Heritage impact assessment for the proposed ESKOM 400KV ELECTRICITY TRANSMISSION LINE, AGGENEYS TO HELIOS SUBSTATIONS, NORTHERN CAPE PROVINCE

Old farm house (1924)

HERITAGE IMPACT ASSESSMENT FOR THE PROPOSED ESKOM 400KV ELECTRICITY TRANSMISSION LINE, AGGENEYS TO HELIOS SUBSTATIONS, NORTHERN CAPE PROVINCE

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Declaration:

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

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March 2011

EXECUTIVE SUMMARY

HERITAGE IMPACT ASSESSMENT FOR THE PROPOSED ESKOM 400KV ELECTRICITY TRANSMISSION LINE, AGGENEYS TO HELIOS SUBSTATIONS, NORTHERN CAPE PROVINCE

In order to support increased electricity demand in the Northern Cape, Eskom Transmission is planning to strengthen the existing network with additional 400kV capacity between the Aggeneys Substation, south of the town of Aggeneys, to Helios Substation east of East Loeriesfontein in the Northern Cape Province. The length of the route is approximately 163 km. Two corridors have been identified – the preferred route and an alternative.

The aim of the survey was to evaluate potential heritage resources that would occur within the boundaries of two corridors, one of which would be selected for the construction of an electricity transmission line.

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

The following heritage sites were identified in the study area:

- Pre-colonial archaeological sites dating to the Middle and Later phases of the Stone Age have been identified to occur in the region of study area. In some cases the impact of the development would only be indirect, e.g. the power line crossing over a site. In other areas of the proposed development, even though the impact will be focused on a particular node, i.e. tower positions or access/ inspection roads, it will give rise to the physical disturbance of the material and its context. This would result in irreplaceable loss of resources.

- Colonial period or historic period heritage manifest in a wide variety – farmsteads, infrastructure and cemeteries. As the power line is to cross a rural landscape for the most part, the impact would only be indirect, e.g. the power line crossing over a site. In other areas of the proposed development the impact will be focused on a particular node, i.e. tower positions or access/ inspection roads and will therefore give rise to the physical damage of the features or structures and its context.

Based on the survey and the available literature, it is our opinion that from a heritage point of view there are no fatal flaws that would prevent the proposed development from taking place in either of the two corridors.

However, having said that, it must be remembered that heritage sites are not only fixed features in the environment, occurring within specific spatial confines, but they are also finite in number. Avoiding of impacts on sites is therefore the preferred form of mitigation. In areas where a high density of sites occurs, if at all possible, exclusion zones where no development is to take place, should be set aside. If that is not possible, mitigation can only be achieved through archaeological investigation.

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

- Mitigation should be based on avoiding of sites rather than anything else. In order to achieve this, a full “walk down” of the selected corridor must be done prior to construction taking place, to document all sites, features and objects, in order to propose adjustments to the routes and thereby to avoid as many impacts as possible.

- The management measures, as set out in Section 7 of this report should be implemented prior to construction taking place.

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

J A van Schalkwyk
Heritage Consultant
March 2011

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GLOSSARY OF TERMS AND ABBREVIATIONS

TERMS

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

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

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

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

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

Historical Period: Since the arrival of the white settlers - c. AD 1800 - in this part of the country

ABBREVIATIONS

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

HERITAGE IMPACT ASSESSMENT FOR THE PROPOSED ESKOM 400KV ELECTRICITY TRANSMISSION LINE, AGGENEYS TO HELIOS SUBSTATIONS, NORTHERN CAPE PROVINCE

1. INTRODUCTION

In order to support increased electricity demand in the Northern Cape, Eskom Transmission is planning to strengthen the existing network with additional 400kV capacity between the Aggeneys Substation, south of the town of Aggeneys, to Helios Substation east of East Loeriesfontein in the Northern Cape Province. The length of the route is approximately 163 km. Two corridors have been identified – the preferred route and an alternative.

