Phula PV Facility, Limpopo Province

PROPOSED SOLAR PV FACILITY ON THE FARM DE GROOTEBOOM 373 KT, NEAR STEELPOORT, LIMPOPO PROVINCE.

Heritage Impact Assessment

Template Number	Document Number	Revision	Date
PGS PJ REP 007 01	672HIA-001	3.0	5 April 2023

PGS HERITAGE
+ 27 (0) 12 332 5305 | +27 (0) 86 675 8077 | contact@pgsheritage.co.za | PO Box 32542, Totiusdal, 0134

Offices in South Africa, Kingdom of Lesotho and Mozambique

Head Office:
906 Bergarend Streets
Waverley, Pretoria,
South Africa

Directors: HS Steyn, PD Birkholtz, W Fourie

REVISION HISTORY

Version	Issue Date	Description of Changes
001	9 March 2023	First draft
002	5 April 2023	Second draft – minor edits
003	15 September 2023	Updated with final layouts

Declaration of Independence

- I, Wouter Fourie, declare that –
- General declaration:
- I act as the independent heritage practitioner 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 heritage impact assessments, 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 will take into account, to the extent possible, the matters listed in section 38 of the NHRA when preparing the application and any report relating to the application;
- 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;
- I will ensure that information containing all relevant facts in respect of the application is distributed or made available to interested and affected parties and the public and that participation by interested and affected parties is facilitated in such a manner that all interested and affected parties will be provided with a reasonable opportunity to participate and to provide comments on documents that are produced to support the application;
- I will provide the competent authority with access to all information at my disposal regarding the application, whether such information is favourable to the applicant or not
- All the particulars furnished by me in this form are true and correct;
- I will perform all other obligations as expected from a heritage practitioner in terms of the Act and the constitutions of my affiliated professional bodies; and
- I realise that a false declaration is an offence in terms of regulation 71 of the Regulations and is punishable in terms of section 24F of the NEMA.

Disclosure of Vested Interest

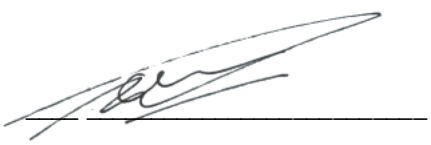
- I do not have and will not have any vested interest (either business, financial, personal or other) in the proposed activity proceeding other than remuneration for work performed in terms of the Regulations;

HERITAGE CONSULTANT: PGS Heritage (Pty) Ltd

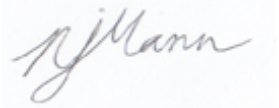
CONTACT PERSON: Wouter Fourie

Tel: +27 (0) 12 332 5305

Email: wouter@pgsheritage.com

SIGNATURE: 

ACKNOWLEDGEMENT OF RECEIPT

Report Title	Heritage Impact Assessment: Proposed Solar PV Facility On the farm De Grooteboom 373 KT, near Steelpoort, Limpopo Province.		
Control	**Name**	**Signature**	**Designation**
Co-Author/Reviewer	**Wouter Fourie**		**PGS Heritage – Director/ Principal Heritage Specialist**
Co-Author	**Nikki Mann**		**PGS Heritage – Archaeologist**
Reviewed	**Jana Minnaar**		Client

CLIENT: **Jones & Wagner (Pty) Ltd**

CONTACT PERSON: **Jana Minnaar**
Tel: 011 519 0394

SIGNATURE:  _____

The Heritage Impact Assessment Report has been compiled considering the National Environmental Management Act (Act No. 107 of 1998) (NEMA): Appendix 6 of the Environmental Impact Assessment (EIA) Regulations of 2014 (as amended, 2017) requirements for specialist reports as indicated in the table below.

Requirements of Appendix 6 – GN R326 EIA Regulations of 7 April 2017	Relevant section in report
1.(1) (a) (i) Details of the specialist who prepared the report	Page ii of Report – Contact details and company
(ii) The expertise of that person to compile a specialist report including a curriculum vita	Section 1.2 – refer to Appendix C
(b) A declaration that the person is independent in a form as may be specified by the competent authority	Page iii of the report
(c) An indication of the scope of, and the purpose for which, the report was prepared	Section 1.1
(cA) An indication of the quality and age of base data used for the specialist report	Section 3, 4 and 5
(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	Section 6 and 7
(d) The duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment	Section 3 and 4
(e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used	Section 3 and Appendix A
(f) details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives;	Section 5 and 6
(g) An identification of any areas to be avoided, including buffers	
(h) A 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 6
(i) A description of any assumptions made and any uncertainties or gaps in knowledge;	Section 1.3
(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	Section 7
(k) Any mitigation measures for inclusion in the EMPr	Section 8
(l) Any conditions for inclusion in the environmental authorization	Section 8
(m) Any monitoring requirements for inclusion in the EMPr or environmental authorization	Section 8
(n)(i) A reasoned opinion as to whether the proposed activity, activities or portions thereof should be authorised and	Section 9
(n)(iA) A reasoned opinion regarding the acceptability of the proposed activity or activities; and	
(n)(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 8, 9
(o) A description of any consultation process that was undertaken during the course of carrying out the study	
(p) A summary and copies if any comments that were received during any consultation process	Not applicable. To date no comments regarding heritage resources that require input from a specialist have been raised.
(q) Any other information requested by the competent authority.	Not applicable.
(2) Where a government notice by the Minister provides for any protocol or minimum information requirement to be applied to a specialist report, the requirements as indicated in such notice will apply.	No protocols or minimum standards for HIAs or PIAs

EXECUTIVE SUMMARY

PGS Heritage (Pty) Ltd (PGS) was appointed by Jones & Wagner (Pty) Ltd Engineering and Environmental Consultants (J&W), on behalf of K2022578590 (SOUTH AFRICA) (Pty) Ltd to undertake a Heritage Assessment that forms part of the Basic Environmental Assessment (BA) for the proposed Platinum Solar PV Project, near Steelpoort, Greater Tubatse Local Municipality and Greater Sekhukhune District Municipality, Limpopo Province. The study area is located on the farm De Grooteboom 373 KT.

Site Name

The proposed Phula PV Facility

Location

The proposed Phula PV Facility project is located approximately 14km south of Steelpoort in the Limpopo Province. It is within the Greater Tubatse Local Municipality and Greater Sekhukhune District Municipality.

The study area incorporates the following farm:

- Remainder and Portion 2 of the Farm De Grooteboom 373 KT

Description of the Proposed Development

The proposed Phula PV Facility is being developed with the aim of generating renewable energy to supply to surrounding mines, private off-takers, and the national grid. The planned installed capacity output of the Solar PV will be 130MW (DC power) and the development area for the facility is ~249 hectares (ha).

Heritage Resources Identified

A selective survey of the study area was conducted on 23-24 January 2023. The fieldwork component consisted of a walkdown of the proposed development area and aimed at identifying heritage resources falling within the impact area. Focus was placed on the undisturbed areas within the larger assessment area. Heritage resources are unique and non-renewable and as such any impact on such resources must be seen as significant.

The assessment has shown that the study area has some heritage resources situated within the proposed development boundaries. Through data analysis and a site investigation, the following issues were identified from a heritage perspective.

Archaeology

A field survey of the proposed development area was undertaken on foot and by a vehicle by one PGS archaeologist (Nikki Mann) and two field assistants (Xander Fourie and Thomas Mulaudzi) on 23th – 24th January 2023.

The fieldwork conducted for the evaluation of the possible impact of the proposed development, has revealed the presence of six (6) heritage resources.

These sites contained scatters of MSA artefacts that were dense enough to be classified as either find spots or medium-low/low density surface scatters. It is evident that the MSA layer is well below the present soil surface. It is therefore unlikely that these artefacts were observed in their primary context due to the nature of the environment where artefacts are exposed due to erosion. This observation is supported by previous findings in the study area by Roodt (2003b). Raw materials utilised included hornfels and fine-grained quartzite. Additionally, single isolated artefacts were also observed across portions of the study area that had been exposed to erosion. See **Figure 31** and the individual site descriptions as contained in **Appendix B.** The field description forms were collected with ArcGIS Survey123 in field software.

Since the six find spots/low density surface scatters (**SSP01** – **SSP-06**) were observed in secondary contexts, they were rated as having **low heritage significance/no heritage significance**.

Palaeontology

According to the Palaeosensitivity Map available on the South African Heritage Resources Information System database (SAHRIS), the Palaeontological Sensitivity of the proposed development areas are mostly rated as low (blue) and Insignificant/Zero (grey) (**Figure 28**). No further palaeontological studies are required in terms of the proposed development but a protocol for finds would be required for the low sensitivity areas (Almond and Pether 2008, SAHRIS website).

Anticipated Impacts on Heritage Resources

Archaeology

The pre-construction and construction phase of the proposed development will entail extensive surface clearance as well as excavations into the superficial sediment cover and underlying bedrock. The possible pre-construction impacts calculated on the tangible cultural heritage resources is overall **LOW NEGATIVE** rating but with the implementation of the recommended buffers and management guidelines will be reduced to a **LOW NEGATIVE** impact.

Mitigation measures

The calculated impact as summarised in **Section 7** of this report confirms the impact of the proposed development will be reduced with the implementation of the mitigation measures. This finding in addition to the implementation of a chance finds procedure, as part of the EMPr, will mitigate possible impacts on unidentified heritage resources. The following mitigation measures are listed in **Table E** 1.

Table E 1 - Heritage management recommendations.

Area and site no.	Mitigation measures
General project area	▪ Implement a chance to find procedures in cases where possible heritage finds are uncovered.
Low density stone tool surface scatters (SPP01-SPP06)	▪ **No mitigation required.**

Conclusions and Impact Statement

If heritage resources are discovered during site clearance, construction activities that may impact the find must stop, and a qualified archaeologist must be appointed to evaluate and make recommendations on mitigation measures.

It is the author's considered opinion that the overall impact of the proposed development on heritage resources is **Low**. With the implementation of recommended mitigation measures the overall impact on heritage resources will be reduced to acceptable levels during the activities of the project.

TABLE OF CONTENT

List of Figures

List of Tables

List of Appendices

TERMINOLOGY AND ABBREVIATIONS

Archaeological resources

This includes:

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

Cultural significance

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

Development

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

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

Early Stone Age

The archaeology of the Stone Age between 700 000 and 2 500 000 years ago.

Fossil

Mineralised bones of animals, shellfish, plants and marine animals. A trace fossil is the track or footprint of a fossil animal that is preserved in stone or consolidated sediment.

Heritage

That which is inherited and forms part of the National Estate (historical places, objects, fossils as defined by the National Heritage Resources Act 25 of 1999).

Heritage resources

This means any place or object of cultural significance and can include (but not limited to) as stated under Section 3 of the NHRA,

- places, buildings, structures and equipment of cultural significance;
- places to which oral traditions are attached or which are associated with living heritage;
- historical settlements and townscapes;
- landscapes and natural features of cultural significance;
- geological sites of scientific or cultural importance;
- archaeological and palaeontological sites;
- graves and burial grounds, and
- sites of significance relating to the history of slavery in South Africa;

Holocene

The most recent geological time period which commenced 10 000 years ago.

Late Stone Age

The archaeology of the last 30 000 years associated with fully modern people.

Late Iron Age (Early Farming Communities)

The archaeology of the last 1000 years up to the 1800's, associated with iron-working and farming activities such as herding and agriculture.

Middle Stone Age

The archaeology of the Stone Age between 30 000-300 000 years ago, associated with early modern humans.

Palaeontology

Any fossilised remains or fossil trace of animals or plants which lived in the geological past, other than fossil fuels or fossiliferous rock intended for industrial use, and any site which contains such fossilised remains or trace.

Abbreviations	Description
AIA	Archaeological Impact Assessment

ASAPA	Association of South African Professional Archaeologists
CRM	Cultural Resource Management
ECO	Environmental Control Officer
EIA practitioner	Environmental Impact Assessment Practitioner
EIA	Environmental Impact Assessment
ESA	Early Stone Age
GPS	Global Positioning System
HIA	Heritage Impact Assessment
I&AP	Interested & Affected Party
J&W	Jones & Wagner (Pty) Ltd Engineering and Environmental Consultants
LSA	Late Stone Age
LIA	Late Iron Age
MSA	Middle Stone Age
MIA	Middle Iron Age
NEMA	National Environmental Management Act
NHRA	National Heritage Resources Act
PHS	Provincial Heritage Site
PSSA	Palaeontological Society of South Africa
SADC	Southern African Development Community
SAHRA	South African Heritage Resources Agency
SAHRIS	South African Heritage Resources Information System

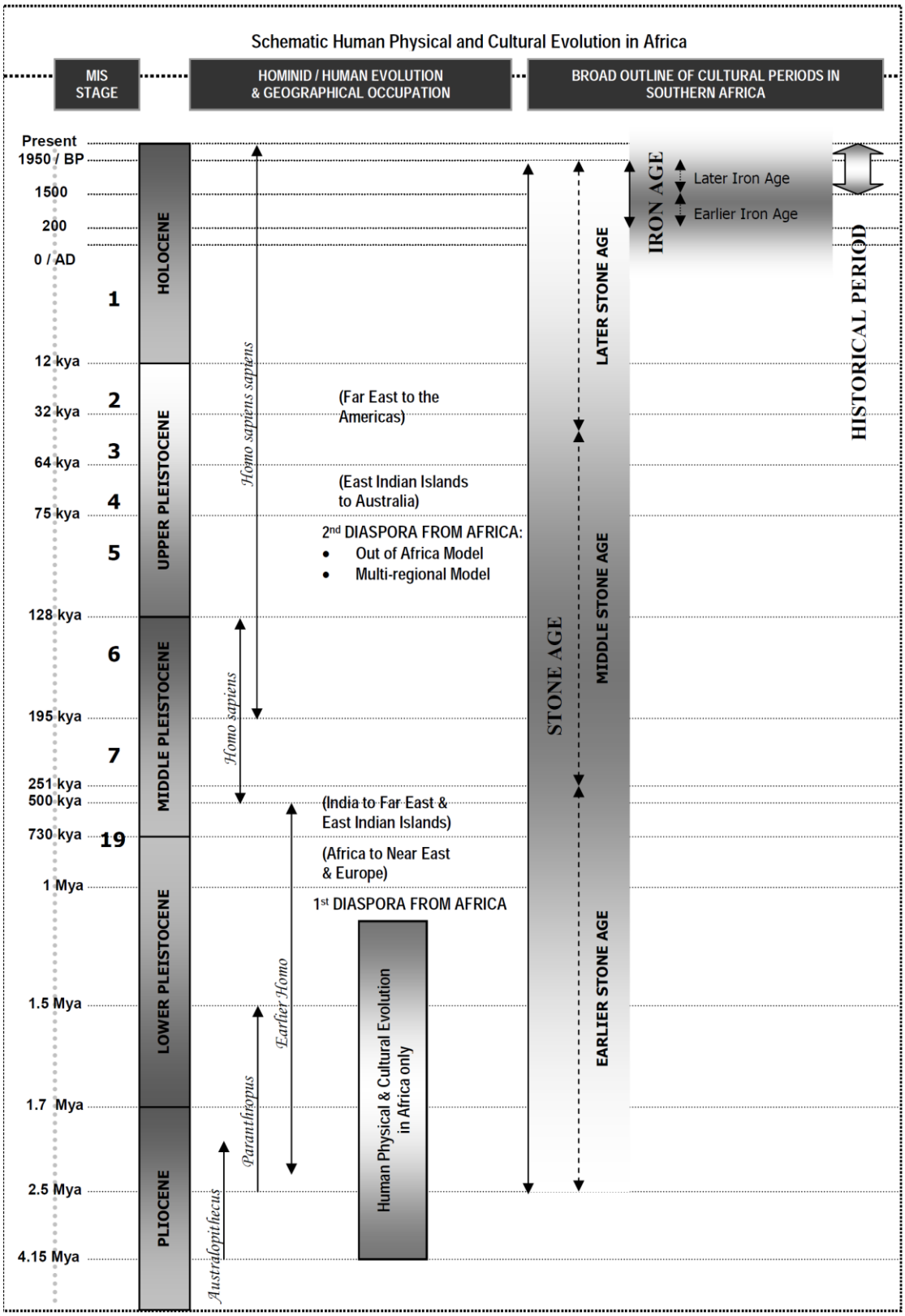


Figure 1 – Human and Cultural Timeline in Africa

1 INTRODUCTION

PGS Heritage (Pty) Ltd (PGS) was appointed by Jones & Wagner (Pty) Ltd Engineering and Environmental Consultants (J&W), on behalf of K2022578590 (SOUTH AFRICA) (Pty) Ltd, to undertake a Heritage Assessment that forms part of the Basic Environmental Assessment (BA) for the proposed Phula PV Facility project, near Steelpoort, Greater Tubatse Local Municipality and Greater Sekhukhune District Municipality, Limpopo Province. The study area is located on the farm De Grooteboom 373 KT.

1.1 Scope of the Study

The aim of this HIA is to identify possible heritage sites and finds that may occur in the proposed development area and to assess the impact of the proposed development on these identified heritage sites. The study also aims to inform the developers to manage the discovered heritage resources in a responsible manner, in order to protect, preserve, and develop them within the framework provided by the National Heritage Resources Act of 1999 (Act 25 of 1999) (NHRA).

1.2 Specialist Qualifications

This HIA Report was compiled by PGS Heritage (PGS).

The staff at PGS has a combined experience of nearly 90 years in the heritage consulting industry. PGS and its staff have extensive experience in managing HIA processes. PGS will only undertake heritage assessment work where they have the relevant expertise and experience to undertake that work competently.

Wouter Fourie, the Project Coordinator and Archaeologist, is registered with the Association of Southern African Professional Archaeologists (ASAPA) as a Professional Archaeologist and is accredited as a Principal Investigator; he is further an Accredited Professional Heritage Practitioner with the Association of Professional Heritage Practitioners (APHP).

Nikki Mann, the co-author of this report, graduated with her Master's degree (MSc) in Archaeology and is registered as a Professional Archaeologist with ASAPA.

1.3 Assumptions and Limitations

The following assumptions and limitations to this study exist:

- Not detracting in any way from the comprehensiveness of the fieldwork undertaken, it is necessary to realise that the heritage resources located during the fieldwork do not necessarily represent all the possible heritage resources present within the area. Various factors account for this, including the subterranean nature of some archaeological sites, as well as the density of vegetation cover found in some areas. As such, should any heritage features and/or objects not included in the present study be located or observed, a heritage specialist must immediately be contacted. Such observed or located heritage features and/or objects may not be disturbed or removed in any way, until such time that the heritage specialist has been able to assess as to the significance of the site (or material) in question. This applies to graves and cemeteries as well. If any graves or burial places are identified or exposed during the development, the procedures and requirements pertaining to graves and burials will apply as set out below.

- The study area boundaries depicted in this report were provided by the client. As a result, these were the areas assessed during the fieldwork. Should any additional development footprints located outside of these study area boundaries be required, such additional areas will have to be assessed in the field by an experienced archaeologist/heritage specialist before construction can commence.

1.4 Legislative Context

The identification, evaluation and assessment of any cultural heritage site, artefact or find in the South African context is required and governed by the following legislation:

- Notice 648 of the Government Gazette 45421- general requirements for undertaking an initial site sensitivity verification where no specific assessment protocol has been identified
- National Environmental Management Act (NEMA), Act 107 of 1998 – Appendix 6
- National Heritage Resources Act (NHRA), Act 25 of 1999

1.4.1 Notice 648 of the Government Gazette 45421

Although minimum standards for archaeological (2007) and palaeontological (2012) assessments were published by SAHRA, GN.648 requires sensitivity verification for a site selected on the national web based environmental screening tool for which no specific assessment protocol related to any theme has been identified. The requirements for this Government Notice (GN) are listed in **Table E** 2 and the applicable section in this report noted.

