



A HERITAGE IMPACT ASSESSMENT STUDY FOR THE PROPOSED BORUTHO-WITKOP
400KV TRANSMISSION LINE, LIMPOPO PROVINCE, SOUTH AFRICA.



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ACKNOWLEDGEMENT OF RECEIPT

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DECLARATION OF INDEPENDENCE

This report has been compiled by Nkosinathi Tomose, leading archaeologist and heritage consultant for NGT Project & Heritage Consultants. The views expressed in this report are entirely those of the author and no other interest was displayed during the decision making process for the project.

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EXECUTIVE SUMMARY

NGT Projects & Heritage Consultants (Pty) Ltd was been appointed by Baagi Environmental Consultancy as an independent and lead CRM firm to conduct an HIA (exclusive of Palaeontological desktop study) for the proposed development (of Borutho-Witkop Line Corridor) as part of specialists (inputs) impact assessment studies required to fulfil the EMP process and its requirements as well as acquisition of Environmental Permits. The appointment of NGT Projects & Heritage Consultants (as an independent CRM firm) is in terms of the NHRA, No. 25 of 1999 (as amended), the NEMA, No.107 of 1998 (as amended & the applicable 2010 Regulations), as well as other applicable legislations such as the MPRDA No. 28 of 2002. Nkosinathi Tomose, the lead archaeologist & heritage consultant of NGT Projects & Heritage Consultants, conducted the HIA study for the proposed 400kV Borutho-Witkop Power Line, spanning an area covering approximately 2 District Municipalities (Waterberg & Capricorn District Municipalities) and 2 local municipalities (i.e. Aganang Local Municipality & Mokopane Local Municipality) in the Limpopo Province, South Africa.

The following conclusions and recommendations are made about Borutho-Witkop Transmission Line Corridor based on existing literature about the project area, observations made during the physical survey of the proposed development area, assessment and evaluation methods using SAHRA minimum standards for evaluation and grading of archaeological (and other heritage) resources as well as the NHRA, No 25 of 1999 for the protection, conservation and management of the Nation Estate (Section 3 of the NHRA, No 25 of 1999), and assessment of associated impacts in term of the BAR Assessment Standards translated to suite the EMP requirement as proposed by the client (Baagi Environmental Consultancy):

The physical survey of the proposed project area, which took place between the 11th and 14 March 2013 yielded a total of 16 heritage resources site (Figure 1 & Figure 47, see also Appendix 1). A significant drop in number of sites as compared to the Medupi-Borutho section of the Medupi-Borutho-Witkop Transmission Line walk-down. The 16 heritage site are a combination of archaeological (ARCH), built environment and landscape (BEL), and burial ground and graves (BGG) sites:

- 50% of these site are archaeological
- Burial grounds and graves (even though some sites were not confirmed as such) make up 33% of the total site number of site and site distribution
- built environment and landscape make up the rest of the percentage -17%)

Out of the 16 sites including two sub-sites 6 sites do not require further action in terms of heritage resources management (i.e. BW-2, Bw-5, BW-6, BW-7, BW-10, BW-15). 9 sites should be treated as no-go-areas (i.e. BW-3, BW-4, BW-8 (both a &b), BW-11, BW-12, BW-14, BW-16, BW-1).

Sites that will require urgent intervention include BW-13 and BW-9.

Based on the results of the assessment and evaluation of the identified resources and above recommendations. It is concluded that, from a cultural resources management point of view, that there are no objections to the project and no negative perceptions about the project, Borutho-Witkop Transmission Line Corridor EMP. The EMP can be approved provided that the above given heritage concerns are full attended to, addressed and adhered to in full by the developer.

* For detail conclusions and recommendations, read the conclusions and recommendations section of this report.

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ABBREVIATIONS

Acronyms	Description
AIA	Archaeological Impact Assessment
ASAPA	Association of South African Professional Archaeologists
ARCH	Archaeological
BEL	Built Environment & Landscape
BGG	Burial Grounds & Graves
BGG?	Proven not to be Burial Ground & Grave
CRM	Cultural Resource Management
DEA	Department of Environmental Affairs
DoE	Department of Energy
EIA practitioner	Environmental Impact Assessment Practitioner
EIA	Environmental Impact Assessment
ESA	Early Stone Age
GIS	Geographic Information System
GPS	Global Positioning System
HIA	Heritage Impact Assessment
I&AP	Interested & Affected Party
K.y.a	Thousand years ago
LHRA	Limpopo Province Heritage Resources Authority
LSA	Late Stone Age
LIA	Late Iron Age
MSA	Middle Stone Age
MIA	Middle Iron Age
NERSA	National Energy Regulator of South Africa
NHRA	National Heritage Resources Act
NEMA	National Environmental Management Act
PHRA	Provincial Heritage Resources Authority
PSSA	Palaeontological Society of South Africa
ROD	Record of Decision
PDAFP	Proposed Development Area Footprint
SADC	Southern African Development Community
SAHRA	South African Heritage Resources Agency
SPV	Special Purpose Vehicle

Z.C.C	Zion Christian Church
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TERMS & DEFINITION

Archaeological resources

This includes:

- material remains resulting from human activity which are in a state of disuse and are in or on land and which are older than 100 years including artefacts, human and hominid remains and artificial features and structures;
- rock art, being any form of painting, engraving or other graphic representation on a fixed rock surface or loose rock or stone, which was executed by human agency and which is older than 100 years, including any area within 10m of such representation;
- wrecks, being any vessel or aircraft, or any part thereof which was wrecked in South Africa, whether on land, in the internal waters, the territorial waters or in the maritime culture zone of the republic as defined in the Maritimes Zones Act, and any cargo, debris or artefacts found or associated therewith, which is older than 60 years or which SAHRA considers to be worthy of conservation;
- Features, structures and artefacts associated with military history which are older than 75 years and the site on which they are found.

Cultural significance

This means aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance

Development

This means any physical intervention, excavation, or action, other than those caused by natural forces, which may in the opinion of the heritage authority in any way result in the change to the nature, appearance or physical nature of a place or influence its stability and future well-being, including:

- construction, alteration, demolition, removal or change in use of a place or a structure at a place;
- carrying out any works on or over or under a place;
- subdivision or consolidation of land comprising a place, including the structures or airspace of a place;
- constructing or putting up for display signs or boards;
- any change to the natural or existing condition or topography of land; and
- any removal or destruction of trees, or removal of vegetation or topsoil

Heritage resources

This means any place or object of cultural significance

1. INTRODUCTION

1.1. Project Background

1.1.1. Summary of the Proposed Project

This project is one of Eskom Power Transmission projects and it involves construction of power transmission lines between Borutho and Witkop Substations. The current study form part of specialists studies aimed at giving inputs in the EMP process and advising on some of the best suitable heritage mitigation measures for the identified heritage resources in terms known heritage resources management measures (Figure 1).

1.1.2. Proposed Project Aims

The aim of the Borutho-Witkop Project is undoubtedly to transmit power between Borutho and Witkop and the surrounding areas. During the EIA process the current (surveyed) alignment would have been selected as the best alternative out of a number of other proposed alternatives/routes. Therefore, the aim of the current study is to advise Eskom Transmission on the suitable and sustainable measures to use during the construction and operational phase of the project and its closure - it does this through a compilation of various impact assessment

studies that feed into the EMP document as well as acquisition of environmental permits. This study aim to contribute to the development of such an EMP document as well as in the acquisition of environmental permits through the assessing and evaluation impacts that affect or have the potential to impact on the cultural environment. The proposed project consists of the following:

- A 400kV power line between Borutho and Witkop Substations
- A 10m Line Corridor Servitude
- No broader servitude buffer was allocated, but the specialist used at his own discretion of 60m buffer outside the 10m Line Corridor Servitude - this is a common buffer for transmission power in case there need to be deviation from the current proposed 10m Line Corridor Servitude as means of mitigating heritage resources
- The nature of tower structures is still to be determined
- Tower/pylon positions in the landscape were given to NGT Project & Heritage Consultants (March 2013)

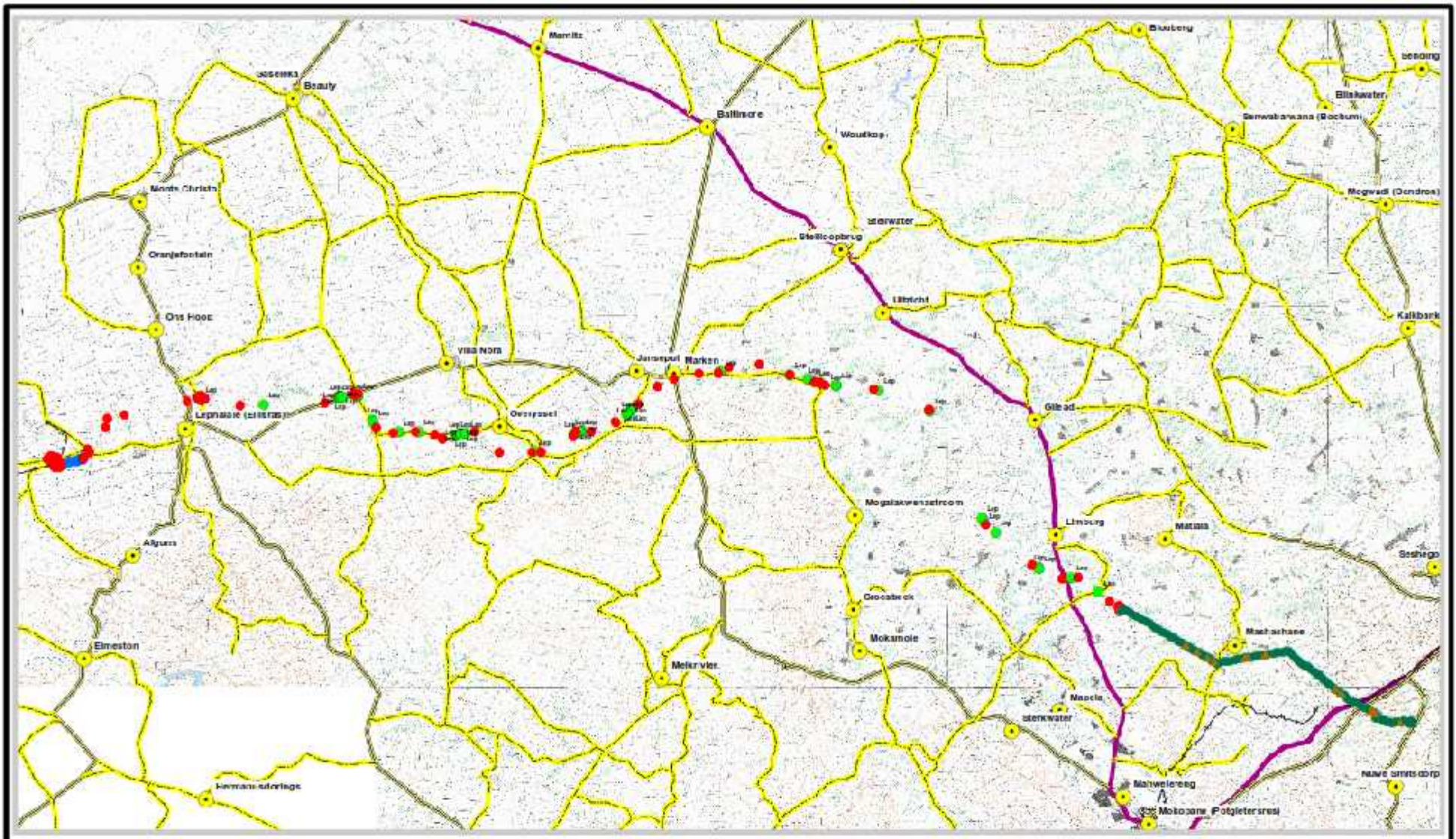
1.1.3. Terms of Reference for the Appointment of Archaeologist and Heritage Specialist

Because of the nature and size of the proposed development - proposed 400kV power line and associated infrastructure exceeding a total area of 5000m², an EIA process for was conducted and its results resulted in the current EMP process. In terms of the EIA Regulations of June 2010 (Government Notice 543-546 published in terms of the NEMA, No 107 of 1998) the construction of the proposed facilities is listed as an activity that requires environmental authorisation. This is because the project comprises of development and construction of a 400kV power line, servitudes and other associated infrastructure such access roads – and it is a development that occupies an area of more than 20ha. Undertaking of an EMP process is therefore a requirement pass the EIA stages. The current process comprises of a EMP, application of Environmental Permits and it involves the identification and assessment of environmental impacts through specialist studies.












NGT Projects & Heritage Consultants (Pty) Ltd has been appointed by Baagi Environmental Consultancy as an independent and lead CRM firm to conduct an HIA (exclusive of Palaeontological desktop study) for the proposed development as part of specialists (inputs)

impact assessment studies required to fulfil the EMP process and its requirements as well as Acquisition of Environmental Permits. Nkosinathi Tomose, the lead archaeologist & heritage consultant of NGT Projects & Heritage Consultants, conducted the HIA study for the proposed Borutho-Witkop Transmission Power Line in the Waterberg District Municipality, Limpopo Province, South Africa (Figure 1).

The appointment of NGT Projects & Heritage Consultants (as an independent CRM firm) is in terms of the NHRA, No. 25 of 1999 (as amended), the NEMA, No.107 of 1998 (as amended & the applicable 2010 Regulations), as well as other applicable legislations such as the MPRDA No. 28 of 2002.



Legend

- | | |
|---|---|
|  Heritage Sites Borutho Witkop |  Substations |
|  BW Pylon Positions |  Airways |
|  Track for the alignment |  Secondary Roads |
|  Pylon Positions |  Main Roads |
|  Towns |  National Roads |
|  Heritage site | |



SITE PLAN: Topographic Map of Medupi-Borutho Transmission Line Corridor





Figure 1- Location of the project area in Limpopo Province, South Africa. Red dots represent track of the alignment and the green heritage sites in the Medupi-Borutho Alignment covered in January-February 2013. The solid green line in the right with brown triangles covers the current study/alignment - Borutho-Witkop 400kV Line and heritage resources.



2. BACKGROUND OF THE STUDY AREA

2.1. Description of the affected environment

Table 1 -Borutho-Witkop, Limpopo Province, South Africa

Location	<ul style="list-style-type: none"> The project area is located in the Waterberg and Capricorn District Municipalities, Limpopo Province of South Africa. It covers the following local municipalities: Mokopane and Aganang local municipalities
Land Uses	<ul style="list-style-type: none"> Tribal Authority: Residential & Subsistence Farming (e.g. cattle & crop farming in form of maize and sorghum/millet -Figure 2). The Powerline traverse the following villages: Segwahleng, Ga-Mashashane, G-Matlapa and Sebora (Figure 3) Government: Municipal offices and parastals (e.g. Eskom substations and transmission lines, and Transnet railways lines - Figure 4) Private Land: Residential & Commercial Farming (e.g. Game farming, cattle ranching and crop farming -Figure 5-6) Mining (Figure-8, platinum mining)
Land Owner(s)	<ul style="list-style-type: none"> Government, Tribal Authorities, Game Farmers and Private Commercial and Mining Industries
Applicant	<ul style="list-style-type: none"> Baagi Environmental on behalf of Eskom Transmission
Proposed Development	<ul style="list-style-type: none"> Development of a 400kV Transmission Line (& associated infrastructure) covering a total length of approximately 60km Borutho-Witkop, Limpopo Province, South Africa
Access	<ul style="list-style-type: none"> Existing national, provincial and local roads, routes and human foot paths. The study area is ensconced between the following major roads: the N11 in the west; the R567 in the north; the R519 in the east; it also passes the R101 and the N1 towards Polokwane just before it reaches Witkop Substation (Figure 1).
Defining natural features	<ul style="list-style-type: none"> It also passes through one of Limpopo Province major rivers - the Sand River, Roosloot and Bloed River. Small tributaries are also found throughout the study area.

- The area is also generally flat in areas near Borutho and becomes mountainous towards Witkop Substation (Figure 5)



Figure 2- Type of farming practices in Tribal land - cattle (left) and maize (right)

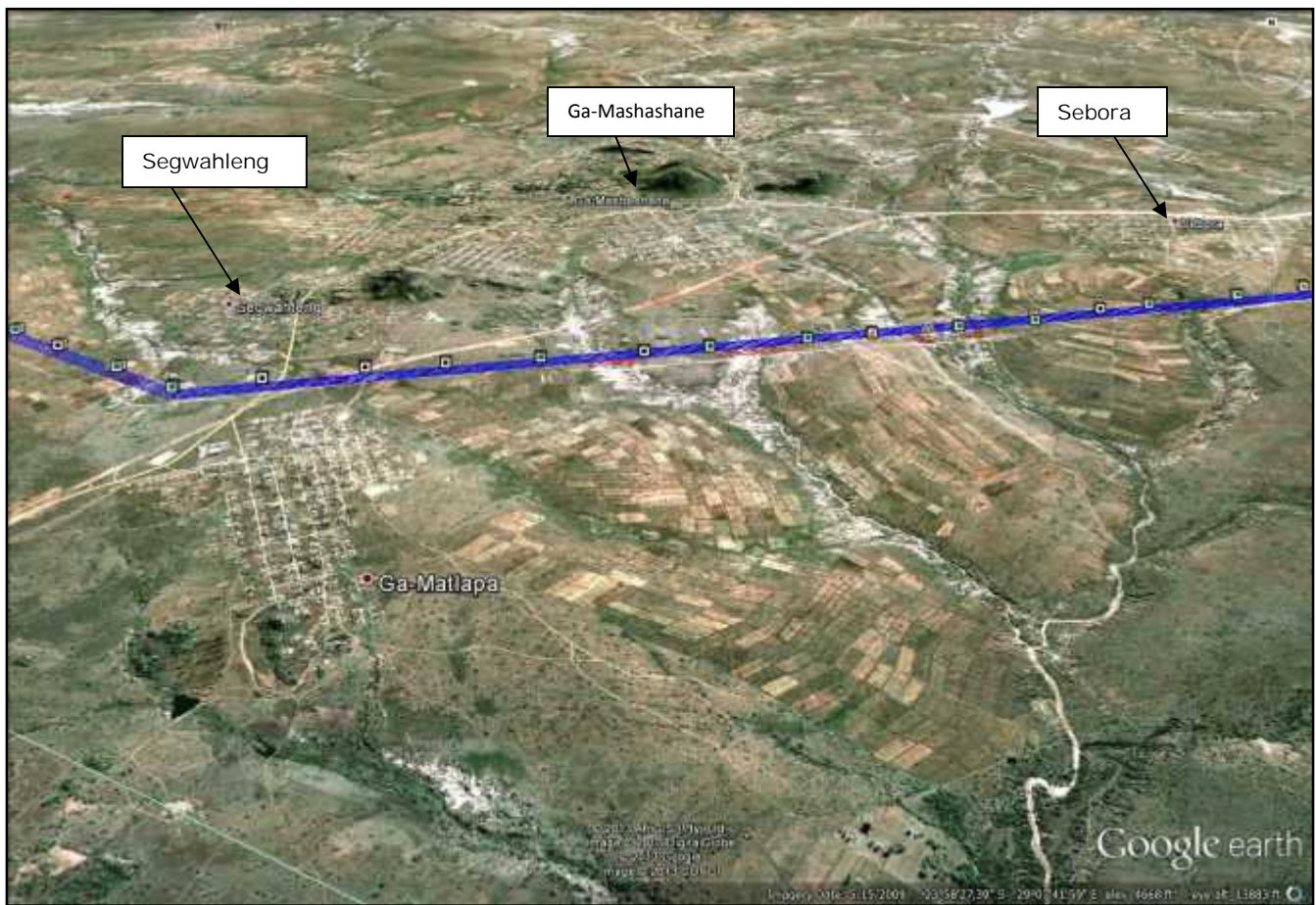


Figure 3 - Villages that the Powerline traverses: Ga-Matlapa, Segwahleng, Ga-Mashashane, Sehora. The 400kV is marked in blue with green square blocks marking pylon positions.



