualand coast line (Orton et al. 2005; Orton 2007). The more recent occupations of the region are also better documented and understood as a great many shell middens, deflated open-air localities and some rock shelters sites have been recorded through research projects but in particular on account of the numerous AIA's undertaken prior to mining activities. The many AIA's since undertaken in the region by archaeologists such as Lita Webley, Genevieve Dewar, Tim Hart, Jason Orton and Dave Halkett documented deep stratified cave deposits and open-air sites for the MSA. The data show a particular strong presence for San hunter-gatherers during the Holocene, and Khoekhoe pastoralists (ancestor of Nama-speakers) for >2000 years, along shores but also at inland open and shelter sites.

Hart (2006) in his review of the Vredendal region also notes that abundant and important heritage resources have been recorded over the last decade. An assessment undertaken in 1991 by Parkinson and Poggenpoel in the Brandsebaai area established intensive utilization of coastal resources within the last 2000 years. This is demonstrated by the ubiquitous Holocene shell middens on rocky shoreline areas. They also found much rarer MSA shell middens at Brandsebaai, Liebenbergsbaai and Boegoeberg (Hart 2006). Numerous sites dating to the last 2000 have been recorded in the Richtersveld. Recent excavations at Jakkalsberg on the bank of the Orange River in the north-western Richtersveld, where fish was a key resource, yielded dates from the mid- to late Holocene (Orton & Halkett 2010).

Surveyed areas in Bushmanland exhibited a markedly low incidence of artefactual material. Morris (2011a-c) points out the reduced archaeological visibility away from landscape features such as hills and rock outcrops. Morris (2011b) noted a general background noise of lithic elements but few sites. According to Morris (1999, 2000a-c, 2001, 2010b, 2011a-c) late Holocene lithics constitute the most common archaeological occurrences within the Aggeneys-Pofadder region. LSA lithics often occur in association with ceramics and OES fragments. OES containers served as water flasks and fragments from broken flasks were used to make beads.

Beaumont et al. (1995), as discussed above, found differences in the geographical distribution of LSA hunter-gatherer localities and the herder sites of pastoral groups. Beaumont et al. (1995) were of the opinion that increasing pressure brought about by the presence of herders in the Orange/Gariep River Basin resulted in the displacement of hunters to marginal areas such as Bushmanland. This came about largely in the last millennium when the archaeological remains of hunting and gathering settlements are commonly found near water sources (Morris 2011c). Notwithstanding, it is clear that there was also a herder presence in this region is suggested by ceramics near Aggeneys and, east of Pofadder, at Schuitdrift South (Morris 1999), grinding hollows on rock outcrops in the Aggeneys/Gamsberg area (Morris 2011a) and attested by herder rock paintings present on a boulder alongside the Aggeneys/Black Mountain aggregate quarry (Morris 2011a).

Such rock art sites are uncommon in some parts of Bushmanland. Janette Deacon documented finger paintings on a boulder next to the Aggregate Quarry at Black Mountain Mine, Aggeneys (29°15'26" S; 18°48'12"E) (Morris 2011a, 2011c, 2013b). The rock art site comprises a boulder with a finger-painted star motif as well as an image of an indented oval shape. Morris (2013a: 38) also refers to a description by Dunn (1931) in his book, *The Bushman*. Dunn (1931: 46) wrote that 'near N'Ghaums [Gams], I saw an engraving of a hippopotamus being dragged across the dry veldt by several Bushman people by means of a rope attached to its nose.' Rock art research demonstrated that images of large mammals were metaphors for rain animals. The location of the engraving has not yet been established. The MSA is widespread across Bushmanland but usually in low densities (Beaumont et al. 1995; Morris 2013a). An extensive MSA workshop was recorded at Gamsberg (GI 1) where the raw material, gossan, was extensively sourced (Morris 2013a). The site has been afforded a high rating of significance. A project near Garies in Namaqualand (Van der Ryst & Küsel 2012, 2013b) found a similar focus on a preferred source of quality toolstone at a MSA quarry site.

ESA Acheulean workshop locales (Gamsberg Sites GI 4 and 5) with handaxes and Victoria West cores were recorded at raw material sources on the western side of the Gamsberg basin. They represent some of the rare known ESA Acheulean sites that have been recorded in Bushmanland, and are therefore of regional significance (Morris 2013a).

### **1:50 000 Topocadastral Map Survey**

- **2824CD Koedoesbergdrift**

Morris (2003, no page numbering) recorded Acheulean and LSA sites on the farm Koodoesberg 141 'on the south bank west of Kudusberg Drift'. However, no detail is available on localities.

Van Ryneveld (2005a) found a number of sites on Roodepan and recommended a Phase 2 mitigation for MSA site RP16 at 28°50'37.5"S; 24°18'23.1"E.

Note that areas to the north of this map such as Klipdrif (Canteen Koppie at 28°32.30' S; 24°31.50'E) have high levels of ESA and some MSA and LSA lithics (Beaumont 1990a). Hutten (2013a) too identified low density scatters of mainly LSA lithics at Klipdrif.

- **2824DC Spytfontein**

Van Ryneveld (2012) points out that the immediate regional context of the greater Kimberley area constitutes a Stone Age cultural landscape. Platfontein 68 and Wildebeest Kuil 69 are particularly important. WBK1 Wildebeestkuil Rock Art Centre (S28°40'10.5"; E24°38'59.0") is a declared Provincial Heritage Site. WBK2 Stone Age S28°42'19.1"; E24°38'51.7" was apparently subsequently demolished (Destruction 2004).

Important heritage resources occur on nearby sites, namely Ronaldsvlei to the east of Spytfontein has MSA lithics (28°47'59.71"S 24°43'4.98"E) (Nel 2008). Stone Age lithics (28°47'59.71"S 24°43'4.98"E) have been recorded, a colonial graveyard (28°51'53.08"S 24°41'33.95"E) and the Magersfontein Battlefield site are situated at 28°57'41.79"S 24°41'19.87". The general region includes Spytfontein to De Aar South African War and Stone Age Archaeology Landscape Areas. Spytfontein stone walling is 10 kilometres north of the Magersfontein Battlefield Site (Becker 2011, 2013).

