

ARCHAEOLOGICAL IMPACT ASSESSMENT

FOR THE PROPOSED TSHIVHASO COAL-FIRED POWER PLANT,
LIMPOPO PROVINCE

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General

The possibility of unmarked or informal graves and subsurface finds cannot be excluded. If any possible finds are made during construction, the operations must be stopped and a qualified archaeologist contacted for an assessment of the find/s.

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EXECUTIVE SUMMARY

Site name and location: The proposed Tshivhaso Power Station is located on the farm Graafwater 456 LQ with the Ash dump located on the farm Appelvlakte 448 LQ. The proposed power line traverses several farms, in addition to the above mentioned farms Gelykebult 485 IQ, Vooruit 449 LQ, Nelsonskop 464 LQ, Grootestryd 465 LQ, Naauw Ontkomen 509 LQ. The project is located close to Lephalale, Limpopo Province.

1: 50 000 Topographic Map: 2327 CB & 2327 DA

EIA Consultant: Savannah Environmental (Pty) Ltd

Developer: Cennergi (Pty) Ltd.

Heritage Consultant: Heritage Contracts and Archaeological Consulting CC (HCAC).

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Date of Report: 29 July 2016. Revised 08 August 2016.

Findings of the Assessment:

HCAC was appointed to assess the study area in terms of the archaeological component of Section 35 of the NHRA as part of the basic assessment for the project. No raw material suitable for stone tool manufacture occurs in the study area and no ceramics or stone walls attributed to the Iron Age were recorded. Similarly no sites of archaeological significance were recorded by other studies in the area (e.g. Huffman 1999, Van der Walt 2009, 2014 & 2015). No further mitigation prior to construction is recommended in terms of Section 35 for the proposed development to proceed.

In terms of the built environment of the area (Section 34), the dilapidated remains of three demolished structures occur within the development footprint. As these are vernacular structures it is not known if these sites are older than 60 years. Sites like these are often associated with unmarked graves and if this is the case the graves would be of high social significance. It is recommended that this should be confirmed through community consultation by the social team if impacted on after the final layout has been confirmed.

In terms of Section 36 of the Act no burial sites were recorded in the study area. However if any graves are located in future they should ideally be preserved *in-situ* or alternatively relocated according to existing legislation. Due to the subsurface nature of archaeological remains and the fact that graves can occur anywhere on the landscape, it is recommended that a chance find procedure is implemented for the project as part of the EMP.

The study area is surrounded by mining developments and no significant cultural landscapes or viewsapes were noted during the fieldwork.

Due to the lack of significant heritage features in the study area there is, from an archaeological point of view, no reason why the development cannot proceed based on approval from SAHRA.

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ABBREVIATIONS

AIA: Archaeological Impact Assessment
ASAPA: Association of South African Professional Archaeologists
BIA: Basic Impact Assessment
CRM: Cultural Resource Management
ECO: Environmental Control Officer
EIA: Environmental Impact Assessment*
EIA: Early Iron Age*
EIA Practitioner: Environmental Impact Assessment Practitioner
EMP: Environmental Management Plan
ESA: Early Stone Age
GPS: Global Positioning System
HIA: Heritage Impact Assessment
LIA: Late Iron Age
LSA: Late Stone Age
MEC: Member of the Executive Council
MIA: Middle Iron Age
MPRDA: Mineral and Petroleum Resources Development Act
MSA: Middle Stone Age
NEMA: National Environmental Management Act
PRHA: Provincial Heritage Resource Agency
SADC: Southern African Development Community
SAHRA: South African Heritage Resources Agency

**Although EIA refers to both Environmental Impact Assessment and the Early Iron Age both are internationally accepted abbreviations and must be read and interpreted in the context it is used.*

GLOSSARY

Archaeological site (remains of human activity over 100 years old)

Early Stone Age (~ 2.6 million to 250 000 years ago)

Middle Stone Age (~ 250 000 to 40-25 000 years ago)

Later Stone Age (~ 40-25 000, to recently, 100 years ago)

The Iron Age (~ AD 400 to 1840)

Historic (~ AD 1840 to 1950)

Historic building (over 60 years old)

1. BACKGROUND INFORMATION

Heritage Contracts and Archaeological Consulting CC (**HCAC**) was appointed to conduct an Archaeological Impact Assessment for the proposed Tshivhaso Power Plant. The Archaeological Impact Assessment report forms part of the EIA for the proposed project.

The aim of the study is to identify cultural heritage sites, document, and assess their importance within local, provincial and national context. It serves to assess the impact of the proposed project on non-renewable heritage resources, and to submit appropriate recommendations with regard to the responsible cultural resources management measures that might be required to assist the developer in managing the discovered heritage resources in a responsible manner. It is also conducted to protect, preserve, and develop such resources within the framework provided by the National Heritage Resources Act of 1999 (Act 25 of 1999).

The report outlines the approach and methodology utilized before and during the survey, which includes: Phase 1, a desktop study that includes collection from various sources and consultations; Phase 2, the physical surveying of the study area on foot and by vehicle; Phase 3, reporting the outcome of the study.

General site conditions were recorded by means of photographs, GPS locations, and site descriptions. Possible impacts were identified and mitigation measures are proposed in the following report.

This report must also be submitted to the SAHRA for review.

1.1. Terms of Reference

Desktop study

Conduct a scoping study (Van der Walt 2015) where information on the area is collected to provide a background setting of the archaeology that can be expected in the area.

Field study

Conduct a field study to: a) systematically survey the proposed project area to locate, identify, record, photograph and describe sites of archaeological, historical or cultural interest; b) record GPS points identified as significant areas; c) determine the levels of significance of the various types of heritage resources recorded in the project area.

Reporting

Report on the identification of anticipated and cumulative impacts the operational units of the proposed project activity may have on the identified heritage resources for all 3 phases of the project; i.e., construction, operation and decommissioning phases. Consider alternatives, should any significant sites be impacted adversely by the proposed project. Ensure that all studies and results comply with Heritage legislation and the code of ethics and guidelines of ASAPA.

To assist the developer in managing the discovered heritage resources in a responsible manner, and to protect, preserve, and develop them within the framework provided by the National Heritage Resources Act of 1999 (Act 25 of 1999).

1.2. Archaeological Legislation and Best Practice

Phase 1, an AIA or a HIA is a pre-requisite for development in South Africa as prescribed by SAHRA and stipulated by legislation. The overall purpose of a heritage specialist input is to:

- » Identify any heritage resources, which may be affected;
- » Assess the nature and degree of significance of such resources;
- » Establish heritage informants/constraints to guide the development process through establishing thresholds of impact significance;
- » Assess the negative and positive impact of the development on these resources;
- » Make recommendations for the appropriate heritage management of these impacts.

The AIA or HIA, as a specialist sub-section of the EIA, is required under the National Heritage Resources Act NHRA of 1999 (Act 25 of 1999), Section 23(2) (b) of the NEMA and section S. 39 (3) (b) (iii) of the MPRDA.

The AIA should be submitted, as part of the EIA, BIA or EMP, to the PHRA if established in the province or to SAHRA. SAHRA will be ultimately responsible for the professional evaluation of Phase 1 AIA reports upon which review comments will be issued. 'Best practice' requires Phase 1 AIA reports and additional development information, as per the EIA, BIA/EMP, to be submitted in duplicate to SAHRA after completion of the study. SAHRA accepts Phase 1 AIA reports authored by professional archaeologists, accredited with ASAPA or with a proven ability to do archaeological work.