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

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

Therefore, in accordance with Section 38 of the NHRA, an independent heritage consultant was appointed by **Classical Environmental Management Services** on behalf of the applicant, Eskom Holdings Limited, to conduct a Heritage Impact Assessment (HIA), as part of an Environmental Impact Assessment (EIA).

2. TERMS OF REFERENCE

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 transmission line.

The scope of work for this study consisted of:

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

The objectives were to

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

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

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

3. HERITAGE RESOURCES

3.1 **The National Estate**

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

- places, buildings, structures and equipment of cultural significance;
- places to which oral traditions are attached or which are associated with living heritage;
- historical settlements and townscapes;
- landscapes and natural features of cultural significance;
- geological sites of scientific or cultural importance;
- archaeological and palaeontological sites;
- graves and burial grounds, including-
    - ancestral graves;
    - royal graves and graves of traditional leaders;
    - graves of victims of conflict;
    - graves of individuals designated by the Minister by notice in the Gazette;
    - historical graves and cemeteries; and
    - other human remains which are not covered in terms of the Human Tissue Act, 1983 (Act No. 65 of 1983);
- sites of significance relating to the history of slavery in South Africa;
- movable objects, including-
    - objects recovered from the soil or waters of South Africa, including archaeological and palaeontological objects and material, meteorites and rare geological specimens;
    - objects to which oral traditions are attached or which are associated with living heritage;
    - ethnographic art and objects;
    - military objects;
    - objects of decorative or fine art;
    - objects of scientific or technological interest; and
    - books, records, documents, photographic positives and negatives, graphic, film or video material or sound recordings, excluding those that are public records as defined in section 1(xiv) of the National Archives of South Africa Act, 1996 (Act No. 43 of 1996).

3.2 **Cultural significance**

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

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

- its importance in the community, or pattern of South Africa's history;
- its possession of uncommon, rare or endangered aspects of South Africa's natural or cultural heritage;
- its potential to yield information that will contribute to an understanding of South Africa's natural or cultural heritage;
- its importance in demonstrating the principal characteristics of a particular class of South Africa's natural or cultural places or objects;

- its importance in exhibiting particular aesthetic characteristics valued by a community or cultural group;
- its importance in demonstrating a high degree of creative or technical achievement at a particular period;
- its strong or special association with a particular community or cultural group for social, cultural or spiritual reasons;
- its strong or special association with the life or work of a person, group or organisation of importance in the history of South Africa; and
- sites of significance relating to the history of slavery in South Africa.

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

4. STUDY APPROACH AND METHODOLOGY

4.1 **Extent of the Study**

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

4.2 **Methodology**

4.2.1 *Preliminary investigation*

4.2.1.1 Survey of the literature
A survey of the relevant literature was conducted with the aim of reviewing the previous research done and determining the potential of the area. Some published books and papers deal with areas, events or groups of people in the larger region (e.g. Beaumont & Vogel 1984; Fagan 2008; Richardson 2001). Other sources are unpublished reports, mostly scoping studies and HIAs done in the region (Morris 200a, 200b).

- All of these sources contributed some information on historic events in the larger region as well as on the location of specific heritage sites and features.

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

- Database surveys produced information on a number of sites located in the larger region of the proposed development.
- The original Title Deeds of some of the farms were located, but produced limited information of use such as the dating of farmsteads, etc.

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 area that had to be investigated was identified by **Classical Environmental Management Services** by means of maps.

As this is a linear development the survey was done by travelling the corridors as far as possible. This turned out not to be difficult as in most cases the corridors are easily accessible by means of roads and tracks.

4.3 **Limitations**

- As the corridors are a kilometre wide, they were surveyed only in a general sense.
- In many cases the proposed power lines will have a visual impact, i.e. indirect impact, on heritage sites. This is not addressed in this report as a separate report will be dealing with visual impacts.
- Most owners do not occupy the properties permanently, choosing to stay in one of the surrounding towns and visiting the farm as required. It was therefore not possible to speak to all of them.

