

HERITAGE IMPACT ASSESSMENT

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

FOR THE PROPOSED THORNCLIFFE WILDLIFE ECO ESTATE (REMAINING EXTENT OF
PORTION 2 OF THE FARM THORNCLIFFE 373 KT (FETAGOMO TUBATSE LOCAL
MUNICIPALITY)).

Type of development:

Wildlife Eco Estate

Client:

Lokisa Environmental Consulting CC

Developer:

Didingwe River Lodge

Report prepared by:



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APPROVAL PAGE

Project Name	Thorncliffe Wildlife Eco Estate Project.
Report Title	Heritage Impact Assessment for the Proposed Thorncliffe Wildlife Eco Estate (Remaining Extent of Portion 2 of the Farm Thorncliffe 373 KT (Fetagomo Tubatse Local Municipality).
Authority Reference Number	LOK2023/002
Report Status	Draft Report
Applicant Name	Didingwe River Lodge

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ate	Report Reference Number	Description of Amendment

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REPORT OUTLINE

Appendix 6 of the GNR 326 Environmental Impact Assessment (EIA) Regulations published on 7 April 2017 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 GN 326 EIA Regulation 2017	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, 7 and 8.
(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 site plan identifying site alternatives;	Section 8 and 9
(g) Identification of any areas to be avoided, including buffers	Section 8 and 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 1.3
(k) Mitigation measures for inclusion in the EMPr	Section 10.1
(l) Conditions for inclusion in the environmental authorisation	Section 10. 1.
(m) Monitoring requirements for inclusion in the EMPr or environmental authorisation	Section 10. 5.
(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 10.3
(o) Description of any consultation process that was undertaken during the course of preparing the specialist report	Section 5
(p) A summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	Refer to BAR report
(q) Any other information requested by the competent authority	N.A

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 (NEMA) (Act No 107 of 1998) and the associated 2014 Environmental Impact Assessment (EIA) Regulations (as amended), that I:</p> <ul style="list-style-type: none"> • I act as an 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 49 A of the Act. of regulation 48 and is punishable in terms of section 24F of the Act.
Signature	
Date	01/06/2023

a) Expertise of the specialist

Jaco van der Walt has been practising as a Cultural Resource Management (CRM) archaeologist for 15 years. Jaco is an accredited member of the Association of South African Professional Archaeologists (ASAPA) (#159) and APHP #114 and have conducted more than 500 impact assessments in Limpopo, Mpumalanga, North West, Free State, Gauteng, Kwa Zulu Natal (KZN) as well as the Northern and Eastern Cape Provinces in South Africa.

Jaco has worked on various international projects in Zimbabwe, Botswana, Mozambique, Lesotho, Democratic Republic of the Congo (DRC) Zambia, Guinea, Afghanistan, Nigeria and Tanzania. Through this, he has a sound understanding of the International Finance Corporations (IFC) Performance Standard requirements, with specific reference to Performance Standard 8 – Cultural Heritage

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Executive Summary

Lokisa Environmental Consulting CC was appointed as the Environmental Assessment Practitioner (EAP) by Didingwe River Lodge to undertake the required Environmental Authorisation Process for the proposed development of the Thorncliffe Wildlife Eco Estate. Beyond Heritage was appointed to conduct a Heritage Impact Assessment (HIA) for the Project and the study area was assessed on a desktop level and by a non-intrusive pedestrian field survey. Key findings of the assessment include:

- Multiple sites are known in the greater region and consists of Stone Age scatters, Iron Age sites, grinding stones, Historic homesteads, multiple burial grounds and graves, pottery, Historical stone walling and historical mine shafts;
- Sections of the southern portion of the project area was previously surveyed (see Birkholtz and Steyn 2005);
- During the current survey finds include packed stone features of a potential burial site, two small sections of Iron Age stone walling, ruin foundations of a small square structure, and a small circular packed stone enclosure; and
- The palaeontological sensitivity of the project area is indicated as insignificant/zero to low and no palaeontological studies are required however a protocol for finds is required.

The impact on heritage resources can be mitigated to an acceptable level, and the project can commence provided that the recommendations in this report are adhered to, based on the South African Heritage Resource Authority (SAHRA) 's approval.

Recommendations:

Avoidance of recorded heritage observations is the preferred course of action; if this is not possible the following apply:

- Due the widespread occurrence of unmarked graves in the greater area, the local community/ stakeholders must be consulted with during the social consultation process to confirm possible grave sites in the study area and verify the presence of graves at DD001.
- If DD001 is confirmed to be a grave site, it is recommended that the potential burial site is indicated on development plans, demarcated with access for family and avoided with a 30 m buffer, a grave management plan should also be compiled for the site;
- If confirmed to be graves (DD001) and avoidance is not possible, the graves can be relocated adhering to all legal requirements and with the relevant permits in place, but this must be seen as a last resort and is not preferable;
- Avoidance of the Stone Packed features with a 30m buffer zone is preferable but if this is not possible the stone packed features (DD002, DD003, DD004 and DD005) can be mitigated (recorded and mapped) after which a destruction permit can be applied for;
- Regular monitoring of the development footprint by the ECO to implement the Chance Find Procedure for heritage and palaeontology resources (outlined in Section 10.2) in case heritage resources are uncovered during construction.

ABBREVIATIONS

ASAPA: Association of South African Professional Archaeologists
BGG Burial Ground and Graves
CFPs: Chance Find Procedures
CMP: Conservation Management Plan
CRR: Comments and Response Report
CRM: Cultural Resource Management
DFFE: Department of Fisheries, Forestry and Environment,
EA: Environmental Authorisation
EAP: Environmental Assessment Practitioner
ECO: Environmental Control Officer
EIA: Environmental Impact Assessment*
EIA: Early Iron Age*
EAP Environmental Assessment Practitioner
EMPr: 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, 2002 (Act No. 28 of 2002)
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)
 Earlier 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:

Beyond Heritage was appointed to conduct a Heritage Impact Assessment (HIA) for the proposed development of the Thorncliffe Wildlife Eco Estate. The site is situated approximately 26km south of Steelpoort, 33km north west of Lydenburg and 41km east of Monsterlus. The Thorncliff mine is situated directly to the west of the site and the Magareng Mine to the south. Didingwe River Lodge is situated on the south eastern portion of the study area (Figure 1.1 to 1.3). The report forms part of the Basic Assessment (BA) and Environmental Management Programme Report (EMPr) for the development.

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 finds were limited to small stone packed features representing a potential burial site, two small sections of Iron Age stone walling, remnants of a small Historic square structure, and a small circular packed stone enclosure. 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 for commenting. Upon submission to SAHRA the project will be automatically given a case number as reference. As such the EIA report and its appendices must be submitted to the case 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) understand the cultural layering of the study area; 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).

1.2 Project Description

Project components and the location of the proposed project are outlined under Table 2 and 3.

Table 2: Project Description

Project area	The proposed project is situated on the Remaining extent of Portion 2 of the Farm Thorncliffe 374 KT
Magisterial District	Fetagomo Tubatse Local Municipality
Central co-ordinate of the development	-24.9767739, 30.1406274
Topographic Map Number	2430CC

Table 3: Infrastructure and project activities

Type of development	Wildlife Eco Estate
Size of development	204.0984 hectares
Project Components	The proposed project entails the establishment of a Wildlife Eco Estate for approximately 44 Eco Residential erven of $\pm 2000\text{m}^2$ each, a resort of $\pm 7.7642\text{ha}$, as well as two (2) industrial erven of 5.5ha and 6.1ha on the site measuring 204.0984 ha in extent.

1.3 Alternatives

No alternatives were provided, but the area assessed allows for siting of the development to avoid impacts to heritage resources.

