

HERITAGE IMPACT ASSESSMENT

REQUIRED UNDER SECTION 38(8) OF THE NHRA (No. 25 OF 1999)

FOR THE PROPOSED HANGLIP PUBLIC GARAGE, LEPHALALE, LIMPOPO PROVINCE

Type of development:

Public Garage

Client:

Tekplan Environmental Consultants

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APPROVAL PAGE

Project Name	Hanglip Public Garage
Report Title	Heritage Impact Assessment Hanglip Public Garage, Lephalale
Authority Reference Number	TBC
Report Status	Final report
Applicant Name	@Sold Investments

	Name	Qualifications and Certifications	Date
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REPORT OUTLINE

Appendix 6 of the GNR 982 EIA Regulations, 2014 [as amended] provides the requirements for specialist reports undertaken as part of the environmental authorisation process. In line with this, Table 1 provides an overview of Appendix 6 together with information on how these requirements have been met.

Table 1. Specialist Report Requirements.

Requirement from Appendix 6 of GNR 982 EIA Regulations, 2014 [as amended]	Chapter
(a) Details of - (i) the specialist who prepared the report; and (ii) the expertise of that specialist to compile a specialist report including a curriculum vitae	Section a Section 12
(b) Declaration that the specialist is independent in a form as may be specified by the competent authority	<i>Declaration of Independence</i>
(c) Indication of the scope of, and the purpose for which, the report was prepared	Section 1
(cA) an indication of the quality and age of base data used for the specialist report	Section 3.4 and 7.1.
(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	9
(d) Duration, Date and season of the site investigation and the relevance of the season to the outcome of the assessment	Section 3.4
(e) Description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used	Section 3
(f) details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives;	Section 8 and 9
(g) Identification of any areas to be avoided, including buffers	Section 9
(h) Map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers	Section 8
(I) Description of any assumptions made and any uncertainties or gaps in knowledge	Section 3.7
(j) a description of the findings and potential implications of such findings on the impact of the proposed activity including identified alternatives on the environment or activities;	Section 9
(k) Mitigation measures for inclusion in the EMPr	Section 9 and 10
(l) Conditions for inclusion in the environmental authorisation	Section 9 and 10
(m) Monitoring requirements for inclusion in the EMPr or environmental authorisation	Section 9 and 10
(n) Reasoned opinion - (i) as to whether the proposed activity, activities or portions thereof should be authorised; (iA) regarding the acceptability of the proposed activity or activities; and (ii) if the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan	Section 10.2
(o) Description of any consultation process that was undertaken during the course of preparing the specialist report	Section 6
(p) A summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	Refer to BA report
(q) Any other information requested by the competent authority	Section 10

Executive Summary

Tekplan Environmental Consultants was appointed to conduct a Basic Assessment for the proposed development of a public garage by @Sold Investments. The proposed site for the public garage is located on Erf 14729, Lephallale Extension 140 (formerly Portion 12 of the farm Hanglip 508 LQ (a portion of Portion 3 of the farm Hanglip 508 LQ)). The site is located on the corner of Roads D2001 (Road to Stockpoort) and D1675 (Road to Steenbokpan) in the Lephallale Municipal area, Limpopo Province. HCAC was appointed to conduct a Heritage Impact Assessment of the proposed project to determine the presence of cultural heritage sites and the impact of the proposed development on these non-renewable resources. The study area was assessed both on desktop level and by a field survey. The field survey was conducted as a non-intrusive pedestrian survey to cover the extent of the study area as development plans were not yet available at the time of the survey. The site is located in an area extensively disturbed by road and power line construction.

In terms of the built environment of the area (Section 34), no standing structures older than 60 years occur within the study area. From the historical topographic map of the study area it is clear that no features of significance occurred in the area.


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 within the study area. An independent paleontological study was conducted for the project (Bamford 2018), concluding that no palaeontological site visit is required and the project may continue on the condition that a Chance Find Protocol forming part of the EMPr is implemented. Therefore, no further mitigation is recommended prior to construction in terms of Section 35 for the proposed development to proceed.

In terms of Section 36 of the Act no burial sites were recorded. If any graves are located in future they should ideally be preserved *in-situ* or alternatively relocated according to existing legislation. No public monuments are located within or close to the study area. Since the surrounding area is extensively developed (power stations, mines and infrastructure) the proposed development will not impact negatively on significant cultural landscapes or views. During the public participation process conducted for the project no heritage concerns were raised.

Due to the lack of significant heritage resources in the study area the impact of the proposed project on heritage resources is considered low and it is recommended that the proposed project can commence on the condition that the following recommendations are implemented as part of the EMPr and based on approval from SAHRA:

- Implementation of a chance finds procedure for both archaeological and palaeontological components.

Declaration of Independence

Specialist Name	Jaco van der Walt
Declaration of Independence	<p>I declare, as a specialist appointed in terms of the National Environmental Management Act (Act No 108 of 1998) and the associated 2014 Environmental Impact Assessment (EIA) Regulations, that I:</p> <ul style="list-style-type: none"> • I act as the independent specialist in this application; • I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant; • I declare that there are no circumstances that may compromise my objectivity in performing such work; • I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity; • I will comply with the Act, Regulations and all other applicable legislation; • I have no, and will not engage in, conflicting interests in the undertaking of the activity; • I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority; • All the particulars furnished by me in this form are true and correct; and • I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.
Signature	
Date	08/11/2018

a) Expertise of the specialist

Jaco van der Walt has been practising as a CRM archaeologist for 15 years. He obtained an MA degree in Archaeology from the University of the Witwatersrand focussing on the Iron Age in 2012 and is a PhD candidate at the University of Johannesburg focussing on Stone Age Archaeology with specific interest in the Middle Stone Age (MSA) and Later Stone Age (LSA). Jaco is an accredited member of ASAPA (#159) and have conducted more than 500 impact assessments in Limpopo, Mpumalanga, North West, Free State, Gauteng, KZN as well as he Northern and Eastern Cape Provinces in South Africa.

Jaco has worked on various international projects in Zimbabwe, Botswana, Mozambique, Lesotho, DRC Zambia and Tanzania. Through this he has a sound understanding of the IFC Performance Standard requirements, with specific reference to Performance Standard 8 – Cultural Heritage.

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ABBREVIATIONS

AIA: Archaeological Impact Assessment
ASAPA: Association of South African Professional Archaeologists
BGG Burial Ground and Graves
BIA: Basic Impact Assessment
CFPs: Chance Find Procedures
CMP: Conservation Management Plan
CRR: Comments and Response Report
CRM: Cultural Resource Management
DEA: Department of Environmental Affairs
EA: Environmental Authorisation
EAP: Environmental Assessment Practitioner
ECO: Environmental Control Officer
EIA: Environmental Impact Assessment*
EIA: Early Iron Age*
EIA Practitioner: Environmental Impact Assessment Practitioner
EMP: Environmental Management Programme
ESA: Early Stone Age
ESIA: Environmental and Social Impact Assessment
GIS Geographical Information System
GPS: Global Positioning System
GRP Grave Relocation Plan
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, 1998 (Act No. 107 of 1998)
NHRA National Heritage Resources Act, 1999 (Act No. 25 of 1999)
NID Notification of Intent to Develop
NoK Next-of-Kin
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 Introduction and Terms of Reference:

Heritage Contracts and Archaeological Consulting CC (HCAC) has been contracted by Tekplan Environmental Consultants to conduct a heritage impact assessment of the proposed Hanglip public garage. The report forms part of the Basic Assessment Report and Environmental Management Programme Report (EMPR) for the development located on Erf 14729 Ellisras X 140 (formerly Portion 12 of the farm Hanglip 508 LQ (a portion of Portion 3 of the farm Hanglip 508 LQ)). The site is located on the corner of Roads D2001 (Road to Stockpoort) and D1675 (Road to Steenbokpan) in the Lephalale Municipal area (Figure 1 -3).

