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MOOKODI INTEGRATION PROJECT – PHASE 2

HERITAGE REPORT – BASIC ASSESSMENT

BASIC HERITAGE ASSESSMENT FOR THE PROPOSED MOOKODI 132KV PHASE 2 POWER LINES DEVELOPMENT, NORTH WEST PROVINCE

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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.

J A van Schalkwyk (D Litt et Phil)
Heritage Consultant
February 2013

EXECUTIVE SUMMARY

BASIC HERITAGE ASSESSMENT FOR THE PROPOSED MOOKODI 132KV PHASE 2 POWER LINES DEVELOPMENT, NORTH WEST PROVINCE

Due to rapid urban expansion and population growth, additional electricity supplies are urgently needed in the larger Vryburg region. In order to satisfy this demand, Eskom propose the construction of a 132kV power line, as well as two substations in the vicinity of Vryburg. For this purpose Eskom has identified a corridor with some alternatives to be evaluated as to its suitability for use in the construction of the power line, as well as the construction of additional substations.

In accordance with Section 38 of the NHRA, an independent heritage consultant was appointed by **SiVest Environmental Division** to conduct a Heritage Impact Assessment to determine if any sites, features or objects of cultural heritage significance occur within the boundaries of the corridors that would disqualify any such corridor from being used for the construction of the power line as well as the substations, or would require the implementation of mitigation measures.

The following categories of heritage sites were identified as occurring in the study area:

- Stone Age sites
- Farming and farming related activities, such as farmsteads, stock pens, windmills, etc.
- Buildings and sites of heritage significance in the various towns.
- Elements of local infrastructure such as a railway line and associated stations and other structures.
- Local and private cemeteries.
- Roadside memorials.

Sensitive areas:

- All pans are sensitive as stone tools have been identified to occur on the rim of a number of them. A buffer of 20 metres from the outer edge of the rim of the pan should be created in order not to impact on the stone tools.

- The same hold true for all water courses.

- Many rock outcrops in the region show signs of having being quarried by Stone Age people in order to obtain material for producing stone tools. In addition, in some cases rock engraving occur on some of the outcrops. Therefore, all outcrops should be avoided as far as possible.

- All farmsteads, occupied or not, should be buffered with a no-go zone of at least 100 metres from the last visible feature associated with the farmstead/homestead.

- All cemeteries should have a buffer of at least 20 metres from the outer most graves. Fortunately, many cemeteries are fenced off, which can then be used as a buffer.

- All other features such as bridges, station buildings, etc. should be buffered with a no-go zone of at least 20 metres.

Evaluation:

Proposed 132kV line: Bophirima DS to Schweizer-Reneke

- At present Alternative 1 seem to be the best proposition for the development of this corridor.

- Proposed 132kV line: Mookodi MTS to proposed Ganyesa substation
  - At present all of the Alternatives seem to be suitable for the development of this corridor.
  - At present, all the substation sites seem to be suitable for the proposed development.

- Proposed 132kV line: Mookodi MTS to Magopela
  - At present Alternatives 3 and 5 seem to be the most suitable for the development of this corridor.

Recommendations:

- It is recommended that the preferred Alternatives are subjected to a "walk-down" by a heritage consultant to determine if there are any fatal flaws that would prevent to proposed development from taking place.

J A van Schalkwyk
Heritage Consultant
February 2013

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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

BASIC HERITAGE ASSESSMENT FOR THE PROPOSED MOOKODI 132KV PHASE 2 POWER LINES DEVELOPMENT, NORTH WEST PROVINCE

1. INTRODUCTION

Due to rapid urban expansion and population growth, additional electricity supplies are urgently needed in the larger Vryburg region. In order to satisfy this demand, Eskom propose the construction of three 132kV power lines, as well as associated substations. For this purpose Eskom has identified routes, each with a number of alternative corridors to be evaluated as to its suitability for use in the construction of the power lines.

South Africa's heritage resources, also described as the 'national estate', comprise a wide range of sites, features, objects and beliefs. However, 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 site.

In accordance with Section 38 of the NHRA, an independent heritage consultant was appointed by **SiVest Environmental Division** to conduct a Basic Assessment to determine if any sites, features or objects of cultural heritage significance occur within the boundaries of the corridors that would disqualify any such corridor from being used for the construction of the power line as well as the substations, or would require the implementation of mitigation measures.

2. TERMS OF REFERENCE

2.1 **Scope of work**

The aim of this 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 lines and if any of these would prevent the proposed development from continuing.

The scope of work for this study consisted of:

- Conducting of a desk-top investigation of the area, in which all 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 routes were investigated only in a broad overview approach.
- In some areas the vegetation, natural as well as agricultural, was very high and dense, seriously limiting archaeological visibility.
- No information on the location of access routes, construction camps or lay-down areas are available and were therefore not included in this survey.

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.

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 2 & 3.

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 and historical sources were consulted – see list of references below.

- Information of a very general nature were obtained from these sources

4.2.1.2 Data bases

The *Heritage Atlas Database,* the *Environmental Potential Atlas*, the *SAHRA Database,* 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.
- The original Title Deeds of some of the farms were located at the C S-G office and indicated a few features in the larger region that is of cultural historical interest. Some references were found in NASA, all dealing with aspects of the management of people, infrastructure and commerce in the region.