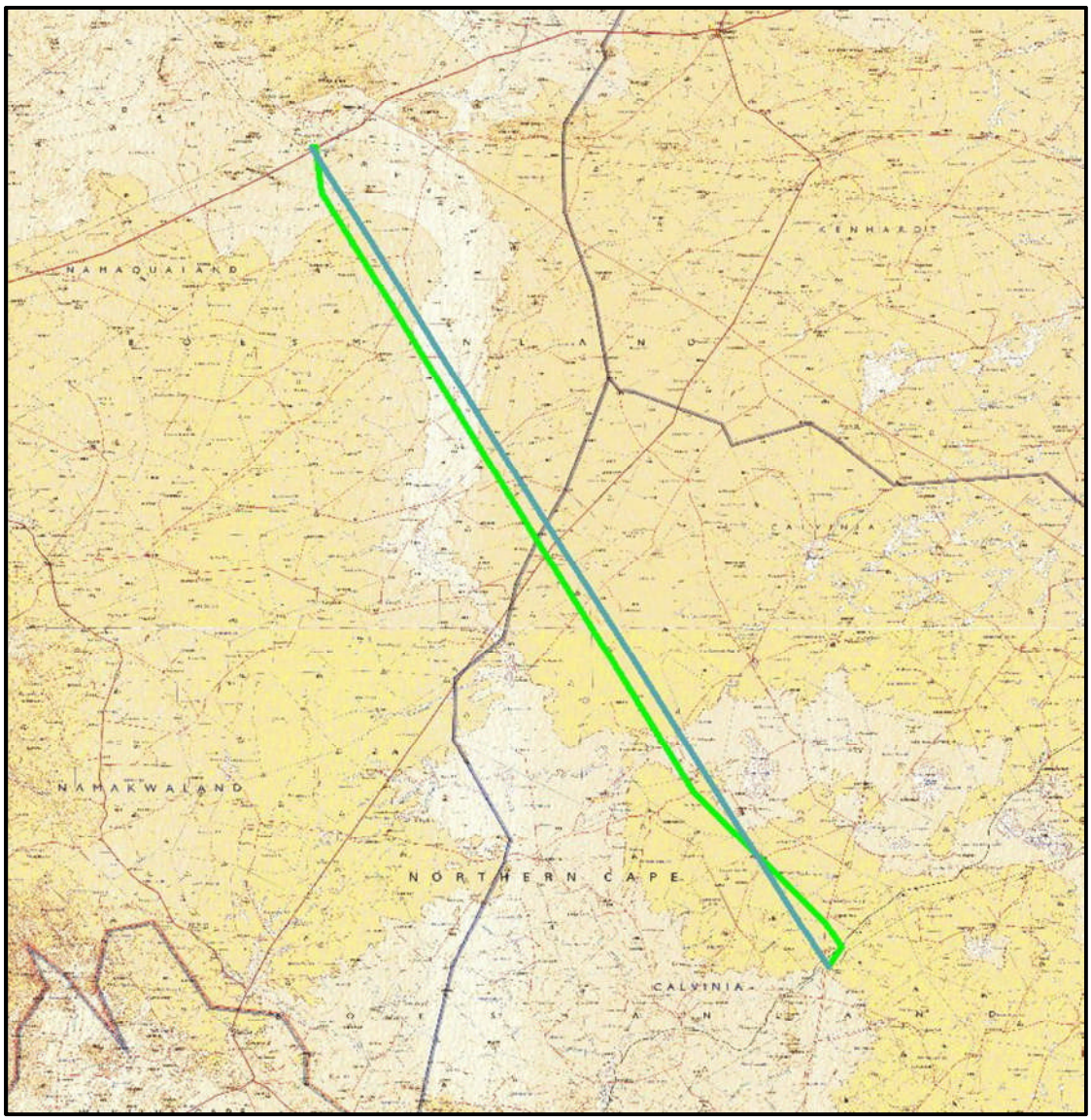

Fig. 1. Location of the study area in regional context.
(Map 2918, 3018: Chief Surveyor-General)

5. DESCRIPTION OF THE AFFECTED ENVIRONMENT

5.1 **Site location and description**

The study area consists of two corridors that run from the town of Aggeneys, west of Pofadder, in south-easterly direction to the Helios Substation, located some 50 km north of the town of Loeriesfontein (see Fig. 1) in the Northern Cape Province. The total length of the corridor is approximately 163 km.