- **2824DD Beaconsfield**

The area is termed the Fieldsview, Kimberley and Beaconsfield Cultural Landscape Areas (Becker 2013). According to Becker (2013: 2) 'Fieldsview is bordered by the footprints of the San and the cultural landscape is a display of the manner in which the //Xam people lived'.

Hutten (2013a) recorded three sites with concentrations of low density stone artefacts.

Note that in other areas low densities of lithics have been reported, for example Beaumont (2013) recorded only five artefacts, probably MSA, on 6.4 ha area on the Remaining Extent of farm Middelpaas 140 situated ~45 km ENE of Daniëlskuil, in the Barkly West Magisterial District 28° 02' 45.7" S, 24° 00' 22.4" E (2824AA KOOPMANSFONTEIN).

- **2825CB Blaauwbosch:** No data found

- **2825CD Cheddar:** No data found

- **2825DA Elandsfontein:** No data found

- **2825DB Dealesville:** No data found

- **2922CD Volstruisbult (Vogelstruispan, Hoekplaas, Klipsgat Pan)**

This is an important area where care should be taken in the positioning of future infrastructural development. Several AIAs recorded heritage resources (Kaplan 2010; Van Schalkwyk 2011a; Orton 2012a, 2012b).

Kaplan (2010) found mainly LSA lithics in low-density and some diffuse scatters. No workshops were identified. He was of the opinion that sufficient recordings were made during the AIA of the lithics. These comprised mainly large flakes, cores, chunks, end scrapers, large utilized and retouched blade tools, and utilized and retouched flakes in fine grained quartzite, highly weathered hornfels and indurated shale. Several formal tool types such as adzes, scrapers, retouched and utilized flakes, bladelets were recorded.

Van Ryneveld (2006) found no heritage resources on portions of the 2922CD and 3022AB maps during her investigation for the reopening of the old Copperton Mine. Orton (2012a-c) observed good visibility for archaeological features during his surveys of the generally flat area with uphill slopes, pan sites and silty deflation hollows that fill with water after rains.

Kaplan and Wiltshire (2011) documented ESA with weathered handaxes and some MSA and LSA sites near pan environments. At Modderpan on Struisbult densities of up to 50 artefacts and more per square were documented. The site has been graded as 3A – local, high significance. The MSA includes large flakes, radial and bipolar cores, points, end scrapers, large utilized and retouched blade tools with utilized and retouched flakes on quartzite, hornfels, banded ironstone, haematite, gneiss and vein quartz. The LSA exhibits lower densities. Direct manufacturing activities for LSA lithics were recorded at exposures of quartzitic bedrock and on boulders of vein quartz (Kaplan & Wiltshire 2011). Similar findings were noted in the AIA report for Nelspoortje (Farm 103, Portions 4 and 5 and Hoekplaas 146) near Copperton where significant MSA and LSA lithic occurrences and also lithic quarries were identified during the survey for the Garob to Kronos line (Van der Walt 2013).

Van Schalkwyk (2011a) documented surface MSA and LSA lithics on or at the foot of small hills. He proposed the avoidance of such areas through buffer zones. In the event that the localities are impacted upon by proposed development, Phase 2 mitigation should be undertaken under a permit from SAHRA.

The following extract from a report by Kaplan and Wiltshire (2011: 9) on the SAHRIS website illustrates the intensity of development for solar and wind energy facilities in this particular region:

*'A recent heritage impact study by van Schalkwyk (2011) dealt with the scoping phase of four wind farms across the Northern Cape and the Eastern Cape. One of these lies about 25km east of Struisbult. Another three energy projects are planned on Vogelstruisbult 104 (F. Gresse, pers. Comm. 2011) and therefore this application on Struisbult is one of at least six possible energy related projects (wind and/or solar). SAHRA needs to take cognisance of the cumulative impact of these applications on the heritage resources documented in the area thus far and clear recommendations to all the relevant stakeholders will be required from SAHRA in the decision-making process'. Subsequently Orton (2012a-c) and others undertook several AIA's.*

On Vogelstruis Bult 104 Orton (2012a) recorded discrete sites with LSA occupations and with a background noise of ESA and MSA lithics. Several dense scatters of lithics have also been recorded. The author assigns low significance to most occurrences but recommend that some of the LSA with high significance should be mitigated in the case of future impact (Orton 2012a). The LSA localities tend to focus on pan environments, for example Perdepan (Orton 2012a). An engraving site along the road between Copperton and Van Wyksvlei was recorded. The rock art comprises scraped engravings of eland and ostrich as well as very recent (historical) images of horses with riders, a chariot and some writing (Orton 2012a).

At Hoekplaas (Orton 2012b) notes background scatters of ESA and MSA artefacts that he rated of very low archaeological significance. There are three pans with several discrete LSA sites around the central pan. Gravel has been quarried at the pan, revealing a buried MSA deposit. In view of this observation Orton (2012b) points out the probability of other important subsurface material close to pan environments.

At Klipsgat Pan (Orton 2012c) again recorded scatters of ESA and MSA artefacts that he rated of very low archaeological significance. For the large number of discrete LSA sites recorded around ephemeral pans and the hill Orton (2012c) suggested mitigation measures in the event that they are impacted by future developments.

Kiberd (2006) excavated at Bundu Pan (29°45'05"S; 22°12'25"E) on the eastern edge of Bushmanland approximately 25 to 30 km northwest of Copperton and to the east of Prieska. Stratified ESA, MSA and LSA deposits were found. A range of Pleistocene fauna include some extinct species such as a giant hartebeest (Kiberd 2006).

- **2922DB Prieska (Oos)**

Van Ryneveld (2005b) recorded a particularly large MSA site (S1, approximate 29°33'S; 22°51'E). Locally-available fine-grained cryptocrystalline silicas (CCS) materials were used extensively whereas other rock types such as hornfels and banded ironstone also featured in the production of the lithics. The lithics are conjectured to be from an eroded context with a

shallow remaining sub-surface deposit. The northern part of Karabee 50, for which an application for an EMP was lodged at SAHRA (see below) is on this map.

