HERITAGE IMPACT ASSESSMENT

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

FOR THE PROPOSED CONSTRUCTION OF A SOLAR PHOTOVOLTAIC (PV) PLANT TO GENERATE UP TO 40 MW OF ENERGY (ERGO MINING SOLAR PV ENERGY PHASE 2) BRAKPAN, CITY OF EKURHULENI METROPOLITAN MUNICIPALITY, GAUTENG PROVINCE

Type of development:

Renewable Energy Development

Client:

Environmental Management Assistance (Pty) Ltd

Applicant:

Tshedza 3 Investments (Pty) Ltd

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Project Reference:
Project number 22110

Report date:
August 2022

APPROVAL PAGE

Project Name	The Proposed Construction of a Solar Photovoltaic (PV) plant to generate up to 40 MW of Energy (Ergo Mining Solar PV Energy Phase 2) Brakpan, City of Ekurhuleni Metropolitan Municipality, Gauteng Province
Report Title	Heritage Impact Assessment for the Proposed Construction of a Solar Photovoltaic (PV) plant to generate up to 40 MW of Energy (Ergo Mining Solar PV Energy Phase 2) Brakpan, City of Ekurhuleni Metropolitan Municipality, Gauteng Province
Authority Reference Number	SAHRA CaseID: 18418
Report Status	Draft Report
Applicant Name	Tshedza 3 Investments (Pty) Ltd

Responsibility	Name	Qualifications and Certifications	Date
Fieldwork and reporting	Jaco van der Walt - Archaeologist	MA Archaeology ASAPA #159 APHP #114	July and August 2022
Fieldwork	Ruan van der Merwe - Archaeologist	BA Hons Archaeology	July 2022
Palaeontological Assessment	Prof Marion Bamford	PhD Paleo Botany	July 2022

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Amendments on Document

Date	Report Reference Number	Description of Amendment

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REPORT OUTLINE

Appendix 6 of the GNR 326 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
(b) Declaration that the specialist is independent in a form as may be specified by the competent authority	*Declaration of Independence*
(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.
(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	Section 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 and 10.5
(l) Conditions for inclusion in the environmental authorisation	Section 10. 1 and 10.5
(m) Monitoring requirements for inclusion in the EMPr or environmental authorisation	Section 10. 4.
(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 5
(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	No other information requested at this time

Executive Summary

Environmental Management Assistance (Pty) Ltd (EMA) has been appointed as the independent environmental assessment practitioner (EAP) to apply for environmental authorization for the proposed construction of a Solar Photovoltaic (PV) plant to generate up to 40 MW of Energy (Phase 2). The Project is located in Brakpan, City of Ekurhuleni Metropolitan Municipality, Gauteng Province. Beyond Heritage was appointed to conduct a Heritage Impact Assessment (HIA) for the project and the study area was assessed through a desktop assessment and by a non-intrusive pedestrian field survey. Key findings of the assessment include:

- The study area is characterised by cultivation and mining activities from the 1940's onwards with various features relating to the built environment occurring in the area, that is older than 60 years, and therefore protected by Heritage Legislation. Additionally historical material was recorded that washed out of reclaimed slimes dams;
- In addition, previous assessments in the area recorded Stone Age sites concurring with Stone age scatters recorded in this assessment.
- Based on the SAHRA paleontological sensitivity map the study area is indicated as of insignificant, low, moderate and high sensitivity and an independent study was conducted for this aspect. Bamford (2022) concluded that the project can continue and that a Fossil Chance Find Protocol should be added to the Environmental Management Programme (EMPr).
- Both the Preferred and Alternative lay out are acceptable from a heritage point of view provided that the recommendations in this report are adhered to.

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

Recommendations:

- Implementation of Chance Find Procedure for the project;
- Monitoring of the study area by the ECO;
- If impacted on the standing structures (DRD008) must be assessed and recorded prior to the application for a destruction or alteration permit adhering to all legal requirements.

Declaration of Independence

Specialist Name	Jaco van der Walt
Declaration of Independence	I declare, as a specialist appointed in terms of the National Environmental Management Act (Act No 107 of 1998) and the associated 2014 Environmental Impact Assessment (EIA) Regulations (as amended), that I: • 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.
Signature	
Date	19/08/2022

a) Expertise of the specialist

Jaco van der Walt has been practising as a Cultural Resource Management (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 the Association of South African Professional Archaeologists (ASAPA) (#159) and have conducted more than 500 impact assessments in Limpopo, Mpumalanga, North West, Free State, Gauteng, Kwa Zulu Natal (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, 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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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)
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 the historic period)
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 for the proposed construction of a Solar Photovoltaic (PV) plant to generate up to 40 MW of Energy (Phase 2) Brakpan, City of Ekurhuleni Metropolitan Municipality, Gauteng Province. The site is located on Ergo Mining owned land adjacent to the Withok Estates Agricultural Holdings within the City of Ekurhuleni Metropolitan Municipality, Gauteng Province (Figure 1.1 to 1.3). The proposed project forms part of a phased approach and entails the development of 40 MW PV facility (hereafter referred to as Phase 2) to integrate with a prior planned and applied for 19.9 MW PV Facility (referred to as Phase 1) for the same study area. The environmental studies undertaken for Phase 1 included the assessment of ancillary infrastructure that will be shared and utilised for Phase 2. The final complete facility (±60 MW; i.e., Phase 1 and Phase 2 combined) will connect to two (2) existing substations (i.e., Ergo Central 88/6 KV substation at the mine and the Ergo Transfer Pumps 88/11 KV substation at the tailings dam). The report forms part of the Environmental Impact Assessment (EIA) and Environmental Management Programme (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, historical artefacts and Stone Age scatters as well as structures possibly older than 60 years 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 this report. The South African Heritage Resources Agency (SAHRA) as a commenting authority under section 38(8) of NHRA 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) 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).

1.2 Project Description

Project components and the location of the proposed Ergo Mining Phase 2 (40MW) PV Plant is outlined under Table 2 and 3.

Table 2: Project Description

Affected properties for Impact Assessment phase	Preferred Layout Area Farm Witpoortje 117 IR Portion 183 Farm Witpoortje 117 IR Portion 272 Alternate Layout Area Farm Witpoortje 117 IR Portion 183 (this area is the same for both the preferred and alternate layout areas) Farm Withok 131 IR Portion 9
Central co-ordinate of the development	26°17'20.90"S and 28°21'37.02"E
Topographic Map Number	2828 AD

Table 3: Infrastructure and project activities

Type of development	Renewable Energy Development
Size of development	~120 hectares
Project Components include but are not limited to: • 40 MW PV panels • Inverter stations • New substation • Internal access roads, and external road access	

1.3 Alternatives

Three areas were provided for assessment namely A1, B and C (Figure 1.1 – 1.3). The preferred layout includes the following properties:

- Farm Witpoortje 117 IR Portion 183 (Area A1)
- Farm Witpoortje 117 IR Portion 272 (Area B)

The Alternate layout Area includes the following properties:

- Farm Witpoortje 117 IR Portion 183 (This area (Area A1) is the same for both the preferred and alternate area)
- Farm Withok 131 IR Portion 9 (Area C)

- The extent of the area assessed allows for siting of the development within these areas to minimize impacts to heritage resources.
- Both the Preferred and Alternative layout are acceptable from a heritage point of view provided that the recommendations in this report are adhered to.