Table E 2 - Reporting requirements for GN648

GN 648	Relevant section in report	Where not applicable in this report
2.2 (a) a desktop analysis, using satellite imagery;	section 5	
2.2 (b) a preliminary on-site inspection to identify if there are any discrepancies with the current use of land and environmental status quo versus the environmental sensitivity as identified on the national web-based environmental screening tool, such as new developments, infrastructure, indigenous/pristine vegetation, etc.	section 4	-
2.3(a) confirms or disputes the current use of the land and environmental sensitivity as identified by the national web-based environmental screening tool;	section 4	-
2.3(b) contains motivation and evidence (e.g. photographs) of either the verified or different use of the land and environmental sensitivity;	section 4	-

An assessment of the Environmental Screening tool provides the following sensitivity ratings for archaeological and heritage resources as low to high (**Figure 2**) and palaeontological resources as medium (**Figure 3**).

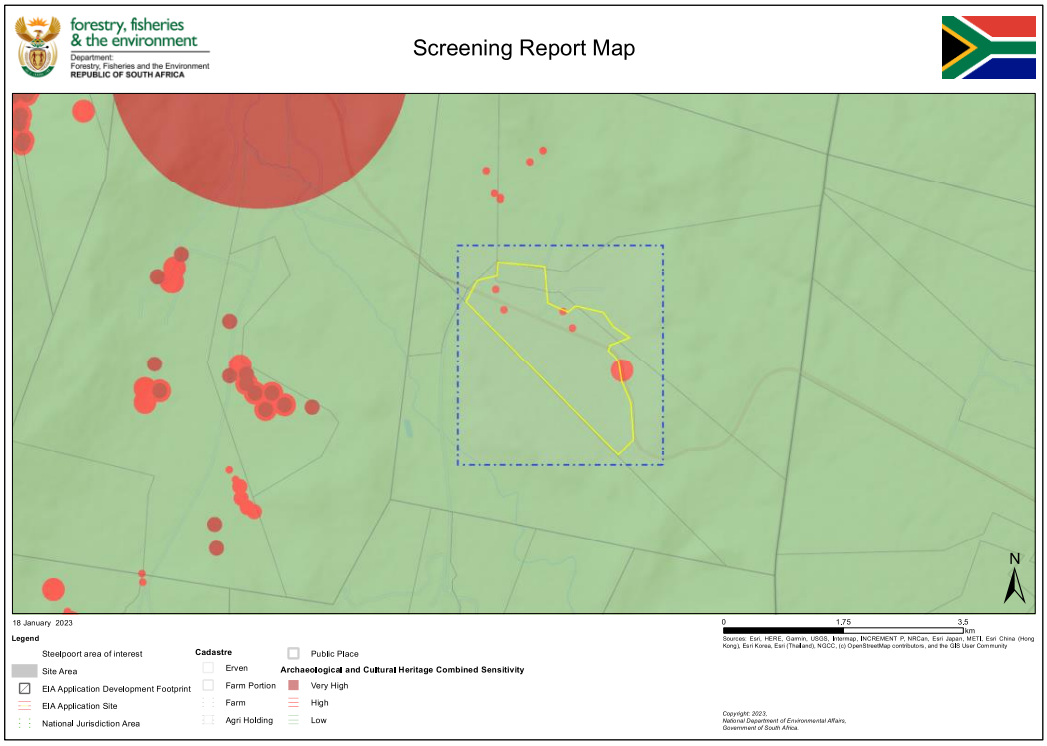


Figure 2 – Archaeology and Heritage screening map for the proposed development (Source: DFFE).

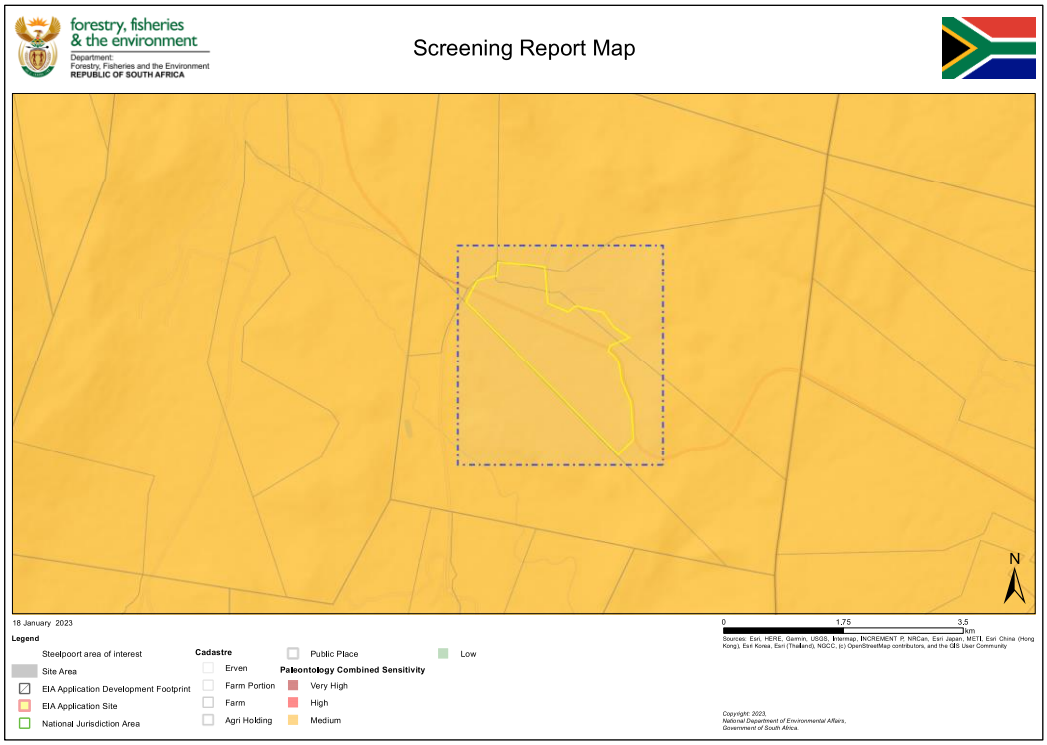


Figure 3 - Palaeontology screening map for the proposed development (Source: DFFE).

1.4.2 NEMA – Appendix 6 requirements

The HIA report has been compiled considering the NEMA Appendix 6 requirements for specialist reports as indicated in the table below. For ease of reference, the table below provides cross-references to the report sections where these requirements have been addressed.

1.4.3 The National Heritage Resources Act

- National Heritage Resources Act (NHRA) Act 25 of 1999
  - Protection of Heritage Resources – Sections 34 to 36; and
  - Heritage Resources Management – Section 38

The NHRA is utilized as the basis for the identification, evaluation, and management of heritage resources and in the case of Cultural Resource Management (CRM) those resources specifically impacted on by development as stipulated in Section 38 of NHRA. This study falls under s38(8) and requires comment from the relevant heritage resources authority.

Section 24(2) of the NEMA requires environmental authorisation from the environmental authority for certain activities that have been identified and must undergo an EIA or Basic Assessment (BA) process. Similarly, Section 38 NHRA lists specific development activities that require notice to the heritage resources authority to determine if an HIA process is necessary. Approval from the heritage authority is mandatory before proceeding with the development activities.

To avoid redundancy and facilitate coordination between NEMA and NHRA requirements, Section 38(8) of the NHRA states that if the development activities listed in Section 38(1) require an EIA under NEMA, a separate HIA and approval from the heritage resources authority are unnecessary. However, the environmental authority must ensure that the heritage resources authority's requirements for HIA are fulfilled and that its comments and recommendations are considered before granting environmental authorisation.

Therefore, if a NEMA EIA is required for the development activities listed under Section 38 of the NHRA, separate HIA and EIA processes may not be followed, and different decisions may not be issued under NHRA and NEMA. The EIA process will be followed, and if the heritage resources authority requires HIA, it must be conducted as one of the EIA specialist studies.

The environmental authority must ensure that the heritage resources authority's requirements for the assessment are met. A separate heritage approval may not be issued, but the environmental authority must consider the heritage resources authority's comments and recommendations before granting or refusing environmental authorisation.

It must however be noted that if no environmental process is required, but the proposed development still triggers the requirements for and HIA under section 38(1) of the NHRA, SAHRA or the relevant provincial heritage authority will be the authorising authority. This entity could then require a full HIA completed considering the requirements for public participation and stakeholder engagement as contemplate in the regulations under the NHRA.

2 DETAILS OF THE PROJECT

2.1 Site Locality

Table E 3 - Table with Locality and Property Information

Study Area Coordinates	**Northern Point** S -24.934834° E 30.135181°	**Eastern Point** S -24.956073° E 30.152984°
	Southern Point S -24.957915° E 30.150932°	**Western Point** S -24.939608° E 30.130994°
Location	The proposed development is located approximately 14km south of Steelpoort in the Limpopo Province. It is within the Greater Tubatse Local Municipality and Greater Sekhukhune District Municipality (**Figure 4**).	
Property	▪ Remainder and Portion 2 of the Farm De Grooteboom 373 KT	
Extent	~249 hectares (ha)	
Topographic Map	2430CC KENNEDY'S VALE	

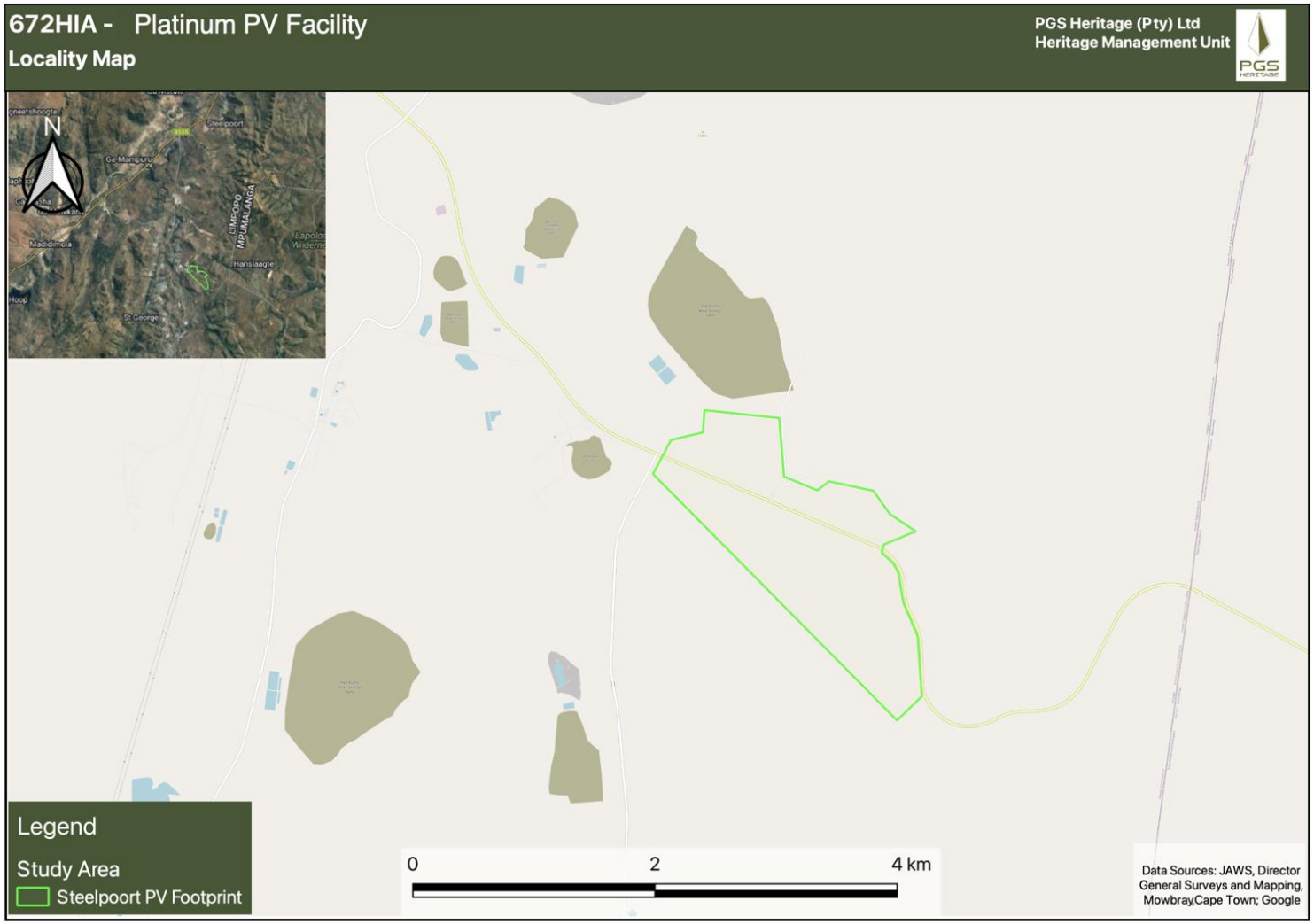


Figure 4 – Regional location of the proposed development area.

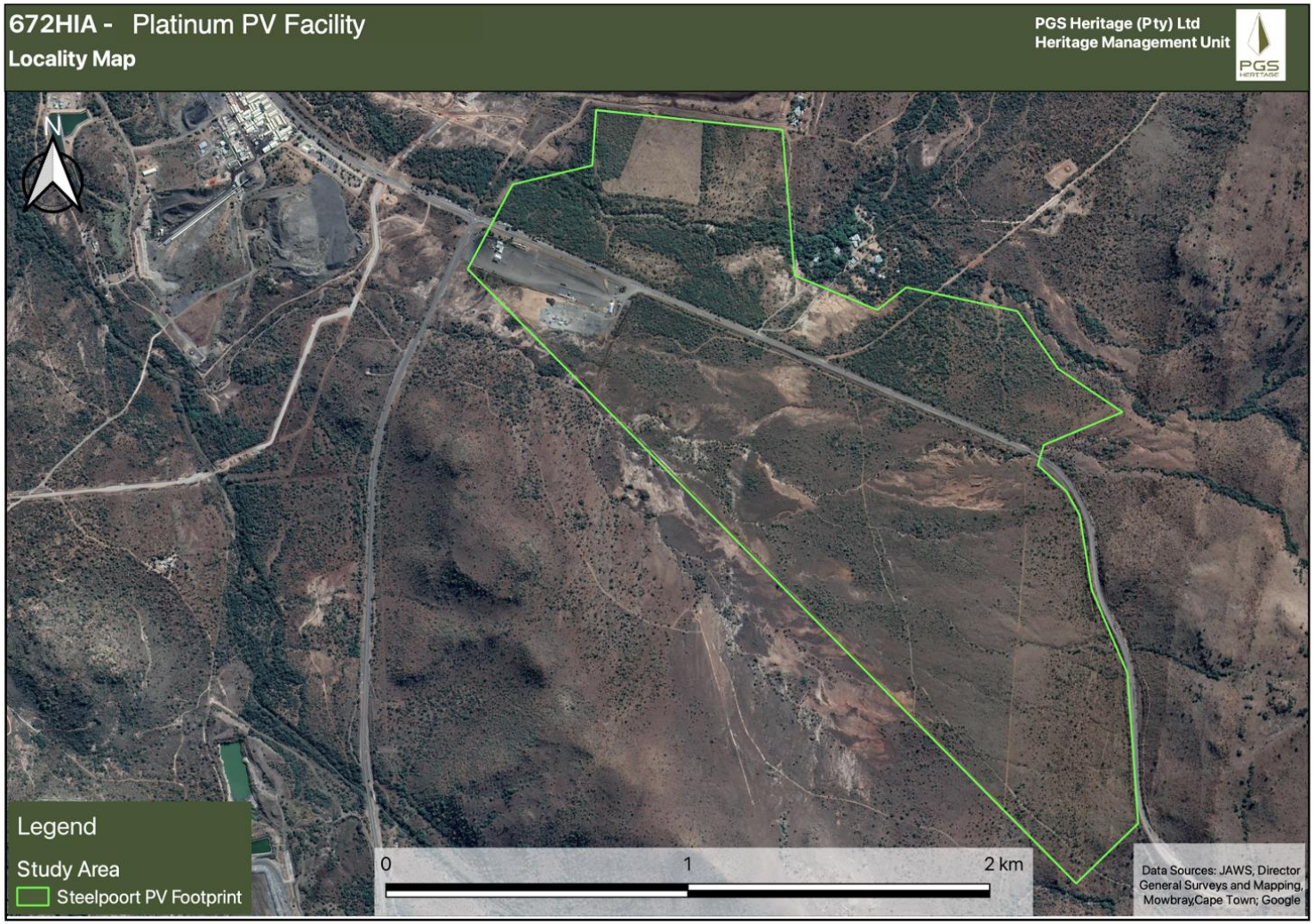
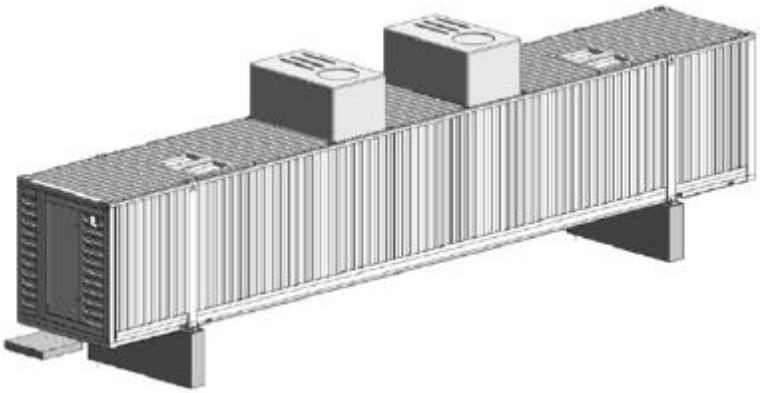
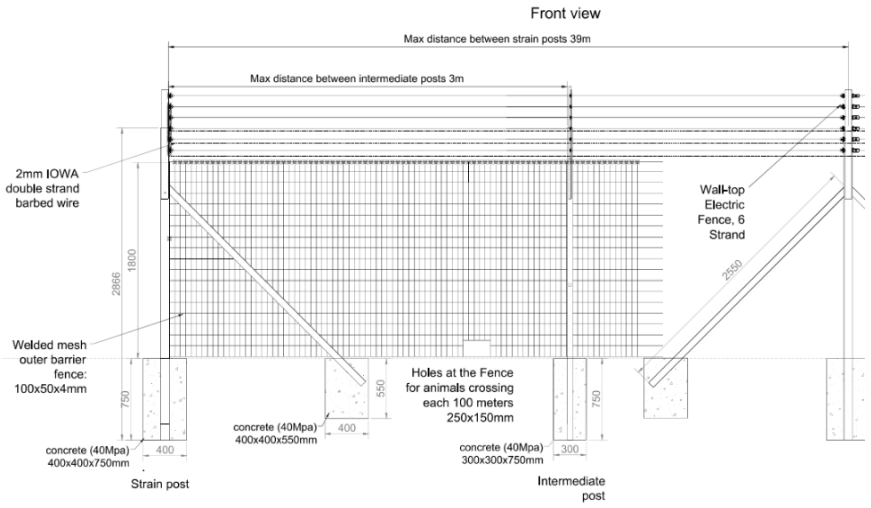
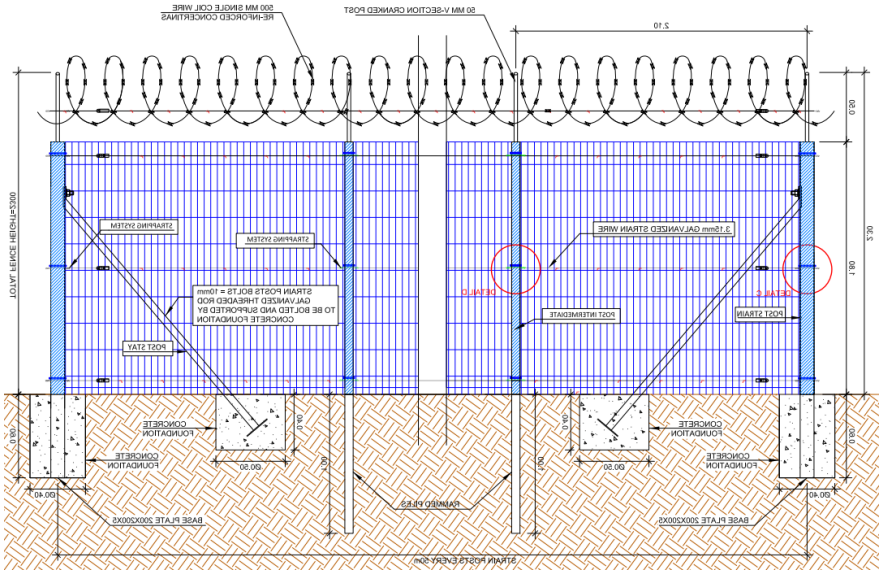


Figure 5 – Location of the proposed development area.