Figure 4 - Eskom transmission powerlines (left) and Transnet railway line (right)

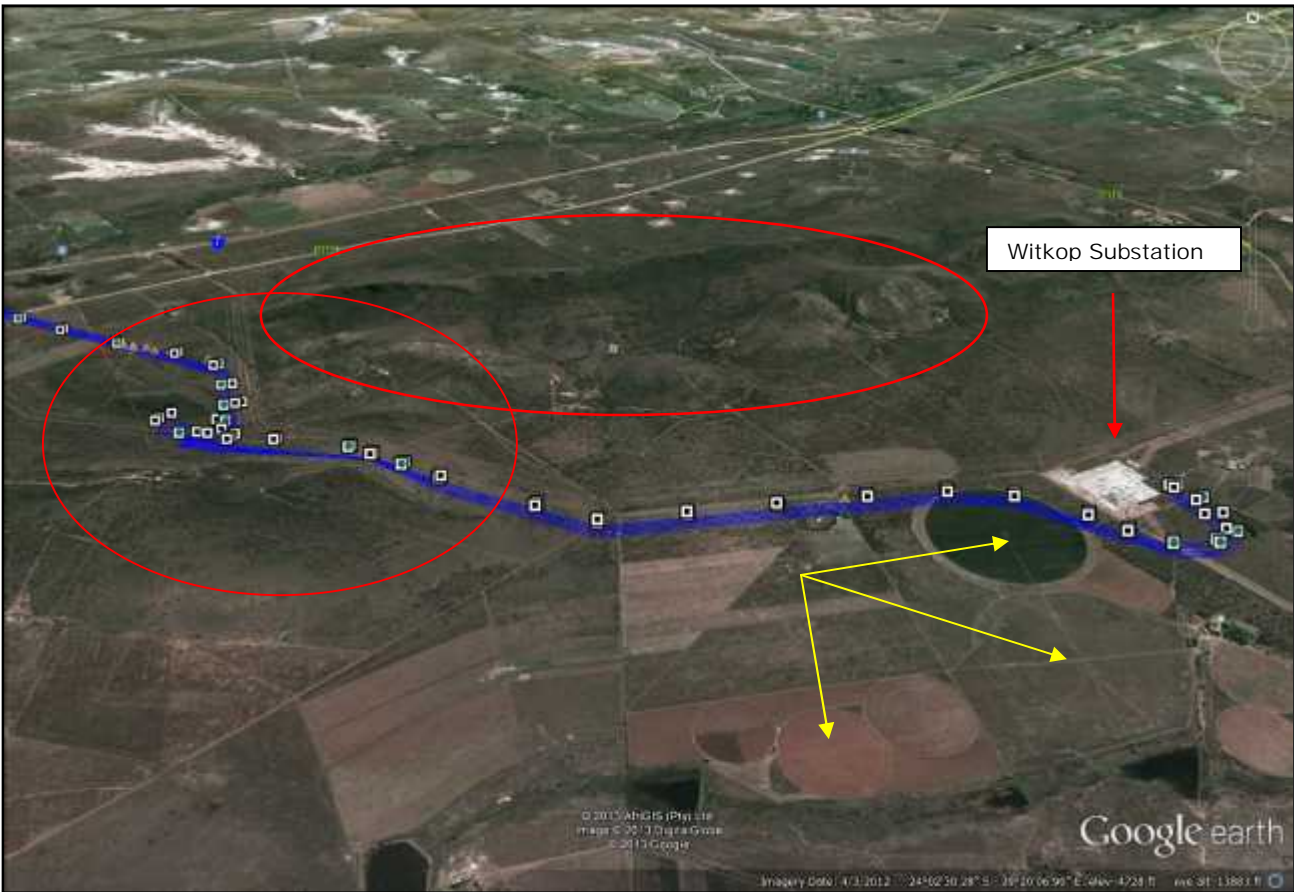


Figure 5 - Example of Pivot farms (yellow arrows) also note the existence of conversional plough fields.. Note Mountainous areas (red oblong circles) near Witkop (area in white)



Figure 6 - Giraffe (left) in one of the game farms towards Witkop and maize farm (right) in one of the pivots near Witkop Substation



Figure 7- landscape features: mountainous area towards Witkop (left) and flat former plough fields that define the area towards Borutho (right)

2.2. Description of proposed activities: Infrastructure Proposed

Table 2 - List of Activities

Activity 1	Construction of 400kV Line, and associated infrastructure such as pylons towers, from Borutho Substation to Witkop Substation .
Activity 2	Clearing of access roads and servitudes to support the construction and maintenance of the Powerline - access for SPVs

2.3. Needs & Desirability

Table 3 –List of activities in-line with the project scope

Activity 1	<ul style="list-style-type: none">• Desktop study of the heritage value and integrity of the area under consideration and its surrounding with a particular focus on resources within the proposed alignment (refer to 2.4 below for detailed overview of resources in the region under consideration).• Physical identification, documentation and recording of heritage resources within the alignment during the physical walk down of the area located between Borutho-Witkop, Limpopo Province as part the EMP process for the proposed development of 400kV Line for Eskom Transmission
Activity 2	<ul style="list-style-type: none">• The mapping, assessment and evaluation of the heritage value and integrity of the identified heritage resources and assessment of potential impacts as a result of the proposed development on these resources.
Activity 3	<ul style="list-style-type: none">• Proposing heritage management measures for inclusion in the EMP document• Making recommendations to SAHRA and provincial heritage resources authority - LIHRA

2.4. Desktop Study: Archaeological and Heritage:

South Africa is rich in diverse forms and types of heritage, ranging from natural to cultural heritage. The natural includes among other things: Geological, Palaeontological, and the various plant and animal species that define the country. The cultural heritage, which dates as

far back as 2.5 million years ago (m.y.a), includes - the different periods of Stone Age Archaeology, the Iron Age Archaeology, Historical and Industrial Archaeology, as well as the “Political/Historic” geographies of South Africa.

2.4.1. Stone Age Archaeology:

The Stone Age Archaeology of South Africa is divided into three categories, namely: the ESA, MSA and the LSA. These Stone Age industries are well documented throughout southern Africa regions including the Limpopo province where the current study is located. Below are detailed summaries of the traits that characterises each industry artefact and/or material culture as well as the types of industries dominant in the province.

ESA – Early Stone Age:

The ESA is dated between 2.5m.y.a and 250 k.y.a (thousand years ago) – during this period predecessors of Homo Sapien Sapiens started making stone artefacts. The earliest known Stone Age industry is referred to as the Olduvian Industry. It derives its name from the first known Stone Age industry recorded in Olduvia Gorge, Tanzania north-east Africa. Stone artefacts associated with this industry are often described as crude and rudimentary in making – they define the earliest form of Stone Age technological innovation. The Olduvian is replaced, in the archaeological records, by the Acheulian Industry some 1.5 m.y.a. The Acheulian is characterised by large cutting tools (also referred to as bifaces) - hand axes and cleavers are the dominant forms of artefacts found in this industry.

Other ESA tools which form part of what is called the Victoria West Stone Industry in regions such as the Free State and Northern Cape include: hand axes and what Smith refers to as ‘Tortoise Cores’ (Smith, 1920; R. A., Smith in 1915). This was probably Smith reference to the peculiar feature or morphology of Prepared Cores – where different pieces of where chipped off from a single piece of parent material to make way for the ultimate removal or shaping of a specific tool and most likely a well defined hand axe. A. H. J., Goodwin (1935) defines the Victoria West Industry with and without cores. Meaning that hand axes and cleavers could have been produced without necessarily having to prepare a parent material to a point to which a single definable tool could be produced. The absence of prepared cores in relation to hand axes and cleaver did not mean the end to this stone tool manufacturing

techniques for it become a dominant and defining feature towards the end of the ESA into the MSA. What first became known as 'Tortoise Cores' was later defined as the transition marker between the ESA and the MSA. Therefore, the Prepared Cored of the Victoria West industry can be taken as the markers of transitional period in the Stone Age industry from Acheulian into the MSA, a second clearly defined phase in Stone Age technological innovation. Lycett (2009) sees the Victoria West as an evolutionary step towards the Levallois Prepared Core Technique which signifies the outwards spread of the Stone Age technology. Such technological innovation within the ESA is also endemic in the Limpopo Province.

One of the site in close proximity to the study area with known ESA stone artefacts, material culture and fossilized remains of *Australopithecus* is the Makapansgat World Heritage Site. The site is located off the N1 some 23km north-east of the Town of Mokopane. Fossil evidence of such occupation date between 1,5m.y.a and 100 k.y.a (MSA).

MSA – Middle Stone Age:

The MSA stone artefact replace the dominant large and often imposing hand axes and cleavers that characterise the ESA. Such a distinction or transition in archaeological records has this far be dated to 250 k.y.a. During this period, smaller artefacts define the archaeological records and the most dominant ones are flake and blade industry. This period has been defined by some in archaeological circles as a period that signifies a secondary step towards the modern human behaviour through technology, physical appearance, art and symbolism (e.g. Binneman et al. 2011). This industry innovation is suggested to have been at its most highest during the last 120 k.y.a. With surface scatters of the flake and blade industries found throughout the southern Africa regions (Thompson & Maream, 2008). They often occur between surface and approximately 50-80cm below ground. Fossil bones may be associated with the MSA in some sites. The flakes and blade industries are often found in secondary context as surface scatters and occurrence like their predecessor industries. Malan (1949) defines the earliest MSA stone industry as the Mangosia and its distribution stretching across the Oriqualand in Northern Cape, Natal, the Cape Point, the Free State and the Limpopo Province our region of interest in this case. The Prepared Core Technique which had become the defining technological technique of the MSA is in this industry replaced by the Micro Lithics that become a dominant feature or trait in the LSA. They mostly occur as surface scatter. The MSA tools include

flakes, blades and points. Their time sequence is often not known because they mostly occur in surface. Other industries within the MSA include:

- The Howieson's Poort which is known to have wide distribution throughout southern Africa
- The Orangia 128 to 75 k.y.a.
- Florisbad and Zeekoegat industries dated between 64 and 32 k.y.a

In the central provinces most of the MSA stone artefacts are made from the following materials: fine grain quartzite, quartz, silcrete, chalcedony and hornfels (Binneman et al. 2011, see also Binneman et al. 2010a). In the Limpopo Province one expect to find these tools in quartzite and quartz owing to the geology of the province. Like the ESA artefacts, the MSA stone artefacts occur in secondary context owing to a variety of reasons. One is due to natural events and/or activities such as erosion and being wash down by water and/or riverine activities, animal and human disturbances etc. It would, therefore, be in the best interest of the author (or archaeologist and/or heritage consultant) to pay special attention to exposed surfaces, disturbed pieces of land and along any gullies and hill foot slopes, drainage lines etc during the survey process.

The Makapansgat World Heritage Site is known to contain some of the MSA stone artefacts and it is located within close proximity of the area under consideration for the Borutho-Witkop 400kV Transmission Line.

LSA – Late Stone Age:

The LSA spans a period from 30 k.y.a to the historical time i.e. the last 500 years to 100 years ago. It is associated, in archaeological records, with the San hunter-gathers. This is particular important for the last 10 k.y.a whereby the San material culture dominates the archaeological records -mostly in rock shelters, caves as well as open air sites in both the interior and coastal regions. However, the San open air sites are not always easy to find because they are in most cases covered by the various forms and types of vegetation and the other contributing factor is the mobility nature of these people. They were not sedentary communities like their counterparts - e.g. the Iron Age people/communities who needed to settled the land for ploughing, grazing etc. In the coastal regions, sand dunes sometimes become impediments in locating LSA sites. Owing to all these factors the preservation state of the LSA archaeology is often

poor and not easily disenable (e.g. Deacon & Deacon 1999). Caves and rock shelters provide a more substantial preservation record of pre-colonial record of indigenous people's archaeology. This is in a form of stone artefacts, rock art and other material culture such as beads etc. The LSA archaeology was, however, not only dominated by the San hunter-gathers - in about 2 k.y.a the southern Africa landscape is known to have also been penetrated and occupied by the Khoekhoe pastoralists/herders who introduce sheep and cattle. The Limpopo Province is well known for sites that document the existence of Khoekhoe herders in South African landscape (e.g. Hall & Smith, 2000). Ceramic vessels are some of the material culture that signifies the Khoekhoe material culture in archaeological records – including the depiction of sheep and cattle often found in San hunter-gather rock art (ibid). Smith and Hall (2000) give detailed descriptions of potential relations that could have taken place between the San, the Khoekhoe and later the Iron Age farmers in Little Mock - an archaeological interaction sites located in the Limpopo Province near the Soutpansberg Mountain north east of the current study geography. In their study, Smith and Hall, argue that the material culture of the Khoekhoe herders included among other things the art of making rock art in form of geometrics, concentric circles etc. Binneman (et al. 2011) asserts that the diet of this new group of people would have also included muscle collected along the muddy river banks, coastal line and riverine and terrestrial foods. Other than the material culture such as artefacts found within the LSA industries, burials or human remains become dominant in the landscape. In the coast they are often found buried underneath middens (dumpsites) (e.g. Deacon & Deacon 1999). While in the interior and northern regions such as the Limpopo Province they are sporadic and can occur across various features in the landscape.

The LSA archaeology is therefore rich and varied consisting of stone artefacts, other forms of material cultures such as beads (ostrich egg shell beads are dominant), pottery, rock art in form of paintings and engravings with engraving dominating the central low land and the interior regions. Engravings are also found here within the Limpopo Province and spread across the Highveld and central regions such as the North West Province, the Free State Province and the Cape provinces such as the Northern Cape - better known to archaeologist as the "Mecca" of engravings sites in South Africa and most probable in southern Africa. Among stone tools found in this period include, continuation of bifaces (e.g. hand axes), but they now become supplemented by tanged barbed arrow heads made from the various materials found with the southern Africa regions. Dark or black fine grained chalcedony would have been the most preferred form of material in the Karoo (Northern Cape regions), the Free State Province and Lesotho (Humphrey, 1969). In the Limpopo Province one expect these to be in dolerite and fine grained quartzite.

In the Waterberg area the LSA is known to occur in the last 20 k.y.a. However, their record in this region of the Limpopo is vivid owing to focus on most archaeological research in the north and eastern regions of the province. Among some of the best known LSA material in the Waterberg is rock art - predominantly in form of rock paintings.

In the north and eastern regions of the Limpopo these are some of the well document LSA sites Salt Pan Shelter in the Soutpansberg Mountains, Little Muck in the Limpopo Shashe Confluence Area, the Makgabeng Plateau and the Blouberg Mountains (e.g. Hall & Smith, 2000; Blundell & Eastwood, 2001; Eastwood, 2003).

2.4.2. Iron Age Archaeology:

The Limpopo Province is probably one of the well researched and documented regions of South Africa in term of Iron Age archaeological research. Like the Stone Age archaeology, in the Limpopo Province (and few other South African province) this period in archaeological records is divided into three categories, namely the EIA (Early Iron Age), MIA (Middle Iron Age) and the LIA (Late Iron Age) (e.g. Huffman, 2005). While in regions such as the Free State Province there is no clearly defined MIA (e.g. Tomose, 2013).

The EIA communities first appear in southern African archaeological records in the 1st Millennium AD (Huffman 2007; van Schalkwyk, 2007). The eastern regions of the country were their preferred regions because of their rainfall patterns – summer rainfall climates conducive for ploughing and growing crops like maize, sorghum and millet. In the interior regions, the former Transvaal areas of Limpopo and Gauteng Province alike were preferred. The Limpopo Province provides a rich canvas of all three Iron Age periods- providing archaeologists' with a unique cultural landscape. In this region most of Iron Age sites occur near the flood plains, along and near some of the major rivers; however, some are known to occur in defensive slopes along some of the Limpopo hill slopes and/or mountainous areas (e.g. van Schalkwyk, 2007; Huffman 2007 also see Hall & Smith 2000).

Huffman (2007) and van Schalkwyk (2007) dates many of the Iron Age sites located north-east of the current study area towards and around the Soutpansberg Mountains early in the Iron Age period- when the Early Iron Age (EIA) proto-Bantu-speaking farming communities began arriving in this region, which was then occupied by hunter-gatherers (Hall & Smith,

2000). For example, van Schalkwyk (ibid) date early known Iron Age site to 200 AD. These EIA communities are grouped into what archaeologists referred to as the Kwale branch of the Urewe EIA Tradition (Huffman, 2007: 127-9). A distinction between the Iron Age and the LSA is drawn on the basis and on the fact that the Iron Age communities occupied the foot-hills and valley lands introducing sedentary settled life, domesticated livestock, crop production and the use of iron (Maggs 1984a; 1984b; Huffman 2007, van Schalkwyk, 2007). Stonewalls are one of major characteristic of the Iron Age people. However, they are not the only characteristic or feature. Huffman (1982), for example described cattle dug, both vitrified and unverified, as one of the Iron Age traits. He also includes pits and burials, with some located inside the cattle kraals (ibid). This would have varied from cultures to cultures and traditions to traditions. For example, alongside the Urewe Tradition is the second group called the Kalundu Tradition whose EIA archaeological sites have been recorded along the Limpopo region. These are therefore some of the important Iron Age traditions in the EIA.

The MIA in the province date between AD 900 and 1300. This period is concentrated in the Shashe-Limpopo basin where the first complex society in southern Africa developed. Like in the earlier periods, during this period sporadic settlements would have found along the Limpopo River to Botswana and some as far as the North West Province. Therefore, areas of the Waterberg District would have also been occupied. The complex society in the Limpopo Shashe basin is distinct from other settlements in the Iron Age in that it was "characterised by sacred leadership and distinct social classes, ...[creating] the first town, first king, first stone-walled palace and the capital of the first state" (Huffman, 2005: 7). Known capital that develop during the MIA is Schroda (AD 900-1000), K2 (1000-1220) and finally the well known and popularised site of Mapungubwe (AD 1220-1300). Mapungubwe discoveries have contributed to the Limpopo Province becoming known as the province were the famous golden rhino that was recovered from the late MIA early LIA settlement site of Mapungubwe in the Limpopo Shashe Confluence Area Valley (Murimbika & Tomose, 2012). This region is also known for the Late Iron Age Great Zimbabwe Culture sites such as Lephalale and Dzata (ibid). Lephalale and Dzata occur with the Kalundu Tradition, one of the LIA traditions that occurs in the region as suggested above (e.g. see Huffman, 2007).

In the Limpopo Province the Iron Age communities are also known to have also practice the tradition of making rock art, especially during the last period of the Iron Age i.e. the LSA. A period characterised by the different encounters between these communities and the colonial settlers. The Makgabeng Plateau located near the Blouberg Mountain range is known for its LIA rock art sites. Rock art depicting conflict scenes associated with the Malebogo Wars – war

between Chief Malebogo of the Hananwa people and President Kruger of the ZAR. This occurred in the 1800s.

Other than rock art, stone walls and pottery – the material culture of the Iron Age communities also includes Iron Implements, traded beads, rainmaking site features, spear sharpening grooves on rock surfaces, grinding stones etc (e.g. Huffman, 2007). In the vicinity of the study area iron ore miners and traders, who frequented the region have left evidence of ore slag and smelters - the ore deposit in Thabazimbi would have attracted many LIA miners and traders.

2.4.3. Historical Archaeology:

The Historical archaeology is a period in archaeological records that refers to the last 500 years in archaeological records. This period encapsulates the Late Stone Age, Late Iron Age, and the period of European settlers and/or "colonist" in southern Africa. The archaeological records that characterises this period includes remnants of Stone Age industries (and material culture), the Late Iron Age material culture (e.g. pottery/ceramics, iron age implements etc) and built environment (e.g. elaborate stone wall settlements etc) and the settlers material culture and built environment. In other regions of the country, settler towns become a dominant form of built environment and landscape features. However, in the Limpopo Province such complexity can be dated as far back as the MIA to LIA (e.g. Huffman, 2005). One of the oldest settler towns that occur within along the study area include the village town of Potgietersrus (i.e. modern day Mokopane). In this province, the earliest towns were established by the European settlers of Dutch descent – the Afrikaans communities after they Trekged from the then Cape Colony to avoid British Administration in the 1930s and 19840s. They fall within what was then called the Transvaal - direct translation for across the Vaal River. Therefore, the above mentioned town (Potgietersrus) can attributed to the Great Trek movement. During the Great Trek these Afrikaans communities, commonly referred to as the Boers (farmers), who left the British Administration of the Cape Colony (i.e. a former Dutch colony in 1795 and again in 1806) established several republics north of the British Colonies - these republics included the Boer Republic of the Orange Free State (1845) and the Transvaal across the Vaal River where our study area is located. The Transvaal which had different autonomous and separate states which were later united to form what became known as the Zuid Afrikaanse Republiek (South African Republic) the ZAR (Celliers, 2010) .

