Vhubvo Archaeo-Heritage Consultants Cc
Registration No.:2010/090598/23
VAT No.: 4960270322

546 16th road, Building no 2
Constantia Park, Midrand
Tel: 011 312 2878
Cell: 082 535 6855
Fax: 011 312 7824
info@vhubvo.co.za

Office No. 25
Bindulavhuthu Complex
Thohoyandou CBD, 0950
P.O. Box 696; Sibasa; 0970
Tel/Fax: 015 9625 742

DIGES GROUP CC

PHASE I ARCHAEOLOGICAL AND CULTURAL HERITAGE SPECIALIST REPORT FOR THE PROPOSED CONSTRUCTION OF 400KV POWERLINE FROM FOSKOR SUBSTATION TO SPENCER SUBSTATION WITHIN THE JURISDICTION OF THE LOCAL MUNICIPALITIES OF GREATER LETABA, MARULENG, GREATER TZANEEN AND BA-PHALABORWA OF MOPANI DISTRICT MUNICIPALITY IN LIMPOPO PROVINCE.

February, 2018

564 16th road, Building no 2, Constantia park, Midrand,1685
PO Box 7068, Midrand, 1685

©COPYRIGHT

DECLARATION

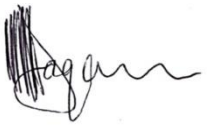
ABILITY TO CONDUCT THE PROJECT

Munyadziwa Magoma is a professional archaeologist, having obtained his BA degree in Archaeology and Anthropology at University of South Africa (UNISA), an Honours degree at the University of Venda (UNIVEN), and a Master's degree at the University of Pretoria (UP). He is an accredited Cultural Resource Management (CRM) member of the Association for Southern African Professional Archaeologists (ASAPA) and Amafaa KwaZulu-Natali. Munyadziwa is further affiliated to the South African Archaeological Society (SAAS), the Society of Africanist Archaeologists (SAfA), and the International Council of Archaeozoology (ICAZ). He has more than seven years' experience in heritage management, having worked for different CRM organisations and government heritage authorities. As a CRM specialist, Munyadziwa has completed well over hundred Archaeological Impact Assessments (AIA) for developmental projects situated in several provinces of the Republic of South Africa. The AIAs projects he has been involved with are diverse, and include the establishment of major substation, upgrade and establishment of roads, establishment and extension of mines. In addition, he has also conducted Heritage Impact Assessments (HIAs) for the alteration to heritage buildings and the relocation of graves. His detailed CV is available on request.

I, Mr. Munyadziwa Magoma, declare that this report has been prepared independently of any influence as may be specified by all relevant department, institution and organization.

CO-AUTHOR AND CONTACT DETAILS:

Munyadziwa Magoma and Roy Muroyi



Cell: 082 535 6855
Tel: 011 312 2878
Fax: 086 566 8079
E-mail: munyadziwa@vhubvo.co.za

CLIENT CONTACT DETAILS:

- DIGES GROUP CC

B. Makanza
Cell: 082 075 6685
Tel: 011 312 2878
Fax: 011 312 7824
Email: brendam@diges.co.za

Acknowledgements

The author and the team of Vhubvo Archaeo-Heritage Consultants Cc would like to acknowledge DIGES Group Cc for their assistance in relation to the conduction of this project, also Google earth and Wikipedia.

EXECUTIVE SUMMARY

Introduction

Vhubvo Archaeo-Heritage Consultants Cc was appointed by DIGES Group Cc to conduct an Archaeological and Cultural-Heritage Impact Assessment study for the proposed construction of a 400 kV Transmission powerline from Foskor Substation (adjacent Phalaborwa) to Spencer Substation (adjacent Giyani) within Mopani District Municipality of Limpopo Province.The aim of the study was to outline the archaeological sites, cultural resources, sites associated with oral histories, graves, cultural landscapes, and any structure of historical significance that may be affected by the proposed development, and to advise on mitigation measure should any sites be affected, these mitigation will in turn assist the developer to make a decision on the most appropriate option (s) in line with the National Heritage Resource Act, 1999 (Act 25 of 1999). The findings of this cultural study have been informed by desktop study and field survey. The desktop study was undertaken through SAHRIS for previous Cultural Heritage Impact Assessments conducted in the region of the proposed development, and also for researches that have been carried out in the area over the past years.

Background and Need of the Project

Load forecast conducted in 2015 showed that Spencer Main Transmission Substation (MTS) will be having a peak demand of 310MVA by year 2018. To ensure the reliability of electricity supply to customers, Eskom Transmission has embarked on a drive to address the transmission constraints at Spencer MTS as well as the 275kV transmission network constraints on the network supplying the substation.

The current situation at Spencer MTS is:

- Spencer MTS equipped with 2x250MVA, 275/132kV transformers;
- Spencer MTS is currently fed from Tabor MTS (86km) and Witkop MTS (138km);

Eskom Holdings SOC Limited proposes to strengthen power loads in the area around Foskor (Phalaborwa) to Spencer (Giyani). Hence, they are proposing to construct a power line. The proposed project will entail the following:

- The construction of a new 400kV power line from Foskor substation (Phalaborwa) to Spencer substation (near Giyani);
- The upgrading of Spencer MTS;

The technical details of the 400kV power line are:

- Length of Power lines: ±110km;
- Servitude: 55m;

- Tower to Tower span: 300m – 350m ;
- Height of Tower: between 30m-35m; and
- Minimum conductor ground clearance: 8.1m

The technical details of the substation are:

- The expansion of the substation footprint/yard to accommodate new equipment;
- The installation of 1x500MVA, 400/132kV transformer at Spencer MTS.

Methodology and Approach

The study method refers to the SAHRA Policy Guidelines for impact assessment, 2012. As part of this impact assessment; the following process were followed:

- Literature Review: To understand the background archaeology of the area, a background study was undertaken and relevant institutions were consulted. These studies entail review of archaeological and heritage impact assessment studies that have been conducted around the proposed area thorough SAHRIS. In addition, E-journal platforms such as J-stor, Google scholars and History Resource Centre were searched. The University of Pretoria's Library collection was also pursued;
- The field survey was conducted from the 1st to the 9th of February 2017, this also included public consultations, and oral interviews;
- The final step involved the recording and documentation of relevant archaeological resources, as well as the assessment of resources in terms of the heritage impact assessment criteria and report writing, as well as mapping and constructive recommendations.

The applicable maps, tables and figures, are included as stipulated in the NHRA (no 25 of 1999), the National Environmental Management Act (NEMA) (no 107 of 1998) and the Minerals and Petroleum Resources Development Act (MPRDA) (28 of 2002).

Brief History of the Area

The Stone Age is the period in human history when stone materials were used to produce tools. In South Africa the Stone Age can be divided into three periods, Early (More than 2 million years ago - 250 000 years Ago), Middle (250 000 years ago – 25 000 years ago) and Late (25 000 years ago - AD 200). It is, however, important to note that dates only provide a broad framework for interpretation. The proposed area is home to all three known phases of the Stone Age. The Iron Age is the name given to the period of human history when metal was mainly used to produce artifacts. In South Africa this period can be divided in two separate phases. Early (AD 400 - AD 1025) and Late (AD 1025 - AD 1830). Although there are no known Early Iron Age sites in the area, there are several Late Iron Age sites (Bergh 1999: 7-8). The Late Iron Age farmers were followed by colonists. Although the area has a rich history of both mining and colonial expansion, the affected towns (Phalaborwa and Giyani) holds little of historic significance.

Impact statement

The construction of the proposed powerlines will result in various threats to archaeological and graves sites in the vicinity of the new infrastructure (s), with impacts ranging from moderate to high. Thus, the impact of the proposed powerline and substation on archaeological and cultural heritage remains is rated as being high to medium (see Table 1) on all proposed study areas. Noteworthy that the linear nature of the project area will cause minimal impact to the ground. Furthermore, tower positions can be moved to avoid direct impacts on heritage resources. It is important to note that all categories of heritage resource, with the possible exception of movable objects, are generally known to occur in the area proposed for development. The primary areas of concern in this study are the impacts on archaeological sites and the landscape that is traversed by the proposed power lines. The presence of the power lines within a wide servitude will have a negative visual impact on heritage sites, and this impact will last for the lifespan of this proposed development. However, this is not addressed in this report as a separate report will be dealing with visual impacts.