2.2 Project Background and Description

Infrastructure	Description / Dimensions
Contracted capacity of PV facility	Up to 130 MW
Technologies	• Solar Photovoltaic (PV) system • PV modules mounted on either a single axis tracking or fixed structure. • Monofacial or Bifacial Panels • Lithium-Ion, Vanadium Redox Flow or similar Batteries
BESS capacity	100MW / 500MWh
Onsite substation	33kV cabling between the project components and the facility substation. 33kV/132kV onsite facility substation.
Height of PV modules	3m at highest point above ground level when PV modules are pointing due east or west.
Battery array height	Up to 3.5 metres – see **Figure 6**  *Figure 6 - battery array*
On-site substation and BESS complex area	The proposed facility layout has been revised: A 100m avifauna buffer around the Springkaanspruit, a 38m biodiversity buffer dividing the main development area into two portions and the conceptual stormwater management infrastructure have informed the layout of the proposed Phula PV facility. Therefore, the revised facility layout makes provision for one on-site substation at the Section 1 (southwestern portion) of the proposed development – gold polygon in Figure 2. The footprint area is approximately 0.6 ha. A BESS area is proposed west of the on-site substation with a proposed footprint area of approximately 2.5 ha – purple polygon in Figure 2. The combined footprint is therefore (approximately) 3.1 ha.

	A construction laydown / storage area is proposed west of the BESS with a proposed footprint of 0.93 ha.	
Development footprints	Section 1	43.95 ha
	Section 2	79.45 ha
	Section 3	27.92 ha
	Section 4	12.6 ha
	Section 5	15.79 ha
	Laydown area	0.93 ha
	Site buildings	0.75 ha
	Substation	0.56 ha
	Battery Area	2.41 ha
Laydown and temporary storage area	Laydown/staging area on-site in front of mounting structures during installation. The proposed temporary store area is located west of the proposed BESS area with a footprint of approximately 0.93 ha (dark blue polygon in **Figure 8**)	
O&M building area	O&M building will be located at the area named 'Site Buildings' (light blue polygon in **Figure 8**) near the substation and battery areas or at the western-most side of Section 1. The estimated size of the building is 600m², excluding parking.	
Width of internal access roads	Access roads (up to 6m wide) and internal distribution roads (up to 5m wide).	
Length of internal access roads	To be determined based on final layout. Estimated at approx. 27 km.	
Site access	Proposed access roads have been recommended by a transport engineer. These access points consider the various guidelines and policies in terms of the sites location and the provincial roads. Five access points are proposed (please refer to saved access roads kmz file): Access 1 and 2 – access to the main (southern) facility area Access 3 – opposite access 2 and this provides access to the northern most area (north of the Springkaanspruit). Access 3 will follow an existing gravel road which traverses the river. It is likely that this will require some works within the river to ensure safe crossing of the river. This may include culverts. If this is required, works within the river will be during the dry period. Access 4 – this will provide access to the northeastern portion of the facility area – a new access is proposed as the existing access road is too close to Access 2 and 3. Access 5 – opposite access 1 providing access to the most western portion area of the facility.	
Grid connection and proximity **(Subject to separate authorisation process)**	Grid connection will be one of the following options, as shown by the diagram (KMZ files transmitted separately): Route 1 between the solar PV site and the Uchoba 132kV Substation running South past Dwarsrivier Mine. Route 2 between the solar PV site and the Uchoba 132kV Substation running North past Dwarsrivier Mine Route 3 between the solar PV site and Anglo Mototolo Shaft supply substation, named Eskom Der Brochen Substation. Western line. Route 3 between the solar PV site and Anglo Mototolo Shaft supply substation, named Eskom Der Brochen Substation. Eastern line.	

Height of substation fencing	Fence height to be between 2.5m and 3m, as per the following: Example 1 (including electric fencing):  Example 2 (alternative to electric fence): 
Type of fencing	Welded steel chain link mesh, or welded steel mesh, hot-dip galvanised, or Clear-vu (or similar) fence.

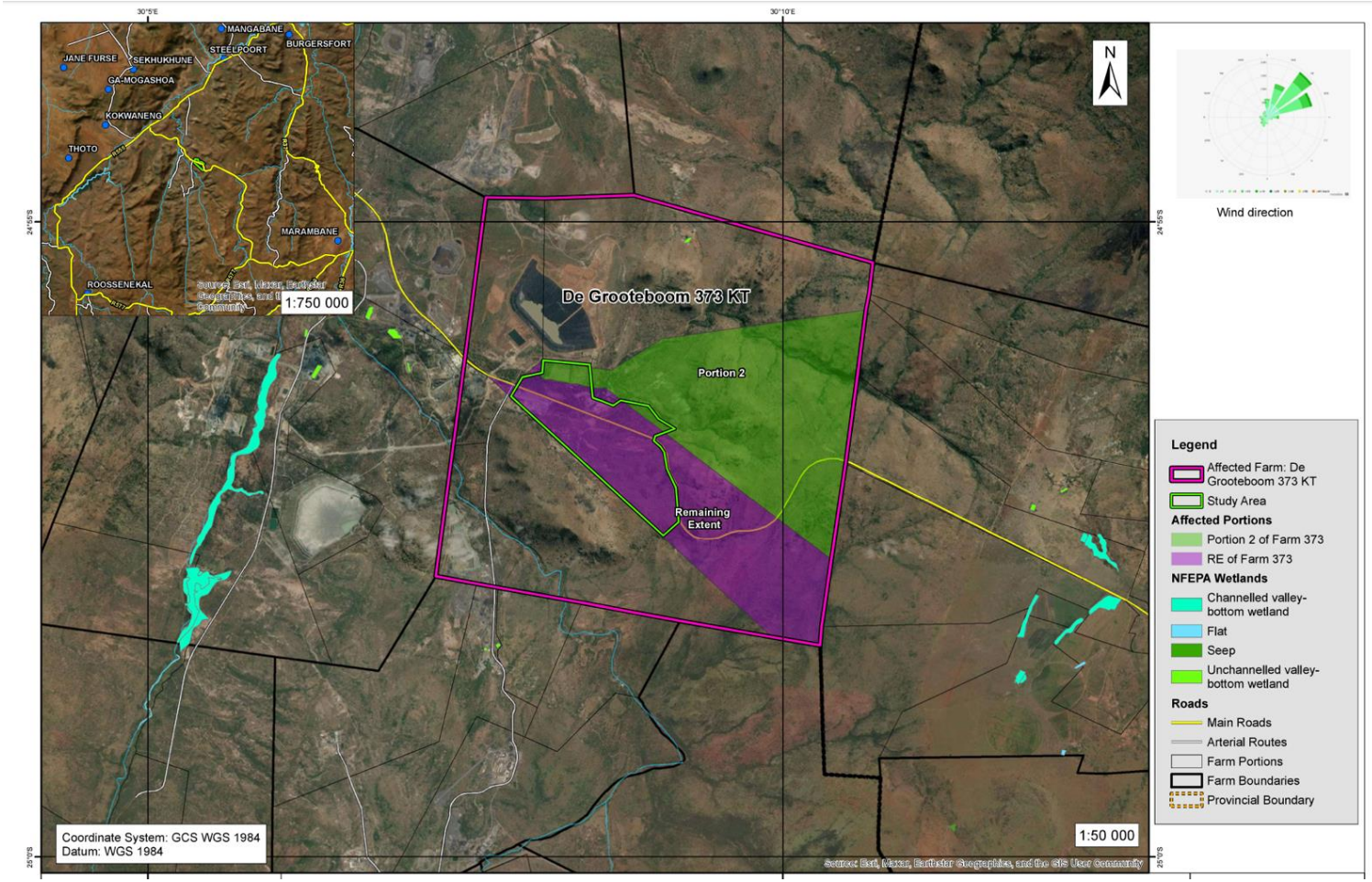


Figure 7 - Locality Map (Supplied by J&W).

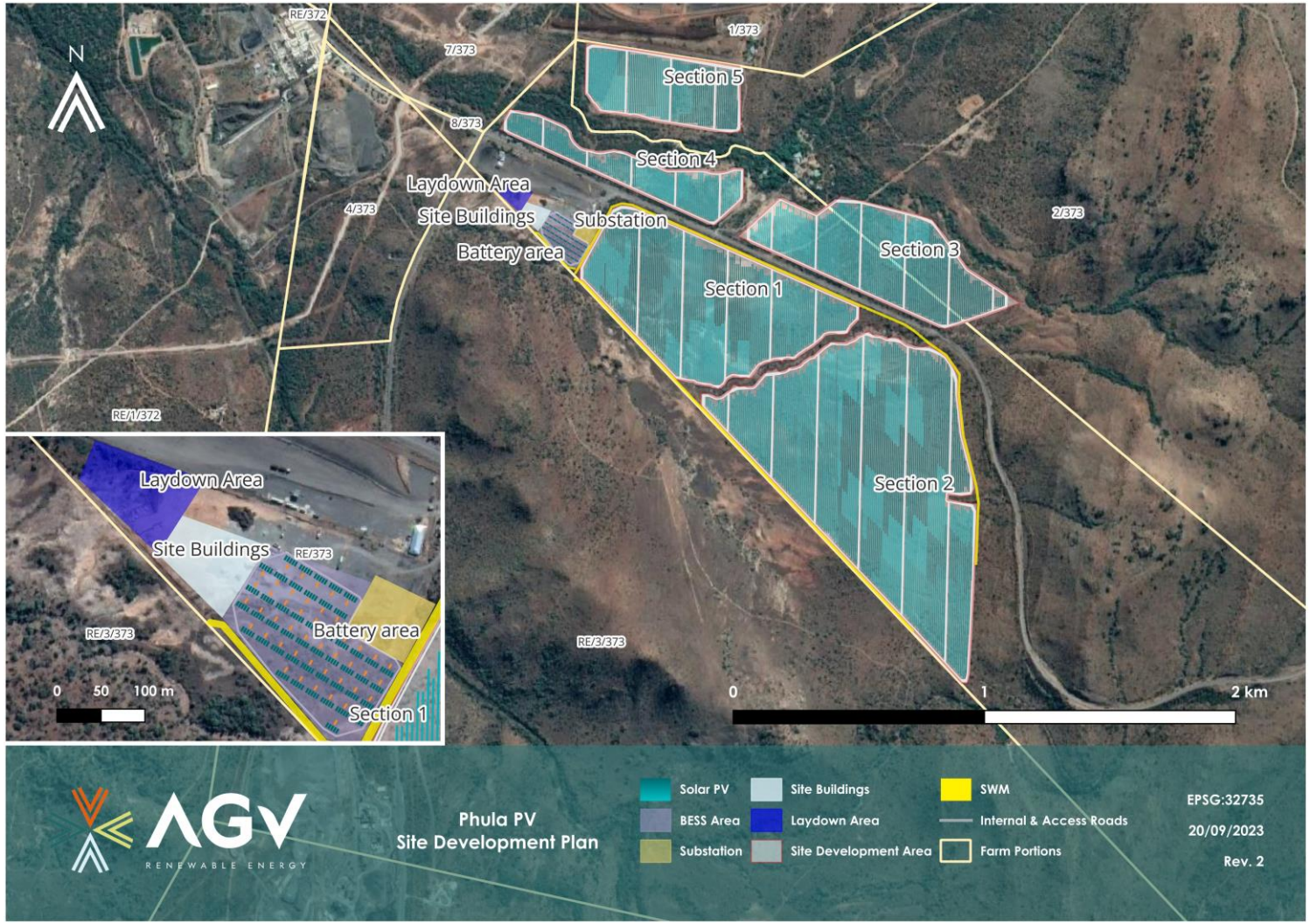


Figure 8 - Proposed layout.

3 ASSESSMENT METHODOLOGY

The section below outlines the assessment methodologies utilised in the study.

3.1 Methodology for Assessing Heritage Site significance

PGS compiled this HIA report for the proposed Phula PV Facility project. The applicable maps, tables and figures are included, as stipulated in the NHRA (no 25 of 1999) and the National Environmental Management Act (NEMA) (No. 107 of 1998). The HIA process consists of three steps:

Step I – Desktop Study: A detailed archaeological and historical overview of the study area and surroundings was undertaken. This work was augmented by an assessment of reports and data contained in the SAHRIS. Additionally, an assessment was made of the available historic topographic maps. All these desktop study components were undertaken to support the fieldwork.

Step II – Physical Survey: A physical survey was conducted by a combination of vehicle and pedestrian access through the proposed project area by one qualified heritage specialist (Nikki Mann) and two field assistants (Xander Fourie and Thomas Mulaudzi) (23-24 January 2023), aimed at locating and documenting sites falling within and adjacent to the proposed development footprint.

Step III – The final step involved the recording and documentation of relevant heritage resources identified in the physical survey, the assessment of these resources in terms of the HIA criteria and report writing, as well as mapping and constructive recommendations.

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

- Site integrity (i.e. primary vs. secondary context),
- Amount of deposit, range of features (e.g., stonewalling, stone tools and enclosures),
- Density of scatter (dispersed scatter)
    - Low - <10/50m2
    - Medium - 10-50/50m2
    - High - >50/50m2
- Uniqueness; and
- Potential to answer present research questions.

Impacts on these sites by the development will be evaluated as follows:

3.1.1 Site Significance

Site significance classification standards use is based on the heritage classification of s3 in the NHRA and developed for implementation keeping in mind the grading system approved by SAHRA

for archaeological impact assessments. The update classification and rating system as developed by Heritage Western Cape (2021) is implemented in this report

Site significance classification standards prescribed by the Heritage Western Cape Guideline (2016), were used for the purpose of this report (**Table E** 4 and **Table E** 5).

Table E 4 - Rating system for archaeological resources

Grading	Description of Resource	Examples of Possible Management Strategies	Heritage Significance
I	Heritage resources with qualities so exceptional that they are of special national significance. Current examples: Langebaanweg (West Coast Fossil Park), Cradle of Humankind	May be declared as a National Heritage Site managed by SAHRA. Specific mitigation and scientific investigation can be permitted in certain circumstances with sufficient motivation.	Highest Significance
II	Heritage resources with special qualities which make them significant, but do not fulfil the criteria for Grade I status. Current examples: Blombos, Paternoster Midden.	May be declared as a Provincial Heritage Site managed by Provincial Heritage Authority. Specific mitigation and scientific investigation can be permitted in certain circumstances with sufficient motivation.	Exceptionally High Significance
III	Heritage resources that contribute to the environmental quality or cultural significance of a larger area and fulfils one of the criteria set out in section 3(3) of the Act but that does not fulfil the criteria for Grade II status. Grade III sites may be formally protected by placement on the Heritage Register.		
IIIA	Such a resource must be an excellent example of its kind or must be sufficiently rare. Current examples: Varschedrift; Peers Cave; Brobartia Road Midden at Bettys Bay	Resource must be retained. Specific mitigation and scientific investigation can be permitted in certain circumstances with sufficient motivation.	High Significance
IIIB	Such a resource might have similar significances to those of a Grade III A resource, but to a lesser degree.	Resource must be retained where possible where not possible it must be fully investigated and/or mitigated.	Medium Significance
IIIC	Such a resource is of contributing significance.	Resource must be satisfactorily studied before impact. If the recording already done (such as in an HIA or permit application) is not sufficient, further recording or even mitigation may be required.	Low Significance
NCW	A resource that, after appropriate investigation, has been determined to not have enough heritage significance to be retained as part of the National Estate.	No further actions under the NHRA are required. This must be motivated by the applicant or the consultant and approved by the authority.	No research potential or other cultural significance

Table E 5 - Rating system for built environment resources

Grading	Description of Resource	Examples of Possible Management Strategies	Heritage Significance
I	Heritage resources with qualities so exceptional that they are of special national significance. Current examples: Robben Island	May be declared as a National Heritage Site managed by SAHRA.	Highest Significance
II	Heritage resources with special qualities which make them significant in the context of a province or region, but do not fulfil the criteria for Grade I status. Current examples: St George's Cathedral, Community House	May be declared as a Provincial Heritage Site managed by Provincial Heritage Authority.	Exceptionally High Significance
II	Such a resource contributes to the environmental quality or cultural significance of a larger area and fulfils one of the criteria set out in section 3(3) of the Act but that does not fulfil the criteria for Grade II status. Grade III sites may be formally protected by placement on the Heritage Register.		
IIIA	Such a resource must be an excellent example of its kind or must be sufficiently rare. These are heritage resources which are significant in the context of an area.	This grading is applied to buildings and sites that have sufficient intrinsic significance to be regarded as local heritage resources; and are significant enough to warrant that any alteration, both internal and external, is regulated. Such buildings and sites may be representative, being excellent examples of their kind, or may be rare. In either case, they should receive maximum protection at local level.	High Significance
IIIB	Such a resource might have similar significances to those of a Grade III A resource, but to a lesser degree. These are heritage resources which are significant in the context of a townscape, neighbourhood, settlement or community.	Like Grade IIIA buildings and sites, such buildings and sites may be representative, being excellent examples of their kind, or may be rare, but less so than Grade IIIA examples. They would receive less stringent protection than Grade IIIA buildings and sites at local level.	Medium Significance
IIIC	Such a resource is of contributing significance to the environs These are heritage resources which are significant in the context of a streetscape or direct neighbourhood.	This grading is applied to buildings and/or sites whose significance is contextual, i.e. in large part due to its contribution to the character or significance of the environs. These buildings and sites should, as a consequence, only be regulated if the significance of the environs is sufficient to warrant protective measures, regardless of whether the site falls within a Conservation or Heritage Area. Internal alterations should not necessarily be regulated.	Low Significance
NCW	A resource that, after appropriate investigation, has been determined to not have enough	No further actions under the NHRA are required. This must be motivated by the applicant	No research potential or

Grading	Description of Resource	Examples of Possible Management Strategies	Heritage Significance
	heritage significance to be retained as part of the National Estate.	and approved by the authority. Section 34 can even be lifted by PHRA for structures in this category if they are older than 60 years.	other cultural significance

3.2 Methodology used in determining the significance of environmental impacts

The methodology used to determine the environmental impact significance is explained in **Appendix B**.

