Heritage impact assessment for the
DEVELOPMENT OF A 132KV ELECTRICITY TRANSMISSION LINE FROM KUDU SUBSTATION TO DORSTFONTEIN SUBSTATION, MUPMULANGA PROVINCE

HERITAGE IMPACT ASSESSMENT FOR THE DEVELOPMENT OF A 132KV ELECTRICITY TRANSMISSION LINE FROM KUDU SUBSTATION TO DORSTFONTEIN SUBSTATION, MUPMULANGA 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
December 2010

EXECUTIVE SUMMARY

HERITAGE IMPACT ASSESSMENT FOR THE DEVELOPMENT OF A 132KV ELECTRICITY TRANSMISSION LINE FROM KUDU SUBSTATION TO DORSTFONTEIN SUBSTATION, MUPMULANGA PROVINCE

Due to an increased demand for electricity arising from expanding mining operations in the region south of Witbank, Mpumalanga, Eskom propose the development of a 132kV transmission line from the Kudu Substation at Komati Power Station to a new substation at Dorstfontein, approximately 15 km to the southwest. For this purpose three different corridors were identified, one of which would be selected for development of the transmission line.

In accordance with Section 38 of the NHRA, an independent heritage consultant was appointed by **SSI Engineers and Environmental Consultants** on behalf of the applicant, Eskom Holdings Limited, to conduct a Heritage Impact Assessment (HIA) as part of an Environmental Impact Assessment (EIA) to assess which of the three proposed corridors would be the most suitable, from an heritage point of view, for the construction of the transmission line.

The aim of this survey was to locate, identify, evaluate and document sites, objects and structures of cultural significance found within the area of the proposed development, to assess the significance thereof and to consider alternatives and plans for the mitigation of any adverse impacts.

A variety of heritage sites have been identified to occur in the region of the proposed development. These range from farmsteads, graves and elements of infrastructural development. Some of these occur in close proximity of the various corridors, but at present it is impossible to determine if any of these would directly be impacted on by the proposed development.

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

- Farmsteads would have a medium significance on a regional level.
- Local and private cemeteries would have a high significance on a local level.
- Infrastructural elements would have a high significance on a regional level.

Based on the above, it is our opinion that any of the three identified corridors would be suitable for the development of the 132kV electricity transmission line as none of the identified sites would prevent the proposed development from continuing as the possibility of the application of mitigation measures are contained in the Heritage Act. However, it is recommended that once the final corridor has been selected, that corridor should be subjected to a full Phase II archaeological survey in accordance with Section 38 of the National Heritage Resources Act.

J A van Schalkwyk
Heritage Consultant
December 2010

TECHNICAL SUMMARY

Property details	
Province	Mpumalanga
Magisterial district	Middelburg & Bethal
Local municipality	Steve Tshwete & Emalahleni
Topo-cadastral map	2629AB
Closest town	Witbank
Farm name	Various

Development criteria	Yes/No
Construction of road, wall, power line, pipeline, canal or other linear form of development or barrier exceeding 300m in length	Yes
Construction of bridge or similar structure exceeding 50m in length	No
Development exceeding 5000 sq m	No
Development involving three or more existing erven or subdivisions	No
Development involving three or more erven or divisions that have been consolidated within past five years	No
Rezoning of site exceeding 10 000 sq m	No
Any other development category, public open space, squares, parks, recreation grounds	No

Development	
Description	Development of an electricity transmission line
Project name	Kudu – Dorstfontein transmission line

Land use	
Previous land use	Farming
Current land use	Farming/mining

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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 (BP)
Middle Stone Age	150 000 - 30 000 BP
Later 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. These people, according to archaeological evidence, spoke early variations of the Bantu Language. Because 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
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 IMPACT ASSESSMENT FOR THE DEVELOPMENT OF A 132KV ELECTRICITY TRANSMISSION LINE FROM KUDU SUBSTATION TO DORSTFONTEIN SUBSTATION, MUPMULANGA PROVINCE

1. INTRODUCTION

Due to an increased demand for electricity arising from expanding mining operations in the region south of Witbank, Mpumalanga, Eskom propose the development of a 132kV transmission line from the Kudu Substation at Komati Power Station to a new substation at Dorstfontein, approximately 15 km to the southwest. For this purpose three different corridors were identified, one of which would be selected for development of the transmission line.