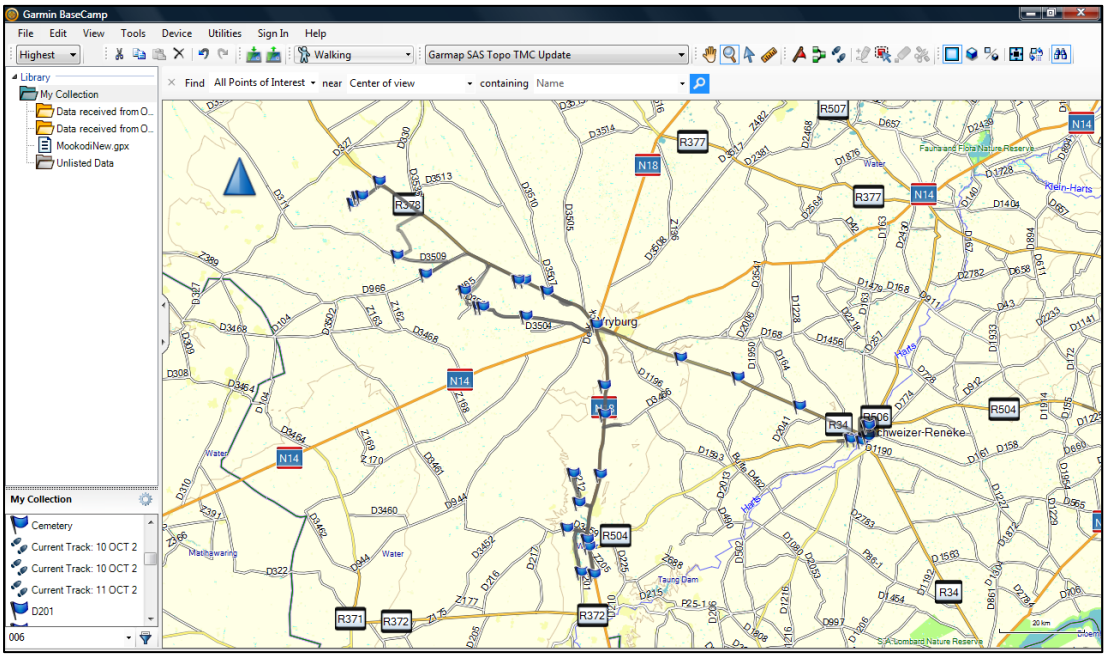
4.2.1.3 Other sources

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 areas that had to be investigated were identified by **SiVest Environmental Division** by means of maps. As the developments are linear in nature, it was surveyed by travelling the extent of the various corridors. Fortunately, as the corridors largely run alongside existing roads, it was easy to follow the routes. In a few smaller sections where this was not possible, the routes were accessed by foot. In addition sensitive areas such as river banks, the rims of natural pans and hills that would be crossed by the proposed power lines, were subjected to a foot survey.



Geology[1]

The lower strata of the Transvaal sequence comprise mostly of dolomite (with some chert and shales interspersed in places) while the upper strata appear to be more varied in constituents. Dolomite consists largely of calcium carbonate and is hence vulnerable to solution, especially by the carbonic acid found in rainwater percolating downwards. The dissolution of dolomite can lead to the formation of underground caverns and horizontal chambers often filled with large volumes of groundwater. Malmane Dolomite appears to be one of the main elements of the Transvaal sequence. It contains abundant algal stromatolites, evidence of an aquatic environment in ancient times. The algal stromatolites have a number of distinctive shapes such as domes, columns and spheres, their shape being governed by the environment in which they were formed. It is believed that the dolomites were laid down in shallow inter-tidal or sub-tidal zone of open water seas.

Although these features are said to occur over a wide area, it is apparently only in a few places where they outcrop and are visible to the naked eye.

- Geological sites

NHRA Category	Palaeontological sites
Protection status	
General Protection - Section 35: Archaeology, palaeontology and meteorites	

Heritage sites assessment		
Site type	*Site significance*	*Site grading (Section 7 of NHRA)*
Stromatolites	Uncertain	Uncertain

Impact assessment	
Impact	Unsure
Mitigation	Unsure
Permits	Unsure

Early history

Very little habitation of the central highveld area took place during Stone Age times. Tools dating to the Early Stone Age period are mostly found in the vicinity of larger watercourses, e.g. the Vaal River or the Harts River and especially in sheltered areas such as at the Taung

[1] As the author of this report is not a geologist, it is recommended that a suitably qualified person is contracted to produce a professional opinion on this topic.

fossil site. During Middle Stone Age (MSA) times (c. 150 000 – 30 000 BP), people became more mobile, occupying areas formerly avoided. In many cases, tools dating to this period are found on the banks of the many pans that occur all over. The MSA is a technological stage characterized by flakes and flake-blades with faceted platforms, produced from prepared cores, as distinct from the core tool-based ESA technology.

Late Stone Age (LSA) people had even more advanced technology than the MSA people and therefore succeeded in occupying even more diverse habitats. Some sites are known to occur in the region. These are mostly open sites located near river and pans. For the first time we also get evidence of people's activities derived from material other than stone tools. Ostrich eggshell beads, ground bone arrowheads, small bored stones and wood fragments with incised markings are traditionally linked with the LSA.

The LSA people have also left us with a rich legacy of rock art, which is an expression of their complex social and spiritual believes. One such site is located on the farm Bernauw located to the east of Vryburg.

Iron Age people started to settle in southern Africa c. AD 300, with one of the oldest known sites at Broederstroom south of Hartebeespoort Dam dating to AD 470. Having only had cereals (sorghum, millet) that need summer rainfall, Early Iron Age (EIA) people did not move outside this rainfall zone, and neither did they occupy the central interior highveld area. Because of their specific technology and economy, Iron Age people preferred to settle on the alluvial soils near rivers for agricultural purposes, but also for firewood and water.

The occupation of the larger geographical area (including the study area) did not start much before the 1500s. By the 16th century things changed, with the climate becoming warmer and wetter, creating condition that allowed Late Iron Age (LIA) farmers to occupy areas previously unsuitable, for example the treeless plains of the Free State and North West Province.