4 CURRENT STATUS QUO

4.1 Site Description

A site visit was conducted by archaeologists from PGS in January 2023. The general vicinity of the proposed development area was assessed. The proposed development area is located approximately 14km south of Steelpoort, in the Greater Tubatse Local Municipality and Sekhukhune District Municipality, Limpopo Province. The area can be accessed via the R555 and informal roads. Portions of the study area, have been disturbed by the construction of farm roads, agriculture and natural erosion (incl. sheet erosion, slope erosion, gully erosion and animal burrows). The study area is in a rural area. The terrain has undergone extensive erosion caused by water flow. The general landscape of the proposed development area comprised of hills, plains, gullies and dongas that were mostly covered in dense to moderate vegetation. The soils were predominately sandy.

The Vegetation type is classified as **Sekhukhune Mountain Bushveld** (Mucina & Rutherford, 2006; Sanbi, 2022). Sekhukhune Mountain Bushveld (SVcb28) vegetation is characterised by "Dry, open to closed micro-phyllous 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 footslopes of clays rich in heavy metals."(Mucina & Rutherford, 2006; Sanbi, 2022). Agricultural activities include ploughing and grazing. In dense thorny sections, visibility on the ground and access was limited.

In terms of geology and soils, the area is characterised by Dwars River Subsuite (pyroxenite, norite, anorthosite, chromitite), Croydon Subsuite and Shelter Norite (Hybrid gabbro, gabbro, norite,

quartz norite, feldspathic pyroxenite) and alluvium, colluvium, eluvium, gravel, scree, sand, soil and debris(Council of Geoscience, 2022). Chert, quartz and other fine-grained material occur on the sites.

The photographs below provide general views and landscape features of the proposed development area.

Figure 9 – View of the typical vegetation on the plains.

Figure 10 – Typical tall grass cover.

Figure 11 – View of dense thorny vegetation.

Figure 12 – View of cleared vegetation adjacent to agricultural fields.

Figure 13 – View of typical deep erosion gullies.

Figure 14 – Typical rock fragments observed throughout study area.

Figure 15 – View of eroded soils.

Figure 16 – View of perennial streambed.

Figure 17 – View of calcrete rich soils.

Figure 18 – View of the farm track on the southern boundary of the study area.

Figure 19 – View of the existing business infrastructure and equipment within the north-western section of the study area.

Figure 20 – View of a trampled cattle grazing area within the study area.

Figure 21 – View of existing powerlines.

5 OVERVIEW OF STUDY AREA AND SURROUNDING LANDSCAPE

The high-level archival research focused on available information sources that were used to compile a general background history of the study area and surrounds.

5.1 Archaeological Overview of the Study Area and Surroundings

5.1.1 Stone Age Period

There are no known Stone Age sites present within the current study area. Several sites have been recorded in the surrounding regions within Limpopo (Pistorius, 2008; Coetzee, 2017; Pelser et al., 2010; Pelser 2017, 2019). The majority of sites mainly date to the Early and Middle Stone Age and occur in secondary contexts.

5.1.1.1 Early Stone Age (ESA) (2.5 million to 200 000 years ago)

The Early Stone Age (ESA) is the first phase identified in South Africa's archaeological history. Early stages include simple flakes struck from cobbles core and pebble tools; later stages include intentionally shaped handaxes, cleavers and picks; final or transitional stages have tools that are smaller than the preceding stages and include large blades (Lombard et al., 2012).

Phases of the ESA:

- **Oldowan**: The earliest phase dates to approximately 1.5 to >2 million years ago. Technological characteristics: crude flakes (cobble, core, or flake tools) with little retouch and hammerstones, manuports, cores and polished bone fragments/tools (Lombard et al., 2012).
- **Acheulian**: The second phase dates to approximately 300 thousand to 1.5 million years ago. Technological characteristics: more refined and better-made stone artefacts such as the cleaver and bifacial hand axe; large flakes (some with deliberate retouch; some show core preparation). They are generally found in disturbed open-air locations (Lombard et al., 2012).
- **ESA-MSA transition**: 200 to 600 thousand years ago. Technological characteristics: Described at some sites as Fauresmith. These assemblages have large blades, points, Levallois technology and the remaining ESA components have small bifaces (Lombard et al., 2012).

The Limpopo province is not as well known for its ESA resources. The closest occurrences of major finds from this time period are located at the Cave of Hearths (Herries, 2011), which has been dated to 1.1-1.4 Ma (best age estimates interpreted from contexts of direct/associated dates) and characterised by Acheulian assemblages.

5.1.1.2 Middle Stone Age (MSA) (300 000 to 40 000 years ago)

The Middle Stone Age (MSA) is the second oldest phase identified in South Africa's archaeological history. This phase is associated with flakes, points and blades manufactured by means of the so-called 'prepared core' technique.

Phases of the MSA:

- **Early MSA**: The phase dates to approximately 130 to 300 thousand years. Technological characteristics: Includes discoidal and Levallois flake technologies, blades from volumetric cores and a generalised toolkit (Lombard et al., 2012).
- **Klasies River**: The phase dates to approximately 105 to 130 thousand years ago. Technological characteristics: Includes recurrent blade and convergent flake production; end products are elongated and relatively thin, often with curved profiles; platforms are often small with diffused bulbs; low frequencies of retouch; and denticulated pieces (Lombard et al., 2012).
- **Mossel Bay**: The phase dates to approximately 77 to 105 thousand years ago. Technological characteristics: Includes recurrent unipolar Levallois point and blade reduction; products have straight profiles; percussion bulbs are prominent and often splintered or ring-cracked; formal retouch is infrequent and restricted to sharpening the tip or shaping the butt (Lombard et al., 2012).
- **Still Bay**: The phase dates to approximately 70 to 77 thousand years ago. Technological characteristics: Thin (<10mm), bifacially worked foliate or lanceolate points; semi-circular or wide-angled pointed butts; and could include blades and finely serrated points (Lombard et al., 2012).
- **Howieson's Poort**: The phase dates to approximately 58 to 66 thousand years ago. Technological characteristics: small baked tools (segments, scrapers, trapezes and backed blades), denticulated blades and pointed forms are rare or absent (Lombard et al., 2012).
- **Sibudu**: The phase dates to approximately 45 to 58 thousand years ago. Technological characteristics: Most points are produced using Levallois technique, side scrapers, unifacial points, plain butts and backed pieces are rare (Lombard et al., 2012).
- **Final MSA**: The phase dates to approximately 20 to 40 thousand years ago. Characterised by high regional variability that may include, e.g. bifacial tools, bifacially retouched points, hollow-based points; triangular flake and blade industries; small bifacial and unifacial; Sibudu point characteristics: short, stout, lighter in mass compared to points from the Sibudu technocomplex, but heavier than those from the Still Bay; can be microlithic; can include bipolar technology; and could include backed geometric shapes such as segments, as well as side scrapers (Lombard et al., 2012).

Most MSA sites in Limpopo Province are caves or rock shelters, the best-known being Cave of Hearths (Mason, 1962, 1988; Sampson, 1974; Sinclair, 2009), Olieboomspoort (Mason, 1962; Van

der Ryst, 2006), Bushman Rock Shelter (Louw, 1969; Plug, 1981; Porraz et al., 2015), Grace Dieu, the Wonder crater and Mwulu's Cave (Tobias, 1949; Sampson, 1974; Phillipson, 1985; Bergh, 1999; Mitchell, 2002).

5.1.1.3 Later Stone Age (LSA) (40 000 to historic past (<2000BP))

The Later Stone Age (LSA) is the third archaeological phase. Variability between assemblages; a wide range of formal tools, particularly scrapers (microlithic and macrolithic), backed artefacts, evidence of hafted stone and bone tools, borers, bored stones, upper and lower grindstones, grooved stones, ostrich eggshell (OES) beads and other ornaments, undecorated/decorated OES fragments, flasks/flask fragments, bone tools (sometimes with decoration), fishing equipment, rock art, and ceramics in the final phase (Lombard et al., 2012).

Phases of the LSA:

- **Early LSA**: The phase dates to approximately 18 to 40 thousand years ago. Technological characteristics: Characterised by unstandardised, often microlithic, pieces and includes the bipolar technique; described at some sites, but not always clear whether assemblages represent a real archaeological phase or a mixture of LSA/MSA artefacts (Lombard et al., 2012).
- **Robberg:** The phase dates to approximately 12 to 18 thousand years ago. Technological characteristics: Characterised by systematic bladelet production, scaled pieces, significant numbers of unretouched bladelets and bladelet cores, few formal tools and some sites have significant macrolithic element (Lombard et al., 2012).
- **Oakhurst:** The phase dates to approximately 7 to 12 thousand years ago. Technological characteristics: Flake-based industry, characterised by round, end and D-shaped scrapers and adzes, wide range of polished bone tools and few or no microliths (Lombard et al., 2012).
- **Wilton:** The phase dates to approximately 4 to 8 thousand years ago. Technological characteristics: Fully developed microlithic tradition with numerous formal tools, highly standardised backed microliths and small convex scrapers, OES and ochre is common and bone, shell and wooden artefacts occur (Lombard et al., 2012).
- **Final LSA**: The phase dates to approximately 1 hundred to 4 thousand years ago. Technological characteristics: Much variability can be expected; variants include macrolithic (similar to Smithfield [Sampson 1974]) and/or microlithic (similar to Wilton) assemblages; assemblages are mostly informal (Smithfield); often characterised by large untrimmed flakes (Smithfield); sometimes microlithic with scrapers, blades and bladelets, backed tools and adzes (Wilton-like); worked bone is common; OES is common; Ochre is common; iron objects are rare; ceramics are absent (Lombard et al., 2012).
- **Ceramic final LSA**: Generally, <2 thousand years ago. Contemporaneous with, and broadly similar to, final LSA, but includes ceramics - Economy may be associated with hunter-gatherers or herders -Technological characteristics: Stone tool assemblages are often microlithic; in some areas they are dominated by long end scrapers and few backed

microliths and in others formal tools are absent or rare; grindstones are common, ground stone artefacts, stone bowls and boat-shaped grinding grooves may occur; includes grit- or grass-tempered pottery; ceramics can be coarse, or well-fired and thin-walled; sometimes with lugs, spouts and conical bases; sometimes with decoration; sometimes shaped as bowls; Ochre and OES is common; metal objects, glass beads and glass artefacts also occur (Lombard et al., 2012).

Major LSA sites occurring in the Limpopo Province include: Balerno Main Shelter (Van Doornum, 2007a), Heuningneskrans Shelter (Klein, 1984), Goergap 113 KR (Van der Ryst, 1998), New Belgium (Van der Ryst, 1998), Schurfpoort 112 KR (Van der Ryst, 1998) and Tshisiku Shelter (Van Doornum, 2007b).

LSA sites have been identified at an area to the south of Polokwane and at Makgabeng (Bergh, 1999; Inskeep, 1978).

5.1.1.4 Rock Art and Engravings

By the beginning of the LSA, human behaviours were undoubtedly modern (Huffman, 2007). Uniquely human traits, such as rock art and purposeful burials with ornaments, became regular practice (Huffman, 2007). South Africa's rock art tradition is the engravings and paintings produced by forager or San communities (Smith & Ouzman 2004). Though considered predominantly shamanistic and symbolic, San rock art also concerns gender, landscape, and politics (Smith & Ouzman 2004).

In addition, Bantu-speaking farmers' rock art also exists that was made by groups that appeared in southern Africa about 2,000 years ago (Vogel 1995) from East and Central Africa (e.g., Ten Raa, 1974; B. Smith, 1995, 1997, 2002). This art has several distinct traditions, among them the northern Sotho initiation and protest rock arts (Smith and van Schalkwyk 2002, van Schalkwyk and Smith 2004), the rock engravings of Late Iron Age settlements (e.g., Maggs, 1995; Smith & Zubieta, 2007), and the boys' initiation rock art of the southern Sotho and Zulu. Most of these traditions are informed by oral history, and some may continue to be practiced (Smith & Ouzman 2004).

Four areas known from the northern part of the country where rock art clusters are found, comprise the Limpopo River Valley, the Makabeng-Blouberg Mountains, the Soutpansberg Mountains and the Waterberg. Each of these areas has its own distinct iconography but also shares several common qualities that make it different from the south-eastern mountain complex (Blundell and Ferreira 2017). These common attributes are:

- A greater representation in the art of diverse animal species. The rock art of the south-eastern mountain complex, as well as other parts of South Africa, heavily emphasizes eland. After eland, reedbuck and hartebeest are the most numerically important animal-images. Images of felines, elephant, domestic animals and other species do occur but are

generally numerically poorly represented, both at a single site (only a single feline may be present at a site, whereas hundreds of images of eland might be present for example) and as a category of images within the corpus of rock art for a region. The rock art of the northern part of South Africa differs from that of the south-eastern mountains because there is greater species variability and numerical representation of those species both at a single shelter and throughout the corpus of rock art. Giraffe, elephant, hartebeest/tsessebe, kudu and other animals are commonly found at rock art sites. The numerical dominance of eland appears to wane in the northern parts of the country (Blundell & Ferreira 2017).

- A greater proportion of images of women when compared to other parts of South Africa. Women typically make up between 2% and 14% of identifiable human images in the rock art of most parts of South Africa but in the northern parts of the country this increases dramatically to 31% (Blundell & Ferreira 2017).
- A widespread emphasis at rock art sites of images of clothing. These images include both men's loincloths (Y-shaped images) and female aprons (stretched-out skin-shapes). Such motifs are exceptionally rare in the south-eastern mountain complex but common in the northern areas of the country (Blundell & Ferreira 2017).

5.1.2 Iron Age Sequence

The Study Area and Surroundings during the Iron Age	
The arrival of early farming communities during the first millennium, heralded in the start of the Iron Age for South Africa. The Iron Age is that period in South Africa's archaeological history associated with pre-colonial farming communities who practiced cultivation and pastoralist farming activities, metal working, cultural customs such as lobola and whose settlement layouts show the tangible representation of the significance of cattle (known as the Central Cattle Pattern) (Huffman, 2007).	
AD 450 – AD 750	The Mzonjani facies of the Kwale Branch of the Urewe Ceramic Tradition is the earliest Iron Age presence for which archaeological evidence had been found in the surroundings of the study area. The key features on the decoration of the ceramics from this facies comprise punctuates on the rim and spaced motifs on the shoulder of the vessel (Huffman, 2007). No sites associated with the Mzonjani facies are known to be located within the study area or its immediate surroundings.
AD 750 – AD 1000	The Doornkop facies of the Happy Rest Sub-branch of the Kalundu Ceramic Tradition is the second Iron Age presence in the study area and surroundings. The key features on the decoration of the ceramics from this facies comprise multiple herringbone bands in neck (Huffman, 2007). No sites associated with the Doornkop facies are known to be located within the study area.
AD 1000 – AD 1300	The Eiland facies of the Happy Rest Sub-branch of the Kalundu Ceramic Tradition is the third Iron Age presence for which archaeological evidence had been found in the surroundings of the study area. The key features on the decoration of the ceramics from this facies comprise fine herringbone with ladder stamping (Huffman, 2007). No significant sites associated with the Eiland facies are known to be located within the study area. However, during an archaeological survey conducted in 2002 by Professor Tom Huffman, two Eiland

	sites were identified approximately 7km south-west of the closest point of the present study area (Huffman, 2002).
AD 1000 – AD 1200	The Klingbeil facies of the Happy Rest Sub-branch of the Kalundu Ceramic Tradition is the fourth Iron Age presence in the study area and surroundings. The key features on the decoration of the ceramics from this facies comprise triangles in neck bordered with slashes and punctuates on the shoulder of the vessels (Huffman, 2007). No sites associated with the Klingbeil facies are known to be located within the study area or its immediate surroundings.
AD 1300 – AD 1500	The Icon facies of the Moloko Branch of the Urewe Ceramic Tradition is the fifth Iron Age presence for which archaeological evidence had been found in the surroundings of the study area. The key features on the decoration of the ceramics from this facies comprise multiple incised bands separated by colour and lip decoration on bowls (Huffman, 2007). An Iron Age site with ceramics containing early Moloko decoration was identified during an archaeological survey for the proposed Mareesburg Joint Venture Mine (Matakoma, 2007). This site is located approximately 9.5km south of the present study area components located on the farm Mareesburg 8 IT. Furthermore, during a heritage study of the farm Richmond 370 KT, Iron Age sites with Icon type pottery were identified (Roodt, 2008).
AD 1650 - AD 1840	The Marateng facies of the Moloko Branch of the Urewe Ceramic Ceramic Tradition is the sixth Iron Age facies to be identified within the surroundings of the study area. The key features of the decoration used on the ceramics from this facies include incised arcades on upper shoulder separating black and red (Huffman, 2007). The Marateng facies can be associated with modern Pedi.

LIA sites are found in abundance throughout the Limpopo Province (Bergh, 1999; Mitchell, 2002). Sites where copper smelting were identified are located between Tzaneen and Polokwane and along the Hout River. Iron working sites were also identified between Polokwane and Tzaneen (Bergh, 1999). Further sites were recorded on the farm Icon (Huffman, 2007; Archaetnos database) and Matoks (Huffman, 2007).

5.2 Aspects of the History of the Study Area and Surroundings

5.2.1 Late Iron Age and Historic Black Settlement

5.2.1.1 The situation during the early nineteenth century

According to Bergh (1999), the Pedi, Roka, Koni and Tau were settled in the wider region during the start of the nineteenth century. As confirmation of this, Schoeman (1997) indicates that when the Bapedi settled in the Sekhukhuneland region during the second half of the seventeenth century (Schoeman, 1997), a number of groups such as the Kwena, Roka, Koni and Tau had preceded them there.

The Kwena of Mongatane was the first of these groups to settle in this wider area. Upon reaching the Olifants River, they split up into two groups. The first of these was under the leadership of Masabela, who established the first permanent Sotho settlement in Sekhukhuneland. The second group under Kope, decided to proceed upstream along the Olifants River and subsequently established themselves near present-day Groblersdal. It was this second group under Kope that later became known as the BaKopa. With time the Phasa, related to the group of Masabela, also moved into the Sekhukhuneland region. Although both these groups referred to themselves as the Roka, other groups of a similar name were also found here. After the settlement of the Roka, and by approximately 1700, various Koni and Tau groups also moved into the area.

5.2.1.2 Khumalo Ndebele

The Khumalo Ndebele of Mzilikazi was a Northern-Nguni group that moved out of KwaZulu-Natal during 1821. They first settled at the confluence of the Vaal and Olifants Rivers from where they moved further north and fought with the Ndzundza-Ndebele of Magodongo who resided near present-day Stoffberg. The Ndzundza-Ndebele were defeated, and Mzilikazi and his followers settled temporarily in these parts (Bergh, 1999). During their short residence in the area, the Khumalo-Ndebele attacked the Koni of Makopole in the vicinity of present-day Lydenburg, before attacking the Bapedi of Maroteng in 1822.

Mzilikazi then turned his attention to the area between the Olifants and Steelpoort Rivers, which was the heartland of the Bapedi. In the ensuing military activities, the Pedi paramount leader Phetedi, as well as most of his brothers, were killed. However, one of the brothers managed to escape northwards and survived. He was Sekwati. Sekwati returned to the area in 1828 and settled at Phiring, from where he started to rebuild the Maroteng kingdom. According to Smith (1969), the Khumalo-Ndebele stayed in the wider surroundings of the present study area for approximately a year, and during this time raided or destroyed much of the grain and livestock of the surrounding communities.