Minimum accreditation requirements include an Honours degree in archaeology or related discipline and 3 years post-university CRM experience (field supervisor level).

Minimum standards for reports, site documentation and descriptions are set by ASAPA in collaboration with SAHRA. ASAPA is based in South Africa, representing professional archaeology in the SADC region. ASAPA is primarily involved in the overseeing of ethical

practice and standards regarding the archaeological profession. Membership is based on proposal and secondment by other professional members.

Phase 1 AIA's are primarily concerned with the location and identification of sites situated within a proposed development area. Identified sites should be assessed according to their significance. Relevant conservation or Phase 2 mitigation recommendations should be made. Recommendations are subject to evaluation by SAHRA.

Conservation or Phase 2 mitigation recommendations, as approved by SAHRA, are to be used as guidelines in the developer's decision making process.

Phase 2 archaeological projects are primarily based on salvage/mitigation excavations preceding development destruction or impact on a site. Phase 2 excavations can only be conducted with a permit, issued by SAHRA to the appointed archaeologist. Permit conditions are prescribed by SAHRA and includes (as minimum requirements) reporting back strategies to SAHRA and deposition of excavated material at an accredited repository.

In the event of a site conservation option being preferred by the developer, a site management plan, prepared by a professional archaeologist and approved by SAHRA, will suffice as minimum requirement.

After mitigation of a site, a destruction permit must be applied for from SAHRA by the client before development may proceed.

Human remains older than 60 years are protected by the National Heritage Resources Act, with reference to Section 36. Graves older than 60 years, but younger than 100 years fall under Section 36 of Act 25 of 1999 (National Heritage Resources Act), as well as the Human Tissues Act (Act 65 of 1983), and are the jurisdiction of SAHRA. The procedure for Consultation Regarding Burial Grounds and Graves (Section 36[5]) of Act 25 of 1999 is applicable to graves older than 60 years that are situated outside a formal cemetery administrated by a local authority. Graves in this age category, located inside a formal cemetery administrated by a local authority, require the same authorisation as set out for graves younger than 60 years, in addition to SAHRA authorisation. If the grave is not situated inside a formal cemetery, but is to be relocated to one, permission from the local authority is required and all regulations, laws and by-laws, set by the cemetery authority, must be adhered to.

Human remains that are less than 60 years old are protected under Section 2(1) of the Removal of Graves and Dead Bodies Ordinance (Ordinance no. 7 of 1925), as well as the Human Tissues Act (Act 65 of 1983), and are the jurisdiction of the National Department of Health and the relevant Provincial Department of Health and must be submitted for final approval to the office of the relevant Provincial Premier. This function is usually delegated to the Provincial MEC for Local Government and Planning; or in some cases, the MEC for Housing and Welfare. Authorisation for exhumation and reinternment must also be obtained from the relevant local or regional council where the grave is situated, as well as the relevant local or regional council to where the grave is being relocated. All local and regional provisions, laws and by-laws must also be adhered to. To handle and transport human remains, the institution conducting the relocation should be authorised under Section 24 of Act 65 of 1983 (Human Tissues Act).

1.3. Description of Study Area

1.3.1 Location Data

The proposed Tshivhaso Power Station is located at 23° 36' 44.7143" S, 27° 31' 08.7028" E on the farm Graafwater 456 LQ with the Ash dump located on the farm Appelvlakte 448 LQ at 23° 37' 41.7430" S, 27° 35' 28.6680" E. The proposed power line traverses several farms, in addition to the above mentioned farms Gelykebult 485 IQ, Vooruit 449 LQ, Nelsonskop 464 LQ, Grootestryd 465 LQ, Naauw Ontkomen 509 LQ. The project is located close to Lephalale, Limpopo Province (Figure 1).

The vegetation is predominantly Limpopo Sweet Bushveld vegetation in the Savannah biome (Mucina & Rutherford 2006). Historical imagery on Google earth indicates that the land has been fallow for a number of years and mostly used for cattle and game farming. The powerline does however traverse areas impacted on previously by mining

1.3.2. Location Map

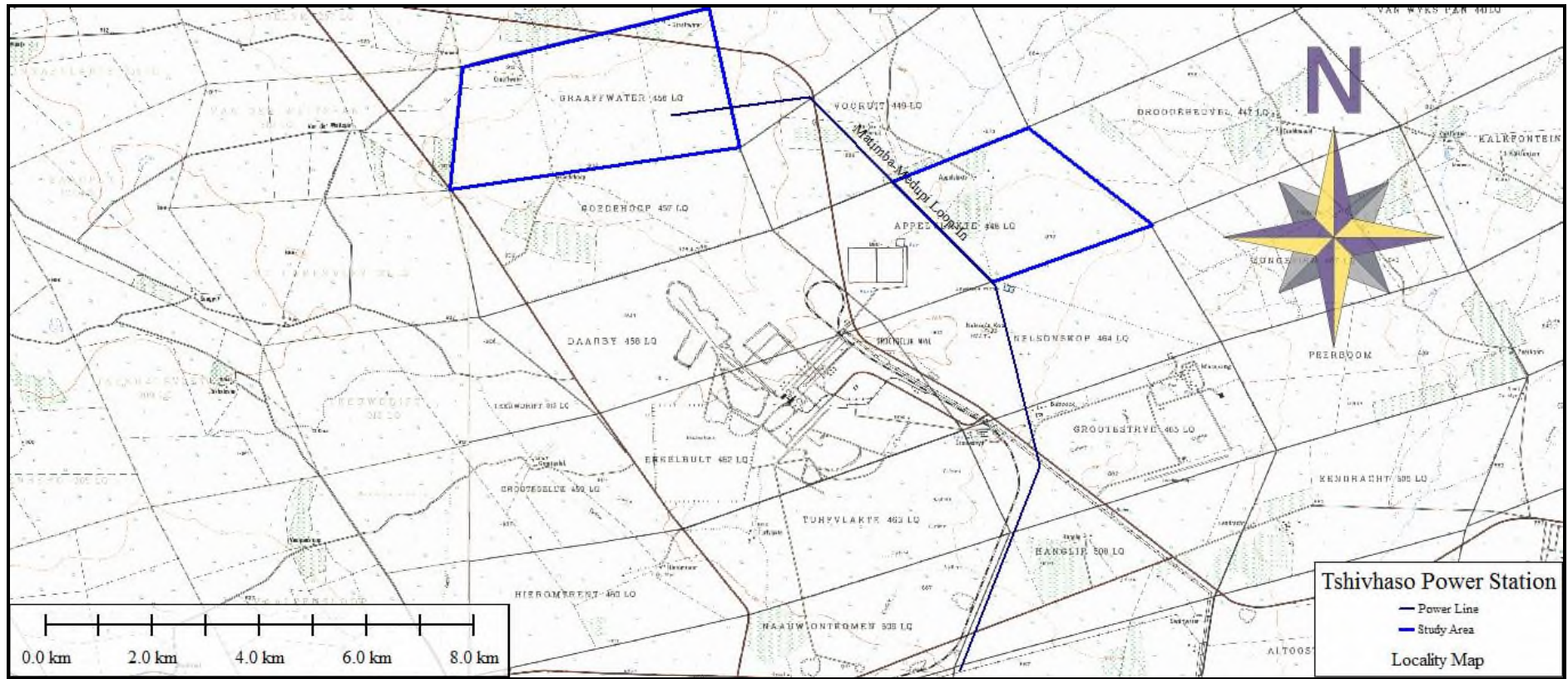


Figure 1. Location map with the proposed power station on the farm Graafwater and the ash dump on Appelvlakte

2. APPROACH AND METHODOLOGY

The aim of the study is to cover archaeological databases to compile a background of the archaeology that can be expected in the study area followed by field verification; this was accomplished by means of the following phases.