The geology of the region is largely sedimentary in nature, being made up of sand, limestone, clay, dune sand, calcrete and silcrete, except in the southern part where it is mostly shale with some dolerite intrusions.

This is a rural landscape where sheep farming dominates. For large sections of the region even this is not a permanent type of settlement, as many farmers move their live-stock to different regions (Loeriesfontein) for a couple of months (July to December) every year. It was only with the drilling of bore holes that the possibility of permanent settlement became a reality.

The region is very arid, although the ample rain of the past season shows that could have been a very attractive area for human settlement for shorter periods in the past. This is for example confirmed by the presence of threshing floors identified at some farmsteads, indicating the production of grain. Almost all the open water is located in pans, most of which is salty and therefore unusable to humans as well as animals.

The corridors pass through three vegetation zones: Bushmanland Sandy Grassland, Bushmandland Arid Grassland and Bushmanland Basin Shrubland.

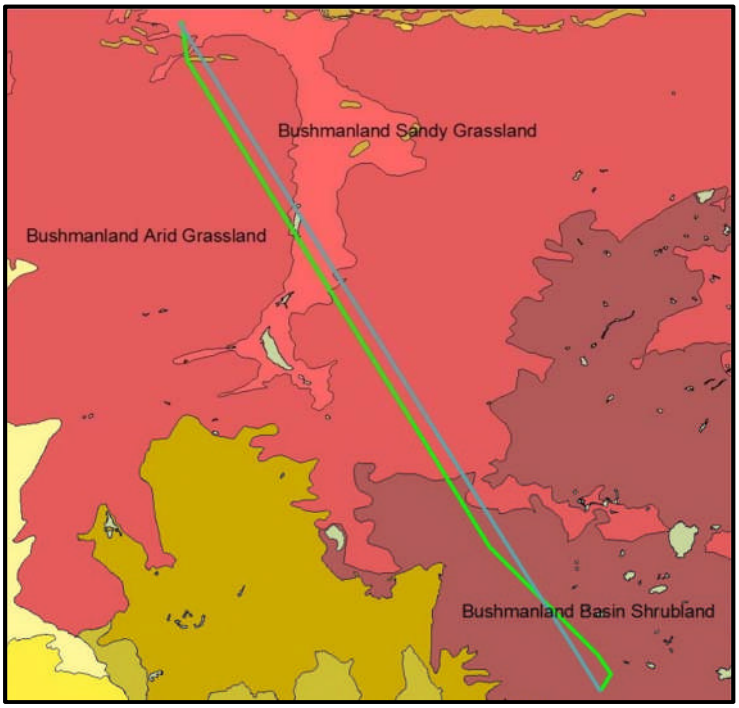

Fig. 2. The vegetation zones found in the study region.
(After Mucina & Rutherford 2006)

The topography is classified as flat to gently rolling plains. As a result of the above environmental factors the following aspects can be seen to dominate in the environment

- Plains which make up the largest section of the study area. Water sources and potential shelter is limited.
- Some areas are covered with red dunes, probably aeolian in origin. Pans occur in between the dunes, making occupation possible
- Small hills and outcrops of dolerite occur in the southern section of the study area. These hills afford some potential for shelter.
- Pans and vleis occur sporadically all over. If water is fresh, occupation is possible.

