

**Cultural heritage impact assessment for
THE PROPOSED DEVELOPMENT OF THE BRAVO 3 POWER LINE, KUSILE
POWER STATION TO LULAMISA SUBSTATION, MPUMALANGA AND
GAUTENG PROVINCES**

CULTURAL HERITAGE IMPACT ASSESSMENT FOR THE PROPOSED DEVELOPMENT OF THE BRAVO 3 POWER LINE, KUSILE POWER STATION TO LULAMISA SUBSTATION, MPUMALANGA AND GAUTENG 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, for which a fair numeration is charged.



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May 2016

EXECUTIVE SUMMARY

CULTURAL HERITAGE IMPACT ASSESSMENT FOR THE PROPOSED DEVELOPMENT OF THE BRAVO 3 POWER LINE, KUSILE POWER STATION TO LULAMISA SUBSTATION, MPUMALANGA AND GAUTENG PROVINCES

The growing demand for electricity is placing increasing pressure on Eskom's existing power generation and transmission capacity. Eskom (SOC) is committed to implementing a Sustainable Energy Strategy that complements the policies and strategies of National Government. Eskom aims to improve the reliability of electricity supply to the country, and in particular to provide for the growth in electricity demand in the Gauteng and Mpumalanga provinces. For this reason, Eskom obtained environmental authorisation to construct the new 400 kV Bravo (Kusile) coal-fired Power Station between Bronkhorstspuit and Witbank in 2007. Construction of the Kusile power station has already commenced. Due to this construction, the new Bravo Power Station needs to be integrated with the existing Eskom electricity infrastructure.

In this regard Eskom also obtained environmental authorization on 09 October 2009 from the Department of Environmental Affairs (DEA) for the construction of a new 400kV power line from Bravo Power Station to the Lulamisa substation (Reference No. 12/12/20/1097).

Eskom has appointed Envirolution Consulting as independent environmental consultants, to undertake the Basic Assessment and Environmental Management Programme (EMPr) process. The main objective of the Basic Assessment and EMPr is to identify and assess potential environmental impacts associated with the proposed project, and to compile appropriate mitigation measures

In accordance with Section 38 of the NHRA, an independent heritage consultant was appointed by Envirolution Consulting to conduct a cultural heritage assessment of the identified towers to determine if the proposed development would have an impact on any sites, features or objects of cultural heritage significance. An original scoping assessment of the proposed power line route was done in 2008 (Pistorius 2008).

At this stage only a line route has been confirmed as negotiations are not complete with relevant landowners and therefore tower positions are not available as yet. The results of this survey should therefore be viewed as tentative in nature.

From the available published and unpublished reports on the cultural heritage resources of region, as well as the field survey, it was revealed the region does have a high potential for heritage sites:

- Only a few sites dating to the Stone Age have been documented in the region; no reports of substantial surface finds of stone tools are known;
- Iron Age settlement took place on a large scale, mostly situated in the mountain ranges, e.g. Magaliesberg and Bronberg. These sites are characterised by stone walling and mostly date to the Late Iron Age.
- As the region is densely populated, a wide range of heritage dating to the recent past occurs in the region. These include farmsteads, formal and informal burial sites as well as elements of infrastructure development, e.g. bridges.
 - ***During the field survey it was determined that a significant number of heritage sites and features that were identified in the past, has since disappeared, mostly due to development that took place in its vicinity.***
 - ***Other sites were extremely difficult to identify.***

Impact assessment

Number	Name	Latitude	Longitude	Distance	Significance impact
2528DD008	Farmstead	-25.90029	28.90524	500m	Low
2528DC036	Cemetery	-25.86779	28.53676	450m	Low
2528DC043	Cemetery	-25.84686	28.62822	650m	Low
2528CD020	Iron Age	-25.89889	28.43750	600m	Low
2528CD021	Iron Age	-25.89833	28.43833	600m	Low
2528CD029	Iron Age	-25.89222	28.42806	400m	Low
2528CD099	Cemetery	-25.91484	28.32417	75m	Medium
2528CD118	Cemetery	-25.90844	28.34064	480m	Low
2528CD130	Cemetery	-25.93010	28.27314	400m	Low
2528CC121	Homestead	-25.91889	28.19750	0m	High
2528CC140	Farmhouse	-25.95691	28.00877	0m	High
2528CC141	Cemetery	-25.95607	28.01042	50m	High
2528CC180	Graves	-25.95640	28.01280	190m	Medium
JCC301	Stone walling	-25.88292	28.44958	0m	High
JCC305	Monument	-25.84005	28.74107	2100m	Low
JCC307	Graves	-25.85983	28.67475	305m	Low
JCC309	Graves	-25.86756	28.89264	200m	Low
JCC310	Graves	-25.86625	28.89047	60m	Medium
JCC311	Graves	-25.86517	28.88617	70m	Medium

- The impacts of the proposed development could be direct or physical but will not be indirect and cumulative.
 - Some informal burial places as well as old settlement sites (homesteads) occur in close proximity of the proposed power line route. These should either be avoided or professionally investigated prior to the construction of the power line.
 - The sites should be isolated by fencing them off with danger tape, leaving a buffer of at least 10m from the outer edge of the site. If the site cannot be avoided, the site should be investigated and documented by archaeologists. If it is a burial place, the graves should be relocated on condition of following the correct procedures (see Appendix 4)

Reasoned opinion as to whether the proposed activity should be authorised:

- From a heritage point of view it is recommended that the proposed development be allowed to continue on acceptance of the proposed mitigation measures.

Conditions for inclusion in the environmental authorisation:

- Should archaeological sites or graves be exposed during construction work, it must immediately be reported to a heritage practitioner so that an investigation and evaluation of the finds can be made.