The aim of the study is to survey the proposed development footprint 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 No 25 of 1999). The report outlines the approach and methodology utilized before and during the survey, which includes: Phase 1, review of relevant literature; Phase 2, the physical surveying of the area on foot and by vehicle; Phase 3, reporting the outcome of the study.

During the survey, no heritage sites were recorded. General site conditions and features on sites were recorded by means of photographs, GPS locations, and site descriptions. Possible impacts were identified, and mitigation measures are proposed in the following report. SAHRA as a commenting authority under section 38(8) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) require all environmental documents, compiled in support of an Environmental Authorisation application as defined by NEMA EIA Regulations section 40 (1) and (2), to be submitted to SAHRA. As such the Environmental Impact Report and its appendices must be submitted to the case officer as well as the EMPr, once it's completed by the Environmental Assessment Practitioner (EAP).

1.1 Terms of Reference

Field study

Conduct a field study to: (a) locate, identify, record, photograph and describe sites of archaeological, historical or cultural interest; b) record GPS points of sites/areas identified as significant areas; c) determine the levels of significance of the various types of heritage resources affected by the proposed development.

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 the relevant legislation, SAHRA minimum standards 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 No 25 of 1999).

Table 2: Project Description

Size of farm and portions	The project is located on Erf 14729 Ellisras X 140 (formerly Portion 12 of the farm Hanglip 508 LQ (a portion of Portion 3 of the farm Hanglip 508 LQ)) on the corner of Roads D2001 (Road to Stockpoort) and D1675 (Road to Steenbokpan) in the Lephalele Municipal area.
Magisterial District	Lephalele Municipal Area
1: 50 000 map sheet number	2327DA
Central co-ordinate of the development	23°41'19.56"S 27°36'51.75"E

Table 3: Infrastructure and project activities

Type of development	Public Garage
Project Components	<p>The project entails the proposed construction of a public garage. 198 000-liter storage tanks will be installed for the storage and handling of dangerous goods for retail purposes.</p> <p>The public garage will consist of the following storage tanks:</p> <p>1x 46 000-liter tank for Petrol 93 1x 46 000-liter tank for Petrol 95 1x 46 000-liter tank for Diesel 10 ppm 1x 46 000-liter tank for Diesel 50 ppm 1x 14 000-liter tank for Paraffin</p> <p>The following will be on site:</p> <ul style="list-style-type: none"> • Convenience shop, • Take away shop, • Tyre shop, • Truck stop, and • Rest rooms. <p>Engineering services like sewage, water supply and electricity will be installed.</p>

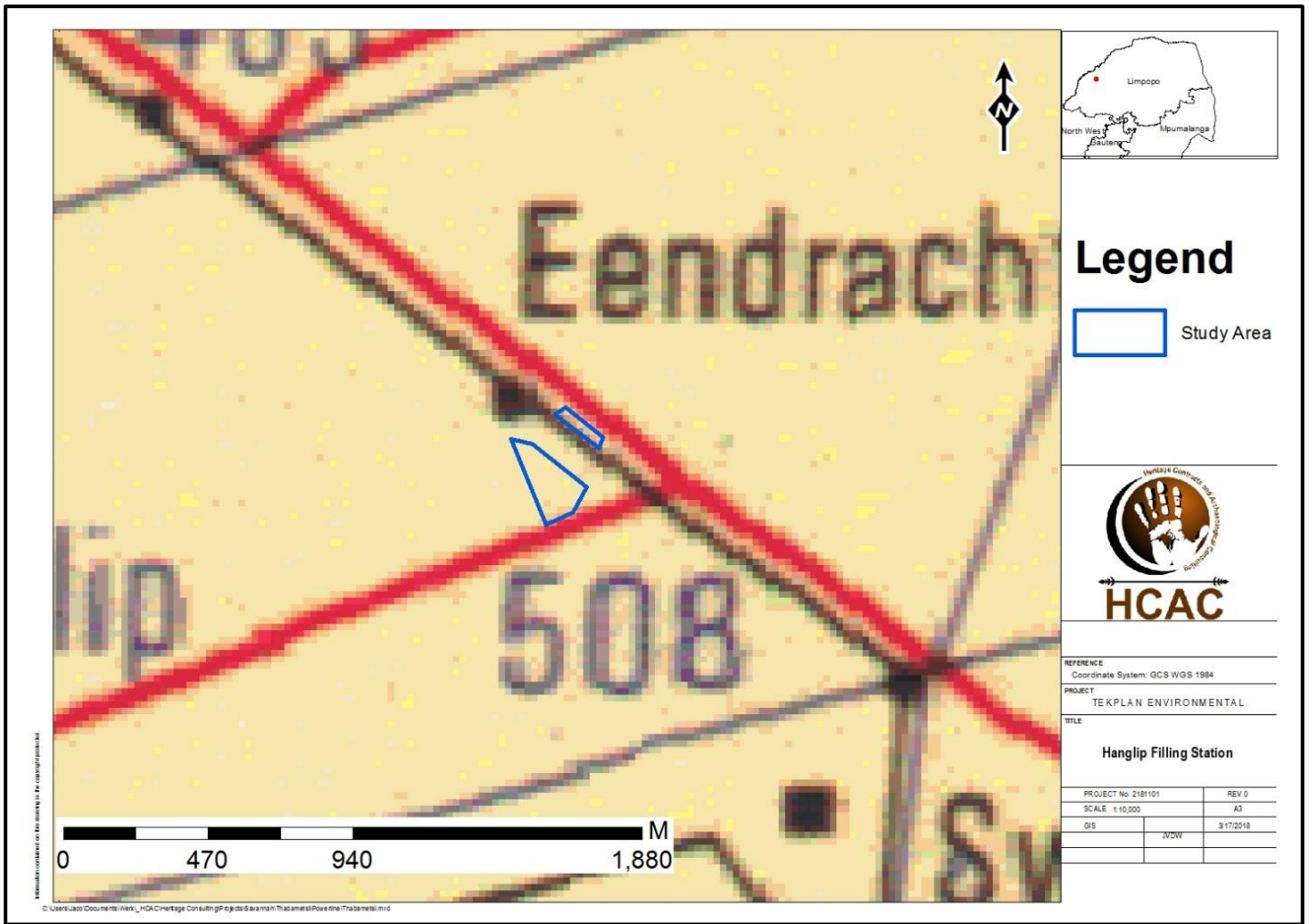


Figure 1. Provincial locality map (1: 250 000 topographical map) indicating the study area in blue.