Fig. 3. Elements of the natural landscape through which the corridors pass.
(Plains, pans, dunes and outcrops)

5.2 **Overview of the region**

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

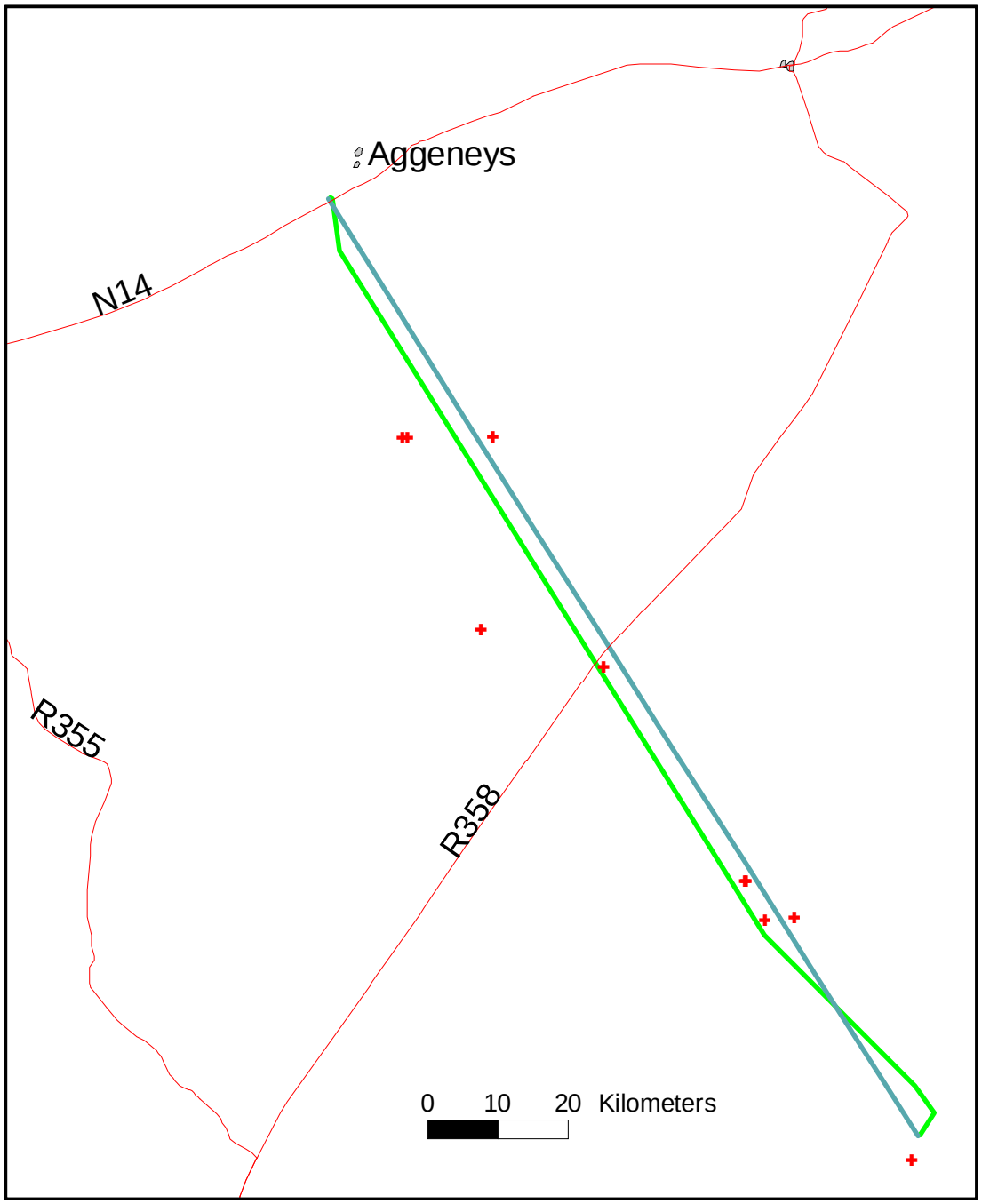

Fig. 4. Distribution of identified sites of heritage significance (red crosses).

5.2.1 *Rural landscape*

This rural landscape has always been sparsely populated and it was only during the last hundred years that people, through the application of specific economic strategies, succeeded to occupy a section of the region for any length of time.