Restrictions and Assumptions

Most of the area proposed for development is encroached by bush which make it almost impossible to access. It is thus possible that some materials could have been overlooked due to that the area was investigated only in a broad, overview approach as access to the different properties was not possible. 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 corridors and that these then will also have to be considered in the selection of the preferred corridor. In addition, it is also assumed that a Visual Impact Assessment will be done to determine the impact of development on any identified heritage sites.

Site-Location Model

Archaeologists who do research in the region generally accept a site-location model proposed by Maggs (1980). The model suggests that inland sites will be found in locations which bear the following:

- Limited to below an altitude of 1000 m asl;
- Situated on riverside or streamside locations, on deep alkaline colluvial soils; and
- In areas appropriate for dry-farming (with sufficient summer rainfall).

Survey Findings and Discussions

The main aim of the survey was to evaluate potential heritage resources that would occur within the boundaries of the proposed area (s) as well as to determine if there is any hamartia that would prevent the proposed development from taking place in any of the proposed study area (s).

Archaeological sites dating to the Stone, Iron and Historical Age are known to occur in the region of study area. However, from the survey conducted, most of the known sites would only have an indirect impact. For example, power line crossing some distance from the site, thereby having only a visual impact. However, note should be taken that detailed information about the powerline is still in early stage, e.g., the exact position of the powerline/ access roads are yet to be finalised, it might be possible that specific aspects related to development might have a direct disturbance, which would result in irreplaceable loss of heritage resources. Below are the sensitive areas that were noted during survey:

- Iron Age people preferred to settle on the alluvial soils close to rivers. As such, all river banks are viewed to be sensitive and should be avoided in the best way possible;
- The proposed development is also located in area with localised Airports, impacting on these should be avoided as far as possible.

The study area was investigated for sites of heritage significance that might be affected by the proposed construction. The only sign of sites of heritage potential were mostly graves (Especially on Corridor 2), and this can be avoided. Nonetheless, there is also a high chance of finding archaeological sites and this will be difficult to avoid since most of these are trifling, and often hidden underground, only exposed once construction begins.

Although no remains of Stone/ Iron Age sites were noted during site visit, the area could still contain camps and some areas with suitable substrates that could have been used as quarries for material to produce tools, particularly within Nature Reserves.

Taking all the above information into account, it can be recommended that **Corridor One (1)** is the preferred alternative from a heritage impact perspective. Noteworthy that all grave sites should be avoided in the best way possible. Meaning attempts should be made to avoid all grave sites during final stage of planning. No major heritage flaws which can hamper the success of this project where noted in any of the identified corridors.

Two alternatives were investigated for the deviations. Option (s) 1a and 1b. The first option, 1a has the high level of heritage sensitivity. However, Option 1b showed minimal signs of heritage sites. It is therefore recommended that **Option 1b can be used as a deviation from Corridor 1 to Corridor 2**. It should still be noted that no site (s) can be found within 1a can be of such high significance such that

construction may not be possible. 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 like. Henceforth, for the project to continue, I, as an independent archaeologist due recommend the following:

A heritage practitioner should complete a “walk down” of the final selected power line servitudes, the chosen deviation location and all other activity areas (access roads, construction camps, etc.) prior to the start of any construction activities. This walk down will document all sites, features and objects, in order to propose adjustments to the routes and thereby to avoid as many impacts to heritage as possible.

Conclusions

A thorough background study and survey of the proposed development was conducted and findings were recorded in line with SAHRA guidelines. It is recommended that LIHRA exercise its discretion and allow the developer to proceed with the project subject to the recommendations given above.

TABLE OF CONTENTS

ACRONYMS AND ABBREVIATIONS

AIA	Archaeological Impact Assessment
EMP	Environmental Management Plan
HIA	Heritage Impact Assessment
LIA	Late Iron Age
MIA	Middle Iron Age
EIA	Early Iron Age
HMP	Heritage Management Plan
LSA	Late Stone Age
MSA	Middle Stone Age
ESA	Early Stone Age
NASA	National Archives of South Africa
NHRA	National Heritage Resources Act
LIHRA	Limpopo Heritage Resources Authority
SAHRA	South African Heritage Resources Agency

GLOSSARY OF TERMS

The following terms used in this Archaeology are defined in the National Heritage Resources Act [NHRA], Act Nr. 25 of 1999, South African Heritage Resources Agency [SAHRA] Policies as well as the Australia ICOMOS Charter *(Burra Charter)*:

Archaeological Material: remains resulting from human activities, which are in a state of disuse and are in, or on, land and which are older than 100 years, including artifacts, human and hominid remains, and artificial features and structures.

Artefact: Any movable object that has been used modified or manufactured by humans.

Conservation: All the processes of looking after a site/heritage place or landscape including maintenance, preservation, restoration, reconstruction and adaptation.

Cultural Heritage Resources: refers to physical cultural properties such as archaeological sites, palaeolontological sites, historic and prehistorical places, buildings, structures and material remains, cultural sites such as places of rituals, burial sites or graves and their associated materials, geological or natural features of cultural importance or scientific significance. This include intangible resources such religion practices, ritual ceremonies, oral histories, memories indigenous knowledge.

Cultural landscape: "the combined works of nature and man" and demonstrate "the evolution of human society and settlement over time, under the influence of the physical constraints and/or opportunities presented by their natural environment and of successive social, economic and cultural forces, both internal and external".

Cultural Resources Management (CRM): the conservation of cultural heritage resources, management, and sustainable utilization and present for present and for the future generations

Cultural Significance: is the aesthetic, historical, scientific and social value for past, present and future generations.

Chance Finds: means Archaeological artefacts, features, structures or historical cultural remains such as human burials that are found accidentally in context previously not identified during cultural heritage scoping, screening and assessment studies. Such finds are usually found during earth moving activities such as water pipeline trench excavations.

Compatible use: means a use, which respects the cultural significance of a place. Such a use involves no, or minimal, impact on cultural significance.

Conservation means all the processes of looking after a place so as to retain its cultural significance.

Expansion: means the modification, extension, alteration or upgrading of a facility, structure or infrastructure at which an activity takes place in such a manner that the capacity of the facility or the footprint of the activity is increased.

Grave: A place of interment (variably referred to as burial), including the contents, headstone or other marker of such a place, and any other structure on or associated with such place.

Heritage impact assessment (HIA): Refers to the process of identifying, predicting and assessing the potential positive and negative cultural, social, economic and biophysical impacts of any proposed project, plan, programme or policy which requires authorisation of permission by law and which may significantly affect the cultural and natural heritage resources. The HIA includes recommendations for appropriate mitigation measures for minimising or avoiding negative impacts, measures enhancing the positive aspects of the proposal and heritage management and monitoring measures.

Historic Material: remains resulting from human activities, which are younger than 100 years, but no longer in use, including artifacts, human remains and artificial features and structures.

Impact: the positive or negative effects on human well-being and / or on the environment.

***In situ* material:** means material culture and surrounding deposits in their original location and context, for instance archaeological remains that have not been disturbed.

Interested and affected parties Individuals: communities or groups, other than the proponent or the authorities, whose interests may be positively or negatively affected by the proposal or activity and/ or who are concerned with a proposal or activity and its consequences.

Interpretation: means all the ways of presenting the cultural significance of a place.

Late Iron Age: this period is associated with the development of complex societies and state systems in southern Africa.

Material culture means buildings, structure, features, tools and other artefacts that constitute the remains from past societies.

Mitigate: The implementation of practical measures to reduce adverse impacts or enhance beneficial impacts of an action.

Place: means site, area, land, landscape, building or other work, group of buildings or other works, and may include components, contents, spaces and views.

Protected area: means those protected areas contemplated in section 9 of the NEMPAA and the core area of a biosphere reserve and shall include their buffers.

Public participation process: A process of involving the public in order to identify issues and concerns, and obtain feedback on options and impacts associated with a proposed project, programme or development. Public Participation Process in terms of NEMA refers to: a process in which potential interested and affected parties are given an opportunity to comment on, or raise issues relevant to specific matters.

Setting: means the area around a place, which may include the visual catchment.

Significance: can be differentiated into impact magnitude and impact significance. Impact magnitude is the measurable change (i.e. intensity, duration and likelihood). Impact significance is the value placed on the change by different affected parties (i.e. level of significance and acceptability). It is an anthropocentric concept, which makes use of value judgments and science-based criteria (i.e. biophysical, physical cultural, social and economic).