- **2922DC Groveput:** No data found.

Note that SAHRA (2012) received notification of an 'application for an environmental management plan in respect of prospecting rights for Portions of Farm Karabee 50 and Prieskaspoort 51, Prieska District' on this map.

- **2922DD Redlands:** No data found.

Farm names such as Bosjemansvlei 49 reflect a historic presence of San groups. The EMP for 2922DC GROVEPUT referred to above includes a portion of Karabee 50 that falls onto the Redlands map.

- **2923AC Kalkkrans**

Beaumont et al. (1995: 240) observed that 'thousands of square kilometres of Bushmanland are covered by a low density lithic scatter'. At Kalkkrans Beaumont (2007) recorded an absence of artefacts in or on the Hutton Sands. Hillside rubbles, calcretes and Rooikoppie surface exposures exhibited a low density of lithics. Fine-grained CCS were mostly used in the manufacture of the lithics but quartzite was also utilized in some cases. He infers a date of > 0.6 Myr (Beaumont & Vogel 2006). He recorded more recent artefacts, mostly thick irregular flakes and some cores, on quartzite and banded ironstone at two Rooikoppie exposures, one in the mining area, at 29°19'15.5" S, 23°11'06.9" E and the other further north, at 29°18'38.3"S; 23°09'47.5" E. Several isolated MSA flakes were also recorded.

- **2923AD Kwartelspan**

Morris 2010/2011 recorded lithics in very low densities across the entire site and rated these occurrences of not high significance. Almond (2010) rated the palaeontological sensitivity of the near-surface sediments at Greefspan as low.

- **2923BB Douglas**

Van Ryneveld (2007) established the presence of MSA lithics at 29°02'45.1"S; 23°46'09.5"E of low significance. Low densities were recorded over the whole of the assessed area. Hornfels and fine-grained dolerite were used to produce scrapers, flakes and flake-blades. An examination of a sub-surface stratigraphic section in a graded road to a depth of 30cm mirrored surface frequencies of artefacts. The presence of similar lithics on mine dumps is ascribed to proximity to the Vaal River.

Burials of humans in small pots, in deposits and often in association with grave goods such as a grooved stone, have been documented along the Riet River and in the area of its confluence with the Vaal River near Douglas in the Northern Cape (Humphreys 1974, 1982, 2007; Morris et al. 2006). The burials date to the contact period.

- **2923BC Pampoenspan:** No data found

- **2923BD Torquay:** No data found

- **2923CA Rooisloot**

Gaigher (20124) has not identified any heritage resources during his investigation. According to Gaigher (2012:44) Stone Age sites in the demarcated area and surrounds are not well known or described 'this far west in the Northern Cape'. Farm names such as Bosjesmansvlei 48 do suggests a San presence in the area.

- **2923CB Jagpan:** No data found.

- **2923CC Groot Doring:** No data found.

However, farm names such as Bosjesmansvlei 4/Boesmanspan do suggests a San presence in the area. Areas around Varschekuil, Groot Varsche Kuil, Klein Varsche Kuil, Lammertjiespan and Doornbergfontein should be inspected.

- **2923CD Kareekloof:** No data found
- **2923DA Leeuberg:** No data found
- **2923DB Rooidam:** No data found.

- **2924AA Plooyburg**

Morris (2005c) found no significant archaeological traces during an AIA of Abrahamoos Fontein near Plooyburg. Morris and Seliane (2005/2007) examined areas on the plain above the present river channel (29°02.129'S; 24°03.092'E) and on a subsequent visit in 2007 a quarry at 29°02.297' S 24°03.196' E. Very low densities of MSA artefacts were found at the base of the shallow surface soil above the calcretes. The authors do caution that LSA burials have been recorded nearby at Weltevrede and Driekopseiland and that this should be borne in mind (see also Douglas 2933BB).

- **2924AC Salt Lake:** No data found

- **2924AB Kolkop**

Various heritage resources including many rock engraving sites at Doornlaagte, Scholtz Fontein North, Goede Hoop and Kameel Doorns, other Stone Age sites, and historical structures have been recorded in the Mokalo National Park. Nearby localities relating to the Anglo-Boer War are known (Morris 2007a; Van Schalkwyk 2008). The visual impact of any development should be a consideration.

- **2924AD Belmont**

Webley and Orton (2012) identified MSA and possibly LSA lithic scatters around koppies and pans. Dolerite boulders on the southern hill exhibit grinding surfaces and historical graffiti was recorded on the northern koppie. A circular stone structure near the railway line may be the remains of an historic fortification. The area has numerous historic heritage resources (Becker 2013). Also note that the Cultural Landscape of the adjoining property incorporates the Battle of Graspan (Webley & Orton 2012; Hutten 2013b). In view of this a study of the visual impact of developments should also take the Cultural Landscape of the adjoining farm into account.

An engraving site was noted on a map at approximately 29°22'S; 24°24'E (SAHRIS H33825-2110-236-0002\_Appendix\_A\_0.pdf). Becker (2013) also refers to sites with engravings to the south of Belmont.

- **2924BA Modderrivier**

The following paragraph is quoted from Becker (2013:63) in a HIA for the railway line from Kimberley to De Aar: *'The Spytfontein, Magersfontein, Modderrivier, Belmont, Heuningneskloof, Witput and Graspan areas are heritage sites of provincial significance and also present a significant display of South Africa's historical battlefield history. The railway line as indicated above forms part of the historical landscape and is a display of historical events that occurred during the South African War. The proposed development areas are embedded in the cultural heritage landscapes of the Kimberley to De Aar area. The fact that various historical battlefield landscape sites, evidence of the //Xam indigenous communities and the railway historical resources are positioned alongside the line means that the section is of high significance. The threats to these identified heritage resources are immediate'*.