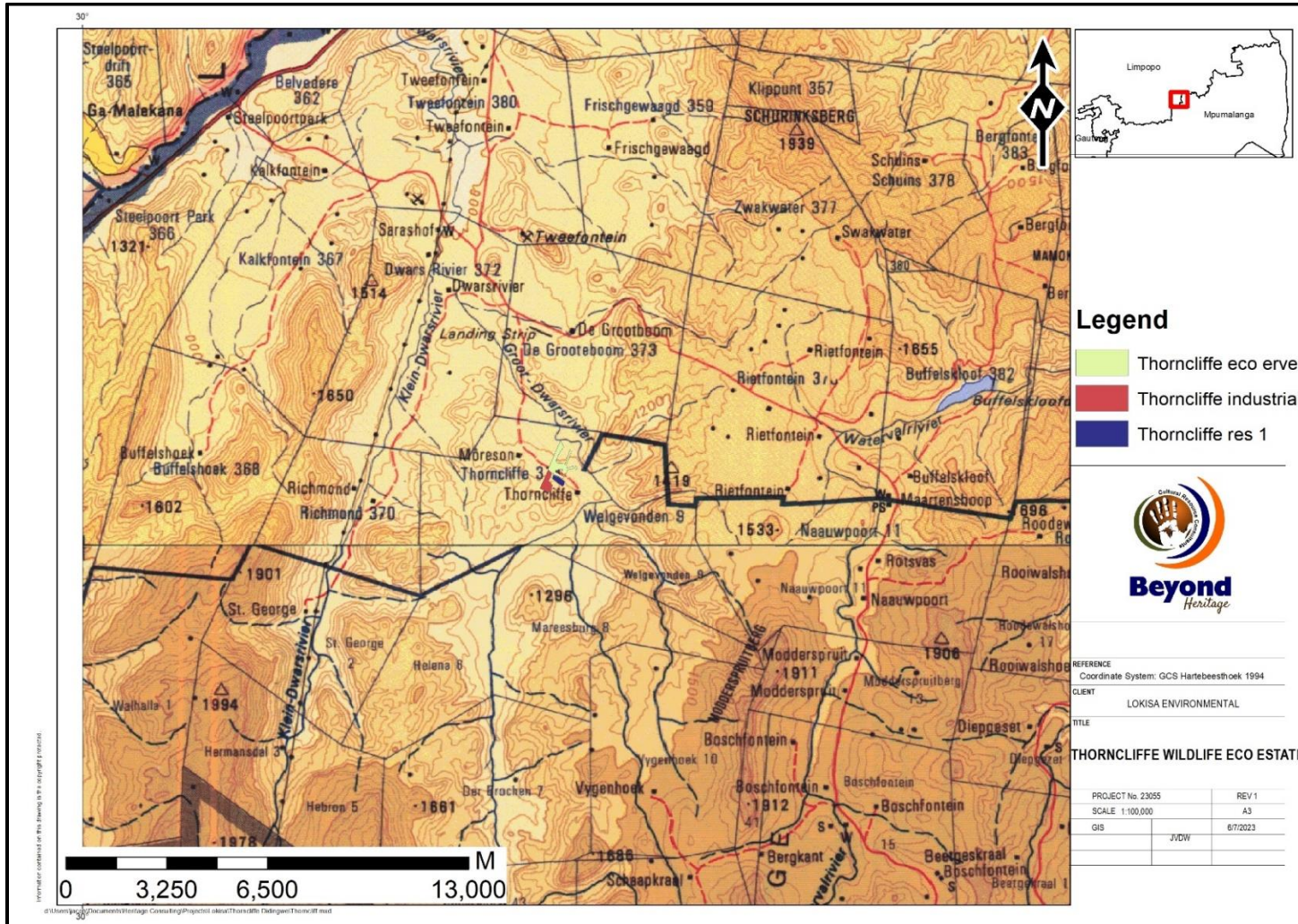


Figure 1.1. Regional setting of the Project (1: 250 000 topographical map).

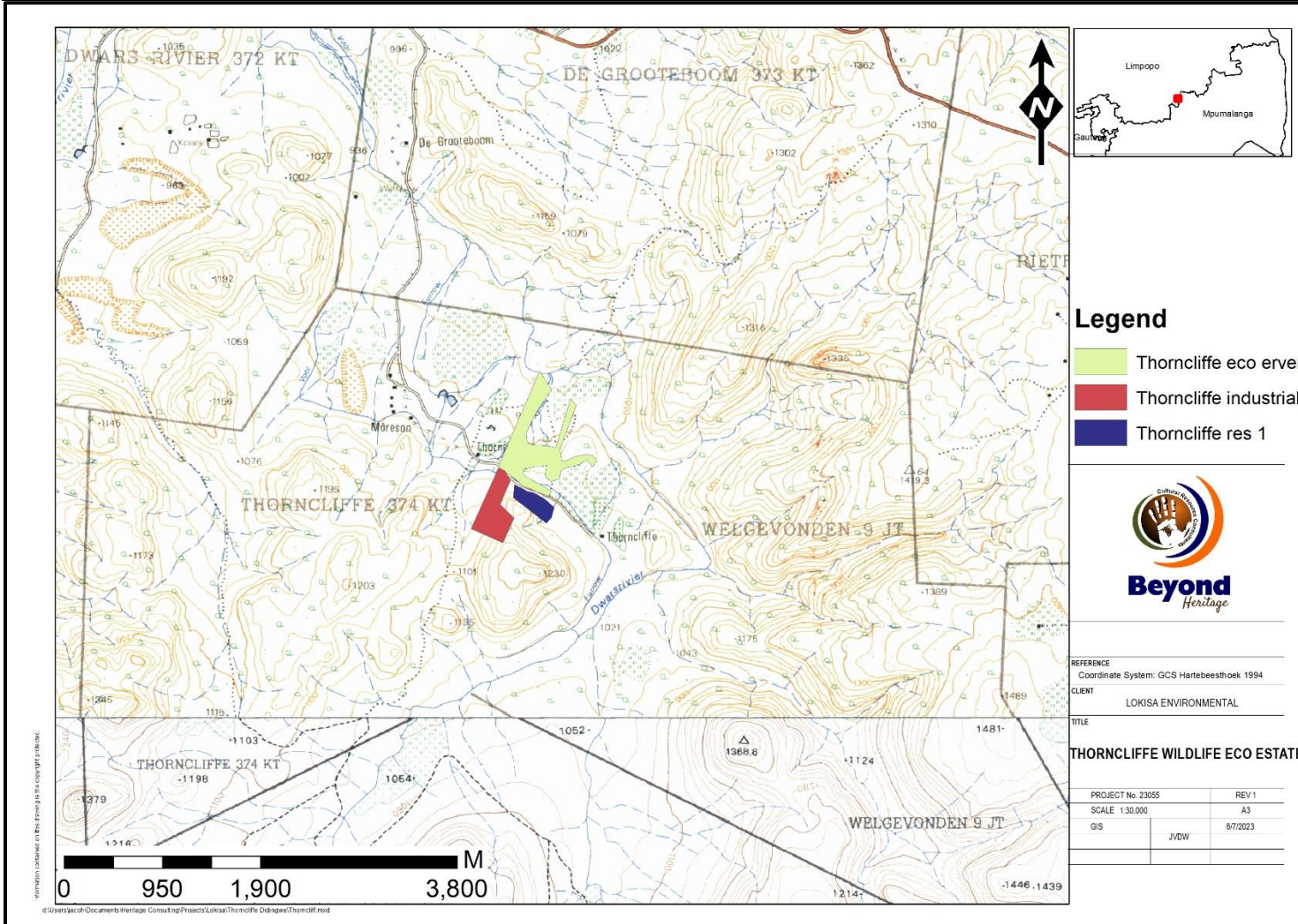


Figure 1.2. Local setting of the Project (2430 CC 1: 50 000 topographical map).

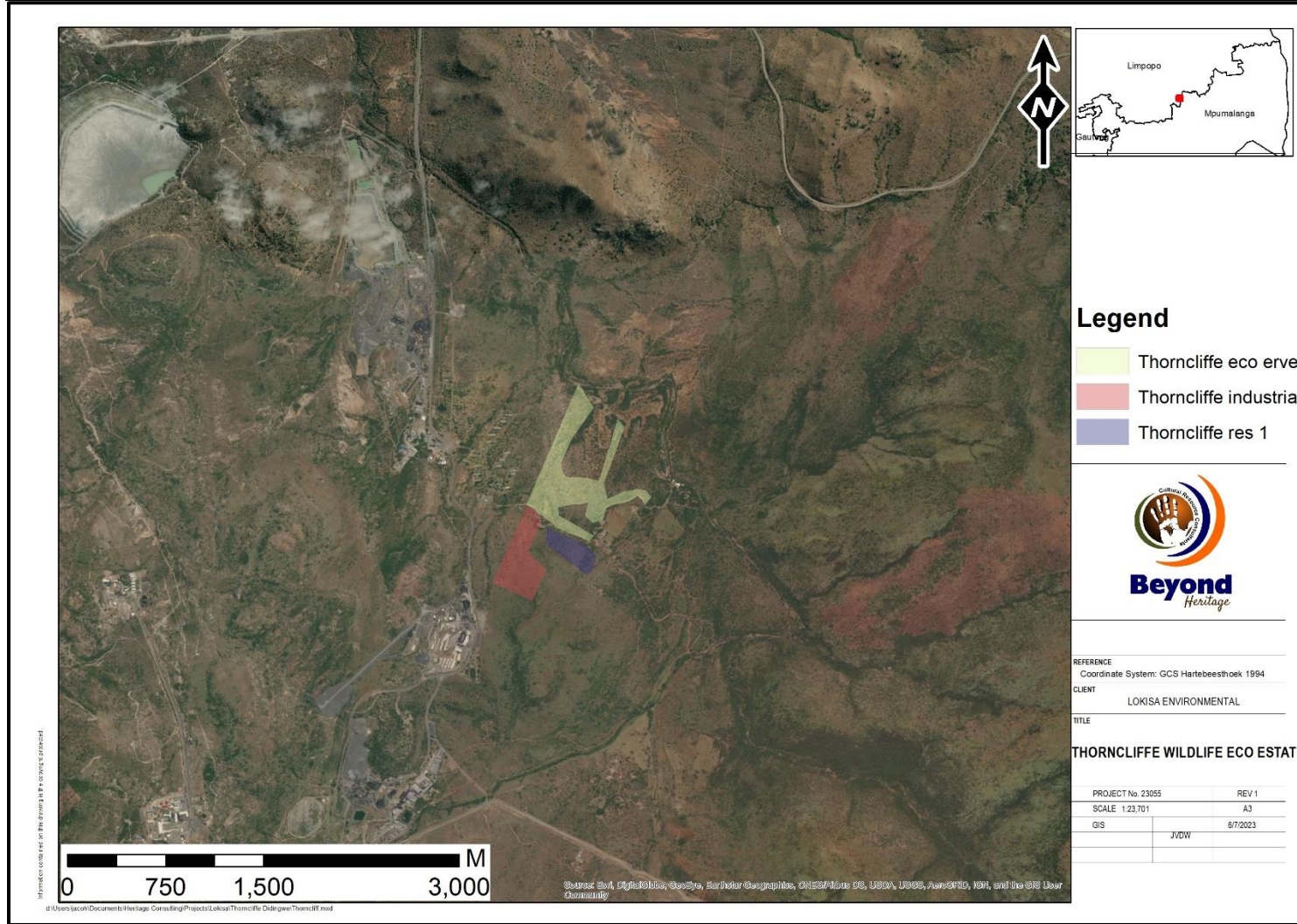


Figure 1.3. Google Earth 2023 Aerial image of the study area and Project components.

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))

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 (or avoidance) of these impacts.

The HIA should be submitted, as part of the impact assessment report or EMP, to the Provincial Heritage Resource Agency (PHRA) or to SAHRA. SAHRA will ultimately be responsible for the evaluation of Phase 1 HIA reports upon which review comments will be issued. 'Best practice' requires Phase 1 HIA reports and additional development information, as per the impact assessment report and/or EMP, to be submitted in duplicate to SAHRA after completion of the study. SAHRA accepts Phase 1 HIA 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 Southern African Development Community (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 HIA'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 include (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 and GNR 548 as well as the SAHRA BGG Policy 2020. Graves older than 60 years, but younger than 100 years fall under Section 36 of Act 25 of 1999 (NHRA), as well as the National Health Act of 2003 and are under 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) re-instituted by Proclamation 109 of 17 June 1994 and implemented by CoGHSTA as well as the National Health Act of 2003 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. . 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 the National Health Act of 2003.