Site: a spatial cluster of artefacts, structures, and organic and environmental remains, as residues of past human activity.

1. Introduction

Vhubvo Archaeo-Heritage Consultants Cc was appointed by DIGES Group Cc to conduct an Archaeological and cultural heritage impact assessment study for the proposed construction of a 400 kV Transmission powerline from Foskor Substation (Phalaborwa) to Spencer Substation (near Giyani) and Spencer MTS upgrading within Mopani District Municipality, Limpopo Province. The aim of the study was to outline the archaeological sites, cultural resources, sites associated with oral histories, graves, cultural landscapes, and any structure of historical significance that may be affected by the proposed construction and to advise mitigation should any be affected and these will in turn assist the developer to make a decision on the most appropriate option in line with the National Heritage Resource Act, 1999 (Act 25 of 1999).

The findings of this cultural study have been informed by desktop study and field survey. The desktop study was undertaken through SAHRIS for previous Cultural Heritage Impact Assessments conducted in the region of the proposed development, and also for researches that have been carried out in the area over the past years

1.1 Nature of the Proposed Project

Eskom Holdings SOC Limited proposes to strengthen power loads in the area around Foskor Substation (Phalaborwa) and Spencer Substation (near Giyani). Hence, they are proposing to construct a power line. The proposed project entails the following:

- The construction of a new 400kV power line from Foskor substation (Phalaborwa) to Spencer substation (near Giyani)
- The upgrading of Spencer MTS

The technical details of the 400kV power line are:

- Length of Power lines: ±110km
- Servitude: 55m
- Tower to Tower span: 300m – 350m
- Height of Tower: between 30m-35m
- Minimum conductor ground clearance: 8.1m

The technical details of the substation are:

- The expansion of the substation footprint/yard to accommodate new equipment
- The installation of 1x500MVA, 400/132kV transformer at Spencer MTS

2. Sites Location and Description

The proposed 400Kv Power line is located in Mopani District Municipality which is Category C municipality and is found in the north-eastern quadrant of the province of Limpopo. Mopani District Municipality comprises five local municipalities; Greater Tzaneen, Greater Letaba, Greater Giyani, Maruleng and Ba-Phalaborwa. Mopani District Municipality is renowned area for its abundance of wildlife (including the big five), craggy mountains, huge man-made and indigenous forests, trout streams and cascading waterfalls. It provides easy access to the northern section of Kruger Park National Park. In short, this power line will traverse over a range of landscapes, including mountainous, flat and open plains, old and new agricultural fields and mixed bushveld. It also transverses over major rivers, wetland features as well as perennial water stream. Most of these activities highlighted have impacted negatively on the area, and subsequently destroyed or disturbed archaeological and historical sites that might have existed in the past. As aforesaid, the proposal entails construction of ±110km, 400kV power line from Foskor MTS near Phalaborwa to Spencer MTS near Tzaneen. This will also include the establishment of 400/132kV transformation yard with the installation of 1x500MVA, 400/132kV transformer at Spencer MTS. To achieve such, two alternatives and two deviations with a 3km servitude will be assessed. Overleaf is a map of the two alternatives and deviations, as well as related photographs (Note that the google map on Fig. 2 can only be understood in light of the topographical map on Fig 1):

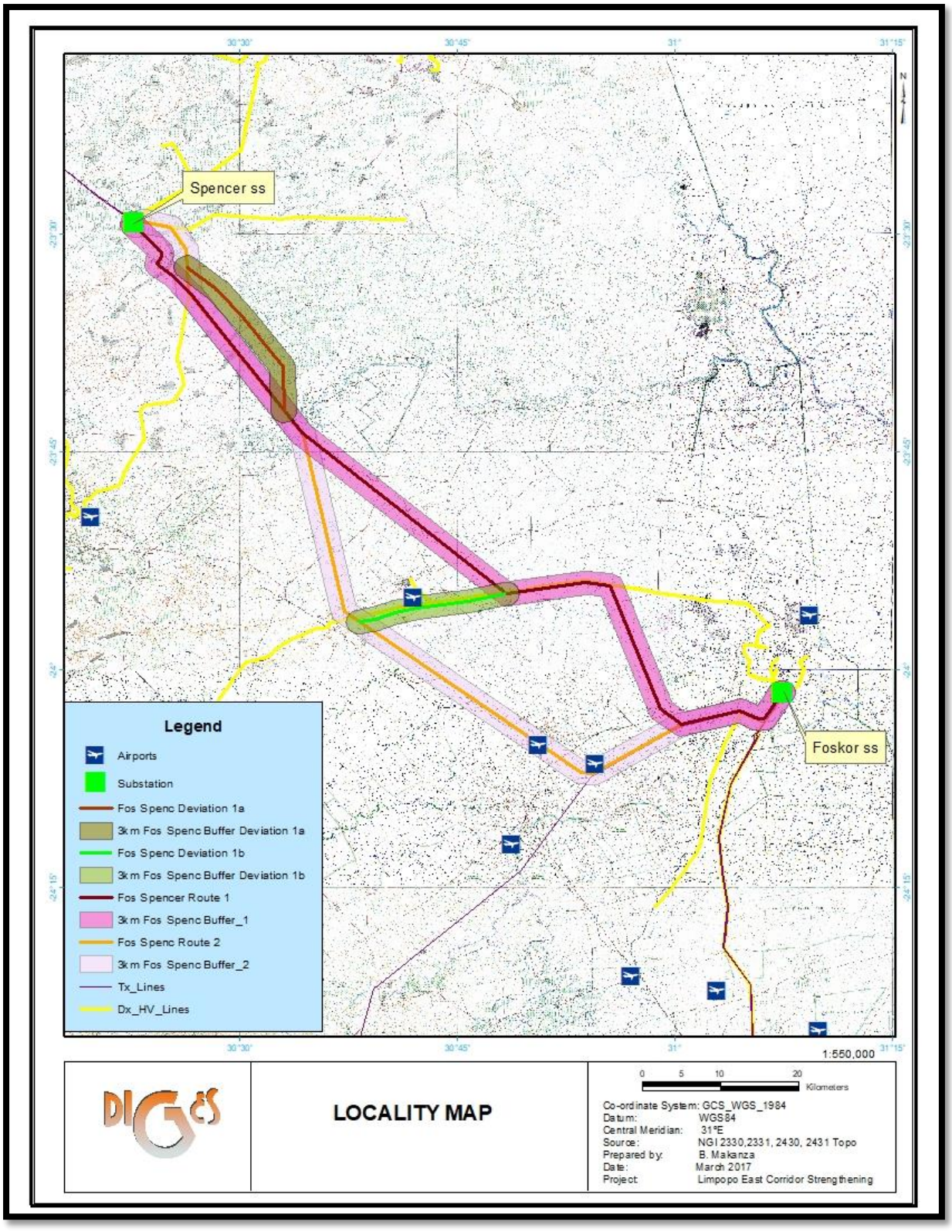


Figure 1: An overview of the Topographical map of the proposed area (Courtesy Diges Group).

Figure 2: An overview of Google map of the proposed area (Courtesy Google Earth).

Figure 3: Over view of Spenser substation which form part of the project area.

Figure 4: An overview of some of the communal agricultural land wherein the powerline will transverse.

Figure 5: An overview of some of the rivers wherein the powerline will transverse.

Figure 6: An overview of some of the wetland wherein the powerline will transverse.

Figure 7: Some of the inspected trenches within the project servitude.

Figure 8: Some of the inspected area along the river banks.

3. Purpose of the Cultural Heritage Study

The purpose of this Archaeological and Cultural Heritage study was to entirely identify and document archaeological sites, cultural resources, sites associated with oral histories, graves, cultural landscapes, and any structure of historical significance that may be affected by the proposed corridors, these will in turn assist the developer in ensuring proper conservation measure in line with the National Heritage Resource Act, 1999 (Act 25 of 1999). Impact assessments highlight many issues facing sites in terms of their management, conservation, monitoring and maintenance, and the environment in and around the site. Therefore, this study involves the following:

- Identification and recording of heritage resources that maybe affected by the proposed corridor (s);
- Providing recommendations on how best to appropriately safeguard identified heritage sites. Mitigation is an important aspect of any development on areas where heritage sites have been identified.