- **2924BB Jacobsdal**

Van Jaarsveld (2006) notes that the area was intensively surveyed by Garth Sampson for the Orange/Gariep River salvage scheme. Artefacts from all periods of the southern African Stone Age and also material from the historic period have been documented (Sampson 1984, 1985, 1986, 2010). Taking these studies into account, Van Jaarsveld (2006) points out that the entire study area comprises one huge Stone Age site. During an assessment by helicopter four sites have been recorded on landing, ranging from the MSA to the LSA.

- **2925AA De Werf**

The following extract from the Xhariep District Municipality Capacity Building Programme Integrated Environmental Programme Final Draft October 2004 reports no heritage resources: '3.5.13 Sites of archaeological interest

*Various discussions had been undertaken with appropriate role players, including the Local Municipalities. No such sites had been identified'.*

- **3022BA Jonkerwater and 3022AB Springbokpoortjie:** No archaeological data found. It is a flat terrain with numerous low hills and rocky ridges that forms part of the low-relief Kaiingveld of eastern Bushmanland (Almond 2011a).

- **3022BB Poortjie:** No data found

- **3023AA Sodium:** No data found.

The farm name Schilderspan Pan 33 and the name of the pan itself, Schilderspan, could possible refer to nearby rock art, but this is obviously merely a suggestion.

- Archaeological sites

<b>NHRA Category</b>	Archaeological and palaeontological sites
<b>Protection status</b>	General Protection - Section 35: Archaeology, palaeontology and meteorites

<b>Significance</b>	High on a regional level – Grade III
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Fig. 3. Stone tool typology and engravings in the region.

*The stone tools (on the left) are not from the region and are only used to illustrate the difference between Early (left), Middle (middle) and Later Stone Age (right) technology.*

### *Historic period*

One of the first whites to access the region was Dr. Heinrich Lichtenstein, a German explorer that, on his journey to the north crossed the Orange River in the vicinity of Prieska in 1804. The area was largely under the control of the Griekwa, with the well-known Nicholaas Waterboer as their leader. These people led a near nomadic life-style, ranging over large areas with their stock. White farmer that entered the area by the late 19<sup>th</sup> century seemed to have stuck close to the various rivers where they farmed with sheep as well as some irrigation farming.

Many later travellers, hunters and missionaries (Burchell 1824, Campbell 1822, Smith 1834-1836 (Lye 1975), Moffat 1842 and Harris 1852) either passed through the area or close to it.

Their writings leave us a tantalising description of what life was in these communities before large-scale interaction with white settlers took place.

White settlers moved into the area during the first half of the 19<sup>th</sup> century. They were largely self-sufficient, basing their survival on cattle/sheep farming and hunting. Few towns were established and it remained an undeveloped area.

During the 1880s the white settlers exploited conflict between the different Tswana chiefdoms to obtain more land. From this developed the Republic of Stellaland, which, due to British intervention in the area due to the discovery of diamonds, was very short-lived. The town of Stella was to be the capital of the republic.

The discovery of diamonds in the larger region during the 1860s would drastically alter the history of the region. Diamonds were first discovered near Hopetown in 1867 and a year later large numbers were discovered in the confluence area of the Vaal and Harts Rivers. By 1870 a few thousand miners were already active along the river, with most in the Pniel and Klipdrift regions. The discovery of the 'Star of South Africa' in 1871 led to the development of mining activities in Kimberly and surrounding areas.

These discoveries gave rise to claims being made by various groups for possession of the diamond fields – the Griekwas, the government of the Orange Free State, the government of the Transvaal Republic, as well as some Tswana-speaking groups in the region. After long discussions, R.W. Keates, Lieutenant-Governor of Natal, was appointed as arbiter. He decided in favour of the Waterboer (Griekwa) claim. However, this did not last very long and in 1871 the British annex the whole area, including the Kimberley diamond fields, as part of the Cape Colony.

During the Anglo-Boer War (1899-1902) a large number of battles were fought in the larger region. Most of them centred around the relief of Kimberley that were besieged by the Republican forces of the Orange Free State Republic and the South African Republic (ZAR).

- Built environment

These are complex features in the landscape, being made up of different yet interconnected elements. Fortunately transmission lines do not usually impact on towns. Most towns in the region have, according to various databases, about 20 buildings that are listed to be of provincial heritage significance.

<b>NHRA Category</b>	Buildings, structures, places and equipment of cultural significance
<b>Protection status</b>	General Protection - Section 34: Structures older than 60 years
<b>Significance</b>	High on a regional level – Grade III

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Fig. 4. Buildings found in an urban environment.

- Farmsteads

Farmsteads are complex features in the landscape, being made up of different yet interconnected elements. Typically these consist of a main house, gardens, outbuildings, sheds and barns, with some distance from that labourer housing and various cemeteries. In addition roads and tracks, stock pens and wind mills complete the setup. An impact on one element therefore impacts on the whole.

<b>NHRA Category</b>	Buildings, structures, places and equipment of cultural significance
<b>Protection status</b>	General Protection - Section 34: Structures older than 60 years

<b>Significance</b>	High on a regional level – Grade III
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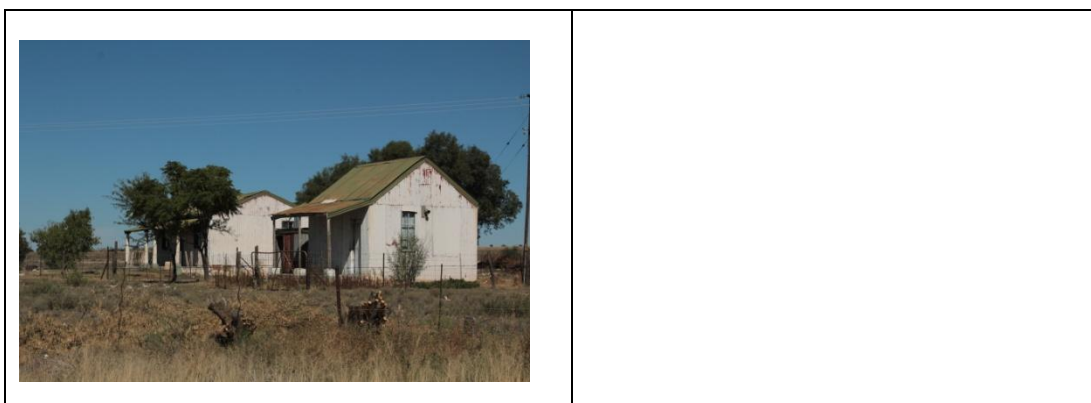


Fig. 5. Examples of farmsteads and farming related features identified in the region.