2.1 Phase 1 - Desktop Study

The first phase comprised desktop, scanning existing records for archaeological sites, historical sites, graves, architecture (structures older than 60 years) of the area. The following approach was followed:

2.1.1 Literature Search

This was conducted by utilising published reports and CRM reports relevant to the area. The aim of this is to extract data and information on the area in question.

2.1.2 Information Collection

SAHRIS was consulted to collect data from previously conducted CRM projects in the region to provide a comprehensive account of the history of the study area.

2.1.3 Consultation

No public consultation was done by the author as this was done independently as part of the EIA.

2.1.4 Google Earth and Mapping Survey

Google Earth and 1:50 000 maps of the area were utilised to identify possible places where sites of heritage significance might be located.

2.1.5 Genealogical Society of South Africa

The database of the Genealogical Society was consulted to collect data on any known graves in the area.

2.2 Phase 2 - Physical Surveying

Due to the nature of cultural remains, the majority of which occurs below surface, a field survey of the proposed development area was conducted. The study area was surveyed by means of vehicle and extensive pedestrian surveys during the week of 13 July 2016. The powerline was only assessed at a desktop level with spot checks along the power line of possible sensitive areas.

The survey was aimed at covering the proposed development footprint, focussing on specific areas on the landscape that would be more likely to contain archaeological and/or other heritage remains like drainage lines, rocky outcrops as well as slight elevations in the natural topography. These areas were searched more intensively, but many other areas were walked in order to confirm expectations in those areas. A certain portion in the south west of the site could not be covered as no access could be gained to this area as this is currently a buffalo camp. Track logs of the areas covered were taken (Figure 2).

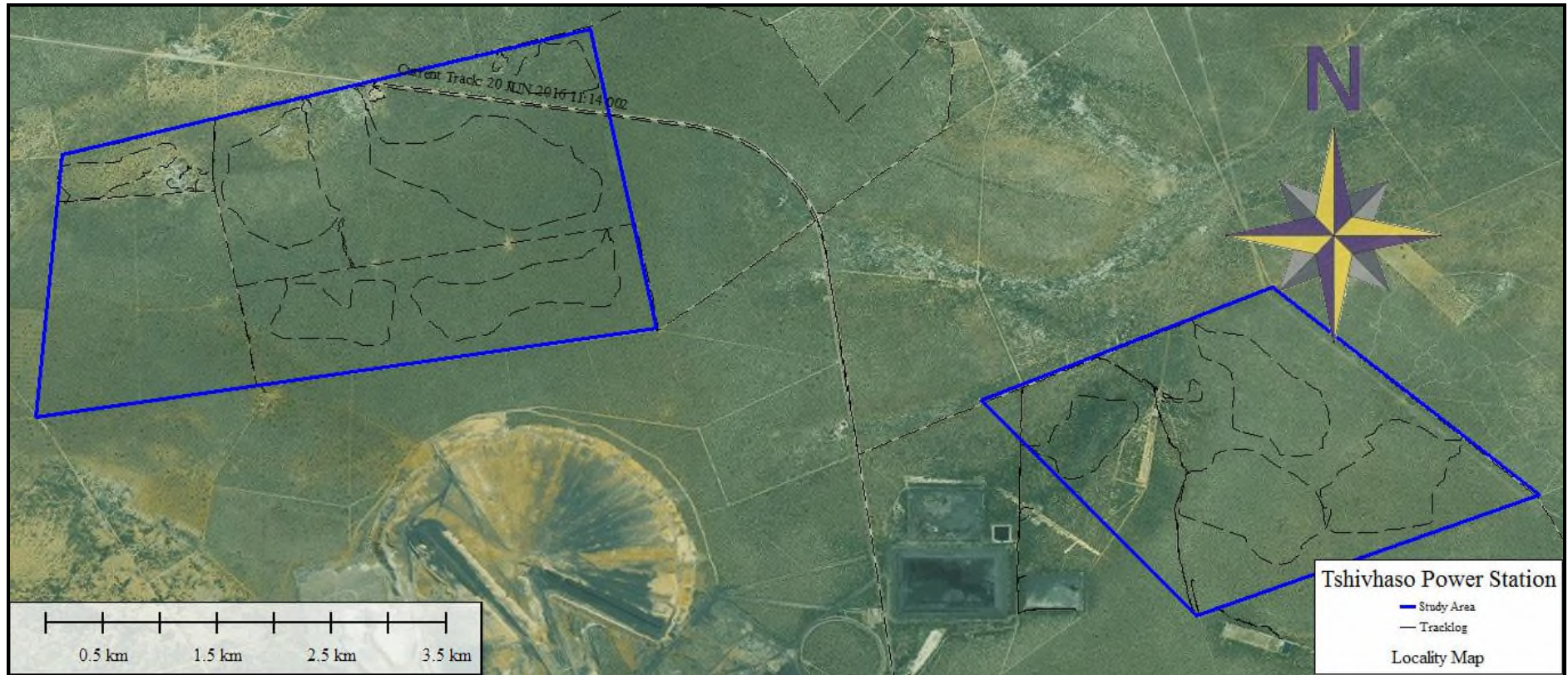


Figure 2. Track logs of the areas surveyed indicated in black with the development footprint indicated in blue.