4. Methodology and Approach

Background study introduction

The methodological approach is informed by the 2012 SAHRA Policy Guidelines for impact assessment. As part of this study, the following tasks were conducted: 1) literature review, 2), consultations with the developer and appointed consultants, 3), completion of a field survey and 4), analysis of the acquired data, leading to the production of this report.

Physical survey

The field survey lasted from the 1st to the 9th of February 2017. A total of three archaeologists from Vhubvo conducted the survey in the presence of DIGES officials.

Documentation

The general project area was documented. This documentation included taking photographs using cameras a 10.1 mega-pixel Sony Cybershort Digital Camera. Plotting of finds was done by a Garmin etrex Venture HC.

Oral interview

Oral interview was initiated with members of the community.

Restrictions and Assumptions

Most of the area proposed for development is encroached by bush which makes it almost impossible to access. It is thus possible that some materials could have been overlooked due to that the area was investigated only in a broad, overview approach, as access to the different properties was not possible. Furthermore, several houses located in the proposed area (s) were noted, and access to these homesteads was not possible.

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 corridors and that these then will also have to be considered in the selection of the preferred corridor. In addition, it is also assumed that a Visual Impact Assessment will be done to determine the impact of development on any identified heritage sites.

5. Applicable Heritage Legislation

Several legislations provide the legal basis for the protection and preservation of both cultural and natural resources. These include the National Environment Management Act (No. 107 of 1998); Mineral Amendment Act (No 103 of 1993); Tourism Act (No. 72 of 1993); Cultural

Institution Act (No. 119 of 1998), and the National Heritage Resources Act (Act 25 of 1999).

Section 38 (1) of the National Heritage Resources Act requires that where relevant, an Impact Assessment is undertaken in case where a listed activity is triggered. Such activities include:

(a) the construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;
(b) the construction of a bridge or similar structure exceeding 50 m in length; and
(c) any development or other activity which will change the character of an area of land, or water -
- *(i) exceeding 5 000 m² in extent;*
- *(ii) involving three or more existing erven or subdivisions thereof; or*
- *(iii) involving three or more erven or divisions thereof which have been consolidated within the past five years; or*
- *(iv) the costs of which will exceed a sum set in terms of regulations by SAHRA or a Provincial Heritage Resources Authority;*

(d) the re-zoning of a site exceeding 10 000 m2 in extent; or
(e) any other category of development provided for in regulations by SAHRA or a Provincial Heritage Resources Authority, must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development.

Section 3 of the National Heritage Resources Act (25 of 1999) lists a wide range of national resources protected under the act as they are deemed to be national estate. When conducting a Heritage Impact Assessment (HIA) the following heritage resources have to be identified:

(a) Places, buildings structures and equipment of cultural significance
(b) Places to which oral traditions are attached or which are associated with living heritage
(c) Historical settlements and townscapes
(d) Landscapes and natural features of cultural significance
(e) Geological sites of scientific or cultural importance
(f) Archaeological and paleontological sites
(g) Graves and burial grounds including-
- *(i) ancestral graves*
- *(ii) royal graves and graves of traditional leaders*
- *(iii) graves of victims of conflict*
- *(iv) graves of individuals designated by the Minister by notice in the Gazette*
- *(v) historical graves and cemeteries; and*
- *(vi) other human remains which are not covered by in terms of the Human Tissue Act,1983 (Act No. 65 of 1983)*

(h) Sites of significance relating to the history of slavery in South Africa
(i) moveable objects, including -
- *(i) objects recovered from the soil or waters of South Africa, including archaeological and paleontological objects and material, meteorites and rare geological specimens*
- *(ii) objects to which oral traditions are attached or which are associated with living heritage*
- *(iii) ethnographic art and objects*
- *(iv) military objects*
- *(v) objects of decorative or fine art*
- *(vi) objects of scientific or technological interest; and*

(vii) 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 of the National Archives of South Africa Act, 1996 (Act No. 43 of 1996).

Other sections of the Act with a direct relevance to the AIA are the following:
Section 34(1) *No person may alter or demolish any structure or part of a structure, which is older than 60 years without a permit issued by the relevant provincial heritage resources authority.*

Section 35(4) *No person may, without a permit issued by the responsible heritage resources authority:*

- *destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or palaeontological site or any meteorite*

Section 36 (3) *No person may, without a permit issued by SAHRA or a provincial heritage resources authority:*

- *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 formal cemetery administered by a local authority; or*
- *bring onto or use at a burial ground or grave any excavation equipment, or any equipment which assists in detection or recovery of metals.*

6. Discussion of (Pre-) History of the of South Africa

South Africa has one of the longest sequences of human development in the world. The prehistory and history of South Africa span the entire known life span of human on earth. It is thus difficult to determine exactly where to begin, a possible choice could be the development of genus *Homo* millions of years ago. South African scientists have been actively involved in the study of human origins since 1925 when Raymond Dart identified the Taung child as an infant halfway between apes and humans. Dart called the remains *Australopithecus africanus*, southern ape-man, and his work ultimately changed the focus of human evolution from Europe and Asia to Africa, and it is now widely accepted that humankind originated in Africa (Robbins *et al.* 1998). In many ways this discovery marked the birth of palaeoanthropology as a discipline. Nonetheless, the earliest form of culture known in South Africa is the Stone Age. These prehistoric period during which humans widely used stone for tool-making, stone tools were made from a variety of different sorts of stone. For example, flint and chert were shaped for use as cutting tools and weapons, while basalt and sandstone were used for ground stone. Stone Age can be divided into Early, Middle and Late, it is argued that there are two transitional period. Noteworthy that the time frame used for Stone Age period is an approximate and differ

from researcher to researcher (see Korsman and Meyer 1999, Mitchell 2002, Robbins *et al.* 1998).

Stone Age

Although a long history of research on the Early Stone Age period of southern Africa has been conducted (Mason 1962, Sampson 1974, Klein 2000, Chazan 2003), it still remains a period were little is known about. These may be due to many factors which includes, though not limited to retrieval techniques used, reliance on secondary, at times unknown sources, and the fact that few fauna from this period has been analysed (Chazan 2003). According to Robbins *et al.* (1998) the Stone Age is the period in human history when stone was mainly used to produce tools. This period began approximately 2.5 million years ago and ended around 200 000 years ago. During this period human beings became the creators of culture and was basically hunters and gatherers, large stone artefacts identify this era.

The Middle Stone Age overlap with the EIA and possibly began around 100 000 to about 200 000 years ago and extends up to around 35 000 years ago. Smaller tools than in ESA mark this period. MSA people made a wide range of stone tools from both coarse – and fine-grained rock types. Sometimes the rocks used for tools were transported considerable distances, presumably in bags or other containers; as such tool assemblages from some MSA sites tend to lack some of the preliminary cores and contain predominantly finished products like flakes and retouched pieces.

Microlithic Later Stone Age period began around 35 000 and extend to the later 1800 AD. According to Deacon (1984), LSA is a period when human being refined small blade tools, conversely abandoning the prepared-core technique. Thus, refined artefacts such as convex-edge scrapers, borers and segments are associated with this period. Moreover, large quantity of art and ornaments were made during this period. This area is home to all three known phases of the Stone Age. Early to Middle Stone Age sites are uncommon in this area, however rock-art sites and Late Stone Age sites are much bettter known. The Late Stone Age of this area is known to contain sites with rock art from the San and Khoi San cultural groups.

Iron Age

The Iron Age is the name given to the period of human history when metal was mainly used to produce artefacts. Recently, they have been a debate about the use of the name. Other archaeologist have argued that the word "Iron Age" is problematic and does not precisely explain the event of what happen in southern Africa, as such, the word farming communities has been proposed (Segobye 1998). Nonetheless, in South Africa this period can be divided into two phases. Early (200 - 1000 A.D) and Late Iron Age (1000 - 1850 A.D). Huffman (2007) has indicated that a Middle Iron Age (900 - 1300 A.D) should be included. According to Huffman (2007:361), until the 1960s and 1970s most archaeologists had not yet recognised a Middle Iron age. Instead they began the Late Iron Age at AD 1000. The Middle Iron Age (AD 900–1300) is characterised by extensive trade between the Limpopo Confluence and the East Coast of Africa. This has been debated, with other researchers, arguing that the period should be restricted to Shashe-Limpopo Confluence.