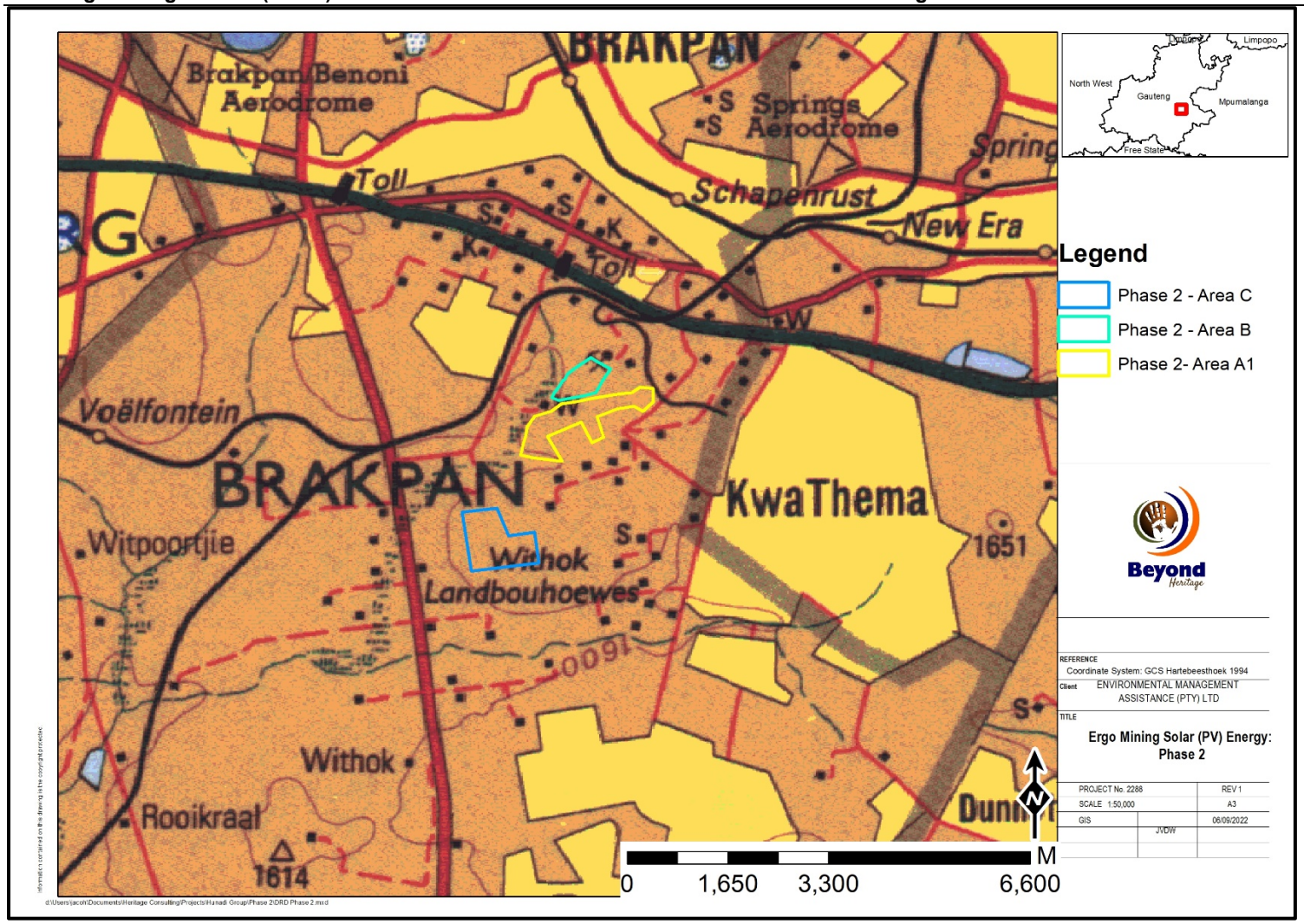

Figure 1.1. Regional setting of the Project (1: 250 000 topographical map).

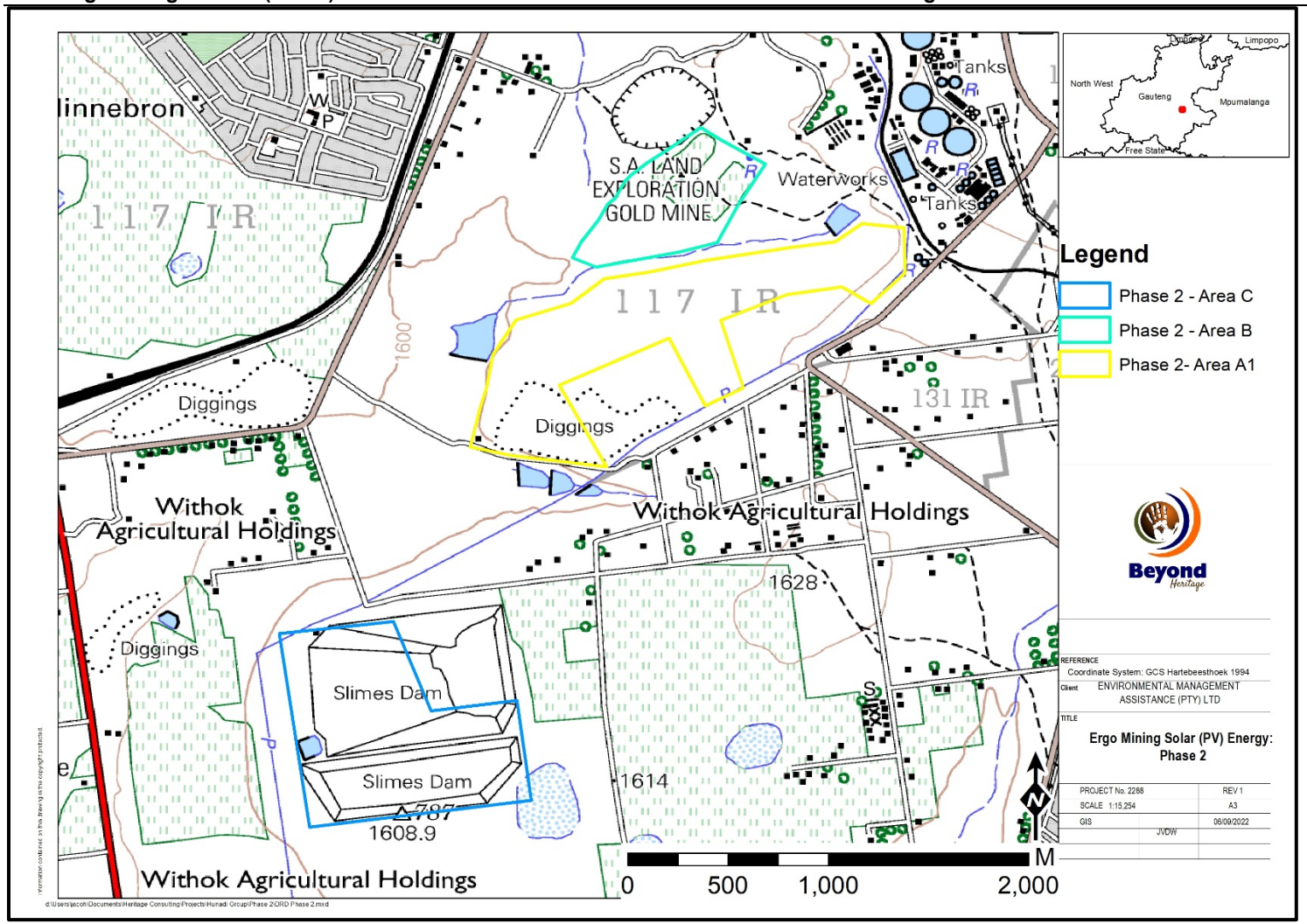

Figure 1.2. Local setting of the Project (1: 50 000 topographical map). Note the excavations and slimes dams in the Project Area.

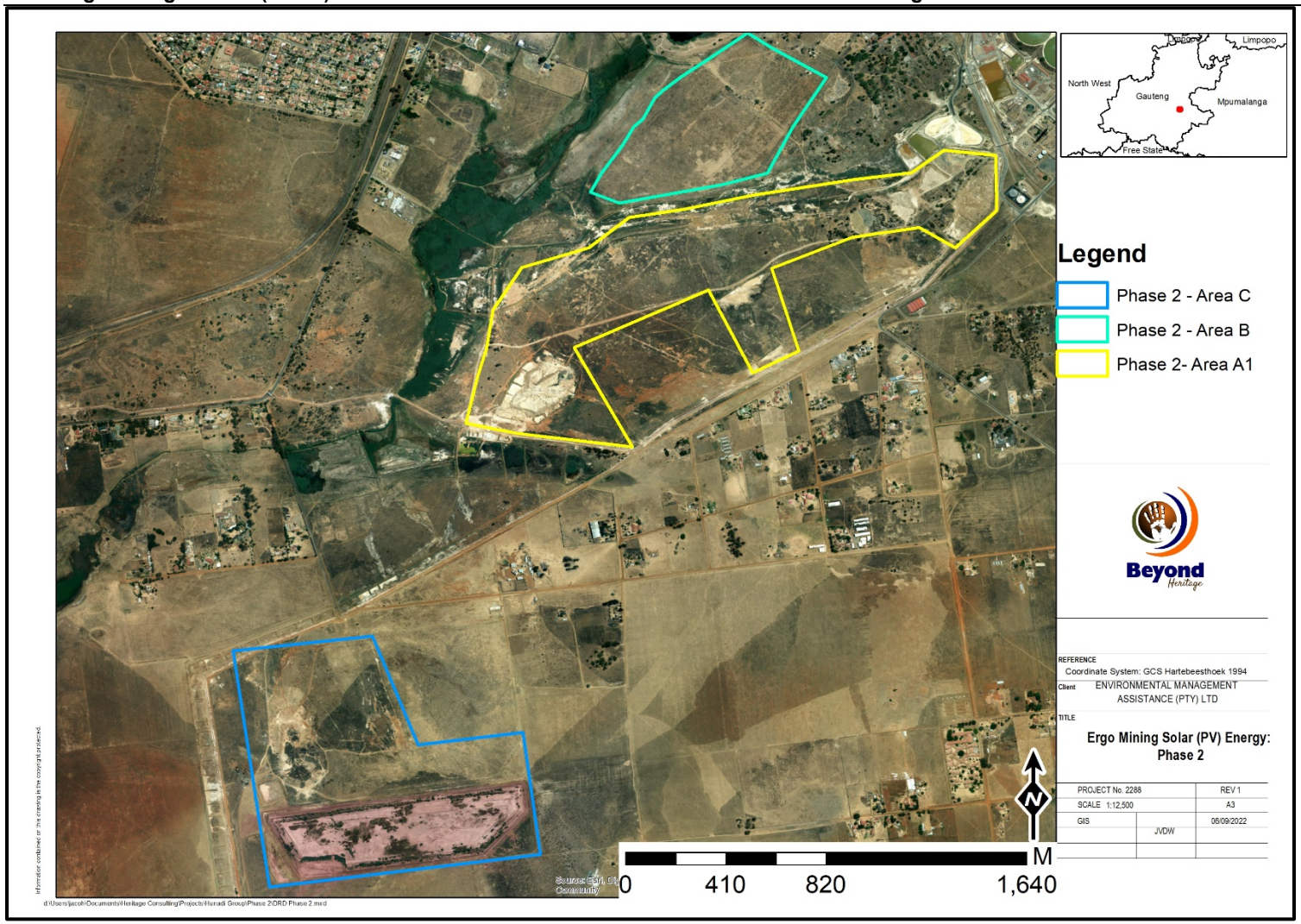

Figure 1.3. Aerial image of the Project area.

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 EMPr, to the PHRA if established in the province 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 EMPr, 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 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 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 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 EIA 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 undertaken by the EAP was to capture and address any issues raised by community members and other stakeholders.

