

**PROPOSED CONTINUOUS DISPOSAL OF ASH AT TUTUKA POWER STATION –
CULTURAL HERITAGE IMPACT ASSESSMENT**

**PROPOSED CONTINUOUS DISPOSAL OF ASH AT TUTUKA POWER STATION –
CULTURAL HERITAGE IMPACT ASSESSMENT STUDY**

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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
June 2014

EXECUTIVE SUMMARY

PROPOSED CONTINUOUS DISPOSAL OF ASH AT TUTUKA POWER STATION – CULTURAL HERITAGE IMPACT ASSESSMENT

Tutuka Power Station, a coal fired power generation facility commissioned between 1985 and 1990, is located 25 km north of Standerton in the province of Mpumalanga. Tutuka Power Station currently disposes of ash in a dry (20% moisture content) form by means of conveyors, spreader and a stacker system from the station terrace to the ash disposal site. According to Eskom's plans, the complete ash disposal site would eventually cover an area of 2 500 ha (Existing & Remaining ash disposal site & pollution control canals) and is located approximately 4.5 km east of the station terrace.

For the purpose of the continuous ash disposal facility, three alternative sites have been identified and will be evaluated in order to select the most suitable as to the best option for future use. In accordance with Section 38 of the NHRA, an independent heritage consultant was appointed by Lidwala Consulting Engineers (SA) (Pty) Ltd to conduct a Cultural Heritage Impact Assessment (HIA) to determine if the development of the dry ash disposal facility would have an impact on any sites, features or objects of cultural heritage significance.

The cultural landscape qualities of the region essentially consist of a single component. This is a rural area in which the human occupation is made up of a limited pre-colonial element (Stone Age and Iron Age) as well as a much later colonial (farmer) component.

The aim of this study, broadly speaking, is to determine if any sites, features or objects of cultural heritage significance occur within the boundaries of the area where it is planned to develop the continuous ash disposal facility for the Tutuka Power Station. For the purpose of the continuous ash disposal facility, three siting alternatives have been identified and will be evaluated in order to select the most suitable as to the best option for future use.

The cultural landscape qualities of the region essentially consist of a single component. This is a rural area in which the human occupation is made up of a limited pre-colonial element (Stone Age and Iron Age) as well as a much later colonial (farmer) component.

As indicated in Section 5 of the report, the proposed development would have an impact on the following sites:

Alternative A

<p>Site A1: What used to be an old farmstead. Up to 2009 the remains of some buildings could be identified on the site. This has all being destroyed since and little of the site remains. It is viewed to be fully documented after incorporating it into this report.</p>
--

<p>Mitigation: No further action required.</p>

Alternative B

<p>Site B1: Clump of trees planted in a rectangle.</p>

<p>Mitigation: This feature is located inside Alternative B and would therefore be impacted on by the ashing facility. It should therefore be documented (mapped and photographed in full prior to development taking place).</p>
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<p>Site B2: Clump of trees planted in a rectangle. Function and status unknown.</p>
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Mitigation: This feature is located inside Alternative B and would therefore be impacted on by the ashing facility. It should therefore be documented (mapped and photographed in full prior to development taking place).

Site B3: A farmstead consisting of a main house and a number of outbuildings. The age and present conservation state is unknown

Mitigation: This feature is located outside, close to the border with Alternative B and might therefore be impacted on by the ashing facility. If that is the case, it should be documented (mapped and photographed) in full prior to development taking place.

Site B4: An informal burial place.

Mitigation: This feature is probably linked to the main farmstead (B3) above. An impact on B3 would therefore imply an impact (indirect) to this feature.

Site B5: Clump of trees planted in a rectangle. Function and status unknown.

Mitigation: This feature is located inside Alternative B and would therefore be impacted on by the ashing facility. It should therefore be documented (mapped and photographed in full prior to development taking place).

Site B6: What used to be an old farmstead. Up to 2009 the remains of some buildings could be identified on the site. This has all being destroyed since and little of the site remains. It is viewed to be fully documented after incorporating it into this report.

Mitigation: No further action required.

Alternative C

Site C1: A number of structures that are probably related to different farming activities.

Mitigation: This feature is located inside Alternative C and would therefore be impacted on by the ashing facility. It should therefore be documented (mapped and photographed in full prior to development taking place).

Site C2: A farmstead consisting of a main house and a number of outbuildings.

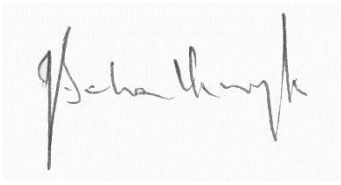
Mitigation: This feature is located outside, close to the border with Alternative C and might therefore be impacted on by the ashing facility. If that is the case, it should be documented (mapped and photographed) in full prior to development taking place.

Fortunately, all the identified sites are judged to have Grade III heritage significance and would therefore not prevent the proposed development from continuing on any of the three alternatives.

Based on an analysis of available information and the field survey, it is our opinion that all three Alternatives would be suitable for the development of the continuous ash disposal facility. However, for the project to continue, we propose the following:

- The mitigation measures set out for each category of sites in Section 5.4 is implemented if development takes place in the vicinity of any of these.
- The management measures, as set out in Section 8 of this report should be implemented prior to construction taking place.
- We recommend that if archaeological sites or graves are exposed during construction work, it should immediately be reported to a heritage consultant so that an investigation and evaluation of the finds can be made.