The earliest Iron Age settlers who moved into the North West Province region were Tswana-speakers such as the Tlhaping, Hurutshe, Fokeng, Kgatla and Rolong. In the region of the study area, it was mostly the booRapulana and booRatlou sections of the Rolong (Breutz 1959).

- Archaeological sites: Stone Age

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

Heritage sites assessment		
Site type	*Site significance*	*Site grading (Section 7 of NHRA)*
Open sites; rock engravings	Engravings – high on a provincial level	II

Impact assessment	
Impact	It is highly likely that the power line would cross over Stone Age sites as many of them occur in the larger region
Mitigation	If the route change and the line is to cross such a feature, total documentation (mapping, photographing and oral documentation) would be required
Permits	SAHRA permits

- Archaeological sites: Iron Age

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

Heritage sites assessment		
Site type	*Site significance*	*Site grading (Section 7 of NHRA)*
Stone walled sites	High on a regional level	III

Impact assessment	
Impact	It is highly unlikely that the power line would cross over any Iron Age site as few occur in the region
Mitigation	If the route change and the line is to cross such a feature, total documentation (mapping, photographing and oral documentation) would be required
Permits	A permit from SAHRA would be required

Historic period

Many early 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 settles took place. Some of the first whites to settle here were the missionaries Samuel Broadbent and Thomas Hodgson, who settled some distance to the east of what later became known as Wolmaransstad.

White settlers moved into the area during the first half of the 19th 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 last chapter in the history of the region was its incorporation under the policy of homeland development, into the Republic of Bophuthatswana. This was a very fragmented 'State' and it would have needed permanent support by the central government to keep it in place. Since 1994, this has fallen away and the people and the region were reincorporated into the larger Republic of South Africa

- 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.

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

Heritage sites assessment		
Site type	*Site significance*	*Site grading (Section 7 of NHRA)*
Farmsteads	Medium on a regional level	III

Impact assessment	
Impact	It is highly unlikely that the power line would cross over any existing farmstead or other buildings
Mitigation	If the route change and the line is to cross such a feature, total documentation (mapping, photographing and oral documentation) would be required
Permits	If older than 60 years, a permit from SAHRA would be required

- Cemeteries

Apart from the formal cemeteries that occur in municipal areas (towns or villages), a number of these, some quite informal, i.e. without fencing, is expected to occur sporadically all over, but probably in the vicinity of the various farmsteads. Many might also have been forgotten, making it very difficult to trace the descendants in a case where the graves are to be relocated.

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 are therefore serve as important 'documents' linking people directly by name to the land.

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

Heritage sites assessment		
Site type	*Site significance*	*Site grading (Section 7 of NHRA)*
Cemetery	High on a regional level	III

Impact assessment	
Impact	As it is unlikely that the power line would have any other than a visual impact on such sites, it is recommended that they are retained in their current location.
Mitigation	These sites should be avoided at all times. During construction it should be clearly demarcated, e.g. by using danger tape.
Permits	If retained, no permits are necessary

- Towns

Vryburg:

This town was founded in 1883 as the capital of the Republic of Stellaland, an independent Boer republic. The Boers that inhabited the area styled themselves as free citizens, or *vryburgers*, in Dutch, from which the name of the town was derived. The town achieved municipal status in 1896.

  - According to available data bases this town has 5 buildings listed as of provincial significance. In addition some cemeteries and monuments also occur.

  - As the proposed power line does not cross into town, there would be no impact on any of these sites.

Schweizer-Reneke:

The town was established in 1888 and named after two officers that were killed during a battle with the Korana.

  - According to available data bases this town has 5 buildings listed as of provincial significance. In addition some cemeteries and monuments also occur.

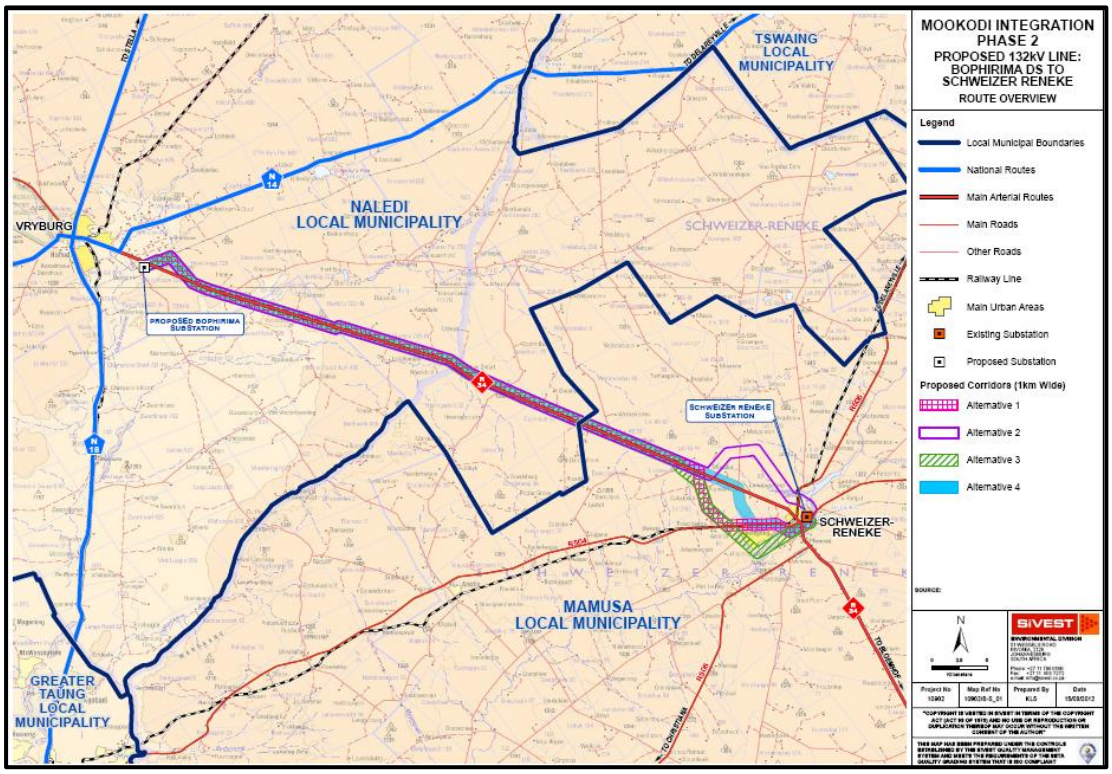
NHRA Category	Buildings, structures, places and equipment of cultural significance
Protection status	
General Protection - Section 34: Structures older than 60 years	