- Cemeteries

Most of these cemeteries, irrespective of the fact that they are for land owner or farm labourers (with a few exceptions where they were integrated), are family orientated. They therefore serve as important 'documents' linking people directly by name to the land.

<b>NHRA Category</b>	Graves, cemeteries and burial grounds
<b>Protection status</b>	General Protection - Section 36: Graves or burial grounds

<b>Significance</b>	High on a local level – Grade III
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Fig. 6. Local cemeteries.

- Public monuments

Although most of these usually occur in urban areas, some also occur in rural areas where some event of significance took place.

<b>NHRA Category</b>	Buildings, structures, places and equipment of cultural significance
<b>Protection status</b>	General Protection - Section 37: Public Monuments and Memorials

<b>Significance</b>	Medium on a regional level – Grade III
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Fig. 7. Monuments in town and the rural area.

- Infrastructure and industrial heritage

In many cases this aspect of heritage is left out of surveys, largely due to the fact that it is taken for granted. However, the land and its resources could not be accessed and exploited without the development of features such as roads, bridges, railway lines, electricity lines and telephone lines.

<b>NHRA Category</b>	Buildings, structures, places and equipment of cultural significance
<b>Protection status</b>	General Protection - Section 34: Structures older than 60 years

<b>Significance</b>	Medium on a regional level – Grade III
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Fig. 8. Infrastructural elements in the environment (bridges and mining features).

## 6. SITE SIGNIFICANCE AND ASSESSMENT

### 6.1 Heritage assessment criteria and grading

The NHRA stipulates the assessment criteria and grading of archaeological sites. The following categories are distinguished in Section 7 of the Act:

- **Grade I:** Heritage resources with qualities so exceptional that they are of special national significance;
- **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
- **Grade III:** Other heritage resources worthy of conservation on a local authority level.

The occurrence of sites with a Grade I significance will demand that the development activities be drastically altered in order to retain these sites in their original state. For Grade II and Grade III sites, the applicable of mitigation measures would allow the development activities to continue.

### 6.2 Statement of significance

A matrix was developed whereby the above criteria, as set out in Sections 3(3) and 7 of the NHRA, No. 25 of 1999, were applied for each identified site (see Appendix 1). This allowed some form of control over the application of similar values for similar sites. Three categories of significance are recognized: low, medium and high.

**Table 2. Summary of identified heritage resources in the study area.**

<b>Identified heritage resources</b>	
<i>Category, according to NHRA</i>	<i>Identification/Description</i>
<b>Formal protections (NHRA)</b>	

National heritage site (Section 27)	Yes
Provincial heritage site (Section 27)	Yes
Provisional protection (Section 29)	Yes
Place listed in heritage register (Section 30)	None
<b>General protections (NHRA)</b>	
structures older than 60 years (Section 34)	Yes
archaeological site or material (Section 35)	Yes
palaeontological site or material (Section 35)	None
graves or burial grounds (Section 36)	Yes
public monuments or memorials (Section 37)	Yes
<b>Other</b>	
Any other heritage resources (describe)	None

In terms of Section 7 of the NHRA, the sites currently known or which are expected to occur in the study area are evaluated to have the following significance:

- Stone Age sites are viewed to have medium significance on a regional level and have Grade III significance;
- Rock art sites (Stone Age) are viewed to have high significance on a regional level and have Grade II significance;
- Farmsteads are viewed to have medium significance on a regional level and have Grade III significance;
- Public monuments and battle fields are viewed to have high significance on a provincial level and some would have Grade II significance.
- Graves and cemeteries are viewed to have high significance on a local level and have Grade III significance;
- Industrial and infrastructural heritage sites are viewed to have medium significance on a regional level and have Grade III significance.

### 6.3 Impact assessment

Impact analysis of cultural heritage resources under threat of the proposed development, are based on the present understanding of the development.

Environmental Parameter	<b>Pre-colonial: Stone Age sites</b>
Issue/Impact/Environmental Effect/Nature	Many sites are still unknown. Their potential and significance therefore unknown. The impact will be the physical disturbance of the material and its context. Impact will be focused on a particular node, i.e. tower positions or access/ inspection roads
Extent	Local
Probability	Can occur
Reversibility	Irreversible

Magnitude	High
Duration	Permanent
Significance Rating	Sites have a medium significance on a region level – viewed as NHRA Grade III sites. Distinguish from find spots, which have low significance. Rock art sites are viewed to have high significance on a regional level – viewed as NHRA Grade II sites.
Mitigation measures	All of these sites should be avoided as far as possible. Mitigation should take the form of isolating known sites and declare them as no-go zones with sufficient large buffer zones around them for protection. Sites that cannot be avoided should be excavated in full by an archaeologist qualified in Stone Age archaeology.

Environmental Parameter	<b>Colonial Period - farmsteads</b>
Issue/Impact/Environmental Effect/Nature	The various features are subject to damage. Easier to identify and therefore easier to avoid. Variety of interconnected elements makes up the whole. Impact on part therefore implies an impact on the whole
Extent	Local
Probability	Unusual but possible
Reversibility	Reversible with human intervention
Magnitude	Low
Duration	Medium term
Significance Rating	Sites have a medium significance on a region level – viewed as NHRA Grade III sites.
Mitigation measures	All of these sites should be avoided as far as possible. Mitigation should take the form of isolating known sites and declare them as no-go zones with sufficient large buffer zones around them for protection. In exceptional cases mitigation can be implemented after required procedures have been followed.