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

A handwritten signature in black ink on a light grey background. The signature is written in a cursive style and appears to read 'J A van Schalkwyk'.

J A van Schalkwyk
Heritage Consultant
June 2013

TECHNICAL SUMMARY

Property details	
Province	Mpumalanga
Magisterial district	Standerton
District municipality	Lekwa
Topo-cadastral map	2629CB, 2629CD
Closest town	Standerton

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	
Construction of bridge or similar structure exceeding 50m in length	
Development exceeding 5000 sq m	Yes
Development involving three or more existing erven or subdivisions	
Development involving three or more erven or divisions that have been consolidated within past five years	
Rezoning of site exceeding 10 000 sq m	Yes
Any other development category, public open space, squares, parks, recreation grounds	

Development	
Description	Development of a continuous ash disposal facility
Project name	Tutuka Dry Ash Disposal Facility

Land use	
Previous land use	Agriculture
Current land use	Agriculture

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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

PROPOSED CONTINUOUS DISPOSAL OF ASH AT TUTUKA POWER STATION – CULTURAL HERITAGE IMPACT ASSESSMENT

1. INTRODUCTION

Tutuka Power Station, a coal fired power generation facility commissioned between 1985 and 1990, is located 25 km north of Standerton in the province of Mpumalanga. Tutuka Power Station currently disposes of ash in a dry (20% moisture content) form by means of conveyors, spreader and a stacker system from the station terrace to the ash disposal site. According to Eskom's plans, the complete ash disposal site would eventually cover an area of 2 500 ha (Existing & Remaining ash disposal site & pollution control canals) and is located approximately 4.5 km east of the station terrace.

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.

For the purpose of the continuous ash disposal facility, three alternative sites have been identified and will be evaluated in order to select the most suitable as to the best option for future use. In accordance with Section 38 of the NHRA, an independent heritage consultant was appointed by Lidwala Consulting Engineers (SA) (Pty) Ltd to conduct a Cultural Heritage Impact Assessment (HIA) to determine if the development of the dry ash disposal facility would have an impact on any sites, features or objects of cultural heritage significance.

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) and is intended for submission to the South African Heritage Resources Agency (SAHRA).

2. TERMS OF REFERENCE

This report does not deal with development projects outside of or even adjacent to the study area as is presented in Section 5 of this report. The same holds true for heritage sites, except in a generalised sense where it is used to create an overview of the heritage potential in the larger region.

2.1 Scope of work

The aim of this HIA, broadly speaking, is to determine if any sites, features or objects of cultural heritage significance occur within the boundaries of the area where it is planned to develop the lodge.

This include:

- 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:

- The unpredictability of archaeological remains occurring below the surface.

2.3 Assumptions

- It is assumed that the Social Impact Assessment and Public Participation Process might also result in the identification of sites, features and objects, including sites of intangible heritage potential in the development area and that these then will also have to be considered in the selection of the preferred routes.
- It is assumed that a Paleontological Review will be done by a suitably qualified specialist.

3. HERITAGE RESOURCES

3.1 The National Estate

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

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

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

3.2 Cultural significance

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

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

- its importance in the community, or pattern of South Africa's history;
- its possession of uncommon, rare or endangered aspects of South Africa's natural or cultural heritage;
- its potential to yield information that will contribute to an understanding of South Africa's natural or cultural heritage;
- its importance in demonstrating the principal characteristics of a particular class of South Africa's natural or cultural places or objects;
- its importance in exhibiting particular aesthetic characteristics valued by a community or cultural group;
- its importance in demonstrating a high degree of creative or technical achievement at a particular period;
- its strong or special association with a particular community or cultural group for social, cultural or spiritual reasons;
- its strong or special association with the life or work of a person, group or organisation of importance in the history of South Africa; and
- sites of significance relating to the history of slavery in South Africa.

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

4. STUDY APPROACH AND METHODOLOGY

4.1 Extent of the Study

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

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 below.

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

4.2.1.2 Data bases

The *Heritage Atlas Database*, the *Environmental Potential Atlas*, the *Chief Surveyor General* 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 Lidwala by means of maps. Please refer to the Scoping Report for the Tutuka Continuous As Disposal Facility (Lidwala 2012) for more detail on this process

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.

Map datum used: Hartebeeshoek 94 (WGS84).

5. DESCRIPTION OF THE AFFECTED ENVIRONMENT

5.1 Site location

Tutuka Power Station is located approximately 25 km north-north-east (NNE) of Standerton in the Mpumalanga Province. The power station falls within the Lekwa Local Municipality which falls within the Gert Sibande District Municipality (Fig. 1). For more information, please see the Technical Summary presented on p. iii above.

A greater part of the study area is within an 8 km radius of the centre point of the Tutuka Power Station Site, and the land use is made up of agricultural, mining and power generation activities.