5.2 **Route description**

The project consists of a number of components which are listed below:

5.2.1 Proposed 132kV line: Bophirima DS to Schweizer-Reneke

- Four route alternatives. For most of the distance the alternatives follow R34. It is only in the region of Schweizer Reneke that the alternative split to present different options.



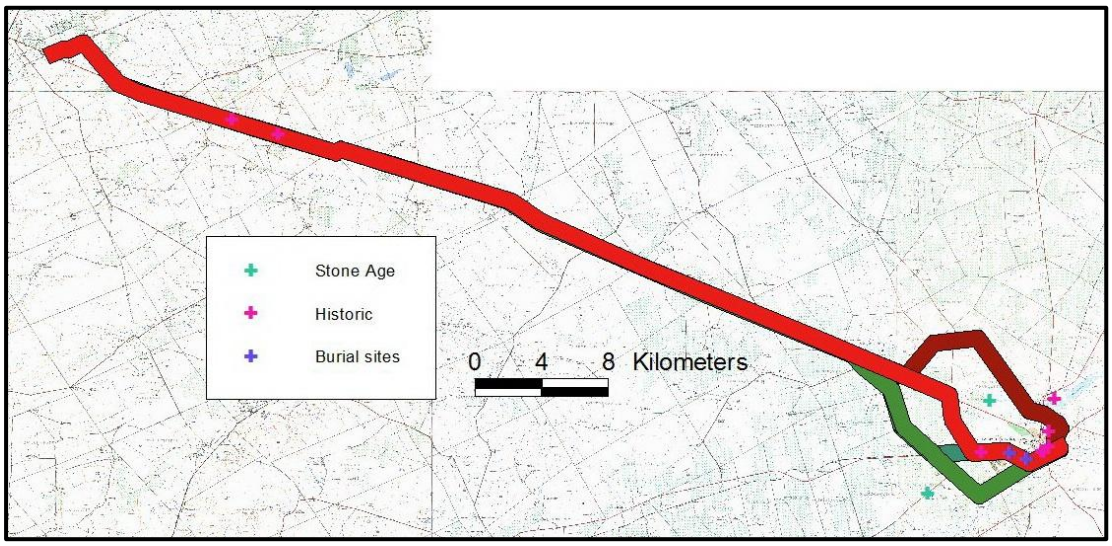


Fig. 2. Map showing the location of known heritage sites in the vicinity on the power line.

The following sites, features and objects of cultural significance are known to exist in the identified corridors:

- Some site dating to historic events that took place during the early part of the foundation of the town of Schweizer-Reneke occurs in the vicinity of the town.
- A number of structures/buildings occur in the town of Schweizer-Reneke.
- A number of formal and informal cemeteries occur in the built regions.
- Some old farmsteads occur in the vicinity of the various alternatives.
- Some informal memorials occur inside or adjacent to the R34 road.

Impact assessment:

- Based on current information it is our view that for most of the corridor alternatives there would be no problem from a heritage point of view for the development of the power line. The urban area of the town of Schweizer-Reneke has some very important heritage sites which should be avoided.
    - At present Alternative 1 seem to be the best proposition for the development of this corridor.

The following sites and features would in all probability fall inside the 300m power line corridor:

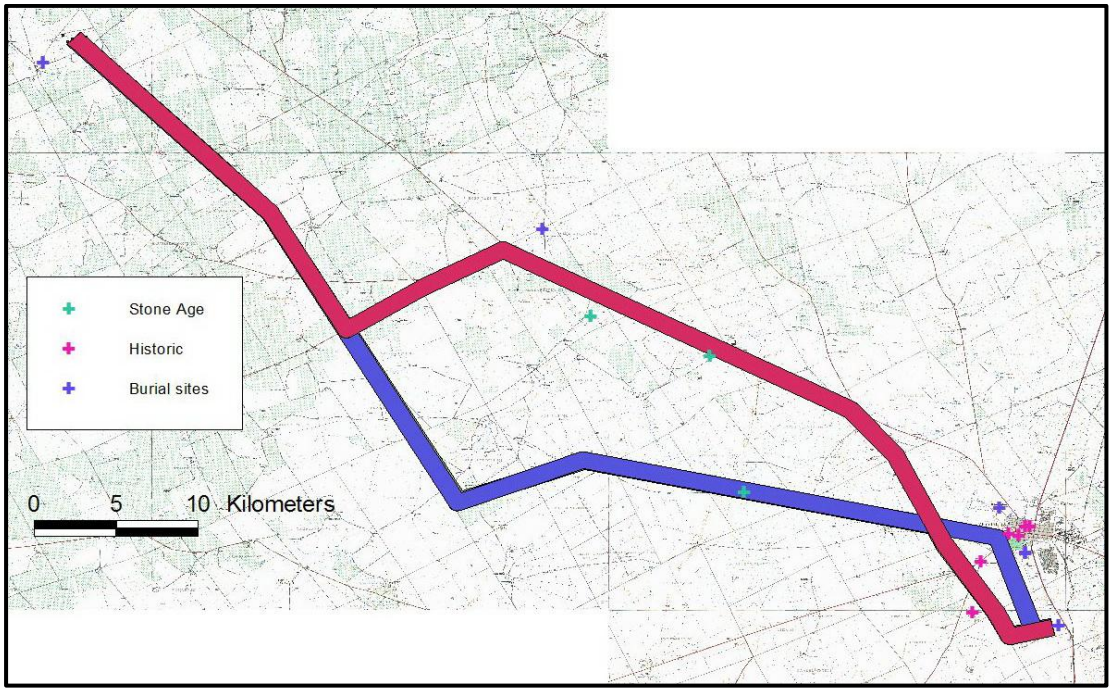
Code	Classification	Name	Farm	Latitude	Longitude
2724BB004	Historic	Memorial	Sweet Home 726	-27.01590	24.89239
2724BB017	Historic	Memorial	Kareeboom Fontein 725	-27.02389	24.91766
2725AB008	Historic	Cemetery	Moredou 62	-27.19458	25.31105
2725AB009	Historic	Cemetery	Moredou 62	-27.19809	25.32002
2725AB017	Historic	Railway bridge	Moredou 62	-27.19430	25.29573