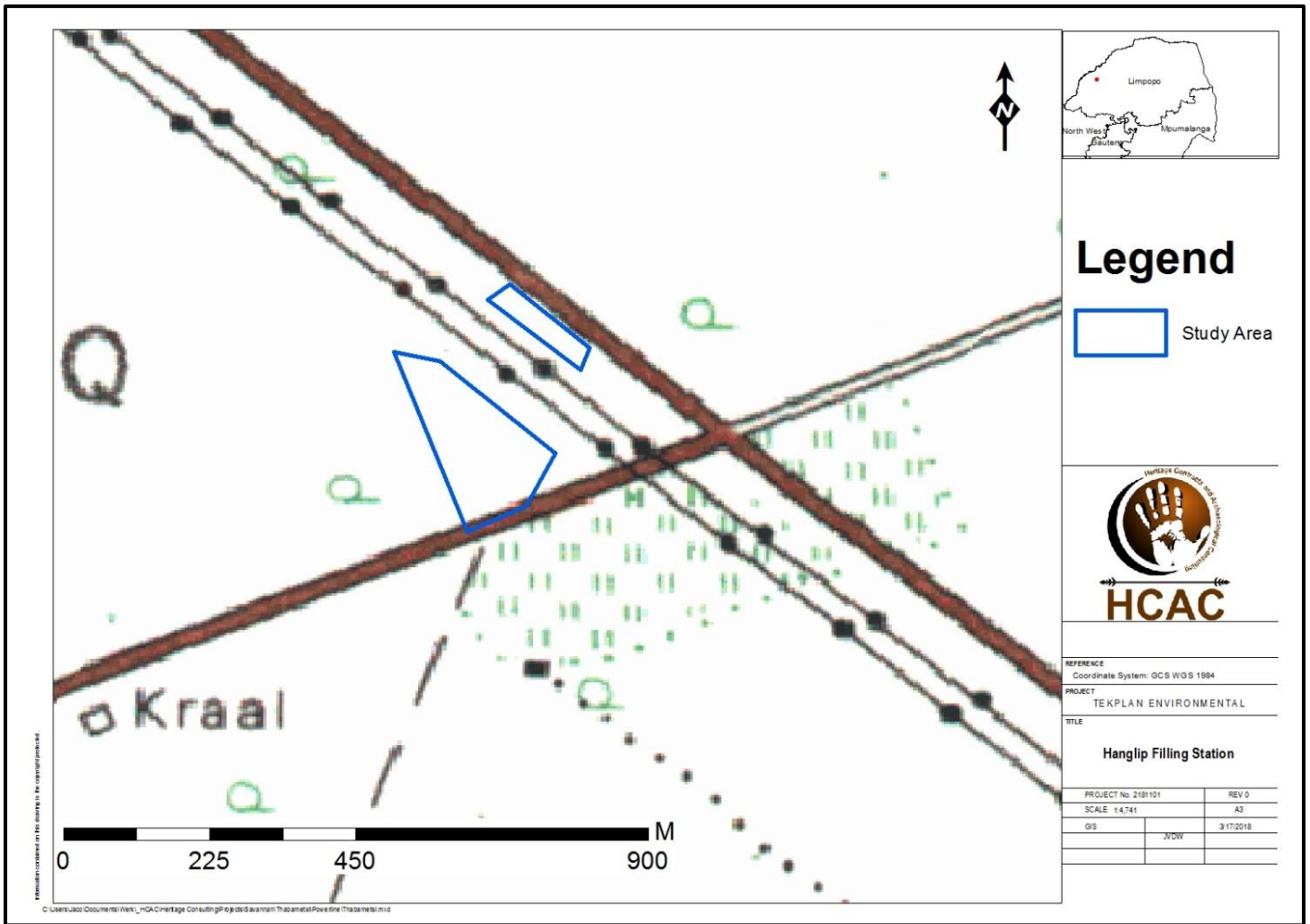


Figure 2: Regional locality map (1:50 000 topographical map) indicating the study area in blue.



Figure 3. 2018 Google Earth image showing the location of the study area. (Google Earth 2018)

2 Legislative Requirements

The HIA, as a specialist sub-section of the EIA, is required under the following legislation:

- National Heritage Resources Act (NHRA), Act No. 25 of 1999)
- National Environmental Management Act (NEMA), Act No. 107 of 1998 - Section 23(2)(b)
- Mineral and Petroleum Resources Development Act (MPRDA), Act No. 28 of 2002 - Section 39(3)(b)(iii)

A Phase 1 HIA is a pre-requisite for development in South Africa as prescribed by SAHRA and stipulated by legislation. The overall purpose of 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; and
- Make recommendations for the appropriate heritage management of these impacts.

The HIA should be submitted, as part of the impact assessment report or EMPr, to the PHRA if established in the province or to SAHRA. SAHRA will ultimately be responsible for the professional evaluation of Phase 1 reports upon which review comments will be issued. 'Best practice' requires Phase 1 reports and additional development information, as per the impact assessment report and/or EMPr, 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 heritage 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 with SAHRA by the applicant 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).

3 METHODOLOGY

3.1 Literature Review

A brief survey of available literature was conducted to extract data and information on the area in question to provide general heritage context into which the development would be set. This literature search included published material, unpublished commercial reports and online material, including reports sourced from the South African Heritage Resources Information System (SAHRIS).

3.2 Genealogical Society and Google Earth Monuments

Google Earth and 1:50 000 maps of the area were utilised to identify possible places where sites of heritage significance might be located; these locations were marked and visited during the field work phase. The database of the Genealogical Society was consulted to collect data on any known graves in the area.

3.3 Public Consultation and Stakeholder Engagement:

Stakeholder engagement is a key component of any BA process, it involves stakeholders interested in, or affected by the proposed development. Stakeholders are provided with an opportunity to raise issues of concern (for the purposes of this report only heritage related issues will be included). The aim of the public consultation process was to capture and address any issues raised by community members and other stakeholders during key stakeholder and public meetings. The process involved:

- Placement of advertisements and site notices;
- Stakeholder notification (through the dissemination of information and meeting invitations);
- Stakeholder meetings undertaken with I&APs;
- Authority Consultation;
- The compilation of a BA Report and opportunity for I&APs to comment on the draft reports.
- The compilation of a Comments and Response Report (CRR).

3.4 Site Investigation

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 of sites/areas identified as significant areas; c) determine the levels of significance of the various types of heritage resources recorded in the project area.

Table 4: Site Investigation Details

	Site Investigation
Date	29 October 2018
Season	Summer - vegetation in parts of the study area is low and archaeological visibility is high in these areas. Most of the study area is however highly overgrown, limiting archaeological visibility, the impact area was however sufficiently covered (Figure 4) to adequately record the presence of heritage resources.