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 fieldwork 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 EA 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 (conducted by the EAP) process was to capture and address any issues raised by community members and other stakeholders during key stakeholder and public meetings.

3.4 Site Investigation

The aim of the site visit was to:

- a) survey the proposed project area to understand the heritage character of the development footprint (focussing on the current layout);
- 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	28 February 2023
Season	Summer – The time of year did influence the survey as the dense vegetation limited heritage visibility. Sections of the study area is also located on a steep slope of a small mountain and it were not possibly to physically walk all of these areas. The development footprint was however sufficiently covered to understand the heritage character of the area (Figure 3.1).

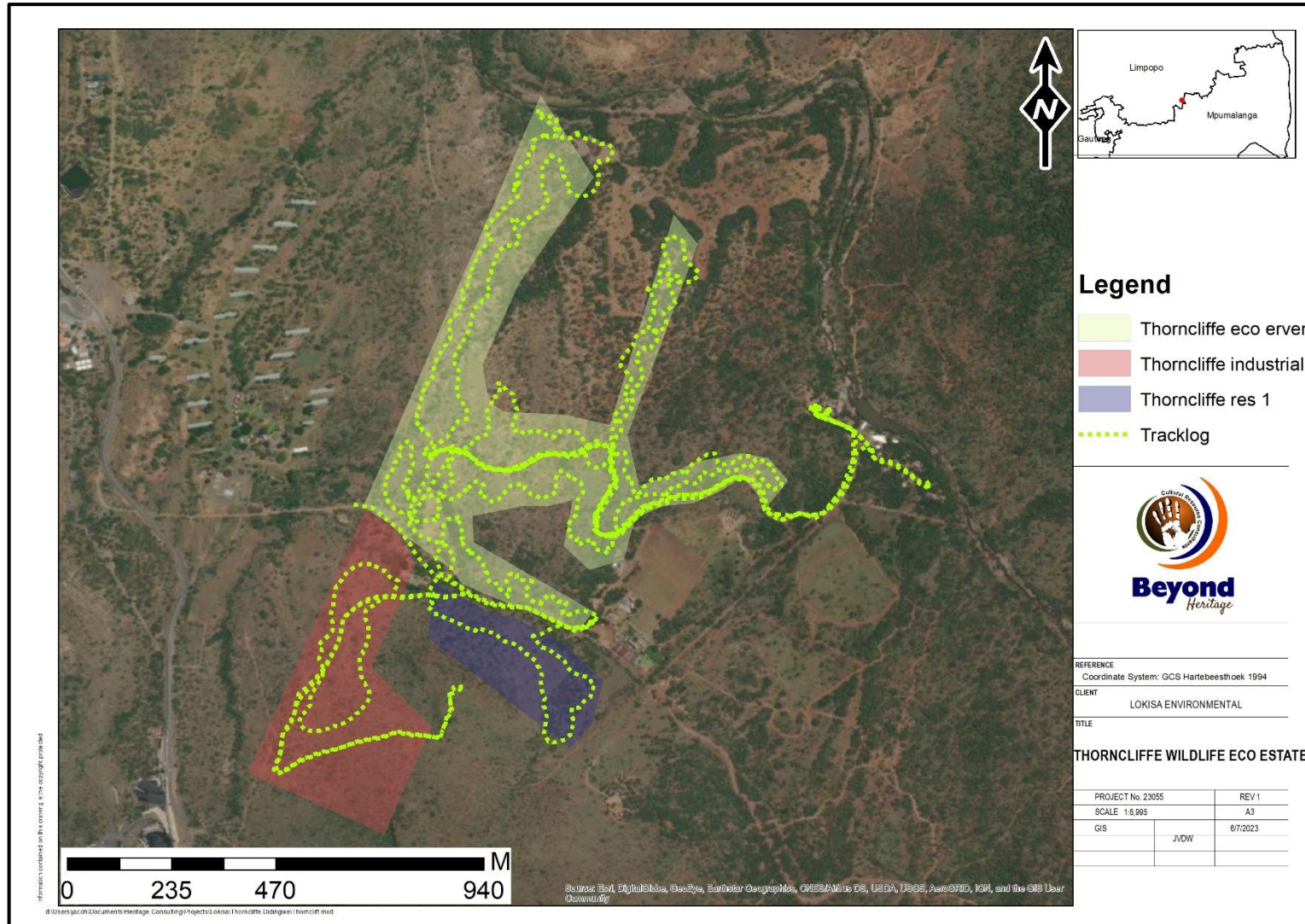


Figure 3.1. Tracklog of the survey path in green.

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 (2007), 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.

Table 5: Heritage significance and field ratings

<i>FIELD RATING</i>	<i>GRADE</i>	<i>SIGNIFICANCE</i>	<i>RECOMMENDED MITIGATION</i>
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

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 Assumptions, 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 heritage resources, the possibility of discovery of heritage resources during the construction phase cannot be excluded. The southern portions of the project area were extremely mountainous and could only be accessed via the old prospecting road that goes up the hill towards Magareng Mine south of the project area. The terrain along this road was extremely rocky and difficult to assess. This limitation will be mitigated with the implementation of a chance find procedure and monitoring of the study area by the ECO. This report only deals with the current layout of the proposed development and consisted of non-intrusive surface surveys that focussed on tangible resources. 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.

Field data were recorded by handheld GPS and Mobile GPS applications. It must be noted that during the process of converting spatial data to final drawings and maps the accuracy of spatial data may be compromised. Printing or other forms of reproduction might also distort the spatial distribution in maps. Due care has been taken to preserve accuracy. 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

According to stasSA, the Greater Tubatse Local Municipality has a population size of 335 676. The population in the municipality is constituted by 97,8% black African, 1,6% white people, with other population groups making up the remaining 0,7. The sex ratio in the municipality is 88, meaning that for every 100 women there are 88 men. Languages spoken in the municipality include Sepedi (78,6%), Tsonga (6,9%), isiNdebele (3,8%), isiZulu (2,1%) and other languages make up 8,6%. Of those aged 20 years and older, 22,6% have completed matric and 6,6% have some form of higher education.

The municipality has a weak economic base and high poverty levels. The Burgersfort town in the municipality has been identified as a growth point in the province because of its mining activities. A potential to grow the economic base in the municipality, through tourism, has been brought by the availability of natural resources. Poverty alleviation projects implemented by the municipality have improved the socio-economic conditions (statssa.gov.za).

5 Results of Public Consultation and Stakeholder Engagement:

5.1.1 Stakeholder Identification

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

6 Contextualising the study area:

6.1 Literature Review (SAHRIS)

Multiple sites are known in the greater region and consists of Stone Age scatters, Iron Age sites, grinding stones, Historic homesteads, multiple burial grounds and graves, pottery, Historical stone walling, historical mine shafts, and a modern ritual site. Part of the southern portion of the project area was previously surveyed (see Birkholtz and Steyn 2005). The following Cultural Resource Management (CRM) assessments (Table 6) were conducted in the larger area and consulted for this report:

Table 6. CRM reports consulted for the study.

Author	Year	Project	Findings
Birkholtz, P., Steyn, H.S.	2005	Phase 1 Heritage Impact Assessment for the Proposed Lebalelo Pipeline on the Farms Dwarsrivier 372 KT & Thorncliffe 374 KT Mpumalanga	MIA archaeological area, Iron Age pottery scatters, lower grinding stone, two MSA find spots.
Coetzee, F.P.	2008	Cultural Heritage Survey of the Proposed Stormwater Dam on the Farm Thorncliffe 374 KT, Sekhukhune District, Limpopo Province	No sites
Huffman, T.N., Schoeman, M.H.	2002	Archaeological Assessment of the Der Brochen Project, Mpumalanga. A phase-1 report prepared for SRK Consulting.	MSA scatters, Historic homesteads, Pedi pottery, Iron Age pottery and slag, a contemporary graveyard.
Roodt, F	2003	Phase 1 Heritage Impact Assessment, Der Brochen Project, Richmond Complex: Trial Mining Phase, Mpumalanga Province	MSA flakes, an early Pedi settlement site, Eiland pottery, a modern grave, modern pottery, remnants of stone foundations, grinding stones, stone cairns.
Roodt, F.	2008	Phase 1 Heritage Resources Scoping Report, Der Brochen Mine Richmond Farm: Mpumalanga.	Historical stone walling, multiple burial sites, grinding stones, pottery, modern ritual site, MSA scatter.
Van Vollenhoven, A.C.	2012	A Report on a Cultural Heritage Impact Assessment for a Proposed New Tailings Storage Facility at the Two Rivers Platinum Mine, Close To Steelpoort, Limpopo Province.	Three MSA tools, an Iron Age potsherd.
Van Vollenhoven, A.C.	2017	A Report on a Cultural Heritage Impact Assessment for the Proposed De Groote Boom Mining Right Application on the Farm De Grooteboom 373 KT, Close To Steelpoort, Limpopo Province.	Three historical mine shafts

6.1.1 Google Earth and The Genealogical Society of South Africa (Graves and burial 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.

6.2 Archaeological Background

The archaeology of the area spans across the Stone Age, Iron Age, and Historical period.