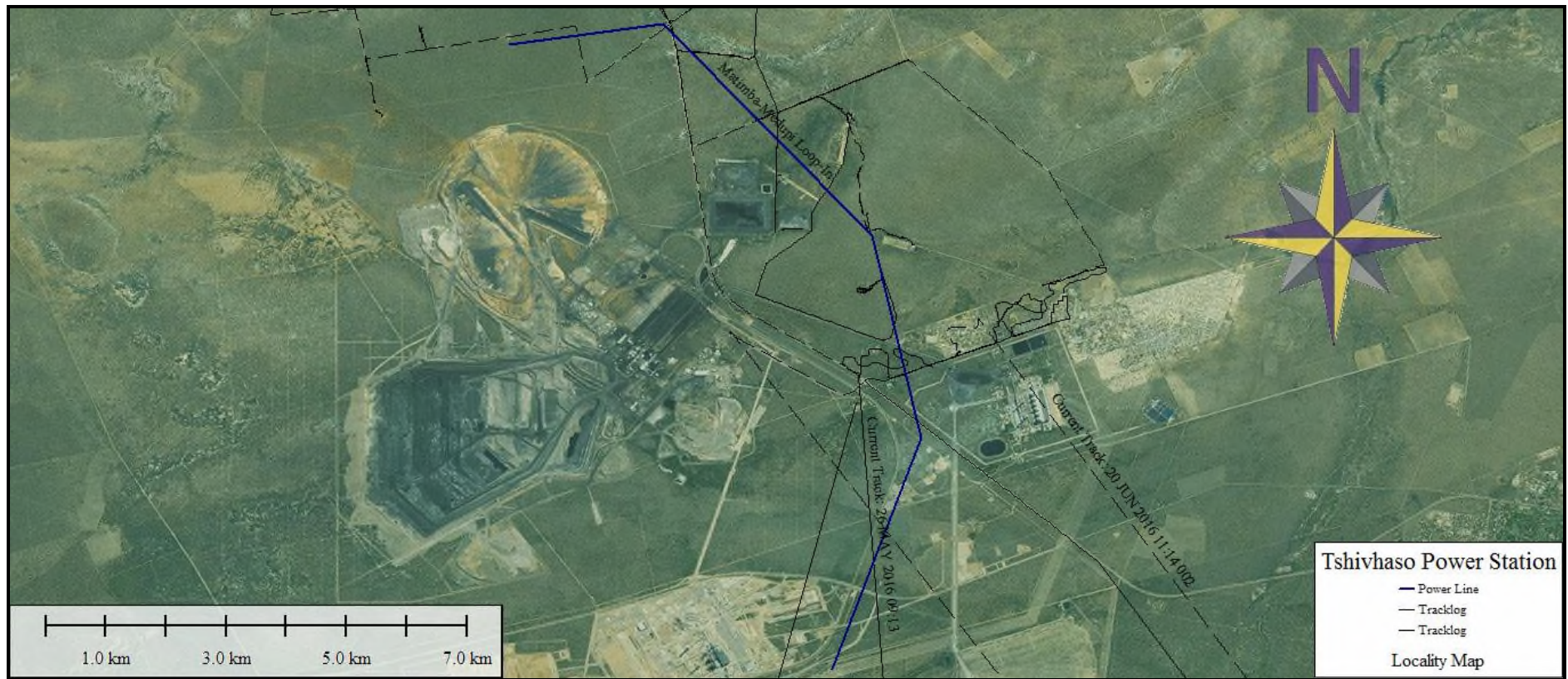


Figure 3: Areas surveyed along the power line route.

2.3. Restrictions

Due to the subsurface nature of archaeological artefacts, high vegetation cover and extensive disturbances in the study area, the possibility exists that some features or artefacts may not have been discovered/ recorded during the survey and the possible occurrence of unmarked graves and other cultural material cannot be excluded. This report only deals with the footprint area of the proposed development as indicated in the location map.

Although HCAC surveyed the area as thoroughly as possible, it is incumbent upon the developer to stop operations and inform the relevant heritage agency should further cultural remains, such as graves, stone tool scatters, artefacts, bones or fossils, be exposed during the process of development.

It must be noted that the landowner could not give the archaeologist access to a portion of the study area due to buffaloes in one of the camps.

3. NATURE OF THE DEVELOPMENT

The power station will utilise Circulating Fluidised Bed (CFB) combustors (boilers) which have the advantage that sulphur trapping can take place with the sorbent bed (limestone) in these boilers. This ensures a plant with relatively low emissions. In addition, the power station will utilise dry cooling technology and dry ashing due to water availability constraints.

The main infrastructure proposed power station includes (specifications will be decided based on the technology selected):

- » Access roads.
- » Coal storage areas and bunkers
- » Coal Mill (for grinding coal into fine material)
- » Pipeline for water supply. Water is expected to be available from the allocation to Exxaro Coal from the Mokolo-Crocodile Water Augmentation Project (MCWAP) phase 2.
- » Coal Loading and offloading areas, as well as conveyor belts.
- » Power plant production unit/s (boilers /furnaces, turbines, generator and associated equipment, control room).
- » Ash dump.
- » Water infrastructure such as Raw-Water Storage Dam, purification works and reservoirs.
- » A substation
- » An overhead power line to connect into the Eskom Grid
- » Office area and maintenance area/s

HISTORICAL AND ARCHAEOLOGICAL BACKGROUND OF THE STUDY AREA

4.1 Databases Consulted

Several CRM studies have been conducted for developments in the greater area. Studies were conducted by Pistorius (2007 and 2010), Van der Walt (2012 & 2014), Huffman & Van der Walt (2008a, b, 2011, 2012) and van Schalkwyk (2005a, 2005b, 2006, 2008). These studies recorded a number of known sites including grave sites, historical ruins, MSA and Iron Age sites.

Google Earth and 1:50 000 maps of the area were utilised to identify possible places where archaeological and historical sites might be located.

Genealogical Society and Google Earth Monuments

No cemeteries are indicated for the farms under investigation.

4.2. Brief background to the study area

4.2.1. Earlier Stone Age

The following background from Huffman & van der Walt (2008 & 2011) is applicable for the study area. Hominids began to make stone tools about 2.6 million years ago. Known as the Oldowan industry, most of the earliest tools were rough cobble cores and simple flakes. The flakes were used for such activities as skinning and cutting meat from scavenged animals. These early artefacts are difficult to recognize and have so far only been found in rock shelters such as the Sterkfontein Caves (Kuman, 1998).

At about 1.4 million years ago hominids started producing more recognizable stone artefacts such as hand axes, cleavers and core tools (Deacon & Deacon, 1999). Among other things these Acheulian tools were probably used to butcher large animals such as elephants, rhinoceros and hippopotamus that had died from natural causes. Acheulian artefacts are usually found near the raw material from where they were quarried, at butchering sites, or as isolated finds. No Acheulian sites are on record near the project area.

4.2.2. Middle Stone Age

By the beginning of the Middle Stone Age (MSA), tool kits included prepared cores, parallel-sided blades and triangular points hafted to make spears (Volman, 1984). MSA people had become accomplished hunters by this time, especially of large grazing animals such as wildebeest, hartebeest and eland.

These hunters are classified as early humans, but by 100,000 years ago, they were anatomically fully modern. The oldest evidence for this change has been found in South Africa, and it is an important point in debates about the origins of modern humanity. In particular, the degree to which behaviour was fully modern is still a matter of debate. The repeated use of caves indicates that MSA people had developed the concept of a home base and that they could make fire. These were two important steps in cultural evolution (Deacon & Deacon, 1999).

MSA artefacts have been found in the Oliboompoot Cave to the south of Lephalale (Mason, 1962; M. van der Ryst, 2006) and in the river gravels of the Limpopo, northwest of the project area (Pistorius, 2007). A large scale survey of almost 9000ha in 2011 by Huffman and vd Walt found that Middle Stone Age sites were associated with pans and ancient drainage systems throughout the project area.

4.2.3. Later Stone Age

By the beginning of the Later Stone Age (LSA), human behaviour was undoubtedly modern. Uniquely human traits, such as rock art and purposeful burials with ornaments, became a regular practice. These people were the ancestors of the San (or Bushmen).

San rock art has a well-earned reputation for aesthetic appeal and symbolic complexity (Lewis-Williams, 1981). There is a single known rock art site (S23.65132 E27.58651) in the project area, on Nelsonskop 464 LQ to the east (Pistorius, 2007, van Schalkwyk 2011, van der Walt 2015).

In addition to art, LSA sites contain diagnostic artefacts, including microlithic scrapers and segments made from very fine-grained rock (Wadley, 1987). Spear hunting probably continued, but LSA people also hunted small game with bows and poisoned arrows. Important LSA deposits have been excavated in Oliboompoot Cave (Mason, 1962) and other sites in the Waterberg to the south (Van der Ryst, 1998). Sites in the open are usually poorly preserved and therefore have less value than sites in caves or rock shelters. A single kopje known as Nelsonskop on an otherwise featureless landscape has engravings on the southern face of the kopje with ephemeral stone walls on top of the hill.