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 site.

Therefore, in accordance with Section 38 of the NHRA, an independent heritage consultant was appointed by **SSI Engineers and Environmental Consultants** on behalf of the applicant, Eskom Holdings Limited, to conduct a Heritage Impact Assessment (HIA) as part of an Environmental Impact Assessment (EIA) to assess which of the three proposed corridors would be the most suitable, from an heritage point of view, for the construction of the transmission line.

2. TERMS OF REFERENCE

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.

Type of study	Aim	SAHRA involved	SAHRA response
Screening	The aim of the screening investigation is to provide an overview of possible heritage-related issues regarding the proposed development by an appropriate heritage specialist. It is based on the review and use of existing heritage data pertaining to the site. The result of this investigation is a brief statement indicating potential heritage impacts/issues and can assist the developer in preliminary planning. This report does grant the developer permission to proceed with the proposed development.	Not necessary	
Scoping (basic assessment)	The aim of the scoping investigation is to provide an informed heritage-related opinion about the proposed development by an appropriate heritage specialist. The objectives are to assess heritage sites and their significance (involving site inspections, existing heritage data); to review the general compatibility of the development proposals with heritage policy and possible heritage features on the site. The result of this investigation is a heritage scoping report indicating the presence/absence of heritage resources and what would be required to manage them in the context of the proposed development. This report does grant the developer permission to proceed with the proposed development.	Not compulsory	
Heritage Impact Assessment	The aim of a full HIA investigation is to provide an informed heritage-related opinion about the proposed development by an appropriate heritage specialist. The objectives are to identify heritage resources (involving site inspections, existing heritage data and additional heritage specialists if necessary); assess their significances; assess alternatives in order to promote heritage conservation issues; and to assess the acceptability of the proposed development from a heritage perspective. The result of this investigation is a heritage impact assessment report indicating the presence/ absence of heritage resources and how to manage them in the context of the proposed development. Depending on SAHRA's acceptance of this report, the developer will receive permission to proceed with the proposed development, on condition of successful implementation of proposed mitigation measures.	Provincial Heritage Resources Authority	Comments on built environment and decision to approve or not
		SAHRA Archaeology, Palaeontology and Meteorites Unit	Comments and decision to approve or not

Table 1: Applicable category of heritage impact assessment study and report.

3. HERITAGE RESOURCES

3.1 **Types of heritage resources**

The National Heritage Resources Act (Act 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.

The above, as well as other criteria, has been formulated in a table (see Appendix 1 below) that is applied to each identified site, in order to evaluate similar sites in a similar manner.

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 (Cloete 2000; De Jong 2009; Praagh 1906; Taylor 1979; Van Schalkwyk 2002, 2007a, 2007b, 2007c, 2009a, 2009b; Wadley & Turner 1987).

- These sources deal mostly with the larger region and contain very little information on the study area specifically.

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 information of a very general nature as well as a number of sites located in the 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 area that had to be investigated was identified by **SSI Engineers and Environmental Consultants** by means of maps. The survey was done by travelling the different corridors as

far as possible. Fortunately, the various corridors follow existing roads for long distances, making the survey easy.

4.3 **Limitations**

The following had a bearing on the survey results:

- As the coordinates for the lines were not available, the different corridors were investigated in a general sense.
- Access to the various properties was not available.
- Dense vegetation limited archaeological visibility to some extent.