6.2.1 Stone Age

South Africa has a long and complex Stone Age sequence of more than 2 million years. The broad sequence includes the Later Stone Age, the Middle Stone Age and the Earlier Stone Age. Each of these phases contains sub-phases or industrial complexes, and within these we can expect regional variation regarding characteristics and time ranges. For (CRM) purposes it is often only expected/ possible to identify the presence of the three main phases. Yet sometimes the recognition of cultural groups, affinities or trends in technology and/or subsistence practices, as represented by the sub-phases or industrial complexes, is achievable. The three main phases can be divided as follows;

- » Later Stone Age (LSA); associated with Khoi and San societies and their immediate predecessors. - Recently to ~30 thousand years ago.
- » Middle Stone Age (MSA); associated with Homo sapiens and archaic modern human - . 30-300 thousand years ago.
- » Earlier Stone Age (ESA); associated with early Homo groups such as Homo habilis and Homo erectus. - 400 000-> 2 million years ago.

Stone Age scatters dating from the ESA, MSA, and LSA, are reported in the immediate region (eg, Birkholtz and Steyn 2005, Huffman and Schoeman 2002, Roodt 2003; 2008, Van Vollenhoven 2012). This shows the presence of early hominid movement throughout the region but there are no Stone Age sites of significance as the recorded isolated finds do not define a definitive archaeological site as they are too sparse to be of high significance.

6.2.2 Iron Age

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 Iron Age as a whole represents the spread of Bantu speaking people and includes both the Pre-Historic and Historic periods. It can be divided into three distinct periods:

- » The Early Iron Age (EIA): Most of the first millennium AD.
- » The Middle Iron Age (MIA): 10th to 13th centuries AD.
- » The Late Iron Age (LSA): 14th century to colonial period.

The Limpopo Province is well known for being the point of entry into South Africa for the Bantu migration with evidence of widespread Iron Age occupation throughout the province. The region in which the project area falls experienced Iron Age occupation throughout most of the Iron Age. During the later period of the 1650s, the Kwena, Roka, Koni, and Tau inhabited this lower region of the larger Steelpoort Valley (Bergh 1999, Schoeman 1997). Evidence of Eiland ceramics within the landscape indicates earlier occupation between around AD 1000-AD1300 (Huffman 2007). One such site was identified 3km southwest of the southern boundary of the project area indicating MIA occupation within the immediate region (Huffman and Schoeman 2002). The Kwena led by Masabela were the first LIA settlers within this region of

Sekhukuneland with a related group, the Phasa following within a short period. By around AD1700, the Koni and Tau were also inhabiting the landscape.

6.2.3. Historical Period

The Difaqane (Sotho), or Mfekane (“the crushing” in Nguni) was a time of bloody upheavals in Natal and on the Highveld, which occurred around the early 1820’s until the late 1830’s (Bergh 1999: 10). It came about in response to heightened competition for land and trade, and caused population groups like gun-carrying Griquas and Shaka’s Zulus to attack other tribes (Bergh 1999: 14; 116-119).

Around AD1700, the BaPedi chiefdom took over the region under the reign of Thulare, who died in AD1826, the chiefdom saw its peak in political power until Mzilikazi attacked the Pedi in the 1820s (Bergh 1999). Mzilikazi and his Matabele entered the region from the south-east and slaughtered many Pedi. Those who survived, fled to the Soutpansberg under the rule of Sekwati, Thulare’s son and only returned in 1828 upon safety and once again established a Pedi capital. Sekwati was succeeded by his son, Sekhukhune after his death in 1861.

Shortly after the Pedi’s return to the region, the first Voortrekkers entered the Steelpoort Valley in the 1840s which caused much turmoil between the Pedi and Voortrekkers. In 1852, the Voortrekkers attempted an attack on the Pedi but the Pedi authority was not broken. This led to negotiations between the Voortrekkers and Sekwati who traded some land for cattle. The Boers then began establishing farms in the area.

Multiple attacks were attempted on the Pedi in attempt to break their authority over the region. This includes the First Sekhukhune War of 1876 and the Second Sekhukhune War of 1879 which both took place approximately 50km north of the project area. During the Second Sekhukhune War, British troops had established a military camp at an unknown location near Dwarsrivier (Birkholtz and Steyn 2005). The Pedi reign was widespread across the region and Pedi stone wall sites are commonly found across the landscape. The Sekhukhune District Municipality was named after him and the region is also referred to as Sekhukhuneland.

In the 1920s, platinum was discovered south of the Steelpoort River which led to further prospecting of the area in search of the platinum fields. Cornelius Jansen Wellbach, a prospector from Lydenburg claimed to have discovered platinum in December of 1924 on the farm Thorncliffe, but he was not granted Discoverer’s Rights (Birkholtz and Steyn 2005).

7 Description of the Physical Environment

The vegetation and landscape are described by Mucina and Rutherford (2006) as Sekhukhune Mountain Bushveld. The Sekhukhune Mountain Bushveld is described as dry, open to closed microphyllous and broad-leaved savanna on hills and mountain slopes that form concentric belts parallel to the northeastern escarpment. Open bushveld often associated with ultramafic soils on southern aspects. Bushveld on ultramafic soils contain a high diversity of edaphic specialists. Bushveld of mountain slopes generally taller than in the valleys, with a well-developed herb layer. Bushveld of valleys and dry northern aspects usually dense, like thicket, with a herb layer comprising many short-lived perennials. Dry habitats contain a number of species with xerophytic adaptations, such as succulence and underground storage organs. Both man-made and natural erosion dongas occur on foot slopes of clays rich in heavy metals.

The project area is situated 800m east of Thorncliff mine just south of the Dwarsrivier and within the Didingwe River lodge property. The surrounding environment consists of mountainous terrain that is covered by a grass and trees. The northern sections of the project area slope downhill towards the Dwarsrivier that forms northern boundary of the project area. The vegetation along the northern boundary are therefore thicker. The southern portions of the project area located in a mountainous area with a sharp incline that could only be accessed through a degraded prospecting road. Existing infrastructure within the

project area consists of small powerlines, gravel roads used to access the main lodge at Didingwe and large degraded dams that may have been used for agricultural activities in the past. General site conditions are illustrated in Figures 7.1 to 7.8.



Figure 7.1. General view of the surrounding vegetation throughout the project area - Image taken along the gravel road running towards the Didingwe River Lodge.

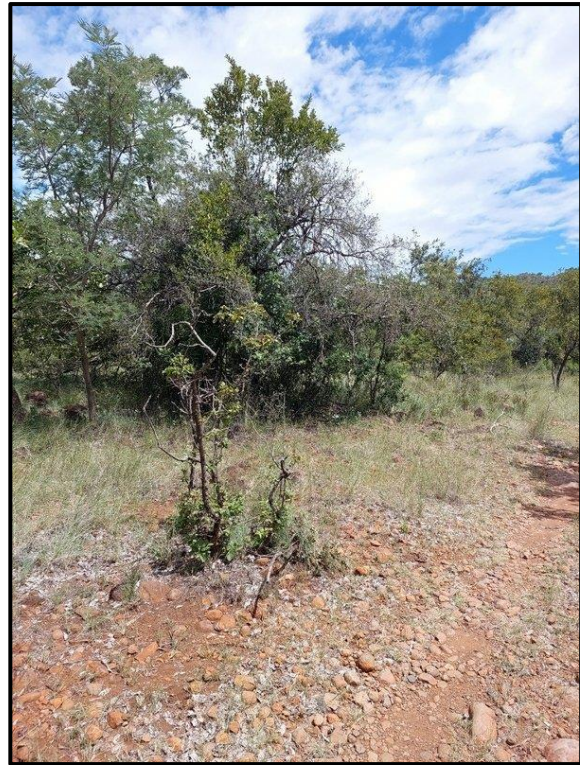


Figure 7.2. General view of the vegetation within the project area.



Figure 7.3. Image showing the tree cover along the northern boundary of the project area near the Dwarsrivier.



Figure 7.4. Image showing the rocky terrain throughout the project area.



Figure 7.5. General site conditions towards the centre of the project area.



Figure 7.6. Large disused earth dam - Possibly used for agricultural activities.



Figure 7.7. Image showing the incline of the steep hill towards the southern sections of the project area.

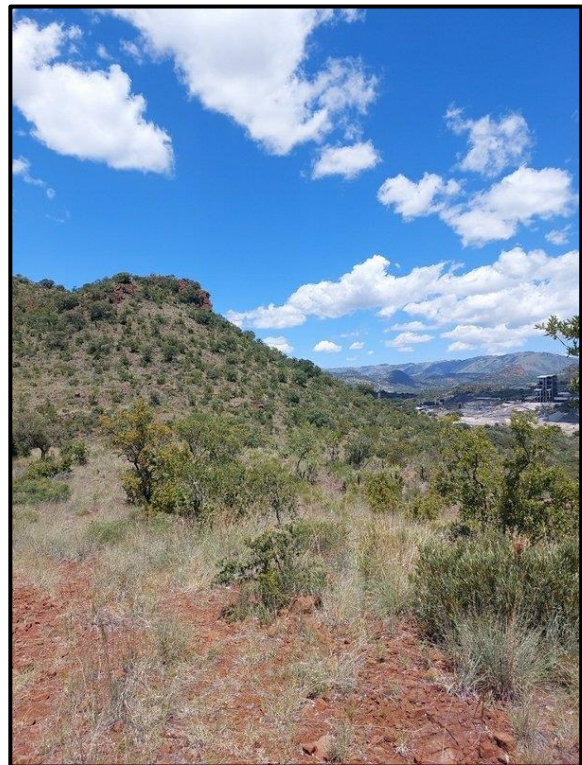


Figure 7.8. Image showing the mountainous terrain along the southern boundary of the project area.

8 Findings of the Survey

8.1 Heritage Resources

Heritage observations within the study area include small, packed stone features marking a potential burial site, two small sections of Iron Age stone walling, ruin foundations of a small square structure, and a small circular packed stone enclosure, and were recorded as Waypoints. General site conditions and site distribution of the recorded observations are illustrated in Figure 8.1 and briefly described in Table 7. A Selection of recorded features are illustrated in Figure 8.2 to 8.16.