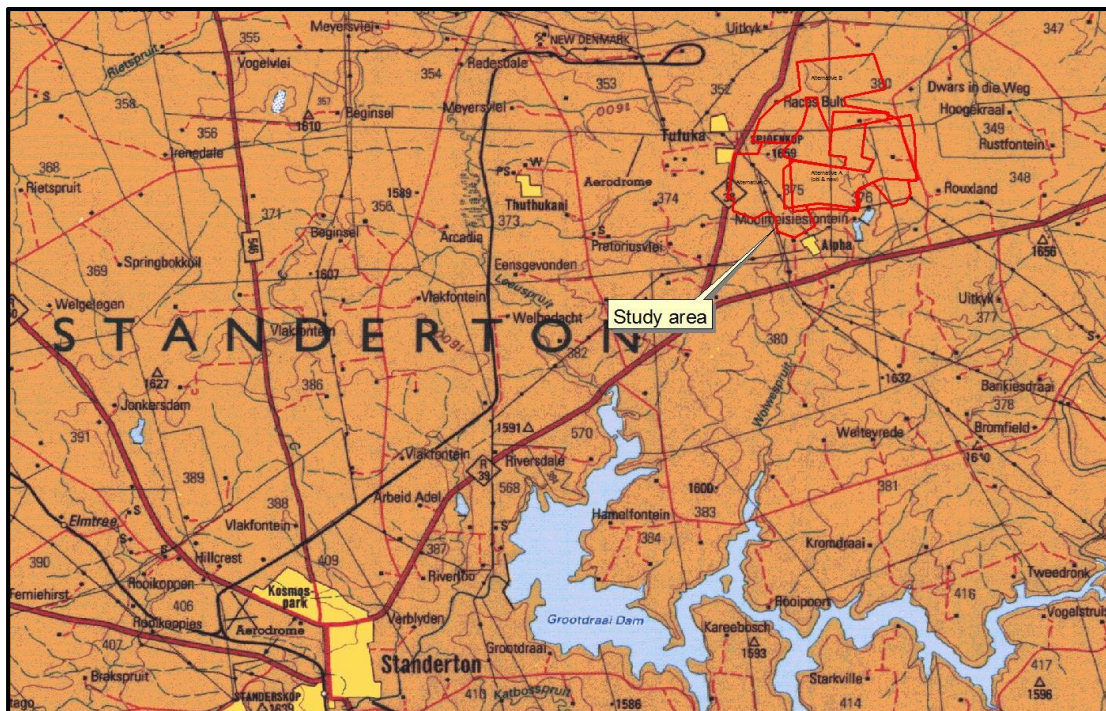


Fig. 1. Location of the study area (green outline) in regional context.
(Map 2628: Chief Surveyor-General)

5.2 Development proposal

The project involves the proposed continuous ash disposal facilities at the Tutuka Power Station in the Mpumalanga Province.

The coal-fired power generation process results in large quantities of ash, which is disposed of in an ash disposal facility. Generally, Eskom has access to, and uses, coal of a low grade (called middlings coal) which produces a larger mass of ash during combustion. Over time, the quality of the coal provided to Eskom has degraded, due to higher ash quantities in the coal. The Tutuka Power Station utilises a dry ashing disposal method.

The waste product is deposited onto the disposal site by means of a stacker, which handles some 85% of the total ash whilst the remaining 15% is placed by a standby spreader system.

Currently, the ash disposal progresses from west to east. In the event that the existing ash disposal facility continues, the two extendible conveyors will be extended to its final lengths of 4 000 m each. The ash disposal facility is built out in two layers. The front stack is deposited by the stacker and spreader to a height of approximately 45 m. The ash is bulldozed out to a slope of 1:3 for dust suppression and rehabilitation purposes. The stacker then moves around the head-end of the shiftable conveyor to dump another 20 m high back stack. The total ash disposal facility height is then approximately 65 m.

As the ash disposal advances, the topsoil is stripped ahead of the activities and is taken by truck and placed on top of the final disposal facility height, as a rehabilitation means. Grass is then planted in this top soil.

For the purpose of the continuous ash disposal facility, three alternative sites have been identified and will be evaluated in order to select the most suitable as to the best option for future use. These sites are depicted in Fig. 6 – 9 below.

By using available information sources (databases, Google Earth, unpublished reports) an overview of each of the Alternatives were established, which gave an indication of the type of cultural heritage resources that can be expected to be encountered during the field survey.

5.3 Overview of the region

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

The cultural landscape qualities of the region essentially consist of a rural setup. In this the human occupation is made up of a pre-colonial element consisting of limited Stone Age occupation and a Late Iron Age occupation, as well as a much later colonial (farmer) component.

5.3.1 Stone Age

No information about Stone Age habitation of the area is available. There might be two reasons for this. Firstly, it is unlikely that Stone Age people would have occupied the area specific, as it would have been too cold and no shelters or caves exists locally that could be used to shelter in. Secondly, no systematic survey of the area has been done and, as a result, no sites have been reported.

5.3.2 Iron Age

Iron Age people started to settle in southern Africa c. AD 300, with one of the oldest known sites at Silver Leaves, south east of Tzaneen dating to AD 270. However, Iron Age occupation of the eastern highveld area (including the study area) did not start much before the 1500s. Some sites dating to the Late Iron Age is known to exist to the north, south and west of the study area.