2724BB004	2724BB017

2725AB008	2725AB009
2725AB017	

5.2.2 Proposed 132kV line: Mookodi MTS to proposed Ganyesa substation

- Three corridor alternatives stretching from Vryburg in a north-western direction.
- Four substation alternatives in the north-western section of the route alternatives



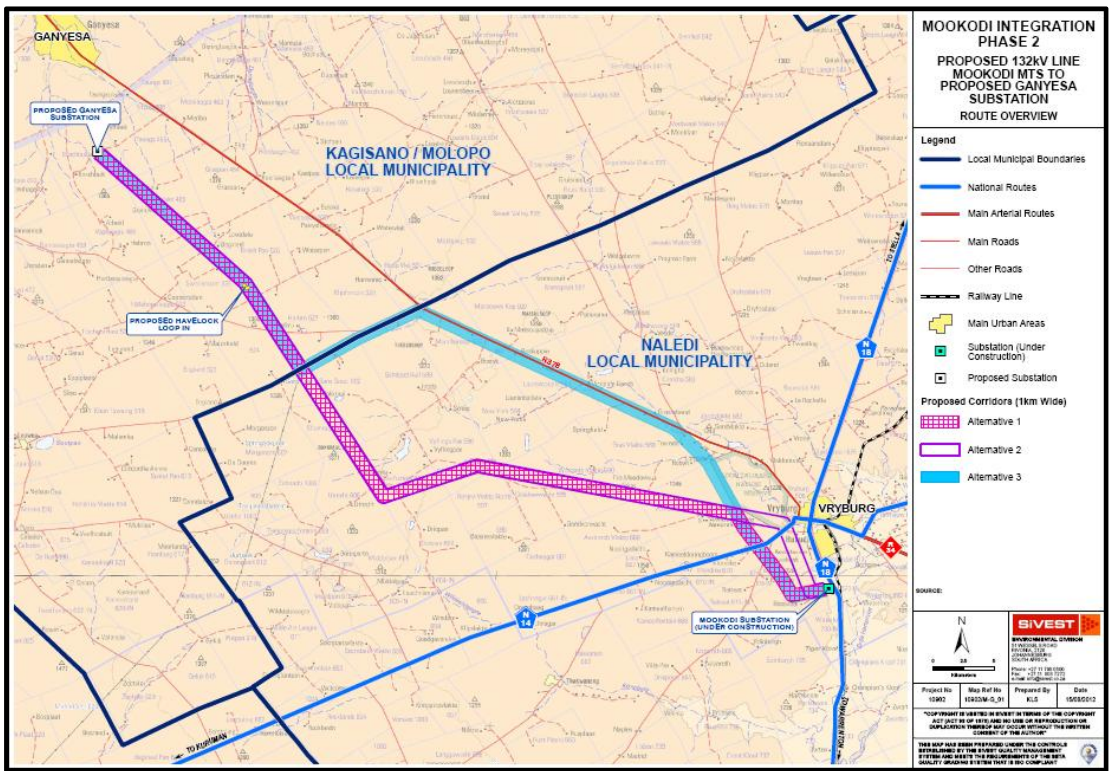


Fig. 3. Map showing the location of known heritage sites in the vicinity on the power line.

The following sites, features and objects of cultural significance are known to exist in the identified corridors:

- Stone Age sites are found to occur over large sections of the study area, especially in the vicinity of natural pans and rock outcrops.
- Some site dating to historic events that took place during the early part of the foundation of the town of Vryburg occurs in the vicinity of the town.
- A number of structures/buildings occur in the town of Vryburg.
- A number of formal and informal cemeteries occur in the built regions.
- Some old farmsteads occur in the vicinity of the various alternatives.

Impact assessment:

- Based on current information it is our view that for most of the corridor alternatives there would be no problem from a heritage point of view for the development of the power line. The area surrounding the town of Vryburg has some very important heritage sites, which should be avoided.
    - At present all of the Alternatives seem to be suitable for the development of this corridor.
    - At present, all the substation sites seem to be suitable for the proposed development.