Throughout the middle of the 1800 Century AD the Limpopo Province witnessed range of settlement patterns- the occupation and reoccupation of the region by the different culture groups that contributed to the contemporary peopling of the present day Limpopo Province (Tomose, 2012). There are various factors that contributed to this historical times settlement of the region. The first has to do with the availability of natural resources and the second is political driven. For example, the Great Trek is a political motivated movement of people that influence the peopling of Limpopo Province and our current study area. The attraction of people to natural resources available in this province date as far back as the 1st Millennium AD, to MIA and the LIA periods alike. During the historical times the availability of natural resources also played a pivotal role in the choice of settlement of people, based not only from a subsistence point of view but also driven by commerce or commercial gains resulting from the exploitation of available natural resources such as coal, iron ore and tin. The town of Thabazimbi, for example - located south-west of the current study area, is known to have developed from the exploitation of its rich haematite deposits (iron ore) during the early 1900s (Circa 1919). Iscor (Iron and Steel Corporation) in this region is synonymous with Thabazimbi. Towards Polokwane in Eersteling historical gold mines or gold mining activities are dated to 1853 with the discovery of gold by Pieter Jacob Marais who first found traces of alluvial gold in the Juskei River and in the vicinity of Marabastad north-east of Mokopane. Mokopane (former Potgietersrus), where Borutho is located, on the other hand is synonymous with the Great Trek - located in the Makapans Poort (name attributed to one of the Ndebele Chief in the region Chief Mokopane/Makapan) and on the gap between the Waterberg Mountain Range and Strydom mountain, this town was chosen by one of the Great Trek leaders Mr Hendrick Potgieter in 1852 and it said to have acquired its name in honour of his son Pieter Johannes who was killed in action in a battle between the Ndebele Chief who had settled in the area i.e. Chief Mokopane and Hendrick Potgieter's people. This town and its surroundings is also known to have played a pivotal role during the South African Wars, commonly known as the Anglo-Boer War. A number of skirmishes are reported to have taken place in proximity of this town. Monuments dedicated to such event still stand and are recorded in some of the maps showing the town (e.g. Figure 6). The question that one would pose is how was the area occupied by the Ndebele, an area better known for the Sotho-Tswana languages speakers - BaPedi.

The presence of the Ndebele people in this region of South Africa was partly influence by the mfecane processes, contributing to migrations and displacements of people in the region and throughout many parts of South Africa and southern Africa (Tomose, 2012). For example, in

the region the mfecane processes can be linked to the Ndebele of Mzilikazi who later settled in Zimbabwe (ibid).

Like the mfecane, the interaction between the Trek Boer or Pioneers as the also known, the Sotho-Tswana people and the Ndebele also triggered wars in the region – wars between the African chiefdoms and the incoming settlers. One such example is the battle of Blouberg, also known as the Malebogo wars, between Chief Malebogo and President Kruger of the ZAR in the Blouberg Mountains and the Makgabeng Plateau (Smith pers.com 2006). Some of these colonial wars and battles lasted into the early 1900s like the First (mid 1860s) and Second (1899 -1902) South African Wars. The later effectively led to complete subjugation of African communities to settler administration starting as part of the ZAR of Transvaal, the Union of South Africa in 1910 following the annexing of the region by the British, the Nationalist South Africa (1948), the Apartheid South Africa as proclaimed in 1948 up to late 1980s until the Democratic South Africa resulting from first democratic elections in 1994.

Amongst the known declared historical heritage sites associated with this archaeological/historical period in the broader study area include:

- The Fort Louis Campbell, Marabastad, Polokwane District- this site was declared a National Monument under the old NMC legislation on the 27 January 1938 (Figure 6) - SAHRA Accession Number (9/2/253/0007)
- The First Gold Crushing Site of Eersteling, Polokwane - this site was declared a National Monument under the old NMC legislation on the 29 June 1938 (Figure 6). It is located approximately some 29km from the town of Mokopane - SAHRA Accession Number (9/2/253/0004)
- The Makapansgat Caves and Limes Works World Heritage Site (Figure 6) - SAHRA Accession Number (9/2/253/0007)
- Anna Tree site in Mokopane - SAHRA Accession Number (9/2/243/0001)

3. METHODOLOGY

3.1. Legislative Requirements

The NEMA, No. 107 of 1998 stipulated that for any development in South African to be granted permission to go ahead an assessment of the potential impacts of the proposed development on both the natural and cultural environment need to be conducted. As such, this HIA fulfils the requirements of NEMA (and the applicable 2010 EIA Regulations) and is conducted in-line with Section 38 (1) of the NHRA, No. 25 of 1999.

3.2. Methodology

This chapter outline the methodologies used in conducting this study. This HIA report was compiled by Nkosinathi Tomose, lead archaeologist and heritage consultant for NGT Projects & Heritage Consultants for the proposed Borutho-Witkop Transmission Line it forms part of specialists studies aimed at giving inputs into the EMP process for this line and Acquisition of Environmental Permits, Waterberg District Municipality, Limpopo Province, South Africa. It covers the following local municipalities: Mokopane and Aganang Local Municipality. It does this in order to adhere to the Terms of Reference provided by the client for the completion of this report. However, some areas of the report follow minimum standards for completion of professional HIA as stipulated in SAHRA minimum standard (2012) such as detailed account to the archaeological and historical background of the study area or region. This is also

3. 2.1. Step I – Literature Review (Desktop Phase):

- The background information search of the proposed area of development was extrapolated for research conducted for Medupi-Borutho HIA (February 2013) and refined to fit the current study needs and desirability on the receipt of Letter of Appointment from the Baagi in March 2013 appointing NGT Projects & Heritage Consultants as an independent and professional CRM firm to conduct an HIA study for 60km stretch 400kV Line from Borutho to Witkop between the 11th and 14 March 2013.
- Sources used in this study included, but not limited to published academic papers and HIA studies conducted in and around the region where the current development will take place.

- There was limited use of archival maps - one historical map and one archaeological map and one general travel map showing the proposed area of development and its surround were assessed to aid information about the proposed area of development and its surrounding.
- This also included a review and assessment of relevant environmental and heritage legislations such as the NEMA (together with the 2010 EIA Regulations) and the NHRA.

3.2.2. Step II – Physical Survey:

The physical survey of the study area aimed to address the following main areas of concern raised by the client in the specialist Terms of Reference:

1. To "conduct an onsite verification "walk down" for the proposed line corridor, focusing on the proposed pylon positions within";
2. To "identify all objects, sites, occurrences and structures of an archaeological or historical nature (cultural heritage sites) located on the proposed line corridor, the pylon locations. Use will be made of annotated maps where appropriate"

In order to address these concerns by the client: -

- The physical survey of the proposed Borutho-Witkop Transmission Line was conducted by a qualified archaeologist and general heritage specialist from NGT Projects & Heritage Consultants between the 11th and 14 March 2013.
- The survey covered the servitude of the proposed Transmission line on foot and track logs of the "walk down" were recorded using Garmin GPSmap 62s.
- The objective of the survey was to locate and identify archaeological and heritage resources and/or sites and objects, occurrence within the proposed line corridor, and pylon positions. To record and map them using necessary and applicable tools and technology.
- The physical survey was deemed necessary since the desktop phase of the project yielded archaeological resources and many other heritage/historic resources about the area between Borutho and Witkop, the Waterberg District Municipality and the Limpopo Province in general.
- The survey also paid special attention to disturbed and exposed layers of soils as such as eroded surfaces because these areas are more likely to exposed or yield

archaeological and other heritage resources that may be buried underneath the soil and be brought to the earth surface by animal and human activities such as animal barrow pits and human excavated grounds. The edges/sides of dirty roads were also inspected for possible Stone Age scatters as well as exposed Iron Age implements and other resources.

- The following technological tools and platforms were deemed important for documenting and recording located and/or identified sites:
 - Garmin GPSmap 62s – to take Lat/Long coordinates of the identified sites and to take track logs of each of the 3 corridors.
 - Lenovo ThinkPad aided with Garmin Basecamp Software, Google Earth – to plot the propose corridors.
 - ArcGIS Software (ArcView Series 10) was used to plot all the identified heritage resources and to develop heritage maps in order to inform the heritage analysis of the 3 proposed corridors.
 - Maps provided by the client before the survey also proved invaluable
 - Shapefiles (KMZ files) provided by the client were used to map the corridors and sites located in each corridor servitude and immediately outside
 - Samsung camera – was use to take photos of the affected environment and the identified heritage sites.

3.2.3. Step III – Data Consolidation and Report Writing:

During field work and on the return from the field the following clients concerns were addressed: -

1. To "assess the significance of the cultural resources in terms of their archaeological, historical, scientific, social, religious, aesthetic and tourism value"
2. To "describe the possible impact of the proposed development on these cultural remains, according to a standard set of conventions;
3. To "propose suitable mitigation measures to minimize possible negative impacts on the culturalresources;
4. To "prepare an heritage resource management plan"

5. "Review applicable legislative requirements" - Section 3.1. of this Chapter (i.e. Chapter 3) addresses this concern as well as Section 5.5 of Chapter 5 discusses Sections of the NHRA, No. 25 triggered by the current study findings

6. To ".....highlight assumptions, exclusions and key uncertainties". Chapter 4 (below) of this report address this concern.

- The final step involved the consolidation of the data collected using the various sources as described above.
- This involved the manipulation Shapefiles/KMZ files through ArcGIS
- Assessing the significance and potential impact of the identified sites, discussing the finds, report writing and making recommendation on the management and mitigation measures of the identified sites and resources as well as the impact and influence of these sites and resources on the proposed corridor.

3.3. Assessment of Site Significance in Terms of Heritage Resources Management Methodologies

The significance of heritage sites was based on four main criteria:

- Site integrity (i.e. primary vs. secondary context)
- Amount of deposit, range of features (e.g., stonewalling, stone tools and enclosures)
 - Density of scatter (dispersed scatter)
 - Low - $<10/50m^2$
 - Medium - $10-50/50m^2$
 - High - $>50/50m^2$
- Uniqueness and
- Potential to answer present research questions.

Management actions and recommended mitigation, which will result in a reduction in the impact on the sites, will be expressed as follows:

- A - No further action necessary;
- B - Mapping of the site and controlled sampling required;
- C - No-go or relocate pylon position
- D - Preserve site, or extensive data collection and mapping of the site; and

- E - Preserve site
- Impacts on these sites by the development will be evaluated as follows:

Measure of Heritage Sites Significance

The following site significance classification minimum standards as prescribed by the SAHRA (2006) and approved by the ASAPA for the SADC region were used for the purpose of this report.

Table 4: Site significance classification standards as prescribed by SAHRA

FIELD RATING	GRADE	SIGNIFICANCE	RECOMMENDED MITIGATION
National Significance (NS)	Grade 1	-	Conservation; National Site nomination
Provincial Significance (PS)	Grade 2	-	Conservation; Provincial Site nomination
Local Significance (LS)	Grade 3A	High Significance	Conservation; Mitigation not advised
Local Significance (LS)	Grade 3B	High Significance	Mitigation (Part of site should be retained)
Generally Protected A (GP.A)	-	High / Medium Significance	Mitigation before destruction
Generally Protected B (GP.B)	-	Medium Significance	Recording before destruction
Generally Protected C (GP.A)	-	Low Significance	Destruction

3.4. Methodology for Impact Assessment in terms of Environmental Impact Assessment Methodologies including Measures for Environmental Management Plan Consideration:

The Basic Assessment Methodology assists in evaluating the overall effect of a proposed activity on the environment. The determination of the effects of environmental impact on an

environmental parameter is determined through a systematic analysis of the various components of the impact. This is undertaken using information that is available to the environmental practitioner through the process of the Basic Assessment & Environmental Impact Assessment. The impact evaluation of predicted impacts was undertaken through an assessment of the significance of the impacts. This is in line with specialist requirements as required by the client. For example, the request that: -

"The impact methodology [should] concentrate on addressing key issues. This methodology to be employed in the report thus results in a circular route, which allows for the evaluation of the efficiency of the process itself. The assessment of actions in each phase [that should] be conducted in the following order:

- Assessment of key issues;
- Analysis of the activities relating to the proposed line corridor, pylon locations;
- Assessment of the potential impacts arising from the activities, without mitigation, and
- Investigation of the relevant mitigation measures.

Because, "activities within the framework of the proposed line corridor give rise to certain impacts". The client recommended that, "for the purposes of assessing these impacts, the project has [to be] divided into two phases from which impact activities can be identified, namely:

- the Construction Phase
- and Operational Phase

The following Assessment Criteria is Used for Impact Assessment

An impact can be defined as any change in the physical-chemical, biological, cultural and/or socio-economic environmental system that can be attributed to human activities related to alternatives under study for meeting a project need.

The significance of the aspects/impacts of the process will be rated by using a matrix derived from Plomp (2004) and adapted to some extent to fit this process. These matrixes use the consequence and the likelihood of the different aspects and associated impacts to

determine the significance of the impacts.

The significance of the impacts will be determined through a synthesis of the criteria below:

Probability: This describes the likelihood of the impact actually occurring

Improbable: The possibility of the impact occurring is very low, due to the circumstances, design or experience.

Probable: There is a probability that the impact will occur to the extent that provision must be made therefore.

Highly Probable: It is most likely that the impact will occur at some stage of the development.

Definite: The impact will take place regardless of any prevention plans and there can only be relied on mitigatory measures or contingency plans to contain the effect.

Duration: The lifetime of the impact

Short Term: The impact will either disappear with mitigation or will be mitigated through natural processes in a time span shorter than any of the phases.

Medium Term: The impact will last up to the end of the phases, where after it will be negated.

Long Term: The impact will last for the entire operational phase of the project but will be mitigated by direct human action or by natural processes thereafter.

Permanent: The impact is non-transitory. Mitigation either by man or natural processes will not occur in such a way or in such a time span that the impact can be considered transient.

Scale: The physical and spatial size of the impact

Local: The impacted area extends only as far as the activity, e.g. footprint

Site: The impact could affect the whole, or a measurable portion of the above mentioned properties. Regional: The impact could affect the area including the neighbouring residential areas.

Magnitude/ Severity: Does the impact destroy the environment, or alter its function

Low: The impact alters the affected environment in such a way that natural processes are not affected.

Medium: The affected environment is altered, but functions and processes continue in a modified way.

High: Function or process of the affected environment is disturbed to the extent where it temporarily or permanently ceases.

Significance: This is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required.

Negligible: The impact is non-existent or unsubstantial and is of no or little importance to any stakeholder and can be ignored.

Low: The impact is limited in extent, has low to medium intensity; whatever its probability of occurrence is, the impact will not have a material effect on the decision and is likely to require management intervention with increased costs.

Moderate: The impact is of importance to one or more stakeholders, and its intensity will be medium or high; therefore, the impact may materially affect the decision, and management intervention will be required.

High: The impact could render development options controversial or the project unacceptable if it cannot be reduced to acceptable levels; and/or the cost of management intervention will be a significant factor in mitigation.

The significance is calculated by combining the criteria in the following formula:

Sum (Duration, Scale, Magnitude) x Probability (Table -2)

S = Significance weighting; Sc = Scale; D = Duration; M = Magnitude; P = Probability

Table 5 -The significance weightings for each potential impact are as follows:

Aspec	Description	Weight
Probability	Improbable	1
	Probable	2
	Highly Probable	4
	Definite	5
Duration	Short term	1
	Medium term	3
	Long term	4
	Permanent	5
Scale	Local	1
	Site	2
	Regional	3
Magnitude/Severit	Low	2
	Medium	6
	High	8
Significance	Sum (Duration, Scale, Magnitude) x Probability	
	Negligible	20
	Low	>20 40
	Moderate	>40 60

	High	>60
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The significance of each activity was rated without mitigation measures (WOM) and with mitigation (WM) measures for both construction, operational and closure phases of the proposed development

To address the question of Heritage Management Plan the following table is used for Measures to be included in the EMP. This table is relevant in that it addresses key issues at the various stages of the project by also addresses how some of the key concerns that develop from a heritage point of view can be mitigated.

Table 6 -Measures for inclusion in the draft Environmental Management Plan:

OBJECTIVE: Description of the objective, which is necessary in order to meet the overall goals; these take into account the findings of the environmental impact assessment specialist studies		
Project component/s	List of project components affecting the objective	
Potential Impact	Brief description of potential environmental impact if objective is not met	
Activity/risk source	Description of activities which could impact on achieving objective	
Mitigation: Target/Objective	Description of the target; include quantitative measures and/or dates of completion	
Mitigation: Action/control	Responsibility	Timeframe
List specific action(s) required to meet the mitigation target/objective described above	Who is responsible for the measures	Time periods for implementation of measures
Performance Indicator	Description of key indicator(s) that track progress/indicate the effectiveness of the management plan.	
Monitoring	Mechanisms for monitoring compliance; the key monitoring actions required to check whether the objectives are being achieved, taking into consideration responsibility, frequency, methods and reporting	

4. ASSUMPTIONS, EXCLUSIONS AND UNCERTAINTIES

The following assumptions, exclusions and uncertainties exist in terms of the present study:

4.1. Assumptions -

- The current study is a Phase 1 Heritage Impact Assessment. As such, a historical and archival desktop study as well as a field survey were undertaken to identify tangible heritage resources located in and around the proposed development area footprint. The assumption is that a heritage social consultative process would have taken place with some of the locals or farm owners to uncertain known archaeological or heritage sites in their properties such as presence or existence of graves and cemeteries etc. However, there was no formal heritage social consultation that took place as part of the study - this is due to the fact that nature of the current study i.e. EMP rather than an EIA process or BAR does not allow for social consultation because the EIA process would have already covered this.
- The study assumes that the amount of heritage resources located in and around the propose line corridor represent the total amount of physical or tangible resources distributed in and around/along the propose line corridor servitude.

4.2. Exclusions -

The following exclusions or limitations have direct consequence to the study and its results-

- The proposed line corridor servitude cover many farms - as such there was no deeds search of individuals farms that the line corridor will pass/traverse between Medupi, Borutho and Witkop.
- The survey was conducted in March 2013, summer period - as such there was high level of vegetation cover for the archaeologist/heritage surveyor to pick up all the different archaeological and heritage features in the landscape such as unmarked graves, the different Stone Age, Iron Age and Historical Archaeology material culture and artefacts. This forms one major limitation in terms of observing and recording all forms of

archaeological and heritage sites in and immediately outside or along the proposed development line corridor servitude.

- The fourth limitation of the project was the issue of access - portions of the proposed development line corridor servitude could not be access because of the nature of farming activities taking place on some of the properties. As well as un-concluded negotiations between Eskom and individual property owners.
- The survey took place during summer and the Limpopo Province is known to fall within the summer rainfall region of South Africa - the last few days of the corridor survey had to be conducted during rainy days and the last day was cancelled because there were floods and some of the mountainous areas could not be access as a result. The same is through for flat lands whereby the surveying archaeologist and other specialist could not cross over flooded rivers.

4.3. Uncertainties -

Heritage studies like most other specialist studies often experience many challenges during and after the physical survey of the proposed development area.

- From an archaeological and general heritage perspective - the assumption is often made that, the amount of identified archaeological and heritage resources during physical survey of the proposed development area represent some of the total amount of resources that exist in and around or along the development area.
- This is not often true because the nature of some the archaeological and heritage resources - some of these resources are subterranean in nature and as such, one cannot totally rule out their presence or existence along the line corridor even though they are not recorded and map as part of the current study. These resources may be exposed or brought to the surface of the earth during the construction phase of the project which will involve excavation for pylons and clearing of vegetation and top for access roads soil in some instances.
- This presents one of the major uncertainties regarding the 'holistic' management or archaeological and heritage resources along the proposed line corridor servitude.
- Archaeologist and heritage specialist alike refer to discovery of such resources as chance finds and to mitigate such uncertainty - it is always advised that should such chance finds be made of archaeological and heritage resources or site the ECO should report them to the nearest SAHRA office or museum or call an archaeologist and heritage specialist to investigate the finds make necessary recommendations.

- Some of the exclusion or limitation also cast a large uncertainty about the potential archaeological and heritage resources - for example, presence of significant resources on that land or properties that could not be accessed as a result of the above given reasons. However, this can be addressed by revisiting some of the properties or farms that could initially be surveyed or investigated

5. FINDINGS

The findings of this study are presented in three ways as per the search and other methodological methods used in conducting it. Such as desktop study, map and physical survey of the proposed Borutho-Witkop Transmission Line. Because there was no deeds search of the various properties and farms that the proposed Transmission Line is going to traverse - no deeds information is provided of the farms that the power line will pass.

5.1. Anticipated Heritage Resources and Sites within the proposed Medupi-Borutho Transmission Line, Limpopo Province–

Based on the known archaeological and historical events that took place within this region of the Limpopo Province and the western and central to northern Limpopo - the following archaeological and heritage resources sites are anticipated to occur within and immediately outside the propose Medupi-Borutho Transmission Line:

- Iron Age implements
- Iron ceramics
- Iron Age graves and burials
- Iron Age stone settlements and kraals
- Ash middens
- Historic monuments – some associated with the South African Wars (commonly known as the Anglo-Boer Wars)
- Historical cemeteries and graves
- Historic houses/buildings
- Farming heritage resources
- Stone Age material culture mostly LSA, MSA, and even ESA

5.2. Results of Desktop Search-

The desktop search of the area revealed a number of things and activities that took place within the region - the literature review section above gives an accounts of this. Resources anticipated to be found mostly emanates from the findings of the Desktop Search.