- Archaeological sites

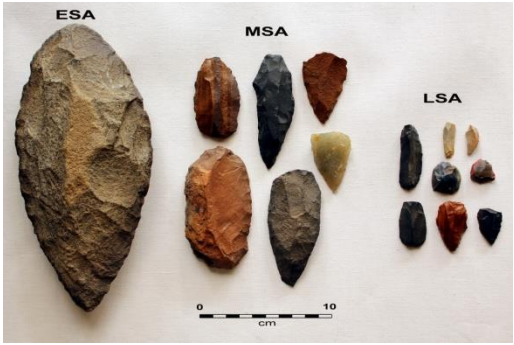

NHRA Category	Archaeological and palaeontological sites
Protection status	
General Protection - Section 35: Archaeology, palaeontology and meteorites	
	

Fig. 2. Typical Stone Age tools and a stone walled site dating to the Late Iron Age. The stone tools (on the left) are not from the region and are only used to illustrate the difference between Early (left), Middle (middle) and Later Stone Age (right) technology.

5.3.3 Historic period

The historic period in this area starts with the arrival of early missionaries, hunters and traders, followed later by the Voortrekkers, who settled permanently and started to farm in the area and developed a number of towns. The town of Standerton was founded in 1878 and attained municipal status in 1903 (Raper 2004). During the Anglo Boer War (1899-1902), some skirmishes took place in the region (Cloete 2000).

Building of the Tutuka Power Station commenced in 1980 and the first unit was put in commercial use on 1 June 1985 and the last unit on 4 June 1990 (www.eskom.co.za).

The farm, Pretorius Vley 374IS on which the power station was developed, was first granted to a certain Mr Pretorius in 1875. A house and farm buildings, approximately in the vicinity of the current farmstead to the southwest of the power station, is indicated on this map (Fig. 4).

- Farmsteads

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

By the early 19th century white settlers took up farms. An investigation of the Title Deeds of most of the farms in the region indicates that they were surveyed as early as the 1860s, implying that they would have been occupied by colonists since then.

Many farmsteads in the region were destroyed during the Anglo Boer War. As a result most structures date to the period after that. The architecture of these farmsteads can be described as eclectic as they were built and added to as required over a period of time. In some cases outbuildings would be in the same style as the main house, if they date to the same period. However, they tend to vary considerably in style and materials used.


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

Fig. 3. Examples of farmsteads/homesteads identified in the region.

- Cemeteries

Apart from the formal cemeteries that occur in municipal areas (towns or villages), a number of these, some quite informal, i.e. without fencing, occur sporadically all over. Many also seem to

have been forgotten, making it very difficult to trace the descendants in a case where the graves are to be relocated.

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


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

Fig. 4. Examples of cemeteries and burial places.

- Infrastructure and industrial heritage

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

A variety of bridges, railway lines and other features that can be included in this category occur near the study area.


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

Fig. 5. An old concrete road bridge.

5.4 Review of the three alternative sites

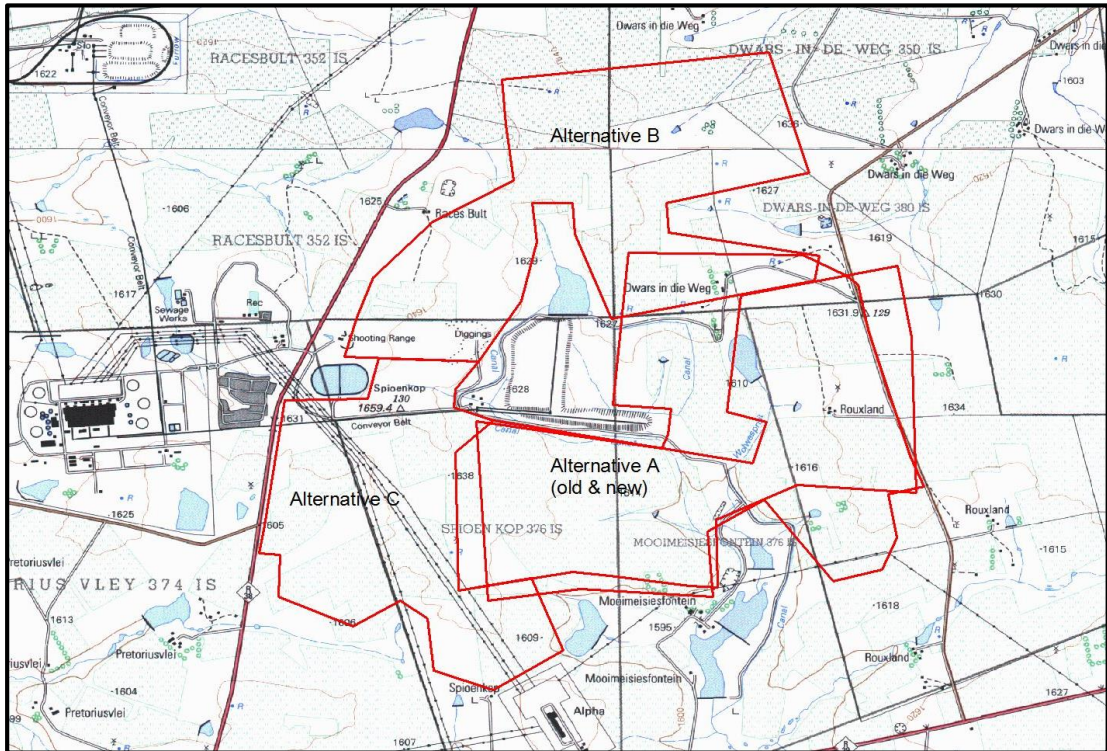


Fig. 6. Location of the Alternative sites.