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 area and to 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	31 May 2022
Season	Autumn – The time of year and season did influence the survey as general archaeological visibility was low due to dense grass cover. Existing as well as abandoned mining infrastructure further hampered archaeological visibility and accessibility. The Project area was however sufficiently covered to understand the heritage character of the area (Figure 3.1).

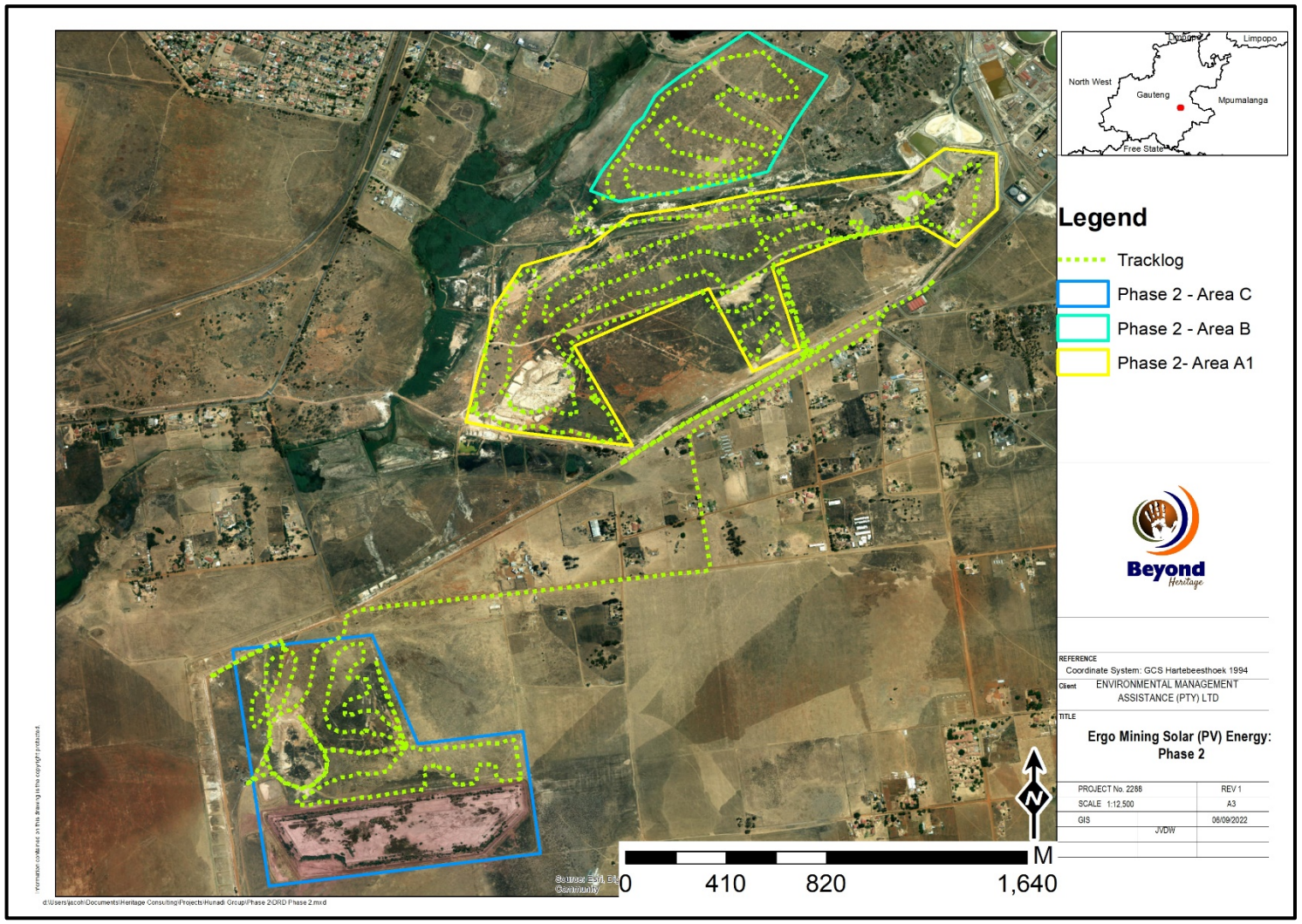

Figure 3.1. Tracklog of the survey path in green.

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

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

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 nature of heritage resources and pedestrian surveys, the possibility exists that some features or artefacts may not have been discovered/recorded and the possible occurrence of graves and other cultural material cannot be excluded. This limitation is successfully mitigated with the implementation of a Chance Find Procedure and monitoring of the study area by the Environmental Control Officer (ECO). 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 will be 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

According to Census 2011, the Ekurhuleni municipality has a total population of just under 3,2 million individuals, 78,7% of whom are black African. Whites make up 15,8%, and other race groups comprise the remaining 5,5%. Of those aged 20 years and older, 3,3% have completed primary school, 35,3% have some secondary education, 35,5% have completed matric and 14,6% have some form of higher education. In terms of employment, there are about 1,6 million economically active individuals (i.e. those who are employed or unemployed but looking for work) residing within the municipality. Of these, 28,8% are unemployed. When the youth (15–34 years) are considered, there are about 840 000 economically active individuals, 36,9% of whom are unemployed (www.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 EIA 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. No heritage concerns have been raised thus far.

6 Literature / Background Study:

6.1 Literature Review (SAHRIS)

The area under investigation was not previously assessed and few HIA's was conducted in the immediate area. Studies conducted in the general area that were consulted is listed in Table 6.

Table 6. Studies conducted in the greater area.

Author	Year	Project	Findings
Van Schalkwyk, J.	1995	A Survey of Cultural Resources Along The Proposed PWV 16 Road Corridor, Brakpan District	No Sites were identified
Huffman, TN and Van der Merwe, HD.	1995	Archaeological Survey of Withoekspruit, Brakpan	Stone Age finds and historical sites
Gaigher, S.	2013	Heritage Impact Assessment for the Proposed Vulcania Cemetery Development	No heritage sites
Gaigher, S.	2014	Heritage Impact Assessment for the Proposed Ergo Road Residential Development	Historical structure.
Gaigher, S.	2018	Heritage Impact Assessment for the Proposed New Mixed-Use Residential Development and Related Infrastructure: Minnebron Extension 1 on Portions 64 - 65, 165 and the Remainder of Portion 3 of the Farm Witpoortjie 117 I.R., in the Ekurhuleni Metropolitan Municipality, Gauteng Province	Mining related features, no heritage sites
Kitto, J.	2019	The proposed Valley Silts Project, City of Johannesburg Metropolitan Municipality, Gauteng Province – HIA	Stone structure and a cemetery
Van der Walt, J & van der Merwe, R.	2021	HIA – Ergo Mining Solar (PV) Energy: Phase 1	Remains of structures and a Stone Age site.

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. The database of the Genealogical Society of South Africa indicated no known grave sites within the study area

6.2 Archaeological Background

6.2.1 Stone Age

The Stone Age can be divided in three main phases 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 humans. 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.

Although there are no published Stone Age sites located near the study area an Early to Middle Stone Age site occur adjacent to the current Project area and more sites dating to this period can be expected. There is also evidence of the use of the larger area by Stone Age communities for example along the Kliprivier where ESA and MSA tools where recorded. LSA material is recorded along ridges to the south of the current study area (Huffman 2008). Petroglyphs occur at Redan as well as along the Vaal River (Berg 1999).

6.2.1. The Iron Age

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: Most of the first millennium AD.
- The Middle Iron Age: 10th to 13th centuries AD
- The Late Iron Age: 14th century to colonial period.

The Iron Age is characterised by the ability of these early people to manipulate and work Iron ore into implements that assisted them in creating a favourable environment to make a better living. Extensive Stone walled sites are recorded at Klipriviers Berg Nature reserve belonging to the Late Iron Age period. A large body of research is available on this area. These sites (Taylor's Type N, Mason's Class 2 & 5) are now collectively referred to as Klipriviersberg (Huffman 2007).

These settlements are complex in that aggregated settlements are common, the outer wall sometimes includes scallops to mark back courtyards, there are more small stock kraals, and straight walls separate households in the residential zone. These sites date to the 18th and 19th centuries and was built by people in the Fokeng cluster. In this area the Klipriviersberg walling would have ended at about AD 1823, when Mzilikazi entered the area (Rasmussen 1978). This settlement type may have lasted longer in other areas because of the positive interaction between Fokeng and Mzilikazi.

6.2.3. Historical Information

Brakpan was first named in 1886 and grew rapidly after the discovery of coal (in 1888) and gold (in 1905). Brakpan officially became a town in 1919.

6.2.4. Anglo-Boer War

The Anglo-Boer War was the greatest conflict that had taken place in South Africa up to date. One skirmish is listed for the Brakpan area on the Farm Hartebeesfontein on 18th February 1901 (http://www.boerenbrit.com/archives/9658)

7 Description of the Physical Environment

The proposed project area is divided into three portions spread across the landscape south of the DRD Ergo mine in Brakpan. The project area is situated mainly along 17th road about 1.5km south of the N17 highway. The environment around the DRD Ergo mine is characterised by highly disturbed portions of grassland. These areas of overgrown grass are situated on portions previously used as large Slimes dams that were later reclaimed. This is evident through historical imagery on Google earth. The proposed project area is fairly dominated by the mine's associated infrastructure such as the large existing pipelines running along 17th road and the existing slimes dams within Area A1. A small drainage line also runs through Area A1 with two man-made dams. The existing dump on the western end of Area A1 is surrounded by what seems to be settling ponds. A small stream runs along the northern edge of area A1. Area B is situated north of the stream. Area C is situated further along the road (17th road becomes 10th road) near a large historical tailings dam. This area is an open grassland that has also been fairly disturbed by the various mining activities. The entire area C includes two existing slimes dams. (Figure 7.1 to 7.4).