The following sites and features would in all probability fall inside the 300m power line corridor:

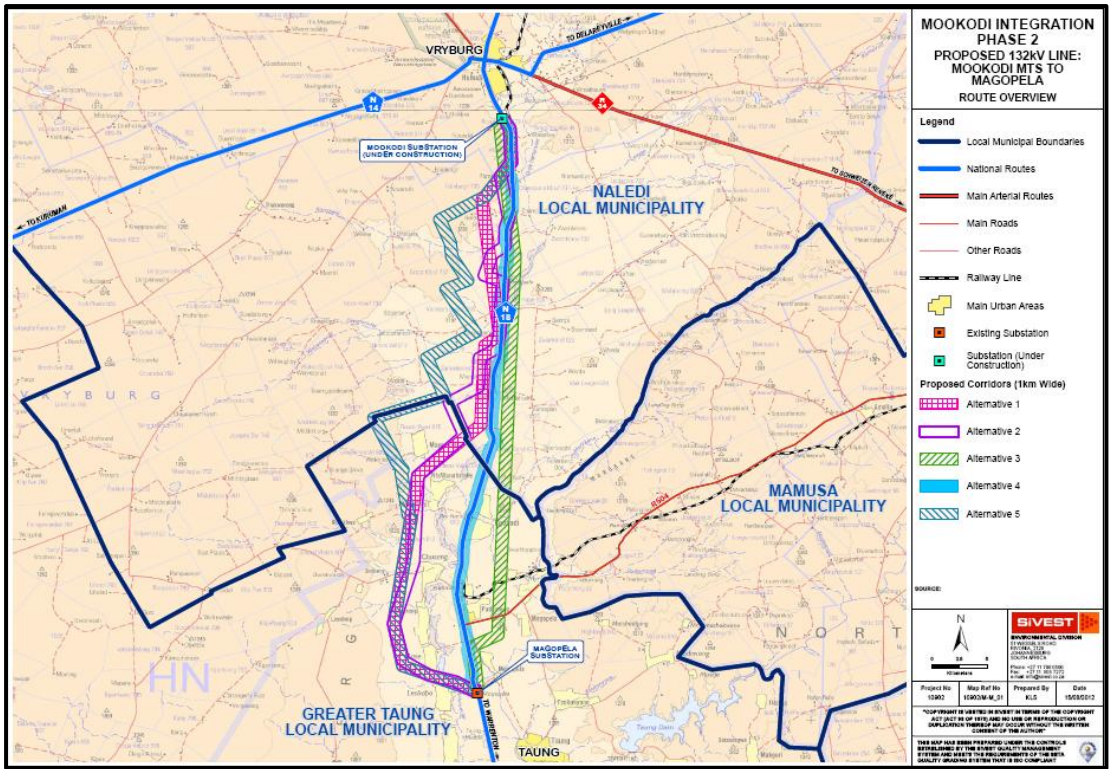
Code	Classification	Name	Farm	Latitude	Longitude
2624DC010	Stone Age	Pan site	Laurencedale 591	-26.86144	24.55506
2624DC011	Stone Age	Pan site	Warrensvlakte 590	-26.93625	24.57377

2624DC010

2624DC011

5.2.3 Proposed 132kV line: Mookodi MTS to Magopela

- Five corridor alternatives going from Mookodi outside Vryburg southwards to Magopela substation