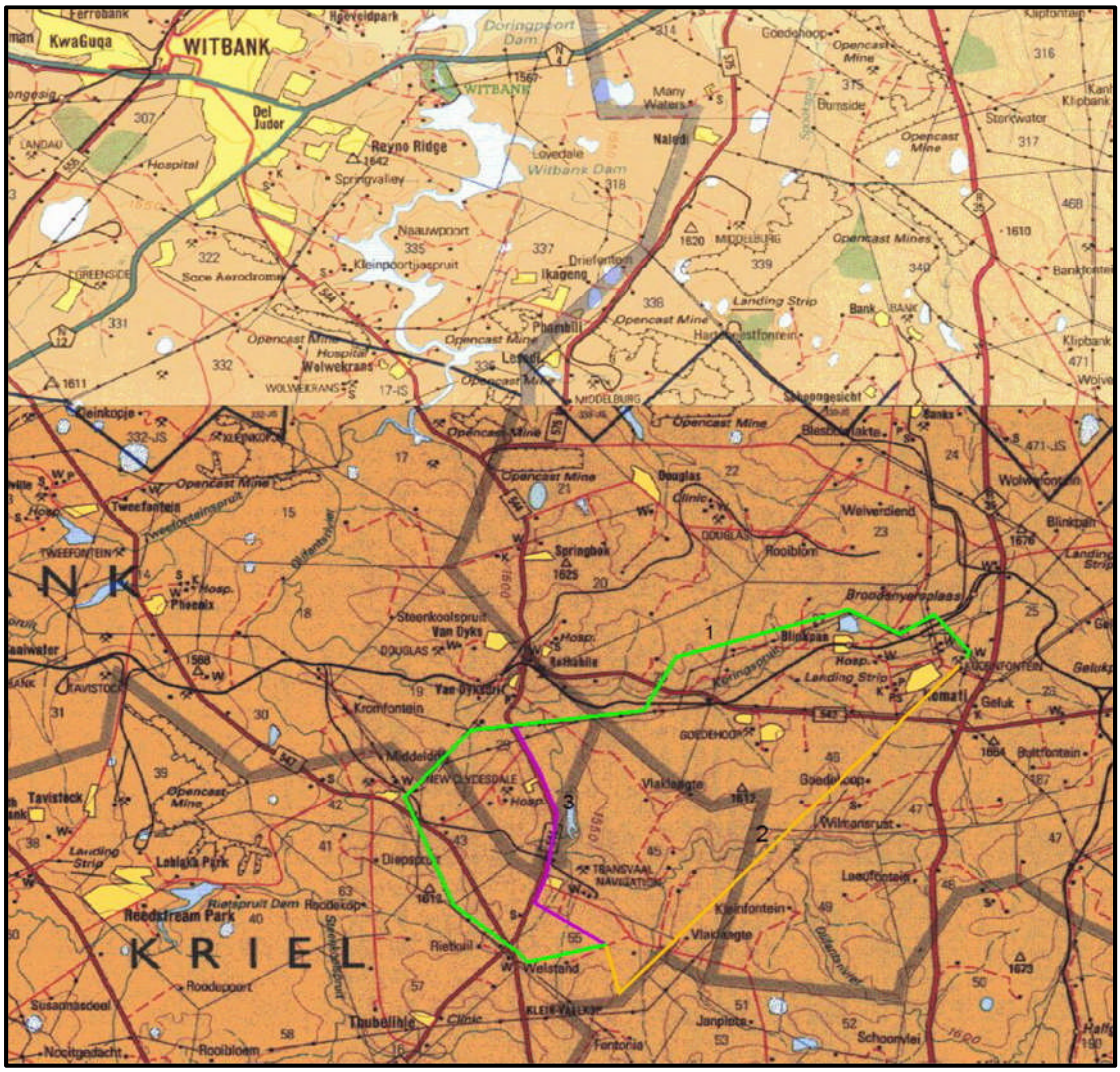
5. DESCRIPTION OF THE AFFECTED ENVIRONMENT

5.1 **Site location and description**

The study area is located south of the town of Witbank and northeast of Kriel in the Witbank and Bethal magisterial districts of Mpumalanga Province. For more information, please see the Technical summary presented above (see also Fig. 1 & 2).

The geology is made up of arenite. The original vegetation is classified as Moist Sandy Highveld Grassland. Most of the area has been subjected to agricultural and forestry activities. No outcrops, hills, caves or streams that usually drew people to settle in its vicinity occur in the study area.

The current land use in the area is farming, with most of the original vegetation replaced by agricultural activities. Some areas have been altered by mining activities, which altered the environment and would have destroyed any heritage feature that might have existed here.