Figure 7.1. Area A1 - Exposed soil near the man-made dam closest to the pipelines.

Figure 7.2. Existing mine dump on the western edge of area A1

Figure 7.3. General site conditions across Area B - Thick grass cover across the entire area B.

Figure 7.4. Large existing mine dump situated within area C

8 Findings of the Survey

8.1 Heritage Resources

The study area is highly disturbed by mining activities and archaeological sites and heritage finds were limited to refuse material brought into the area with 20th century artefacts (mixed with modern mining refuse), ruins and broken-down structures and isolated Stone Age artefacts. The spatial distribution of these observations is illustrated in Figure 8.1. Historical refuse material is washing out of the remains of the slime dams in area A1 and where these were reclaimed. These artefacts are attributed to household refuse and include glass fragments, metal and fragments of burnt cattle bones and were probably discarded along with the mine waste material. Low density and isolated MSA lithics are also recorded where the reclamation of the large slimes dam that covered the entire area A1 used to be. Heritage mitigation of a site on the Ergo property showed that these artefacts are all out of context and most probably being brought in during the construction of the slimes dam (van der Walt in prep). Features were numbered sequentially with the prefix DRD. General site conditions, site distribution and selected features are illustrated in Figure 8.2 – 8.15. Recorded observations are briefly described in Table 7.

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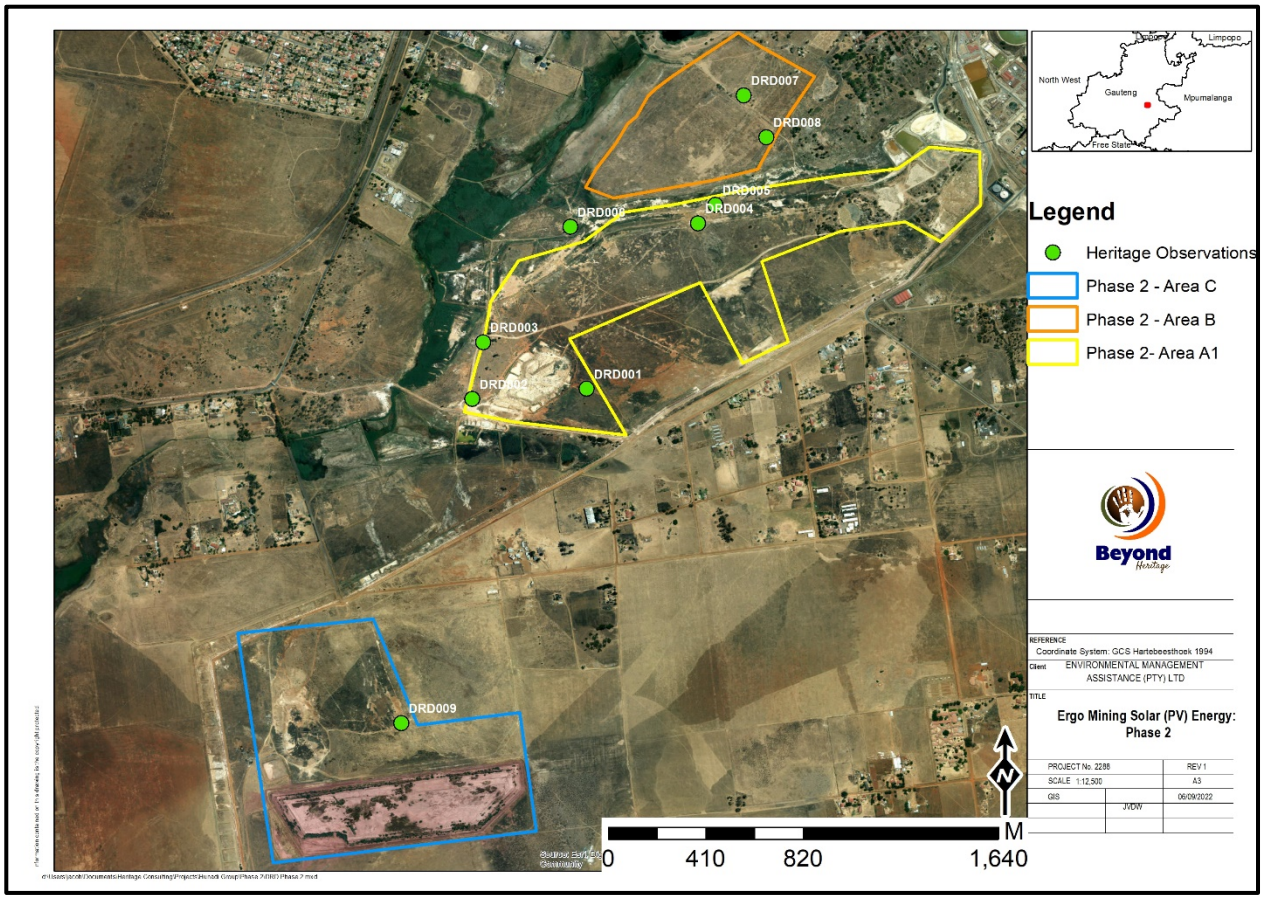


Figure 8.1. Heritage site distribution in relation to the Project area.

Table 7. Heritage observations recorded in the study area.

Label	Location	Type Site	Description	Significance and Field Rating
DRD 001	28° 21' 28.1952" E 26° 17' 37.4135" S	Historical artefacts	Refuse material that is out of context is found where the remains of the reclaimed slimes dam that covered the entire Area A1 used to be.	GP C Low Significance
DRD 002	28° 21' 12.6217" E 26° 17' 38.7959" S	Historical artefacts	Historical/Recent refuse material that is out of context is found where the remains of the reclaimed slimes dam that covered the entire Area A1 used to be	GP C Low Significance
DRD 003	28° 21' 14.0797" E 26° 17' 31.0451" S	Historical artefacts	Refuse material that is out of context is found at the remains of reclaimed slimes dam is located on the western end of Area A1.	GP C Low Significance
DRD 004	28° 21' 43.3620" E 26° 17' 14.8669" S	Historical artefacts	Refuse material that is out of context is found at the remains of the reclaimed slimes dam that covered Area A1.	GP C Low Significance
DRD 005	28° 21' 45.7129" E 26° 17' 12.3503" S	Stone Age Artefacts	Low density of less than 1 artefact per 2m² of MSA lithics situated on the edge of the small stream between area A1 and B. These are washed and out of context.	GP C Low Significance
DRD 006	28° 21' 25.9596" E 26° 17' 15.3600" S	Ruin	Large broken down structure/foundation. The feature seems to have been a structure with multiple rooms. The feature is totally demolished and only the foundations are still visible as well as a small section of wall. Site measures approximately 20 x 20 m.	GP C Low Significance
DRD 007	28° 21' 49.5937" E 26° 16' 57.4213" S	Ruins	Large series of broken down structures and foundations situated in area B. Only the ephemeral remains of foundations are still visible.	GP C Low Significance
DRD 008	28° 21' 52.6643" E 26° 17' 03.1343" S	Structures	Three small cement structures. Possibly part of past mining infrastructure, currently occupied by squatters.	GP C Low Significance
DRD 009	28° 21' 02.9591" E 26° 18' 22.9393" S	Stone age Artefacts	Small collection of MSA flakes situated on a section of exposed gravels in Area A1 near the remnants of the reclaimed slimes dam and is out of context.	GP C Low Significance

Figure 8.2. Small collection of glass fragments.

Figure 8.3. Remains of reclaimed slimes dam.

Figure 8.4 Small collection of glass artefacts washing out of the remains of the reclaimed slimes dam on the western edge of Area A1

Figure 8.5. General view of dumped material at the slimes dams.

Figure 8.6. Refuse material washing out of the existing slimes dams at DRD003.

Figure 8.7. Small collection of glass artefacts at DRD004.

Figure 8.8. Dorsal view MSA artefacts at DRD005.

Figure 8.9. Ruin at DRD006.

Figure 8.10. Ruins at DRD007. Only foundations are left in Area B.

Figure 8.11. Three small structures at DRD008. The structures are currently occupied by squatters.

Figure 8.12. MSA flakes at DRD009.

Figure 8.13. Reclaimed slimes dam at DRD009.

8.2 Cultural Landscape

The project site is situated on Ergo Mining owned land adjacent to the Withok Estates Agricultural Holdings and Witpoort Estates Agricultural Holdings areas of Brakpan within the City of Ekurhuleni Metropolitan Municipality, Gauteng Province. The area is characterised by cultivation and mining activities from the 1940's onwards.