5.4.1 Alternative A

Location	A1	-26.77570	29.42457
Description	What used to be an old farmstead. Up to 2009 the remains of some buildings could be identified on the site. This has all being destroyed since and little of the site remains. It is viewed to be fully documented after incorporating it into this report.		
NHRA Category	Buildings, structures, places and equipment of cultural significance		
Protection status	General Protection - Section 34: Structures older than 60 years		
Significance	Low on a regional level – Grade III		
Mitigation	No further action required.		

This feature is located inside Alternative B and would therefore be impacted on by the ashing facility. It should therefore be documented (mapped and photographed in full prior to development taking place).

Location	B2	-26.74528	29.39704
Description			
Clump of trees planted in a rectangle. Function and status unknown.			
NHRA Category	Buildings, structures, places and equipment of cultural significance		
Protection status			
General Protection - Section 34: Structures older than 60 years			
Significance	Medium on a regional level – Grade III		
Mitigation			
This feature is located inside Alternative B and would therefore be impacted on by the ashing facility. It should therefore be documented (mapped and photographed) in full prior to development taking place.			

Location	B3	-26.75665	29.38473
Description			
A farmstead consisting of a main house and a number of outbuildings. The age and present conservation state is unknown			
NHRA Category	Buildings, structures, places and equipment of cultural significance		
Protection status			
General Protection - Section 34: Structures older than 60 years			
Significance	Medium on a regional level – Grade III		
Mitigation			
This feature is located outside, close to the border with Alternative B and might therefore be impacted on by the ashing facility. If that is the case, it should be documented (mapped and photographed) in full prior to development taking place.			

Location	B4	-26.75767	29.38312
Description			
An informal burial place.			
NHRA Category	Graves or burial grounds		
Protection status			
General Protection - Section 36: Graves or burial grounds			
Significance	Medium on a regional level – Grade III		
Mitigation			
This feature is probably linked to the main farmstead (B3) above. An impact on B3 would therefore imply an impact (indirect) to this feature.			

Location	B5	-26.76729	29.39155
Description			
Clump of trees planted in a rectangle. Function and status unknown.			
NHRA Category	Buildings, structures, places and equipment of cultural significance		
Protection status			
General Protection - Section 34: Structures older than 60 years			
Significance	Medium on a regional level – Grade III		
Mitigation			
This feature is located inside Alternative B and would therefore be impacted on by the ashing facility. It should therefore be documented (mapped and photographed) in full prior to development taking place.			

Location	B6	-26.76248	29.41325
Description			
A farmstead consisting of a main house and a number of outbuildings. Up to 2009 the remains of some buildings could be identified on the site. This has all being destroyed since and little of the site remains (Fig. 8). It is viewed to be fully documented after incorporating it into this report.			
NHRA Category	Buildings, structures, places and equipment of cultural significance		
Protection status			
General Protection - Section 34: Structures older than 60 years			
Significance	Medium on a regional level – Grade III		
Mitigation			
No further action required			



Fig. 8. Site B6 in 2009 and in 2013.