Before the arrival of Europeans, the area was the home to Bantu-speaking peoples such as the Sotho-Tswana. During the Late Iron Age, farming was of significance in the region. These farming communities built numerous stone walled settlements throughout the Free State from the 17th century onwards. These sites are associated with the predecessors of the Sotho-Tswana, and are linked with the so-called N-, V-, R- and Z-Type of settlements which are respectively associated with Fokeng, Kwena, Kgatla and Rolong clans.

7. Discussion of (Pre-) History of the Area

Limpopo Province is one of the few South African Provinces with a multi-layered archaeological record, documenting the existence of the Stone Age people, Iron Age farmers and the Colonial settlers of the province is a complex task. Although Stone Age sites are found in abundance throughout the Province, it is one of the richest Provinces in Iron Age, and several archaeology researches had been conducted producing diverse Iron Age sites. The archaeology of the province can be divided into the Stone Age, Iron Age and Historical timeframe.

Stone Age

Limpopo Province is known for the existence of several Stone Age sites that conform to the generic South African periodization spilt into the Early Stone Age (ESA), Middle Stone Age (MSA) and Late Stone Age (LSA) (van der Walt 2012). It is well known for the World Heritage Site Makapans Caves which yields evidence of hominid occupation by "*Australopithecus*

africanus" from approximately 3.3 million years ago (Bergh 1999; van der Walt 2012). The Caves of Hearths is considered to be one of the two known in the world to have yielded an unbroken sequence showing evidence and artefacts of occupation of the caves through ESA, MSA, LSA, and right up to the Iron Age; and it is one of the few rock shelters to present Acheulian assemblages in Southern Africa (Mitchell 2002). Most of the LSA sites in the region are well documented and preserved. LSA in the region is well represented by sites that had been discovered in the Waterberg which is known for its many rock art sites including those containing shaded painting such as at Haakdoorndraai (Eastwood et al., 2002). Other rock art site can be found at Makgabeng plateau which has over 460-recorded rock art sites (Pager 1973; Eastwood et al., 2002). Rock art paintings have also been documented at Blouberg Mountains and Soutpansberg Mountains (Blundell & Eastwood, 2001; Eastwood, 2003; Hall & Smith, 2000; Louw 1969).

Various Stone Age sites have been previously identified just west of the Town of Phalaborwa. LSA is represented in the south west of the project area, presence of rock art paintings and engravings are found in abundance in the Mohlapitse River valley in the Wolkberg, Steelpoort valley and Olifants River (Bergh 1999; Changuion 2008). Studies in the Kruger National Park to the east have documented numerous Middle and Late Stone Age sites and it can be expected that all phases of the Stone Age are represented in the Phalaborwa area (Pistorius 2007). However, the specific affected project-receiving area environment has low potential for Stone Age sites.

Iron Age

Limpopo Province is one of the provinces with the most extensive research done on Iron Age (Huffman 2007). Many of the Limpopo Province Iron Age sites are located near flood plains, along and near some of the major rivers, hill slopes and/or mountain areas (Hall & Smith 2000; Huffman 2007; van Schalkwyk 2007) The Iron Age of Limpopo Province region dates back to the 5th century AD when the Early Iron Age proto-Bantu-speaking farming communities began arriving in the area, which was then occupied by Stone Age people. The region is well known for the famous golden rhino that was recovered from Iron Age settlement site of Mapungubwe in the Limpopo Shashi Valley, now a UNESCO World Heritage Site.

The Early Iron Age (EIA) in the wider area of Limpopo Province is represented by sites such Schroda in the Limpopo Valley, KommandoKop and Pont Drift. The EIA of the area of study is significantly represented by the site at Silver Leaves a few kilometres south of Tzaneen which has provided the oldest evidence for grain cultivation in southern Africa and represents the earliest phase of the Kwale Branch in South Africa (Klapwijk& Huffman 1996). Huffman proposed Middle Iron Age for the period between 900 and 1300 AD in the Shashe-Limpopo area (2007: 361). Some researchers still do not agree with Huffman's proposal. Limpopo Middle Iron Age (MIA) includes the well-known Mapungubwe a World Heritage site, K2, Kommandokop and Shroda in the Limpopo Valley (AD 900-1000) (Bergh 1999; Huffman, 2005). Late Iron Age (LIA) sites are found in abundance throughout the Limpopo Province and are usually located on the foot or against slope hills for defensive purposes, an example would be the LIA Zimbabwe tradition sites such as Thulamela and Dzata found in the Soutpansberg. Despite the Lowveld region poor environmental conditions, this area of study holds a significant history of Middle and Late Iron Age settlements which has been ascribed to its mineral wealth and the attraction of metal working communities (Evers 1975; Evers & Van Der Merwe 1987). Research has shown that the area of Phalaborwa was a major metal producing centre of copper and iron from the 10th century with tin-bronze and brass appearing from the 17th century onwards; approximately 53 metal working sites have been recorded (Miller et al. 2001; Friede et. al. 1975; Pistorius 2007; Van der Merwe & Scully 1971).

Historical era

Historically the people in the wider vicinity of the study area include the Pedi people, Shangaan/Tsonga and Lobedu (Krige 1938). The first Europeans arrived in the area around 1838, with the second group arriving in 1844. They were not able to settle permanently due to tsetse fly. During the 1840's and 1850's there was a great explosion in the trading and exploring activity in the area due to the abundance of game in this region (http://www.kruger2canyons.org/tribal_history.html).

The wider area is famous for the residence of the Modjadji Rain Queen of the Balobedu people who settled in the area since the 1600s (Krige & Krige 1943; Joubert 2011). Their origin has been traced to the Rozwi states Karanga. During the early 20th Century modern mining of gold and copper began in the area, it was only during early 1950s with the establishment of Foskor; mining for phosphates, that large scale mining became a feature of the area and precipitated

the establishment of the modern town of Phalaborwa (Alpers 1970; Mashale 2009; Pistorius 2007). Not far away from the proposed corridors, there is a Tsongo Kraal Museum, located inside the Hans Merensky Nature Reserve. It is built exclusively of traditional materials, showcasing the many traditional building styles of the North Tsonga tribes who originated as refuges from southern Mozambique. No sites, features or objects of any historical nature were recorded in the area where the proposed upgrade will take place.

8. Degree of Significance

This category requires a broad, but detailed knowledge of the various disciplines that might be involved. It must be borne in mind that the significance of a site from an archaeological perspective does not necessarily depend on the size of the site but more on the uniqueness of the site within a region. The following table is used to grade heritage resources.

Table 1: Grading systems for identified heritage resources in terms of National Heritage Resources Act (Act 25 of 1999).

Level		Significance		Possible action
National (Grade I)		Site of National Value		Nominated to be declared by SAHRA
Provincial (Grade II)		Site of Provincial Value		Nominated to be declared by PHRA
Local Grade (IIIA)		Site of High Value Locally		Retained as heritage
Local Grade (IIIB)		Site of High Value Locally		Mitigated and part retained as heritage
General Protected Area A		Site of High to Medium		Mitigation necessary before destruction
General Protected Area B		Medium Value		Recording before destruction
General Protected Area C		Low Value		No action required before destruction

Significance rating of sites

(i) High (ii) Medium (iii) Low

These categories relate to the actual artefact or site in terms of its actual value as it is found today, and refers more specifically to the condition that the item is in. For example, an archaeological site may be the only one of its kind in the region, and will thus be considered to

be of high regional significance, however; should there be heavy erosion of the greater part of the site, its significance rating would be medium to low. The following are guidelines for the nature of the mitigation that must take place as Phase 2 of the project.

High

- This is a 'do not touch' situation, alternative must be sought for the project, examples would be natural and cultural landscapes like the Mapungubwe Cultural Landscape World Heritage Site, or the house in which John Langalibalele resided.
- Certain sites, or features may be exceptionally important, but do not warrant leaving entirely alone. In such cases, detailed mapping of the site and all its features is imperative, as is the collection of diagnostic artefactual material on the surface of the site. Extensive excavations must be done to retrieve as much information as possible before destruction. Such excavations might cover more than half the site and would be mandatory; it would also be advisable to negotiate with the client to see what mutual agreement in writing could be reached, whereby part of the site is left for future research.

Medium

- Sites of medium significance require detailed mapping of all the features and the collection of diagnostic artefactual material from the surface of the site. A series of test trenches and test pits should be excavated to retrieve basic information before destruction.