- Archaeological sites

Very little information regarding the archaeology of the study area exists as no intensive survey has been done in the region.

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

Fig. 5. A few flakes and tools, probably dating to the Middle Stone Age.
Examples of stone tools identified during the trip. The stone tools in the right hand picture are not from the region and are only used to illustrate the difference between Early (left), Middle (middle) and Later Stone Age (right) technology.

It seems as if finds of Early Stone Age material this far to the west is very limited and no report of any such finds in the study region could be found. This is a fact that has been commented on by various authors (see Morris 2000b).

With regards to the Middle Stone Age, a few such tools and flakes were found. These were mostly of hornfels, although some are of indurated shale (Fig. 5a). All were found at the foot of a number of hills/outcrops in the southern section of the study area. However, the density of occurrence of this material is very low, probably only < 1: 50 m^2.

Occupation of the region seems to have increased during the Later Stone Age (LSA). This is probably the result of an interface between a foraging presence and a pastoralist occupation of the region. However, the latter subsistence regime would only have been possible in a situation of increased open water available for live-stock, a fact that would need much more background research to be confirmed.

According to local land owners stone tools are most commonly found in the following places:

- On the rims of fresh water pans or stream beds where water might remain for some time during the rainy season.
- Amongst some of the red sand dunes, where small pans are likely to develop during the rainy season.
- At the base of some of the dolerite hills/outcrops in the southern region.

With regard to the dune sites, the owner of the farm Dirks-Kop confirmed the presence of stone tools and ostrich eggshells used as water containers around one such pan. **This site is located outside the corridor.**

With regard to the dolerite hills, Mr J van der Westhuizen tells of a site at Dansterkop where during the late 1800s some trekboers/farmers killed a number of San people who were living here. They were accused of always stealing sheep. Apparently some stone walling, ostrich eggshell beads and glass beads were found here. **This site is located outside the corridor.**

- Farmsteads

In the case of colonial period occupation we are fortunate to have land owners who are descendants of some of the earliest farmers who settled in the area and all of whom have a remarkable knowledge of the region and it's past.

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

Fig. 6. Examples of farmsteads and farming related features identified in the region.

By the 19th century some Dutch speaking trekboers moved into the region, grazing their stock. As they depended on water for their live-stock, these farmers would have stuck close to available water sources and it was only during the wetter parts of the rain season that they might have accessed other areas for short periods of time. An investigation of the Title Deeds of most of the farms under consideration indicated that they were surveyed during the early part of the twentieth century, implying that they would have been occupied since then.

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.

The architecture of these farmsteads can be described as an eclectic mix of styles modified to adapt to local circumstances. Farm buildings were generally single storied. Walls were thick and built in stone. The roof was either flat or ridged and thatched or tiled and was terminated at either end by simple linear parapet gables.

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 as they were erected later as and when they were required.

It is accepted that the power line would not be built across a farmstead and the direct impact can therefore be considered to be low. However, it would have a big visual impact, which might be a problem for some land owners as they have or are planning to have some form of tourism activity on their property. The farmsteads are viewed to have a medium significance on a regional level.

- Cemeteries

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

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

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

- 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, as well as industries that exploit locally available resources.

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

Fig. 7. Extensive salt works on Galputs.
(Photo: Google Earth)

Due to the sparse population, infrastructural development in this part of the world has always been low. The roads are gravel and graded occasionally. As there are no major rivers, river crossings remained informal.

The one industrial activity that is practised in the region on a commercial basis is the extraction of salt from the various pans in the region. The manner in which the salt is extracted requires a low level technology, with the result that even if it has taken place over a long period of time at any given place, few structures or features are associated with it.

It is probable that the salt pans were exploited in pre-colonial times for obtaining of salt, but this would have been on a very low level of activity. It was only with the more permanent settlement of farmers in the region since the early twentieth century that the salt was exploited on a commercial basis.