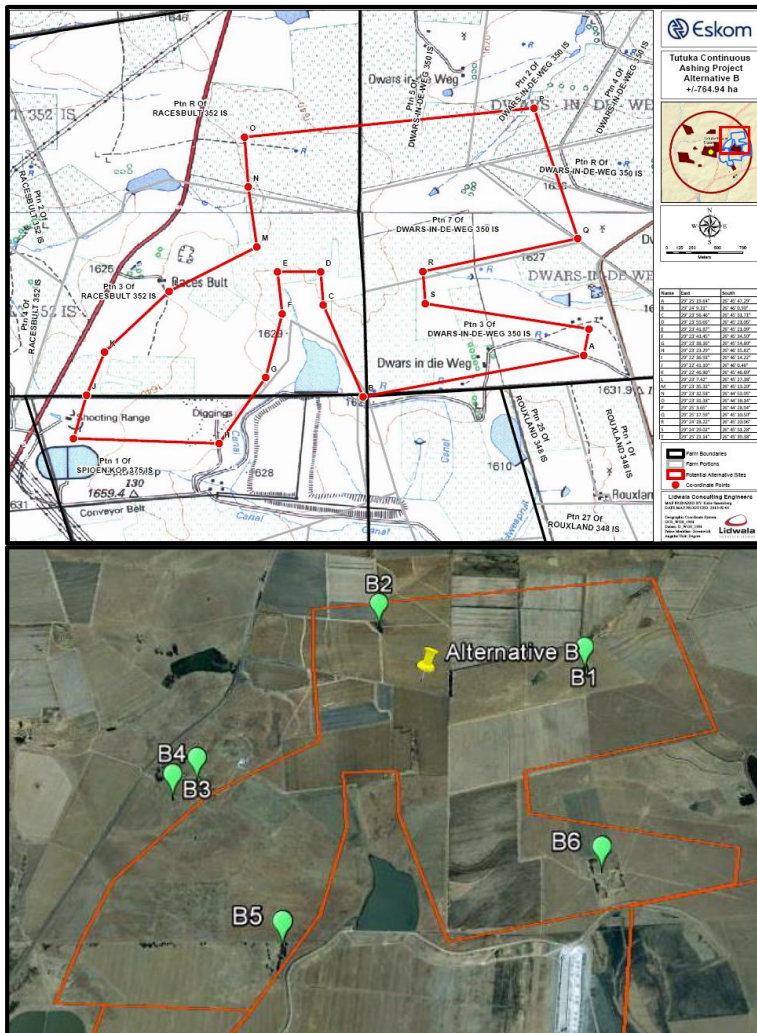


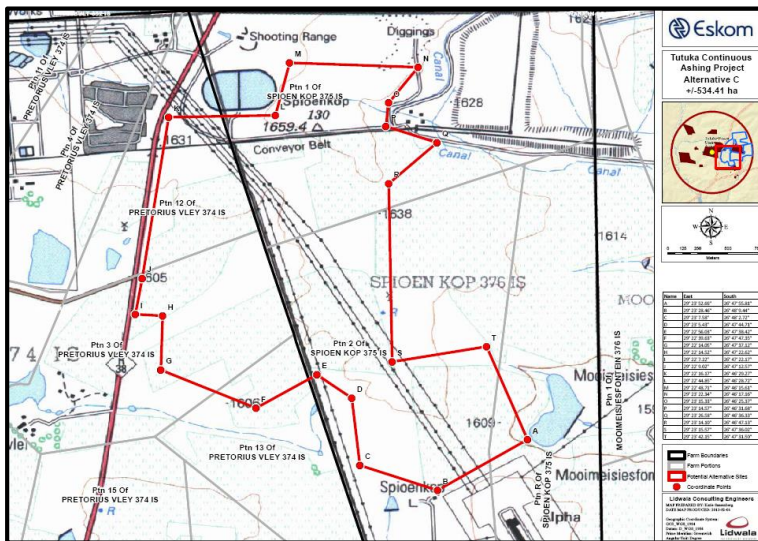
Fig. 9. Layout of Alternative B.

5.4.3 Alternative C

Location	C1	-26.78243	29.37049
Description	A number of structures that are probably related to different farming activities. Function and status unknown.		
NHRA Category	Buildings, structures, places and equipment of cultural significance		
Protection status	General Protection - Section 34: Structures older than 60 years		
Significance	Medium on a regional level – Grade III		
Mitigation	This feature is located inside Alternative C and would therefore be impacted on by the ashing facility. It should therefore be documented (mapped and photographed in full prior to development taking place.		

Location	C2	-26.80301	29.39081
Description			

A farmstead consisting of a main house and a number of outbuildings. The age and present conservation state is unknown	
NHRA Category	Buildings, structures, places and equipment of cultural significance
Protection status	
General Protection - Section 34: Structures older than 60 years	
Significance	Medium on a regional level – Grade III
Mitigation	
This feature is located on the border with Alternative C and might therefore be impacted on by the ashing facility. It should therefore be documented (mapped and photographed) in full prior to development taking place.	



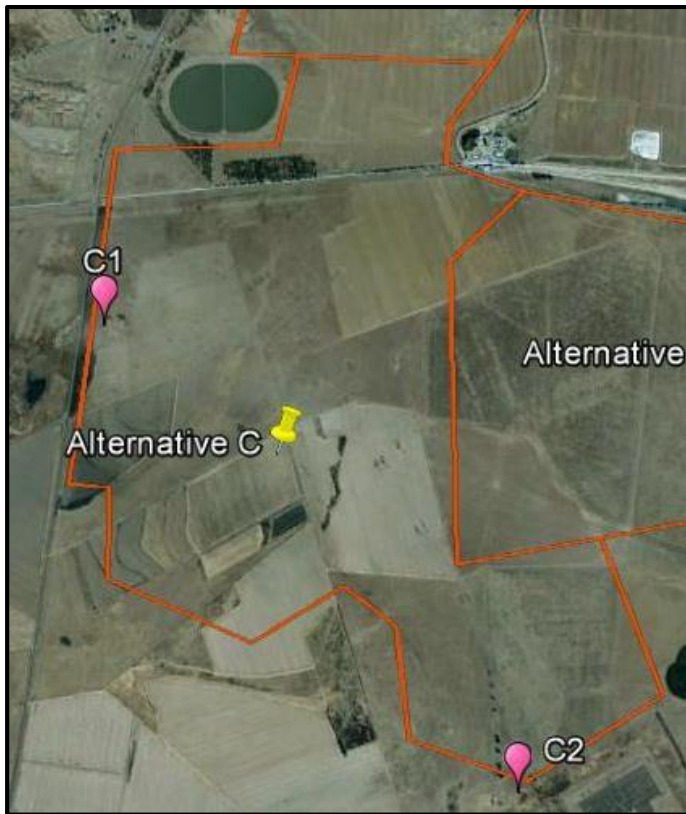


Fig. 10. Layout of Alternative C.