5.2.1.3 Bapedi

As mentioned before, the Bapedi settled in the Sekhukhuneland region during the second half of the seventeenth century (Schoeman, 1997). During the later stages of the 1700s and early period of the 1800s, the Morateng group of the Bapedi became the most dominant force in the area, subjecting many of the other communities and groups. They reached their zenith during the rule of Thulare (ca. 1790 – ca. 1820). Although the heartland of the BaPedi kingdom was the area between

the Olifants and Steelpoort Rivers, their influence stretched much further than that. For example, the winter pasture of Sekwati was located in the areas directly to the east of the Steelpoort River.

5.2.1.4 Voortrekkers and the establishment of Ohrigstad and Lydenburg

In an effort to get further away from British influence, and at the same time closer to the market atDelagoa Bay, the Voortrekker leader Andries Hendrik Potgieter together with a large following, moved from areas only recently established after the Great Trek such as Potchefstroom, Pretoria and the Magaliesberg to the vicinity of Ohrigstad. It is estimated that by August 1845, there were already a thousand Voortrekkers resident in the surroundings of Ohrigstad (Botha, 1958).

Figure 22 - Andries Hendrik Potgieter (Pienaar, 1990:136).

Attention now focused on the establishment of a town, and as early as 30 July 1845 a meeting was held at the new town named Ohrigstad. The meeting was aimed at reorganising the Voortrekker government and also establishing a new Volksraad (Botha, 1958). The wider areas surrounding the town also became increasingly settled by the new arrivals. During the period between August 1845 and December 1847, a total of 406 individual farms were proclaimed. Due to a number of reasons, including the prevalence of malaria, the settlement of Ohrigstad began to decline. As a result, the Volksraad came together on 19 September 1849 in the higher-lying town of Krugerspos and decided that a new town was to be established in a healthier area. On 20 September 1849, the decision was made to name the new town “Leidenburg”, and on 23 January 1850, the Volksraad in Potchefstroom decided that the new town was to be established on the farm Rietspruit (Botha,

1958:91). The Lydenburg district was proclaimed as an independent state, namely the Republic of Lydenburg, on 17 December 1856 (Duvenage, 1966).

5.2.1.5 Relations between the Voortrekkers and Bapedi during Sekwati's reign

In July 1845 the Voortrekker leader A.H. Potgieter negotiated a settlement with Sekwati. This settlement was aimed at allowing Potgieter's followers to settle and establish farms in present-day Mpumalanga. However, relations turned sour when the Volksraad negotiated and made a separate agreement with the Swazi kingdom to allow white farmers to settle in the areas falling under Sekwati's rule. Sekwati was very unhappy about this agreement in that he felt that as the Swazi never managed to subject him, he still had the only say in terms of the land in question. Nonetheless, farmers started establishing farms over large parts near Ohrigstad and Lydenburg, as well as quite close to Sekwati's residence and capital.

Although the initial stages (1845 to 1846) of contact between the Bapedi of Sekwati and the Boers was characterised by peace, this issue regarding the land negotiations started to have a negative impact on the relationship. By August 1852, relations had so deteriorated that Potgieter led a commando against Sekwati. The commando, assisted by Black forces, was not able to defeat the Pedi at their Phiring stronghold and lay a siege around the town in an attempt to subjugate them. The siege also proved unsuccessful and the commando left. Although the military activities did not curtail the power and influence of Sekwati, he decided to relocate his capital to the more defensive Thaba Mosego in the Leolo Mountains.

Due to the failure of the military actions taken against Sekwati, as well as the secession of the Lydenburg Republic in 1856, the Boers from these parts started making a strong motion in favour of a peaceful settlement with Sekwati. In October 1857, a commission was appointed to investigate the possible resolution of peace with the Pedi leader. Issues regarding land and boundaries were also to be discussed. On 17 November 1857, the Boers and Sekwati concluded a peace agreement. According to the terms of the agreement, the Steelpoort River was established as the boundary between the Bapedi and the Boer Republic. However, the agreement did not solve all the problems as it did not stipulate or rule on the issue of Boer farms already existing to the west of the Steelpoort River, nor did it indicate how far south the boundary of the Pedi land reached. After the signing of the agreement, during the late 1850s, relative peace settled over the area. However, the 1860s and 1870s were characterised by friction between the Bapedi

and the white farmers. These unfriendly relations worsened and culminated in open warfare during the latter part of the 1870s.

5.2.1.6 Relations between the Whites and Bapedi during Sekhukhune's reign

When Sekhukhune succeeded Sekwati as ruler of the Bapedi in 1861, his first priority was to strengthen his power base by eliminating or fighting any threats to his throne. Apart from the direct threats to his throne, Sekhukhune also felt threatened by a number of groups that used to be under Pedi influence. For example, both the Ndzundza-Ndebele and Bakopa started functioning independently from the Pedi during this time. As a means of strengthening his position, Sekhukhune remained at peace with the Boers, and subsequently made an agreement with the Lydenburg Republic, which in effect upheld the same provisions contained in the 1857 agreement, with the exception that no ruling was made in terms of the Steelpoort River as the boundary.

During October 1863, Sekhukhune also sent Pedi forces to assist a Boer attack on the Ndzundza. However, the attack was a failure (Bergh, 1999). Nevertheless, a number of factors again soured the relationship between the Bapedi and the whites (Bergh, 1999). During this time Sekhukhune sent some of his people to settle on the farms south and east of the Steelpoort River. In terms of the present study area, it is interesting to note that groups under Vroetepe and Marobele were sent to the banks of the Dwars Rivers to settle there to grow crops on the rivers' banks (Van Rooyen, 1950). When a farmer named Jancowitz, who had bought a farm in the vicinity of Mafolofolo, was prohibited from marking the beacons on his property (or from collecting wood there) by followers of Sekhukhune's younger brother Johannes Dinkwanyane, Sekhukhune decided to send his warriors to assist his brother.

The Boers from the surrounding areas identified the incident as a threat and grouped themselves into lagers. They subsequently asked the government for assistance. On 16 May 1876, the Volksraad declared war on the Bapedi. After a number of successes, the forces of the Zuid-Afrikaansche Republiek attacked Tshate, the new capital of Sekhukhune. As the first attacks proved unsuccessful, the decision was made to place the town under siege. Although a peace

agreement was signed on 16 February 1877, Sekhukhune was not in agreement with all of the provisions. The subsequent British annexation of Transvaal allowed Sekhukhune a measure of strategic space. Although negotiations were undertaken with the new British authorities, the relations between the British and the Bapedi eventually resulted in the outbreak of war. The war ended in the attack on Sekhukhune's capital Tshate on 28 November 1879. Although Sekhukhune managed to escape, he was captured on 2 December 1879, and imprisoned at Pretoria (Bergh, 1999).

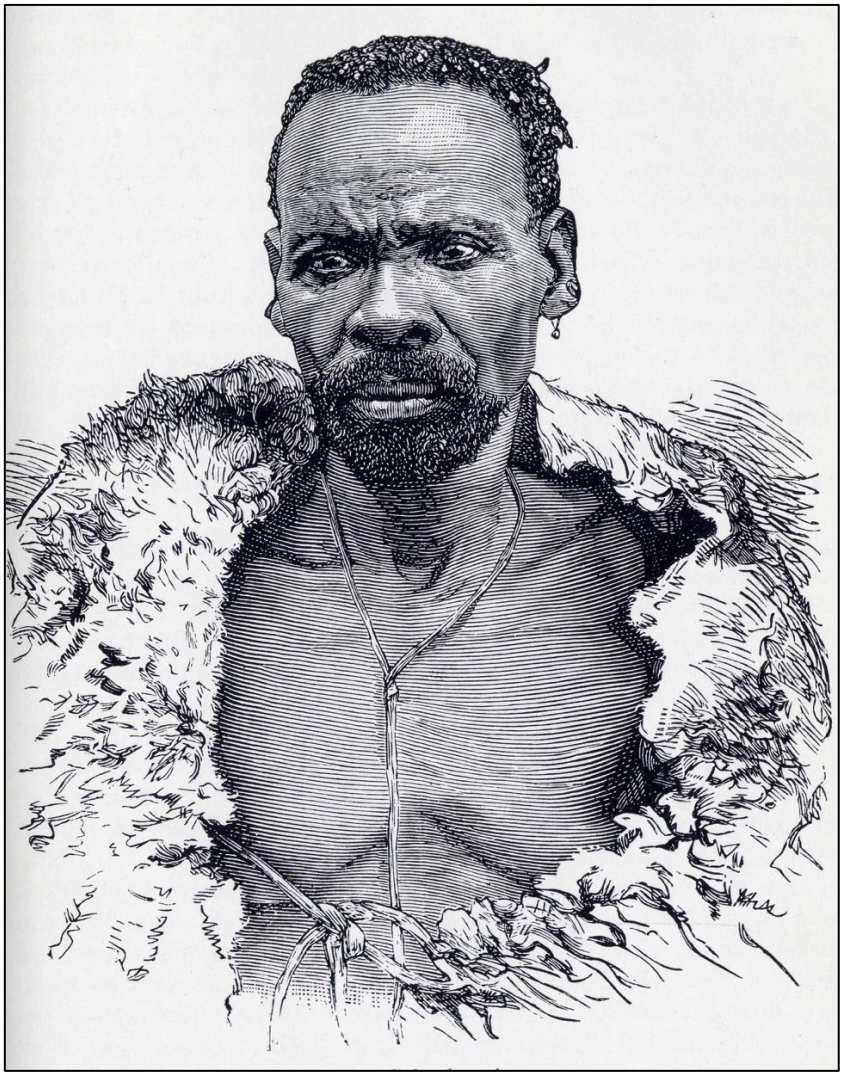


Figure 23 - Sekhukhune, ruler of the Bapedi (Grosskopf, 1957).

Most of the significant battles of the wars between the Bapedi of Sekhukhune and the Z.A.R. as well as the British authorities, such as the decisive Tshate battle of 28 November 1879, took place far away from the study area. However, during the war between the British forces and Sekhukhune's Bapedi of 1878-1879, a British territorial force known as the Diamond Field Horse had a military camp "…near

Dwars River". The camp was situated in an area surrounded by hills and had a clear field of fire of approximately 300 to 400 yards around the camp. On 7 August 1878 the camp was attacked by a force of some 2000 men. Forty-eight head of cattle and fifty-two horses were captured by the attackers (Smith, 1966).

The exact locality of the camp is not known. While Smith (1966:24 & 25) describes it as being "…about four miles on the Lydenburg side of Dwars River", it still does not give any indication from which point on the Dwars River the four miles is taken. Van Rooyen (1950) only states that the place where the Diamond Field Horse was attacked was close to the Steelpoort River. Although the camp, therefore, appears to be located some distance away from the study area, it at least indicates that the military activities during this period were not only restricted to the areas north of the Steelpoort River.

5.3 Historic Overview of Mining within the Study Area

While platinum was first found in the Lydenburg District by J.A. Lombaard on his farm Maandagshoek 254 KT (old number 148) (roughly 60 km north of the present study area), it was Hans Merensky who identified the first platinum reef in South Africa and brought it to the attention of the world (Machens, 2009). With the assistance provided by Lombaard's cousins Schalk and Willem Schoeman, Merensky also discovered platinum south of the Steelpoort River. All these discoveries and investigations were made during August and September 1924 (National Archives, MNW, MM525/25).

The discovery of a platinum reef by Hans Merensky led to a mad rush by fortune seekers, prospectors and businessman from across the country to obtain options on farms where platinum was believed to be found. In a report written by a Dr. Wagner (during or just before 1925) on the platinum fields of the Lydenburg District, he indicated that although the platinum reef had not yet been traced all the way from Maandagshoek to Dwarsrivier, it was clearly evident on the last mentioned farm. The report also stated that the outcrop stretched over Thorncliffe and continued for nearly 16 miles all the way to Sterkfontein. With the farm Thorncliffe located directly north of Helena, it is evident that platinum had already been discovered at Helena by this time.

In fact, according to a sworn statement held at the National Archives in Pretoria, platinum was discovered on the farm Helena by Lydenburg lawyer Cornelius Jansen Weilbach on 6 December 1924 (National Archives, MNW, 775, MM1037/25). This discovery was made by Weilbach during prospecting activities undertaken on the Remainder of the farm Helena that was owned by Barend Leendert Geldenhuys. These prospecting activities were undertaken in terms of the consent provided by the minerals rights owned by Geldenhuys and Magtild Cecilia Weilbach, Cornelius Jansen Weilbach's wife. At the time, each of the two mineral rights owners of the remainder of the farm Helena held one-half share of the mineral rights to the said portion.

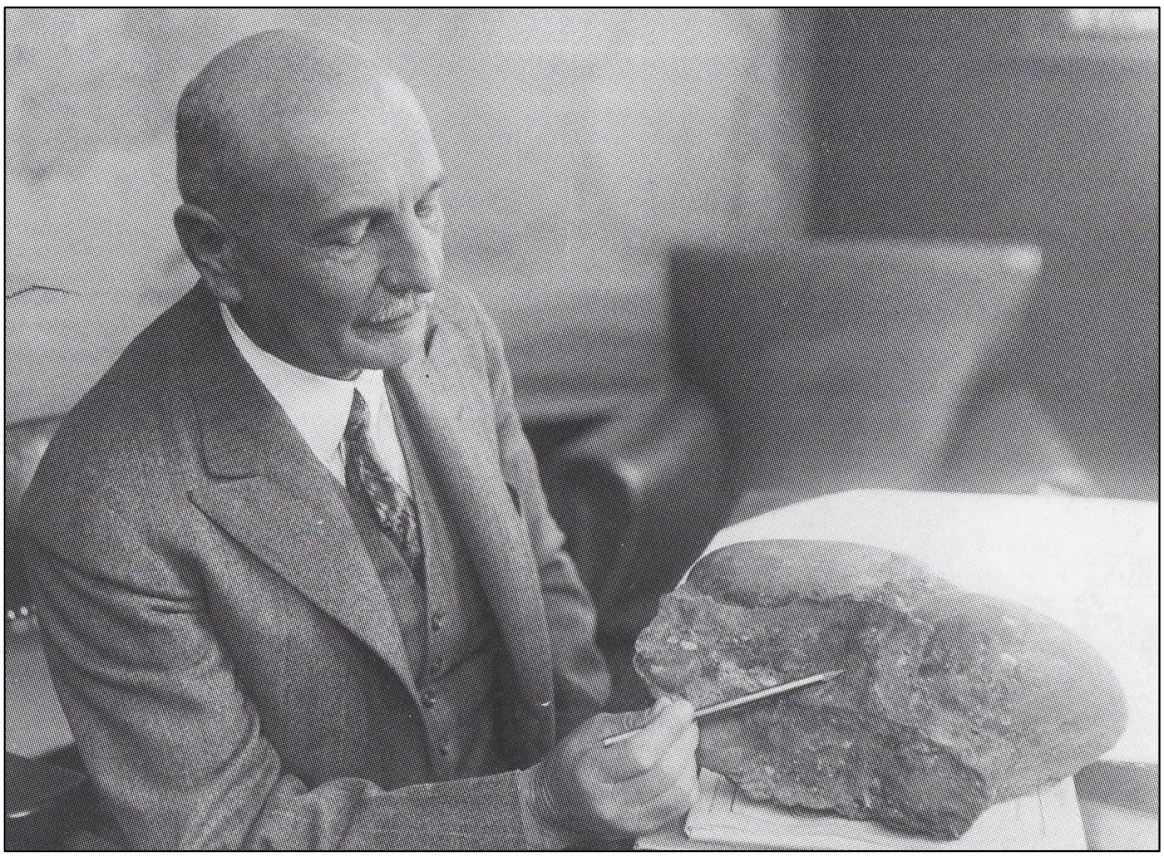


Figure 24 - Hans Merensky (16 March 1871 – 21 October 1952) (Machens, 2009).

On 17 January 1925 the Platinum Proprietary Company (of Lydenburg) Limited was established (South African Mining Yearbook, 1941/42) with Cornelius Jansen Weilbach as one of the directors. On 26 January 1925 an application for discoverers rights on the farm Helena was submitted. At this point, on 17 March 1925, the portion of the farm belonging to Bresler was transferred to Ludwig Wipplinger. On 28 April 1925, Cornelius Jansen Weilbach received 20 discoverer's

claims on the farm Helena and on 10 September 1925 a beacon certificate was issued which defined the boundary of Weilbach's discoverer's rights on the farm. By 14 September 1925, the ownership of mineral rights for the farm Helena was registered in such a way that of the portion of the farm owned by Barend Leendert Geldenhuys one-half share of the mineral rights was owned by Geldenhuys while the remaining half was owned by Magtild Cecilia Weilbach (born Schoeman). In turn, of the portion owned by Ludwig Wipplinger, one half share in the mineral rights of this portion were owned by Pieter Benjamin Bresler with the remaining half share owned by Magtild Cecilia Weilbach (born Schoeman). This means that by September 1925 Mrs. Weilbach owned one-half share in the mineral rights of the entire farm.

In an article published in "Die Huisgenoot" of 5 June 1925, G.P. Canitz describes a visit made by him to the Lydenburg platinum fields, including the workings on Dwarsrivier. The prospecting operations undertaken on Dwarsrivier are described in some detail by Canitz (1925). He indicates that the platinum reef ran halfway up along a big mountain range on the farm, and all along the reef tunnels and shafts were excavated and bored into the mountain. The ore was then taken to the Dwarsrivier camp where it was stamped and bagged. The final phase in the process was the panning of the fine ore in the Dwars River to evaluate the quality of the platinum. It can be expected that early prospecting operations on the farm Helena would have been conducted in the same way as was the case on the farm Dwarsrivier.

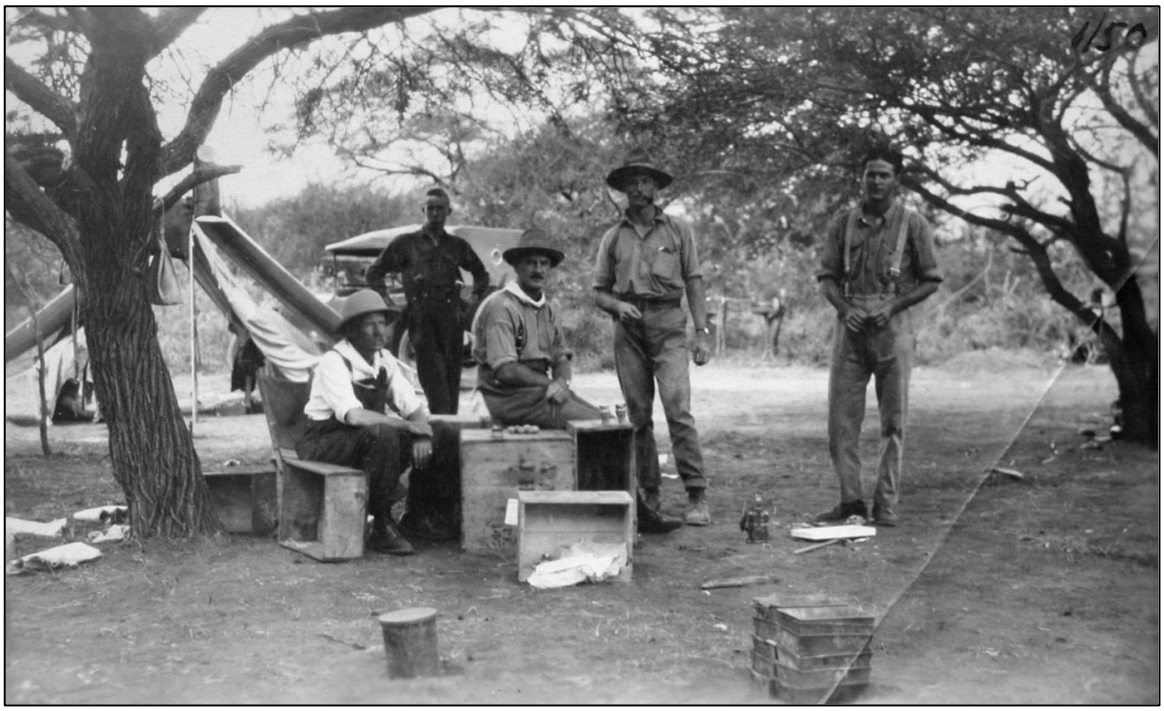


Figure 25 - This historic photograph taken in 1925 shows five unnamed platinum prospectors at their camp on the farm Dwarsrivier (National Archives, Photographs, TAB, 17509). While this camp is not believed to have been located anywhere near the present study area, this photograph does provide one with an idea as to the early platinum prospecting activities in this general vicinity.