6. SITE SIGNIFICANCE AND ASSESSMENT

6.1 **Heritage assessment criteria and grading**

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

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

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

6.2 **Statement of significance**

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

- Stratified Stone Age sites are viewed to have a high significance on a regional level and have Grade II significance;

- Farmsteads are viewed to have medium significance on a regional level and have Grade III significance;

- Graves and cemeteries are viewed to have high significance on a local level and have Grade III significance;

- Industrial heritage sites are viewed to have medium significance on a regional level and have Grade III significance.

6.3 **Impact assessment**

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

Environmental Parameter	**Pre-colonial: Stone Age sites**
Issue/Impact/Environmental Effect/Nature	Many sites are still unknown. Their potential and significance therefore unknown. The impact will be the physical disturbance of the material and its context. Impact will be focused on a particular node, i.e. tower positions or access/ inspection roads
Extent	Local
Probability	Can occur
Reversibility	Irreversible
Magnitude	High
Duration	Permanent
Significance Rating	Sites have a high significance on a region level – viewed as NHRA Grade II sites. Distinguish from find spots, which have low significance
	Impact rating
Extent	2
Probability	3
Reversibility	5
Magnitude	4
Duration	5
Significance rating	48 (negative high)
Mitigation measures	All of these sites should be avoided as far as possible. Sites that cannot be avoided should be excavated in full by an archaeologist qualified in Stone Age archaeology.

Environmental Parameter	**Colonial Period - farmsteads**
Issue/Impact/Environmental Effect/Nature	The various features are subject to damage. Easier to identify and therefore easier to avoid. Variety of interconnected elements makes up the whole. Impact on part therefore implies an impact on the whole
Extent	Local
Probability	Unusual but possible
Reversibility	Reversible with human intervention
Magnitude	Moderate
Duration	Medium term

Significance Rating	Sites have a medium significance on a region level – viewed as NHRA Grade III sites.
	Impact rating
Extent	2
Probability	2
Reversibility	3
Magnitude	3
Duration	3
Significance rating	22 (low negative)
Mitigation measures	Mitigation should take the form of isolating known sites and declare them as no-go zones with sufficient large buffer zones around them for protection. In exceptional cases mitigation can be implemented after required procedures have been followed.

Environmental Parameter	**Colonial Period – industrial heritage**
Issue/Impact/Environmental Effect/Nature	Different features are subject to damage. Some might be unique – no alternatives or second examples. Easy to identify and therefore easy to avoid
Extent	Site
Probability	Unusual but possible
Reversibility	Reversible with human intervention
Magnitude	Marginal loss of resources
Duration	Medium term
Significance Rating	Sites have a medium significance on a region level – viewed as NHRA Grade III sites.
	Pre-mitigation impact rating
Extent	1
Probability	2
Reversibility	2
Magnitude	3
Duration	3
Significance rating	19 (low negative)
Mitigation measures	Mitigation should take the form of isolating known sites and declare them as no-go zones with sufficient large buffer zones around them for protection. In exceptional cases mitigation can be implemented after required procedures have been followed, but only as last case scenario.

7. RECOMMENDED MANAGEMENT MEASURES

Heritage sites are fixed features in the environment, occurring within specific spatial confines. Any impact upon them is permanent and non-reversible. Those resources that cannot be

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

7.1 **Objectives**

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

The following shall apply:

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

7.2 **Control**

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

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

8. CONCLUSIONS

The aim of the survey was to evaluate potential heritage resources that would occur within the boundaries of two corridors, one of which would be selected for the construction of an electricity transmission line.

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

The following heritage sites were identified in the study area:

- Pre-colonial archaeological sites dating to the Middle and Later phases of the Stone Age have been identified to occur in the region of study area. In some cases the impact of the development would only be indirect, e.g. the power line crossing over a site. In other areas of the proposed development, even though the impact will be focused on a particular node, i.e. tower positions or access/ inspection roads, it will give rise to the physical disturbance of the material and its context. This would result in irreplaceable loss of resources.