Low

- These sites require minimum or no mitigation. Minimum mitigation recommended could be a collection of all surface materials and/ or detailed site mapping and documentation. No excavations would be considered to be necessary.

In all the above scenarios, permits will be required from the South African Heritage Resources Agency (SAHRA) or the appropriate PHRA as per the legislation (the National Heritage Resources Act, no. 25 of 1999). Destruction of any heritage site may only take place when the appropriate heritage authority has issued a permit. The following table is used to determine rating system on the receiving environment.

Table 2: Rating and evaluating criteria of impact assessment

NATURE		
Including a brief description of the impact of the heritage parameter being assessed in the context of the project. This criterion includes a brief written statement of the heritage aspect being impacted upon by a particular action or activity.		
TOPOGRAPHICAL EXTENT		
This is defined as the area over which the impact will be expressed. Typically, the severity and significance of an impact have different scales and as such bracketing ranges are often required. This is often useful during the detailed assessment of a project in terms of further defining the determined.		
1	Site	The impact will only affect site.
2	Local/district	Will affect the local area or district.
3	Province/region	Will affect the entire province or region.
4	International and National	Will affect the entire country.
PROBABILITY		
This describes the chance of occurrence of an impact		
2	Unlikely	The chance of the impact occurring is extremely low (Less than 25% chance of occurrence).
4	Possible	The impact may occur (Between a 25% to 50% chance of occurrence).
6	Probable	The impact will likely occur (Between 50% to 75% chance of occurrence).
8	Definite	Impact will certainly occur (Greater than 75% chance of occurrence).
REVERSIBILITY		
This describes the degree to which an impact on a heritage parameter can be successfully reversed upon completion of the proposed activity.		
1	Completely reversible	The impact is reversible with implementation of minor mitigation measures.

2	Partly reversible	The impact is partly reversible but more intense mitigation measures are required.
3	Barely reversible	The impact is unlikely to be reversed even with intense mitigation measures.
4	Irreversible	The impact is irreversible and mitigation measures exist.
IRREPLACEABLE LOSS OF RESOURCES		
This describes the degree to which heritage resources will be irreplaceably lost as a result of proposed activity		
1	No loss of resource	The impact will not result in the loss of any resources.
2	Marginal loss of resource	The impact will result in marginal loss of resources.
3	Significant loss of resource	The impact will result insignificant loss of resources.
4	Complete loss of resource	The impact is result in a complete loss of all resources.
DURATION		
This describes the duration of the impact on the heritage parameter. Duration indicates the lifetime of a result of the proposed activity.		
1	Short term	The impact and its effects will either disappear with mitigation or will be mitigated through natural process in span shorter than the construction phase (0-1 years), or the impact and its effects will last for the period of a relatively short construction period and a limited recovery time after construction, thereafter it will be entirely negated (0-2 years).

2	Medium term	The impact and its effects will continue or last for some time after the construction phase but will be mitigated by direct human action or by natural processes thereafter (2-10 years).
3	Long term	The impact and its effects will continue or last for entire operational life of the development, but will be mitigated by direct human action or by natural processes thereafter (10-50 years).
4	Permanent	The only class of the impact that will non-transitory. Mitigation either by man or natural process will not occur in such a way or such a time span that the impact can be considered transient (Indefinite).
CUMULATIVE EFFECT		
This describes the cumulative effect of the impacts on the heritage parameter. A cumulative effect/impact is an effect, which in itself may not be significant but may become significant if added to other existing or potential impacts emanating from similar or diverse activities as a result of the project activity in question.		
1	Negligible Cumulative Impact	The impact would result in negligible to no cumulative effects.
2	Low Cumulative Impact	The impact would result in insignificant cumulative effects
3	Medium Cumulative Impact	The impact would result in minor cumulative effects
4	High Cumulative Impact	The impact would result in significant cumulative effects.
MAGNITUDE		
Describes the severity of an impact.		

1	Low	Impact affects the quality, use and integrity of the system/component in a way that is barely perceptible.
2	Medium	Impact alters the quality, use and integrity of the system/component but system/ component still continues to function in a moderately modified way and maintains general integrity (some impact on integrity).
3	High	Impact affects the continued viability of the system/component and the quality, use, integrity and functionality of the system or component is severely impaired and may temporarily cease. High costs of rehabilitation and remediation.
4	Very High	Impact affects the continued viability of the system/component and the quality, use, integrity and functionality of the system or component permanently ceases and is irreversibly impaired (system collapsed).Rehabilitation and remediation often impossible .If possible rehabilitation and remediation often unfeasible due to extremely high costs of rehabilitation and remediation.

SIGNIFICANCE

It provides an indication of the importance of the impact in terms of both tangible and intangible characteristics. (S) is formulated by adding the sum of numbers assigned to Extent (E), Duration (D), and Intensity (I) and multiplying the sum by the Probability.

$$S= (E+D+M) P$$

<30	Low	Mitigation of impacts is easily achieved where this impact would not have a direct influence on the decision to develop in the area.
30-60	Medium	Mitigation of impact is both feasible and fairly easy. The impact could influence the decision to develop in the area unless it is effectively mitigated.
>60	High	Significant impacts where there is difficult. The impact must have an influence on the decision process to develop in the area.

9. Findings and Discussions

The main aim of the survey was to evaluate potential heritage resources that would occur within the boundaries of the proposed area (s) as well as to determine if there is any hamartia that would prevent the proposed development from taking place in any of the proposed study areas. Archaeological sites dating to the Stone, Iron and Historical Age are known to occur in the region of study area, as enunciated under background study above. However, from the survey conducted, most of the known sites would only have an indirect impact. For example, power line crossing some distance from the site, thereby having only a visual impact. Note should be taken that detailed information about the powerline is still in early stage, e.g., the exact position of the powerline/ access roads are yet to be finalised, it might be possible that specific aspects related to development might have a direct disturbance, which would result in irreplaceable loss of heritage resources. Below are the sensitive areas that were noted during survey:

- Iron Age people preferred to settle on the alluvial soils close to rivers. As such, all river banks are viewed to be sensitive and should be avoided in the best way possible;
- The development is also located in game and nature reserves, several localized Airports were noted, these should be avoided as far as possible;

The study area was investigated for sites of heritage significance that might be affected by the construction of the proposed powerline and substation. The only sign of sites of heritage potential were graves and historical structures found in various areas of corridors. Although no remains of Stone/ Iron Age sites were noted during site visit, the area could still contain camps and some areas with suitable substrates that could have been used as quarries for material to produce tools. Below is the table detailing some of the finds noted in the proposed area (s). Reference is also made to the **Figure 11** for the location of the finds:

Table 6: Information of some of the archaeological/ heritage sites noted in the proposed area

Site	Coordinates	Description	Significance
Spe001	23.48158°S 30.42467°E	Informal grave site (s) with marked and unmarked graves was noted on the area proposed for Corridor 2. The grave yard is characterised by a number of graves. Spinney	High

		Yucca Plants (eternity plants) which are commonly found in older cemeteries were also noted.	
Spe002	23.49391°S 30.41997°E	An abandoned settlement was noted on the area proposed corridor 2, nearby Spenser Substation. This site has a portion that is demarcated by a wire suggesting it could have been an abandoned grave and an area with active vegetation and a cactus plant that is normally found on unmarked graves.	High
Spe003	23.60836°S 30.49391°E	Grave site was noted in Ga-Mawa which consists of marked and unmarked graves, densely populated with active vegetation suggesting the likelihood of discovering many more graves on that area. These graves are located within the project servitude on the area of deviation route 1a.	High
Spe004	23.65713°S 30.67114°E	Muti wa Vatsonga Open Museum is approximately 10.9km and 13km east of Deviation 1a and Corridors 1 and 2 respectively. The kraal was fashioned around the homestead of the Chief, with his eight wives. It is a traditional Tsonga homestead, where everyday life is portrayed and where you can see the different styles used by the Northern Tsonga over the past 200 years.	Medium

Figure 9: An overview of some of the informal grave sites noted along the first corridor.