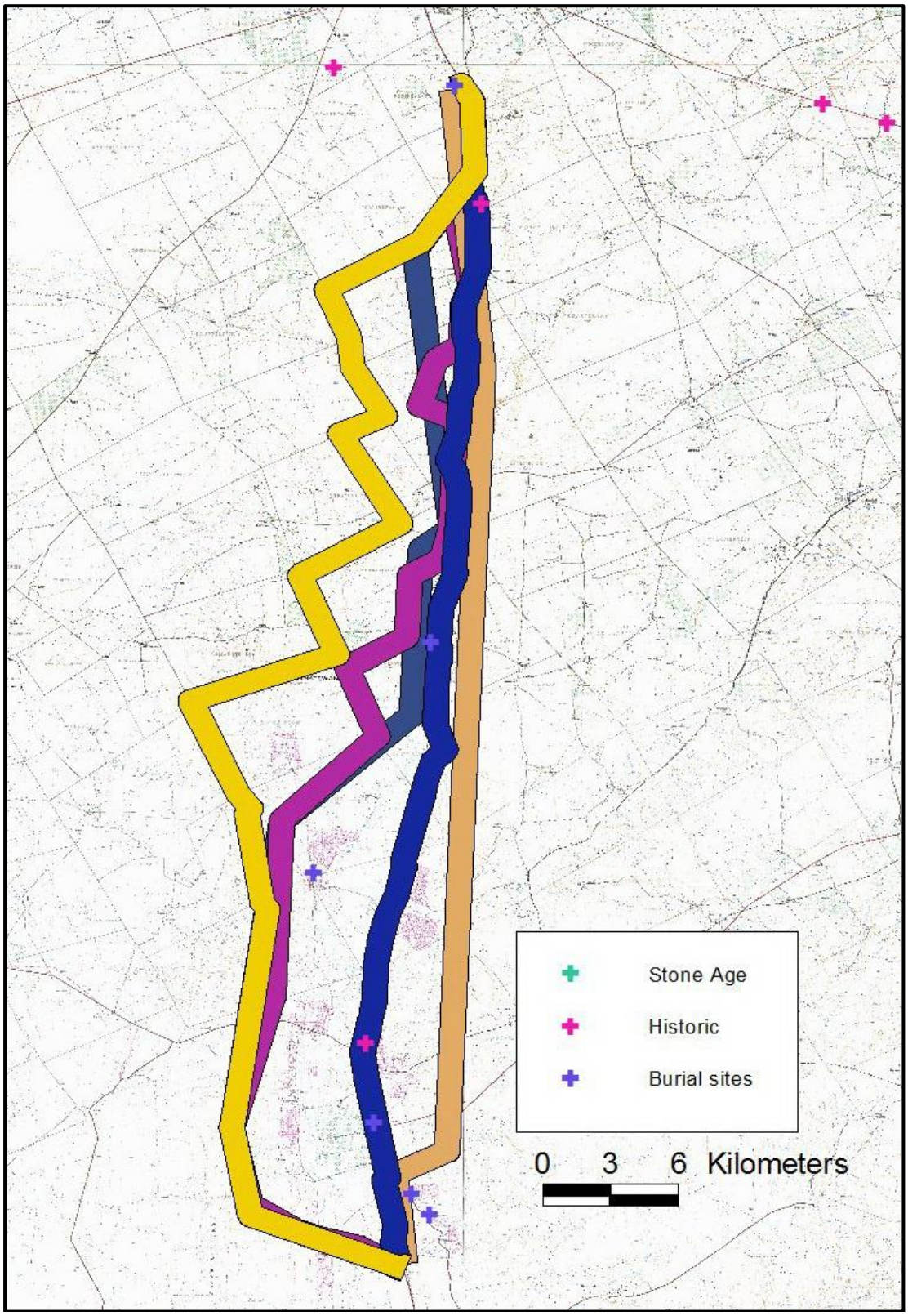


Fig. 4. Map showing the location of known heritage sites in the vicinity on the power line.

Fig. 5. RSA Bluebook dating to 1922, showing the railway line and stations.

The following sites, features and objects of cultural significance are known to exist in the identified corridors:

- Stone Age sites are found to occur over large sections of the study area, especially in the vicinity of natural pans and rock outcrops.
- Some site dating to historic events that took place during the early part of the foundation of the town of Vryburg occurs in the vicinity of the town.
- A number of structures/buildings occur in the town of Vryburg as well as in the smaller township to the south.
- A number of formal and informal cemeteries occur in the built regions.
- Some old farmsteads occur in the vicinity of the various alternatives.
- The railway line and some of its associated structures such as station buildings, date to at least the early 1920s.

Impact assessment:

- Based on current information it is our view that for some of the corridor alternatives there would be some problems from a heritage point of view for the development of the power line. The area following the railway line has some very important heritage sites, such as the Tierkloof Institute and old station buildings, which should be avoided.
    - At present Alternatives 3 and 5 seem to be the most suitable for the development of this corridor.

The following sites and features would in all probability fall inside the 300m corridor:

Code	Classification	Name	Farm	Latitude	Longitude
2724BA002	Historic	Cemetery	Rosendal 673	-27.00903	24.74626
2724BA003	Historic	Cemetery	Middel Rand 820	-27.22934	24.73681
2724BB003	Historic	Tierkloof Institute	Waterloo 730	-27.05568	24.75713
2724BC002	Historic	Graves	Taung 841	-27.44754	24.72918
2724BC003	Historic	Railway house	Taung 841	-27.38811	24.71123
2724BC005	Historic	Cemetery	Taung 841	-27.41942	24.71444

2724BA002

2724BA003

2724BB003

2724BC003	2724BC005

6. COMPARATIVE ASSESSMENT OF ALTERNATIVES

Key

Preferred	The alternative will result in a low impact / reduce the impact
Not Preferred	The alternative will result in a high impact / increase the impact
Favourable	The impact will be relatively insignificant

Alternative	Preference	Reasons
MOOKODI-MAGOPELA POWER LINE		
Corridor Route 1 (pink)	Not Preferred	Large number of heritage features
Corridor Route 2 (purple)	Not preferred	Large number of heritage features
Corridor Route 3 (green)	Preferred	
Corridor Route 4 (blue)	Not Preferred	Large number of heritage features
Corridor Route 5 (blue/green)	Preferred	
BOPHIRIMA-SCHWEIZER POWER LINE		
Corridor Route 1 (pink)	Preferred	
Corridor Route 2 (purple)	Not preferred	Large number of heritage features
Corridor Route 3 (green)	Favourable	
Corridor Route 4 (blue)	Favourable	
MOOKODI-GANYESA POWER LINE		
Corridor Route 1 (pink)	Preferred	
Corridor Route 2 (purple)	Favourable	
Corridor Route 3 (blue)	Favourable	
GANYESA SUBSTATION		
Site Alternative 1	Favourable	No known heritage sites or features
Site Alternative 2	Favourable	No known heritage sites or features
Site Alternative 3	Favourable	No known heritage sites or features
Site Alternative 4	Favourable	No known heritage sites or features

7. SITE SIGNIFICANCE AND ASSESSMENT

7.1 **Heritage assessment criteria and grading**

According to the NHRA, No. 25 of 1999, Section 2(vi), the *significance* of heritage sites and artefacts is determined by it aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technical value in relation to the uniqueness, condition of preservation and research potential.

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.

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 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 application of mitigation measures would allow the development activities to continue.

7.2 **Statement of significance**

In terms of Section 7 of the NHRA, all the sites currently known or which are expected to occur in the study area are evaluated to have Grade III significance with

- Farming and farming related activities, such as farmsteads, stock pens, windmills, etc. would have a high significance on a local level.
- Town/community cemeteries and farm cemeteries would have a high significance on a local level.
- Roadside memorials would have a high significance on a local level.