J A van Schalkwyk
Heritage Consultant
May 2016

TECHNICAL SUMMARY

Property details	
Province	Mpumalanga, Gauteng
Magisterial district	Witbank, Highveld Ridge, Standerton
Local municipality	Ekurhuleni
Topo-cadastral map	2528CC, 2528CD, 2528DC, 2528DD, 2527DD
Farm name	-
Closest town	Pretoria

Development criteria in terms of Section 38(1) of the NHR Act	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	Construction of a 400kV power line
Project name	Bravo 4

Land use	
Previous land use	Farming
Current land use	Farming/Urban

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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
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. 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
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

CULTURAL HERITAGE IMPACT ASSESSMENT FOR THE PROPOSED DEVELOPMENT OF THE BRAVO 3 POWER LINE, KUSILE POWER STATION TO LULAMISA SUBSTATION, MPUMALANGA AND GAUTENG PROVINCES

1. INTRODUCTION

The growing demand for electricity is placing increasing pressure on Eskom's existing power generation and transmission capacity. Eskom (SOC) is committed to implementing a Sustainable Energy Strategy that complements the policies and strategies of National Government. Eskom aims to improve the reliability of electricity supply to the country, and in particular to provide for the growth in electricity demand in the Gauteng and Mpumalanga provinces. For this reason, Eskom obtained environmental authorisation to construct the new 400 kV Bravo (Kusile) coal-fired Power Station between Bronkhorstspuit and Witbank in 2007. Construction of the Kusile power station has already commenced. Due to this construction, the new Bravo Power Station needs to be integrated with the existing Eskom electricity infrastructure.

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Eskom has appointed Envirolution Consulting as independent environmental consultants, to undertake the Basic Assessment and Environmental Management Programme (EMPr) process. The main objective of the Basic Assessment and EMPr is to identify and assess potential environmental impacts associated with the proposed project, and to compile appropriate mitigation measures

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 Envirolution Consulting to conduct a cultural heritage assessment of the identified towers to determine if the proposed development would have an impact on any sites, features or objects of cultural heritage significance. An original scoping assessment of the proposed power line route was done in 2008 (Pistorius 2008).

This report forms part of the Environmental Impact Assessment (EIA) as required by the EIA Regulations in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) as amended and is intended for submission to the South African Heritage Resources Agency (SAHRA).

2. TERMS OF REFERENCE

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.

2.1 Scope of work

The aim of this study is to determine if any sites, features or objects of cultural heritage significance occur within the boundary of the proposed power line development.

This includes:

- Conducting a desk-top investigation of the area;
- A visit to the proposed development site.

The objectives were to:

- Identify possible archaeological, cultural and historic sites within the proposed development areas;
- 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:

- Access to the some properties could not be attained.
- It is assumed that the description of the proposed project, provided by the client, is accurate.
- No subsurface investigation (i.e. excavations or sampling) were undertaken, since a permit from SAHRA is required for such activities.
- It is assumed that the public consultation process undertaken as part of the Environmental Impact Assessment (EIA) is sufficient and that it does not have to be repeated as part of the heritage impact assessment.
- The unpredictability of buried archaeological remains.
- This report does not consider the palaeontological potential of the site.

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 6 below and illustrated in Figure 3.

4.2 Methodology

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 in Section 10.

- 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* and the *National Archives of South Africa* 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 were obtained from these sources

4.2.2 Field survey

The field survey was done according to generally accepted archaeological practices, and was aimed at locating all possible sites, objects and structures. The area that had to be investigated was identified by Envirolution Consulting by means of maps and .kml files indicating the development area. This was loaded onto a Nexus 7 tablet and used in Google Earth during the field survey to access the areas.

The site was visited on 30 May and 31 May 2016. The power line route was accessed by farm tracks and by walking.

The following is relevant to the field survey:

- An exhaustive review of the available published and unpublished reports on the cultural heritage resources potential of region was done (De Jong 2008; Pistorius 2008; Van Schalkwyk 1998, 2002, 2003, 2004, 2006, 2010, 2012, 2013, 2015). This revealed the fact that the region have a high potential for heritage sites:
 - Only a few sites dating to the Stone Age have been documented in the region; no reports of substantial surface finds of stone tools are known;
 - Iron Age settlement took place on a large scale, mostly situated in the mountain ranges, e.g. Magaliesberg and Bronberg. These sites are characterised by stone walling and mostly date to the Late Iron Age.

- As the region is densely populated, a wide range of heritage dating to the recent past occurs in the region. These include farmsteads, formal and informal burial sites as well as elements of infrastructure development, e.g. bridges.
- **During the field survey it was determined that a significant number of heritage sites and features that were identified in the past, has since disappeared, mostly due to development that took place in its vicinity – see Figure 1 below.**
- **Other sites were extremely difficult to identify as the picture below indicate (Fig 1).**



Fig. 1. Field survey issues.

4.2.3 Documentation

All sites, objects and structures that are identified are documented according to the general minimum standards accepted by the archaeological profession. Coordinates of individual localities are determined by means of the *Global Positioning System* (GPS) and plotted on a map. This information is added to the description in order to facilitate the identification of each locality.

The track log and identified sites were recorded by means of a Garmin Oregon 550 handheld GPS device. Photographic recording was done by means of a Canon EOS 550D digital camera.

Map datum used: Hartebeeshoek 94 (WGS84).

5. SITE SIGNIFICANCE AND ASSESSMENT

5.1 Heritage assessment criteria and grading

The National Heritage Resources Act, Act no. 25 of 1999, stipulates the assessment criteria and grading of heritage sites. The following grading 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.

A matrix was developed whereby the criteria, as set out in Sections 3(3) and 7 of the NHRA, 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 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.

5.2 Methodology for the assessment of potential impacts

All impacts identified during the EIA stage of the study will be classified in terms of their significance. Issues were assessed in terms of the following criteria:

- The **nature**, a description of what causes the effect, what will be affected and how it will be affected;
- The physical **extent**, wherein it is indicated whether:
 - 1 - the impact will be limited to the site;
 - 2 - the impact will be limited to the local area;
 - 3 - the impact will be limited to the region;
 - 4 - the impact will be national; or
 - 5 - the impact will be international;
- The **duration**, wherein it is indicated whether the lifetime of the impact will be:
 - 1 - of a very short duration (0–1 years);
 - 2 - of a short duration (2-5 years);
 - 3 - medium-term (5–15 years);
 - 4 - long term (> 15 years); or
 - 5 - permanent;
- The **magnitude** of impact, quantified on a scale from 0-10, where a score is assigned:
 - 0 - small and will have no effect;
 - 2 - minor and will not result in an impact;
 - 4 - low and will cause a slight impact;
 - 6 - moderate and will result in processes continuing but in a modified way;
 - 8 – high, (processes are altered to the extent that they temporarily cease); or
 - 10 - very high and results in complete destruction of patterns and permanent cessation of processes;
- The **probability** of occurrence, which describes the likelihood of the impact actually occurring and is estimated on a scale where:
 - 1 - very improbable (probably will not happen);
 - 2 - improbable (some possibility, but low likelihood);
 - 3 - probable (distinct possibility);
 - 4 - highly probable (most likely); or
 - 5 - definite (impact will occur regardless of any prevention measures);
- The **significance**, which is determined through a synthesis of the characteristics described above (refer formula below) and can be assessed as low, medium or high;
- The **status**, which is described as either positive, negative or neutral;
- The degree to which the impact can be reversed;
- The degree to which the impact may cause irreplaceable loss of resources; and
- The degree to which the impact can be mitigated.