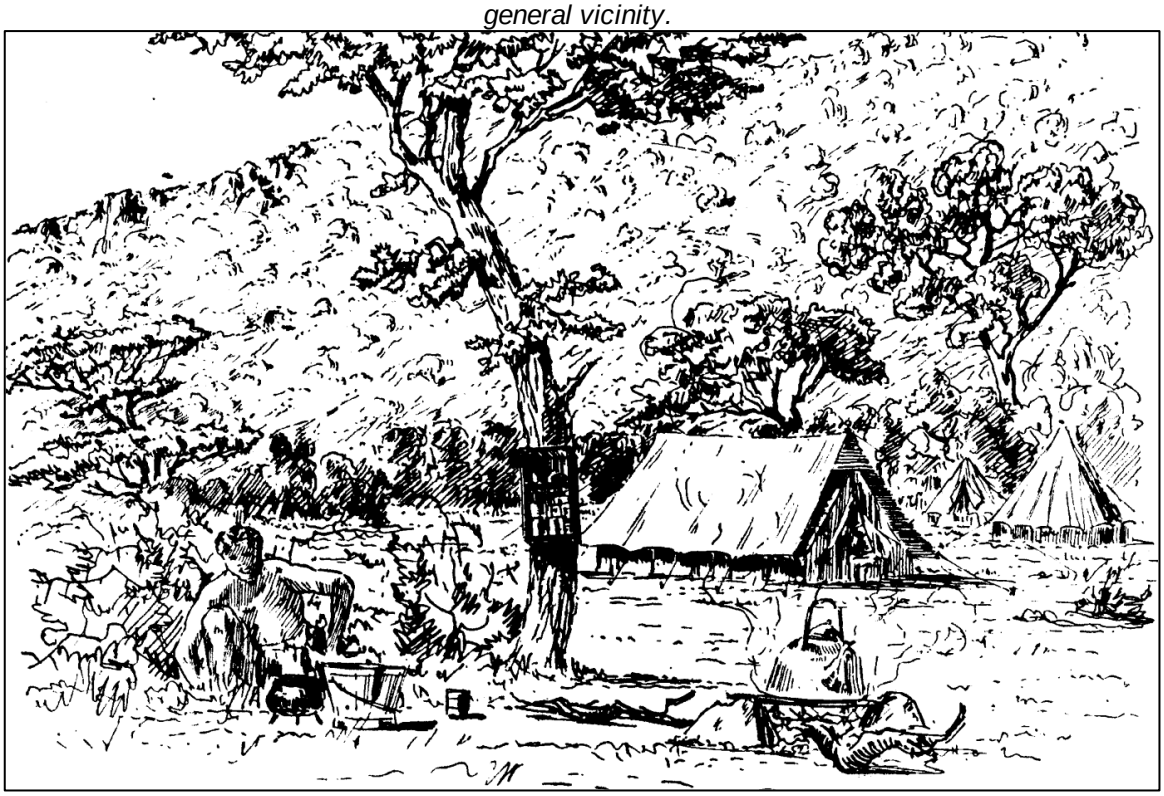


Figure 26 - Sketch of the kitchen area at the Dwars River camp c. 1925 (Canitz, 1925:23).

Cornelius Jansen Weilbach subsequently ceded his discoverer's rights to the farm to the Platinum Proprietary Company (of Lydenburg) Limited, in which he was a director. This company owned the mineral rights to the farm Helena and by c. 1929

had undertaken a "...*considerable amount of work...on the Merensky Horizon...on Helena*" (Wagner, 1973: 303).

It is not known for how long the Platinum Proprietary Company conducted mining activities on Helena, but by the early 1940s, the company was still active on the farm. At the time the ompany directors were D.C. Greig, Herman Ohlthaver and Ludwig Wipplinger (South African Mining Yearbook, 1941/42). While Wipplinger had been the assistant to Hans Merensky, Ohlthaver was a friend of Merensky and with his business partner Gustav Becker often supported Merensky's prospecting expeditions financially (Machens, 2009).

The company name still appears in archival records dating to 1957 (National Archives, WLD, 936/1957), but not after this date. It would appear therefore that the Platinum Proprietary Company ceased to exist during the late 1950s.

5.4 National and Provincial Heritage Resources

No Provincial Heritage Resources are known from within the study area. According to the relevant map on SAHRIS, the nearest Provincial Heritage Resources to the study area include:

- Dwars River Geological Occurrence, Lydenburg District. This site is located approximately 4km north-west of the nearest point along the study area boundary.
- Mapoch's Caves, Roos Senekal, Middelburg District. This site is located approximately 31km south-west of the nearest point along the study area boundary.
- Steenkamp Bridge, Spekboom River, Lydenburg District. This site is located approximately 35km north-east of the nearest point along the study area boundary.
- Remains of Old Voortrekker Fort, Ohrigstad, Lydenburg. This site is located approximately 49km north-east of the nearest point along the study area boundary.
- The Tjate Heritage Site. This site is located approximately 57km north-north-west of the nearest point along the study area boundary.

In terms of National Heritage Resources, the relevant map on SAHRIS indicates that only one National Heritage Resource is located in the wider surroundings of the study area. This site represents the Makapans Valley, which is located 128km north west of the closest point along the present study area. Makapans Valley is also a declared World Heritage Site.

5.5 Archival/Historical Maps

Topographic maps (1:50 000) for various years (1963, 1976, 1997), were available for utilisation in the background study. These maps were assessed to observe the development of the area, as well as the location of possible historical structures and burial grounds. The study area was overlain on the map sheets to identify structures or graves situated within or immediately adjacent to the study area that could possibly be older than 60 years and thus protected under Section 34 and 36 of the NHRA.

5.5.1 1: 50 000 Topographical Map 2430CC KENNEDY'S VALE - First Edition 1973

With the study area extending across one topographic map (1:50 000), the first edition historical topographic map was used for this study. The first edition map was decided upon as it provides the oldest views of the landscape. This topographic map was based on aerial photography undertaken in 1954, was surveyed in 1963 and drawn in 1964 by the Trigonometrical Survey Office.

The study area boundaries were overlain on the map sheet to identify any possible heritage features (such as structures or graves) situated within or immediately adjacent to the study area boundaries. This was done using Google Earth and the georeferenced imagery for the two maps that were obtained from National Geo-Spatial Information at the Department of Agriculture, Land Reform and Rural Development in Cape Town.

Two structures were identified immediately adjacent to the study area boundaries. The distribution of the heritage features that were identified on the old topographic map is shown in **Figure 27**.

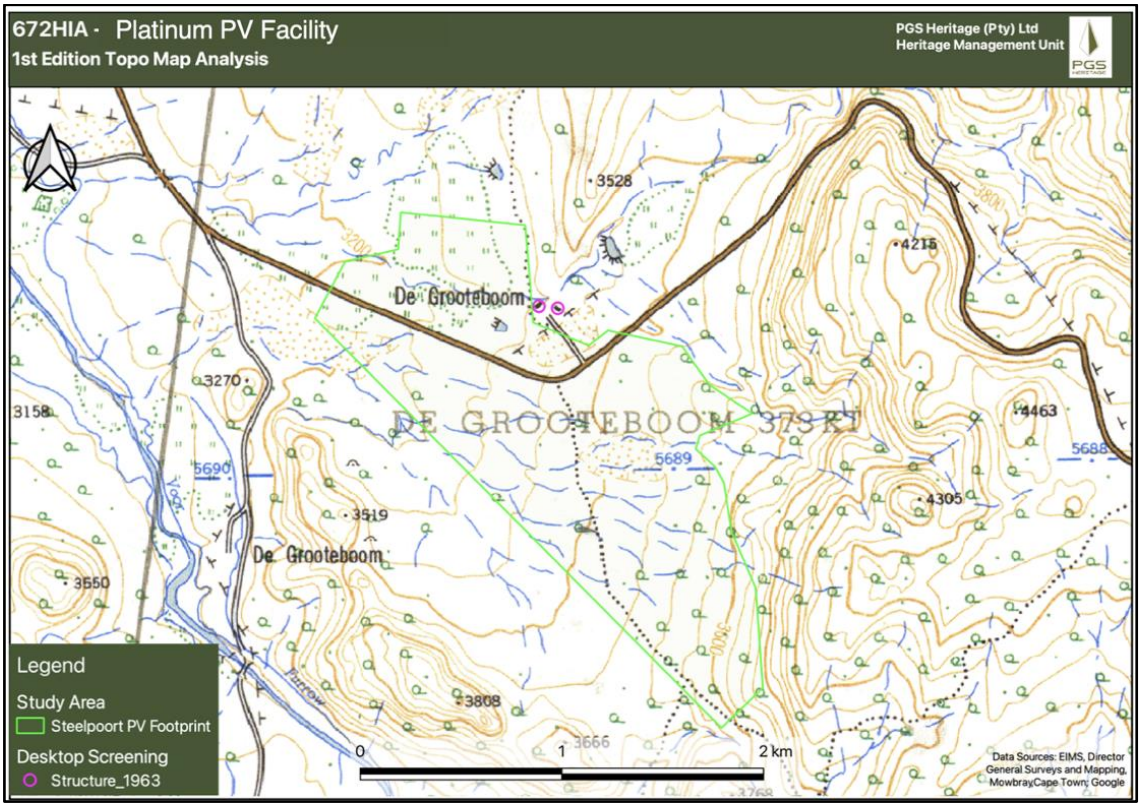


Figure 27 – Distribution of the heritage features identified on the First Edition of the 2430CC Topographic Map.

Previous Heritage Impact Assessment Reports from the Study Area and Surroundings

A search of the SAHRIS database revealed that two previous archaeological and heritage impact assessments had been undertaken for areas that are located within sections of the present study area. These previous studies are listed in chronological order below:

- HUFFMAN, T. & H.S. SCHOEMAN. 2002. Archaeological Assessment of the Der Brochen Project, Mpumalanga. **The survey area was located approximately 11km south of the current study area. A total of 25 archaeological and heritage sites were identified during this 2002 study. These identified sites included cemeteries, historic to recent Pedi homesteads, Iron age sites as well as Stone Age sites.**
- VAN VOLLENHOVEN, A.C. & A. Pelser. 2002. Report on a Cultural Resources Survey for the Two Rivers Project, done on the Farm Dwarsrivier 372 KT, Mpumalanga Province. **Two heritage sites are included in the report. Sites recorded included a MSA and LSA surface scatter and an EIA site.**
- ROODT, F. 2003a. Phase 1 Heritage Impact Assessment Der Brochen Tailings Dams Farms: Helena And St. George Mpumalanga Province. **The survey area was located approximately 9km south-west of the current study area. Several Middle and Late Iron Age sites, historical ruins and graves were identified.**

- ROODT, F., 2003b. Phase 1 Heritage Impact Assessment: De Grootboom Township Establishment, Mpumalanga, Polokwane: Cultural Resource Consultants. **MSA material (flakes, cores) was scattered throughout the study area, especially in eroded areas. One concentration of EIA pottery fragments (Doornkop Tradition dating to approx. 800AD) was recorded in an eroded setting. Two of the MSA sites (ref: SITE 2 and SITE 4) and the EIA site (ref: SITE 1) were recorded within the current study area.**
- ROODT, F., 2003c. Phase 1 Heritage Impact Assessment: Der Brochen Project Helena Complex - Trial Mining Phase, Mpumalanga Province, Polokwane: Cultural Resources Consultants. **An isolated piece of Eiland pottery, several isolated Pedi pottery fragments, the ruins of an original farmhouse and two graves were recorded**.
- VAN DER WALT, J. & W. FOURIE. 2007. Archaeological Impact Assessment for Proposed Mining Development on the farm Mareesburg 8 JT, District Steelpoort. **Four Iron Age sites were identified.**
- BIRKHOLTZ, P.D. & H.S. STEYN. 2005. *Phase 1 Heritage Impact Assessment for the Proposed Lebalelo Pipeline on the Farms Dwarsrivier 372 KT and Thorncliffe 374 KT*, Mpumalanga Province, South Africa. **A total of seven heritage sites are included in the report.**
- COETZEE, F. P., 2008. CULTURAL HERITAGE SURVEY OF THE PROPOSED PLATINUM FLOTATION AND TAILINGS FACILITY ON THE FARM DE GROOTEBOOM 373 KT, SEKHUKHUNE DISTRICT, LIMPOPO PROVINCE, PRETORIA: UNISA. **The survey area was located approximately 2.7km south-west of the current study area. No Stone Age or Iron Age settlements, structures, features or artefacts or historical buildings were recorded during the survey.**
- ROODT, F. 2008. Heritage Resources Scoping Report for the Der Brochen Minerichmond Farm: Mpumalanga. **A heritage resources survey of this area has detected significant archaeological sites, graves, as well as a number of sites with recent historical remains. A total of 42 heritage sites were recorded (incl. historical period sites, several grave sites and sacred places, Iron Age and Stone Age remains).**
- VAN DER WALT, J. & J.P. CELLIERS. 2009. Archaeological Impact Assessment for a Proposed Water Pipeline and Access Route for the Booysendal Platinum Mine, Steelpoort, Mpumalanga Province. **Thirty one sites of heritage significance were identified during the survey.**
- PISTORIUS, J. 2011. Phase 1 Cultural and Heritage Impact Assessment Study for the Proposed Extension of Mining Operations (Project Fairway) at Everest Platinum Mine on parts of several adjoining farms in the Steenkampsberge between Roossenekal and Lydenburg in the Limpopo Province of South Africa. **During the survey historical remains consisting of two hamlets, and an informal burial ground were identified.**
- DU PIESANIE, J. 2012. Heritage Statement for Rhodium Reef Limited Platinum Operation, 2430CA and CC, De Goedeverwachting 332 KT; Boschkloof 331 KT; Belvedere 362 KT; Kennedy's Vale 361 KT; and Tweefontein 360 KT, Limpopo Province. **A total of 25 heritage**

sites are included in the report. Communal activity areas are also common in the region. These consist of several grinding hollows and areas usually grouped or in a line.

- ROODT, F. & L. STEGMANN. 2012. Phase 1 Heritage Impact Assessment Report. Two Rivers Platinum Mine, Limpopo. **A total of 23 heritage sites are included in the report.**
- VAN VOLLENHOVEN, A, 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. **Only a few stone tools and a single potsherd were recorded.**
- MAGOMA, M., 2014. Phase 1 Archaeological Impact Assessment Specialist Study Report for the proposed Tubatse Strengthening Phase 1 Senakangwedi B Integration Project in Steelpoort Area of Greater Tubatse Local Municipality within Sekhukhune District Limpopo Province, Pretoria: Vhubvo Archaeo-Heritage Consultants. **Several LIA sites were recorded**.
- HIGGITT, N, DU PIESANIE, J. AND NEL, J. 2015. DE GROOTEBOOM MINING PERMIT APPLICATION AND ASSOCIATED ENVIRONMENTAL MANAGEMENT PLAN: HERITAGE SCOPING REPORT. **The proposed prospecting area encompassed the current study area. Middle Stone Age lithics were recorded within the project as a result of the scoping site visit. These lithics were not found in situ within a heavily eroded area in the proposed power line route.**
- VAN SCHALKWYK, J. 2016. Cultural heritage impact assessment for THE PROPOSED MINING ACTIVITIES ON PORTIONS OF THE FARMS KENNEDY'S VALE 361KT AND SPITSKOP 333KT, GREATER TUBATSE LOCAL MUNICIPALITY, LIMPOPO PROVINCE. **The survey area was located approximately 8km north of the current study area. Sites that were recorded includes: Low density scatters of stone tools in erosion gullies; five old homestead sites; nine informal burial places; and an industrial heritage site.**
- KRUGER, N. 2017. ARCHAEOLOGICAL IMPACT ASSESSMENT (AIA) ON PORTIONS OF THE FARMS THORNCLIFFE 374 KT, HELENA 6 JT, DE GROOTEBOOM 373 KT AND ST GEORGE 2 JT FOR THR PROPOSED GLENCORE EASTERN MINES EXPANSION PROJECT, STEELPOORT AREA, GREATER FETAKGOMO TUBATSE LOCAL MUNICIPALITY, LIMPOPO PROVINCE. **The survey area was located approximately 2.4km south-west of the current study area. A small Iron Age occupation site consisting out of the foundations of crude stone wall structures, undecorated potsherds and a lower grindstone were identified at one locality. Another small Iron Age occupation site consisting of several grinding hollows and stone wall structures occur at the site. A possible Historical Period occupation site with stone wall features, a broken lower grindstone and enamel artefacts. Two recent Historical Period cemeteries and several other grave sites as well as numerous stone wall foundation structures were recorded.**
- VAN VOLLENHOVEN, A, 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. **The survey area was located approximately 1.8km north of the current study area. Three historical mine shafts of cultural heritage significance were identified. The**

description of these sites within the heritage report was seen as sufficient recording and no further mitigation was recommended.

- VAN DER WALT, J. 2018. Heritage Impact Assessment for the Establishment of Various Projects and the Expansion of the Exploration Programme at Dwarsrivier Chrome Mine, Steelpoort, Limpopo Province. **A total of 25 heritage sites are included in the report, which includes 21 previously identified sites, three sites identified from old topographic maps and one Provincial Heritage Resource. None of the 21 previously identified heritage sites are located within the study area. The three sites identified from old topographic maps and the Provincial Heritage Resource are already included in the relevant sections of this report and are not included again in the table or maps below.**
- BIRKHOLTZ, P. 2019. Heritage Impact Assessment for the Proposed Der Brochen Amendment Project located on certain sections of the farms Helena 6 JT, Der Brochen 7 JT and Mareesburg 8 JT, south of Steelpoort, Greater Tubatse Local Municipality, Greater Sekhukhune District Council, Limpopo Province. **The fieldwork resulted in the identification of 57 archaeological and heritage sites.**
- Munyai, R.R. 2021. Phase 1 Archaeological and Cultural Historical Impact Assessment Scan for Additional Activities located within the Approved Mining Right Area and Authorised, Two Rivers Platinum (Pty) Ltd on Portion 6 of Dwarsrivier Farm 372 KT, Steelpoort, Limpopo Province. **A total of five heritage sites are included in the report.**
- VAN DER WALT, J. 2021a. Heritage Impact Assessment for the Proposed New Khulu Tailings Storage Facility and Associated Infrastructure Project, Dwarsrivier Chrome Mine, Limpopo Province. **Six heritage sites are included in the report.**
- VAN DER WALT, J. 2021b. Heritage Impact Assessment for the proposed pipeline (SE2) between Spitskop Pump Station and Mototolo Mine, Steelpoort, Limpopo Province. **The survey area was located approximately 3km west of the current study area. Three burial sites and a possible Iron Age site marked by ephemeral stone packed terrace walls have been recorded.**
- COETZEE, F. P., 2022. Phase 1 Archaeological Impact Assessment for the Proposed ECM Mareesburg Mining Development on Portions of the Farm Helena 6 JT and Mareesburg 8 JT, Steelpoort, Limpopo. **The survey area was located approximately 8km south of the current study area. LIA structures and artefacts, as well as ESA and MSA tools were recorded**.