- Colonial period or historic period heritage manifest in a wide variety – farmsteads, infrastructure and cemeteries. As the power line is to cross a rural landscape for the most part, the impact would only be indirect, e.g. the power line crossing over a site. In other areas of the proposed development the impact will be focused on a particular node, i.e. tower positions or access/ inspection roads and will therefore give rise to the physical damage of the features or structures and its context.

Based on the survey and the available literature, it is our opinion that from a heritage point of view there are no fatal flaws that would prevent the proposed development from taking place in either of the two corridors.

However, having said that, it must be remembered that heritage sites are not only fixed features in the environment, occurring within specific spatial confines, but they are also finite in number. Avoiding of impacts on sites is therefore the preferred form of mitigation. In areas where a high density of sites occurs, if at all possible, exclusion zones where no development is to take place, should be set aside. If that is not possible, mitigation can only be achieved through archaeological investigation.

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

- Mitigation should be based on avoiding of sites rather than anything else. In order to achieve this, a full “walk down” of the selected corridor must be done prior to construction taking place, to document all sites, features and objects, in order to propose adjustments to the routes and thereby to avoid as many impacts as possible.

- The management measures, as set out in Section 7 of this report should be implemented prior to construction taking place.

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

9. REFERENCES

9.1 **Data bases**

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Environmental Potential Atlas, Department of Environmental Affairs and Tourism.
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South African Heritage Resources Agency

9.2 **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.

Beaumont, P.B. & Vogel, J.C. 1984. Spatial patterning of the ceramic Later Stone Age in the Northern Cape Province, South Africa. In Hall, M., Avery, G., Avery, D.M., Wilson, M.L. & Humphreys, A.J.B. *Frontiers: Southern African Archaeology Today*. Cambridge.

Fagan, G. 2008. *Brakdak: platdakke in die Karoo*. Kaapstad: Breestraat Publikasies.

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Mucina, L & Rutherford, M.C. (eds.) 2006. *The Vegetation Atlas of South Africa, Lesotho and Swaziland*. Strelitzia 19. Pretoria. South African National Biodiversity Institute.

Playne, E. (Ed.) 1910-1911. *Cape Colony (Cape Province): its History, Commerce, Industries and Resources*. London: The Foreign and Colonial Compiling and Publishing Co.

Richardson, D. 2001. *Historic sites of South Africa*. Cape Town: Struik Publishers.

9.3 **Maps and aerial photographs**

1:50 000 Topocadastral maps: 2918DB, 2918BD, 2919CC, 2919CA, 3019AA, 3019AB, 3019BC, 3019DA, 3019AD, 3019CB .

Google Earth

9.4 **Interviews**

Mr J van der Westhuizen, farm Uitspankolk
Owner of Middelputs (Dirks-Kop).

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

Significance

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

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

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

Significance of impact:

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

Certainty of prediction:

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

Recommended management action:

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

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

Legal requirements:

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

APPENDIX 2. RELEVANT LEGISLATION

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

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

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

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

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

(a) destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or palaeontological site or any meteorite;

(b) destroy, damage, excavate, remove from its original position, collect or own any archaeological or palaeontological material or object or any meteorite;

(c) trade in, sell for private gain, export or attempt to export from the Republic any category of archaeological or palaeontological material or object, or any meteorite; or

(d) bring onto or use at an archaeological or palaeontological site any excavation equipment or any equipment which assist in the detection or recovery of metals or archaeological and palaeontological material or objects, or use such equipment for the recovery of meteorites.

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

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

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

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

(a) destroy, damage, alter, exhume or remove from its original position or otherwise disturb the grave of a victim of conflict, or any burial ground or part thereof which contains such graves;

(b) destroy, damage, alter, exhume, remove from its original position or otherwise disturb any grave or burial ground older than 60 years which is situated outside a formal cemetery administered by a local authority; or

(c) bring onto or use at a burial ground or grave referred to in paragraph (a) or (b) any excavation equipment, or any equipment which assists in the detection or recovery of metals.

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