Environmental Parameter	<b>Colonial Period - cemeteries</b>
Issue/Impact/Environmental Effect/Nature	The various features are subject to damage. Easier to identify and therefore easier to avoid. Variety of interconnected elements makes up the whole. Impact on part therefore implies an impact on the whole
Extent	Local
Probability	Unusual but possible
Reversibility	Reversible with human intervention
Magnitude	Moderate
Duration	Medium term
Significance Rating	Sites have a medium significance on a region level – viewed as NHRA Grade III sites.
Mitigation measures	All of these sites should be avoided as far as possible. Mitigation should take the form of isolating known sites and declare them as no-go zones with sufficient large buffer zones around them for protection. In exceptional cases mitigation can be implemented after required procedures have been followed.

Environmental Parameter	<b>Colonial Period – public monuments and battle fields</b>
Issue/Impact/Environmental Effect/Nature	The various features are subject to damage. Usually identified by a monument, but total extent of battlefield not always easy to demarcate. Variety of interconnected elements makes up the whole. Impact on part therefore implies an impact on the whole
Extent	International
Probability	Can occur
Reversibility	Reversible with human intervention
Magnitude	High
Duration	Permanent
Significance Rating	Sites have a high significance on a provincial level – some viewed as NHRA Grade II sites.
Mitigation measures	All of these sites should be avoided as far as possible. Mitigation should take the form of isolating known sites and declare them as no-go zones with sufficient large buffer zones around them for protection.

Environmental Parameter	<b>Colonial Period – industrial heritage</b>
Issue/Impact/Environmental Effect/Nature	Different features are subject to damage. Some might be unique – no alternatives or second examples. Easy to identify and therefore easy to avoid
Extent	Site
Probability	Unusual but possible
Reversibility	Reversible with human intervention
Magnitude	Marginal loss of resources
Duration	Medium term
Significance Rating	Sites have a medium significance on a region level – viewed as NHRA Grade III sites.
Mitigation measures	All of these sites should be avoided as far as possible. Mitigation should take the form of isolating known sites and declare them as no-go zones with sufficient large buffer zones around them for protection. In exceptional cases mitigation can be implemented after required procedures have been followed, but only as last case scenario.

Significance assessments for the three alternative routes are presented in the table below – see Appendix 3 for the methodology used.

At present there are no grounds, based on heritage resources, for deciding between the alternative routes. From this it is deduced that all three of the alternative routes would be equally suitable for development of the power line. However, the corridors would pass through a highly sensitive region due to the occurrence of a large number of battle field sites. This is specifically the case with the new Alternative 1A, which, it is believed, would have a visual impact on Anglo Boer War battlefield sites at Rhodelaagte and Belmont

### Potential Heritage Impacts and Mitigations

Scoring Without Mitigation = (NM)

Scoring With Mitigation = (WM)

Analysis of the Significance of Potential Heritage Impacts (Perseus - Kronos – for all three route corridors)

Environmental Parameter	Nature of Impact	Magnitude	Reversibility	Extent	Duration	Probability of occurrence	Ranking	Significance	
								Without Mitigation	With Mitigation
Pre Colonial Stone Age Sites	Many sites are still unknown. Their potential and significance therefore unknown. The impact will be the physical disturbance of the material and its context. Impact will be focused on a particular node, i.e. tower positions or access/ inspection roads	3 2	3 3	2 2	5 5	3 3	39 36	High	High
Colonial Period - farmsteads	The various features are subject to damage. Easier to identify and therefore easier to avoid. Variety of interconnected elements makes up the whole. Impact on part therefore implies an impact on the whole	3 3	3 3	2 2	3 3	2 2	22 22	Moderate	Moderate
Colonial Period - cemeteries	The various features are subject to damage. Easier to identify and therefore easier to avoid. Variety of interconnected elements makes up the whole. Impact on part therefore implies an impact on the whole	2 2	3 3	3 3	3 3	2 2	22 22	Moderate	Moderate

Environmental Parameter	Nature of Impact	Magnitude	Reversibility	Extent	Duration	Probability of occurrence	Ranking	Significance	
								Without Mitigation	With Mitigation
Colonial Period – industrial heritage	The various features are subject to damage. Easier to identify and therefore easier to avoid. Variety of interconnected elements makes up the whole. Impact on part therefore implies an impact on the whole	3 2	3 3	1 2	4 4	2 2	22 22	Moderate	Moderate
Colonial Period – public monuments and battle fields	The various features are subject to damage. Easier to identify and therefore easier to avoid. Variety of interconnected elements makes up the whole. Impact on part therefore implies an impact on the whole	4 4	5 3	5 5	4 4	4 4	72 68	Very high	Very high



## 7. RECOMMENDED MANAGEMENT MEASURES

Heritage sites are fixed features in the environment, occurring within specific spatial confines. Any impact upon them is permanent and non-reversible. Those resources that cannot be avoided and that are directly impacted by the proposed development can be excavated/recorded and a management plan can be developed for future action. Those sites that are not impacted on can be written into the management plan, whence they can be avoided or cared for in the future.

### 7.1 Objectives

- Protection of archaeological, historical and any other site or land considered being of cultural value within the project boundary against vandalism, destruction and theft.
- The preservation and appropriate management of new discoveries in accordance with the NHRA, should these be discovered during construction activities.

The following shall apply:

- Known sites should be clearly marked in order that they can be avoided during construction activities.
- The contractors and workers should be notified that archaeological sites might be exposed during the construction activities.
- Should any heritage artefacts be exposed during excavation, work on the area where the artefacts were discovered, shall cease immediately and the Environmental Control Officer shall be notified as soon as possible;
- All discoveries shall be reported immediately to a heritage practitioner so that an investigation and evaluation of the finds can be made. Acting upon advice from these specialists, the Environmental Control Officer will advise the necessary actions to be taken;
- Under no circumstances shall any artefacts be removed, destroyed or interfered with by anyone on the site; and
- Contractors and workers shall be advised of the penalties associated with the unlawful removal of cultural, historical, archaeological or palaeontological artefacts, as set out in the National Heritage Resources Act (Act No. 25 of 1999), Section 51. (1).