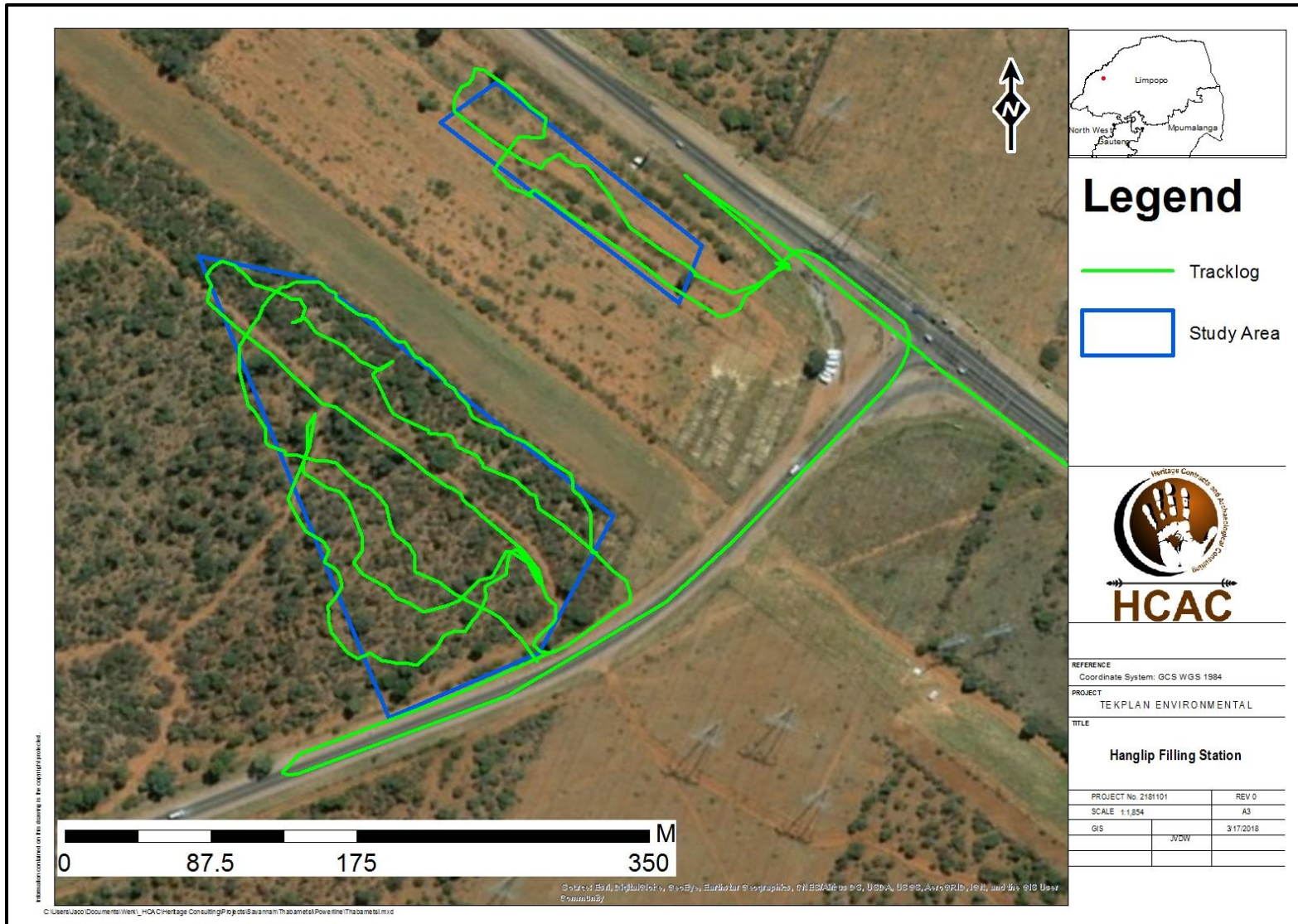


Figure 4: Track logs of the survey in green.

3.5 Site Significance and Field Rating

Section 3 of the NHRA 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.

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 with cognisance of Section 3 of the NHRA:

- 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; and
- Potential to answer present research questions.

In addition to this criteria field ratings 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 10 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
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3.6 Impact Assessment Methodology

The criteria below are used to establish the impact rating on sites:

- 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).

3.7 Limitations and Constraints of the study

The authors acknowledge that the brief literature review is not exhaustive on the literature of the area. Due to the subsurface nature of archaeological artefacts, 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. Similarly, the depth of the deposit of heritage sites cannot be accurately determined due its subsurface nature. This report only deals with the footprint area of the proposed development and consisted of non-intrusive surface surveys. This study did not assess the impact on medicinal plants and intangible heritage as it is assumed that these components would have been highlighted through the public consultation process if relevant. It is possible that new information could come to light in future, which might change the results of this Impact Assessment.

4 Description of Socio-Economic Environment

Stats SA provides the following information: Lephalale is the fastest growing town in the Waterberg district. There are 115 767 people in the district. 9 out of every 10 residents (90,1%) are black African, followed by whites at 7,9%, with other population groups making up the remaining 2%. Amongst those aged 20 years and older, 37% have secondary education, 23,5% have completed matric, 11,6% have some form of higher education, 17,8 completed/have some primary education. Of the 45 527 economically active (employed or unemployed but looking for work) people in the municipality, 22,2% are unemployed. 26,9% of the 26 368 economically active youth (15 – 34 years) in the municipality are unemployed. The building site of the Medupi Power Station and the operational Matimba Power Station are the largest sources of employment together with agricultural activities such as cattle, poultry, and game farming.

5 Description of the Physical Environment:

The proposed development includes the establishment of a public garage on Erf 14729 (formerly Portion 12 of the farm Hanglip 508 LQ (a portion of Portion 3 of the farm Hanglip 508 LQ)) on the corner of Roads D2001 (Road to Stockpoort) and D1675 (Road to Steenbokpan) in the Lephalale Municipal area.

The site is undeveloped, relatively flat, characterised by extensive sand cover without any major topographical features like calcrete pans or rocky outcrops. The vegetation is predominantly Limpopo Sweet Bushveld vegetation in the Savannah biome (Mucina & Rutherford 2006). Large sections of the study area is degraded and impacted on by disused tar roads (Figure 5 -6) and overgrown with thick sickle bush (Figure 7 – 8).



Figure 5. General site conditions



Figure 6. General site conditions



Figure 7. General site conditions



Figure 8. General site conditions

6 Results of Public Consultation and Stakeholder Engagement:

Adjacent landowners and the public at large were informed of the proposed activity as part of the BA process. Site notices and advertisements notifying interested and affected parties were placed at strategic points and in local newspapers as part of the process.

7 Literature / Background Study:

7.1 Literature Review

Through consultation of CRM reports on the area together with secondary source material, primary sources, maps as well as online sources the study area was contextualised. Several previous heritage studies were conducted in the general study area (SAHRIS) by van Schalkwyk (2005), Pistorius (2007), Huffman 2008, Huffman & van der Walt (2008, 2011), Karodia and Higgit (2013).

These studies revealed that pans in the area with exposed calcrete could contain Middle Stone Age sites and although unlikely it might be possible to find Late Iron Age sites (mostly cattle posts) belonging to the *Letsibogo* ceramic *facies* that dates to between 1550 AD and 1750 AD. San rock art has a well-earned reputation for aesthetic appeal and symbolic complexity (Lewis-Williams, 1981) and a single known rock art site (S23.65132 E27.58651) on the farm Nelsonskop 464 LQ (Pistorius 2007, van Schalkwyk 2011, Van der Walt 2017 a and b) occur to the north east of the study area.

The following CRM reports were consulted conducted in the larger area:

Author	Year	Project	Findings
Van Schalkwyk, J.	2005	Heritage Impact Scoping Report for The Proposed New Matimba B Power Station, Lephalale District, Limpopo Province	Farmsteads, graves, Stone tools
Van Schalkwyk, J.	2006	Report for the proposed establishment of a New Coal-Fired Power Station in the Lephalale Area, Limpopo Province	Burial sites and Iron Age pottery.
Pistorius, JCC	2007	A phase 1 HIA for Eskoms proposed 400 kV power line route between Matimba B Power station and the Marang substation	Ruins, graves and stone walled sites.
Van Vollenhoven, A.C.	2008	A Report on A Cultural Heritage Impact Assessment for The Proposed Housing Development at Extension 89 Ellisras On the Farm Onverwacht 503 LQ, Lephalale, Limpopo Province	Historical sites
Nel J.	2011	Addendum to Phase 1 Archaeological Impact Assessment for the For Boikarabelo Coal Mine (Proposed Railway Link from The Farm Kruishout To the Farm Buffelsjagt) Lephalale Local Municipality, Waterberg District, Limpopo Province	Farmstead, Stone Age Lithics, Potsherds, Burial sites
Pistorius, J.C.C	2013	A Phase I Heritage Impact Assessment (HIA) Study for Eskom's Proposed Community Network Centre in Lephalale In the Limpopo Province	No sites
Rossouw, L.	2015	Exemption of a Phase 1 Archaeological Impact Assessment for a proposed new overhead installation of a Vodacom optic fibre cable along provincial road reserves in the vicinity of Lephalale, Limpopo Province	No sites
Van der Walt, J	2017	Heritage Impact Assessment Nelson's Kop	No Sites
Van der Walt, J.	2018	Heritage walk down Thabametsi Power Station Power Line	MSA Scatter

7.1.1 Genealogical Society and Google Earth Monuments

No known grave sites are on record close to the study area.

7.2 General History of the area

7.2.1 Archaeology of the area

The archaeological record for the greater study area consists of the Stone Age and Iron Age.

7.2.1.1 *The Stone Age*

The Stone Age can be divided in three main phases as follows;

Later Stone Age; associated with Khoi and San societies and their immediate predecessors. Recently to ~30 thousand years ago

Middle Stone Age; associated with Homo sapiens and archaic modern humans. 30-300 thousand years ago.

Earlier Stone Age; associated with early Homo groups such as Homo habilis and Homo erectus. 400 000- > 2 million years ago.