Figure 10: View of other grave sites located along the corridors

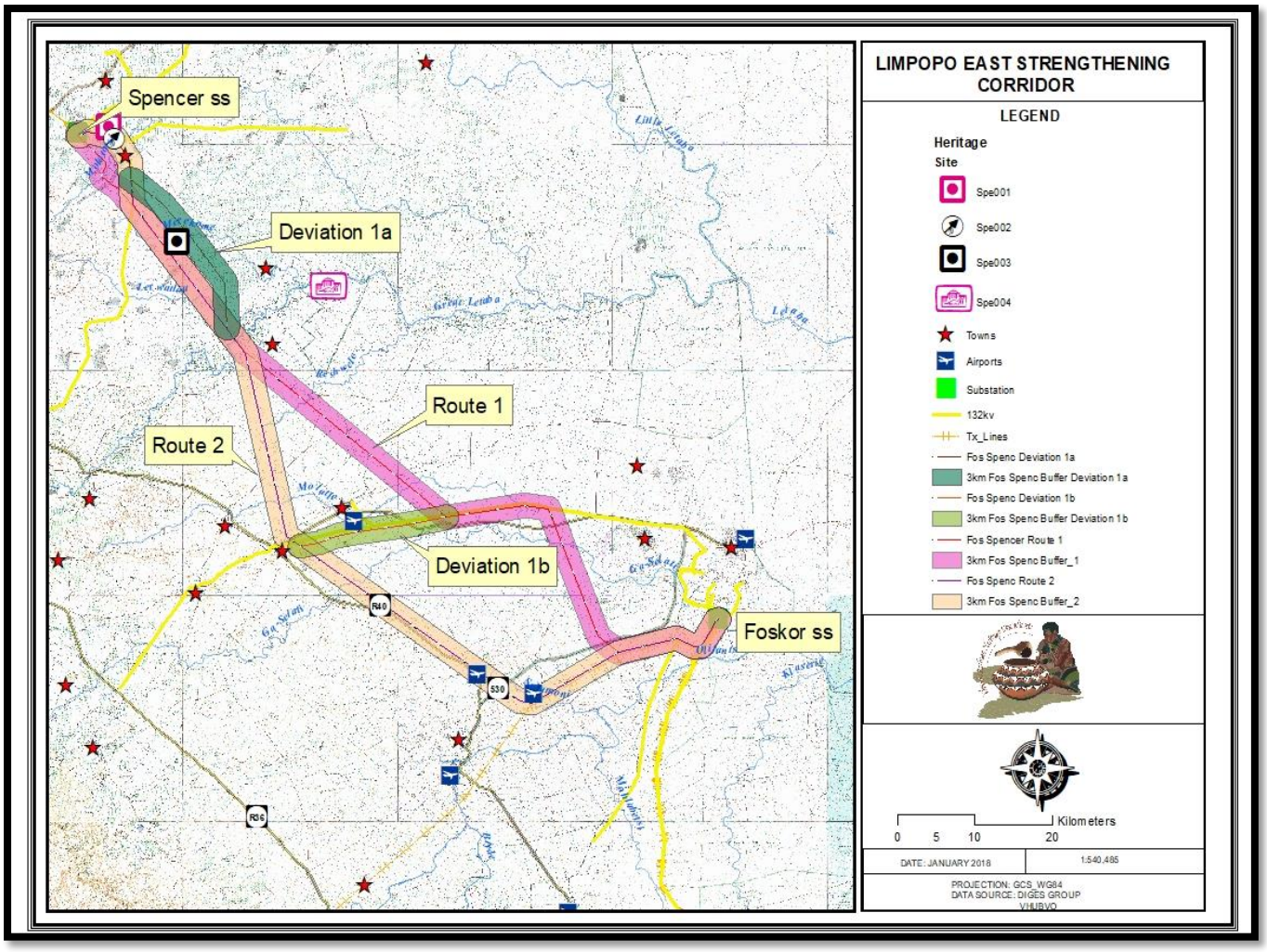


Figure 11: Locality of archaeological and grave sites

Figure 12: View of some of the abandoned settlement noted on the area proposed for deviation 1a

9.1 Impact Assessment

Below is a description of the two alternatives and respective deviations, as well as related impact ratings. These ratings are for archaeological and cultural heritage sites known to exist in the proposed area, and includes Stone and Iron Age, as well as Historical era materials. Note that these impacts are assessed as per Table 7:

Alternative Corridor 1

The first corridor stretches on an unused land and sections of the nature reserves, these areas are ideal for isolated archaeological materials, or historic settlement such as stone walling which are known to spread across the area. This corridor also transverse over active farmlands and villages, especially towards Spencer Substation. Farmers and Villagers in these areas are known to bury their loved ones in their place of dwelling. Making this an ideal place for finding either known or unknown burial. It is noteworthy that this corridor follows a more direct route as compared to Alternative 2, section of this corridor which is associated with Nature Reserve as well as ecotourism ventures will have a moderate to high visual impact. However, where the corridor follows the R71, the visual impact will vary from low to high. Thus, it will be low for travellers travelling at 2 – 3km away (low impact). Conversely, it will be high for landowners and guests on properties up to 2km away. The anticipated rating for Corridor 1 is given in Table 7 below:

Table 7: Anticipated impact rating.

Alternatives Corridor 1	**Ratings**
Impact	Loss of archaeological objects and graves
Nature	Negative
Topographical Extent	The impact will only affect site
Duration	Long term
Magnitude	Medium
Probability	Possible
Significance	Low
Reversibility	Irreversible
Irreplaceable Loss	The impact can result in significant loss

Alternative Corridor 2

This corridor is located on a similar landscape to that of Corridor 1. Certain portions of this corridor, especially north of the Groot Letaba River is the same as that which is proposed for corridor 1. Of significance is that this corridor transverses across section of Olifants North Game Reserve which is one of the reserve which is still intact. Thus, while the general area around the proposed corridor is disturbed, the area adjoining the Nature reserve is still intact. Archaeologically, Nature Reserves are considered sensitive since they have not had many disturbances due to that they are a protected landscape. This area thus remains sensitive form an archaeological point of view. The visual impact south of the Groot Letaba River can be considered as medium to high. For most of the route, a moderate to high visual impact will be experienced by landowners and visitors to the area. Current impacts such as roads, fences, telephone lines, power lines and houses and lodges have a negative visual impact. Reference is made to Table 8 below:

Table 8: Anticipated impact rating.

Alternatives	**Ratings**
Impact	Loss of archaeological objects and graves
Nature	Negative
Topographical Extent	The impact will only affect site.
Duration	Long term
Magnitude	Medium
Probability	Probable
Significance	Low
Reversibility	Irreversible
Irreplaceable Loss	The impact will result in complete loss of resource

Alternative Deviation (s)

Furthermore to these two corridors, two deviations are proposed and are referred to as 1a and 1b. Deviation 1a is on an area which is under extreme residential sites, there is no large scale farming activities on this area, and family graves are expected in this area due to its high

residential setting. The second deviation referred to as 1b is at the boundary of Selati Game Reserve, and is running parallel an existing 132kV power line and traverses undulating environment, this area is also characterised by isolated farmsteads. In terms of visual impact, these Deviations whose current impacts include roads, fences, buildings as well as powerlines and telephone lines possesses a visual impact of low to moderate. See Table 9 below:

Table 9: Anticipated impact rating.

Alternatives	Ratings
Impact	Loss of archaeological objects and graves
Nature	Negative
Topographical Extent	The impact will only affect site.
Duration	Long term
Magnitude	Medium
Probability	Possible
Significance	Low
Reversibility	Partly reversible
Irreplaceable Loss	The impact will result in marginal loss of resources

10. Recommendations

Taking all the above information into account, it can be recommended that **Corridor One (1)** is the preferred alternative from a heritage impact perspective. Noteworthy that all grave sites should be avoided in the best way possible. Meaning attempts should be made to avoid all grave sites during final stage of planning. No major heritage flaws which can hamper the success of this project where noted in any of the identified corridors.

Two alternatives were investigated for the deviations. Option (s) 1a and 1b. The first option, 1a, has a high level of heritage sensitivity. However, Option 1b showed minimal signs of heritage sites. It is therefore recommended that **Option 1b be considered as a deviation from Corridor 1 to Corridor 2**. It should still be noted that no site (s) can be found within 1a can be of such high significance such that construction may not be possible.