5.3. Cadastral Search:

The following maps of the study area were used to assess the evolutions of the landscape in and around the area in which the proposed corridor will traverse:

The first map (Figure 6) is a recent map taken from the Lephalale Local Municipality Guide book. This map is important in this study in terms of giving a general indication of the location of some of the geographical features that are mentioned in the Description of Affected Landscape Section and the location of some of the known archaeological and historical heritage sites within the Limpopo Province. It proved important in the sense that it also shows us some of the biodiversity protected areas such as Percy Fyfe Nature Reserve. Also important about this map is the clear of manmade features such as towns, roads, villages and south of the town of Mokopane a memorial dedicated to South Africa War (Anglo-Boer War) is depicted in the map, the Makapansgat Caves and Lime Works, the position of Fort Louis Campbell - Marabastad and the first gold crushing site, Eersteling (Figure 6). This map gives such a good illustration of the activities and evolution of the landscape of the study area. However, it becomes more relevant only when it is compared to the other two maps.

The second map is an archaeological map showing areas with some of the mineral resources known to have been exploited by the Iron Age people during the pre-historic times up to historic times (from 1800s). From this map we learn that the area produced tin in the prehistoric times, the site of Rooiberg is an example of such mineral wealth exploitation. What is also important about this map is that, we also see the distribution of sites that contained copper, gold and the location of Salt pans especially in Botswana (Figure 7). All these resources would have played a vital role, in terms of trade, during the different periods of Iron Age up to historical times.

The third Map, that which depicts physical features of the Transvaal gives us a relative date of some of the oldest towns in the Limpopo Province -for example, the location of Mokopane

indicated in the map as Piet Potgieter's Rust, Nylstrom further south and Polokwane indicated as Pietersburg. These towns are linked by the railway line and this means that the railway line predates the map. From this map we also see that the study area towards Mokopane is ensconced between the Soutpansberg and Waterberg escarpments within the Middle Veld and Low Veld (Figure 8).

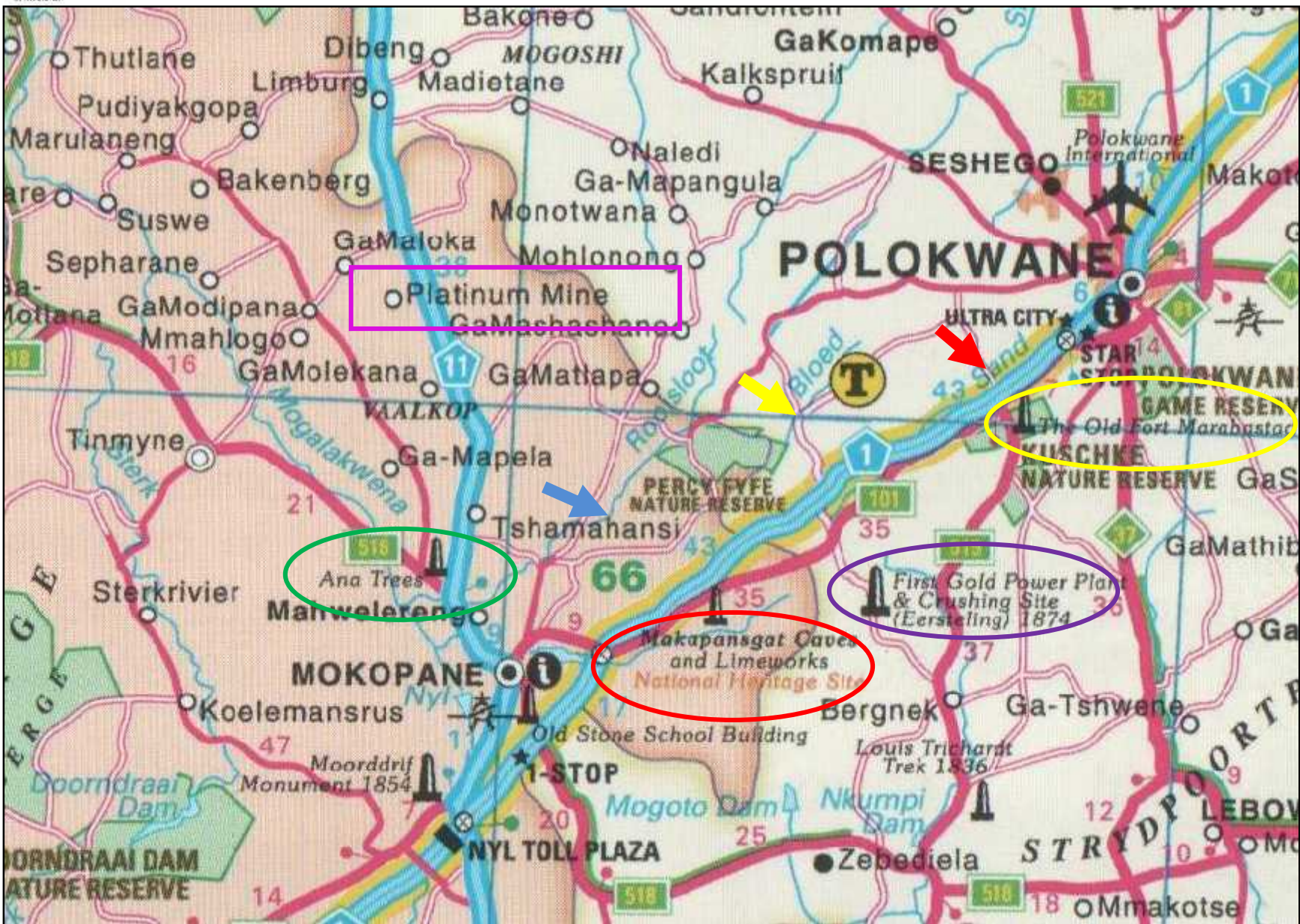


Figure 8-A general map showing the some of the cultural and natural features that define the broader study area. The cultural features marked using oblong circles are heritage sites that define the broader study area. These sites have archaeological and historical association. Significant natural features will include the Sand River (red arrow), Bloed (yellow) and Rooisloot (blue arrow)). The N1 and the N11 form part of South Africa's national roads. Purple rectangle show the position of current Platinum Mines @Lephalale Guide Book, 2011.

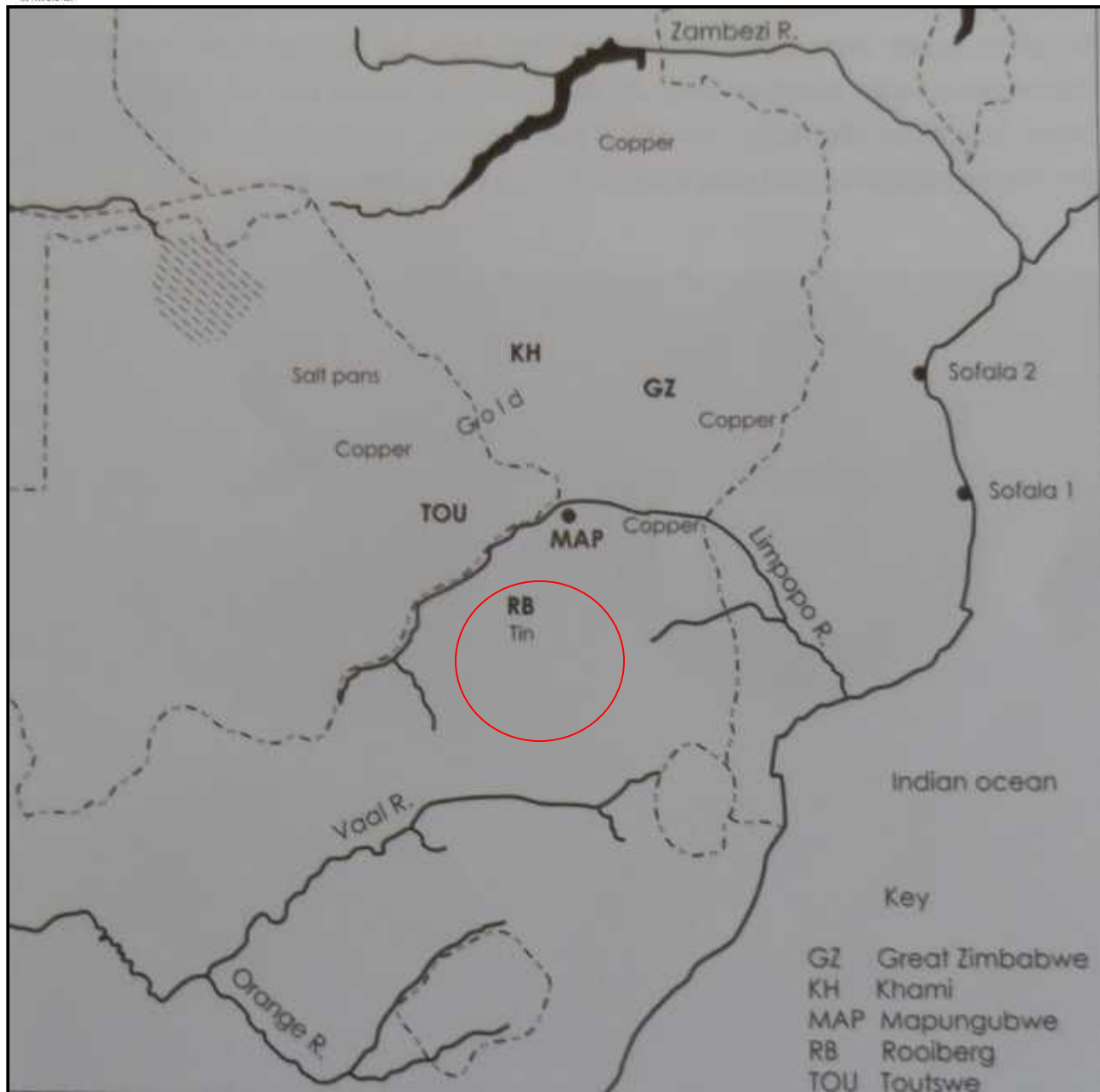


Figure 9- An archaeological map of southern Africa showing the location of important natural resources. The red circle show the proximity location of our study area for the Medupi-Borutho Transmission Line. @ Huffman, 2007:51.

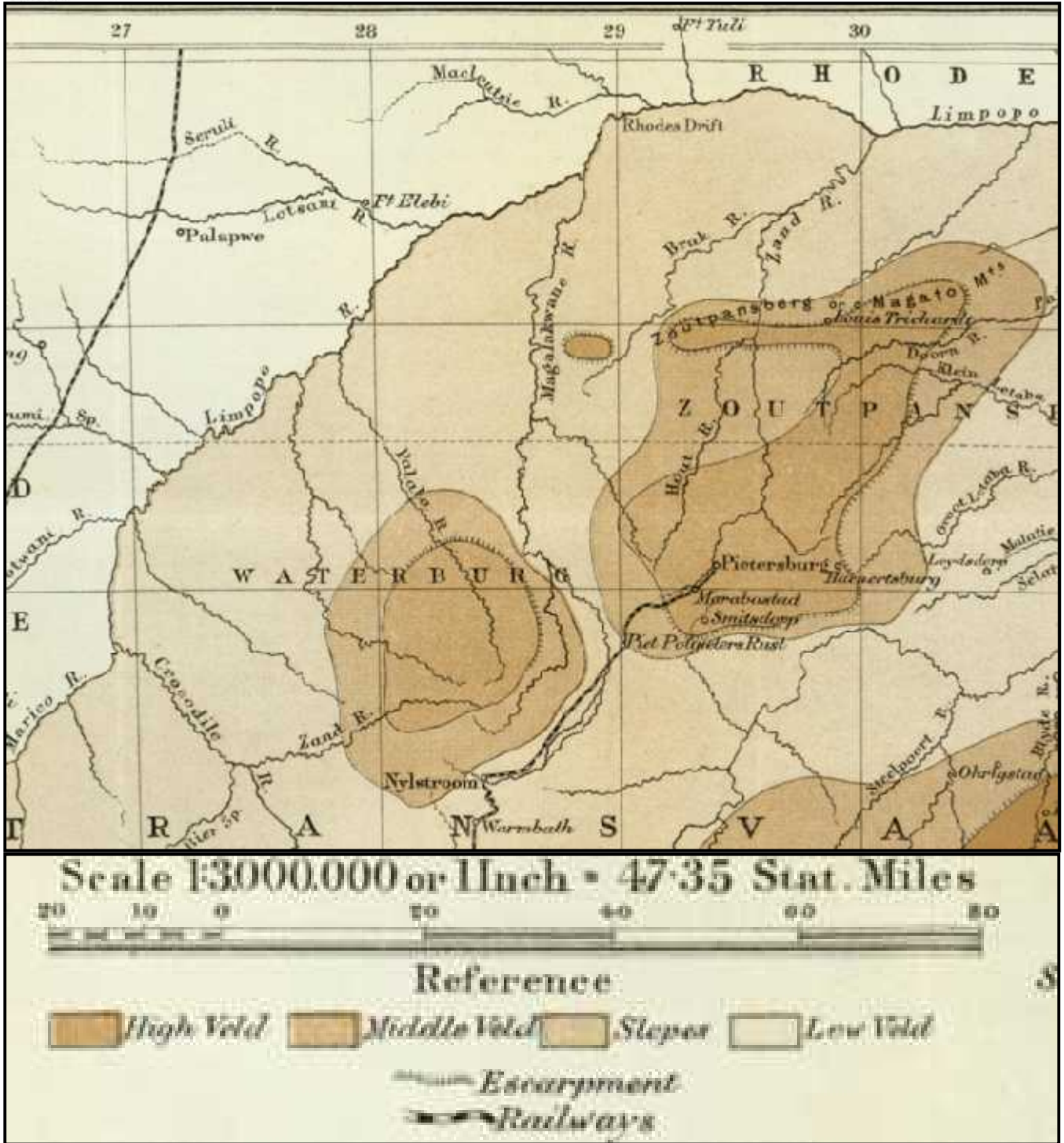


Figure 10-1905 Map illustrating the physical features of the Transvaal by Tudor G. Trevor, - F.G.S.A.R.S.M @ Trevor, 1906.

5.4. Deeds Search:

No deeds search was conducted as part of the study.

5.5. Field Survey and Identified Archaeological/Heritage Resources:

The physical survey of the proposed Borutho-Witkop Transmission Line made a number of observations about the presence of archaeological and heritage resources sites within and immediate outside the alignment servitude as well as the general surrounding landscape as described in the 'affected environment' section above. A number of sites varying from archaeological to historic historical heritage sites were identified in alignment corridor. As a result of such observations the following sections of the NHRA, No. 25 of 1999 were triggered:

- Section 34 for the built environment and landscape features which include the historic buildings in this case
- Section 35 for archaeological resources - i.e. stone tools or artefacts, ash middens, kraal, grinding stones, digging stick support system etc
- And Section 36 for burial grounds and graves e.g. the cemeteries and/or burial sites

Below is the description and evaluation of identified sites within and immediately around the proposed alignment corridor

Borutho-Witkop - Archaeological and Heritage Sites:

Site Name: BW-2

Type: LIA/Historic isolated grinding stone

Density (Low): 1x grinding stone

Location/GPS Coordinates: S23 56 42.9 E29 03 42.1

Approximate Age: Older than 60 years

Applicable NHRA Section: Section 35

Nearest Pylon Position:

Pylon No.	Distance from the pylon in meters	Distance from the servitude centre line in meters
BRO-WIT026	66m	5m

Site Description:

This is not a site but an isolated and eroded grinding stone scatter. It is millet grindstone in the middle of former plough fields (Figure 11) . There are no other structures or forms of material culture associated with it.

Nature of Impacts, Assessments & Predictions in terms of Standard Heritage & Basic Assessment (i.e. adopted from Standard Environmentally Basic Assessment Guidelines):

Field Rating	Grade	Impact Scale	Impact Significance	Heritage Significance	Certainty of Impacts	Duration	Mitigation
GP.C	-	Local	Negligible (WOM/WM)	Low significance	Highly probable (WOM)	Short term: Construction phase	A

Nature of Activities:

1. Construction Phase: Clearing of the servitude and development of associated infrastructure

such as access roads.		
2. Operation Phase: N/A		
	WOM	WM
Probability	Highly probable (4)	Improbable (1)
Duration	Short term(1)	Short term (1)
Scale	Local (1)	Local (1)
Magnitude/Severity	Low (2)	Low (2)
Significance	(16)Negligible	(4) Negligible
Status (positive or negative)	Negative	Positive
Reversibility	Low	High
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated?	Yes	
Mitigation: The material is already degraded and it is not worth of collection. Therefore, no further action required.		
Cumulative impacts: No cumulative impact are predicted		
Residual Impacts:		
<ul style="list-style-type: none"> • The project will positively contribute to the transmission of power loads from Borutho to Witkop. • There are no negative impact regarding this scatter - it is of low heritage significance and its impact significance are negligible 		

Measures for inclusion in the draft Environmental Management Plan:

OBJECTIVE: The overall goal is to identify, manage and conserve heritage resources within and immediately outside the proposed development area footprint i.e. the proposed 10m line corridor servitude and the 60m buffer within the corridor. The site is of low heritage significance and there are no further mitigation measures proposed for it.

Project component/s	Construction phase of the project		
Potential Impact	N/A		
Project component/s	Operational phase of the project		
Potential Impact	N/A		
Activity/risk source	N/A		
Mitigation: Target/Objective	No further action required		
Mitigation: Action/control	Responsibility	Timeframe	
N/A	N/A	N/A	
Performance Indicator	N/A		
Monitoring	N/A		



Figure 11 -Sorghum/millet grinding stone

Site Name: BW-3

Type: Cemetery

Density (High): Approximately 120 graves

Approximate Age: Older and less than 60 years

Applicable NHRA Section: Section 36

Location/GPS Coordinates: S23 57 41.9 E29 05 26.0

Nearest Pylon Position:

Pylon No.	Distance from the pylon in meters	Distance from the servitude centre line in meters
BOR-WIT030	174m	23m

Site Description:

The site in a tribal authority formalised cemetery located west of the village of Segwahleng. It is fenced off from the rest of the surrounding landscape and contains approximately 120 graves -mostly with granite headstones and dressings (Figure 12). There are also new burials with only soil mounds (Figure 12). The cemetery is clearly visible from Google satellite imagery (Figure 13).

Nature of Impacts, Assessments & Predictions in terms of Standard Heritage & Basic Assessment (i.e. adopted from Standard Environmentally Basic Assessment Guidelines):

Field Rating	Grade	Impact	Impact Significance	Heritage Significance	Certainty of Impacts	Duration	Mitigation
Local significance	3A	Local	Negligible	High significance	Probable (WOM)	Short-term	C - avoid the site

Nature of Activities:		
<p>1. Construction Phase: : The site falls outside the servitude line or 10m buffer line corridor. It is also clearly marked and fenced off from its surrounding landscape and will therefore not be negatively affected.</p> <p>2. Operation Phase: The site falls outside the servitude line or 10m buffer line corridor. It is also clearly marked and fenced off from its surrounding landscape and will therefore not be negatively affected.</p>		
	WOM	WM
Probability	Improbable (1)	Improbable (1)
Duration	Short term (1)	Short term (1)
Scale	Local (1)	Local (1)
Magnitude/Severity	Low (2)	Low (2)
Significance	(4)Negligible	(4) Negligible

Status (positive or negative)	Positive	Positive
Reversibility	Low	Low
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes - it can be mitigated by means of avoidance	
Mitigation: Avoid the site and treat it as no go area		
Cumulative impacts: No cumulative impacts are predicted		
Residual Impacts: <ul style="list-style-type: none"> The project will positively contribute to the transmission of power loads from Borutho to Witkop. 		

Measures for inclusion in the draft Environmental Management Plan:

OBJECTIVE: The overall goal is to identify, manage and conserve heritage resources within and immediately outside the proposed development area footprint i.e. the proposed 10m line corridor servitude and the 60m buffer within the corridor. The site consist of approximately 120 graves, it is of high heritage significance with negligible impact significance because it falls outside the 10m line corridor. The proposed mitigation measure for this site is total avoidance.

Project component/s	Construction phase of the project
Potential Impact	The site is located outside the development footprint and will not be directly impacted
Project component/s	Operational phase of the project
Potential Impact	The site is located outside the development footprint and will not be directly impacted
Activity/risk source	Exclusion of the above objectives from the overall EMP

Mitigation: Target/Objective	The site should be avoided and be treated as a no-go area		
Mitigation: Action/control	Responsibility	Timeframe	
The site should be avoided and be treated as a no-go area	ECO should ensure that the site is avoided and treated as no go area	Project construction phase	
Performance Indicator	The type of indicator used here will be Actionable Indicators – this will measure action/progress in terms of completion of the above objectives with the approval of the EMP against their actual implementation.		
Monitoring	The ECO should ensure that construction activities and machinery avoid the site by all means. He/she should do physical monitoring of the site to ensure that it is completely avoided.		