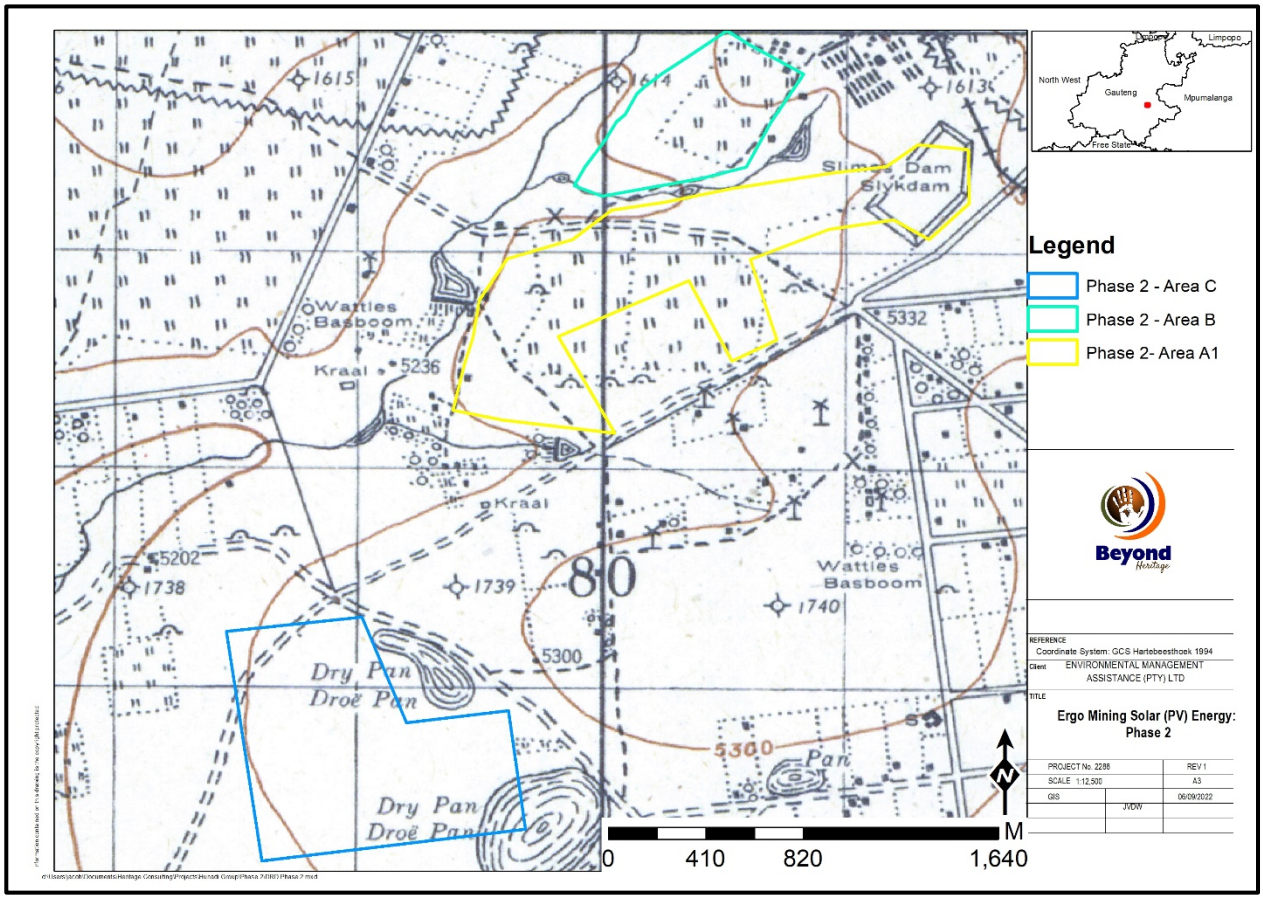


Figure 8.14. 1944 Topographic map indicating a number of huts in Area A1 as well as cultivation in the study area.

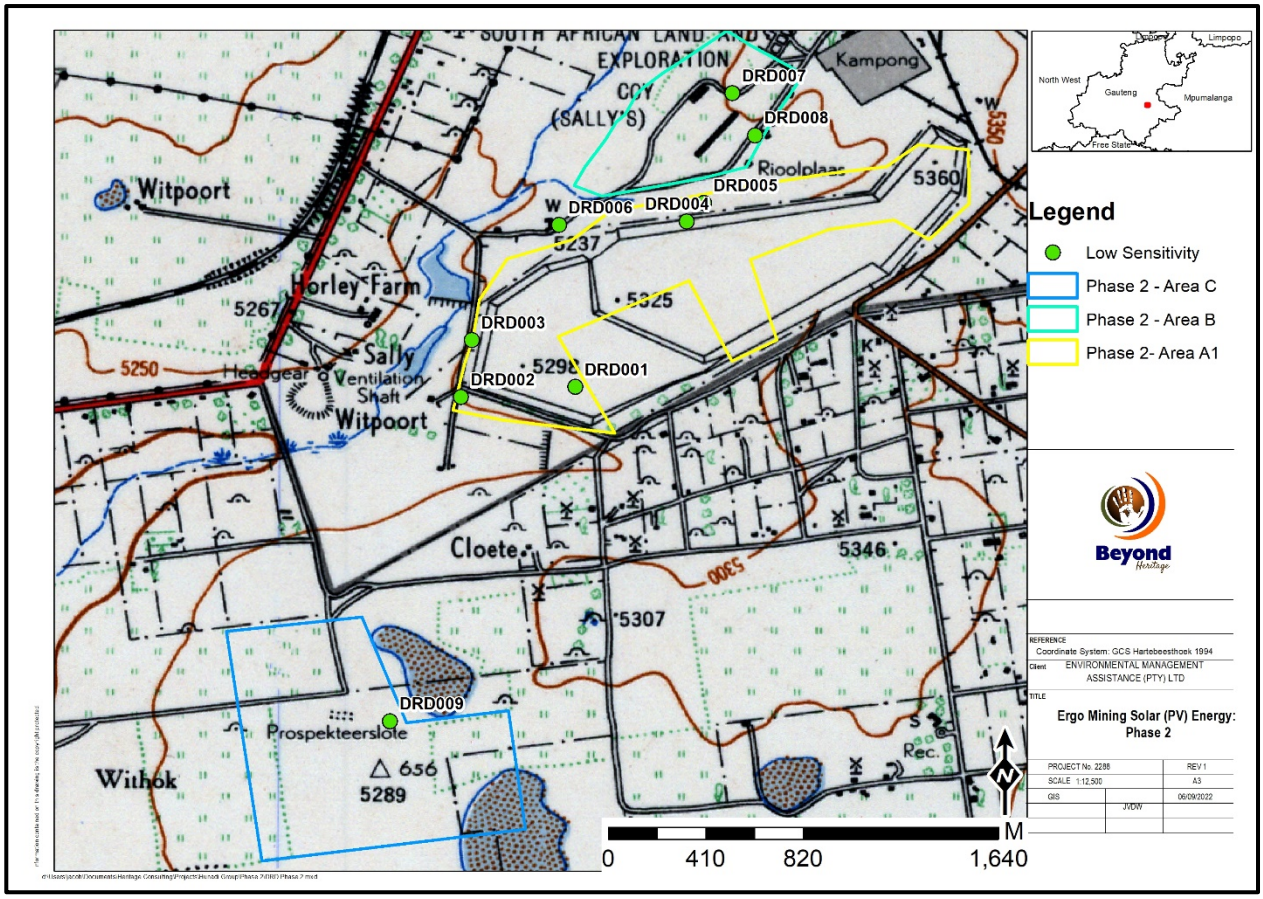


Figure 8.15. 1960 Topographic map of the study area indicating the recorded observations. Structures are indicated at DRD007 and 008.