5.6 Palaeontology

According to the Palaeosensitivity Map available on the South African Heritage Resources Information System database (SAHRIS), the Palaeontological Sensitivity of the proposed development areas are mostly rated as low (blue) and Insignificant/Zero (grey) (**Figure 28**). No further palaeontological studies are required in terms of the proposed development but a protocol for finds would be required for the low sensitivity areas (Almond and Pether 2008, SAHRIS website).

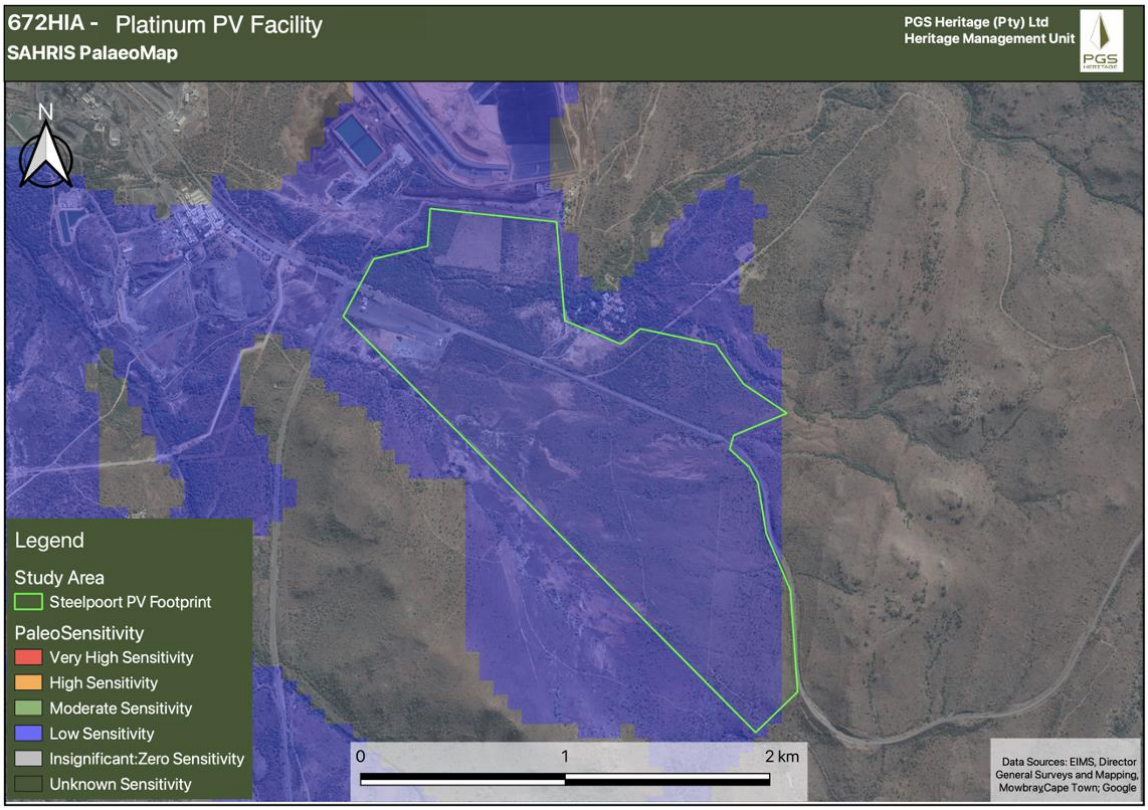


Figure 28 - Extract of the 1: 250 000 SAHRIS Palaeosensitivity Map (Council of Geosciences), overlain with the location of the study area.

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 29 – Key to the SAHRIS palaeontological map.

5.7 Findings of the historical desktop study

The findings can be compiled as follows and have been combined to produce a heritage sensitivity map for the project based on the desktop assessment.

5.7.1 Heritage sensitivity

Analysis of maps and satellite imagery enabled the identification of possible heritage sensitive areas. By superimposition and analysis, it was possible to rate these structures according to age and thus their level of protection under NHRA. **Table E** 6 lists the possible tangible heritage sites identified in the vicinity of the study area and the relevant legislative protection.

Table E 6 - Tangible heritage site in the study area.

Name	Description	Legislative protection
Archaeology	Older than 100 years	NHRA Sections 3 and 35
Structures	Possibly older than 60 years	NHRA Sections 3 and 34
Burial grounds	Graves	NHRA Sections 3 and 36 and MP Graves Act

5.7.2 Possible Heritage Finds

The evaluation of satellite imagery and the analysis of the studies previously undertaken in the area has indicated that certain areas may be sensitive from a heritage perspective. This combined analysis of satellite imagery and previous heritage studies has assisted in the development of the following landform type to heritage find matrix (**Table E** 7).

Table E 7 - Landform type to heritage find matrix

Landform Type	Heritage Type
Crest and foot hill	LSA and MSA scatters
Crest of small hills	Small LSA sites – scatters of stone artefacts, ostrich eggshell, pottery and beads
Pans	Dense LSA sites
Dunes	Dense LSA sites
Outcrops	Occupation sites dating to LSA
Farmsteads	Historical archaeological material

6 FIELDWORK FINDINGS[1]

A controlled surface survey was conducted on foot and by a vehicle by one archaeologist and two field assistants from PGS, from the 23 January - 24 January 2023. The fieldwork component of the study was aimed at identifying tangible remains of archaeological, historical and heritage significance. To some degree, the archaeological visibility of the area was not ideal for surveying due to dense thorny vegetation cover which affected access to parts of the study area.

Heritage resources are unique and non-renewable and as such any impact on such resources must be seen as significant. The locations of finds were recorded using a GPS device and photographs were taken of the identified finds and general landscape of the proposed development area. The recorded track logs show the routes followed by the fieldwork team on site (**Figure 30**).

The field work revealed six (6) heritage resources (**Figure 31, Figure 32**) containing scatters of MSA artefacts that were dense enough to be classified as either find spots or medium-low/low density surface scatters. It is evident that the MSA layer is well below the present soil surface. It is therefore unlikely that these artefacts were observed in their primary context due to the nature of the environment where artefacts are exposed due to erosion. This observation is supported by previous findings in the study area by Roodt (2003b). Raw materials utilised included hornfels and fine-grained quartzite. Additionally, single isolated artefacts were also observed across portions of the study area that had been exposed to erosion.

Site coordinates		
Site ID	**Lat**	**Long**
SSP01	-24.94144	30.142
SSP02	-24.94099	30.14381
SSP03	-24.93987	30.14119
SSP04	-24.93976	30.14098
SSP05	-24.93976	30.14121
SSP06	-24.94009	30.14134

Refer to **Appendix B** for full site descriptions (incl. photographs).

[1] *Site in this context refers to a place where a heritage resource is located and not a proclaimed heritage site as contemplated under s27 of the NHRA.*

Figure 30 - Fieldwork tracklogs (track in red, study area in green).

Figure 31 - Identified heritage resources within the proposed development area. See inset A below.

Figure 32 - Inset A.

Figure 33 - View of the flakes identified at the site SSP02.

Figure 34 - View of the flakes and cores identified at the site SSP06.

6.1 Heritage Screening

A Heritage Screening Report was compiled using the Department of Environment, Forestry and Fisheries National Web-based Environmental Screening Tool as required by Regulation 16(1)(v) of the Environmental Impact Assessment Regulations 2014, as amended. An analysis of the screening tool and sensitivity for the proposed development has shown that the overall sensitivity rating is low (**Figure 35**) with localised site specific high ratings (**Figure 36**).

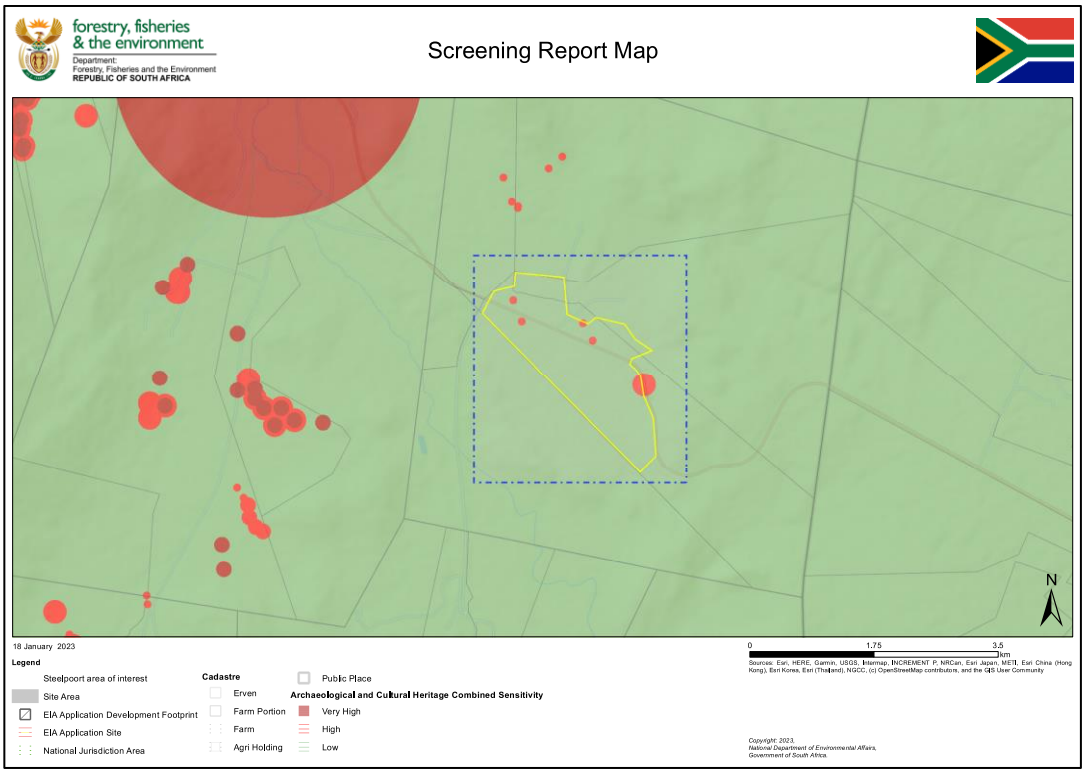


Figure 35 - DFFE Screening - Archaeological and Cultural Heritage significance – entire PV area.

The fieldwork and site survey of the study area has confirmed localised heritage resources, in the form of low-density surface scatters of stone tools. **To some degree the level of erosion and dense vegetation in the study area hindered the identification of further possible heritage resources.**

One of the low-density surface scatters of flakes (**SSP06**), corresponded with one of the areas marked as having a high sensitivity (see **Figure 36**). The field assessment has, however, confirmed that this specific sensitivity rating needs to be corrected, as the site has been rated as having a low heritage significance due to its disturbed context.

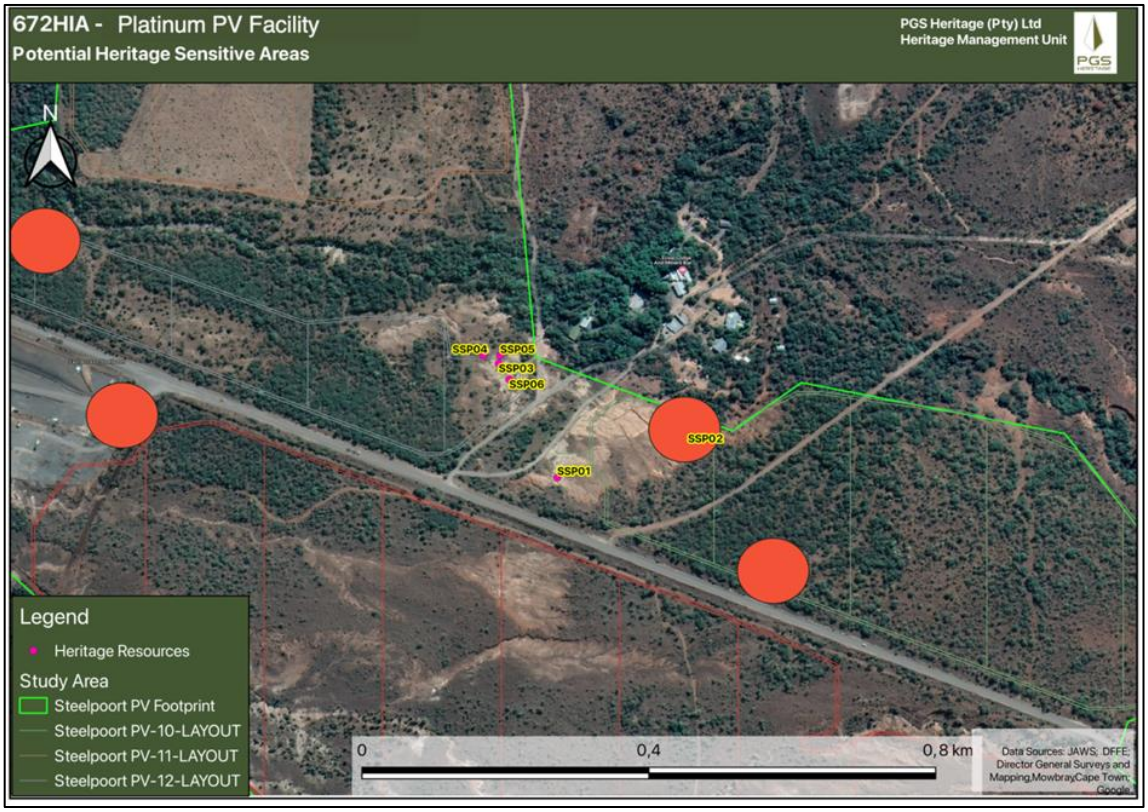


Figure 36 – Potential heritage sensitive areas as identified during desktop analysis (DFFE Screening - Archaeological and Cultural Heritage significance) in relation to the heritage sites identified during the survey.

The other areas with a high sensitivity rating, as per the screening tool, are either located within contexts disturbed by infrastructure (see **Figure 37,** areas **A** and **B**) or are located within areas that have previously been cultivated (see **Figure 37,** areas **C** and **D**). No evidence of structures was observed on maps, aerial photographs or in the field to support these flagged areas. Therefore, it is most likely that these sites are associated with archaeological remains and these specific high sensitivity rating needs to be corrected to reflect a low rating, due to their disturbed contexts.

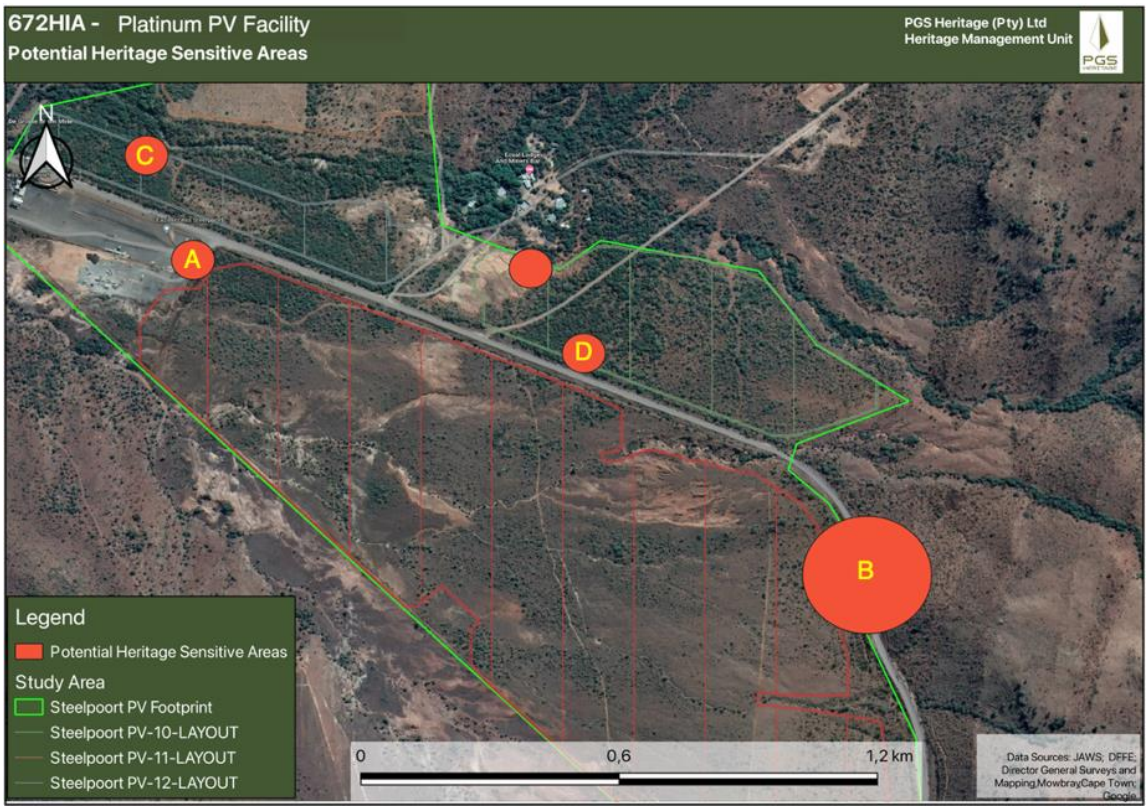


Figure 37 – Overview of the potential heritage sensitive areas within the study area as identified during desktop analysis (DFFE Screening - Archaeological and Cultural Heritage significance).

Therefore, in the case of this study area, the DFFE screening tool sensitivity map is not supported based on the findings of this fieldwork

7 IMPACT ASSESSMENT

The impact assessment rating is based on the rating scale as contained in **Appendix B**.

7.1 General Observations

In this section, an assessment will be made of the impact of the proposed development on the identified heritage sites. An overlay of all the heritage sites identified during the fieldwork over the proposed development footprint areas was made to assess the impact of the proposed development on these identified heritage sites. This overlay resulted in the following observations:

The following general observations will apply for the impact assessment undertaken in this report:

- Heritage sites assessed to have a low heritage significance are not included in these impact risk assessment calculations. The reason for this is that sites of low significance will not require mitigation. These sites are the stone tool surface scatters (**SSP01-SSP06**).
- It is necessary to realise that the heritage resources located during the fieldwork do not necessarily represent all the possible heritage resources present within the area. Various factors account for this, including the size of the study area and the subterranean nature of some heritage sites. The impact assessment conducted for heritage sites assumes the possibility of finding heritage resources during the project life and has been conducted as such.

7.2 Impact Assessment Table

The following table (**Table E** 8) provides a quantitative assessment of the impacts of the proposed development on the general project area.

Table E 8 - Impact ratings for the proposed development

ACTIVITY	ASPECTS AFFECTED	POTENTIAL IMPACT	PRE-MITIGATION	Score	Rating	MITIGATION	POST-MITIGATION	Score	Rating	CUMULATIVE	Score	Rating
Heritage												
Site clearance and soil movement	Due to the size of the area assessed and the current vegetation cover, the possibility of encountering heritage features in un-surveyed areas does exist.	Destruction of unidentified heritage resources	Significance	2	1,60	Implement a chance to find procedures in case where possible heritage finds are uncovered.	Significance	1	1,40	Significance	1	0,93
			Magnitude - Spatial	1			Magnitude - Spatial	1		Magnitude - Spatial	1	
			Magnitude - Temporal	5			Magnitude - Temporal	5		Magnitude - Temporal	5	
			Probability	3			Probability	3		Probability	2	

8 MANAGEMENT RECOMMENDATIONS AND GUIDELINES

The following section must be read in conjunction with **Table E** 10 of this report.