Figure 12- Cemetery site containing approximately 120 graves. Note graves with granite headstone and new burials.



Figure 13 -Google imagery for BW-3

Site Name: BW-4

Type: Possible grave

Density (Low): Possible grave near a garden

Location/GPS Coordinates: S23 58 01.5 E29 05 57.2

Approximate Age: Over 60 years or less

Applicable NHRA Section: Section 36

Nearest Pylon Position:

Pylon No.	Distance from the pylon in meters	Distance from the servitude centre line in meters
BOR-WIT 032	174m	23m

Site Description:

The site is a possible grave located on the edge of a garden - it has stone mound dressing and headstone (Figure 14). In such cases the only way to determine whether a structure is a grave or not a test trench would be necessary to ascertain changes in soil colourations.

Nature of Impacts, Assessments & Predictions in terms of Standard Heritage & Basic Assessment (i.e. adopted from Standard Environmentally Basic Assessment Guidelines):

Field Rating	Grade	Impact	Impact Significance	Heritage Significance	Certainty of Impacts	Duration	Mitigation
Local significance	3A	Local	Negligible	High significance	Probable (WOM)	Short-term	C - avoid the site

Nature of Activities:

1. Construction Phase: : The site falls outside the servitude line or 10m buffer line corridor. It is also clearly marked and fenced off from its surrounding landscape and will therefore not be negatively affected.

2. Operation Phase: The site falls outside the servitude line or 10m buffer line corridor. It is also clearly marked and fenced off from its surrounding landscape and will therefore not be negatively affected.

	WOM	WM
Probability	Improbable (1)	Improbable (1)
Duration	Short term (1)	Short term (1)
Scale	Local (1)	Local (1)
Magnitude/Severity	Low (2)	Low (2)
Significance	(4)Negligible	(4) Negligible
Status (positive or negative)	Positive	Positive

Reversibility	Low	Low
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes - it can be mitigated by means of avoidance	
Mitigation: Avoid the site and treat it as no go area		
Cumulative impacts: No cumulative impacts are predicted		
Residual Impacts: <ul style="list-style-type: none"> The project will positively contribute to the transmission of power loads from Borutho to Witkop. 		

Measures for inclusion in the draft Environmental Management Plan:

OBJECTIVE: The overall goal is to identify, manage and conserve heritage resources within and immediately outside the proposed development area footprint i.e. the proposed 10m line corridor servitude and the 60m buffer within the corridor. The site consist of single grave and is of high heritage significance with negligible impact significance because it falls outside the 10m line corridor. The proposed mitigation measure for this site is total avoidance.

Project component/s	Construction phase of the project
Potential Impact	The site is located outside the development footprint and will not be directly impacted
Project component/s	Operational phase of the project
Potential Impact	The site is located outside the development footprint and will not be directly impacted
Activity/risk source	Exclusion of the above objectives from the overall EMP

Mitigation: Target/Objective	The site should be avoided and be treated as a no-go area		
Mitigation: Action/control	Responsibility	Timeframe	
The site should be avoided and be treated as a no-go area	ECO should ensure that the site is avoided and treated as no go area	Project construction phase	
Performance Indicator	The type of indicator used here will be Actionable Indicators – this will measure action/progress in terms of completion of the above objectives with the approval of the EMP against their actual implementation.		
Monitoring	The ECO should ensure that construction activities and machinery avoid the site by all means. He/she should do physical monitoring of the site to ensure that it is completely avoided.		



Figure 14 - Possible grave - based on the stone arrangement and placement of a bigger stone on the west end of the circle.

Site Name:	BW-5
Type:	2 x LIA potshard scatter
Density (Low):	2 x potshard scatter
Location/GPS Coordinates:	S23 57 46.9 E29 08 24.4
Approximate Age:	Older than 60 years
Applicable NHRA Section:	Section 35

Nearest Pylon Position:

Pylon No.	Distance from the pylon in meters	Distance from the servitude centre line in meters
BOR-WIT041	16m	16m

Site Description:

This is not a site rather a LIA isolated potshards or scatters found in the middle of former plough-fields (Figure 15).

Nature of Impacts, Assessments & Predictions in terms of Standard Heritage & Basic Assessment (i.e. adopted from Standard Environmentally Basic Assessment Guidelines):

Field Rating	Grade	Impact	Impact Significance	Heritage Significance	Certainty of Impacts	Duration	Mitigation
GP.C	-	Local	Negligible	Low	Highly probable	Short term	A

Nature of Activities:

1. Construction Phase: The scatter will be affected, but is of low significance
2. Operation Phase: It will probably be already affected by construction or natural activities

	WOM	WM
Probability	Probable (2)	Probable (2)
Duration	Short term (1)	Short term (1)
Scale	Local (1)	Local (1)
Magnitude/Severity	Low (2)	Low (2)
Significance	(8) Negligible	(8) Negligible
Status (positive or negative)	Positive	Positive

Reversibility	Low	Low
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	No	
Mitigation: No further action required - insignificant scatter/isolated potshards		
Cumulative impacts: No cumulative impacts predicated		
Residual Impacts:		
<ul style="list-style-type: none"> The project will positively contribute to the transmission of power loads from Borutho to Witkop. No negative residual impacts predicted, this is not a site but a scatter or isolated potshard 		

Measures for inclusion in the draft Environmental Management Plan:

OBJECTIVE: The overall goal is to identify, manage and conserve heritage resources within and immediately outside the proposed development area footprint i.e. the proposed 10m line corridor servitude and the 60m buffer within the corridor. The scatter or isolated potshards are insignificant and no further action is required

Project component/s	Construction phase of the project		
Potential Impact	The 2 shards are insignificant scatter and they fall outside the 10m line corridor		
Project component/s	Operational phase of the project		
Potential Impact	The 2 shards are insignificant scatter and they fall outside the 10m line corridor		
Activity/risk source	N/A		
Mitigation: Target/Objective	There are no mitigation measures proposed for the scatters - they are of low heritage significance and fall outside the 10m line corridor		
Mitigation: Action/control	Responsibility	Timeframe	

There are no mitigation measures proposed for the scatters - they are of low heritage significance and fall outside the 10m line corridor.	N/A	N/A
Performance Indicator	The type of indicator used here will be Actionable Indicators – this will measure action/progress in terms of completion of the above objectives with the approval of the EMP against their actual implementation.	
Monitoring	N/A	



Figure 15- 2x potshards - one decorated and reddish burnished (right) and the other is undecorated.

Site Name: BW-6
 Type: MSA Site
 Density (Low): Flakes scatter
 Location/GPS Coordinates: S23 57 44.2 E29 08 35.9
 Approximate Age: 300-60k.y.a

Applicable NHRA Section: Section 35

Nearest Pylon Position:

Pylon No.	Distance from the pylon in meters	Distance from the servitude centre line in meters
BOR-WIT 042	209m	2.8m

Site Description:

The site consists of flakes scatters and is of low heritage significance (Figure 16). The 3 scatters were collected together for purposes of photography.

Nature of Impacts, Assessments & Predictions in terms of Standard Heritage & Basic Assessment (i.e. adopted from Standard Environmentally Basic Assessment Guidelines):

Field Rating	Grade	Impact	Impact Significance	Heritage Significance	Certainty of Impacts	Duration	Mitigation
GP.C	-	Site	Low (WOM/WM)	Low significance	Probable (WOM/MW)	Short-term: Construction	A

Nature of Activities:

1. Construction Phase: Clearing of the servitude and development of associated infrastructure such as access roads.
2. Operation Phase: The scatter will probably be already displaced by natural causes such as erosion.

	WOM	WM
Probability	Probable (2)	Probable (2)
Duration	Short term (1)	Short5 term (1)
Scale	Local (1)	Local (1)

Magnitude/Severity	Low (2)	Low (2)
Significance	(8)Low	(8) Low
Status (positive or negative)	Positive	Positive
Reversibility	Low	Low
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	No	
Mitigation: No further action required		
Cumulative impacts: N/A		
Residual Impacts:		
<ul style="list-style-type: none"> The project will positively contribute to the transmission of power loads from Borutho to Witkop. 		

Measures for inclusion in the draft Environmental Management Plan:

OBJECTIVE: OBJECTIVE: The overall goal is to identify, manage and conserve heritage resources within and immediately outside the proposed development area footprint i.e. the proposed 10m line corridor servitude and the 60m buffer within the corridor. The scatter fall directly within the 10m line corridor and will be affected - however, they are of low heritage significance and no further action is proposed.

Project component/s	Construction phase of the project
Potential Impact	The scatters will be impacted - however, they are of low heritage significance
Project component/s	Operational phase of the project
Potential Impact	The scatters will be impacted - however, they are of low heritage significance
Activity/risk source	N/A

Mitigation: Target/Objective	No further action proposed		
Mitigation: Action/control	Responsibility	Timeframe	
No further action proposed	N/A	N/A	
Performance Indicator	The type of indicator used here will be Actionable Indicators – this will measure action/progress in terms of completion of the above objectives with the approval of the EMP against their actual implementation.		
Monitoring	N/A		



Figure 16- Example of flakes and cores found at the site

Site Name: MB-7

Type: MSA Site

Density (low): Flakes occurrence

Location/GPS Coordinates: S23 57 44.1 E29 08 37.0

Approximate Age: 300-60k.y.a old

Applicable NHRA Section: Section 35

Nearest Pylon Position:

Pylon No.	Distance from the pylon in meters	Distance from the servitude centre line in meters
BOR-WIT 042	175m	6m

Site Description:

The site consists of approximately 16 flakes in an area that covers approximately 10m². The site is an occurrence of flakes exposed through erosive processes, some have been washed down and in their secondary context (Figure 17).

Nature of Impacts, Assessments & Predictions in terms of Standard Heritage & Basic Assessment (i.e. adopted from Standard Environmentally Basic Assessment Guidelines):

Field Rating	Grade	Impact	Impact Significance	Heritage Significance	Certainty of Impacts	Duration	Mitigation
GP.	-	Local	Negligible (WOM/WM)	Medium significance	Improbable (WOM/MW)	Short term	A

Nature of Activities:

1. Construction Phase: No site will be affected as it falls immediately outside the 10m line corridor
2. Operation Phase: No impact are predicted for this phase - the occurrences will probably be already been displaced by either natural processes that are taking place at the site such as the

server erosion processes or through construction activities.		
	WOM	WM
Probability	Highly probable (4)	Highly probable (4)
Duration	Short term (1)	Short term (1)
Scale	Local (1)	Local (1)
Magnitude/Severity	Low (2)	Low (2)
Significance	(16)Negligible	(16) Negligible
Status (positive or negative)	Negative	Positive
Reversibility	Low	Low
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes - but the current photographic, GPS recording and mapping is deemed sufficient enough	
Mitigation: No further action required - current photographic, GPS recording and mapping is deemed sufficient enough		
Cumulative impacts: No cumulative impacts are predicted		
Residual Impacts:		
<ul style="list-style-type: none"> The project will positively contribute to the transmission of power loads from Borutho to Witkop. 		

Measures for inclusion in the draft Environmental Management Plan:

OBJECTIVE: The overall goal is to identify, manage and conserve heritage resources within and immediately outside the proposed development area footprint i.e. the proposed 10m line corridor servitude and the 60m buffer within the corridor. The site is an occurrence of flakes exposed through erosive processes, some have been washed down and in their secondary context. The occurrence fall immediately outside the 10m line corridor and will be impacted - however, the current recording or documentation is deemed sufficient enough.

Project component/s	Construction phase of the project	
Potential Impact	The site will be directly affected but the current photographic, GPS recording and mapping is deemed sufficient enough	
Project component/s	Operational phase of the project	
Potential Impact	The site will be directly affected but the current photographic, GPS recording and mapping is deemed sufficient enough	
Activity/risk source	N/A	
Mitigation: Target/Objective	No further action proposed	
Mitigation: Action/control	Responsibility	Timeframe
No further action proposed	N/A	N/A
Performance Indicator	The type of indicator used here will be Actionable Indicators – this will measure action/progress in terms of completion of the above objectives with the approval of the EMP against their actual implementation.	
Monitoring	N/A	



Figure 17 - Flakes found at the site. Please note that they were collected together for purposes of photography.

Site Name: BW-8a

Type: Historic stone kraal

Density (Medium): Approximately 40 x 30m²

Location/GPS Coordinates: S23 57 31.1 E29 09 56.6

Approximate Age: Older than 60 years

Applicable NHRA Section: Section 35

Nearest Pylon Position:

Pylon No.	Distance from the pylon in meters	Distance from the servitude centre line in meters
BOR-WIT 047	110m	20m

Site Description:

The site consists of semi-rectangular shape with one side forming a circle like shape. The outer wall cover an approximate area of 40 x 30m². It fall outside the 10m line corridor and will not be directly affected. Inside the big enclosure are 5 small structures in a form of

rondaval foundations (e.g. Figure . A small rectangular shape is found to the entrance of the big enclosure. The walls of both the enclosure and smaller walls are not well preserved.

Nature of Impacts, Assessments & Predictions in terms of Standard Heritage & Basic Assessment (i.e. adopted from Standard Environmentally Basic Assessment Guidelines):

Field Rating	Grade	Impact	Impact Significance	Heritage Significance	Certainty of Impacts	Duration	Mitigation
GP.B	3A	Local	Negligible	Medium significance	Probable (WOM)	Short-term : Construction phase	C

Nature of Activities:		
<p>1. Construction Phase: The site is less likely to be destroyed by the construction of the Powerline- There is already existing servitude line corridor and SPV access roads that passes around it.</p> <p>2. Operation Phase: The site is less likely to be destroyed by the construction of the Powerline- There is already existing servitude line corridor and SPV access roads that passes around it.</p>		
	WOM	WM
Probability	Probable (1)	Improbable (1)
Duration	Medium term(2)	Short term (1)
Scale	Local (1)	Site (2)
Magnitude/Severity	Low (2)	Low (2)
Significance	(5)Negligible	(5) Negligible
Status (positive or negative)	Negative	Positive
Reversibility	Low	Low
Irreplaceable loss of resources?	Yes	No

Can impacts be mitigated?	Yes
Mitigation: The site should be avoided by all means - no sections of the site may be removed or destroyed.	
Cumulative impacts: Cumulative impacts are predicted to arise from construction activities such as expansion of servitude lines	
Residual Impacts: <ul style="list-style-type: none"> • The project will positively contribute to the transmission of power loads from Borutho to Witkop. • Negative residual impacts have resulted from previous construction and operational activities 	

Measures for inclusion in the draft Environmental Management Plan:

OBJECTIVE: The overall goal is to identify, manage and conserve heritage resources within and immediately outside the proposed development area footprint i.e. the proposed 10m line corridor	
Project component/s	Construction phase of the project
Potential Impact	In the case the above objectives are not met, the following potential impacts may occur: complete destruction of the remaining portions of the site and loss of heritage/historic resource.
Project component/s	Operational phase of the project
Potential Impact	In the case the above objectives are not met, the following potential impacts may occur: complete destruction of the remaining portions of the site and loss of heritage/historic resource.
Activity/risk source	Exclusion of the above objectives from the overall EMP
Mitigation: Target/Objective	The site should be avoided and be treated as a no-go area during the construction phase of the project as well as during servitude maintenance

Mitigation: Action/control	Responsibility	Timeframe
To ensure that the above mitigation objective are met. There should be monitoring of the site at all times during the construction phase of the project and during servitude maintenance.	ECO	During the construction phase of the project
Performance Indicator	The type of indicator used here will be Actionable Indicators – this will measure action/progress in terms of completion of the above objectives with the approval of the EMP against their actual implementation.	
Monitoring	The ECO should ensure that construction activities and machinery avoid the site by all means. He/she should do physical monitoring of the site.	



Figure 18 -Outline view of the site - note the growth of plants along its edges



Figure 19 - Rondaval foundation



Figure 20 - Soil and stone rondaval foundation



Figure 21- Example of cores found at the site

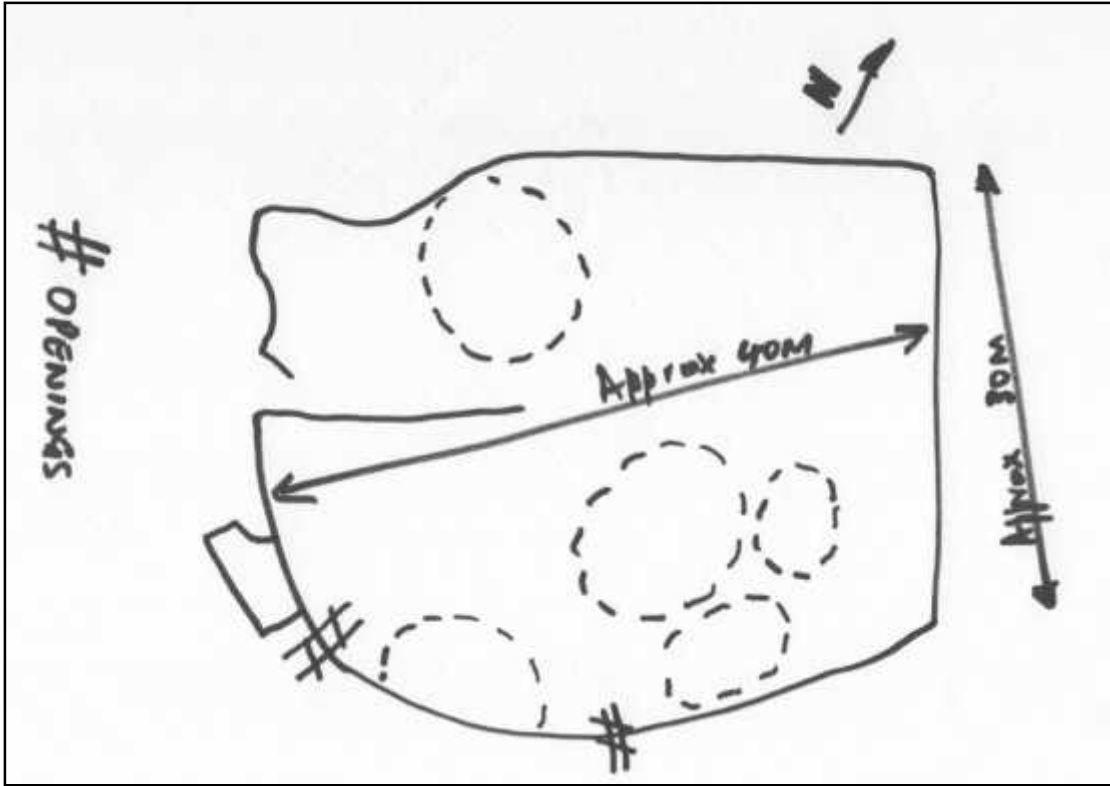


Figure 22 - Schematic representation of the shape and size of the kraal

Site Name: MB-8b

Site Name: BW-4

Type: Possible grave

Density (low): Single stone cairn

Location/GPS Coordinates: S23 57 29.8 E29 10 00.4

Approximate Age: Over 60 years

Applicable NHRA Section: Section 36

Nearest Pylon Position:

Pylon No.	Distance from the pylon in meters	Distance from the servitude centre line in meters
BOR-WIT 047	5m	3m

Site Description:

The site is a possible grave located close to pylon position BOR-WIT047 and within the proposed 10m line corridor. It is dominantly stone mound cairn and there is no headstone (Figure 23). The site is located with close proximity to BW-8a thus label or name BW-8b. Because on the nature of the proposed development - the pylon position would need to be moved forward for approximately 30 to 50m pass its current position toward BOR-WIT048.

Nature of Impacts, Assessments & Predictions in terms of Standard Heritage & Basic Assessment (i.e. adopted from Standard Environmentally Basic Assessment Guidelines):

Field Rating	Grade	Impact	Impact Significance	Heritage Significance	Certainty of Impacts	Duration	Mitigation
Local significance	3A	Local	Moderate (WOW)/ Negligible (WM)	High significance	Permanent (WOM)	Short-term	C - avoid the site

Nature of Activities:

1. Construction Phase: : The site falls within the 10m line corridor and will directly be impacted if not mitigated.

2. Operation Phase: The site falls within the 10m line corridor and will directly be impacted if not mitigated during the maintenance of line corridor.