Fig, 1. The study area in regional context.
(Maps 2528, 2628: Chief Surveyor-General)

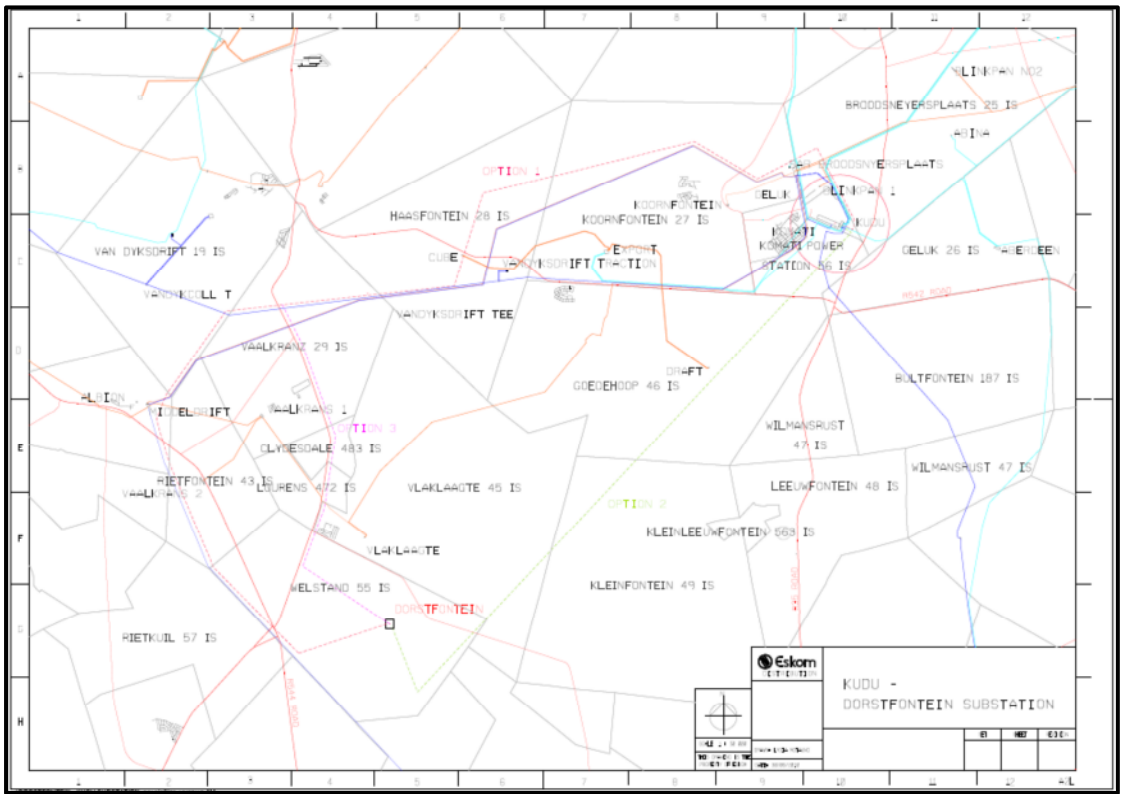


Fig. 2. Location of the different corridors.

5.2 **Regional overview**

Stone Age

Very little habitation of the 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 in sheltered areas such as the Magaliesberg. During Middle Stone Age (MSA) times (c. 150 000 – 30 000 BP), people became more mobile, occupying areas formerly avoided. 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. Open sites were still preferred near watercourses.

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 vary from sealed (i.e. cave) sites, located to the south of the study area (Wadley & Turner 1987), to open sites near the Vaal River. Also, for the first time we 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.

Iron Age

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 the Mpumalanga highveld.

This wet period came to a sudden end sometime between 1800 and 1820 by a major drought lasting 3 to 5 years. The drought must have caused an agricultural collapse on a large, subcontinent scale.

This was also a period of great military tension. Military pressure from Zululand spilled onto the highveld by at least 1821. Various marauding groups of displaced Sotho-Tswana moved across the plateau in the 1820s. Mzilikazi raided the plateau extensively between 1825 and 1837. The Boers trekked into this area in the 1830s. And throughout this time settled communities of Tswana people also attacked each other.

As a result of this troubled period, Sotho-Tswana people concentrated into large towns for defensive purposes. Because of the lack of trees they built their settlements in stone. These stone-walled villages were almost always located near cultivatable soil and a source of water. Such sites are known to occur near Kriel (e.g. Pelser et al 2006) and to the south (Taylor 1979).