4.2.4. The Iron Age (AD 400 to 1840)

Bantu-speaking people moved into Eastern and Southern Africa about 2,000 years ago (Mitchell, 2002). These people cultivated sorghum and millets, herded cattle and small stock and manufactured iron tools and copper ornaments. Because metalworking represents a new technology, archaeologists call this period the Iron Age. Characteristic ceramic styles help archaeologists to separate the sites into different groups and time periods. The first 1,000 years is called the Early Iron Age.

As mixed farmers, Iron Age people usually lived in semi-permanent settlements consisting of pole-and-daga (mud mixed with dung) houses and grain bins arranged around a central area for cattle (Huffman, 1982). Usually, these settlements with the 'Central Cattle Pattern' (CCP) were sited near water and good soils that could be cultivated with an iron hoe. For the project area, archaeological sites such as these are unlikely to occur except along river terraces.

Archaeologists have not yet resolved the role of a special pottery, known as Bambata, in the spread of pastoralism and mixed farming (Huffman, 2007). Some believe that Bambata pottery represents the vanguard of the Early Iron Age, or alternatively, Khoe pastoralists, while others believe it was acquired by LSA people through trade. This pottery has been found at Oliboempoort in LSA deposits (Mason, 1962; Van der Ryst, 2006) and is thus believed to exist in the general region.

Some Iron Age settlements are on record for the general area, for instance alongside the Matlabas River (Aukema in Huffman, 1990) and in Botswana (Biemond, 2005) and south of the Limpopo close to Steenbokpan (Huffman & vd Walt, 2011). These sites are recognized by distinctive pottery known as the Letsibogo facies of Moloko (Huffman, 2007).

The Little Ice Age began at about AD 1300, and its impact on farming societies was particularly severe. Another major drought occurred at about AD 1650.

4.2.5. Cultural and Historic

Voortrekkers crossed the Vaal River in 1836, and within a few years, began to spread north. Much of the Limpopo Province contained tsetse fly, and so early Boer farmers didn't settle immediately in the area. European settlement of the region began at the beginning of the last century. Some of the first settlers, D.P. van der Westhuizen and C. Ricks, both arrived in about 1901. The study area is close to the ox-cart route to Botswana that crossed the Limpopo a few kilometres upstream from the modern border post. Some of pans were used as outspans along the route. Because the area was not suitable for grain agriculture, African farmers did not live in the area, and labour had to come from far afield. Rather the area was used primarily for hunting.

5. HERITAGE SITE SIGNIFICANCE AND MITIGATION MEASURES

The presence and distribution of heritage resources define a 'heritage landscape'. In this landscape, every site is relevant. In addition, because heritage resources are non-renewable, heritage surveys need to investigate an entire project area, or a representative sample, depending on the nature of the project. In the case of the proposed project the local extent of its impact necessitates a representative sample and only the footprint of the areas demarcated for development were surveyed. In all initial investigations, however, the specialists are responsible only for the identification of resources visible on the surface.

This section describes the evaluation criteria used for determining the significance of archaeological and heritage sites. The following criteria were used to establish site significance:

- » The unique nature of a site;
- » The integrity of the archaeological/cultural heritage deposits;
- » The wider historic, archaeological and geographic context of the site;
- » The location of the site in relation to other similar sites or features;
- » The depth of the archaeological deposit (when it can be determined/is known);
- » The preservation condition of the sites;
- » Potential to answer present research questions.

Furthermore, The National Heritage Resources Act (Act No 25 of 1999, Sec 3) distinguishes nine criteria for places and objects to qualify as 'part of the national estate' if they have cultural significance or other special value. These criteria are:

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

5.1. Field Rating of Sites

Site significance classification standards prescribed by SAHRA (2006), and acknowledged by ASAPA for the SADC region, were used for the purpose of this report. The recommendations for each site should be read in conjunction with section 7 of this report.

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.C)	-	Low significance	Destruction

» 5.2 Impact Rating of Assessment

The criteria below are used to establish the impact rating of sites as per the impact rating methodology employed by Savannah environmental:

- » The **nature**, which shall include a description of what causes the effect, what will be affected and how it will be affected.
- » The **extent**, wherein it will be indicated whether the impact will be local (limited to the immediate area or site of development) or regional, and a value between 1 and 5 will be assigned as appropriate (with 1 being low and 5 being high):
- » The **duration**, wherein it will be indicated whether:
 - * the lifetime of the impact will be of a very short duration (0-1 years), assigned a score of 1;
 - * the lifetime of the impact will be of a short duration (2-5 years), assigned a score of 2;
 - * medium-term (5-15 years), assigned a score of 3;
 - * long term (> 15 years), assigned a score of 4; or
 - * permanent, assigned a score of 5;

- » The **magnitude**, quantified on a scale from 0-10 where; 0 is small and will have no effect on the environment, 2 is minor and will not result in an impact on processes, 4 is low and will cause a slight impact on processes, 6 is moderate and will result in processes continuing but in a modified way, 8 is high (processes are altered to the extent that they temporarily cease), and 10 is very high and results in complete destruction of patterns and permanent cessation of processes.
- » The **probability of occurrence**, which shall describe the likelihood of the impact actually occurring. Probability will be estimated on a scale of 1-5 where; 1 is very improbable (probably will not happen), 2 is improbable (some possibility, but low likelihood), 3 is probable (distinct possibility), 4 is highly probable (most likely) and 5 is definite (impact will occur regardless of any prevention measures).
- » The **significance**, which shall be determined through a synthesis of the characteristics described above and can be assessed as low, medium or high; and
- » the **status**, which will be described as either positive, negative or neutral.
- » the degree to which the impact can be reversed.
- » the degree to which the impact may cause irreplaceable loss of resources.
- » the *degree* to which the impact can be mitigated.

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

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

S = Significance weighting

E = Extent

D = Duration

M = Magnitude

P = Probability

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

- » < 30 points: Low (i.e., where this impact would not have a direct influence on the decision to develop in the area),
- » 30-60 points: Medium (i.e., where the impact could influence the decision to develop in the area unless it is effectively mitigated),
- » > 60 points: High (i.e., where the impact must have an influence on the decision process to develop in the area).

6. BASELINE STUDY-DESCRIPTION OF SITES

Paleo drainage lines and seasonal pans in the wider study area are known to contain MSA material, dating to what is referred to as a Post Howiesons Poort industry. While the Limpopo floodplain to the north was settled by Iron Age communities producing stylistic pottery known as *Letsibogo* while their herdsmen utilized the calcrete plateau for summer grazing as far as 15 km from the settlements (Huffman & van der Walt 2011). More favourable water rich areas to the south of the study area in the Waterberg was also inhabited by Stone Age communities (Van der Ryst 1998) and later by Iron Age groups producing stylistic pottery known as *Eiland* as well as Ndebele groups (Aukema 1989; Huffman 2007). Tsetse fly and the lack of good agricultural conditions also meant that the area was sparsely inhabited in the late 1800's and early 1900's. A single kopje known as Nelsonskop on an otherwise featureless landscape has engravings on the southern face of the kopje with ephemeral stone walls on top of the hill. This site is located approximately 280 meters to the west of the proposed power line on the farm Nelsonskop (Figure 13). **This site is located outside of the impact area of the proposed powerline and are therefore not discussed further here.**

The study area is characterised by a featureless flat landscape characterised by thick sand cover and veld grass with some mining activities on the farm Appelvakte (Figure 4 – 7). The lack of any ephemeral or permanent water sources and the lack of raw material suitable for manufacturing of stone tools possibly attribute to the marked paucity of archaeological sites in the study area and during the survey no archaeological sites were recorded. Three demolished ruins were however recorded (Figure 8). These features are indicated on the 1990 1:50 000 maps of the study area and are presumably not older than 60 years.