The **significance** is determined by combining the criteria in the following formula:

S = (E+D+M) x P; where
 S = Significance weighting
 E = Extent
 D = Duration
 M = Magnitude
 P = Probability

The **significance weightings** for each potential impact are calculated as follows:

Table 1: Significance ranking

Significance of impact					
Extent	Duration	Magnitude	Probability	Significance	Weight
-	-	-	-	-	-

Points	Significant Weighting	Discussion
< 30 points	Low	where this impact would not have a direct influence on the decision to develop in the area
31-60 points	Medium	where the impact could influence the decision to develop in the area unless it is effectively mitigated
> 60 points	High	where the impact must have an influence on the decision process to develop in the area

6. PROJECT DESCRIPTION

6.1 Site location and development proposal

The project involves the construction of a new 400kV power line from the Bravo (Kusile) Power Station to the Lulamisa Substation (near Kyalami), over a distance of approximately 90km. At this stage only a line route has been confirmed as negotiations are not complete with relevant landowners and therefore tower positions are not available as yet. For more information, please see the Technical Summary presented above (p. iv).

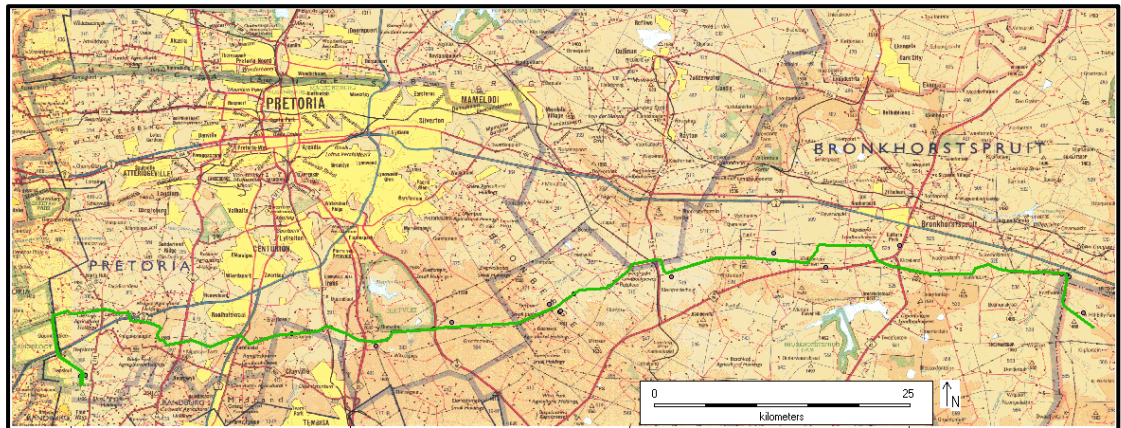


Fig. 2. Location of the study area in a regional context.

7. DESCRIPTION OF THE AFFECTED ENVIRONMENT

7.1 Regional overview

7.1.1 Stone Age

Stone tools dating to the various phases of the Stone Age occur all over the region. Stone Age tools associated with the Early and Middle Stone Age are common in the area, especially along the spruits and rivers where they cut through ridges and at the lower parts of the ridges and larger outcrops. These are viewed as find spots rather than sites per se. That means that as most of these are surface finds, they are viewed to be out of context and do not have any significance. Only a few stratified sites are known in the Magaliesberg range, but even these have little significance as the deposits have either eroded away, or have been impacted upon by later occupants of the shelters. However, this does not mean that the discovery of new sites can be ruled out.

7.1.2 Iron Age

Sites dating to the Late Iron Age are found all over. Some of them can be related to the Tswana-speakers, whereas others to the Ndebele-speakers and possibly a few also to the Ndebele of Mzilikazi. However, this still needs to be researched in more detail.

The Iron Age sites tend to cluster in the Bronberg as well as on the more open flatlands, especially in areas where outcrops (dolorite, etc.) occur. It is possible, although not yet proven, that this distinction can be linked to the difference between the Sotho and Ndebele referred to above. Some engravings, attributed to either the Stone Age or Iron Age occur on the farm Mooiplaats.

Occupation of Midrand by the first groups of Iron Age settlers began some 1600 years ago. These people spoke Bantu languages, such as Tswana, kept domesticated animals, grew crops and manufactured pots and iron implements. Like the Stone Age people, they also hunted and gathered edible plants. A site such as The Boulders was probably occupied by early Iron Age groups between 350 and 600 AD, followed by new periods of settlement by Tswana-speaking groups since the early 16th century. Like the Stone Age people, the Iron Age communities often favoured sheltered places, as is evidenced by their occupation of Glenferness Cave. The San, who were basically Late Stone Age people, were not displaced immediately, as is evidenced by their probable occupation of The Boulders between 1100 and 1200 AD, and for many centuries they lived side by side with the Iron Age settlers.

7.1.3 Historical period

Early white farmers selected farms (such as Mooiplaats) and then provided a description of the farm to the local landdrost, who noted the detail in a registration book and gave the claimant a copy. Claimed land was then inspected before a title and deed were issued (Fig. 9). Since the registration of land entailed registration costs and annual land taxes, it was often delayed as long as possible. As a result, the registration of land claimed on the basis of burgher rights continued well into the 1890s.

The government of the Transvaal Boer republic (ZAR) granted the original farm Mooiplaats (then known as Mooiplaats 502) to PJ Joubert on 13 March 1860. This PJ Joubert could have been the later General Piet Joubert. The farm was properly surveyed by MH Walker in 1893.

Very few, if any resources that can be ascribed to early white settlement in the area are still in existence. It is possible that a more intensive survey would reveal a number, such as the farm buildings at "Friesland" on the farm Zwartkoppies.