Historic period

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 until the discovered of coal and later gold. The establishment of the NZASM railway line in the 1880s, linking Pretoria with Lourenço Marques and the world at large, brought much infra-structural and administrative development to the area. This railway line also became the scene of many battles during the Anglo-Boer War and after the battle of Bakenlaagte (30 October 1901) the Clewer station served as hospital for the wounded British soldiers. A concentration camp was established near the Balmoral station, northwest of the study area. battles took place in the region. The battle closest to the study area took place on the farm Wilmansrust, a short distance to the southeast, in June 1901. During this clash, more than 50 British troops were killed (Cloete 2000). In line with the 'scorched earth' policy, most farmsteads were destroyed by the British during the latter part of the hostilities.

Coal mining occurred only sporadically in the area. However, with the discovery of the Witwatersrand gold fields, the need for a source of cheap energy became important, and coal mining developed on a large scale in various regions. By 1899, at least four collieries were operating in the Middelburg-Witbank district, supplying the gold mining industry (Praagh 1906).

Old mining related settlements occur in the region. These are Albion Collieries, New Clydesdale Colliery and Transvaal Navigation Collieries. All of them go back to the 1940s and even earlier. What is problematic is that they are now being demolished by mining companies, probably without the necessary permits.

5.3 **Identified sites**

For more information, please see the map in Appendix 3.

5.3.1 *Stone Age*

- No sites, features or objects dating to the Stone Age were identified in the study area.

5.3 2 *Iron Age*

- No sites, features or objects dating to the Iron Age were identified in the study area.

5.3.3 *Historic period*

A variety of sites dating to the historic period were identified in the study area. These range from:

- Farmsteads, consisting of houses, outbuildings and farming related structures. Most of these are probably not older than 60 years, although some would incorporate features that might be older, e.g. old sheds, etc. A permit would be required from SAHRA before they can be destroyed.

- Informal cemeteries associated with the land owners or their labourers. These features occur sporadically in the environment and are in some cases difficult to detect. As some of them can be older than 60 years (graves as well as headstones), a permit would be required from SAHRA to relocate them. That is, apart from other permits from the police, Department of Health, etc.

- Infra-structural elements, such as power lines, railway lines, bridges, etc. It is difficult to determine the date of these features, but they are probably very close to the cut-off point of 60 years. It would therefore be important to document it before destroying it.

- Old mining related settlements occur in the region. These are Albion Collieries, New Clydesdale Colliery and Transvaal Navigation Collieries. All of them go back to the 1940s and even earlier. What is problematic is that they are now being demolished by mining companies, probably without the necessary permits. However, it is doubtful if the proposed power line would have an impact on any of them.

Fig. 3. Examples of the type of heritage features identified in the region.
Farmsteads, cemeteries, the only remains of the Albion Collieries are trees and roads, old bridges and power line towers.

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.

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

6.2 **Statement of significance**

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

- Farmsteads would have a medium significance on a regional level.
- Local and private cemeteries would have a high significance on a local level.
- Infrastructural elements would have a high significance on a regional level.

Identified heritage resources	
Category, according to NHRA	*Identification/Description*
Formal protections (NHRA)	
National heritage site (Section 27)	None
Provincial heritage site (Section 27)	None
Provisional protection (Section 29)	None
Place listed in heritage register (Section 30)	None
General protections (NHRA)	
structures older than 60 years (Section 34)	Yes
archaeological site or material (Section 35)	None
palaeontological site or material (Section 35)	None
graves or burial grounds (Section 36)	Yes

public monuments or memorials (Section 37)	Yes
Other	
Any other heritage resources (describe)	None

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

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.

Prediction of impacts (before mitigation)

Impact	Nature	Intensity	Extent	Duration	Probability	Confidence
Destruction of heritage resources	Negative	Medium	Local	Permanent	Probable	High

Prediction of impacts (after mitigation)

Impact	Nature	Intensity	Extent	Duration	Probability	Confidence
Destruction of heritage resources	Negative	High	Local	Permanent	Probable	High
With mitigation	Negative	Low	Local	Permanent	Improbable	High

Assigning a consequence rating

Impact	Nature	Consequence	Probability	Confidence
Destruction of heritage resources	Negative	Medium	Improbable	High
With mitigation	Negative	Low	Improbable	High

Assigning a significance rating

Impact	Consequence	Probability	Significance	Confidence
Destruction of heritage resources	Medium	Improbable	Low	High
With mitigation	Low	Improbable	Low	High

- From the above, it can be seen that the impact on the sites would be of medium consequence, but would be rated as low after the application of mitigation measures.