The first structure (Feature 5071) consists of the demolished remains of a rectangular structure with modern clay bricks (Figure 9). Cultural material consists of glass bottles and other industrial artefacts scattered around a deflated midden. The second structure (Feature 5081) is constructed of sundried mud bricks and is marked by cement slab flooring (Figure 10). The third Feature (5092) consists of several demolished structures; all that is left are the cement slabs where these structures used to stand (Figure 11 & 12). A large midden with modern glass bottles etc. are also noted here. These structures are totally demolished and are of no heritage or architectural value. Although no graves were noted in these areas it is very possible that some graves might occur associated with these features. The structures are of low significance but if graves are present the graves are of high social significance and this should be confirmed through community liaison prior to development.

Table 1: Recorded features with co-ordinates.

LABEL	TYPE SITE	LONGITUDE	LATITUDE	ELEVATION
5071	Ruin	27° 30' 34.3907" E	23° 36' 29.0269" S	920.9041
5081	Ruin	27° 31' 59.1383" E	23° 35' 57.5377" S	920.4534
5092	Ruin	27° 35' 03.2891" E	23° 37' 28.3945" S	880.0382
Nelsonskop	Archaeological	27° 35' 12.1153" E	23° 39' 03.5145" S	885.324



Figure 4: General site conditions on Graafwater.



Figure 5: General site conditions on Graafwater.



Figure 6: General site conditions on Appelvlakte.



Figure 7: Mining activities on Appelvlakte.

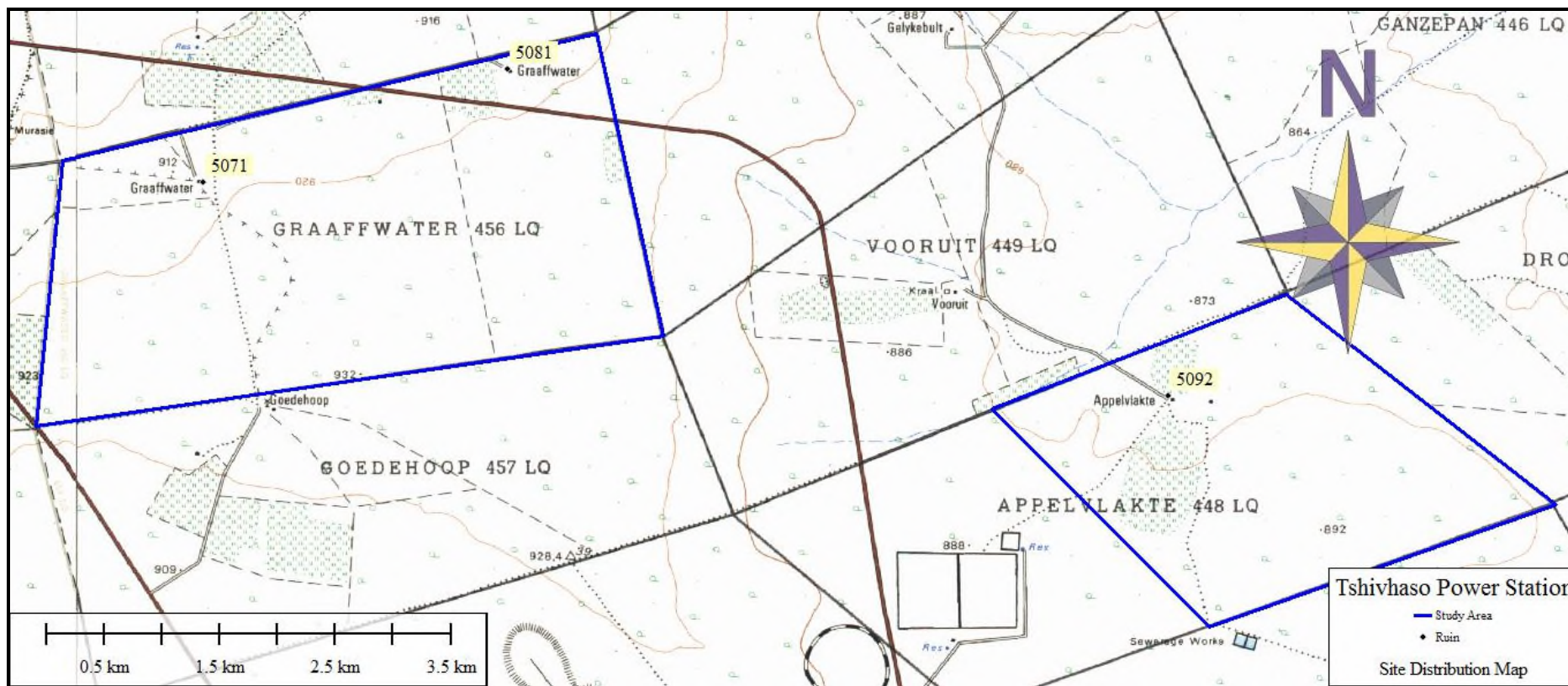


Figure 8. Recorded Features.