Of course, this was also the area over which the British troops advanced during the 2nd Anglo-Boer War, before engaging in battle, on 11 and 12 June 1900, that was later to become known as the "Battle of Diamond Hill" or, the "Slag van Donkerhoek". It was one of the largest battles that took place during the war and the remains of gun placements, trenches and fortifications can still be found, however, mostly to the east of the study area.

Since its founding in 1855, urban development of Pretoria remained concentrated in the central area around Church Square. Elsewhere, settlement was mainly agricultural, characterized by the subdivision of the original farms to accommodate children. During the 1940-1950 era there was a large increase in the urban population and many new suburbs were developed on the periphery of the urban area.

In the 1820s the first white people appeared on the scene, hunters, traders, missionaries and other travellers. Permanent occupation by whites began in the early 1840s, when Voortrekker farmers such as Frederik Andries Strydom and Johannes Elardus Erasmus established the farms Olifantsfontein and Randjesfontein respectively. These early white settlers and their descendants were buried on their farms, and it is thus important to preserve these burial sites where history has been written into stone. Elements of the original farmsteads have survived and should also be recorded and preserved for posterity.

Gradually the entire area was divided into farms, often with names which describe the local geographical conditions: Blue Hills, Witbos, Witpoort, Kaalfontein, Waterval, Zevenfontein, Witsloot, Diepsloot, and others. However, it was only since the 1880s that these farms were formally surveyed and mapped, and when not only their names, but also the names of rivers (Kaalspruit, Jukskei, etc) and other features became permanent fixtures on maps.

Parallel with urban development was the development and settlement of smallholdings around the urban centres. Agricultural smallholdings developed in the Transvaal after World War I, but a real increase in the number of smallholdings only took place between 1935 and 1939. The establishment and proclamation of smallholding settlements was regulated by national (1919) and provincial (1931) legislation. Beginning with Pumulani, Montana and Onderstepoort in 1951, the 1950s saw the start of an increase in the number of new smallholdings proclaimed in terms of the above legislation. Smallholdings, such as Montana, Olympus and Willow Glen, eventually grew into proper residential suburbs. On Mooiplaats and adjacent farms such as Kleinfontein, Zwavelpoort, Boschkop and Rietfontein, more smallholdings sprung up in the 1960s, falling under the jurisdiction of the Transvaal Peri-Urban Areas Health Board (De Jong 2008).

Apart from the Pretoria East cemetery, a number of smaller, informal cemeteries were also identified. These are mostly overgrown or hidden away in inaccessible area.

Until well into the 20th century, the development of Midrand was determined by local agriculture. The original farms, which became more and more subdivided as the number of farmers increased, supplied food and fibre to the burgeoning populations of Pretoria in the north and the Witwatersrand in the south. The practice of burying farmers and their workers on or near the farms and smallholdings continued, and a number of small graveyards in Midrand date back to this period. Of the 19th and early 20th century farmsteads, only a few have survived, for example Bibury Grange, Blue Hills, Kaalfontein and possibly one in Halfway Gardens. Also dating back to the 1890s is Helderfontein, later extensively redesigned by Sir Herbert Baker.

The Anglo-Boer War (1899-1902) also touched Midrand, and for a short period it was a key focus of the British war effort, when the British forces under Lord Roberts advanced through Midrand from Johannesburg en route to Pretoria, which was occupied on 5 June 1900. A few British military units were stationed in the Midrand area, for example at the present Escom Training Centre, and at Bibury Grange.

Pretoria and Johannesburg were connected by stage-coach and post-cart services in the 1880s, and a stop-over station where horse and mule teams could be changed and

passengers could rest was developed midway between the two towns. This facility became known as the 'Halfway House'. It gave rise to the establishment of a hotel (with the inevitable pub) and a post-office in 1889. A year later, when it was predicted that the proposed railway line between the Witwatersrand and Pretoria would pass Halfway House, a township, known as 'Waterval Mooigelegen', was surveyed, which made provision for a station, government offices, shops and a market. However, the railway bypassed Halfway House to the east, and thus Midrand's first railway station was opened on the farm Olifantsfontein in 1892.

Halfway House became a town in 1920, and in 1925 Halfway House Estate was established. However, development was slow, and Halfway House remained a one-horse town for decades to come. Real industrial, commercial and residential development, as symbolised by the opening of a post-office in 1939, only began in the late 1930s as a result of Halfway House's central and accessible location in the heart of Gauteng. The post-office was demolished in 1987.