### 7.2 Control

In order to achieve this, the following should be in place:

- A person or entity, e.g. the Environmental Control Officer, should be tasked to take responsibility for the heritage sites and should be held accountable for any damage.
- Known sites should be located and isolated, e.g. by fencing them off. All construction workers should be informed that these are no-go areas, unless accompanied by the individual or persons representing the Environmental Control Officer as identified above.
- In areas where the vegetation is threatening the heritage sites, e.g. growing trees pushing walls over, it should be removed, but only after permission for the methods proposed has been granted by SAHRA. A heritage official should be part of the team executing these measures.

## 8. CONCLUSIONS

The aim of the survey was to evaluate potential heritage resources that would occur within the boundaries of a proposed electricity transmission corridor and to determine if there are any

fatal flaws that would prevent the proposed development from taking place in any of the three corridors where it is proposed to develop the electricity transmission line.

The cultural landscape qualities of the region essentially consist of a three components. The first is a rural area in which the human occupation is made up of a pre-colonial (Stone Age and Iron Age) occupation and a much later colonial (farmer) component. This rural landscape has always been sparsely populated. The second component is an urban one consisting of a number of smaller towns, most of which developed during the last 150 years or less. The third component is made up of a number of battlefields which, although spread out over a large part of the landscape, are still linked to each other.

The following heritage sites were identified in the larger region:

- Pre-colonial archaeological sites dating to the Stone Age have been identified to occur in the region of study area. In most known cases the impact of the development would only be indirect, e.g. the power line crossing some distance from the site, thereby having only a visual impact. However, when more detailed information is available, e.g. the exact position of the different towers and access/inspection roads, which will give rise to physical disturbance of the material and its context, it might be determined that specific development aspects might have a direct disturbance, which would result in irreplaceable loss of heritage resources.
- Colonial period or historic period heritage manifest in a wide variety – farmsteads, infrastructure, cemeteries and battlefields. As the power line is to cross a rural landscape for the most part, the impact would only be indirect, e.g. the power line crossing some distance from the site, thereby having only a visual impact. However, when more detailed information is available, e.g. the exact position of the different towers and access/inspection roads, which will give rise to physical disturbance of the material and its context, it might be determined that specific development aspects might have a direct disturbance, which would result in irreplaceable loss of heritage resources.

It is our opinion that from a heritage point of view, although there are no fatal flaws that would prevent the proposed development from taking place in any of the corridors it is a highly sensitive region due to the occurrence of a large number of battle field sites. It must be remembered that heritage sites are not only fixed features in the environment, occurring within specific spatial confines, but they are also finite in number. Avoiding of impacts on sites is therefore the preferred form of mitigation. In areas where a high density of sites occurs, if at all possible, exclusion zones where no development is to take place, should be set aside. If that is not possible, mitigation can only be achieved through archaeological investigation.

As the exact coordinates for the power line and the individual tower structures are not yet available, it is difficult to determine what the final impact of the proposed development would be. Therefore, for the project to continue, we propose the following:

- Mitigation should be based on avoiding of sites rather than anything else. In order to achieve this, a full “walk down” of the selected corridor must be done prior to construction taking place, to document all sites, features and objects, in order to propose adjustments to the routes and thereby to avoid as many impacts as possible.
- In addition, the management measures, as set out in Section 7 of this report should be implemented prior to construction taking place.
- The corridors would pass through a highly sensitive region due to the occurrence of a large number of battle field sites. However, it is perceived that the impact of the proposed development on these sites would largely be visual in nature. This is specifically the case with the newly proposed Alternative 1A, which would have a visual impact on battle field sites at Roodelaagte and Belmont. It is therefore highly recommended that a visual impact assessment is done by a specialist for these power line route alternatives.

- No impact on heritage sites, features or objects can be allowed without a valid permit from SAHRA.

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### **9.3 Maps and aerial photographs**

1: 50 000 Topocadastral maps  
Google Earth

## APPENDIX 1: CONVENTIONS USED TO ASSESS THE SIGNIFICANCE OF HERITAGE RESOURCES

### Significance

According to the NHRA, Section 2(vi) the **significance** of heritage sites and artefacts is determined by its aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technical value in relation to the uniqueness, condition of preservation and research potential. It must be kept in mind that the various aspects are not mutually exclusive, and that the evaluation of any site is done with reference to any number of these.

Matrix used for assessing the significance of each identified site/feature

<b>1. Historic value</b>				
Is it important in the community, or pattern of history				
Does it have strong or special association with the life or work of a person, group or organisation of importance in history				
Does it have significance relating to the history of slavery				
<b>2. Aesthetic value</b>				
It is important in exhibiting particular aesthetic characteristics valued by a community or cultural group				
<b>3. Scientific value</b>				
Does it have potential to yield information that will contribute to an understanding of natural or cultural heritage				
Is it important in demonstrating a high degree of creative or technical achievement at a particular period				
<b>4. Social value</b>				
Does it have strong or special association with a particular community or cultural group for social, cultural or spiritual reasons				
<b>5. Rarity</b>				
Does it possess uncommon, rare or endangered aspects of natural or cultural heritage				
<b>6. Representivity</b>				
Is it important in demonstrating the principal characteristics of a particular class of natural or cultural places or objects				
Importance in demonstrating the principal characteristics of a range of landscapes or environments, the attributes of which identify it as being characteristic of its class				
Importance in demonstrating the principal characteristics of human activities (including way of life, philosophy, custom, process, land-use, function, design or technique) in the environment of the nation, province, region or locality.				
<b>7. Sphere of Significance</b>		High	Medium	Low
International				
National				
Provincial				
Regional				
Local				
Specific community				
<b>8. Significance rating of feature</b>				
1.	Low			
2.	Medium			
3.	High			

## APPENDIX 2. RELEVANT LEGISLATION

All archaeological and palaeontological sites, and meteorites are protected by the National Heritage Resources Act (Act no 25 of 1999) as stated in Section 35:

(1) Subject to the provisions of section 8, the protection of archaeological and palaeontological sites and material and meteorites is the responsibility of a provincial heritage resources authority: Provided that the protection of any wreck in the territorial waters and the maritime cultural zone shall be the responsibility of SAHRA.