6. SITE SIGNIFICANCE AND ASSESSMENT

6.1 Heritage assessment criteria and grading

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

- **Grade I:** Heritage resources with qualities so exceptional that they are of special national significance;
- **Grade II:** Heritage resources which, although forming part of the national estate, can be considered to have special qualities which make them significant within the context of a province or a region; and
- **Grade III:** Other heritage resources worthy of conservation, on a local authority level.

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

6.2 Statement of significance

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

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:

6.3.1 Construction phase

As indicated in Section 5 above, the proposed development would have an impact on the following sites:

Alternative A

<p>Site A1: What used to be an old farmstead. Up to 2009 the remains of some buildings could be identified on the site. This has all being destroyed since and little of the site remains. It is viewed to be fully documented after incorporating it into this report.</p>
--

<p>Mitigation: No further action required.</p>

Alternative B

<p>Site B1: Clump of trees planted in a rectangle.</p>

<p>Mitigation: This feature is located inside Alternative B and would therefore be impacted on by the ashing facility. It should therefore be documented (mapped and photographed in full prior to development taking place).</p>
--

<p>Site B2: Clump of trees planted in a rectangle. Function and status unknown.</p>
--

<p>Mitigation: This feature is located inside Alternative B and would therefore be impacted on by the ashing facility. It should therefore be documented (mapped and photographed in full prior to development taking place).</p>
--

<p>Site B3: A farmstead consisting of a main house and a number of outbuildings. The age and present conservation state is unknown</p>

<p>Mitigation: This feature is located outside, close to the border with Alternative B and might therefore be impacted on by the ashing facility. If that is the case, it should be documented (mapped and photographed) in full prior to development taking place.</p>
--

<p>Site B4: An informal burial place.</p>
--

<p>Mitigation: This feature is probably linked to the main farmstead (B3) above. An impact on B3 would therefore imply an impact (indirect) to this feature.</p>

<p>Site B5: Clump of trees planted in a rectangle. Function and status unknown.</p>
--

<p>Mitigation: This feature is located inside Alternative B and would therefore be impacted on by the ashing facility. It should therefore be documented (mapped and photographed in full prior to development taking place).</p>
--

<p>Site B6: What used to be an old farmstead. Up to 2009 the remains of some buildings could be identified on the site. This has all being destroyed since and little of the site remains. It is viewed to be fully documented after incorporating it into this report.</p>
--

<p>Mitigation: No further action required.</p>

Alternative C

<p>Site C1: A number of structures that are probably related to different farming activities.</p>
--

<p>Mitigation: This feature is located inside Alternative C and would therefore be impacted on by the ashing facility. It should therefore be documented (mapped and photographed in full prior to development taking place).</p>
--

Site C2: A farmstead consisting of a main house and a number of outbuildings.
Mitigation: This feature is located outside, close to the border with Alternative C and might therefore be impacted on by the ashing facility. If that is the case, it should be documented (mapped and photographed) in full prior to development taking place.

6.3.2 Operational phase

Issue	Impact on heritage sites and features
Potential impact	No additional impacts on sites, features or objects of cultural heritage significance are expected during the operational phase of the project. This is conditional of all the identified sites having been subjected to required mitigation processes and that no changes are made to the project plan without an input by a heritage consultant.
EMP	Management measures to be included in the EMP for actions to be taken on uncovering unknown sites and features

6.3.3 Decommissioning phase

Issue	Impact on heritage sites and features
Potential impact	No additional impacts on sites, features or objects of cultural heritage significance are expected during the operational phase of the project. This is conditional of all the identified sites having been subjected to required mitigation processes and that no changes are made to the project plan without an input by a heritage consultant.
EMP	Management measures to be included in the EMP for actions to be taken on uncovering unknown sites and features

6.3.4 Cumulative impact

Issue	Impact on heritage sites and features
Potential impact	The cumulative effect of the development should be viewed in the context of other, as well as similar, projects also taking place, all of which are contributing to a process of "sanitation" through the gradual removal of sites, features and objects of cultural significance from the larger cultural landscape. The implication is that sites that now are viewed to have low significance might in the future have high significance, which would in all probability have serious constraints on later proposed developments. Therefore, avoidance of impacts in the present, where possible, might make things a bit easier in the future.
EMP	Management measures to be included in the EMP for actions to be taken on uncovering unknown sites and features

7. SITE PREFERENCE RANKING

In order to identify which of the alternative sites is deemed preferred the specialists were requested to rank the alternative sites according to a site preference ranking methodology.

The site preference rating system is applied to each discipline, and the rating of each site was conducted according to the following system:

1 = Not suitable for development / No-Go (impact of very high significance - negative)

- 2 = not preferred (impact of high significance - negative)
 3 = acceptable (impact of moderate significance - negative)
 4 = Preferred (impact of low or negligible significance - negative)

While each specialist study was required to have the Site Preference as an outcome, how each site is evaluated will vary from discipline to discipline and the description of the specific approach must be outlined in each specialist report.

The site preference results from each specialist study will be entered into a matrix and added together. The site with the highest value is then considered the most preferable.