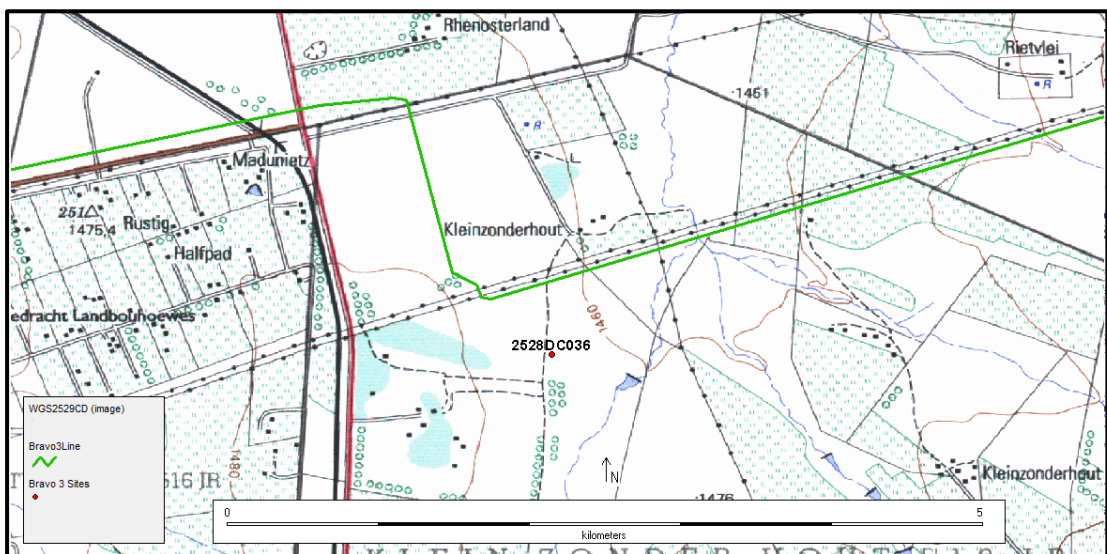
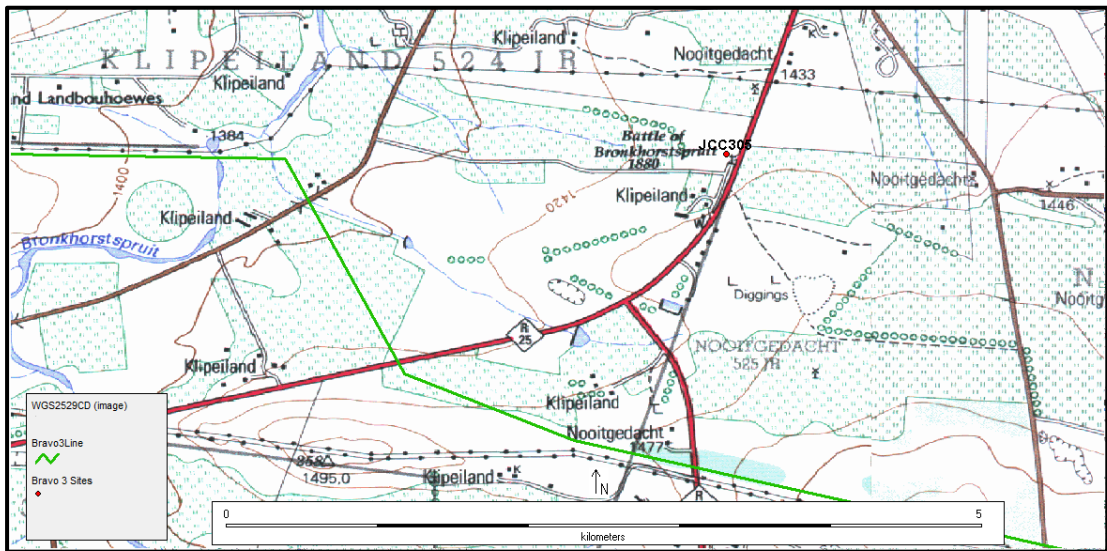
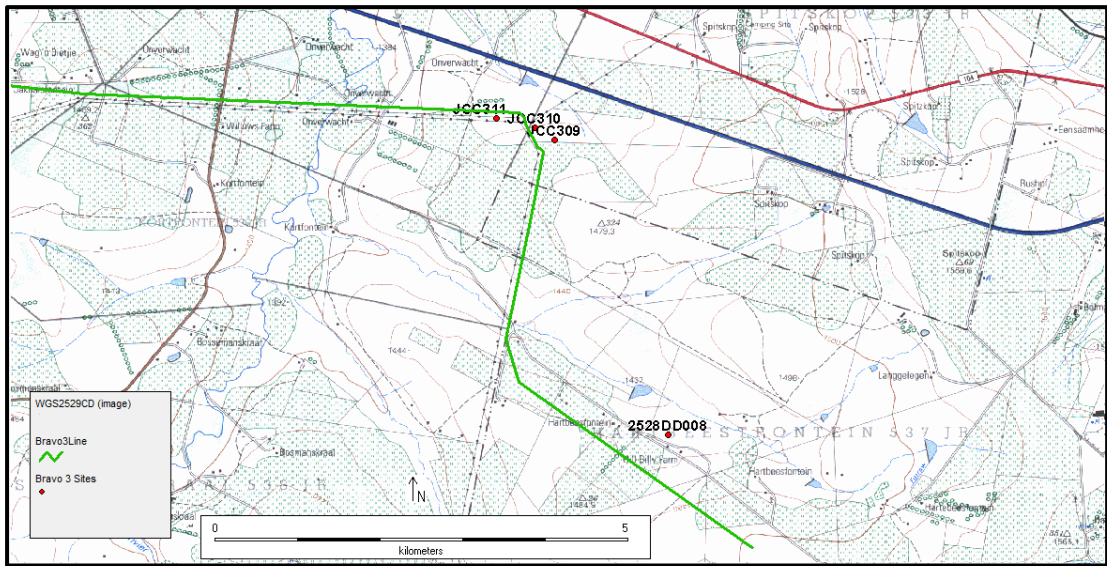
A feature of the 1930s and 1940s was the establishment of large agricultural estates, for example Crowthorne and Beaulieu, which in later years were subdivided into smallholdings for purchase by wealthy members of the public. This period also saw the development of Midrand as a mecca for flying sport (Grand Central Flying Club 1937), motor racing (Grand Central Speedway 1948) and horse riding (Lippizaner equestrian centre).