No Acheulian sites are on record near the project area, but isolated finds are possible. However, isolated finds have little value. Therefore, the project is unlikely to disturb a significant site.

MSA artefacts have been found in the Oliboempoort 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 van der Walt found that Middle Stone Age sites were associated with pans and ancient drainage systems throughout the larger area. The lack of prominent pans in the study area or raw material suitable for knapping may explain the paucity of significant sites in the study area. Important LSA deposits have been excavated in Oliboempoort Cave (Mason, 1962) and other sites in the Waterberg to the south (Van der Ryst, 1998).

4.1. The Iron Age (AD 400 to 1840)

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 Oliboompoot 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, and it is unlikely that Iron Age people lived in the study area at these times.

7.2.1.2 *Battles close to the study area*

No battlefield or concentration camp sites are located close to the study area.

7.3 Cultural Landscape

The sites under investigation are located about 1,5 kilometres to the south of Matimba Power Station and about 13 kilometres to the west of the town of Lephalale in Limpopo Province.

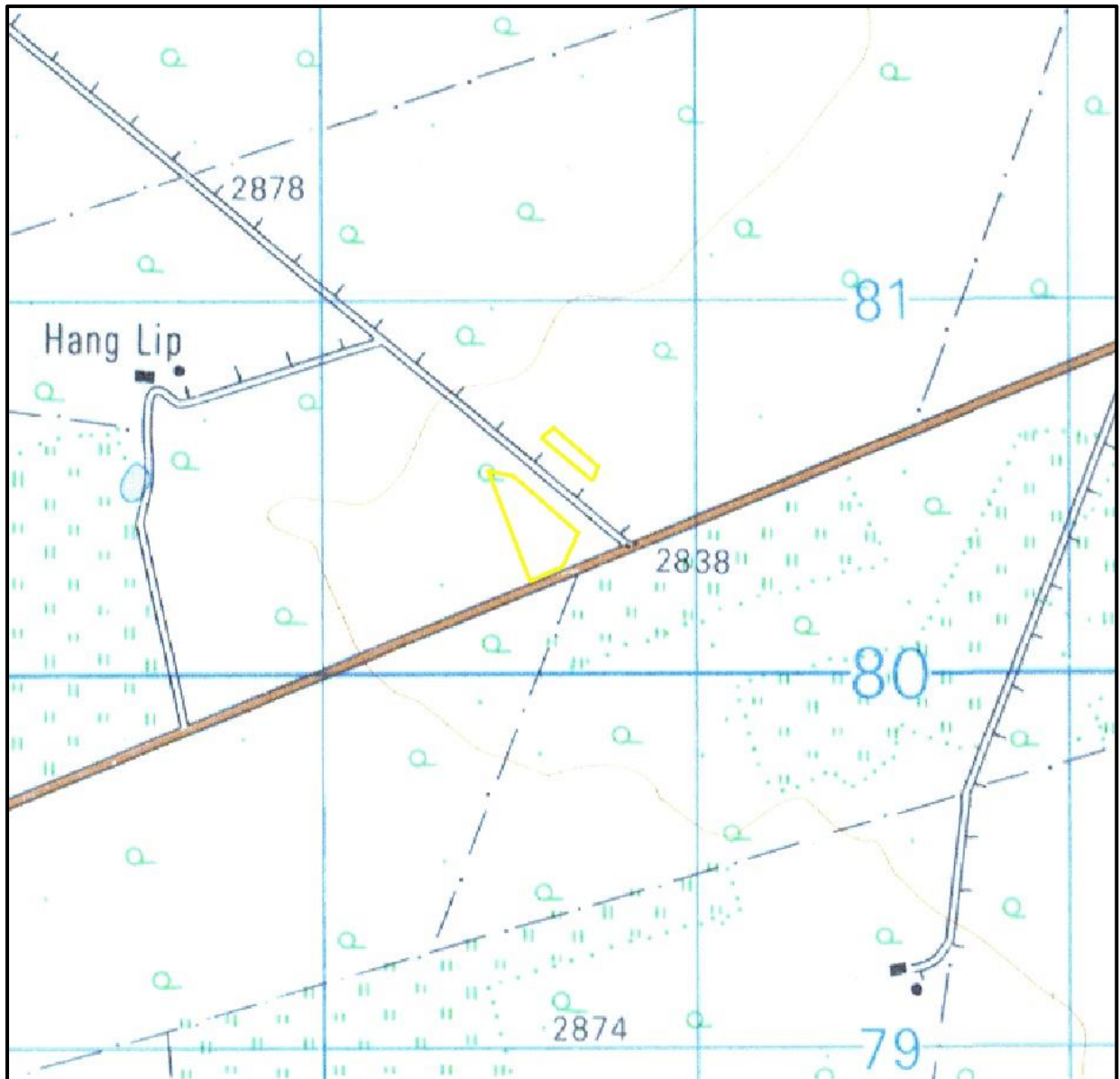


Figure 9. 1969 Topographical map of the sites under investigation. The approximate study area is indicated with yellow borders. No developments can be seen in the study area. A secondary road can be seen to the south of the sites and a service railway ran between the two sites. (Topographical Map 1969)