	WOM	WM
Probability	Definite (4)	Improbable (1)
Duration	Permanent (5)	Medium term (3)
Scale	Site (2)	Local (1)
Magnitude/Severity	High(8)	Low (2)

Significance	(60) Moderate	(6) Negligible
Status (positive or negative)	Negative	Positive
Reversibility	Low	High
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated?	Yes -	
Mitigation: Two mitigation measures are proposed:		
<ul style="list-style-type: none"> • Avoid the site and treat it as no go area - fence it off from the rest of construction activities. • Apply to relocate the possible grave to a formalised cemetery to avoid future management of the site 		
Cumulative impacts:		
Predicted during the operational phase of the project		
Residual Impacts:		
<ul style="list-style-type: none"> • The project will positively contribute to the transmission of power loads from Borutho to Witkop. • Residual impacts are predicted to result from servitude maintenance 		

Measures for inclusion in the draft Environmental Management Plan:

OBJECTIVE: The overall goal is to identify, manage and conserve heritage resources within and immediately outside the proposed development area footprint i.e. the proposed 10m line corridor servitude and the 60m buffer within the corridor. The site consist of a single grave and is of high heritage significance with moderate (WOM) to negligible (WM) impact significance because it falls within the 10m line corridor. The proposed mitigation measure for this site is total avoidance and fencing it or relocation of the site avoid future maintenance.

Project component/s	Construction phase of the project
Potential Impact	The site falls within the 10m line corridor and will directly be

	impacted if not mitigated.		
Project component/s	Operational phase of the project		
Potential Impact	The site falls within the 10m line corridor and will directly be impacted if not mitigated during the maintenance of line corridor.		
Activity/risk source	Exclusion of the above objectives from the overall EMP		
Mitigation: Target/Objective	The site should be avoided and be treated as a no-go area or be relocated		
Mitigation: Action/control	Responsibility	Timeframe	
<ul style="list-style-type: none"> Two mitigation measures are proposed: Avoid the site and treat it as no go area - fence it off from the rest of construction activities. <u>This is a preferred measure</u> Apply to relocate the possible grave to a formalised cemetery to avoid future management of the site 	ECO should ensure that the site is avoided and treated as no go area	Project construction and operational phase	
Performance Indicator	The type of indicator used here will be Actionable Indicators – this will measure action/progress in terms of completion of the above objectives with the approval of the EMP against their actual implementation.		
Monitoring	The ECO should ensure that construction activities and machinery avoid the site by all means. He/she should do physical monitoring of the site to ensure that it is completely avoided.		



Figure 23-- Example of cores found at the site

Site Name: BW-9

Type: Built Environment & Landscape

Density (High): Farmstead

Location/GPS Coordinates: S24 02 45.7 E29 20 37.8

Approximate Age: Less than 60 years old

Applicable NHRA Section: Section 34

Nearest Pylon Position:

Pylon No.	Distance from the pylon in meters	Distance from the servitude centre line in meters
BOR-WIT102	136m	10 m

Site Description:

The site is a farmstead located within the proposed development 10m line corridor. It consists of approximately 11 structures - one of which is the main farm house located 10m from the 10m line corridor (Figure 25). The Powerline is basically just above the main farm house. The rest of the houses are farm labourers quarters and industrial structures as part of the outbuildings (Figure 24).

Nature of Impacts, Assessments & Predictions in terms of Standard Heritage & Basic Assessment (i.e. adopted from Standard Environmentally Basic Assessment Guidelines):

Field Rating	Grade	Impact Scale	Impact Significance	Heritage Significance	Certainty of Impacts	Duration	Mitigation
Not a heritage site	N/A	Local	Negligible (WOM/WM)	N/A	Probable	Long term: Construction phase & operational phase	Shift the line approximately 100 m south of the farmstead

Nature of Activities:

1. Construction Phase: the farmstead will be affected by construction activities of the Powerline.
2. Operation Phase: The farmstead will be visual impacted or dwarfed by the Powerline which will be above the main farmhouse and the induction procedures associated with the Powerline and its maintenance or maintenance of the line servitude will affect the farmer during the maintenance of his farmstead. For example, it would mean he has to apply for induction before he can cut grass below the line servitude.

	WOM	WM
Probability	Definite (5)	Improbable (1)
Duration	Permanent (5)	Short term (1)

Scale	Site (2)	Local (1)
Magnitude/Severity	High (8)	Low (2)
Significance	(75)High	(4)Negligible
Status (positive or negative)	Negative	Positive
Reversibility	Low	Low
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	
<p>Mitigation: The only applicable and proposed mitigation is in terms of visual impact of the house - this is proposed in "kind". To deviate the propose 10m line corridor approximately 100m south of the farmstead on its way to joint BOR-WIT102. However, since the site is not a cultural historic site the visual impact fall outside the bounds of this HIA study, but it is worth noting as a <u>social issue</u></p>		
<p>Cumulative impacts: Cumulative impacts are associated with the maintenance of the 10m line corridor as well the associated induction procedures associated with its maintenance</p>		
<p>Residual Impacts:</p> <ul style="list-style-type: none"> • The project will positively contribute to the transmission of power loads from Borutho to Witkop. • Negative residual impact is dwarfing or visual impact to the farm stead and associated induction procedures associated with the maintenance of the servitudes. This will mean that the farmer has to apply for same induction procedures for any maintenance on property since his property will be located with the proposed 10m line corridor servitude line. 		

Measures for inclusion in the draft Environmental Management Plan:

OBJECTIVE: The overall goal is to identify, manage and conserve heritage resources within and immediately outside the proposed development area footprint i.e. the proposed 10m line corridor servitude and the 60m buffer within the corridor. The site is a farmstead consisting of approximately 11 structures including the main farm house. The farmstead will be visual impacted or dwarfed by the Powerline which will be above the main farmhouse and the induction procedures associated with the Powerline and its maintenance or maintenance of the line servitude will affect the farmer during the maintenance of his farmstead. For example, it would mean that he has to apply for induction before he can cut grass or forms of property maintenance below the line servitude.

Project component/s	Construction phase of the project	
Potential Impact	the farmstead will be affected by construction activities of the Powerline.	
Project component/s	Operational phase of the project	
Potential Impact	The farmstead will be visual impacted or dwarfed by the Powerline which will be above the main farmhouse and the induction procedures associated with the Powerline and its maintenance or maintenance of the line servitude will affect the farmer during the maintenance of his farmstead. For example, it would mean he has to apply for induction before he can cut grass below the line servitude.	
Activity/risk source	N/A	
Mitigation: Target/Objective	Deviate the proposed Powerline approximated 100m south of the farmstead	
Mitigation: Action/control	Responsibility	Timeframe
The only applicable and proposed mitigation is in terms of visual impact of the house - this is proposed in "kind". To deviate the propose 10m line corridor approximately 100m south of the farmstead on its way to joint BOR-WIT102. However, since the site is not a cultural historic site the visual impact fall outside the bounds of this HIA study, but it is worth noting as a <u>social issue</u> . The farmer was of the view that the Powerline was going to be place some 100m south of his farmstead and has not problem with the transmission line in his farm as long it will not be above his house and rest of the farmstead. Contact Mr. Meyer Wiem (082	Project managers and engineers	Before the construction phase of the project

454 7764) of Portion 1 of Nanties 25KS	
Performance Indicator	The type of indicator used here will be Actionable Indicators – this will measure action/progress in terms of completion of the above objectives with the approval of the EMP against their actual implementation.
Monitoring	ECO



Figure 24-Farm house located within the proposed 10m line corridor



Figure 25- The farmstead in relation to the proposed 10m line corridor servitude.

Site Name: BW-10

Type: Stone walled kraal

Density (Low): 1 kraal

Approximate Age: Older than 60 years

Applicable NHRA Section: Section 35

Location/GPS Coordinates: S24 02 04.6 E29 18 42.8

Nearest Pylon Position:

Pylon No.	Distance from the pylon in meters	Distance from the servitude centre line in meters
BOR-WIT086	85m	9m

Site Description:

The site consist of a medium sized, approximately 10m² kraal.

Nature of Impacts, Assessments & Predictions in terms of Standard Heritage & Basic Assessment (i.e. adopted from Standard Environmentally Basic Assessment Guidelines):

Field Rating	Grade	Impact	Impact Significance	Heritage Significance	Certainty of Impacts	Duration	Mitigation
GP.C	-	Local	Negligible	Low	Improbable	Short term	A

Nature of Activities:		
1. Construction Phase: The site will not be affected, it falls outside project footprint.		
2. Operation Phase: The site will not be affected, it falls outside project footprint.		
	WOM	WM
Probability	Probable (2)	Probable (2)
Duration	Short term (1)	Short term (1)
Scale	Local (1)	Local (1)
Magnitude/Severity	Low (2)	Low (2)
Significance	(8)Negligible	(8) Negligible
Status (positive or negative)	Positive	Positive
Reversibility	Highly	Highly
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes- No further action proposed the site fall outside the development footprint	
Mitigation: No further action required - the site will not be affected, it falls outside project		

footprint.
Cumulative impacts: Construction and operational phase of the project will cumulatively impact on the site
Residual Impacts: <ul style="list-style-type: none"> The project will positively contribute to the transmission of power loads from Medupi to Borutho.

Measures for inclusion in the draft Environmental Management Plan:

OBJECTIVE: The overall goal is to identify, manage and conserve heritage resources within and immediately outside the proposed development area footprint i.e. the proposed 10m line corridor servitude and the 60m buffer within the corridor. The site will not be affected, it falls outside project footprint. No further action proposed regarding its mitigations

Project component/s	Construction phase of the project		
Potential Impact	The site will not be affected, it falls outside project footprint. (i.e. 10m line corridor buffer)		
Project component/s	Operational phase of the project		
Potential Impact	The site will not be affected, it falls outside project footprint. (i.e. 10m line corridor buffer)		
Activity/risk source	N/A		
Mitigation: Target/Objective	No further action necessary		
Mitigation: Action/control	Responsibility	Timeframe	
There are not mitigation measures proposed for the site	N/A	N/A	
Performance Indicator	The type of indicator used here will be Actionable Indicators – this will measure action/progress in terms of completion of the above objectives with		

	the approval of the EMP against their actual implementation.
Monitoring	N/A



Figure 26- Stone walls of BW-10

Site Name: BW-11

Type: Historic stone kraal

Density (Medium): With a radius that measures approximately 40m²

Location/GPS Coordinates: S24 01 59.9 E29 18 33.5

Approximate Age: Older than 60 years

Applicable NHRA Section: Section 35

Nearest Pylon Position:

Pylon No.	Distance from the pylon in meters	Distance from the servitude centre line in meters
BOR-WIT 086	52m	8m

Site Description:

The site consists of a big round kraal enclosure with 3 smaller enclosures inside it (Figure 30). It is located just below the hill where BW-10 is found. The big kraal enclosure radius measures

approximately 40m² (Figures 27 & 30). Some walls of the site are well preserved and this is inclusive of the small circle enclosures inside the big kraal (Figure 28 & 29).

Nature of Impacts, Assessments & Predictions in terms of Standard Heritage & Basic Assessment (i.e. adopted from Standard Environmentally Basic Assessment Guidelines):

Field Rating	Grade	Impact	Impact Significance	Heritage Significance	Certainty of Impacts	Duration	Mitigation
GP.B	3A	Local	Negligible	Medium significance	Probable (WOM)	Short-term : Construction phase	C

Nature of Activities:		
1. Construction Phase: The site fall immediately outside the proposed 10m line corridor servitude line (north of the line). If not monitored during the construction phase it is more likely to be impacted by construction activities.		
2. Operation Phase: The site fall immediately outside the proposed 10m line corridor servitude line (north of the line). If not monitored during the servitude maintenance during the operational phase it is more likely to be impacted by the maintenance SPV.		
	WOM	WM
Probability	Probable (1)	Improbable (1)
Duration	Medium term(2)	Short term (1)
Scale	Local (1)	Site (2)
Magnitude/Severity	Low (2)	Low (2)
Significance	(5)Negligible	(5) Negligible
Status (positive or negative)	Negative	Positive
Reversibility	Low	Low

Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated?	Yes	
Mitigation: The site should be avoided by all means - no sections of the site may be removed or destroyed.		
Cumulative impacts: Cumulative impacts are predicted to arise from construction activities such as expansion of servitude lines		
Residual Impacts: <ul style="list-style-type: none"> The project will positively contribute to the transmission of power loads from Borutho to Witkop. 		

Measures for inclusion in the draft Environmental Management Plan:

OBJECTIVE: The overall goal is to identify, manage and conserve heritage resources within and immediately outside the proposed development area footprint i.e. the proposed 10m line corridor servitude and the 60m buffer within the corridor. The site consist of a big round kraal enclosure with 3 smaller enclosures inside it. Some of the walls are not well preserved - its only ruminants of foundation that remain while in some section one can still be able to discern the exact shape of the wall. It is of medium heritage significance with negligible impact significance. The site should be treated as no go areas or be completely avoided.

Project component/s	Construction phase of the project
Potential Impact	In the case the above objectives are not met, the following potential impacts may occur: complete destruction of the site and loss of heritage/historic resource.
Project component/s	Operational phase of the project
Potential Impact	In the case the above objectives are not met, the following potential impacts may occur: complete destruction of the site and loss of heritage/historic resource.

Activity/risk source	Exclusion of the above objectives from the overall EMP		
Mitigation: Target/Objective	The site should be avoided and be treated as a no-go area during the construction phase of the project as well as during servitude maintenance		
Mitigation: Action/control	Responsibility	Timeframe	
To ensure that the above mitigation objective are met. There should be monitoring of the site at all times during the construction phase of the project and during servitude maintenance.	ECO	During the construction phase of the project	
Performance Indicator	The type of indicator used here will be Actionable Indicators – this will measure action/progress in terms of completion of the above objectives with the approval of the EMP against their actual implementation.		
Monitoring	The ECO should ensure that construction activities and machinery avoid the site by all means. He/she should do physical monitoring of the site.		



Figure 27- Extent of the bigger circle enclosure



Figure 28 - State of wall preservation - big kraal enclosure



Figure 29 - Example of smaller circle enclosure inside the big kraal enclosure

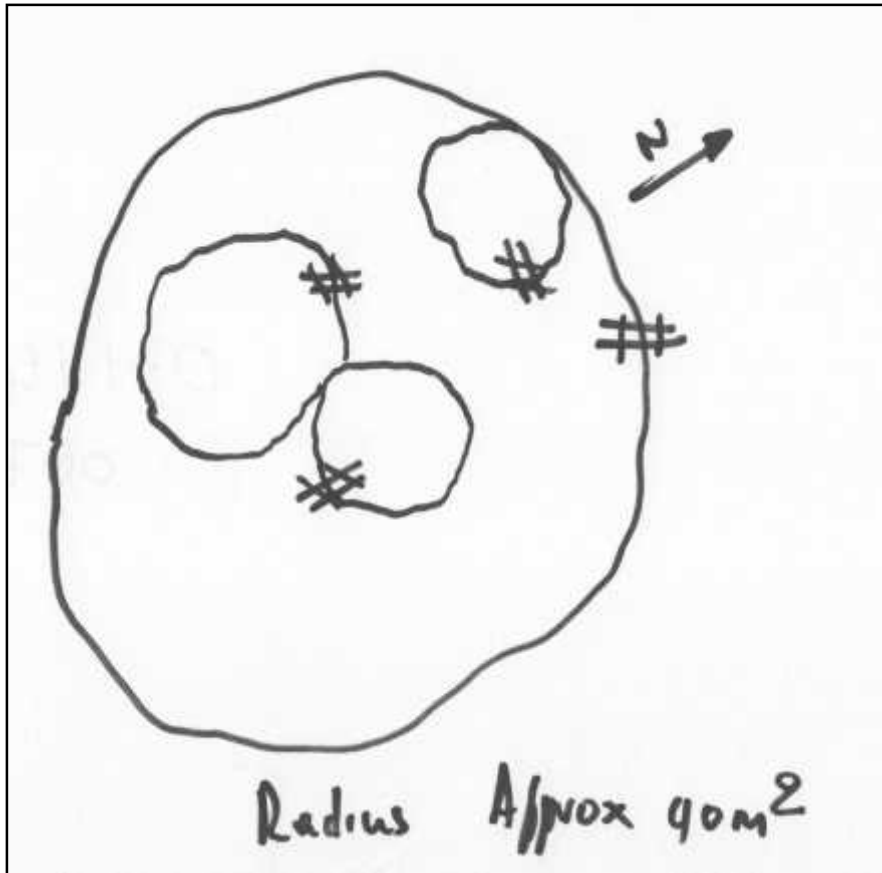


Figure 30- Schematic representation of the kraal . Note the big kraal and smaller enclosures inside

Site Name:	BW-12
Type:	Stone walled kraal
Density (Low):	1 x kraal
Approximate Age:	Older than 60 years
Applicable NHRA Section:	Section 35
Location/GPS Coordinates:	S24 01 58.6 E29 18 29.8
Approximate Age:	Older than 60 years
Applicable NHRA Section:	Section 35
Nearest Pylon Position:	

Pylon No.	Distance from the pylon in meters	Distance from the servitude centre line in meters
BOR-WIT086	163m	11m

Site Description:

The is a single medium sized kraal built against 2 boulders and it measures approximately 24m x 16m in extent (Figure 33). The walls of this kraal are in good state of preservation as compared to other sites in the area like BW-11 (Figures: 31-32).

Nature of Impacts, Assessments & Predictions in terms of Standard Heritage & Basic Assessment (i.e. adopted from Standard Environmentally Basic Assessment Guidelines):

Field Rating	Grade	Impact	Impact Significance	Heritage Significance	Certainty of Impacts	Duration	Mitigation
GP.B	3A	Local	Negligible	Medium significance	Highly probable (WOM)	Short-term : Construction phase	C

Nature of Activities:

1. Construction Phase: The kraal fall immediately outside the 10m line corridor servitude, but might potentially be affected during clearing of the servitude and development of associated infrastructure such as access roads.

2. Operation Phase: The kraal fall immediately outside the 10m line corridor servitude, but might potentially be affected be affected during servitude maintenance

	WOM	WM
Probability	Highly probable (4)	Improbable (1)
Duration	Short term(1)	Short term (1)
Scale	Local (1)	Local (1)

Magnitude/Severity	Low (2)	Low (2)
Significance	(16) Negligible	(4) Negligible
Status (positive or negative)	Negative	Positive
Reversibility	Low	High
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated?	Yes	
Mitigation: The site should be avoided and be treated as a no-go area to avoid an potential impacts during the servitude clearance.		
Cumulative impacts: Cumulative impacts are predicted to arise from construction and operational activities such as servitude maintenance.		
Residual Impacts: <ul style="list-style-type: none"> The project will positively contribute to the transmission of power loads from Borutho to Witkop. 		

Measures for inclusion in the draft Environmental Management Plan:

OBJECTIVE: The overall goal is to identify, manage and conserve heritage resources within and immediately outside the proposed development area footprint i.e. the proposed 10m line corridor servitude and the 60m buffer within the corridor. The is a single medium sized kraal built against 2 boulders and it measures approximately 24m x 16m in extent. It is of medium heritage significance with negligible impact significance, but should be avoided by all means.

Project component/s	Construction phase of the project
Potential Impact	In case the kraal is not avoided the following impacts are predicted: destruction of the kraals and loss of a heritage/historic resource.
Project component/s	Operational phase of the project

Potential Impact	In case the kraal is not avoided the following impacts are predicted: destruction of the kraals and loss of a heritage/historic resource.		
Activity/risk source	Exclusion of the above objectives from the overall EMP		
Mitigation: Target/Objective	The kraal should be avoided and be treated as a no-go area during the construction phase of the project as well as during servitude maintenance		
Mitigation: Action/control	Responsibility	Timeframe	
To ensure that the above mitigation objective are met. There should be monitoring of the site at all times during the construction phase of the project and during servitude maintenance.	ECO	During the construction phase of the project	
Performance Indicator	The type of indicator used here will be Actionable Indicators – this will measure action/progress in terms of completion of the above objectives with the approval of the EMP against their actual implementation.		
Monitoring	The ECO should ensure that construction activities and machinery avoid the site by all means. He/she should do physical monitoring of the site.		



Figure 31- State of preservation of the stone kraal. Note some of the area in which the stone wall joins the boulder.