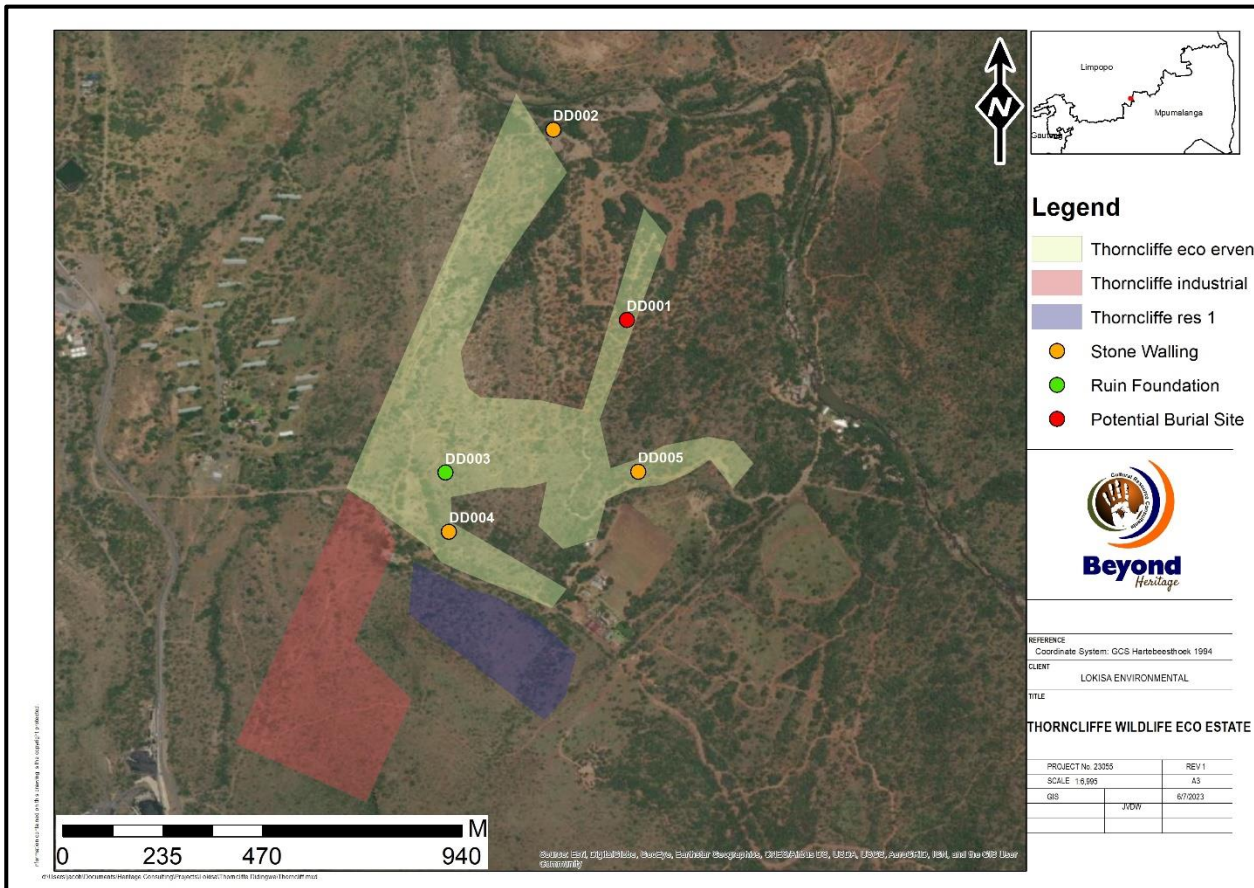


Figure 8.1. Site distribution map.

Table 7. Recorded finds in the study area

Label	Description	Longitude	Latitude	Significance/ Field Rating
DD001	The site is 5 x 5m in size and consists of a small series of packed stone features that may possibly resemble a small but highly degraded burial site containing ~ 2 to 3 packed stone graves. The site is in dense vegetation along a natural drainage line towards the northern boundary of the project area.	30° 8'27.97"E	24°58'30.96"S	Local Significance (LS) Grade 3B High significance
DD002	The site consists of a small section of Iron Age stone packed walling situated near the stream on the northern boundary of the project area. The feature is extremely degraded and overgrown with only a small section still visible and to ascribe the site to the Iron Age is tentative. The features have been encroached on by vegetation and the site extent could not be determined.	30° 8'22.43"E	24°58'16.36"S	Low Significance GP C
DD003	The site is 10 x 10m in size and consists of the foundations of a small square structure. Only the remnants of the packed stone foundation can still be seen.	30° 8'14.20"E	24°58'42.28"S	Low Significance GP C
DD004	Small section of packed stone walling possibly a small enclosure situated on a rocky outcrop potentially dating to the Iron Age or historical period. The features have been encroached on by vegetation and the site extent could not be determined.	30° 8'14.48"E	24°58'47.14"S	Low Significance GP C
DD005	The Iron Age site consist of a small circular packed stone enclosure situated towards the eastern boundary of the project area. The feature is built from loosely packed stones with walls approximately 80 cm high. The circular enclosure has an approximate diameter of 3 meters.	30° 8'28.79"E	24°58'42.78"S	Medium Significance GP B



Figure 8.2. General site conditions of DD001.



Figure 8.3. Packed stone feature that could possibly be grave dressing at DD001.



Figure 8.4. Packed stone feature at DD001 that could be grave dressing.

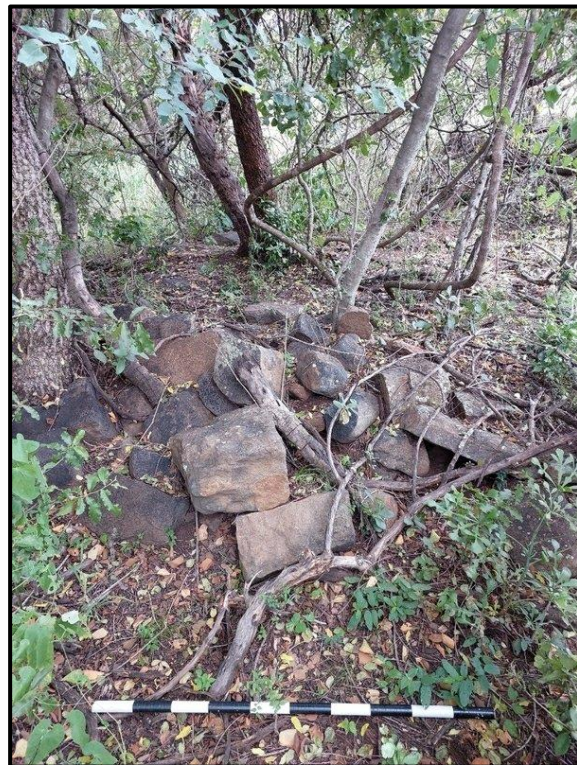


Figure 8.5. Small section of packed stone walling of DD002 situated near the edge of a small stream.

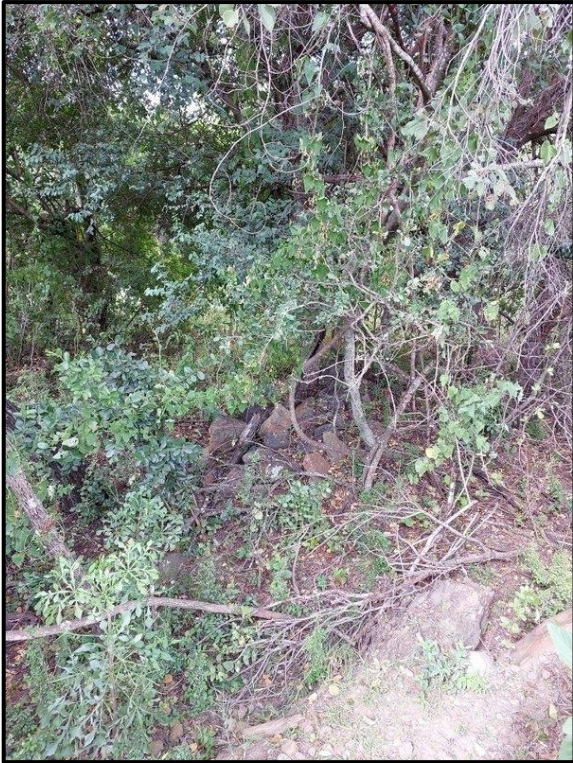


Figure 8.6. General view of the surrounding vegetation of DD002.



Figure 8.7. General site conditions of DD002.



Figure 8.8. Square packed stone foundation or the remnants of a small structure at DD003.

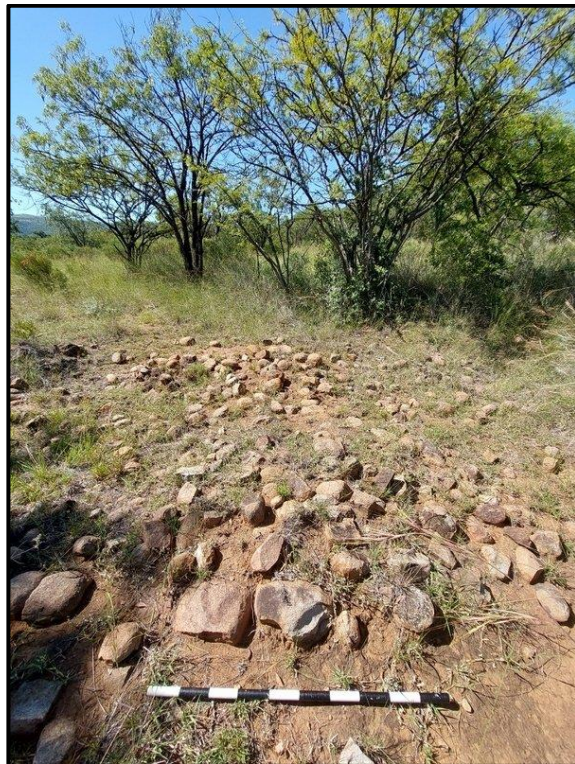


Figure 8.9. General view of the square foundation at DD003.



Figure 8.10. General view of the surrounding environment of DD003.