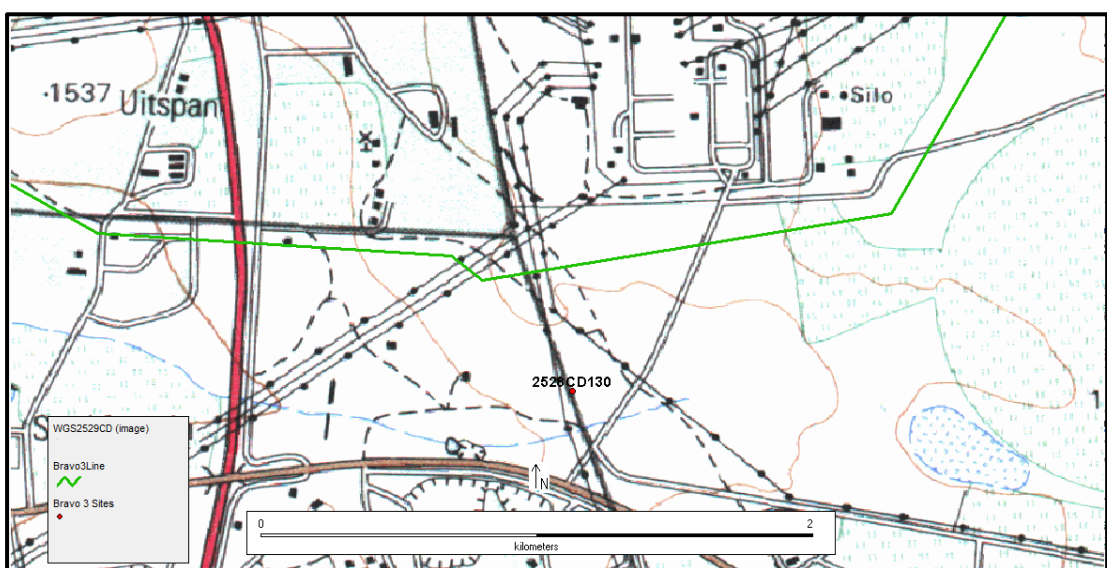
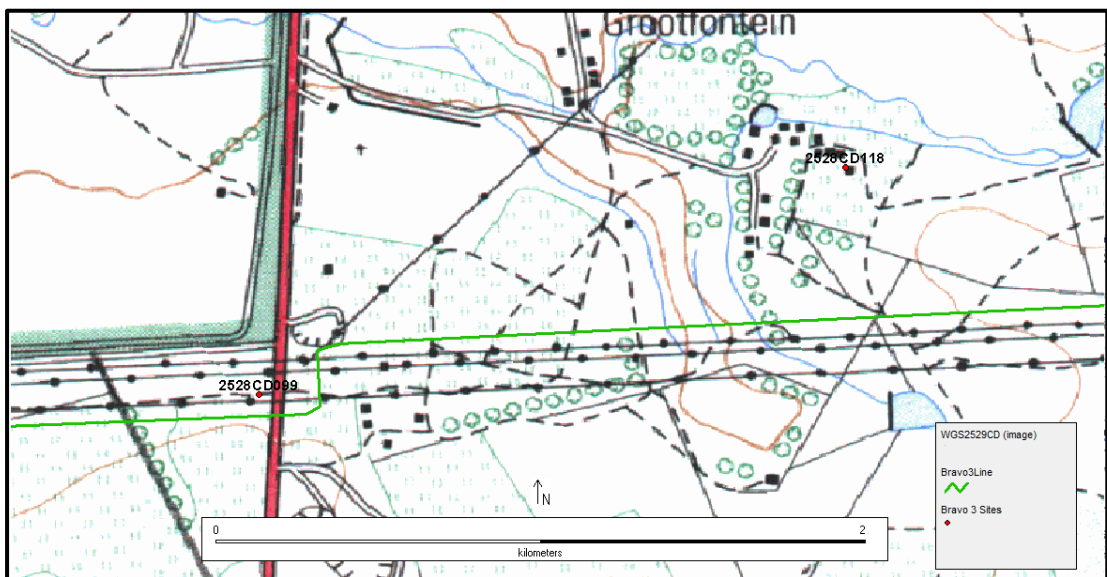
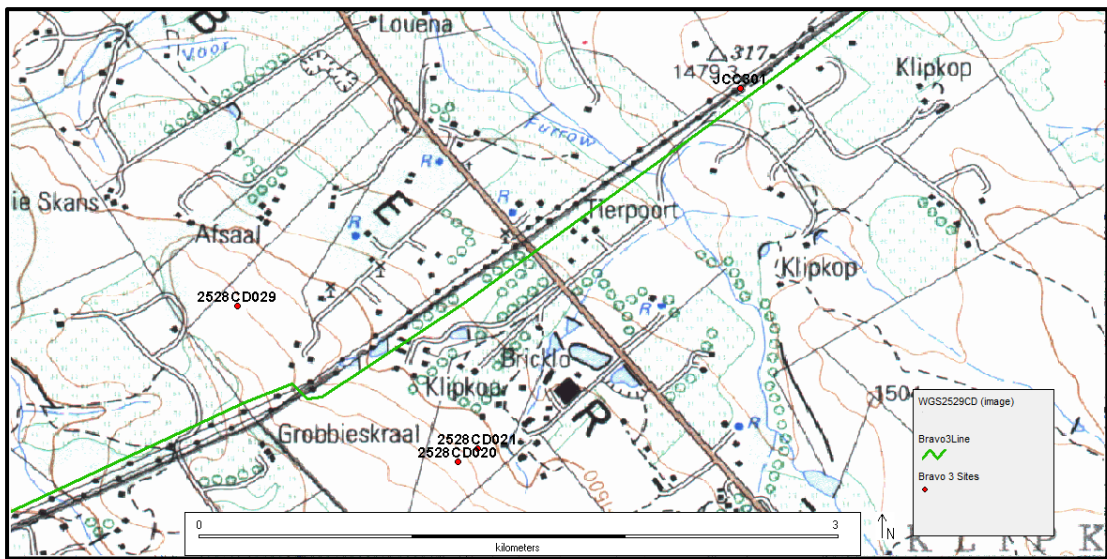
7.3 Identified sites

A large number of sites are known to exist in the study area. However, only those that were within 600m of the proposed power line are presented here as it is viewed that the line would probably not deviate that much from the proposed route.

Table 2. Identified heritage resources within 600m from the study area.

Number	Name	Latitude	Longitude	Distance	Significance impact
2528DD008	Farmstead	-25.90029	28.90524	500m	Low
2528DC036	Cemetery	-25.86779	28.53676	450m	Low
2528DC043	Cemetery	-25.84686	28.62822	650m	Low
2528CD020	Iron Age	-25.89889	28.43750	600m	Low
2528CD021	Iron Age	-25.89833	28.43833	600m	Low
2528CD029	Iron Age	-25.89222	28.42806	400m	Low
2528CD099	Cemetery	-25.91484	28.32417	75m	Medium
2528CD118	Cemetery	-25.90844	28.34064	480m	Low
2528CD130	Cemetery	-25.93010	28.27314	400m	Low
2528CC121	Homestead	-25.91889	28.19750	0m	High
2528CC140	Farmhouse	-25.95691	28.00877	0m	High
2528CC141	Cemetery	-25.95607	28.01042	50m	High
2528CC180	Graves	-25.95640	28.01280	190m	Medium
JCC301	Stone walling	-25.88292	28.44958	0m	High
JCC305	Monument	-25.84005	28.74107	2100m	Low
JCC307	Graves	-25.85983	28.67475	305m	Low
JCC309	Graves	-25.86756	28.89264	200m	Low
JCC310	Graves	-25.86625	28.89047	60m	Medium
JCC311	Graves	-25.86517	28.88617	70m	Medium