Figure 32 - The height of the wall in relation to plant species

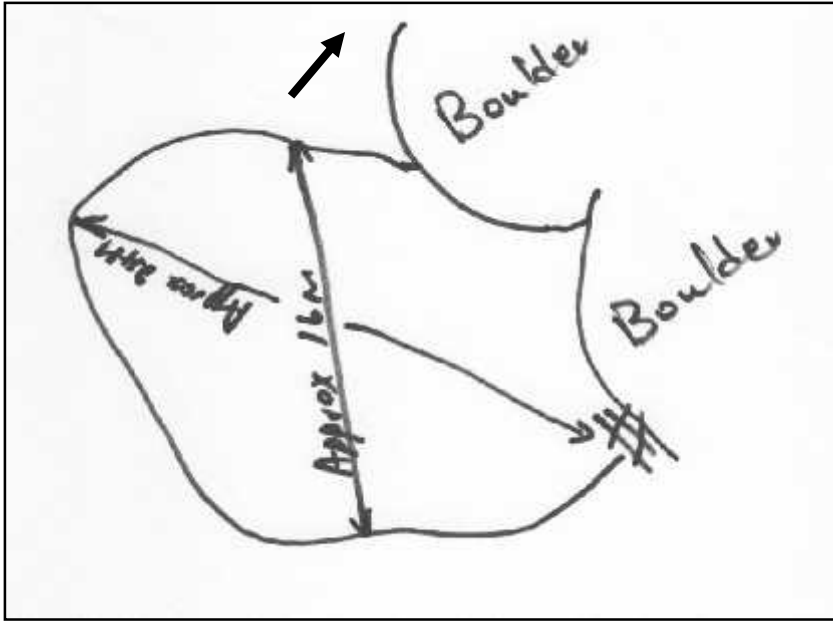


Figure 33 - Schematic presentation the kraal

Site Name: BW-13

Type: Archaeological (historic) and burial grounds and grave site

Density (Medium): Approximately 6 structures

Location/GPS Coordinates: S24 01 56.3 E29 18 27.0
 S24 01 56.1 E29 18 24.6
 S24 01 55.4 E29 18 23.9

Approximate Age: Less than 60 years old

Applicable NHRA Section: Section 34 & Section 36

Nearest Pylon Position:

Pylon No.	Distance from the pylon in meters	Distance from the servitude centre line in meters
BOR-WIT085	218m	12m
BOR-WIT085	153m	18m
BOR-WIT085	126m	7m

Site Description:

The site covers a total area of approximately 90m². The total number of observed structures and features amounted to 7 and 11 including the 4 graves found in association with other structures. The structures include 2 rectangular foundations each measuring approximately 4mx2m (Figure 34). 2 rondaval foundations (Figure 35) and 3 smaller stone packing foundation between the bigger structures (Figure 36) - these are typical of grain bin foundations. Contemporary agricultural iron implement and glass are found at the site (Figure 37). The graves (4) are orientated in the typical east-west burial position (Figure 38 & 39). The proposed 10m line servitude traverse through the site.

Nature of Impacts, Assessments & Predictions in terms of Standard Heritage & Basic Assessment (i.e. adopted from Standard Environmentally Basic Assessment Guidelines):

Field Rating	Grade	Impact	Impact Significance	Heritage Significance	Certainty of Impacts	Duration	Mitigation
GPA	-	Site	High	High/Medium	Definite	Permanent	B- This will include mapping of the site and relocating the graves to a formalise cemetery - possible close to their current location.

Nature of Activities:

1. Construction Phase: The site will be affected regardless of it being mitigated or not.

Operation Phase: The site will be affected regardless of it being mitigated or not.

	WOM	WM
Probability	Definite (5)	Definite (5)

Duration	Permanent (5)	Permanent (5)
Scale	Site (2)	Site (2)
Magnitude/Severity	High (8)	Low (6)
Significance	(75)High	(65) High
Status (positive or negative)	Negative	Positive
Reversibility	Low	Highly
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated?	Yes-	
Mitigation: A phase 2 mitigation of the site is required. This will include mapping of the site and relocating the graves to a formalise cemetery -possible close to their current location. The site will inevitable be negatively affected as the line corridor servitude line traverses through it.		
Cumulative impacts: Construction and operational phase of the project will cumulatively impact on the site		
Residual Impacts: <ul style="list-style-type: none"> The project will positively contribute to the transmission of power loads from Borutho to Witkop. 		

Measures for inclusion in the draft Environmental Management Plan:

OBJECTIVE: The overall goal is to identify, manage and conserve heritage resources within and immediately outside the proposed development area footprint i.e. the proposed 10m line corridor servitude and the 60m buffer within the corridor. The site measures approximately 90m² and will be affected regardless of it being mitigated or not.

Project component/s	Construction phase of the project
Potential Impact	The site will be directly affected by the proposed development - it is traversed proposed 10m line corridor servitude

Project component/s	Operational phase of the project		
Potential Impact	The site will be directly affected by the proposed operations (SPVs and maintenance)- it is traversed proposed 10m line corridor servitude		
Activity/risk source	Exclusion of the above objectives from the overall EMP		
Mitigation: Target/Objective	Phase study of the site		
Mitigation: Action/control	Responsibility	Timeframe	
A phase 2 mitigation of the site is required. This will include mapping of the site and relocating the graves to a formalise cemetery -possible close to their current location. The site will inevitable be negatively affected as the line corridor servitude line traverses through it.	Eskom will need to appoint an archaeologist accredited with historic archaeology and grave relocation to mitigate the site	Before the construction phase. The planning phase of the project will be ideal.	
Performance Indicator	The type of indicator used here will be Actionable Indicators – this will measure action/progress in terms of completion of the above objectives with the approval of the EMP against their actual implementation.		
Monitoring	Accredited archaeologist or CRM firm		



Figure 34- Rectangular structure- stone and mud



Figure 35 - Circle structure



Figure 36- Smaller stone packed structures



Figure 37 - recent agricultural iron implement



Figure 38- Picture showing the four identified graves



Figure 39 - Closer zoom of one of the four graves. Note the headstone and the stone and soil dressing

Site Name: BW-14
Type: Cemetery
Density (High): Approximately 19 graves

Approximate Age: Older and less than 60 years

Applicable NHRA Section: Section 36

Location/GPS Coordinates: S24 01 55.1 E29 18 22.1

Nearest Pylon Position:

Pylon No.	Distance from the pylon in meters	Distance from the servitude centre line in meters
BOR-WIT085	76m	24m

Site Description:

The site is in a cemetery containing approximately 19 graves in the middle and between trees (Figure 40). It is located some 52m from the end of BW-13 (S24 01 55.4 E29 18 23.9). It is located just outside the Eskom Transmission Lines corridors- south of the lines.

Nature of Impacts, Assessments & Predictions in terms of Standard Heritage & Basic Assessment (i.e. adopted from Standard Environmentally Basic Assessment Guidelines):

Field Rating	Grade	Impact	Impact Significance	Heritage Significance	Certainty of Impacts	Duration	Mitigation
Local significance	3A	Local	Negligible	High significance	Probable (WOM)	Short-term	C - avoid the site

Nature of Activities:

1. Construction Phase: : The site falls outside outside the Eskom Transmission Lines corridors- south of the lines and will therefore not be affected.

2. Operation Phase: The site falls outside the outside the Eskom Transmission Lines corridors- south of the lines not be affected.

	WOM	WM
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Probability	Improbable (1)	Improbable (1)
Duration	Short term (1)	Short term (1)
Scale	Local (1)	Local (1)
Magnitude/Severity	Low (2)	Low (2)
Significance	(4)Negligible	(4) Negligible
Status (positive or negative)	Positive	Positive
Reversibility	Low	Low
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes - it can be mitigated by means of avoidance	
Mitigation: Avoid the site and treat it as no go area		
Cumulative impacts: No cumulative impacts are predicted		
Residual Impacts: <ul style="list-style-type: none"> The project will positively contribute to the transmission of power loads from Borutho to Witkop. 		

Measures for inclusion in the draft Environmental Management Plan:

OBJECTIVE: The overall goal is to identify, manage and conserve heritage resources within and immediately outside the proposed development area footprint i.e. the proposed 10m line corridor servitude and the 60m buffer within the corridor. The site consist of approximately 19 graves, it is of high heritage significance with negligible impact significance because it falls outside outside the Eskom Transmission Lines corridors- south of the lines. The proposed mitigation measure for this site is total avoidance.

Project component/s

Construction phase of the project

Potential Impact	The site is located outside the development footprint and outside the Eskom Transmission Lines corridors- south of the lines		
Project component/s	Operational phase of the project		
Potential Impact	The site is located outside the development footprint and outside the Eskom Transmission Lines corridors- south of the lines		
Activity/risk source	Exclusion of the above objectives from the overall EMP		
Mitigation: Target/Objective	The site should be avoided and be treated as a no-go area		
Mitigation: Action/control	Responsibility	Timeframe	
The site should be avoided and be treated as a no-go area	ECO should ensure that the site is avoided and treated as no go area	Project construction phase	
Performance Indicator	The type of indicator used here will be Actionable Indicators – this will measure action/progress in terms of completion of the above objectives with the approval of the EMP against their actual implementation.		
Monitoring	The ECO should ensure that construction activities and machinery avoid the site by all means. He/she should do physical monitoring of the site to ensure that it is completely avoided.		



Figure 40- Graves located within and between trees

Site	BW-15
Name:	MB-32
Type:	Built environment & landscape site
Density (Low):	Approximately 3 structures
Location/GPS Coordinates:	S23 35 29.4 E28 32 31.0
Approximate Age:	Less than 60 years old
Applicable NHRA Section:	Section 34
Nearest Pylon Position:	

Pylon No.	Distance from the pylon in meters	Distance from the servitude centre line in meters
BOR-WIT075	95m	28m

Site Description:

The site consists of 3 structure foundations- all rondaval foundations (Figure 41).

Nature of Impacts, Assessments & Predictions in terms of Standard Heritage & Basic Assessment (i.e. adopted from Standard Environmentally Basic Assessment Guidelines):

Field Rating	Grade	Impact	Impact Significance	Heritage Significance	Certainty of Impacts	Duration	Mitigation
GP.C	-	Local	Negligible	Low	Improbable	Short term	A

Nature of Activities:		
1. Construction Phase: The site will not be affected, it falls outside project footprint.		
2. Operation Phase: The site will not be affected, it falls outside project footprint.		
	WOM	WM
Probability	Probable (2)	Probable (2)
Duration	Short term (1)	Short term (1)
Scale	Local (1)	Local (1)
Magnitude/Severity	Low (2)	Low (2)
Significance	(8)Negligible	(8) Negligible
Status (positive or negative)	Positive	Positive
Reversibility	Highly	Highly
Irreplaceable loss of resources?	No	No

Can impacts be mitigated?	Yes- No further action proposed the site fall outside the development footprint
Mitigation: No further action required - the site will not be affected, it falls outside project footprint.	
Cumulative impacts: Construction and operational phase of the project will cumulatively impact on the site	
Residual Impacts: <ul style="list-style-type: none"> The project will positively contribute to the transmission of power loads from Medupi to Borutho. 	

Measures for inclusion in the draft Environmental Management Plan:

OBJECTIVE: The overall goal is to identify, manage and conserve heritage resources within and immediately outside the proposed development area footprint i.e. the proposed 10m line corridor servitude and the 60m buffer within the corridor. The site will not be affected, it falls outside project footprint. No further action proposed regarding its mitigations

Project component/s	Construction phase of the project	
Potential Impact	The site will not be affected, it falls outside project footprint. (i.e. 10m line corridor buffer)	
Project component/s	Operational phase of the project	
Potential Impact	The site will not be affected, it falls outside project footprint. (i.e. 10m line corridor buffer)	
Activity/risk source	N/A	
Mitigation: Target/Objective	No further action necessary	
Mitigation: Action/control	Responsibility	Timeframe
There are not mitigation measures	N/A	N/A

proposed for the site		
Performance Indicator	The type of indicator used here will be Actionable Indicators – this will measure action/progress in terms of completion of the above objectives with the approval of the EMP against their actual implementation.	
Monitoring	N/A	



Figure 41- structure foundations - rondavals, stone and mud

Site Name: BW-16

Type: Burial site

Density (High): Approximately 4 graves

Approximate Age: Older and less than 60 years

Applicable NHRA Section: Section 36

Location/GPS Coordinates: S23°58'2.20" E29°12'43.40"

Nearest Pylon Position:

Pylon No.	Distance from the pylon in meters	Distance from the servitude centre line in meters
BOR-WIT059	25m	25m

Site Description:

The site consists of 4 graves near a big tree. The graves marked using cement brick for both grave dressing and headstones (Figure 42) . They are located some 25m from the pylon position and 25m from the proposed 10m line corridor servitude.

Nature of Impacts, Assessments & Predictions in terms of Standard Heritage & Basic Assessment (i.e. adopted from Standard Environmentally Basic Assessment Guidelines):

Field Rating	Grade	Impact	Impact Significance	Heritage Significance	Certainty of Impacts	Duration	Mitigation
Local significance	3A	Local	Negligible	High significance	Probable (WOM)	Short-term	C - avoid the site

Nature of Activities:

1. Construction Phase: : The site falls outside the servitude line or 10m buffer line corridor. It is also clearly marked using headstones and grave dressing.

2. Operation Phase: The site falls outside the servitude line or 10m buffer line corridor. It is also clearly marked using headstones and grave dressing.

	WOM	WM
Probability	Improbable (1)	Improbable (1)
Duration	Short term (1)	Short term (1)
Scale	Local (1)	Local (1)

Magnitude/Severity	Low (2)	Low (2)
Significance	(4)Negligible	(4) Negligible
Status (positive or negative)	Positive	Positive
Reversibility	Low	Low
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	
Mitigation: Avoid the site and treat it as no go area		
Cumulative impacts: No cumulative impacts are predicted		
Residual Impacts: <ul style="list-style-type: none"> The project will positively contribute to the transmission of power loads from Borutho to Witkop. 		

Measures for inclusion in the draft Environmental Management Plan:

OBJECTIVE: The overall goal is to identify, manage and conserve heritage resources within and immediately outside the proposed development area footprint i.e. the proposed 10m line corridor servitude and the 60m buffer within the corridor. The site consist of approximately 4 graves and it is of high heritage significance with negligible impact significance because it falls outside the 10m line corridor. The proposed mitigation measure for this site is total avoidance and fence it off during the construction process.

Project component/s	Construction phase of the project
Potential Impact	The site is located outside the development footprint and will not be directly impacted
Project component/s	Operational phase of the project

Potential Impact	The site is located outside the development footprint and will not be directly impacted		
Activity/risk source	Exclusion of the above objectives from the overall EMP		
Mitigation: Target/Objective	The site should be avoided and be treated as a no-go area		
Mitigation: Action/control	Responsibility	Timeframe	
By means of avoidance and fencing it off during the construction phase of servitude and the pylon	ECO should ensure that the site is avoided and treated as no go area	Project construction phase	
Performance Indicator	The type of indicator used here will be Actionable Indicators – this will measure action/progress in terms of completion of the above objectives with the approval of the EMP against their actual implementation.		
Monitoring	The ECO should ensure that construction activities and machinery avoid the site by all means. He/she should do physical monitoring of the site to ensure that it is completely avoided.		



Figure 42- Example of 1 of the 4 graves found at site BW-16.

Site Name: BW-1

Type: Built Environment & Landscape

Density (Medium): 3 x structures

Location/GPS Coordinates: S23 56 42.9 E29 03 42.1

Approximate Age: Older than 60 years old

Applicable NHRA Section: Section 34

Nearest Pylon Position:

Pylon No.	Distance from the pylon in meters	Distance from the servitude centre line in meters
BOR-WIT023	212m	17m

Site Description:

The sites is a built environment and landscape site consisting of a farm house building ruins (no windows, doors, roof, and window), reservoir and/or tank. The architectural and structural fabric of the house is still intact. The red bricks used to build the walls of the house are laid on sandstone slabs/bricks used to construct the foundation (Figure 43 & 44) . This (sandstone) and solid lintels as shown in figure 45 give a relative age of the structure.

Nature of Impacts, Assessments & Predictions in terms of Standard Heritage & Basic Assessment (i.e. adopted from Standard Environmentally Basic Assessment Guidelines):

Field Rating	Grade	Impact Scale	Impact Significance	Heritage Significance	Certainty of Impacts	Duration	Mitigation
GP.B	-	Local	Negligible (WOM/WM)	Middle significance	Probable (WOM)	Short term: Construction phase	A

Nature of Activities:

1. Construction Phase: Clearing of the servitude and development of associated infrastructure such as access roads. However, the structure falls immediately outside the 10m line corridor servitude.		
2. Operation Phase: maintenance of servitudes using dozers or SPVs		
	WOM	WM
Probability	Probable (2)	Probable (2)
Duration	Short term(1)	Short term (1)
Scale	Local (1)	Local (1)
Magnitude/Severity	Low (2)	Low (2)
Significance	(8)Negligible	(8)Negligible
Status (positive or negative)	Positive	Positive
Reversibility	Low	Low
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	
Mitigation: Full documentation and recording of the house		
Cumulative impacts: Such impacts are expected with the construction and operational phases of the project		
Residual Impacts:		
<ul style="list-style-type: none"> The project will positively contribute to the transmission of power loads from Medupi to Borutho. 		

Measures for inclusion in the draft Environmental Management Plan:

OBJECTIVE: The overall goal is to identify, manage and conserve heritage resources within and immediately outside the proposed development area footprint i.e. the proposed 10m line corridor servitude and the 60m buffer within the corridor. The site consists of 3x historic structures and it is of medium significance. Should Eskom wish to demolish the house now or in future it needs to apply for a permit for full conservationist architect recording and documentation.

Project component/s	Construction phase of the project		
Potential Impact	The site will probably not be directly impacted project - it fall immediately outside the 10m line corridor servitude.		
Project component/s	Operational phase of the project		
Potential Impact	The site will probably not be directly impacted project - it fall immediately outside the 10m line corridor servitude.		
Activity/risk source	Exclusion of the above objectives from the overall EMP		
Mitigation: Target/Objective	The site will probably not be directly impacted project - it fall immediately outside the 10m line corridor servitude. Should Eskom wish to demolish it - a full documentation need to take place.		
Mitigation: Action/control	Responsibility	Timeframe	
Should Eskom wish to demolish the house now or in future it needs to apply for a permit for full conservationist architect recording and documentation. For now the house ruins can be avoided and be treated as no go area.	ECO	Before the construction phase, during the construction phase and operations	
Performance Indicator	The type of indicator used here will be Actionable Indicators – this will measure action/progress in terms of completion of the above objectives with the approval of the EMP against their actual implementation.		
Monitoring	ECO		



Figure 43 - Side and right front facade of the old farm house ruins. Note the sandstone slabs/bricks used to construct the house foundation and stoop (red bent arrow). Also note the L-shape design as marked by yellow arrow.



Figure 44- Front facade of the house. Note the extension of the stoop from side facade (Figure 43) the L-shape design of the house (Figure 44).



Figure 45- The ruins of the farm house have some of the amazingly solid window lintels (red arrow)

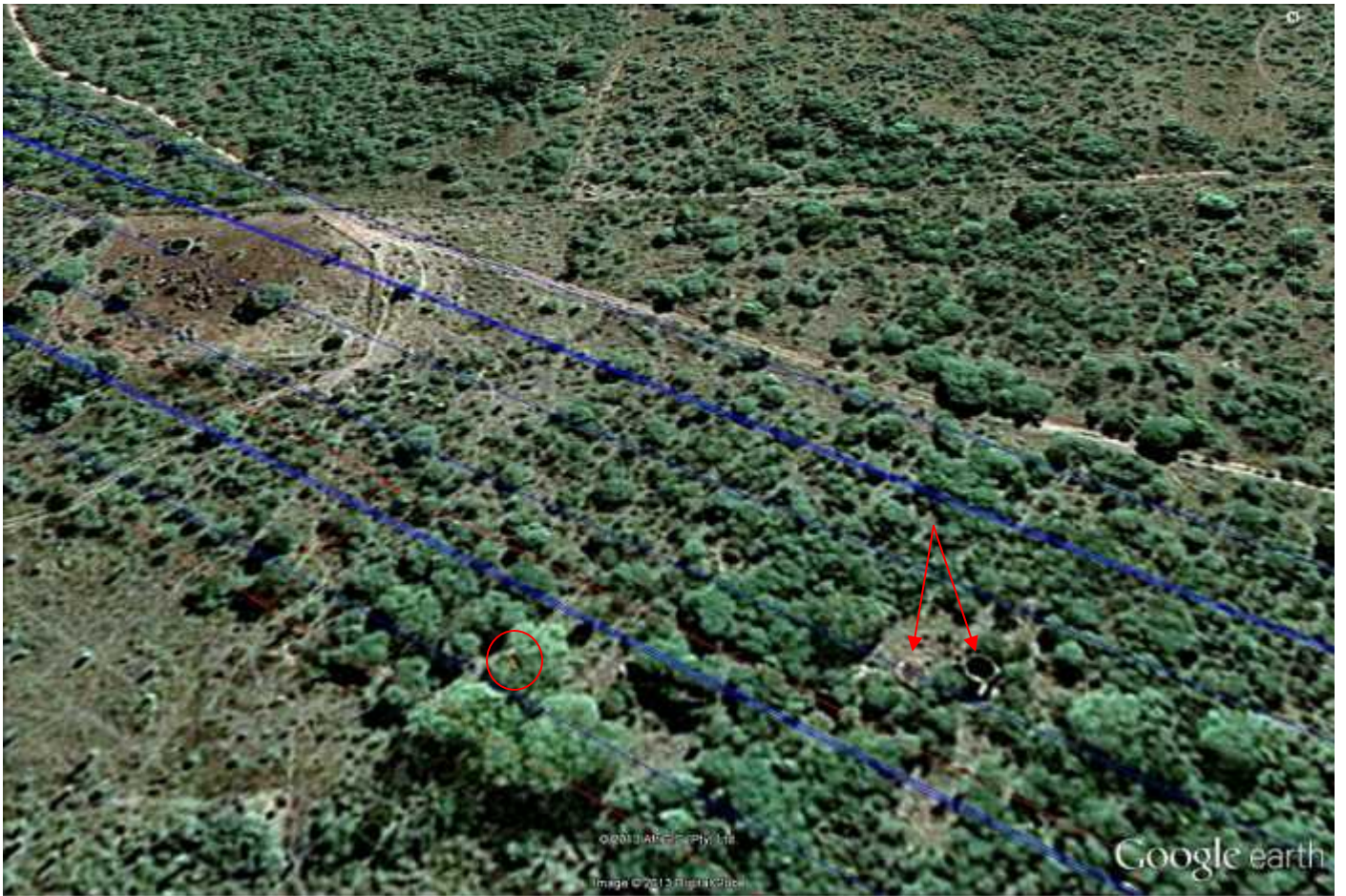


Figure 46- Location of the house way point in the landscape (brown triangle inside the red circle). Also note the location of the reservoir associated with the house.