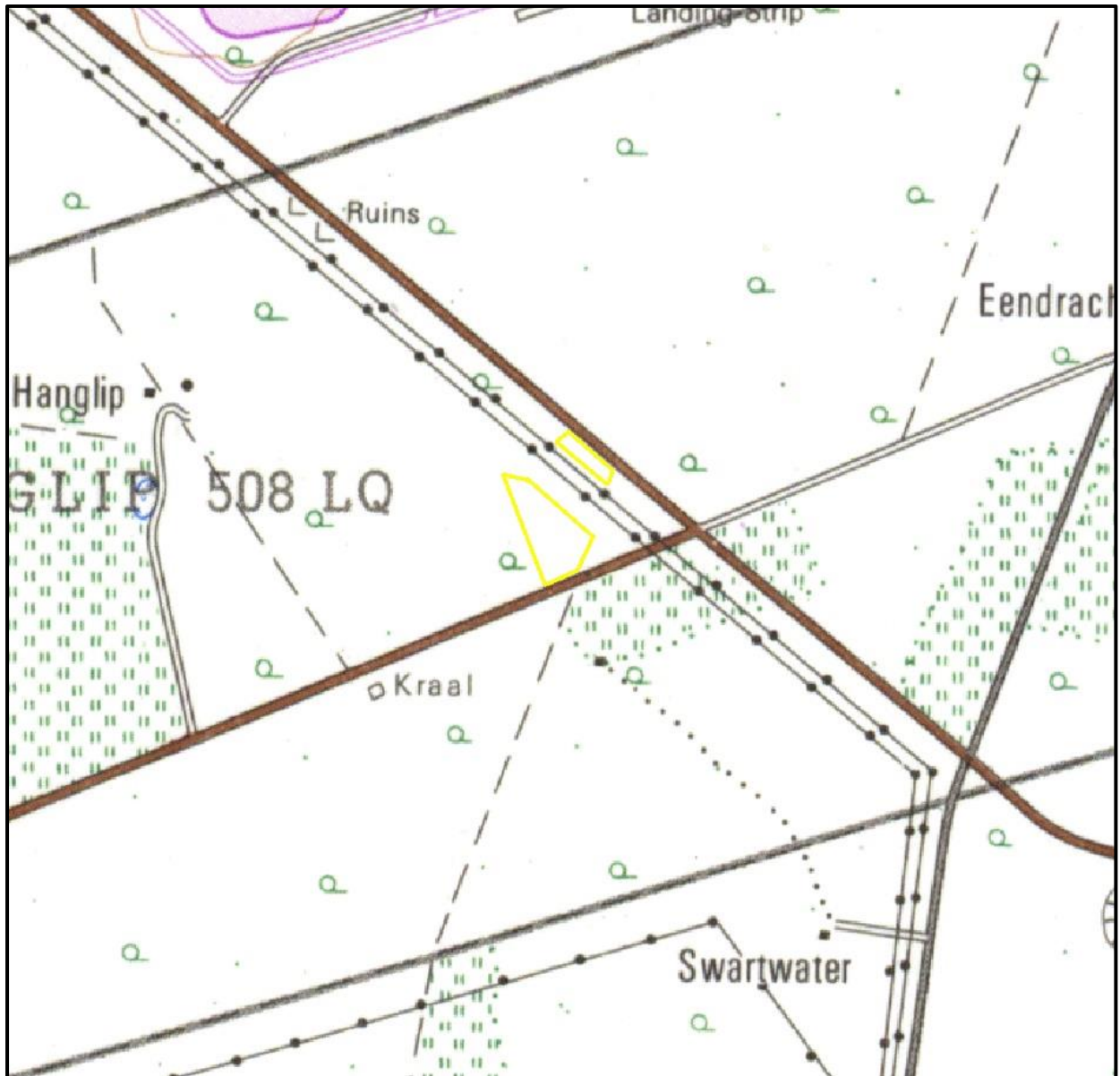


Figure 10. 1981 Topographical map of the sites under investigation. The approximate study area is indicated with yellow borders. No developments can be seen in the study area. Secondary roads can be seen to the south and east of the sites and two power lines ran between the sites. (Topographical Map 1981)

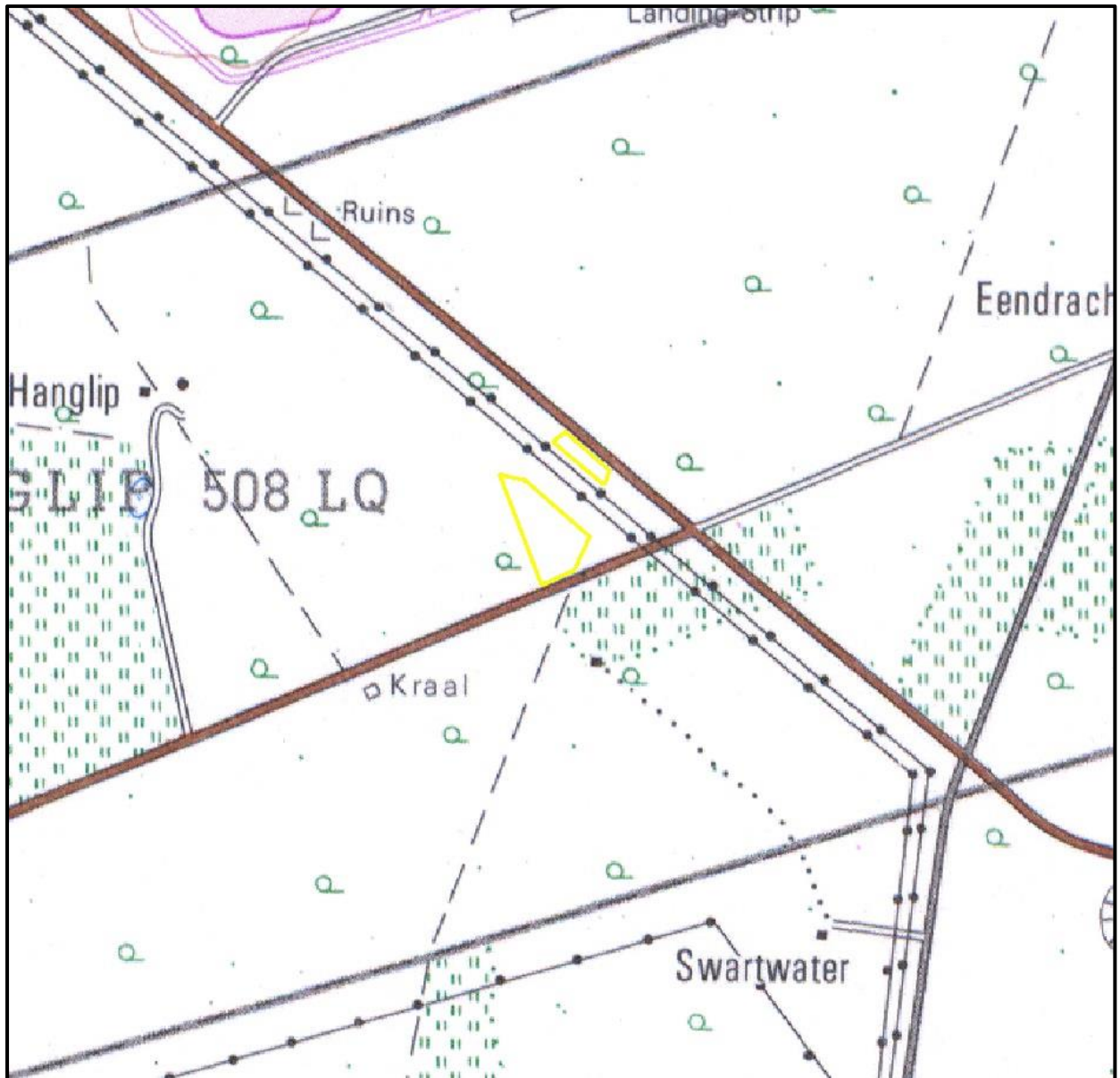


Figure 11. 1990 Topographical map of the sites under investigation. The approximate study area is indicated with yellow borders. No developments can be seen in the study area. Secondary roads can be seen to the south and east of the sites and two power lines ran between the sites. (Topographical 1990)