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 development can be excavated/recorded and a management plan can be developed for future action. Those sites that are not impacted can be written into the management plan, whence they can be avoided or cared for in the future.

Impact analysis and resultant management of cultural resources under threat of the proposed development, are based on the present understanding of the construction and operation of a power line. The following objectives and design standards, if adhered to, can eliminate, minimise or enhance potential impacts.

- The developer must ensure that an archaeologist inspects the total route of the power line. If the power line impacts on a heritage site but cannot be shifted, mitigation measures, i.e. the controlled excavation of the site prior to development, can be implemented. This can only be done by a qualified archaeologist after obtaining a valid permit from the PHRA (Provincial Heritage Resources Agency).

- The same action holds true for any infrastructure development such as access routes, construction campsites, etc.

- In the past, people used to settle near water sources. Therefore riverbanks, rims of pans and smaller watercourses should be avoided as far as possible.

- In this particular part of the country, Iron Age people also preferred to settle on the saddle (or neck) between mountains (hills/outcrops). These areas should also be avoided.

- Avoid all patches bare of vegetation unless previously inspected by an archaeologist. These might be old settlement sites.

- Rock outcrops might contain rock shelters, engravings or stone walled settlements, and should therefore be avoided unless previously inspected by an archaeologist.

- Communities living close to the proposed corridor should be consulted as to the existence of sites of cultural significance, e.g. graves, as well as sites that do not show any structures but have emotional significance, such as battlefields, etc.

- All graves or cemeteries should be avoided, unless when totally impossible. The correct procedure, i.e. notification of intent to relocate them, consultation with descendants and permit application, should then be followed in relocating the graves. If any of the graves are older than 60 years, they can only be exhumed by an archaeologist. Graves of victims of conflict requires additional permits from SAHRA before they can be relocated.

- Heritage sites and features located in close proximity of the proposed development should be clearly demarcated (e.g. with danger tape) and declared as no-go zones for the duration of the construction activities.

- Archaeological material, by its very nature, occurs below ground. The developer should therefore keep in mind that archaeological sites might be exposed during the construction work. If anything is noticed, work in that area should be stopped and the occurrence should immediately be reported to a heritage practitioner who should then investigate and evaluate the find.

- Any mitigation measures applied by an archaeologist, in the sense of excavation and documentation, should be published in order to bring this information into the public domain.

8. CONCLUSIONS

The aim of this survey was to locate, identify, evaluate and document sites, objects and structures of cultural significance found within the area of the proposed development, to

assess the significance thereof and to consider alternatives and plans for the mitigation of any adverse impacts.

A variety of heritage sites have been identified to occur in the region of the proposed development. These range from farmsteads, graves and elements of infrastructural development. Some of these occur in close proximity of the various corridors, but at present it is impossible to determine if any of these would directly be impacted on by the proposed development.

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

- Farmsteads would have a medium significance on a regional level.
- Local and private cemeteries would have a high significance on a local level.
- Infrastructural elements would have a high significance on a regional level.

Based on the above, it is our opinion that any of the three identified corridors would be suitable for the development of the 132kV electricity transmission line as none of the identified sites would prevent the proposed development from continuing as the possibility of the application of mitigation measures are contained in the Heritage Act. However, it is recommended that once the final corridor has been selected, that corridor should be subjected to a full Phase II archaeological survey in accordance with Section 38 of the National Heritage Resources Act.