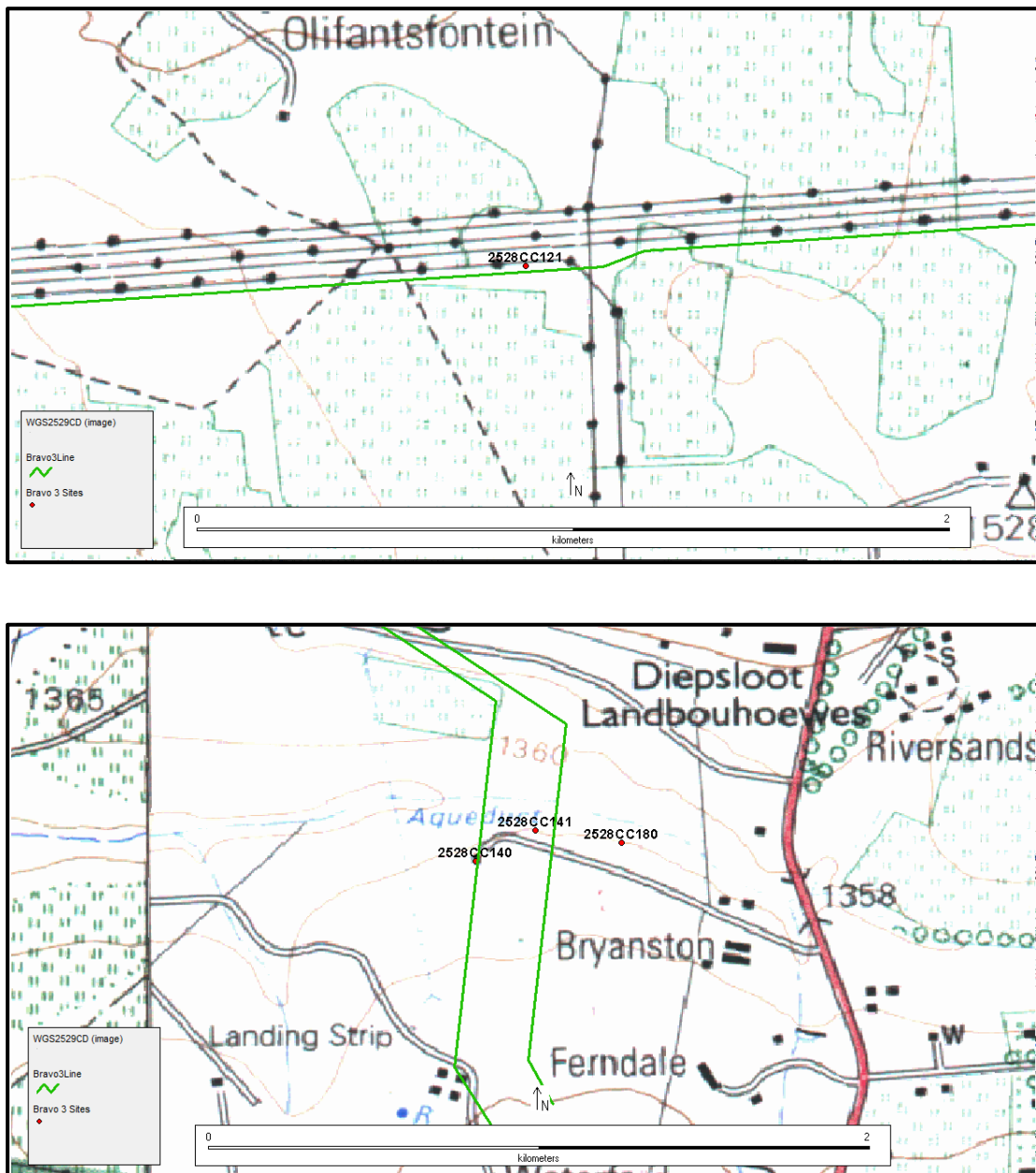


Fig. 3. Location of identified sites in the study area.

7.4 Impact assessment

Heritage impacts are categorised as:

- Direct or physical impacts, implying alteration or destruction of heritage features within the project boundaries;
- Indirect impacts, e.g. restriction of access or visual intrusion concerning the broader environment;
- Cumulative impacts that are combinations of the above.

Impact can be managed through one or a combination of the following measures:

- Mitigation

- Avoidance
- Compensation
- Enhancement (positive impacts)
- Rehabilitation
- Interpretation
- Memorialisation

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

- The impacts of the proposed development could be direct or physical but will not be indirect and cumulative.
 - Some informal burial places as well as old settlement sites (homesteads) occur in close proximity of the proposed power line route. These should either be avoided or professionally investigated prior to the construction of the power line.
 - The sites should be isolated by fencing them off with danger tape, leaving a buffer of at least 10m from the outer edge of the site. If the site cannot be avoided, the site should be investigated and documented by archaeologists. If it is a burial place, the graves should be relocated on condition of following the correct procedures (see Appendix 4)

8. 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.

8.1 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).

8.2 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.

9. RECOMMENDATIONS

At this stage only a line route has been confirmed as negotiations are not complete with relevant landowners and therefore tower positions are not available as yet. The results of this survey should therefore be viewed as tentative in nature.

From the available published and unpublished reports on the cultural heritage resources of region, as well as the field survey, it was revealed the region does have a high potential for heritage sites:

- Only a few sites dating to the Stone Age have been documented in the region; no reports of substantial surface finds of stone tools are known;
- Iron Age settlement took place on a large scale, mostly situated in the mountain ranges, e.g. Magaliesberg and Bronberg. These sites are characterised by stone walling and mostly date to the Late Iron Age.
- As the region is densely populated, a wide range of heritage dating to the recent past occurs in the region. These include farmsteads, formal and informal burial sites as well as elements of infrastructure development, e.g. bridges.
 - ***During the field survey it was determined that a significant number of heritage sites and features that were identified in the past, has since disappeared, mostly due to development that took place in its vicinity.***
 - ***Other sites were extremely difficult to identify.***

Impact assessment

Number	Name	Latitude	Longitude	Distance	Significance impact
2528DD008	Farmstead	-25.90029	28.90524	500m	Low
2528DC036	Cemetery	-25.86779	28.53676	450m	Low
2528DC043	Cemetery	-25.84686	28.62822	650m	Low
2528CD020	Iron Age	-25.89889	28.43750	600m	Low
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2528CD029	Iron Age	-25.89222	28.42806	400m	Low
2528CD099	Cemetery	-25.91484	28.32417	75m	Medium
2528CD118	Cemetery	-25.90844	28.34064	480m	Low