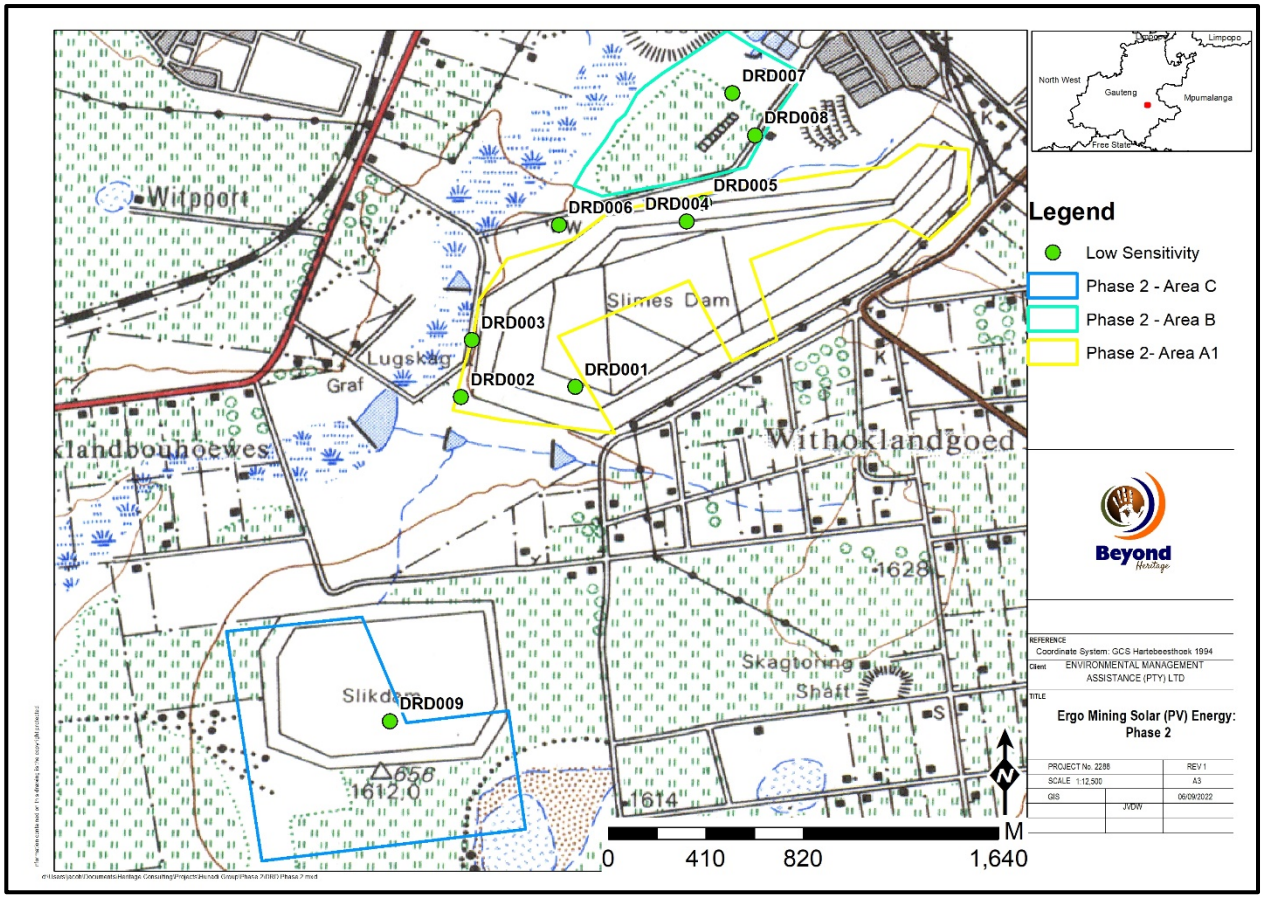
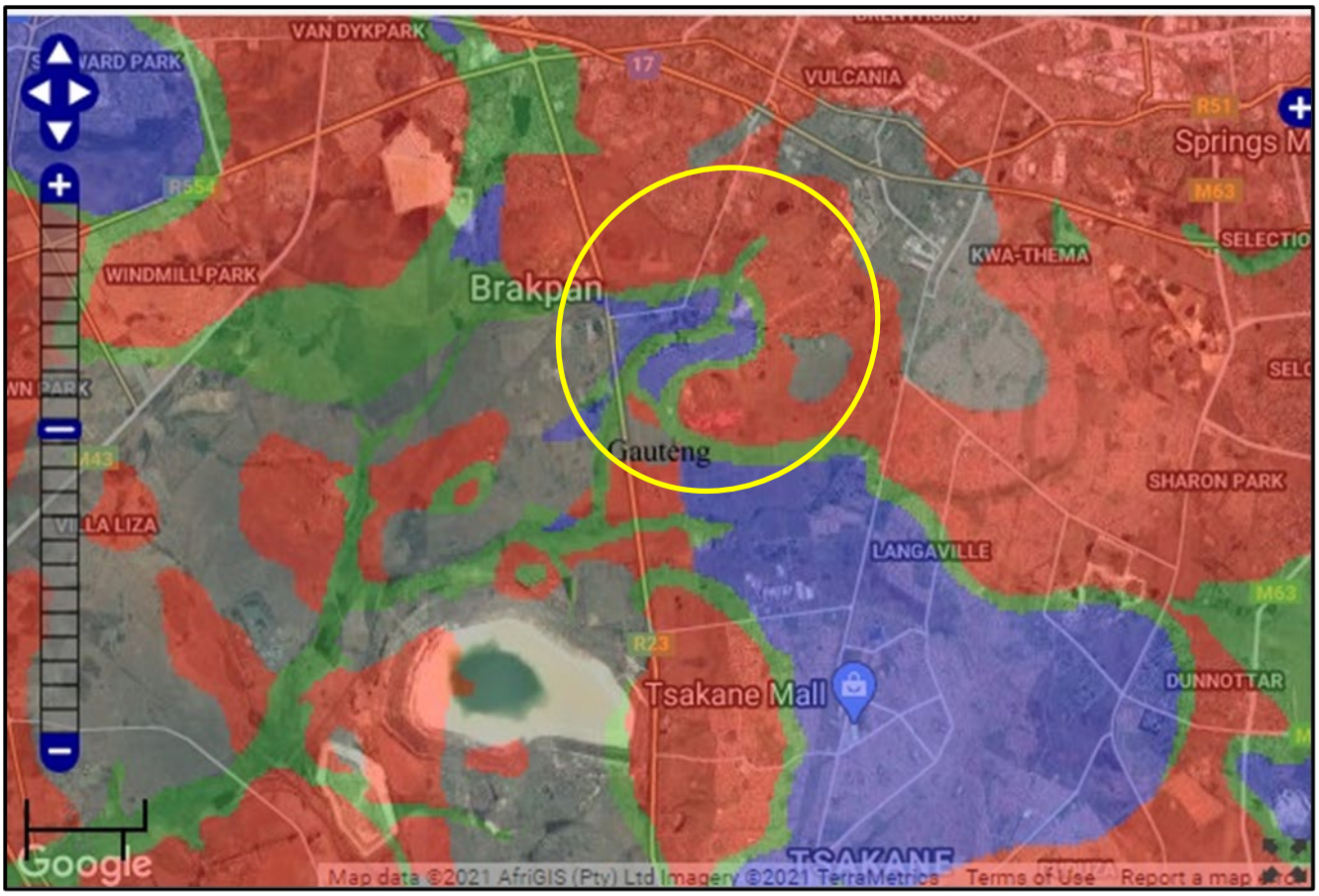


Figure 8.16. 1976 Topographic map of the study area. Much of the study area have been impacted on by slimes dams and mining developments.

8.3 Paleontological Heritage

According to the SAHRA Paleontological map the study area is of moderate paleontological significance (Figure 8.17) and an independent study was conducted for this aspect. Bamford (2022) concluded that it is extremely unlikely that any fossils would be preserved in the overlying soils of the Quaternary. In addition, the area is already disturbed by mining activities and infrastructure. There is a very small chance that fossils may occur in the below ground shales of the early Permian Vryheid Formation so a Fossil Chance Find Protocol should be added to the EMPr. If fossils are found by the contractor, environmental officer, or other responsible person once excavations for foundations, poles and infrastructure have commenced then they should be rescued, and a palaeontologist called to assess and collect a representative sample. The impact on the palaeontological heritage would be low so the project should be authorised. As far as the palaeontology is concerned, there is no preference for the site of the photovoltaic collectors, or for the grid connection.



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

9 Potential Impact

Impacts to heritage resources without mitigation within the project footprint will be permanent and negative and occur during the pre-construction and construction activities. Historical and modern artefacts were recorded where the reclaimed slimes dam that covered area A1 (DRD001 to DRD004) occurred. The artefacts are out of context and isolated, but artefacts at DRD003 and DRD004 allude to historical mining and associated occupation of the area and surrounds. These are mostly in a mixed context and of low significance. Better preserved samples have been mitigated and recorded by Pelser (2022) that showed these to be of limited value and most probably being dumped at these locations.

The survey recorded Stone Age artefacts at DRD005 and DRD009. The artefacts are out of context and scattered too sparsely to be of significance apart from mentioning them in this report and can be attributed to background scatter (Orton 2016) of low significance.

The recorded structures and ruins at DRD006, DRD007 and DRD008, potential to contribute to aesthetic, historic, scientific, and social aspects are non-existent, and it is therefore of low heritage significance. Feature DRD006 is located outside of the impact areas and will not be affected by the project. The standing structures at DRD008 are likely older than 60 years and therefore fall under the ambit of the NHRA based on their age and if impacted on mitigation will be required. The ruin at DRD007 has been destroyed to such an extent that nothing of historical value remains. The impacts can be mitigated to an acceptable level (Figure 9.1).

Any additional effects to subsurface heritage resources can be successfully mitigated by implementing a chance find procedure. Mitigation measures for specific observations as outlined under Table 9 and additional recommendations in this report should be implemented during all phases of the project. With the implementation of the recommended mitigation measures impacts of the project on heritage resources is acceptable (Table 8).

Cumulative impacts considered as an effect caused by the proposed action that results from the incremental impact of an action when added to other past, present, or reasonably foreseeable future actions. (Cornell Law School Information Institute, 2020). 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 this project, impacts can be mitigated to an acceptable level. However, this and other projects in the area can have a negative impact on heritage sites in the area where these sites have been destroyed unknowingly.

9.1.1 Pre-Construction phase

It is assumed that the pre-construction phase involves the removal of topsoil and vegetation in impact areas 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

Potential impact is illustrated in Figure 9.1 and 9.2 and assessed in Table 8.