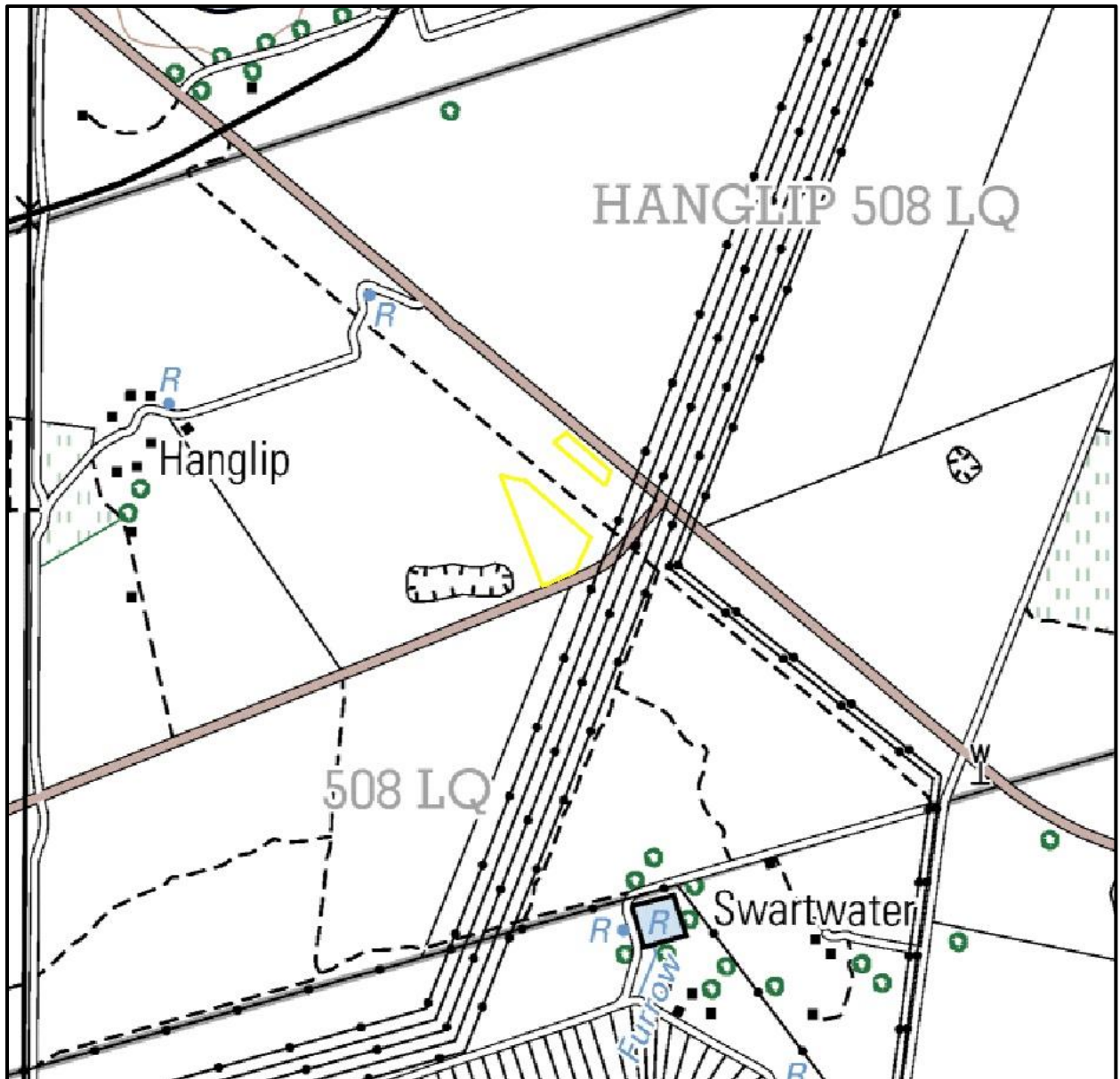


Figure 12. 2008 Topographical map of the sites under investigation. The approximate study area is indicated with yellow borders. No developments can be seen in the study area. Secondary roads can be seen to the south and east of the sites and a track / hiking trail ran between the sites. An excavation is visible to the south west of the study area, and to the east several power lines can be seen. (Topographical 2008)



Figure 13. 2017 Google Earth image showing the study area in relation to Marapong, Lephale and other sites. (Google Earth 2017)

8 Findings of the Survey

It is important to note that only the development footprint of the project was surveyed. The study area is characterised by a featureless flat landscape that falls in an inhospitable environment with low rainfall. The lack of any ephemeral or permanent water sources possibly attributes to the marked paucity of archaeological sites in the study area. 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.

Archaeological visibility is low as the area has been fallow for a number of years and grass cover is extremely high. In terms of the national estate as defined by the NHRA no sites of significance were found during the survey as described below.

8.1 Built Environment (Section 34 of the NHRA)

No standing structures older than 60 years occur in the study area.

8.2 Archaeological and palaeontological resources (Section 35 of the NHRA)

During the survey, no archaeological sites were recorded. The larger study area is however not void of heritage sites and 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 8km to the north east of the study area and will not be impacted on by the development.

An independent paleontological study was conducted by Bamford (2018) and concluded that *“the proposed site lies on the sandstone, gritstone and mudstones of the Swartrand Formation, Ecca Group of early Permian age and could potentially preserve fossil plants of the Glossoteris flora. No fossils have been reported from this area and the twelve test pits excavated for the Geotechnical Report did not yield any fossils. Nonetheless a Chance Find Protocol should be added to the EMP. Based on this information it is recommended that no palaeontological site visit is required and the project may continue”* (Bamford 2018). Please refer to the full report for further details.

8.3 Burial Grounds and Graves (Section 36 of the NHRA)

In terms of Section 36 of the Act no burial sites were recorded.

8.4 Cultural Landscapes, Intangible and Living Heritage.

Long term impact on the cultural landscape is considered to be negligible as the surrounding area consists of a residential area. Visual impacts to scenic routes and sense of place are also considered to be low due to the previous developments in the area and the lack of significant sites.

8.5 Battlefields and Concentration Camps

There are no battlefields or concentration camp sites in the study area.

9 Impact Assessment

9.1 Potential Impact

The chances of impacting unknown archaeological sites in the study area is considered to be negligible. Any direct impacts that might occur would be during the construction phase only and would be of very low significance. Cumulative impacts occur from the combination of effects of various impacts on heritage resources. The importance of identifying and assessing cumulative impacts is that the whole is greater than the sum of its parts. In the case of the development, it will, with the recommended mitigation measures and management actions, not impact any heritage resources directly. However, this and other projects in the area could have an indirect impact on the larger heritage landscape. The lack of any heritage resources in the immediate area and the extensive existing development surrounding the study area minimises additional impact on the landscape.

9.1.1 Pre-Construction phase:

It is assumed that the pre-construction phase involves the removal of topsoil and vegetation as well as the establishment of infrastructure needed for the construction phase. These activities can have a negative and irreversible impact on heritage sites. Impacts include destruction or partial destruction of non-renewable heritage resources.

9.1.2 Construction Phase

During this phase, the impacts and effects are similar in nature but more extensive than the pre-construction phase. These activities can have a negative and irreversible impact on heritage sites. Impacts include destruction or partial destruction of non-renewable heritage resources.

9.1.3 Operation Phase:

No impact is envisaged for the recorded heritage resources during this phase.

Table 5. Impact Assessment table.

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 material or objects.		
	Without mitigation	With mitigation (Preservation/ excavation of site)
Extent	Local (1)	Local (1)
Duration	Permanent (5)	Permanent (5)
Magnitude	Low (2)	Low (2)
Probability	Not probable (2)	Not probable (2)
Significance	16 (Low)	16 (Low)
Status (positive or negative)	Negative	Negative
Reversibility	Not reversible	Not reversible
Irreplaceable loss of resources?	No resources were recorded	No resources were recorded.
Can impacts be mitigated?	Yes, a chance find procedure should be implemented.	Yes
Mitigation: Due to the lack of apparent significant heritage resources no further mitigation is required prior to construction. A Chance Find Procedure should be implemented for the project should any sites be identified during the construction process.		

10 Conclusion and recommendations

HCAC was appointed to conduct a Heritage Impact Assessment for the proposed Hanglip public garage on Erf 14729 (formerly Portion 12 of the farm Hanglip 508 LQ (a portion of Portion 3 of the farm Hanglip 508 LQ)). The site is located on the corner of Roads D2001 (Road to Stockpoort) and D1675 (Road to Steenbokpan) in the Lephalale Municipal area. The site is undeveloped, relatively flat, characterised by extensive sand cover without any major topographical features like calcrete pans or rocky outcrops. Large sections of the study area is degraded and impacted on by disused tar roads and power lines, these features would have impacted on surface indicators of heritage sites in the area. The study area has been fallow and is overgrown with thick sickle bush. In terms of the national estate as defined by the NHRA no sites of significance were found during the survey as described below.

In terms of the built environment of the area (Section 34 of the NHRA), no standing structures older than 60 years occur within the study area and based on historical topographic maps of the study area it is clear that no features of significance occurred in the area.

In terms of the archaeological component (Section 35) no sites of significance was recorded. The lack of any ephemeral or permanent water sources possibly attributes to the marked paucity of archaeological sites in the study area. 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 herdsman 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). 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 within the study area.

In terms of the palaeontological component of Section 35 an independent paleontological study concluded that the proposed study area lies on the sandstone, gritstone and mudstones of the Swartrand Formation, Eccca Group of early Permian age and could potentially preserve fossil plants of the *Glossoteris* flora. No fossils have been reported from this area and the twelve test pits excavated for the Geotechnical Report did not yield any fossils (Bamford 2018). Based on this information it is recommended that no palaeontological site visit is required and the project may continue. Therefore, no further mitigation is recommended prior to construction in terms of Section 35 for the proposed development to proceed

In terms of Section 36 of the Act no burial sites were recorded. If any graves are located in future they should ideally be preserved *in-situ* or alternatively relocated according to existing legislation. No public monuments are located within or close to the study area. The proposed development will not impact negatively on significant cultural landscapes or views. During the public participation process conducted for the project no heritage concerns was raised.