Figure 8.11. General view of the small packed stone feature at DD004 situated on a rocky outcrop.



Figure 8.12. Image showing a section of the packed stone walling at DD004.

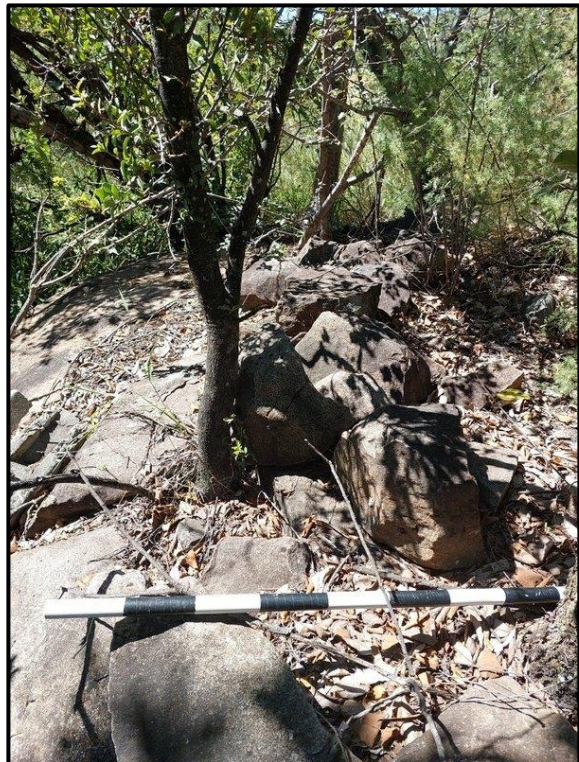


Figure 8.13. Image showing a section of the packed stone walling at DD004.



Figure 8.14. General view of the small packed stone enclosure at DD005.



Figure 8.15. Image showing a section of the packed stone feature at DD005.



Figure 8.16. General site conditions surrounding the feature at DD005.

8.2 Cultural Landscape

The cultural landscape is comprised of natural elements – the mountains and valleys surrounding the study area as well as the Dwarsrivier Geo-site, a few kilometres north-west of Dwarsrivier Chrome Mine, where a small canyon cut by the Dwars River has exposed the rare combination of black chromite seams, finely layered and split, within white anorthosite. This outcrop of a portion of the Bushveld Igneous Complex shows both the magnificent nature of the geology of this 2-billion-year-old igneous intrusion, and hints at the immense mineral wealth contained in similar (but thicker) chrome seams. The area attests to occupation from the Stone Age, with more intensive settlement during the Iron Age and more recently extensive mining operations. The project area is part of a rich, diverse and layered cultural landscape.

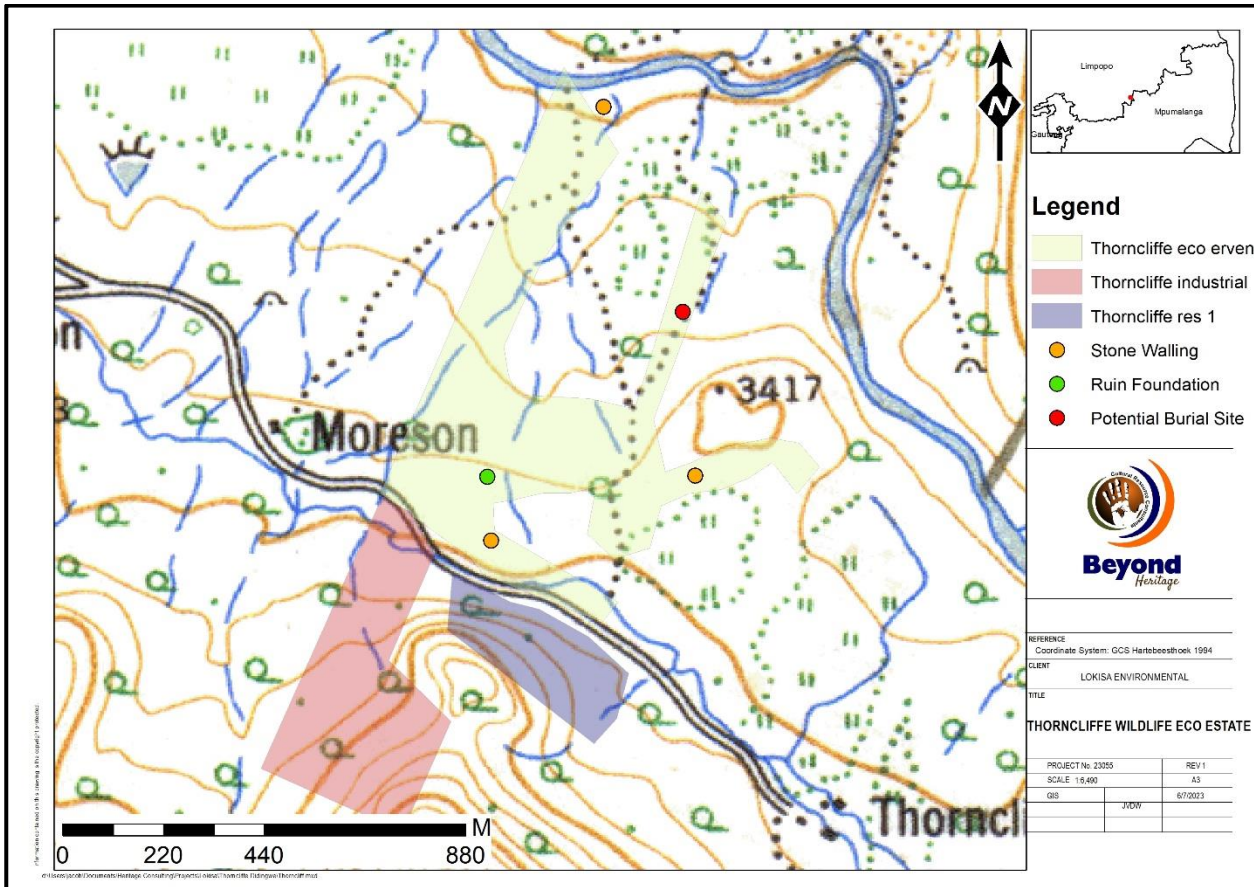


Figure 8.17. 1963 Topographic map indicating no features in the study area.

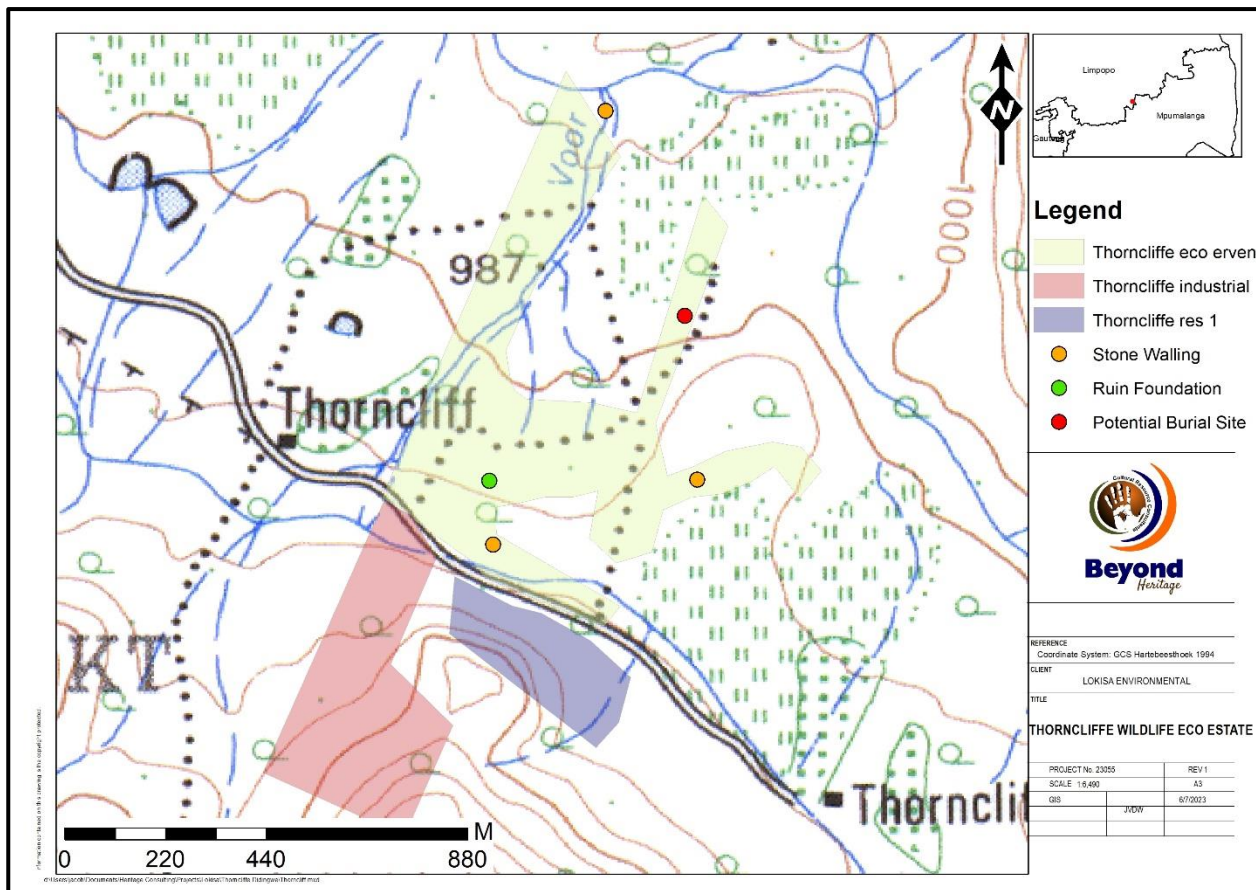


Figure 8.18. 1976 Topographic map indicating small tracks and cultivation in the surrounding area.