Figure 9: Cement slab marking demolished feature 5071



Figure 10: Demolished ruin 5081



Figure 11: Feature 5081



Figure 12: Demolished structures at feature 5092

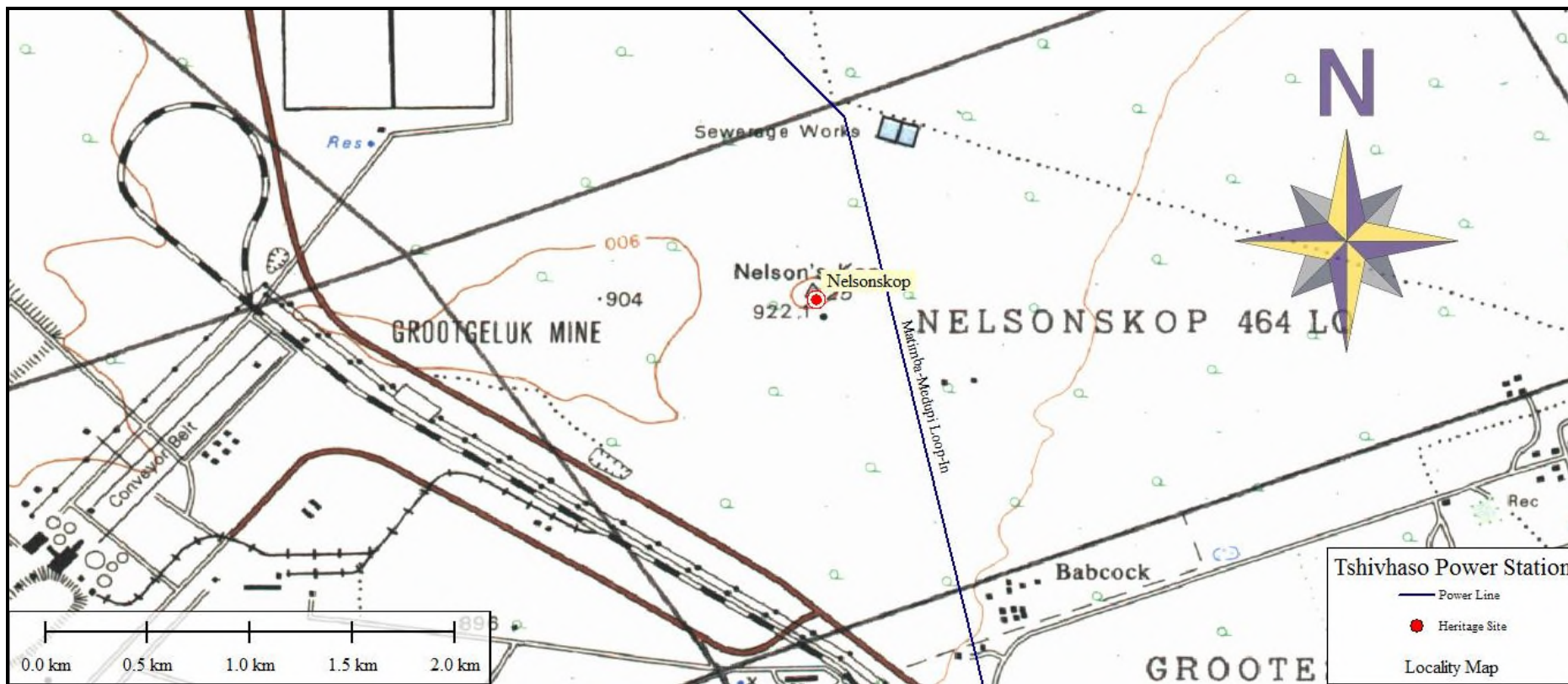


Figure 13: Nelsonskop in relation to the power line.

6.1. Impact evaluation of the proposed project on heritage resources

Nature: During the construction phase activities resulting in disturbance of surfaces and/or sub-surfaces may destroy, damage, alter, or remove from its original position archaeological and paleontological material or objects.		
	Without mitigation	With mitigation (Preservation/ excavation of site)
Extent	Local (3)	Local (3)
Duration	Permanent (5)	Permanent (5)
Magnitude	Low (4)	Low (3)
Probability	Probable (3)	Not Probable (2)
Significance	36 (Medium)	22 (Low)
Status (positive or negative)	Negative	Negative
Reversibility	Not reversible	Not reversible
Irreplaceable loss of resources?	Yes	Yes unless sites can be preserved.
Can impacts be mitigated?	Yes	Through preservation or excavation of sites.
Mitigation: Due to the lack of apparent significant archaeological resources no further mitigation is required prior to construction. It is however recommended that it should be established whether there are unmarked graves associated with the ruins and if so the graves should ideally be preserved in situ. If this is not possible the graves should be relocated following the correct procedures as per legislation. A Chance Find Procedure should be incorporated into the EMPr should any additional sites be identified during the construction process.		
Residual Impacts: If sites are destroyed this results in the depletion of archaeological record of the area. However if sites are recorded and preserved or mitigated this adds to the record of the area.		

6.2. Cumulative Assessment

Through CRM studies for developments in the area heritage sites are identified and protected from accidental damage, this can be regarded as a positive impact as it adds to the heritage database of the area.

In terms of the cumulative impact of this and other developments in the area, as there are numerous developments of varying natures (i.e. mining development) in the area the impact on the heritage landscape and sites of low heritage significance is increased as these sites are destroyed through development.

Action trigger	Development impact
Is the proposed action one of several similar past, present or future actions in the same geographic area?	Yes
Do other activities (whether state or private) in the region have environmental effects similar to those of the proposed action?	Yes
Will the proposed action (in combination with other planned activities) affect any natural resources, cultural resources, socio or economic units, or ecosystems of local, regional or national concern?	No
Have any recent heritage studies of similar actions identified important adverse or beneficial cumulative effects issues?	Data on the heritage resources in the area is being collected through systematic surveys and identified resources are recorded and managed through mitigation.
Has the impact been historically significant, such that the importance of the resource is defined by past loss, gain or investments to restore resources?	No
Does the proposed action involve any of the following? <ul style="list-style-type: none"> » Loss of natural habitats or historic character through residential, commercial and industrial development » Social, economic or cultural effects on marginalised communities resulting from ongoing development 	Currently the study site is not inhabited. The social benefits of the project have been classified as beneficial in terms of economic growth including the creation of employment opportunities.

Cumulative Impact Assessment

Nature: Heritage impacts associated with the development on the archaeology of the area		
	Without mitigation	With mitigation (Preservation/ excavation of site)
Extent	Local (2)	Local (2)
Duration	Permanent (5)	Permanent (5)
Magnitude	Low (4)	Low (3)
Probability	Not probable (2)	Not Probable (2)
Significance	22 (Low)	20 (Low)
Status (positive or negative)	Negative	Negative
Reversibility	Not reversible	Not reversible
Irreplaceable loss of resources?	Yes	Yes unless sites can be preserved.
Can impacts be mitigated?	Yes	Through preservation or excavation of sites.
Mitigation: Implementation of Chance Find Procedures in the EMPr.		

7. CONCLUSIONS AND RECOMMENDATIONS

HCAC was appointed to assess the study area in terms of the archaeological component of Section 35 of the NHRA. No raw material suitable for stone tool manufacture occurs in the study area as the study area and no ceramics or stone walls attributed to the Iron Age were recorded within the study area. No further mitigation is recommended in terms of Section 35 for the proposed development to proceed.

In terms of the built environment of the area (Section 34), no standing structures older than 60 years occur within the study area, although the remains of several dilapidated ruins of unknown age were found. From the 1: 50 000 topographic maps of the study area it is clear that no features of significance occurred in the area.

In terms of Section 36 of the Act no burial sites were recorded. The lack of cemeteries should be investigated during the social process as ruins such as the features that were recorded are known to be associated with unmarked graves. It must be noted that due to dense vegetation cover graves especially unmarked and informal graves might not have been identified during the field survey. It is recommended that the absence of graves should be verified during the public consultation process. If any graves are located in future they should ideally be preserved *in-situ* or alternatively relocated according to existing legislation.

The known site – Nelson’s Kop will not be impacted by the proposed development. The impacts of the powerline on heritage resources are expected to be low, but it is recommended that the final alignment should be submitted to a heritage walk down prior to construction.

In terms of the location of the ash dump both the Graafwater and Appelvlakte alternatives are acceptable if the recommendations are adhered to.

Table 2: EMPR management measures

OBJECTIVE: To preserve and mitigate non-renewable heritage resources in the study area.

Project component/s	Heritage resources can be impacted by the pre-construction and construction activities of the project.
Potential Impact	Irreplaceable loss of heritage resources in the study area and depletion of the archaeological database of the area.
Activity/risk source	Activities such as vegetation clearing and digging foundations could destroy archaeological resources.
Mitigation: Target/Objective	An environmental management plan that considers heritage resources in the event of any future extensions of infrastructure or identification of heritage resources. Mitigation is not considered to be necessary at this point. .