Due to the lack of significant heritage resources in the study area the impact of the proposed project on heritage resources is considered low and it is recommended that the proposed project can commence on the condition that the following chance find procedure are implemented as part of the EMP and based on approval from SAHRA.

10.1 Chance Find Procedures

The possibility of the occurrence of subsurface finds cannot be excluded. Therefore, if during construction any possible finds such as stone tool scatters, artefacts or bone and fossil remains are made, the operations must be stopped and a qualified archaeologist must be contacted for an assessment of the find and therefor chance find procedures should be put in place as part of the EMP. A short summary of chance find procedures is discussed below.

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;
- If fossils are found once construction has commenced then they should be rescued and a palaeontologist called to assess and collect a representative sample;
- 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.

10.2 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 heritage record of the area.

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12 Appendices:**Curriculum Vitae of Specialist**

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Degree obtained : BA Hons Archaeology
Year of graduation : 2002

Name of University or Institution : University of the Witwatersrand
Degree Obtained : MA (Archaeology)
Year of Graduation : 2012

Name of University or Institution : University of Johannesburg
Degree : PhD
Year : Currently Enrolled

EMPLOYMENT HISTORY:

2011 – Present: **Owner – HCAC (Heritage Contracts and Archaeological Consulting CC).**
2007 – 2010 : **CRM Archaeologist**, Managed the Heritage Contracts Unit at the University of the Witwatersrand.
2005 - 2007: **CRM Archaeologist**, Director of Matakoma Heritage Consultants
2004: **Technical Assistant**, Department of Anatomy University of Pretoria
2003: **Archaeologist**, Mapungubwe World Heritage Site
2001 - 2002: **CRM Archaeologists**, For R & R Cultural Resource Consultants, Polokwane
2000: **Museum Assistant**, Fort Klapperkop.

Countries of work experience include:

Republic of South Africa, Botswana, Zimbabwe, Mozambique, Tanzania, The Democratic Republic of the Congo, Lesotho and Zambia.

SELECTED PROJECTS INCLUDE:

Archaeological Impact Assessments (Phase 1)

Heritage Impact Assessment Proposed Discharge Of Treated Mine Water Via The Wonderfontein Spruit Receiving Water Body Specialist as part of team conducting an Archaeological Assessment for the Mmamabula mining project and power supply, Botswana

Archaeological Impact Assessment Mmamethlake Landfill

Archaeological Impact Assessment Libangeni Landfill

Linear Developments

Archaeological Impact Assessment Link Northern Waterline Project At The Suikerbosrand Nature Reserve

Archaeological Impact Assessment Medupi – Spitskop Power Line,

Archaeological Impact Assessment Nelspruit Road Development

Renewable Energy developments

Archaeological Impact Assessment Karoshoek Solar Project

Grave Relocation Projects

Relocation of graves and site monitoring at Chloorkop as well as permit application and liaison with local authorities and social processes with local stakeholders, Gauteng Province.

Relocation of the grave of Rifle Man Maritz as well as permit application and liaison with local authorities and social processes with local stakeholders, Ndumo, Kwa Zulu Natal.

Relocation of the Magolwane graves for the office of the premier, Kwa Zulu Natal

Relocation of the OSuthu Royal Graves office of the premier, Kwa Zulu Natal

Phase 2 Mitigation Projects

Field Director for the Archaeological Mitigation For Booyensdal Platinum Mine, Steelpoort, Limpopo Province. Principle investigator Prof. T. Huffman

Monitoring of heritage sites affected by the ARUP Transnet Multipurpose Pipeline under directorship of Gavin Anderson.

Field Director for the Phase 2 mapping of a late Iron Age site located on the farm Kameelbult, Zeerust, North West Province. Under directorship of Prof T. Huffman.

Field Director for the Phase 2 surface sampling of Stone Age sites effected by the Medupi – Spitskop Power Line, Limpopo Province

Heritage management projects

Platreef Mitigation project – mitigation of heritage sites and compilation of conservation management plan.

MEMBERSHIP OF PROFESSIONAL ASSOCIATIONS:

- Association of Southern African Professional Archaeologists. Member number 159
Accreditation:
 - Field Director Iron Age Archaeology
 - Field Supervisor Colonial Period Archaeology, Stone Age
Archaeology and Grave Relocation
- Accredited CRM Archaeologist with SAHRA
- Accredited CRM Archaeologist with AMAFA
- Co-opted council member for the CRM Section of the Association of Southern African Association Professional Archaeologists (2011 – 2012)

PUBLICATIONS AND PRESENTATIONS

- A Culture Historical Interpretation, Aimed at Site Visitors, of the Exposed Eastern Profile of K8 on the Southern terrace at Mapungubwe.
 - J van der Walt, A Meyer, WC Nienaber
 - Poster presented at Faculty day, Faculty of Medicine University of Pretoria 2003
- 'n Reddingsondersoek na Anglo-Boereoorlog-ammunisie, gevind by Ifafi, Noordwes-Provinsie. South-African Journal for Cultural History 16(1) June 2002, with A. van Vollenhoven as co-writer.
- Fieldwork Report: Mapungubwe Stabilization Project.
 - WC Nienaber, M Hutten, S Gaigher, J van der Walt
 - Paper read at the Southern African Association of Archaeologists Biennial Conference 2004
- A War Uncovered: Human Remains from Thabantšho Hill (South Africa), 10 May 1864.
 - M. Steyn, WS Boshoff, WC Nienaber, J van der Walt
 - Paper read at the 12th Congress of the Pan-African Archaeological Association for Prehistory and Related Studies 2005
- Field Report on the mitigation measures conducted on the farm Bokfontein, Brits, North West Province .
 - J van der Walt, P Birkholtz, W. Fourie
 - Paper read at the Southern African Association of Archaeologists Biennial Conference 2007
- Field report on the mitigation measures employed at Early Farmer sites threatened by development in the Greater Sekhukhune area, Limpopo Province. J van der Walt
 - Paper read at the Southern African Association of Archaeologists Biennial Conference 2008
- Ceramic analysis of an Early Iron Age Site with vitrified dung, Limpopo Province South Africa.
 - J van der Walt. Poster presented at SAFA, Frankfurt Germany 2008

- Bantu Speaker Rock Engravings in the Schoemanskloof Valley, Lydenburg District, Mpumalanga (*In Prep*)
 - J van der Walt and J.P Celliers
- Sterkspruit: Micro-layout of late Iron Age stone walling, Lydenburg, Mpumalanga. W. Fourie and J van der Walt. A Poster presented at the Southern African Association of Archaeologists Biennial Conference 2011
- Detailed mapping of LIA stone-walled settlements' in Lydenburg, Mpumalanga. J van der Walt and J.P Celliers
 - Paper read at the Southern African Association of Archaeologists Biennial Conference 2011
- Bantu-Speaker Rock engravings in the Schoemanskloof Valley, Lydenburg District, Mpumalanga. J.P Celliers and J van der Walt
 - Paper read at the Southern African Association of Archaeologists Biennial Conference 2011
- Pleistocene hominin land use on the western trans-Vaal Highveld ecoregion, South Africa, Jaco van der Walt.
 - J van der Walt. Poster presented at SAFA, Toulouse, France. Biennial Conference 2016

REFERENCES:

1. Prof Marlize Lombard Senior Lecturer, University of Johannesburg, South Africa
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2. Prof TN Huffman Department of Archaeology Tel: (011) 717 6040
University of the Witwatersrand
3. Alex Schoeman University of the Witwatersrand
E-mail: Alex.Schoeman@wits.ac.za