2528CD130	Cemetery	-25.93010	28.27314	400m	Low
2528CC121	Homestead	-25.91889	28.19750	0m	High
2528CC140	Farmhouse	-25.95691	28.00877	0m	High
2528CC141	Cemetery	-25.95607	28.01042	50m	High
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JCC305	Monument	-25.84005	28.74107	2100m	Low
JCC307	Graves	-25.85983	28.67475	305m	Low
JCC309	Graves	-25.86756	28.89264	200m	Low
JCC310	Graves	-25.86625	28.89047	60m	Medium
JCC311	Graves	-25.86517	28.88617	70m	Medium

- The impacts of the proposed development could be direct or physical but will not be indirect and cumulative.
 - Some informal burial places as well as old settlement sites (homesteads) occur in close proximity of the proposed power line route. These should either be avoided or professionally investigated prior to the construction of the power line.
 - The sites should be isolated by fencing them off with danger tape, leaving a buffer of at least 10m from the outer edge of the site. If the site cannot be avoided, the site should be investigated and documented by archaeologists. If it is a burial place, the graves should be relocated on condition of following the correct procedures (see Appendix 4)

Reasoned opinion as to whether the proposed activity should be authorised:

- From a heritage point of view it is recommended that the proposed development be allowed to continue on acceptance of the proposed mitigation measures.

Conditions for inclusion in the environmental authorisation:

- Should archaeological sites or graves be exposed during construction work, it must immediately be reported to a heritage practitioner so that an investigation and evaluation of the finds can be made.

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10.3 Maps and aerial photographs

1: 50 000 Topocadastral maps
Google Earth

APPENDIX 1: INDEMNITY AND TERMS OF USE OF THIS REPORT

The findings, results, conclusions and recommendations given in this report are based on the author's best scientific and professional knowledge as well as available information. The report is based on survey and assessment techniques which are limited by time and budgetary constraints relevant to the type and level of investigation undertaken and the author reserve the right to modify aspects of the report including the recommendations if and when new information may become available from ongoing research or further work in this field, or pertaining to this investigation.

Although all possible care is taken to identify all sites of cultural importance during the investigation of study areas, it is always possible that hidden or sub-surface sites could be overlooked during the study. The author of this report will not be held liable for such oversights or for costs incurred as a result of such oversights.

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APPENDIX 2: CONVENTIONS USED TO ASSESS THE SIGNIFICANCE OF IDENTIFIED HERITAGE RESOURCES

Significance

According to the NHRA, Section 2(vi) the **significance** of a 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 3. RELEVANT LEGISLATION

National Heritage Resources Act (Act no 25 of 1999)

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.

The National Heritage Resources Act (Act no 25 of 1999) 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, and which prescribes heritage resources assessment criteria, consistent with the criteria set out in section 3(3), which must be used by a heritage resources authority or a local authority to assess the intrinsic, comparative and contextual significance of a heritage resource and the relative benefits and costs of its protection, so that the appropriate level of grading of the resource and the consequent responsibility for its management may be allocated in terms of section 8.

Presenting archaeological sites as part of tourism attraction requires, in terms 44 of the Act, a Conservation Management Plan as well as a permit from SAHRA.

(1) Heritage resources authorities and local authorities must, wherever appropriate, co-ordinate and promote the presentation and use of places of cultural significance and heritage resources which form part of the national estate and for which they are responsible in terms of section 5 for public enjoyment, education, research and tourism, including-

- (a) the erection of explanatory plaques and interpretive facilities, including interpretive centres and visitor facilities;
- (b) the training and provision of guides;
- (c) the mounting of exhibitions;
- (d) the erection of memorials; and
- (e) any other means necessary for the effective presentation of the national estate.

(2) Where a heritage resource which is formally protected in terms of Part I of this Chapter is to be presented, the person wishing to undertake such presentation must, at least 60 days prior to the institution of interpretive measures or manufacture of associated material, consult with the heritage resources authority which is responsible for the protection of such heritage resource regarding the contents of interpretive material or programmes.

(3) A person may only erect a plaque or other permanent display or structure associated with such presentation in the vicinity of a place protected in terms of this Act in consultation with the heritage resources authority responsible for the protection of the place.

APPENDIX 4. RELOCATION OF GRAVES

If the graves are younger than 60 years, an undertaker can be contracted to deal with the exhumation and reburial. This will include public participation, organising cemeteries, coffins, etc. They need permits and have their own requirements that must be adhered to.

If the graves are older than 60 years old or of undetermined age, an archaeologist must be in attendance to assist with the exhumation and documentation of the graves. This is a requirement by law.

Once it has been decided to relocate particular graves, the following steps should be taken:

- Notices of the intention to relocate the graves need to be put up at the burial site for a period of 60 days. This should contain information where communities and family members can contact the developer/archaeologist/public-relations officer/undertaker. All information pertaining to the identification of the graves needs to be documented for the application of a SAHRA permit. The notices need to be in at least 3 languages, English, and two other languages. This is a requirement by law.
- Notices of the intention needs to be placed in at least two local newspapers and have the same information as the above point. This is a requirement by law.
- Local radio stations can also be used to try contact family members. This is not required by law, but is helpful in trying to contact family members.
- During this time (60 days) a suitable cemetery need to be identified close to the development area or otherwise one specified by the family of the deceased.
- An open day for family members should be arranged after the period of 60 days so that they can gather to discuss the way forward, and to sort out any problems. The developer needs to take the families requirements into account. This is a requirement by law.
- Once the 60 days has passed and all the information from the family members have been received, a permit can be requested from SAHRA. This is a requirement by law.
- Once the permit has been received, the graves may be exhumed and relocated.
- All headstones must be relocated with the graves as well as any items found in the grave.

Information needed for the SAHRA permit application

- The permit application needs to be done by an archaeologist.
- A map of the area where the graves have been located.
- A survey report of the area prepared by an archaeologist.
- All the information on the families that have identified graves.
- If graves have not been identified and there are no headstones to indicate the grave, these are then unknown graves and should be handled as if they are older than 60 years. This information also needs to be given to SAHRA.
- A letter from the landowner giving permission to the developer to exhume and relocate the graves.
- A letter from the new cemetery confirming that the graves will be reburied there.
- Details of the farm name and number, magisterial district and GPS coordinates of the gravesite.

APPENDIX 5. SPECIALIST COMPETENCYJohan (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.