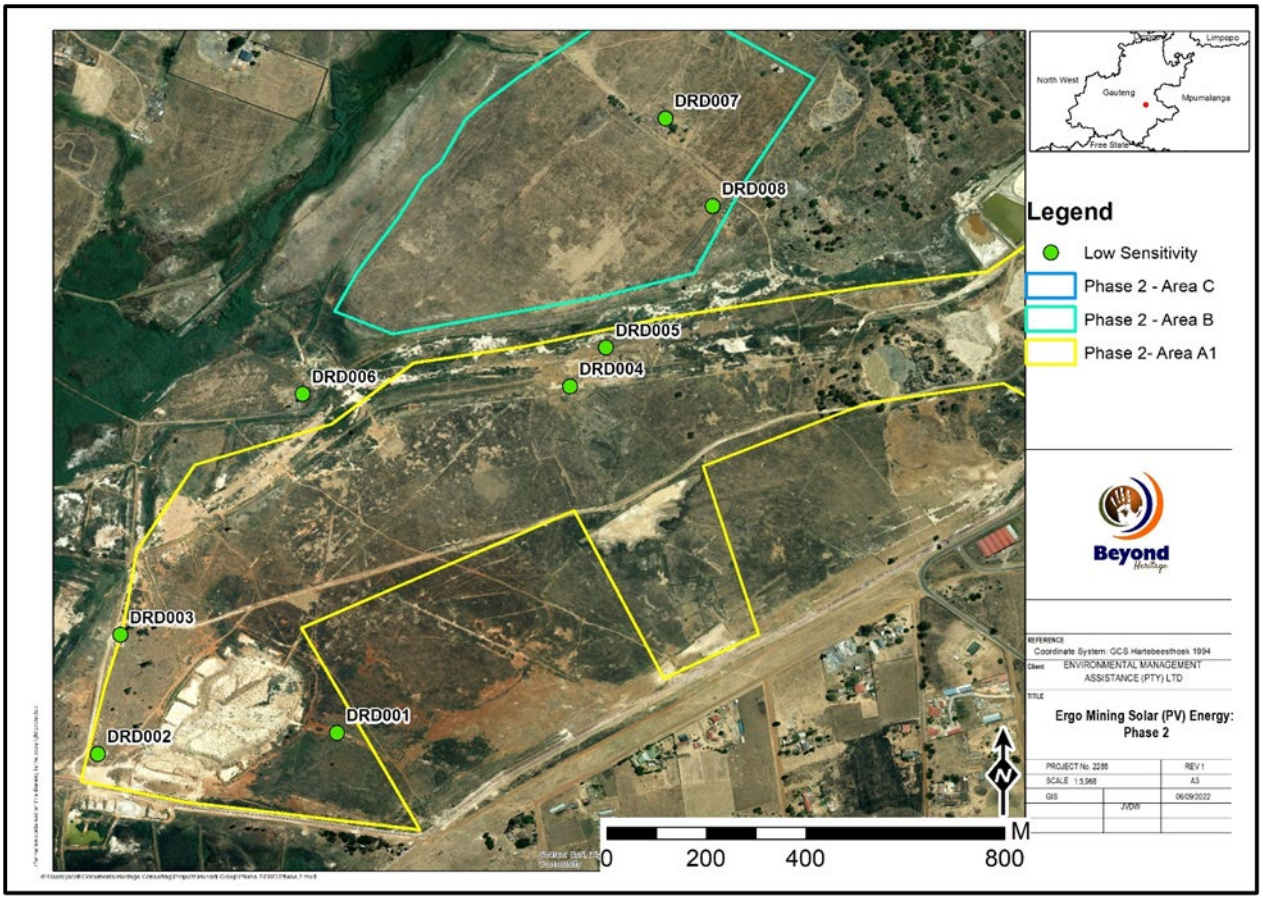


Figure 9.1. Site DRD001 to 008 in relation to the proposed impact area (preferred layout).

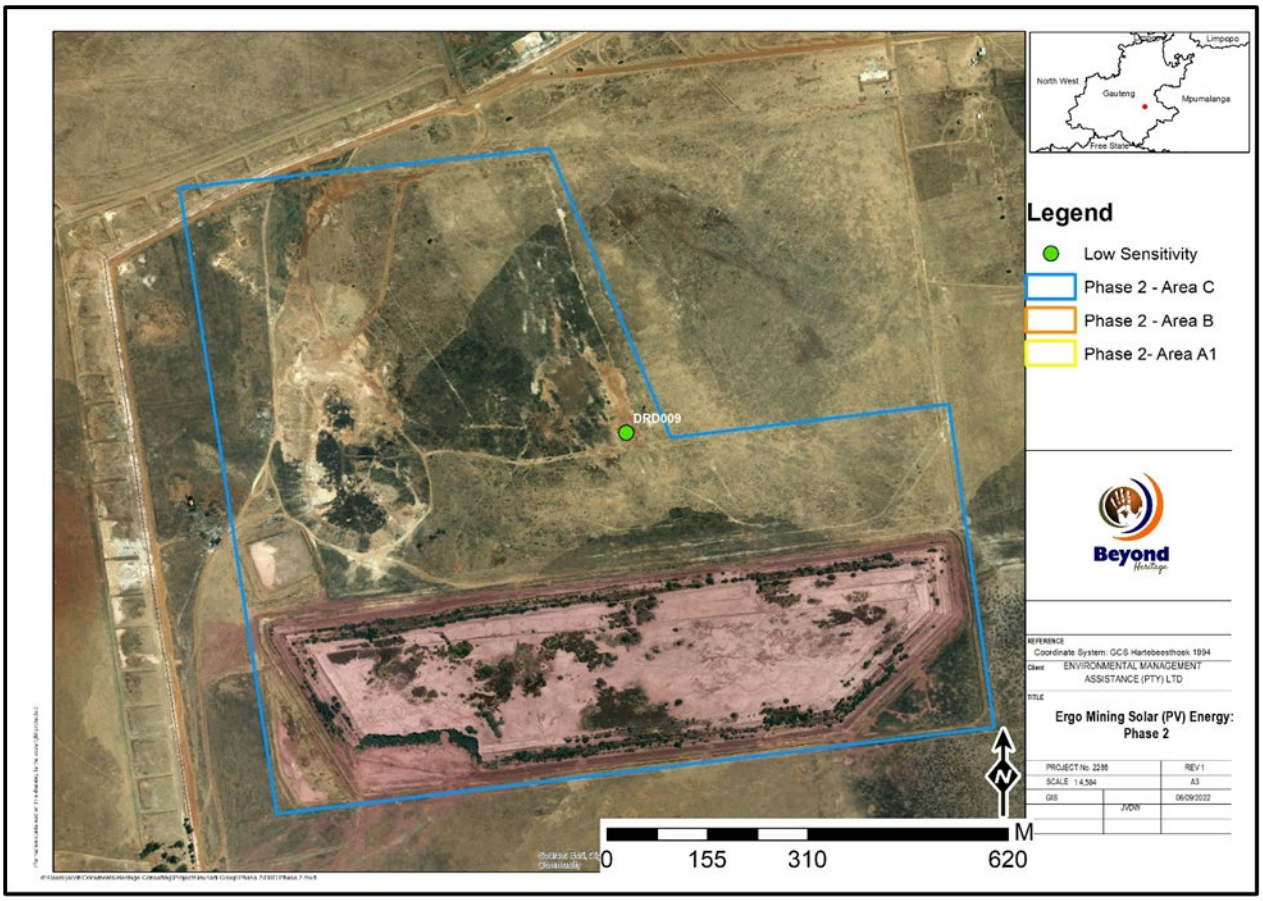


Figure 9.2. Site DRD009 in relation to the proposed impact area (portion of alternate layout).

Table 8. Impact assessment for the project.

Activity:	Construction and Operation of PV Plant (Preferred and Alternative layout)				
Impact:	During the construction and operation 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				
Significance rating:	**Duration**	**Extent**	**Magnitude**	**Probability**	**Significance**
Pre-Mitigation	5	3	4	3	**36**
Post-Mitigation	5	2	2	3	**27**
Is the Impact Reversible?	• Impacts to heritage resources are irreversible.				
Mitigation Measures:	• Implementation of Chance Find Procedure for the project; • Monitoring of the study area by the ECO; • If impacted on the standing structures (DRD008) must be assessed and recorded prior to the application for a destruction or alteration permit adhering to all legal requirements				
Cumulative impacts:	• The greater study area has been impacted on by various mining developments and the current development has a low to medium cumulative impact.				
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.				
Climate Change:	• NA				

10 Conclusion and recommendations

The Project area is characterised by disturbed areas that were previously mined and is considered to be of low archaeological potential. This was confirmed during the field survey and finds were limited to ruins, structures, and scattered historic artefacts as well as isolated stone age artefacts. DRD 007, 008 and 009 are indicated on archival maps dating to 1960. The structures (DRD 008) are protected based on their age and if impacted on will require mitigation prior to the application for a destruction permit adhering to all legal requirements. The ruins at DRD007 and DRD009 have been destroyed to such an extent that no features with heritage value remain. Scattered Stone Age artefacts are indicators of landscape occupation but are out of context and scattered too sparsely to be of significance. Historical artefacts on site were washed out of dumps, are poorly preserved and similar examples have been mitigated and recorded by Pelser (2022) resulting in limited artefacts being recovered. Both the Preferred and Alternative lay out are acceptable from a heritage point of view provided that the recommendations in this report are adhered to.

According to the SAHRA Paleontological sensitivity map the study area is of moderate paleontological significance (Figure 8.9) and an independent study was conducted for this aspect. Bamford (2022) concluded that it is extremely unlikely that any fossils would be preserved in the loose soils and sands of the Quaternary. There is a very small chance that fossils may occur in the shales and siltstones of the early Permian Vryheid Formation, but only more than 5m below the surface, therefore, a Fossil Chance Find Protocol should be added to the EMPr.

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

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:

- Implementation of Chance Find Procedure for the project;
- Monitoring of the study area by the ECO;
- If impacted on the standing structures (DRD008) must be assessed and recorded prior to the application for a destruction or alteration permit adhering to all legal requirements.

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 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 Program for Paleontology – 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 must be given a cursory inspection by the environmental officer or designated person. Any fossiliferous material (trace fossils, fossils of plants, insects, bone or coalified material) 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 fossil plants, vertebrates, invertebrates or trace fossils in the shales and mudstones. 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 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 and unrecorded cultural resources (of which graves and subsurface cultural material are the highest risk). This can cause delays during construction, as well as additional costs involved in mitigation and 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. If any heritage resources are found, the chance finds procedure must be followed as outlined above.

Table 9. Monitoring requirements for the project

Heritage Monitoring					
Aspect	**Area**	**Responsible for monitoring and measuring**	**Frequency**	**Proactive or reactive measurement**	**Method**
Cultural Heritage Resources	Entire project area	EO & ECO	Weekly (Pre construction and construction phase)	Proactively	• If risks are manifested (accidental discovery of heritage resources) the chance find procedure should be implemented: 1. Cease all works immediately; 2. Report incident to Site Manager 3. EPC (Engineering Procurement and Construction) Contractor to contact an archaeologist/ palaeontologist to inspect the site; 4. Report incident to SAHRA; as advised by specialist and 5. Employ site specific mitigation measures recommended by the specialist after assessment in accordance with the requirements of the relevant authorities. • Only recommence operations once impacts have been mitigated.