6. DISCUSSION OF RESULTS:

Site yielded by the survey:-

The physical survey of the Borutho-Witkop section of Medupi-Borutho-Witkop Transmission Line was conducted between the 11 and 14 March 2013 and it yielded a total of 16 heritage sites (Figure 47 -brown triangle legend). Appendix 1 gives a detailed list of the identified sites: from site type, site names, nearest pylon position or pylon number, distance of site location in relation to pylon position, distance of site location in relation to line corridor centre line, proposed heritage management action for each of the identified sites and GPS coordinates for each site (i.e. the 16 independent sites) including sub-sites. A significant drop in number of sites as compared to the Medupi-Borutho section of the Medupi-Borutho-Witkop Transmission Line walk-down. The 16 heritage sites are a combination of archaeological (ARCH), built environment and landscape (BEL), and burial ground and graves (BGG) sites.

Sites in terms of site type distribution:-

In terms of Site Type distribution out of the 16 identified independent sites including 2 sub-sites - 18 sites: 9 sites are archaeological and make up 50% of the total site distribution; they are followed by 6 sites that are burial grounds and graves (even though some sites were not confirmed as such), which make up 33% of the total site distribution; built environment and landscape make up the rest of the percentage (17%) in terms of site distribution.

In terms of archaeological sites - most or predominance of sites were historical archaeological sites. There were only 2 archaeological sites that are Stone Age (MSA sites) and they included BW-6 and BW-7 (Figure 16-17). No ESA or LSA sites were found in terms of archaeological resources. Therefore, archaeological sites dominance can be attributed to LIA sites or historical archaeological sites without any distinction being made between the two archaeological periods. Archaeological sites included the following sites: BW-2, BW-5, BW-6, BW-7, BW-8a, BW-10, BW-11, BW-12, and BW-13.

Burial grounds and graves sites included: BW-3, BW-4, BW-8b, BW-13, BW-14 and BW-16. While on the other hand built environment and landscape sites included: BW-15, BW-1 and BW-9.

Site in terms of their heritage significance (and value) and impact mitigation:-

Out of the total number of sites including sub-sites - 6 sites were not considered to be of high heritage significance and this is reflective of the mitigation measures developed for these sites. These are sites that will not require any further intervention in terms of their management and they include: BW-2, BW-5, BW-6, BW-7, BW-10 and BW-15. It has to be noted that not all sites whose mitigation procedure is less important some sites where not assigned any further action because they were either located outside the project area or the 10m line corridor the proposed development footprint

9 sites where assessed to be of medium to high heritage significant and the proposed mitigation measures for these site is reflective of the heritage value and significance. These sites include BW-3, BW-4, BW-8 (both a & b), BW-11, BW-12, BW14, BW-16 and BW-1. These sites should be avoided and treated as not go areas for the project to proceed.

Only 2 sites require intensive intervention measures and they include BW-9 and BW-13. However, such intervention varies with each site. For example, for BW-9 which is a farmstead (modern) the Powerline servitude will require to be shifted to approximately 100m south of the farmstead as previously agreed in the discussions between the farmer and Eskom. This farmstead in not a heritage sites, but touches on social issues which the heritage sector cannot avoid since the field is also deeply involved with socio-cultural issues that affect the wellbeing of society.

For BW-13 there are not other intervention measures except to map out the site, sample it and relocated the graves. Alternatively a new Powerline route will need to be surveyed in term of heritage value and significance. Reason for such a proposition or recommendation is that the clearing of the line servitude during the construction, and its maintenance post the construction (operational phase) resources identified at BW-13 will inevitable to destructed.

Disclaimer

It has to be noted that the above sites only represent the total number of heritage sites (in their variety of forms and nature) that were only yielded by the physical survey and not the total number of heritage sites that might exist along the line corridor. Some archaeological and heritage resources such as unmarked graves are subterranean in nature and might have

been missed by the current study. The developer should take note of this. In cases such resources are unearthed during the excavation processes for pylon positions or ground clearance for servitude line, they should be treated as chance finds. Refer to Appendix 2 "Heritage Management Plan Inputs Medupi-Borutho Transmission Line Corridor" for the management of chance finds.

7. CONCLUSIONS

From a cultural resources management point of view, there are no objections to the project and no negative perceptions about the project, Borutho-Witkop EMP. The EMP can be approved provided that the above given heritage concerns are full attended to and addressed in full by the developer. For example, the issue of conducting a proper rescue for BW-13 and attending to BW-9. To treating BW-3, BW-4, BW-8 (both a & b), BW-11, BW-12, BW-14 and BW-16 and BW-1 as No-go-area and to avoid and monitor them as recommended in each site mitigation measures for inclusion in the overall EMP.

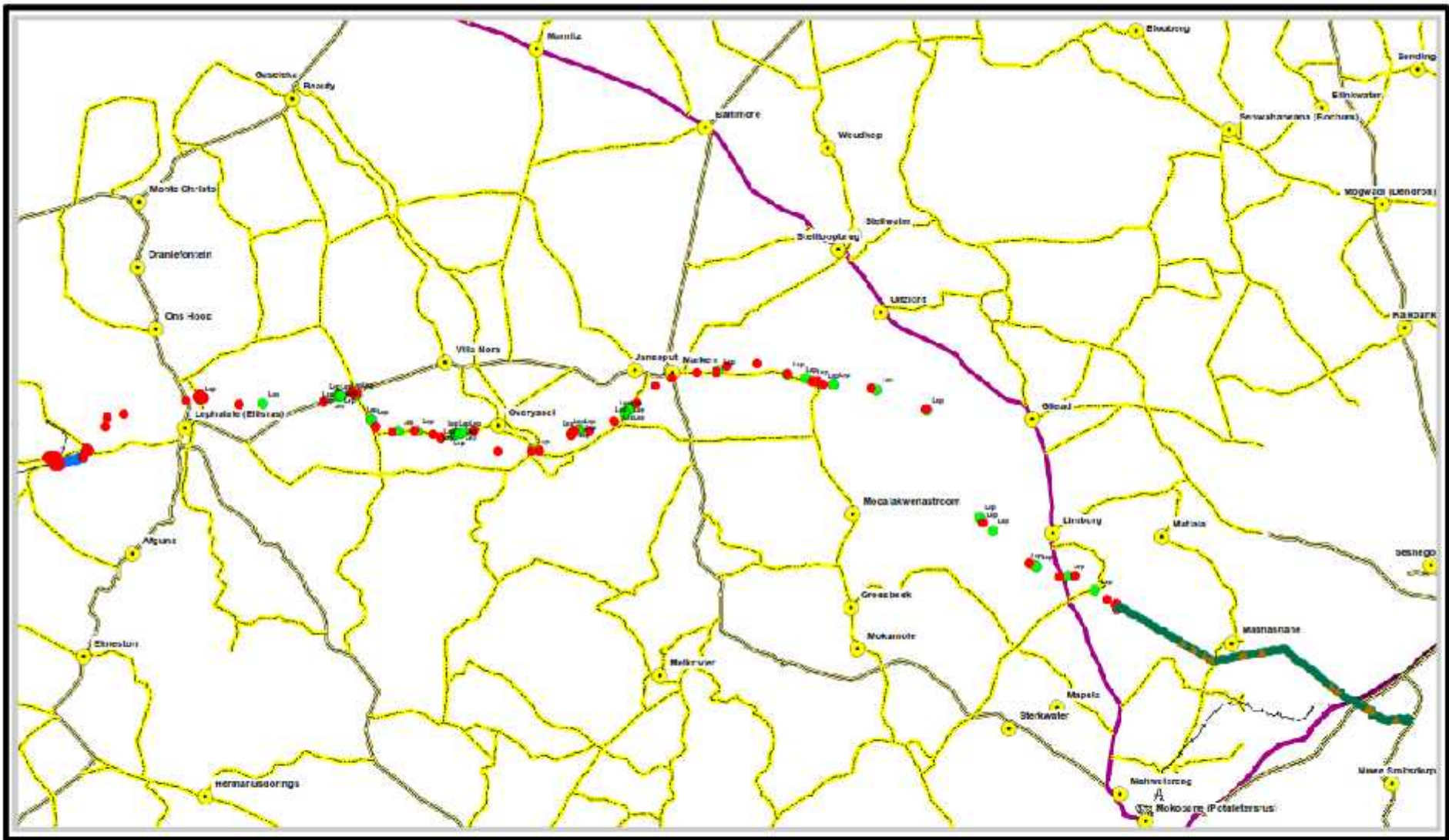
8. RECOMMENDATIONS

Based on the above discussion about the nature and status of heritage resources yielded during the physical survey of Borutho-Witkop line corridor and conclusions made above regarding sites that need special attention for the EMP to be approved and endorsed by relevant heritage authorities such as LHRA and SAHRA the following recommendations are made about the project:

- The developer should attend to and address all concerns regarding the management of heritage resources deemed worthy of protection and conservation during the construction and operational phase of this project - including its closure thereof.
- It is recommended that a rescue permit should be applied for with SAHRA APM Unit and BGG Unit for the rescue of BW-13 by a professional and accredited archaeologist. Alternative to this a new Powerline route that will avoid the site should be surveyed for.

need to collect material from the following sites: MB-2, MB-18, MB-28, MB-33, and MB-37.

- That the following five sites fully mapped and sampled before the commencement of operational activities for the project: MB-3, MB-4, MB-5, MB-6 and MB-27.
- That the following sites: BW-3, BW-4, BW-8 (both a & b), BW-11, BW-12, BW-14 and BW-16 and BW-1 be avoided at all times during the construction phase of the project and that this will continue to the operational phase of the project - during servitude maintenance



Legend

- Heritage Sites Borotho Witkop
- BW Pylon Positions
- Track for the alignment
- Pylon Positions
- Towns
- Heritage site
- Substations
- Railway
- Secondary Roads
- Main Roads
- National Roads



SITE PLAN: Heritage Site Map of Medupi-Borotho Transmission Line Corridor

0 25 50 Kilometers

N



Figure 47 - Distribution of heritage sites within and along the proposed Medupi-Burutho Transmission Line Corridor - the red dots on the map mark the position of the alignment track or track of the alignment and green dots heritage resources identified during the physical survey of the Medupi-Borutho line corridor in January-February 2013. The solid green line in the right with brown triangles covers the current study/alignment - Borutho-Witkop 400kV Line and heritage resources. .



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10. APPENDIXES

10.1. APPENDIX 1: SITE DATABASE BORUTHO-WITKOP TRANSMISSION LINE CORRIDOR EMP, LIMPOPO PROVINCE, SOUTH AFRICA

Site Type	Site name	Pylon No.	Distance from the pylon in meters	Distance from the servitude centre line in meters	Proposed heritage management action for site	GPS Coordinates
ARCH	BW-2	BRO-WIT026	66m	5m	A-No Further Action Necessary	S23 56 42.9 E29 03 42.1
BGG	BW-3	BOR-WIT030	174m	23m	C-No-go Area, Avoid site & ECO Monitor	S23 57 41.9 E29 05 26.0
BGG	BW-4	BOR-WIT032	174m	23m	C-No-go Area, Avoid site & ECO Monitor	S23 58 01.5 E29 05 57.2
ARCH	BW-5	BOR-WIT041	16m	16m	A-No Further Action Necessary	S23 57 46.9 E29 08 24.4
ARCH	BW-6	BOR-WIT042	209m	2.8m	A-No Further Action Necessary	S23 57 44.2 E29 08 35.9
ARCH	BW-7	BOR-WIT042	175m	6m	A-No Further Action Necessary	S23 57 44.1 E29 08 37.0
ARCH	BW-8a	BOR-WIT047	110m	20m	C-No-go Area, Avoid site & ECO Monitor	S23 57 31.1 E29 09 56.6
BGG	BW-8b	BOR-WIT047	5m	3m	C-No-go Area, Avoid site & ECO Monitor	S23 57 29.8 E29 10 00.4
FARMSTEAD	BW-9	BOR-WIT102	136m	10 m	Shift the line approximately 100 m south of the farmstead	S24 02 45.7 E29 20 37.8
ARCH	BW-10	BOR-WIT086	85m	9m	A- No Further Action Necessary	S24 02 04.6 E29 18 42.8
ARCH	BW-11	BOR-WIT086	52m	8m	C-No-go Area, Avoid site & ECO Monitor	S24 01 59.9 E29 18 33.5
ARCH	BW-12	BOR-WIT086	163m	11m	C-No-go Area, Avoid site & ECO Monitor	S24 01 58.6 E29 18 29.8
ARCH&BGG	BW-13	BOR-	218m	12m	B- This will include mapping of the site and	S24 01 56.3 E29 18 27.0

		WIT085			relocating the graves to a formalise cemetery - possible close to their current location.	
	BW-13	BOR-WIT085	153m	18m		S24 01 56.1 E29 18 24.6
	BW-13	BOR-WIT085	126m	7m		S24 01 55.4 E29 18 23.9
BGG	BW-14	BOR-WIT085	76m	24m	C-No-go Area, Avoid site & ECO Monitor	S24 01 55.1 E29 18 22.1
BEL	BW-15	BOR-WIT075	95m	28m	A- No Further Action Necessary	S23 35 29.4 E28 32 31.0
BGG	BW-16	BOR-WIT059	25m	25m	C-No-go Area, Avoid site & ECO Monitor	S23 58 2.20 E2912 43.40
BEL	BW-1	BOR-WIT023	212m	17m	C-No-go Area, Avoid site & ECO Monitor	S23 56 42.9 E29 03 42.1

10.2. APPENDIX 2: HERITAGE MANAGEMENT PLAN INPUT INTO THE BORUTHO-WITKOP TRANSMISSION LINE CORRODR EMP, LIMPOPO PROVINCE, SOUTH AFRICA

Chart Title:	Heritage Management Inputs for the Borutho-Witkop Transmission Line Corridor, EMP , Limpopo Province , South Africa								© NGT
Project Title:									
Objectives of the inputs	<ul style="list-style-type: none"> To avoid disturbance/destruction/damage to the identified and unidentified heritage resources with and immediately around the project area To actively and properly manage all the identified resources with the project area To mitigate any impact or potential impacts to the identified and unidentified heritage resources during the project planning, construction and operational phases 								
Type of Resources	Mitigation of Heritage Resources During Different Project Phases					Responsibility/Implementer/Monitor	Duration	Contact	EMP
	Planning	Construction	Chance Finds/Disturbances During Construction	Rehabilitation	Operational			Client/EM to	
Archaeological [Stone Age (ESA, MSA&LSA); Iron Age (EIA, MIA? LIA); Rock Art; & Historic Archaeology]; Palaeontological; & Meteorite.	Ensure that all the identified and mapped archaeological resources, both within and immediately around the project footprint, are demarcated in preparation for construction activities and associated infrastructure. (These Sections are also worthy to note 7, 27, 31 of the NHRA, NO.25 of 1999). A 5m buffer is recommended	Ensure that the demarcated archaeological resources, both with and immediately around the project footprint, are not disturbed at all times. Ensure that no machinery or other construction related infrastructure compromises the nature of any of these resources	Construction needs to stop immediately and a professional and accredited archaeologist or palaeontologist need to be called on sites to investigate and evaluate the finds and make necessary recommendations (e.g. objects in terms of Section 32 of the NHRA, No. 25 of 1999)	The identified mapped and demarcated archaeological resources need to be included in the rehabilitation plan of the project	During this phase all the resources that were identified and demarcated for conservation purposes need to be monitored on 6 months to annual basis	Environmental Control Officer (ECO)	Throughout the project – reporting to environmental manager on weekly basis and urgently in cases of chance finds.	Contact a professional and accredited archaeologist in terms of Section 35 of the NHRA, No.25 of 1999. “Preferable the one involved in the project scoping and/or EIA phases”	Include all significant archaeological/palaeontological/meteorite resources in the Integrated Environmental Management Plan as part of Section 35 of the NHRA, No.25 of 1999 or include them in terms of Section 38 of the NHRA depending

									on the nature and size of development
Historical, Built Environment & Landscape (incl. Industrial)	Ensure that all historical, built environment & landscape features including industrial structures/features are documented, mapped, demarcated in preparation for construction activities and related infrastructure unless they will form part of the project construction such addition and/or alteration in which case a permit needs to be applied for from relevant responsible authority e.g. SAHRA or	Ensure that all the demarcated historical & built environment and landscape feature including industrial structures/features are not in any way compromised by the construction unless they form an integral part of the construction such as additions and/or alterations.	Should any unplanned disturbance to such resources occur as a result of unforeseen events such as accident the work needs to stop immediately and a qualified heritage consultant needs to be called on site to investigate and evaluate the nature of disturbance and make necessary recommendations. In case of discovery of heritage objects (in terms of Section 32 of the NHRA, No 25 of 1999)	The identified mapped and demarcated resources or resources included in the current project construction activities either through additions and/or alterations need to be included in the overall project area rehabilitation	During this phase all the resources that were identified and demarcated for conservation purposes need to be monitored on 6 months to annual basis – this includes structures/features added on/altere	ECO	Throughout the project – reporting to environmental manager/project manager on weekly basis and urgently in cases of unforeseen disturbances as a result of accidents.	Contact a professional and accredited heritage consultant in terms of Section 34 of the NHRA, No.25 of 1999. “Preferable the one involved in the project scoping and/or EIA phases”. In case of discovery of heritage objects (in terms of Section 32 of the NHRA, No 25 of 1999) through construction/digging, an archaeologist will be called on site.	Include all significant heritage resources in the Integrated Environmental Management Plan as part of Section 34 of the NHRA, No.25 of 1999 or include them in terms of Section 38 of the NHRA depending on the nature and size of development

	PHRA (refer to Section 7 & 27 of the NHRA, NO.25 of 1999). A 5 to 2m buffer is recommended for structures/features not forming part of the current construction.		through construction/digging an archaeologist will be called on site.						
Burial Grounds & Grave	Ensure that all the identified and mapped burial grounds and graves sites (e.g. isolate graves or cemeteries – both municipal formalised and those not formalised as such), both within and immediately around the project footprint, are demarcated in preparation for construction activities and associated infrastructure. Should it be deemed that they will inevitably be disturbed a permit needs to be applied	Ensure that the demarcated burial grounds and grave sites, both with and immediately around the project footprint, are not disturbed at all times. Ensure that no machinery or other construction related infrastructure compromises the nature of any of these resources	Should any an previously un identified burials and graves, as a result of them being unmarked to make them visible, be accidentally discovered/uncovered - construction needs to stop immediately and a professional and accredited archaeologist dealings with burials and graves need to be called on sites to investigate and evaluate the finds and make necessary recommendations (e.g. in	The identified, mapped and demarcated burial grounds and graves sites need to be included in the rehabilitation plan of the project	During this phase all the resources that were identified and demarcated for conservation purposes need to be monitored on monthly, 6 months to annual basis as deemed necessary by the responsible archaeologist in consultation with the EM or client & ECO	Environmental Control Officer (ECO)	Throughout the project – reporting to environmental manager on weekly basis and urgently in cases of accidentally discovered/uncovered burials and graves.	Contact a professional and accredited archaeologist in terms of Section 35 of the NHRA, No.25 of 1999. “Preferable the one involved in the project scoping and/or EIA phases”	Include all burials and graves Integrated Environmental Management Plan as part of Section 36 of the NHRA, No.25 of 1999 or include them in terms of Section 38 of the NHRA depending on the nature and size of development.

© NGT	for with SAHRA BGG Unit in terms of Section 36 of the NHRA, NO.25 of 1999). In a case where they will not be direct impacted it is recommended that a 5m buffer need to be made available		terms of Section 36 of the NHRA, No. 25 of 1999)						
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