(2) Subject to the provisions of subsection (8)(a), all archaeological objects, palaeontological material and meteorites are the property of the State. The responsible heritage authority must, on behalf of the State, at its discretion ensure that such objects are lodged with a museum or other public institution that has a collection policy acceptable to the heritage resources authority and may in so doing establish such terms and conditions as it sees fit for the conservation of such objects.

(3) Any person who discovers archaeological or palaeontological objects or material or a meteorite in the course of development or agricultural activity must immediately report the find to the responsible heritage resources authority, or to the nearest local authority offices or museum, which must immediately notify such heritage resources authority.

(4) No person may, without a permit issued by the responsible heritage resources authority-

- (a) destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or palaeontological site or any meteorite;
- (b) destroy, damage, excavate, remove from its original position, collect or own any archaeological or palaeontological material or object or any meteorite;
- (c) trade in, sell for private gain, export or attempt to export from the Republic any category of archaeological or palaeontological material or object, or any meteorite; or
- (d) bring onto or use at an archaeological or palaeontological site any excavation equipment or any equipment which assist in the detection or recovery of metals or archaeological and palaeontological material or objects, or use such equipment for the recovery of meteorites.

In terms of cemeteries and graves the following (Section 36):

(1) Where it is not the responsibility of any other authority, SAHRA must conserve and generally care for burial grounds and graves protected in terms of this section, and it may make such arrangements for their conservation as it sees fit.

(2) SAHRA must identify and record the graves of victims of conflict and any other graves which it deems to be of cultural significance and may erect memorials associated with the grave referred to in subsection (1), and must maintain such memorials.

(3) No person may, without a permit issued by SAHRA or a provincial heritage resources authority-

- (a) destroy, damage, alter, exhume or remove from its original position or otherwise disturb the grave of a victim of conflict, or any burial ground or part thereof which contains such graves;
- (b) destroy, damage, alter, exhume, remove from its original position or otherwise disturb any grave or burial ground older than 60 years which is situated outside a formal cemetery administered by a local authority; or
- (c) bring onto or use at a burial ground or grave referred to in paragraph (a) or (b) any excavation equipment, or any equipment which assists in the detection or recovery of metals.

(4) SAHRA or a provincial heritage resources authority may not issue a permit for the destruction or damage of any burial ground or grave referred to in subsection (3)(a) unless it is satisfied that the applicant has made satisfactory arrangements for the exhumation and re-interment of the contents of such graves, at the cost of the applicant and in accordance with any regulations made by the responsible heritage resources authority.



### APPENDIX 3. METHODOLOGY FOR THE ASSESSMENT OF POTENTIAL IMPACTS

All impacts identified during Scoping and EIA stages of the study will be classified in terms of their significance. The broad significance categories are as follows:

- The **Nature** of the impact: This will describe the cause and the effect, what will be affected and how it will be affected.
- **Mitigation level:** The degree at which the impact can be mitigated.
- The **Extent** of the impact: This will be categorised as local, regional or national.
- The **Magnitude** of the impact: This will be quantified as:
  - Low: Will cause a low impact on the environment;
  - Moderate: Will result in the process continuing but in a controllable manner;
  - High: Will alter processes to the extent that they temporarily cease; and
  - Very High: Will result in complete destruction and permanent cessation of processes.
- The **Probability:** which shall describe the likelihood of impact occurring and will be rated as follows:
  - Extremely remote: Which indicates that the impact will probably not happen;
  - Can Occur: there is a possibility of occurrence;
  - Unusual but Possible: Distinct possibility of occurrence;
  - Almost Certain: Most likely to occur; and
  - Certain/ Inevitable: Impact will occur despite any preventative measures put in place.
- **The duration (Exposure):** wherein it will be indicated whether:
  - The impact will be of a immediate;
  - The impact will be of a short tem (between 0-5 years);
  - The impact will be of medium term (between 5-15 years);
  - The impact will be long term (15 and more years); and
  - The impact will be permanent.
- **Reversibility/ Replaceability:** The degree at which the impact can be **reversible or the lost resource can be replaced.**

To determine the significance ranking, the following ranking (or similar) will be applied to each impact identified:

The Significance of the impact is calculated as follows:

<b>Significance= Consequence (Magnitude+ Duration+ Extent + Reversibility) X Probability</b>
--

Table 1: Significance ranking (Savahanna Environmental, 2008)

RANKING	MAGNITUDE	REVERSIBILITY	EXTENT	DURATION	PROBABILITY
5	Very high/ don't know	Irreversible	International	Permanent	Certain/inevitable
4	High		National	Long term (impact	Almost certain

				ceases after operational life of asset)	
3	Moderate	Reversibility with human intervention	Provincial	Medium term	Can occur
2	Low		Local	Short term	Unusual but possible
1	Minor	Completely reversible	Site bound	Immediate	Extremely remote
0	None		None		None

<b>RANKING</b>	<b>100-65</b>	<b>64-36</b>	<b>35-16</b>	<b>15-5</b>	<b>4-1</b>
<b>SIGNIFICANCE</b>	Very High	High	Moderate	Low	Minor

**APPENDIX 4. SPECIALIST COMPETENCY**Johan (Johnny) van Schalkwyk

J A van Schalkwyk, D Litt et Phil, heritage consultant, has been working in the field of heritage management for more than 30 years. Based at the National Museum of Cultural History, Pretoria, he has actively done research in the fields of anthropology, archaeology, museology, tourism and impact assessment. This work was done in Limpopo Province, Gauteng, Mpumalanga, North West Province, Eastern Cape, Northern Cape, Botswana, Zimbabwe, Malawi, Lesotho and Swaziland. Based on this work, he has curated various exhibitions at different museums and has published more than 60 papers, many in scientifically accredited journals. During this period he has done more than 2000 impact assessments (archaeological, anthropological, historical and social) for various government departments and developers. Projects include environmental management frameworks, road-, pipeline-, and power line developments, dams, mining, water purification works, historical landscapes, refuse dumps and urban developments.

Maria Magdalena van der Ryst

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