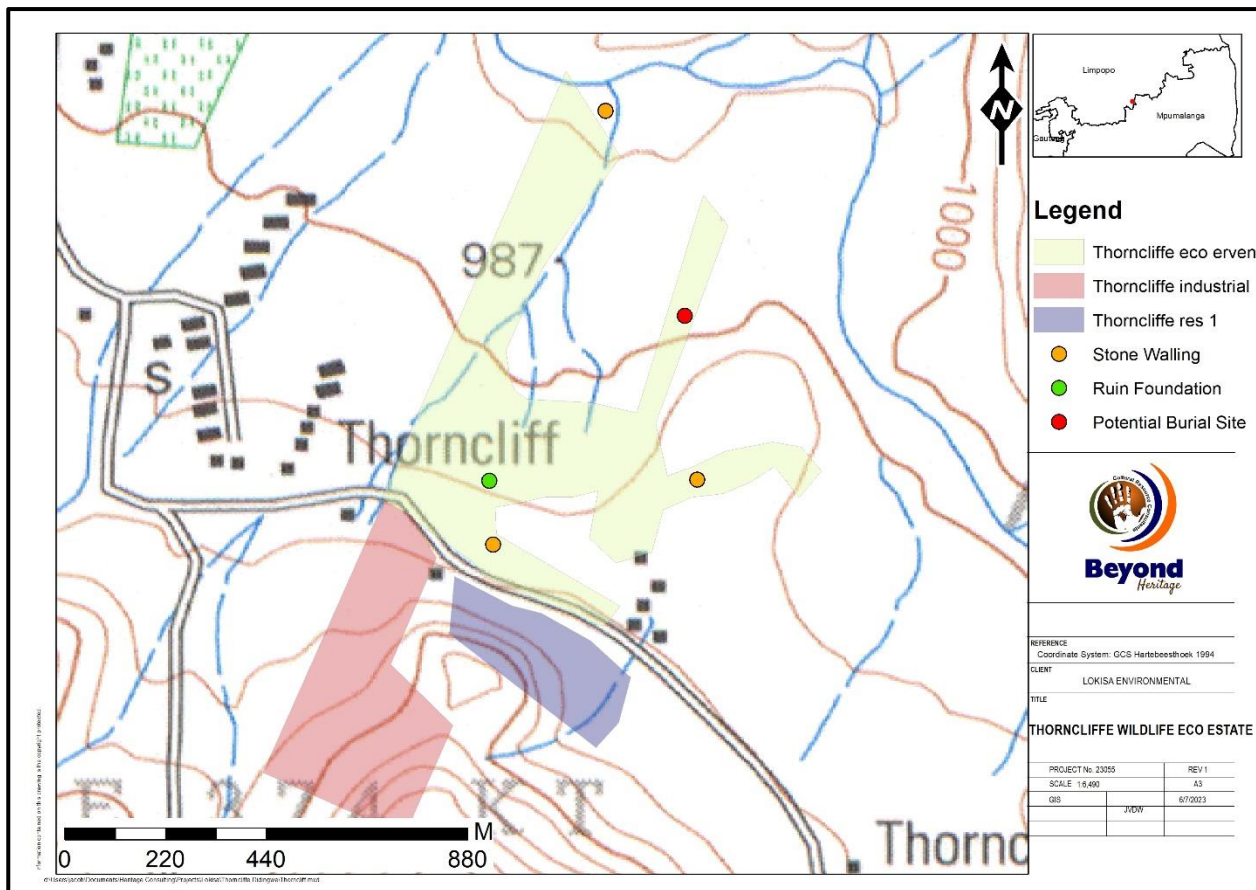


Figure 8.19. 1997 Topographic map indicating structures to the south of the study area.

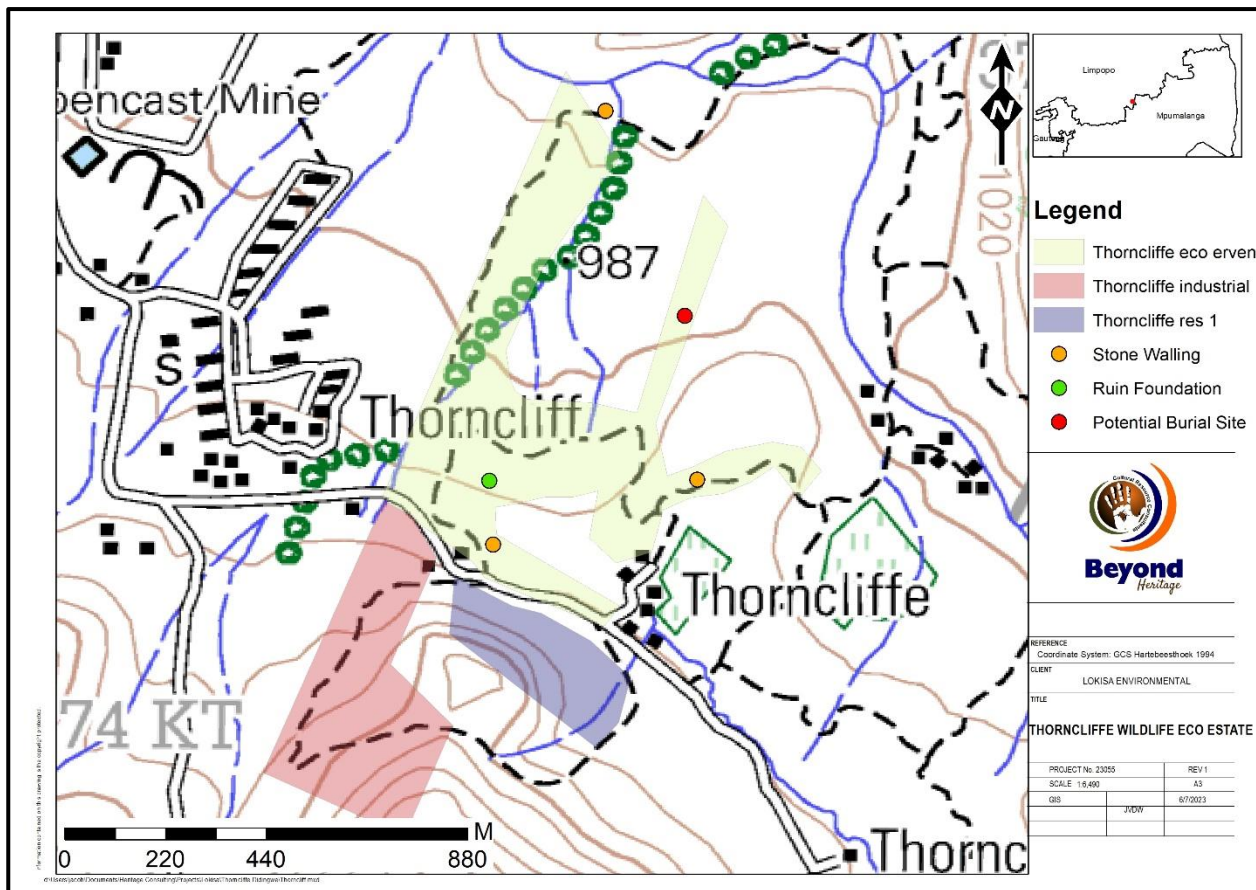


Figure 8.20. 2002 Topographic map indicating structures in the surrounding area and mining activities to the northwest of the study area.

8.3 Paleontological Heritage

The study area is indicated as of insignificant/zero to low sensitivity on the SAHRA paleontological sensitivity map (Figure 8.21), and no palaeontological studies are required however a protocol for finds is required.



Colour	Sensitivity	Required Action
RED	VERY HIGH	Field assessment and protocol for finds is required
ORANGE/YELLOW	HIGH	Desktop study is required and based on the outcome of the desktop study, a field assessment is likely
GREEN	MODERATE	Desktop study is required
BLUE	LOW	No palaeontological studies are required however a protocol for finds is required
GREY	INSIGNIFICANT/ZERO	No palaeontological studies are required
WHITE/CLEAR	UNKNOWN	These areas will require a minimum of a desktop study. As more information comes to light, SAHRA will continue to populate the map

Figure 8.21. Paleontological sensitivity of the approximate study area (yellow polygon) as indicated on the SAHRA Palaeontological sensitivity map.

9 Potential Impact

The potential burial site at DD001 is of high significance unless proven not to be graves. The circular enclosure at DD005 is of medium significance and any impact to these features will be negative. The Iron Age stone walling ruins at DD002 is outside of the development and will not be directly impacted on. Feature DD003 & DD004 will be impacted on by residential erven but as both sites are of low significance, the impact will therefore also be low at both sites.

Any additional effects to subsurface heritage resources can be successfully mitigated by implementing a chance find procedure. Mitigation measures as recommended in this report should be implemented during all phases of the project. Impacts of the project on heritage resources is expected to be low during all phases of the development if the correct mitigation measures are followed (Table 8-10).

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. These activities can have a negative and irreversible impact on heritage features if any occur. 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. Potential impacts include destruction or partial destruction of non-renewable heritage resources.

9.1.3 Operation Phase

No impacts are expected during the operation phase.

9.1.4 Impact Assessment for the Project

Table 8. Impact assessment on low significance ruins (DD003, DD004)

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 (1)	Local (1)
Duration	Permanent (5)	Permanent (5)
Magnitude	Low (4)	Minor (2)
Probability	Probable (3)	Improbable (2)
Significance	30 (Low)	16 (Low)
Status (positive or negative)	Negative	Negative
Reversibility	Not reversible	Not reversible
Irreplaceable loss of resources?	Yes	Yes
Can impacts be mitigated?	NA	NA
Mitigation:		
<ul style="list-style-type: none"> Avoidance of the Stone Packed features with a 30m buffer zone is preferable but if this is not possible the stone packed features (DD002, DD003, DD004) can be mitigated (recorded and mapped) after which a destruction permit can be applied for; Regular monitoring of the development footprint by the ECO to implement the Chance Find Procedure for heritage and palaeontology resources (outlined in Section 10.2) in case heritage resources are uncovered during construction. 		
Cumulative impacts:		

The cumulative impact can be mitigated to an acceptable level with the implementation of the recommendations in this report.