9. REFERENCES

9.1 **Data bases**

Chief Surveyor General
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Heritage Atlas Database, Pretoria.
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9.3 **Maps and aerial photographs**

1: 50 000 Topocadastral maps: 2629AB
Google Earth

APPENDIX 1: CONVENTIONS USED TO ASSESS THE IMPACT OF PROJECTS ON 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		

Significance of impact:

- low where the impact will not have an influence on or require to be significantly accommodated in the project design
- medium where the impact could have an influence which will require modification of the project design or alternative mitigation
- high where it would have a "no-go" implication on the project regardless of any mitigation

Certainty of prediction:

- Definite: More than 90% sure of a particular fact. Substantial supportive data to verify assessment
- Probable: More than 70% sure of a particular fact, or of the likelihood of that impact occurring
- Possible: Only more than 40% sure of a particular fact, or of the likelihood of an impact occurring
- Unsure: Less than 40% sure of a particular fact, or the likelihood of an impact occurring

Recommended management action:

For each impact, the recommended practically attainable mitigation actions which would result in a measurable reduction of the impact, must be identified. This is expressed according to the following:

1 = no further investigation/action necessary
2 = controlled sampling and/or mapping of the site necessary
3 = preserve site if possible, otherwise extensive salvage excavation and/or mapping necessary
4 = preserve site at all costs
5 = retain graves

Legal requirements:

Identify and list the specific legislation and permit requirements which potentially could be infringed upon by the proposed project, if mitigation is necessary.

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: SURVEY RESULTS

See Appendix 1 for an explanation of the conventions used in assessing the significance of the cultural remains.

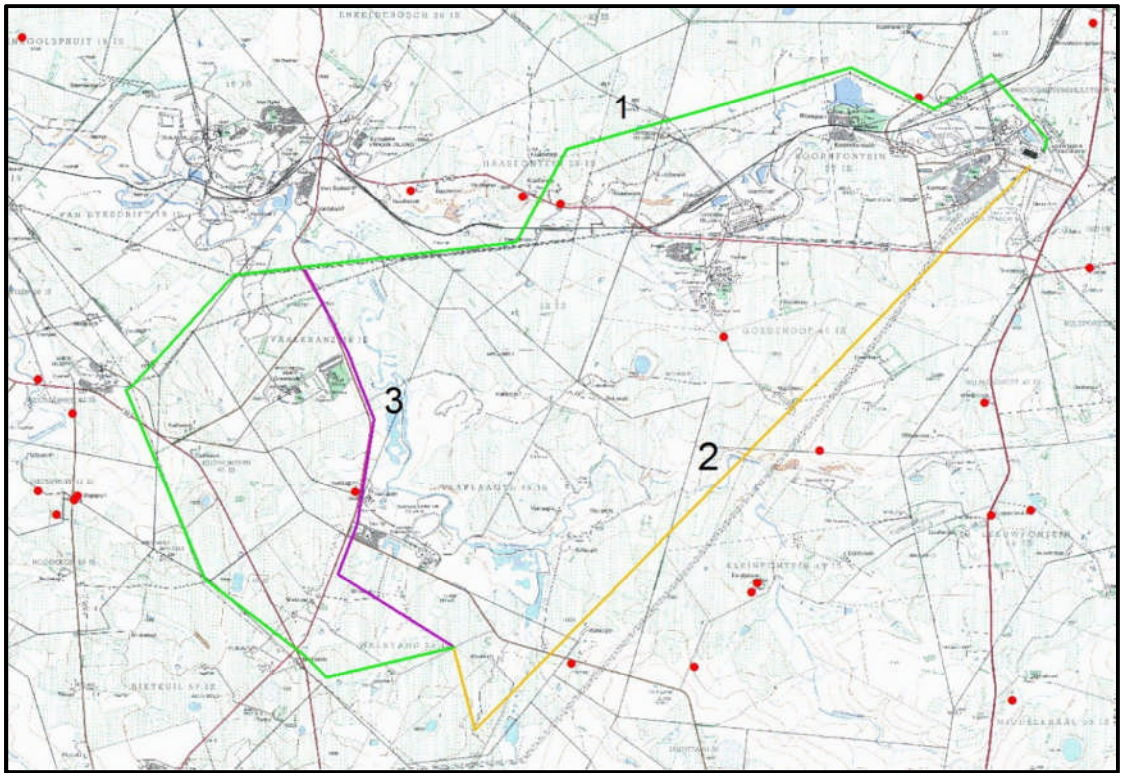

Fig. 5. Map showing the location of known heritage features in the region.