7.3 **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	**Stone Age**	
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. if the trench cut through a site.	
Extent	Local	
Probability	Possible	
Reversibility	Partly reversible	
Irreplaceable loss of resources	Marginal loss	
Duration	Medium term	
Cumulative effect	Low cumulative effect	
Intensity/magnitude	Medium	
Significance Rating	Sites have a medium significance on a region level – viewed as NHRA Grade III sites.	
	Pre-mitigation impact rating	Post mitigation impact rating
Extent	2	1
Probability	2	1
Reversibility	3	1

Irreplaceable loss	4	1
Duration	4	1
Cumulative effect	2	1
Intensity/magnitude	2	1
Significance rating	34 (Negative low impact)	6 (low negative)
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	**Iron Age**	
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. if the trench cut through a site.	
Extent	Local	
Probability	Possible	
Reversibility	Partly reversible	
Irreplaceable loss of resources	Marginal loss	
Duration	Medium term	
Cumulative effect	Low cumulative effect	
Intensity/magnitude	Medium	
Significance Rating	Sites have a medium significance on a region level – viewed as NHRA Grade III sites.	
	Pre-mitigation impact rating	Post mitigation impact rating
Extent	2	1
Probability	2	1
Reversibility	3	1
Irreplaceable loss	4	1
Duration	4	1
Cumulative effect	2	1
Intensity/magnitude	2	1
Significance rating	34 (Negative low impact)	6 (low negative)
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 Iron Age archaeology.	

Environmental Parameter	**Colonial Period – farmsteads**

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	Possible	
Reversibility	Partly reversible	
Irreplaceable loss of resources	Marginal loss	
Duration	Medium term	
Cumulative effect	Low cumulative effect	
Intensity/magnitude	Medium	
Significance Rating	Sites have a medium significance on a region level – viewed as NHRA Grade III sites.	
	Pre-mitigation impact rating	Post mitigation impact rating
Extent	2	1
Probability	2	1
Reversibility	2	1
Irreplaceable loss	2	1
Duration	2	1
Cumulative effect	2	1
Intensity/magnitude	2	1
Significance rating	24 (Negative low impact)	6 (low negative)
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	**Colonial Period – cemeteries**	
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	Possible	
Reversibility	Partly reversible	
Irreplaceable loss of resources	Marginal loss	
Duration	Medium term	
Cumulative effect	Low cumulative effect	
Intensity/magnitude	Medium	
Significance Rating	Sites have a medium significance on a region level – viewed as NHRA Grade III sites.	
	Pre-mitigation impact rating	Post mitigation impact rating
Extent	2	1
Probability	2	1

Reversibility	2	1
Irreplaceable loss	2	1
Duration	2	1
Cumulative effect	2	1
Intensity/magnitude	2	1
Significance rating	24 (Negative low impact)	6 (low negative)
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.	

8. CONCLUSIONS

The aim of the survey was to broadly identify, evaluate and document sites, objects and structures of cultural significance found within the corridor alternatives in which it is proposed to develop 132kV power lines as well as the substation sites.

The following categories of heritage sites were identified as occurring in the study area:

- Stone Age sites
- Farming and farming related activities, such as farmsteads, stock pens, windmills, etc.
- Buildings and sites of heritage significance in the various towns.
- Elements of local infrastructure such as a railway line and associated stations and other structures.
- Local and private cemeteries.
- Roadside memorials.

Sensitive areas:

- All pans are sensitive as stone tools have been identified to occur on the rim of a number of them. A buffer of 20 metres from the outer edge of the rim of the pan should be created in order not to impact on the stone tools.

- The same hold true for all water courses.

- Many rock outcrops in the region show signs of having being quarried by Stone Age people in order to obtain material for producing stone tools. In addition, in some cases rock engraving occur on some of the outcrops. Therefore, all outcrops should be avoided as far as possible.

- All farmsteads, occupied or not, should be buffered with a no-go zone of at least 100 metres from the last visible feature associated with the farmstead/homestead.

- All cemeteries should have a buffer of at least 20 metres from the outer most graves. Fortunately, many cemeteries are fenced off, which can then be used as a buffer.

- All other features such as bridges, station buildings, etc. should be buffered with a no-go zone of at least 20 metres.

Evaluation:

Proposed 132kV line: Bophirima DS to Schweizer-Reneke

- At present Alternative 1 seem to be the best proposition for the development of this corridor.

- Proposed 132kV line: Mookodi MTS to proposed Ganyesa substation
  - At present all of the Alternatives seem to be suitable for the development of this corridor.
  - At present, all the substation sites seem to be suitable for the proposed development.

- Proposed 132kV line: Mookodi MTS to Magopela
  - At present Alternatives 3 and 5 seem to be the most suitable for the development of this corridor.

Recommendations:

- It is recommended that the preferred Alternatives are subjected to a “walk-down” by a heritage consultant to determine if there are any fatal flaws that would prevent to proposed development from taking place.

9. REFERENCES

9.1 **Data bases**

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Environmental Potential Atlas, Department of Environmental Affairs and Tourism.
Heritage Atlas Database, Pretoria.
National Archives of South Africa
South African Heritage Resources Agency Database

9.2 **Literature**

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Van Riet Lowe, C. n.d. *The distribution of Prehistoric rock engravings and paintings in South Africa*. Archaeological Survey, Archaeological Series No. 7.

9.3 **Maps and aerial photographs**

1: 50 000 Topocadastral maps: 2624BA, 2624BB, 2624DA, 2624DB, 2624DC, 2624DD, 2624BC, 2624BD, 2724BA, 2724BB

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 it 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

1. Historic value			
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			
2. Aesthetic value			
It is important in exhibiting particular aesthetic characteristics valued by a community or cultural group			
3. Scientific value			
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			
4. Social value			
Does it have strong or special association with a particular community or cultural group for social, cultural or spiritual reasons			
5. Rarity			
Does it possess uncommon, rare or endangered aspects of natural or cultural heritage			
6. Representivity			
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.			
7. Sphere of Significance	High	Medium	Low
International			
National			
Provincial			
Regional			
Local			
Specific community			
8. Significance rating of feature			
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.