Table 1: Final Site Ranking Matrix

Study	Alt A	Alt B	Alt C
Cultural Heritage	30	30	30

Table 2: Final Site Ranking Matrix

Study	Alt A	Alt B	Alt C
Cultural Heritage	4	3	4

8. RECOMMENDED MANAGEMENT MEASURES

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

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

The aim of this study, broadly speaking, is to determine if any sites, features or objects of cultural heritage significance occur within the boundaries of the area where it is planned to develop the continuous ash disposal facility for the Tutuka Power Station. For the purpose of the continuous ash disposal facility, three siting alternatives have been identified and will be evaluated in order to select the most suitable as to the best option for future use.

The cultural landscape qualities of the region essentially consist of a single component. This is a rural area in which the human occupation is made up of a limited pre-colonial element (Stone Age and Iron Age) as well as a much later colonial (farmer) component.

As indicated in Section 5 above, the proposed development would have an impact on the following sites:

Alternative A

<p>Site A1: What used to be an old farmstead. Up to 2009 the remains of some buildings could be identified on the site. This has all being destroyed since and little of the site remains. It is viewed to be fully documented after incorporating it into this report.</p>
--

<p>Mitigation: No further action required.</p>

Alternative B

<p>Site B1: Clump of trees planted in a rectangle.</p>

<p>Mitigation: This feature is located inside Alternative B and would therefore be impacted on by the ashing facility. It should therefore be documented (mapped and photographed in full prior to development taking place).</p>
--

<p>Site B2: Clump of trees planted in a rectangle. Function and status unknown.</p>
--

Mitigation: This feature is located inside Alternative B and would therefore be impacted on by the ashing facility. It should therefore be documented (mapped and photographed in full prior to development taking place).

Site B3: A farmstead consisting of a main house and a number of outbuildings. The age and present conservation state is unknown

Mitigation: This feature is located outside, close to the border with Alternative B and might therefore be impacted on by the ashing facility. If that is the case, it should be documented (mapped and photographed) in full prior to development taking place.

Site B4: An informal burial place.

Mitigation: This feature is probably linked to the main farmstead (B3) above. An impact on B3 would therefore imply an impact (indirect) to this feature.

Site B5: Clump of trees planted in a rectangle. Function and status unknown.

Mitigation: This feature is located inside Alternative B and would therefore be impacted on by the ashing facility. It should therefore be documented (mapped and photographed in full prior to development taking place).

Site B6: What used to be an old farmstead. Up to 2009 the remains of some buildings could be identified on the site. This has all being destroyed since and little of the site remains. It is viewed to be fully documented after incorporating it into this report.

Mitigation: No further action required.

Alternative C

Site C1: A number of structures that are probably related to different farming activities.

Mitigation: This feature is located inside Alternative C and would therefore be impacted on by the ashing facility. It should therefore be documented (mapped and photographed in full prior to development taking place).

Site C2: A farmstead consisting of a main house and a number of outbuildings.

Mitigation: This feature is located outside, close to the border with Alternative C and might therefore be impacted on by the ashing facility. If that is the case, it should be documented (mapped and photographed) in full prior to development taking place.

Fortunately, all the identified sites are judged to have Grade III heritage significance and would therefore not prevent the proposed development from continuing on any of the three alternatives.

Based on an analysis of available information and the field survey, it is our opinion that all three Alternatives would be suitable for the development of the continuous ash disposal facility. However, for the project to continue, we propose the following:

- The mitigation measures set out for each category of sites in Section 5.4 is implemented if development takes place in the vicinity of any of these.
- The management measures, as set out in Section 8 of this report should be implemented prior to construction taking place.
- We recommend that if archaeological sites or graves are exposed during construction work, it should immediately be reported to a heritage consultant so that an investigation and evaluation of the finds can be made.

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

10. REFERENCES

10.1 Data bases

Chief Surveyor General
Environmental Potential Atlas, Department of Environmental Affairs and Tourism.
Heritage Atlas Database, Pretoria.
National Archives of South Africa

10.2 Literature

Acocks, J.P.H. 1975. *Veld Types of South Africa*. Memoirs of the Botanical Survey of South Africa, No. 40. Pretoria: Botanical Research Institute.

Cloete, P.G. 2000. *The Anglo-Boer War: a Chronology*. Pretoria: JP van der Walt

Mason, R.J. 1962. *Prehistory of the Transvaal*. Johannesburg: Witwatersrand University Press.

Mason, R.J. 1968. Transvaal and Natal Iron Age settlement revealed by aerial photography and excavation. *African Studies* 27.

Praagh, L.V. (ed.) 1906. *The Transvaal and its mines*. London: Praagh & Lloyd.

Van Schalkwyk, J.A. 2002. *A survey of cultural resources for the proposed new Tutuka-Alpha power transmission line, Standerton district Mpumalanga Province*. Unpublished report 2002KH034.

Van Schalkwyk, J.A. 2010. *Heritage impact assessment for the proposed brine and groundwater treatment works at Tutuka Power Station, Mpumalanga*. Unpublished report 2010/JvS/033.

Van Schalkwyk, J.A. 2012. *Heritage impact assessment for the proposed continuation of Tutuka Ash Disposal Facilities, Mpumalanga Province*. Unpublished report 2012/JvS/044.

10.3 Maps and aerial photographs

1: 50 000 Topocadastral maps: 2629CB, 2629CD
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 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			

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

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.

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.