Mitigation: Action/control	Responsibility	Timeframe
Implement a Chance Finds Procedure to ensure that if any heritage resources are uncovered that these are reported and correctly mitigated.	ECO	Daily

Performance Indicator	Heritage impacts should be considered in any future development in the area. Implementation of a chance find procedure i.e. Immediate reporting to relevant heritage authorities of any heritage feature discovered during any phase of development or operation of the facility.
Monitoring	The ECO should monitor the possible occurrence of heritage resources regularly.

Due to the subsurface nature of archaeological remains and the fact that graves can occur anywhere on the landscape, it is recommended that a chance find procedure is implemented for the project as part of the EMPr as detailed below:

Chance find procedure

This procedure applies to the developer's permanent employees, its subsidiaries, contractors and subcontractors, and service providers. The aim of this procedure is to establish monitoring and reporting procedures to ensure compliance with this policy and its associated procedures. Construction crews must be properly inducted to ensure they are fully aware of the procedures regarding chance finds as discussed below.

- If during the pre-construction phase, construction, operations or closure phases of this project, any person employed by the developer, one of its subsidiaries, contractors and subcontractors, or service provider, finds any artefact of cultural significance or heritage site, this person must cease work at the site of the find and report this find to their immediate supervisor, and through their supervisor to the senior on-site manager.
- It is the responsibility of the senior on-site Manager to make an initial assessment of the extent of the find, and confirm the extent of the work stoppage in that area.
- The senior on-site Manager will inform the ECO of the chance find and its immediate impact on operations. The ECO will then contact a professional archaeologist for an assessment of the finds who will notify the SAHRA.

The study area is surrounded by mining developments and no significant cultural landscapes or viewsapes were noted during the fieldwork.

7.1 Reasoned Opinion

From a heritage perspective the proposed project is acceptable. If the above recommendations are adhered to and based on approval from SAHRA, HCAC is of the opinion that the development can continue as the development will not impact negatively on the archaeological record of the area. If during the pre-construction phase or during construction, any archaeological finds are made (e.g. graves, stone tools, and skeletal material), the operations must be stopped, and the archaeologist must be contacted for an assessment of the finds. Due to the subsurface nature of archaeological material and graves the possibility of the occurrence of unmarked or informal graves and subsurface finds cannot be excluded, but can be easily mitigated by preserving the sites *in-situ* within the development.

8. PROJECT TEAM

Jaco van der Walt, Project Manager

9. STATEMENT OF COMPETENCY

I (Jaco van der Walt) am a member of ASAPA (no 159), and accredited in the following fields of the CRM Section of the association: Iron Age Archaeology, Colonial Period Archaeology, Stone Age Archaeology and Grave Relocation. This accreditation is also acknowledged by SAHRA and AMAFA.

I have been involved in research and contract work in South Africa, Botswana, Zimbabwe, Mozambique, Tanzania and the DRC; having conducted more than 300 AIA's since 2000.

10. REFERENCES

- Aukema, J. 1989. *Rain-making: a thousand year-old ritual?* South African Archaeological Bulletin 44: 70-72.
- Biamond, W.M., 2005. The Iron Age sequence around a Limpopo River floodplain on Basinghall Farm, Tuli Block, Botswana, during the Second Millennium AD. Proceedings of the 12th Congress of the Pan African Archaeological Association for Prehistory and Related Studies, July, Gaborone, Botswana.
- Deacon, H.J., Deacon, J. 1999. *Human Beginnings in South Africa. David Philip, Cape Town.*
- Geskiedenisatlas van Suid-Afrika. Die vier noordelike provinsies.* Edited by J. S. Bergh. 1999. Pretoria: J. L. van Schaik Uitgewers
- Huffman, T.N., 1990. The Waterberg research of Jan Aukema. *South African Archaeological Bulletin* 45, 61-70.
- Huffman, T.N. 2007. Handbook to the Iron Age. The archaeology of pre-colonial farming societies in Southern Africa. Pietermaritzburg: University of KwaZulu-Natal Press.
- Huffman, T.N., Van der Walt, J. 2008. *Mafutha EBA: Cultural Heritage and Archaeology Report.* A field study prepared for Environmental Resources Management. Archaeological Resources Management, Johannesburg.
- Huffman, T.N. Van der Walt, J. 2011. *Mafutha Heritage Report.* A field study prepared for Environmental Resource management, Sasol Technology, SRK Consulting and Sustainable Environmental Solutions. Archaeological Resources Management, Johannesburg.
- Kuman, K., 1998. The earliest South African Industries. In: *Lower Palaeolithic Settlement of the Old World.* Eds by M.D. Petraglia and R. Korisetter, pp 151-186. Routledge Press, London.
- Lombard, M. Wadley, L., Deacon, J., Wurz, S., Parsons, I., Mohapi, M., Swart, J. & Mitchell, P. 2012. *South African and Lesotho Stone Age sequence updated (I).* South African Archaeological Bulletin 67(195): 120 - 144.
- Lewis-Williams, J.D., 1981. *Believing and Seeing: Symbolic Meanings in southern San Rock Paintings.* Academic Press, London.
- Mason, R.J., 1962. *The Prehistory of the Transvaal.* Witwatersrand University Press, Johannesburg.
- Mitchell, P., 2002. *The Archaeology of Southern Africa.* Cambridge University Press, Cambridge.
- Mucina, L. & Rutherford, M.C. 2006. The vegetation map of South Africa, Lesotho and Swaziland. SANBI, Pretoria.
- National Heritage Resources Act NHRA of 1999 (Act 25 of 1999)
- Pistorius, J.C.C. 2007. *A Phase 1 Heritage Impact Assessment Study for the Eskom Mmamabula Delta Project near Lephalale in the Limpopo Province of South Africa.* Prepared for PBA International.
- SAHRA Report Mapping Project Version 1.0, 2009
- South African Heritage Information System 2013
- Van der Walt, J. 2012. Archaeological Scoping Report for the proposed IPP Waterberg Powerstation, Lephalale, Limpopo Province. Unpublished report.
- Van der Ryst, M.M. 1998. *The Waterberg Plateau in the Northern Province, RSA, in the Later Stone Age.* British Archaeological Reports (BAR) International Series 715. Oxford.
- Van der Ryst, M.M., 2006. *Seeking Shelter: Later Stone Age Hunters, Gatherers and Fishers of Oliboempoort in the western Waterberg south of the Limpopo.* Unpublished doctoral thesis, University of the Witwatersrand, Johannesburg
- Van Schalkwyk, J.A. 2005. *Heritage Impact Scoping Report for the Proposed New Matimba B Power Station. Lephalale District, Limpopo Province.* An unpublished report by the National Cultural History Museum on file at SAHRA as: 2005-SAHRA-0106.

Van Schalkwyk, J.A. 2011. *Heritage Impact Assessment Report for the proposed establishment of the Exxaro PV Plant on the farm Nelsonskop, Lephalale, Limpopo Province*. Prepared for Savannah Environmental (Pty) Ltd.

Van Schalkwyk, L & Wahl, E. 2014. Draft Phase 1 Heritage Impact Assessment Report: Proposed Zonderwater Project Area, Lephalale Local Municipality, Waterberg District, Limpopo Province, South Africa

Volman, T.P. 1984. Early prehistory of southern Africa. In: Klein, R.G. (ed.) *Southern African Prehistory and Palaeoenvironments*: 169-220. Rotterdam: Balkema

Wadley, L., 1987. *Later Stone Age Hunters and Gatherers of the southern Transvaal*. BAR International Series 380, Oxford.

Wits Archaeological Database