10.6 Management Measures for inclusion in the EMPr

Table 10. Heritage Management Plan for EMPr implementation

Area	Mitigation measures	Phase	Timeframe	Responsible party for implementation	Target	Performance indicators (Monitoring tool)
General project area	Implement chance find procedures in case possible heritage finds are uncovered	Construction	Throughout the project	Applicant EPC Contractor	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 35, 36 and 38 of NHRA	ECO Checklist/Report
DRD008	If the structures will be altered or destroyed the features must be assessed prior to the application for a destruction or alteration permit adhering to all legal requirements	Pre-Construction and construction	Throughout the project	Applicant/ EAP	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 36 of NHRA	ECO Checklist/Report
General project area	Monitoring of the study area by the ECO	Construction	Throughout the project	Applicant EPC Contractor	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 35, 36 and 38 of NHRA	ECO Checklist/Report

11 References

Archaeological database, University of the Witwatersrand.

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

Gaigher, S. 2018 . Heritage Impact Assessment for the Proposed New Mixed-Use Residential Development and Related Infrastructure: Minnebron Extension 1 on Portions 64 - 65, 165 and the Remainder of Portion 3 of the Farm Witpoortjie 117 I.R., in the Ekurhuleni Metropolitan Municipality, Gauteng Province

Gaigher, S. 2014. Heritage Impact Assessment for the Proposed Ergo Road Residential Development

Gaigher, S. 2013 Heritage Impact Assessment for the Proposed Vulcania Cemetery Development

Huffman, TN and Van der Merwe, HD. 1995. Archaeological Survey of Withoekspruit, Brakpan

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

Kitto, J. 2019. The proposed Valley Silts Project, City of Johannesburg Metropolitan Municipality, Gauteng Province – HIA

Lombard, M., L. Wadley, J. Deacon, S. Wurz, I. Parsons, M. Mohapi, J. Swart & P. Mitchell. 2012. South African and Lesotho Stone Age Sequence Updated (I). South African Archaeological Bulletin 67 (195): 120–144, 2012.

National Heritage Resources Act (No 25 of 1999). Pretoria: the Government Printer. Republic of South Africa. 1998.

National Environmental Management Act (no 107 of 25 1998). Pretoria: The Government Printer.

Pelser, A.J. 2022. A Report On Archaeological Test Excavations: Proposed Soventix Solar Pv Plant On Portions 127 & 128 Of Vogelfontein 84ir (Erf 757) Boksburg, City Of Ekurhuleni, Gauteng

Van Schalkwyk, J. 1995. A Survey Of Cultural Resources Along The Proposed Pwv 16 Road Corridor, Brakpan District

CURRICULUM VITAE

1. **Name of Staff:** Jaco van der Walt

2. **Name of Firm**: Beyond Heritage

3. **Date of Birth**: 4 November 1977

4. **Nationality**: South African

5. **Years of experience**: 22

6. **Education**:

PhD Archaeology –	University of Johannesburg –	Currently enrolled
MA Archaeology -	University of the Witwatersrand –	2012
BA Hons Archaeology -	University of the Witwatersrand –	2003
BA Archaeology -	University of Pretoria -	2001

7. **Key Accreditations:**

- Association of Southern African Professional Archaeologists. Member number 159
- Association of Professional Heritage Practitioners. Member Number #114
- 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)

8. **Countries of Work Experience**: South Africa, Botswana, Zimbabwe, Mozambique, Tanzania, The Democratic Republic of the Congo, Lesotho, Afghanistan, Guinea and Zambia.

9. Key qualifications

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 the Northern and Eastern Cape Provinces in South Africa.

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

10. Languages

English: write, read, speak

Afrikaans: write, read, speak

11. Employment history

2011 – Present	**HCAC Heritage Consultants now known as Beyond Heritage** Archaeologist and project manager
2007 - 2010	**Managed the Heritage Contracts Unit at the University of the Witwatersrand -** CRM Archaeologist and project manager as well as lecturing a course on CRM Archaeology
2005 – 2007	**Director of Matakoma Heritage Consultants**

	CRM Archaeologist and project manager
2004	**Department of Anatomy University of Pretoria – Technical Assistant**,
2003	**Mapungubwe World Heritage Site** Archaeologist and site supervisor
2001 – 2002	**R & R Cultural Resource Consultants, Polokwane** CRM Archaeologists
2000	**Fort Klapperkop** Museum Assistant

Representative experience

Representative Archaeological Impact Assessments and Heritage Impact Assessments
Batoka Gorge Hydro Electric Power Project
As lead archaeologist on the team for ERM UK Jaco was responsible for the archaeological survey and interviews with local communities as well as report compilation for the archaeological impact assessment for the infrastructure component of the Batoka Gorge Hydro-Electric Scheme, Zambia adhering to IFC requirements.

Kisanfu Environmental Impact Study, Democratic Republic of the Congo.
As part of the Heritage team for SRK Consulting (South Africa) Jaco conducted archaeological surveys, compiled the results of previous studies and compiled the archaeological assessment report for the Kisanfu open cast mine in the Democratic Republic of the Congo.

Kalungwishi Hydropower Project in the Luapula and Northern Provinces, Zambia
Jaco was lead archaeologist and part of the team who conducted the cultural heritage assessment for the hydropower project. Jaco was responsible for establishing a representative cultural heritage baseline for the project through targeted ground surveys of areas deemed as having a higher potential for important cultural heritage sites within the impact areas. The study included identifying, documenting and assessing the importance of cultural heritage sites; as well as evaluating negative impacts on non-renewable heritage resources according to IFC PS 8.

Heritage study for the Environmental, Health and Socio-Economic Baseline Studies for Block 2 at Siguiri Mine, Guinea
As part of the ESIA team for SRK consulting Jaco was responsible for the heritage survey, documentation of identified cultural heritage sites according to best practice standards for heritage related studies. He also assessed the significance of the cultural resources in terms of their archaeological, historical, scientific, social, religious, aesthetic and tourism value and compiled a heritage report with cognisance of the applicable legislative requirements.

Afghanistan Gas Project (Pipeline and Amine Plant), Afghanistan
Jaco was lead archaeologist and provided guidance for local specialists with regards to field work and information collection and compiled the Baseline Heritage Report with impact assessment, mitigation and management measures adhering to international best practice.

Representative Heritage Management Plans

Afghanistan Gas Project (Pipeline and Amine Plant), Afghanistan
Jaco compiled heritage management measures with chance find procedures.

SKA Management Plan
Jaco was the lead archaeologist on the the South African Radio Astronomy Observatory Square Kilometre Array Heritage Impact Assessment and Conservation Management Plan Project. The project was carried out in accordance with the South African environmental legal framework and IFC performance standards.

Platreef Platinum Mine

As part of the Platreef heritage mitigation project Jaco was responsible for the compilation of the conservation management plan.

Representative heritage due diligence projects
Heritage Due Diligence Report – Erf 2 Frankenwald, Johannesburg in Gauteng.
Heritage Due Diligence Report – Umlazi, Kwa-Zulu Natal.
Heritage Due Diligence Report – Sandhurst, Johannesburg in Gauteng.
Heritage Due Diligence Study for the Bashokuhle Primary School, Durban in Kwa-Zulu Natal.

Representative Water Management and Water Infrastructure Projects
Archaeological impact assessment, Sekuruwe Pipelines, Mokopane, Limpopo.
Archaeological Impact assessment, Seema Pipelines, Mokopane, Limpopo.
Archaeological impact assessment, Tshamahansi Pipelines, Mokopane, Limpopo.
A cultural heritage evaluation for the proposed Spencer Venulu Power line.
Archaeological walkdown of the Mareetsane Powerline, North West Province.
Phase 1 Heritage Assessment of Doornpoort 312 JS Witbank, Mpumalanga.

Representative Renewable Energy Projects
HIA for the proposed Karoshoek Solar Development, Northern Cape.
HIA for the proposed Buffels Solar Farm 1 , Klerksdorp, North West Province.
HIA for the proposed Buffels Solar Farm 2 , Klerksdorp, North West Province.
HIA for the proposed Woodhouse Solar Development, North West Province.
HIA for the proposed Orkney Solar Farm, Orkney, North West Province.
HIA for the proposed Henneman Solar AIA, Free State Province.
Heritage Assessment for the project Batoka Gorge HIA, Zambia.
Heritage assessment for the project Kalungwishi Heritage study, Zambia.

Representative Heritage Mitigation Projects

Field director for the archaeological mitigation for Booysendal Platinum Mine, Steelpoort, Limpopo Province.
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.
Field director for the Phase 2 surface sampling of Stone Age sites effected by the Medupi – Spitskop Power Line, Limpopo Province

Professional Skills

- Project management and coordination;
- Management of non- renewable heritage resources within the framework of national and international legislation;
- Archaeological site identification and spatial analysis;
- Archaeological Excavations and research skills;
- Proficient in GIS;
- Heritage impact assessments;
- Data capturing in field using Fulcrum
- Practical instruction and training of both students and interns;
- Management of staff and general project management including management of finances, logistics and tasks;
- Team focused, both working as part of a team and managing teams;
- Planning and organisational skills, able to prioritise effectively and bring motivation to any task;
- Strong interpersonal skills, able to build productive relationships with others;
- Analytical problem solver, uses initiative to deliver outcomes;
- Meticulous level of attention to detail, ability to analyse data and compile reports;
- Good communication skills, written and verbal, able to engage with a range of people at all levels;
- Target driven, works with accuracy to challenging deadlines;
- Committed to professional development;
- Excellent IT skills in MS Excel, MS Word, BaseCamp and Power Point;
- Proficient in both English and Afrikaans.