The exact coordinates for the power line and the individual tower structures are not yet available. This limitation makes it difficult to determine what the final impact of the proposed development would be like. Henceforth, for the project to continue, I, as an independent archaeologist due recommend the following:

i. A heritage practitioner should complete a "walk down" of the final selected power line servitudes, and all other activity areas (access roads, construction camps, etc.) prior to the start of any construction activities. This walk down will document all sites, features and objects, in order to propose adjustments to the routes and thereby to avoid as many impacts to heritage as possible.

11. Conclusions

A thorough background study and survey of the proposed development was conducted and findings were recorded in line with SAHRA guidelines. It is recommended that LIHRA exercise its discretion and allow the developer to proceed with the project subject to the recommendations given above.

Data bases

Chief Surveyor General

Environmental Potential Atlas, Department of Environmental Affairs and Tourism. Heritage Atlas Database, Pretoria.

National Archives of South Africa

References

Bergh, J.S. (red.). 1999. Geskiedenisatlas van Suid-Afrika. Die viernoordelikeprovinsies. Pretoria: J.L. van Schaik.

Bradfield, J., Holt, S. & Sadr, K. 2009. The last of the LSA on the Makgabeng Plateau, Limpopo Province. South African Archaeological Bulletin 64 (190), pp. 176- 183.

Coertze, P.J. & Coertze, R.D. 1996. Verklarendevakwoordeboekvir Antropologieen Argeologie. Pretoria: R.D. Coertze.

Daniel, S. 2015. Old kraals and a cave found in the hills on the Waterberg Project. (Unpublished report, Johannesburg, GeoActive Dynamic Geological Services).

De Jong, R.C. 2010. Heritage Impact Assessment Report: Support of the Environmental Impact Assessment for the proposed upgrading of the Bulk Municipal Water Supply Pipeline (12km) on the farms Zeeland 526 LQ, Worcester 520 LQ, and Paarl 522 LQ, Lephalale Local Municipality, Limpopo Province. Unpublished Report for Gudani Consulting Polokwane July 2010.

Eastwood, E., van Schalkwyk, J. & Smith, B. 2002. Archaeological and Rock Art Survey of the Makgabeng Plateau, Central Limpopo Basin. The Digging Stick, 19 (1).

Hall, S & Smith, B. 2000. Empowering places: rock shelters and ritual control in farmer-forager interactions in the Northern Province. South African Archaeological society Doodwin Series, 8: 30-46.

Hanisch, E.O.M. 2003. Archaeology- A first synthesis of the Environmental, Biological and Cultural Assets of the Soutpansberg.

Huffman, T.N. 2007. Handbook to the Iron Age: The Archaeology of Pre-Colonial Farming Societies in Southern Africa. Scotsville: University of KwaZulu- Natal Press.

International Finance Corporation. 2012. Overview of performance standards on Environmental and Social Sustainability. Performance Standard 8, Cultural Heritage. World Bank Group.

Knudson, S.J. 1978. Culture in retrospect. Chicago: Rand McNally College Publishing Company.

Korsman, S.A. & Meyer, A. 1999. Die Steentydperkenrotskuns. Bergh, J.S. (red.). Geskiedenisatlas van Suid-Afrika. Die viernoordelikeprovinsies. Pretoria: J.L. vanSchaik.

Krige, E.J. &Krige, J.D., 1943. The Realm of a Rain Queen. A study of the pattern of Lobedu society. Oxford University Press.

Krige, E.J., 1938. The Place of the North-Eastern Transvaal Sotho in the South Bantu Complex. Africa: Journal of the International African Institute, Vol. 11, No. 3 (Jul., 1938), pp.265-293.

Mitchell, P. 2002. The Archaeology of Southern African. Cambridge: Cambridge University Press.

Murimbika, M. 2006. Archaeological Impact Assessment Study for the Proposed Construction of Electricity Distribution Powerlines Within, Limpopo Province. An unpublished report by Nzumbululo Heritage Solutions

Oberholster, J.J. 1972. The historical monuments of South Africa. Cape Town: C. Struik (Pty.) Ltd.

Pager, H. 1973. Shaded rock-paintings in the Republic of South Africa, Lesotho, Rhodesia and Botswana. The South African Archaeological Bullentin.

Pelser, A.J. 2010. A Report on an Archaeological Impact Assessment (AIA) for the proposed upgrading of the bulk Municipal Water Supply Pipeline on the farms Zeeland 526 LQ, Worcester 520 LQ and Paarl 522 LQ, Lephalale Local Municipality Limpopo Province. Unpublished Report AE1043 for Cultmatrix Heritage Consultants July 2010.

Pelser, A.J. 2011. A desktop heritage assessment study for a prospecting rights application on various farms near Alldays in the Musina and Blouberg Magisterial Districts, Limpopo Province. (Unpublished report, Groenkloof, Archaetnos).

Pelser, A.J. 2012. Specialist Walkdown Report for the new 400kV Powerlines (MedupiMassa) between the Medupi Powerstation and Massa Substation near Lephalale, Limpopo Province. Unpublished Report AE01203P for Baagi Environmental Consultants January 2012.

Pistorius, J.C.C. 2007. A Phase 1 Heritage Impact Assessment (HIA) Study for Eskom's Proposed new 2 x 400Kv Powerline Route between the Matimba B Powerstation and the Dinaledi Substation near Madibeng (Brits). (Unpublished report, Lynnwood: For ESKOM Transmission).

Roodt, F., 2001a. Archaeological Impact Assessment: Fry Dam: Raising of Dam Wall, Matomashoek 371 LT &Gemsbokspruit 372 LT. An unpublished report by R & R Cultural Resource Consultants on file at SAHRA as: 2001-SAHRA-0005.

Roodt, F., 2001b. Proposed Tzaneen Extension 60, Archaeological Impact Assessment. An unpublished report by R & R Cultural Resource Consultants on file at SAHRA as: 2001-SAHRA 0029.

Sadr, K. 2005. Mphekwane test excavation of site MB5 (Mont Blanc) (Unpublished report, WITS University).

Smith, B.W. & Van Schalkwyk, J.A. 2002. The white camel of the Makgabeng. Journal of African History. 43, pp. 235-254.

Stoffberg, D.P. 1988. Argeologieseopgrawings van die SchoemansdalseVoortrekkerskans (distrik Louis Trichardt). Pretoria: Etnologiesediens, SA Leërhoofkwartier.

Van der Ryst, M.M. & Meyer, A. 1999. Die Ystertydperk. Bergh, J.S. (red.). Geskiedenisatlas van Suid-Afrika. Die viernoordelikeprovinsies. Pretoria: J.L. van Schaik.

Van Schalkwyk, J.A. &Moifatswane, S.M. 1991. The siege of Leboho: South African Republic Fortifications in the Blouberg, Northern Transvaal. Military History Journal. 8(5), pp.1-17.

Van Schalkwyk, J.A., 2000. A Survey of Cultural Resources on a Section of the Farm Novengilla, Letsitele Area, Northern Province. An unpublished report by the National Cultural History Museum on file at SAHRA as: 2000-SAHRA-0016.

Van Schalkwyk, J.A., Moifatswane, S., & Smith, S., 1996a. A Survey of Cultural Resources in the Proposed Janetsi Dam Site, Letaba River. An unpublished report by the National Cultural History Museum on file at SAHRA as: 1996-SAHRA-0031.

Van Schalkwyk, J.A., Moifatswane, S., & Smith, S., 1996b. A Survey of Cultural Resources in the Proposed Lesitele Dam Site, Letsitele River. An unpublished report by the National Cultural History Museum on file at SAHRA as: 1996-SAHRA-0029.

Van Vollenhoven, A.C. 2015b. A report on a basic cultural heritage assessment for the proposed ESKOM Goedetrouw and Ketting substations and 132kV lines project, Limpopo Province. (Unpublished report, Groenkloof, Archaetnos).

APPENDIX 1: SITE SIGNIFICANCE

The following guidelines for determining site *significance*were developed by SAHRA in 2003. 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.

(a) 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 organization of importance in history?
- Does it have significance relating to the history of slavery?

(b) Aesthetic value

- Is it important in exhibiting particular aesthetic characteristics valued by a community or cultural group?

(c) 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?

(d) Social value

- Does it have strong or special association with a particular community or cultural group for social, cultural or spiritual reasons?

(e) Rarity

- Does it possess uncommon, rare or endangered aspects of natural or cultural heritage?

(f) Representivity

- Is it important in demonstrating the principal characteristics of a particular class of natural or cultural places or objects?
- What is the 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?
- Is it important 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?