Residual Impacts:

Although surface sites can be avoided or mitigated, there is a chance that completely buried sites would still be impacted on, but this cannot be quantified.

Table 9. Impact assessment on potentially degraded burial site of DD001.

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 (1)	Local (1)
Duration	Permanent (5)	Permanent (5)
Magnitude	Moderate (6)	Moderate (6)
Probability	Highly Probable (4)	Improbable (2)
Significance	48 (Medium)	24 (Low)
Status (positive or negative)	Negative	Negative
Reversibility	Not reversible	Not reversible
Irreplaceable loss of resources?	Yes	Yes
Can impacts be mitigated?	NA	NA

Mitigation:

- Due the widespread occurrence of unmarked graves in the greater area, the local community/ stakeholders must be consulted with during the social consultation process to confirm possible grave sites in the study area and verify the presence of graves at DD001.
- If DD001 is confirmed to be a grave site, it is recommended that the potential burial site is indicated on development plans, demarcated with access for family and avoided with a 30 m buffer, a grave management plan should also be compiled for the site;
- If confirmed to be graves (DD001) and avoidance is not possible, the graves can be relocated adhering to all legal requirements and with the relevant permits in place, but this must be seen as a last resort and is not preferable;
- Regular monitoring of the development footprint by the ECO to implement the Chance Find Procedure for heritage and palaeontology resources (outlined in Section 10.2) in case heritage resources are uncovered during construction.

Cumulative impacts:

The cumulative impact can be mitigated to an acceptable level with the implementation of the recommendations in this report.

Residual Impacts:

Although surface sites can be avoided or mitigated, there is a chance that completely buried sites would still be impacted on, but this cannot be quantified.

Table 10. Impact Assessment on circular enclosure at DD005.

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 (1)	Local (1)

Duration	Permanent (5)	Permanent (5)
Magnitude	Moderate (4)	Moderate (4)
Probability	Probable (3)	Improbable (2)
Significance	30 (Medium)	20 (Low)
Status (positive or negative)	Negative	Negative
Reversibility	Not reversible	Not reversible
Irreplaceable loss of resources?	Yes	Yes
Can impacts be mitigated?	NA	NA
Mitigation: <ul style="list-style-type: none"> Avoidance of the Stone Packed features with a 30m buffer zone is preferable but if this is not possible the stone packed features (DD005) can be mitigated (recorded and mapped) after which a destruction permit can be applied for; Regular monitoring of the development footprint by the ECO to implement the Chance Find Procedure for heritage and palaeontology resources (outlined in Section 10.2) in case heritage resources are uncovered during construction. 		
Cumulative impacts: The cumulative impact can be mitigated to an acceptable level with the implementation of the recommendations in this report.		
Residual Impacts: Although surface sites can be avoided or mitigated, there is a chance that completely buried sites would still be impacted on, but this cannot be quantified.		

10 Conclusion and recommendations

The potential burial site at DD001 is of high significance unless proven not to be graves. The circular enclosure at DD005 is of low to medium significance and any impact to these features will be negative. The Iron Age stone wall ruins at DD002 is outside of the development and will not be directly impacted on. The small stone walled features at DD003 & DD004 will be impacted on by residential erven but as both sites are of low significance, the impact will therefore also be low at both sites and these sites can be mitigated. The palaeontological sensitivity of the project area is indicated as insignificant/zero to low and no palaeontological studies are required however a protocol for finds is required.

It is recommended that the project can commence on the condition that the following recommendations (Section 10) are implemented as part of the EMP and based on approval from SAHRA.

10.1 Recommendations for condition of authorisation

The following recommendations for Environmental Authorisation apply and the project may only proceed based on approval from SAHRA:

Recommendations:

- Due the widespread occurrence of unmarked graves in the greater area, the local community/ stakeholders must be consulted with during the social consultation process to confirm possible grave sites in the study area and verify the presence of graves at DD001.
- If DD001 is confirmed to be a grave site, it is recommended that the potential burial site is indicated on development plans, demarcated with access for family and avoided with a 30 m buffer, a grave management plan should also be compiled for the site;
- If confirmed to be graves (DD001) and avoidance is not possible, the graves can be relocated adhering to all legal requirements and with the relevant permits in place, but this must be seen as a last resort and is not preferable;
- Avoidance of the Stone Packed features with a 30m buffer zone is preferable but if this is not possible the stone packed features (DD002, DD003, DD004 and DD005) can be mitigated (recorded and mapped) after which a destruction permit can be applied for;
- Regular monitoring of the development footprint by the ECO to implement the Chance Find Procedure for heritage and palaeontology resources (outlined in Section 10.2) in case heritage resources are uncovered during construction.

10.2 Chance Find Procedures

10.2.1 Heritage Resources

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 and monitoring guidelines applicable to the Chance Find procedure is discussed below and monitoring guidelines for this procedure are provided in Section 10.5.

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.

10.2.2 Monitoring Programme for Palaeontology – to commence once the excavations / drilling activities begin.

1. The following procedure is only required if fossils are seen on the surface and when drilling/excavations commence.
2. When excavations begin the rocks and discard must be given a cursory inspection by the environmental officer or designated person. Any fossiliferous material (plants, insects, bone or trace fossils) should be put aside in a suitably protected place. This way the project activities will not be interrupted.
3. Photographs of similar fossils must be provided to the developer to assist in recognizing the trace fossils such as stromatolites in the dolomites or the Quaternary bones, rhizoliths, traces. This information will be built into the EMP's training and awareness plan and procedures.
4. Photographs of the putative fossils can be sent to the palaeontologist for a preliminary assessment.
5. If there is any possible fossil material found by the developer/environmental officer then the qualified palaeontologist sub-contracted for this project, should visit the site to inspect the selected material and check the dumps where feasible.
6. Fossil plants or vertebrates that are considered to be of good quality or scientific interest by the palaeontologist must be removed, catalogued and housed in a suitable institution where they can be made available for further study. Before the fossils are removed from the site a SAHRA permit must be obtained. Annual reports must be submitted to SAHRA as required by the relevant permits.
7. If no good fossil material is recovered, then no site inspections by the palaeontologist will be necessary. A final report by the palaeontologist must be sent to SAHRA once the project has been completed and only if there are fossils.
8. If no fossils are found and the excavations have finished, then no further monitoring is required.

10.3 Reasoned Opinion

The overall impact of the project is considered to be low if the correct mitigation measures are followed and residual impacts can be managed to an acceptable level through implementation of the recommendations made in this report. The socio-economic benefits also outweigh the possible impacts of the development if the correct mitigation measures are implemented for the project.

10.4 Potential risk

Potential risks to the proposed project are the occurrence of intangible features, unrecorded cultural material and burial sites. This can cause delays during construction, as well as additional costs involved in mitigation, as well as possible layout changes.

10.5 Monitoring Requirements

Day to day monitoring can be conducted by the Environmental Control Officers (ECO). The ECO or other responsible persons should be trained along the following lines:

- *Induction training:* Responsible staff identified by the developer should attend a short course on heritage management and identification of heritage resources.
- *Site monitoring and watching brief:* As most heritage resources occur below surface, all earth-moving activities need to be routinely monitored in case of accidental discoveries. The greatest potential impacts are from pre-construction and construction activities. The ECO should monitor all such activities daily. If any heritage resources are found, the chance finds procedure must be followed as outlined above.

Table 11. Monitoring requirements for the project

Heritage Monitoring					
Aspect	Area	Responsible for monitoring and measuring	Frequency	Proactive or reactive measurement	Method
Cultural Resources Chance Finds	Entire project area	ECO	Weekly (Pre construction and construction phase)	Proactively	<ul style="list-style-type: none"> • If risks are manifested (accidental discovery of heritage resources) the chance find procedure should be implemented: <ol style="list-style-type: none"> 1. Cease all works immediately; 2. Report incident to the Sustainability Manager; 3. Contact an archaeologist/ palaeontologist to inspect the site; 4. Report incident to the competent authority; and 5. Employ reasonable mitigation measures in accordance with the requirements of the relevant authorities.

Heritage Monitoring					
Aspect	Area	Responsible for monitoring and measuring	Frequency	Proactive or reactive measurement	Method
					<ul style="list-style-type: none">• Only recommence operations once impacts have been mitigated.

10.6 Management Measures for inclusion in the EMPr

Table 12. Heritage Management Plan for EMPr implementation

Area	Mitigation measures	Phase	Timeframe	Responsible party for implementation	Target	Performance indicators (Monitoring tool)
General project area	Regular monitoring of the development footprint by the ECO to implement the Chance Find Procedure for heritage and palaeontology resources (outlined in Section 10.2) in case heritage resources are uncovered during construction;	Construction	Throughout the project	Applicant EAP	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 35, 36 and 38 of NHRA	ECO Checklist/Report
DD001	Due the widespread occurrence of unmarked graves in the greater area, the local community/ stakeholders must be consulted with during the social consultation process to confirm possible grave sites in the study area and verify the presence of graves at DD001. If DD001 is confirmed to be a grave site, it is recommended that the potential burial site is indicated on development plans, demarcated with access for family and avoided with a 30 m buffer, a grave management plan should also be compiled for the site; If confirmed to be graves (DD001) and avoidance is not possible, the graves can be relocated adhering to all legal requirements and with the relevant permits in place, but this must be seen as a last resort and is not preferable;	Pre-construction	Throughout the project	Applicant EAP	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 35, 36 and 38 of NHRA	ECO Checklist/Report
Stone Packed Features	Avoidance of the Stone Packed features with a 30m buffer zone is preferable but if this is not possible the stone packed features (DD002, DD003, DD004 and DD005) can be mitigated (recorded and mapped) after which a destruction permit can be applied for.	Pre-construction	Throughout the project	Applicant EAP	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 35, 36 and 38 of NHRA	ECO Checklist/Report

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