8.1 Construction and operational phases

The project will encompass a range of activities during the construction phase, including ground clearance and infrastructure development associated with the project.

It is possible that cultural material will be exposed during construction and may be recoverable, keeping in mind delays can be costly during construction, and as such must be minimised. Development surrounding infrastructure and construction of facilities results in significant disturbance, however foundation holes do offer a window into the past and it thus may be possible to rescue some of the data and materials. It is also possible that substantial alterations will be implemented during this phase of the project, and these must be catered for. Temporary infrastructure developments, such as construction camps and laydown areas, are often changed or added to the project as required. In general, these are low impact developments as they are superficial, resulting in little alteration of the land surface, but still need to be catered for.

During the construction phase, it is important to recognize any significant material being unearthed, making the correct judgment on which actions should be taken. It is recommended that the following chance find procedure should be implemented.

8.2 Chance finds procedure

- An appropriately qualified heritage practitioner / archaeologist must be identified to be called upon in the event that any possible heritage resources or artefacts are identified.
- Should an archaeological site or cultural material be discovered during construction (or operation), the area should be demarcated, and construction activities halted.
- The qualified heritage practitioner / archaeologist will then need to come out to the site and evaluate the extent and importance of the heritage resources and make the necessary recommendations for mitigating the find and the impact on the heritage resource.
- The contractor therefore should have some sort of contingency plan so that operations could move elsewhere temporarily while the materials and data are recovered.
- Construction can commence as soon as the site has been cleared and signed off by the heritage practitioner / archaeologist.

8.3 Possible finds during construction

The study area occurs within a greater historical and archaeological site as identified during the desktop and fieldwork phase. Soil clearance for infrastructure as well as the proposed reclamation activities, could uncover the following:

- Historical structures and foundations
- unmarked burial grounds and graves

8.4 Timeframes

It must be kept in mind that mitigation and monitoring of heritage resources discovered during construction activity will require permitting for collection or excavation of heritage resources and lead times must be worked into the construction time frames. **Table E** 9 gives guidelines for lead times on permitting.

Table E 9 - Lead times for permitting and mobilisation

Action	Responsibility	Timeframe
Preparation for field monitoring and finalisation of contracts	The contractor and service provider	1 month
Application for permits to do necessary mitigation work	Service provider – Archaeologist and SAHRA	3 months
Documentation, excavation and archaeological report on the relevant site	Service provider – Archaeologist	3 months
Handling of chance finds – Graves/Human Remains	Service provider – Archaeologist and SAHRA	2 weeks
Relocation of burial grounds or graves in the way of the development	Service provider – Archaeologist, SAHRA, local government and provincial government	6 months

8.5 Heritage Management Plan for EMPr implementation

Table E 10 - Heritage Management Plan for EMPr implementation

Area and site no.	Mitigation measures	Phase	Timeframe	The responsible party for implementation	Monitoring Party (frequency)	Target	Performance indicators (monitoring tool)
General project area	Implement a chance to find procedures in case where possible heritage finds are uncovered.	Construction	During construction	Applicant ECO Heritage Specialist	ECO (monthly / as or when required)	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 34-36 and 38 of NHRA	ECO Monthly Checklist/Report
Stone tool surface scatters that were rated as having low heritage significance (**SSP01-SSP06**)	**No mitigation required**	Pre-construction	Pre-construction	Applicant ECO Archaeologist	None	Ensure compliance with relevant legislation and recommendations from PHRA under Section 36 and 38 of NHRA	ECO Monthly checklist/report

9 CONCLUSIONS AND RECOMMENDATIONS

The HIA identified various archaeological resources within the study area which are rated as having a low heritage significance and will require no further mitigation work before the project can continue.

9.1 Archaeological Site

The fieldwork conducted for the evaluation of the possible impact of the proposed development, has revealed the presence of six (6) heritage resources.

These sites contained scatters of MSA artefacts that were dense enough to be classified as either find spots or medium-low/low density surface scatters. It is evident that the MSA layer is well below the present soil surface. It is therefore unlikely that these artefacts were observed in their primary context due to the nature of the environment where artefacts are exposed due to erosion. This observation is supported by previous findings in the study area by Roodt (2003b). Raw materials utilised included hornfels and fine-grained quartzite. Additionally, single isolated artefacts were also observed across portions of the study area that had been exposed to erosion.

Since the six find spots/low density surface scatters (**SSP01** – **SSP-06**) were observed in secondary contexts, they were rated as having **low heritage significance/no heritage significance**.

9.2 Palaeontology

According to the Palaeosensitivity Map available on the South African Heritage Resources Information System database (SAHRIS), the Palaeontological Sensitivity of the proposed development areas are mostly rated as low (blue) and Insignificant/Zero (grey) (**Figure 28**). No further palaeontological studies are required in terms of the proposed development but a protocol for finds would be required for the low sensitivity areas (Almond and Pether 2008, SAHRIS website).

9.3 Anticipated Impacts on Heritage Resources

9.3.1 Archaeology

The pre-construction and construction phase of the proposed development will entail extensive surface clearance as well as excavations into the superficial sediment cover and underlying bedrock. The possible pre-construction impacts calculated on the tangible cultural heritage resources is overall **LOW NEGATIVE** rating but with the implementation of the recommended buffers and management guidelines will be reduced to a **LOW NEGATIVE** impact.

9.4 Mitigation measures

The calculated impact as summarised in **Section 7** of this report confirms the impact of the proposed development will be reduced with the implementation of the mitigation measures. This finding in addition to the implementation of a chance finds procedure, as part of the EMPr, will mitigate possible impacts on unidentified heritage resources. The following mitigation measures are listed below:

Table E 11 - Heritage management recommendations.

Area and site no.	Mitigation measures
General project area	▪ Implement a chance to find procedures in cases where possible heritage finds are uncovered.
Low density stone tool surface scatters (SPP01-SPP06)	▪ **No mitigation required.**

9.5 Conclusions and Impact Statement

If heritage resources are discovered during site clearance, construction activities that may impact the find must stop, and a qualified archaeologist must be appointed to evaluate and make recommendations on mitigation measures.

It is the author's considered opinion that the overall impact of the proposed development on heritage resources is **Low**. With the implementation of recommended mitigation measures the overall impact on heritage resources will be reduced to acceptable levels during the activities of the project.

10 REFERENCES

10.1 Published References

Bergh, J.S. 1999. Geskiedenisatlas van Suid-Afrika: die Vier Noordelike Provinsies. Van Schaik, Pretoria.

Burke, E.E., (Ed.) 1969. The Journals of Carl Mauch: His Travels in the Transvaal and Rhodesia 1869-1872. National Archives of Rhodesia. Salisbury.

Changuion, L., 2008. A Report on the potential impact of Ndowana's prospecting activities on items of historical significance in Haenertsbeurg and its surroundings.

Conan Doyle, A. 1902. The Great Boer War. (http://www.angloboerwar.com/books/40-conan-doyle-the-great-boer-war/986-conan-doyle-chapter-37-the-campaign-of-january-to-april-1902).

Herries, A.I.R. 2011. A chronological perspective on the Acheulian and its transition to the Middle Stone Age in southern Africa: the question of the Fauresmith. International Journal of Evolutionary Biology 2011: 1-25.

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

Inskeep, R. R. 1978. The peopling of southern Africa. David Phillip, Cape Town.

Jordaan, J. 1992. The Bakoni Malapa Museum: Establishment and Management. Commissioned by the Town Council of Pietersburg. Review Printers.

Klein, R. 1., 1984. Later Stone Age Faunal Samples from Heuningneskrans Shelter (Transvaal) and Leopard's Hill Cave (Zambia). The South African Archaeological Bulletin, 39(140), pp. 109-116.

Lombard, M., Wadley, L., Deacon, J., Wurz, S., Parsons, I., Moleboheng, M., Swart, J., & Mitchell, P. 2012. South African and Lesotho Stone Age Sequence Updated. The South African Archaeological Bulletin 67: 123-144.

Loubser, J.H.N. 1994. Ndebele Archaeology of the Pietersburg Area. Navorsinge van die Nasionale Museum Bloemfontein. Vol. 10, Part 2.

Louw, A. W., 1969. Bushman Rock Shelter, Ohrigstad, Eastern Transvaal: A Preliminary Investigation, 1965.. The South African Archaeological Bulletin, 24(94), pp. 39-51.

Maggs, T., 1995. Neglected Rock Art, The rock engravings of agricultural communities, in SA Archaeological Bulletin, 162.

Mason, R. 1962. Prehistory of the Transvaal. Wits University Press: Johannesburg.

Mason, R.J. 1988. Kruger Cave, Late Stone Age, Magaliesburg. Johannesburg: Archaeological Research Unit, University of the Witwatersrand.

Mitchell, P. 2002. The Archaeology of Southern Africa. Cambridge University Press: Cambridge.

Mönnig, H.O.1967. The Pedi. Pretoria: J.L. van Schaik.

Morris, D. 2008. Archaeological and Heritage Impact Assessment on Remainder of Carter Block 458, near Lime Acres, Northern Cape. McGregor Museum.

Pelser, A. G. 2012. Report On An Archaeological Impact Assessment For The Expansion Of The Lafarge Aggregate Quarry Near Polokwane, Limpopo Province. Prepared for Lafarge Mining South Africa (Pty) Ltd.

Phillipson, D.W. 1985. African archaeology. Cambridge University Press, Cambridge.

Plug, I., 1981. Some Research Results on the Late Pleistocene and Early Holocene Deposits of Bushman Rock Shelter, Eastern Transvaal. The South African Archaeological Bulletin, Vol. 36, No. 133, pp. 14-21.

Porraz, G., Val, A., Dayet, L., De La Pena, P., Douze, K., Miller, C.E., Murungi, M.L., Tribolo, C., Schmid, V.C.& Sievers, C. 2015. Bushman Rock Shelter (Limpopo, South Africa): a perspective from the edge of the Highveld. South African Archaeological Bulletin 70: 166–179.

Roodt, F. 2008. Heritage Impact Assessment Report: Residential Development Roodepoort 744 LS Port. 4 & Langgenoeg 745 LS Port. 1 Polokwane, Limpopo. Prepared for Gideon De Klerk, Envirodel.

Sampson, C.G. 1974. The Stone Age Archaeology of Southern Africa. New York: Academic Press. Sinclair, A. 2009. The MSA stone tool assemblage from the Cave of Hearths, Beds 4–9. In: McNabb, J. & Sinclair, A. (eds) The Cave of Hearths: Makapan Middle Pleistocene Research Project: Field Research by Anthony Sinclair and Patrick Quinney, 1996–2001: 105–137. Oxford: Archaeopress.

Smith, B.W. 2002. Forbidden images: Rock paintings and the Nyau secret society of central Malawi and eastern Zambia. African Archaeological Review 18:187–211.

Smith, B.W. 1997. Zambia's ancient rock art: The paintings of Kasama. Oxford: Nuffield Press for the National Heritage Conservation Commission of Zambia.

Smith, B.W., & Ouzman, S. 2004. Taking Stock Identifying Khoekhoen Herder Rock Art in Southern Africa. Current Anthropology 45: 499-526.

Smith, B.W., & Van Schalkwyk, J.A. 2002. The white camel of the Makgabeng. Journal of African History 43:235–54.

Smith, B. & Zubieta, L. F., 2007. The Power of Ancient Art. In: Mpumalanga: History and Heritage. Durban: University of Kwa-Zulu Natal Press.

SOUTH AFRICAN MUSEUMS ASSOCIATION, (SAMA). 1991. Guide to the Museums in the Transvaal. SAMA Transvaal Regional Branch: Pretoria.

Ten Raa, E. 1974. A record of some pre-historic and some recent Sandawe rock paintings. Tanzania Notes and Records 75:9–27.

Tobias, P.V. 1949. The excavation of Mwulu's Cave, Potgietersrust district. South African Archaeological Bulletin 4: 2–13.

Van der Ryst, M.M. 1998. The Waterberg Plateau in the Northern Province, Republic of South Africa, in the Later Stone Age. Oxford: British Archaeological Reports International Series 715.

Van der Ryst, M.M., 2006. Seeking Shelter: Later Stone Age Hunters, Gatherers and Fishers of Oliboompoort in the western Waterberg south of the Limpopo. Unpublished doctoral thesis, University of the Witwatersrand, Johannesburg.

Van Doornum, B. 2007a. Changing places, spaces and identity in the Shashi-Limpopo region of Limpopo Province, South Africa. Unpublished PhD thesis. Johannesburg: University of the Witwatersrand.

Van Doornum, B. 2007b. Tshisiku Shelter and the Shashe-Limpopo confluence area hunter-gatherer sequence. Southern African Humanities 19:17-67.

Van Schalkwyk, J.A., & Smith, B.W. 2004. “Insiders and outsiders: Sources for reinterpreting an historical event,” in African Historical Archaeologies. Edited by Andrew Reid and Paul Lane, pp. 325–46. London: Kluwer Academic.

10.1 Unpublished Sources

Birkholtz, P. 2019. Heritage Impact Assessment for the Proposed Der Brochen Amendment Project located on certain sections of the farms Helena 6 JT, Der Brochen 7 JT and Mareesburg 8 JT, south of Steelpoort, Greater Tubatse Local Municipality, Greater Sekhukhune District Council, Limpopo Province

Birkholtz, P.D. & H.S. Steyn. 2005. Phase 1 Heritage Impact Assessment for the Proposed Lebalelo Pipeline on the Farms Dwarsrivier 372 KT and Thorncliffe 374 KT, Mpumalanga Province, South Africa.

Blundell, G. & A. Ferreira. 2017. A report on the archaeology of “Wellington’s Domes”, on the Farm Utrecht (776LR), Mokopane.

Coetzee, F. P., 2022. Phase 1 Archaeological Impact Assessment for the Proposed ECM Mareesburg Mining Development on Portions of the Farm Helena 6 JT and Mareesburg 8 JT, Steelpoort, Limpopo.

Coetzee, F. 2012. Cultural Heritage Survey of the Proposed Kabi Vaalkop PV Solar Facility, near Orkney, Dr Kenneth Kaunda District, North West Province. For Savannah Environmental (Pty) Ltd.

Coetzee, F. P., 2008. CULTURAL HERITAGE SURVEY OF THE PROPOSED PLATINUM FLOTATION AND TAILINGS FACILITY ON THE FARM DE GROOTEBOOM 373 KT, SEKHUKHUNE DISTRICT, LIMPOPO PROVINCE, PRETORIA: UNISA.

Dreyer, K. 2005. Archaeological and Historical Investigation of the Proposed Residential Developments on Subdivision 13 of the farm Pretoriuskraal 53, Viljoenskroon, Free State.

Du Piesanie, J. 2012. Heritage Statement for Rhodium Reef Limited Platinum Operation, 2430CA and CC, De Goedeverwachting 332 KT; Boschkloof 331 KT; Belvedere 362 KT; Kennedy’s Vale 361 KT; and Tweefontein 360 KT, Limpopo Province.

Higgitt, N, Du Piesanie, J. and Nel, J. 2015. DE GROOTEBOOM MINING PERMIT APPLICATION AND ASSOCIATED ENVIRONMENTAL MANAGEMENT PLAN: HERITAGE SCOPING REPORT.

Huffman, T. & H.S. Schoeman. 2002. Archaeological Assessment of the Der Brochen Project, Mpumalanga.

Kruger, N. 2017. ARCHAEOLOGICAL IMPACT ASSESSMENT (AIA) ON PORTIONS OF THE FARMS THORNCLIFFE 374 KT, HELENA 6 JT, DE GROOTEBOOM 373 KT AND ST GEORGE 2 JT FOR THR PROPOSED GLENCORE EASTERN MINES EXPANSION PROJECT, STEELPOORT AREA, GREATER FETAKGOMO TUBATSE LOCAL MUNICIPALITY, LIMPOPO PROVINCE.

Magoma, M., 2014. Phase 1 Archaeological Impact Assessment Specialist Study Report for the proposed Tubatse Strengthening Phase 1 Senakangwedi B Integration Project in Steelpoort Area of Greater Tubatse Local Municipality within Sekhukhune District Limpopo Province, Pretoria: Vhubvo Archaeo-Heritage Consultants.

Matlosana Municipality, n.d. Catalogue of Heritage Sites.

Miller, S. 2015. Cultural Heritage Impact Assessment for Shafts #1 to #7, Orkney, Northwest Province, South Africa. For CAPM Gold.

Munyai, R.R. 2021. Phase 1 Archaeological and Cultural Historical Impact Assessment Scan for Additional Activities located within the Approved Mining Right Area and Authorised, Two Rivers Platinum (Pty) Ltd on Portion 6 of Dwarsrivier Farm 372 KT, Steelpoort, Limpopo Province.

Pistorius, J. 2011. Phase 1 Cultural and Heritage Impact Assessment Study for the Proposed Extension of Mining Operations (Project Fairway) at Everest Platinum Mine on parts of several adjoining farms in the Steenkampsberge between Roossenekal and Lydenburg in the Limpopo Province of South Africa.

Roodt, F. 2003a. Phase 1 Heritage Impact Assessment Der Brochen Tailings Dams Farms: Helena And St. George Mpumalanga Province.

Roodt, F., 2003b. Phase 1 Heritage Impact Assessment: De Grootboom Township Establishment, Mpumalanga, Polokwane: Cultural Resource Consultants.

Roodt, F., 2003c. Phase 1 Heritage Impact Assessment: Der Brochen Project Helena Complex - Trial Mining Phase, Mpumalanga Province, Polokwane: Cultural Resources Consultants.

Roodt, F. 2008. Heritage Resources Scoping Report for the Der Brochen Minerichmond Farm: Mpumalanga.

Roodt, F. & L. Stegmann. 2012. Phase 1 Heritage Impact Assessment Report. Two Rivers Platinum Mine, Limpopo.

Van Der Walt, J. 2021a. Heritage Impact Assessment for the Proposed New Khulu Tailings Storage Facility and Associated Infrastructure Project, Dwarsrivier Chrome Mine, Limpopo Province.

Van Der Walt, J. 2021b. Heritage Impact Assessment for the proposed pipeline (SE2) between Spitskop Pump Station and Mototolo Mine, Steelpoort, Limpopo Province. Van Der Walt, J. 2018. Heritage Impact Assessment for the Establishment of Various Projects and the Expansion of the Exploration Programme at Dwarsrivier Chrome Mine, Steelpoort, Limpopo Province.

Van der Walt, J. & J.P. Celliers. 2009. Archaeological Impact Assessment for a Proposed Water Pipeline and Access Route for the Booysendal Platinum Mine, Steelpoort, Mpumalanga Province.

Van der Walt, J. & W. Fourie. 2007. Archaeological Impact Assessment for Proposed Mining Development on the farm Mareesburg 8 JT, District Steelpoort.

Van Schalkwyk, J. 2016. Cultural heritage impact assessment for THE PROPOSED MINING ACTIVITIES ON PORTIONS OF THE FARMS KENNEDY'S VALE 361KT AND SPITSKOP 333KT, GREATER TUBATSE LOCAL MUNICIPALITY, LIMPOPO PROVINCE.

Van Vollenhoven, A, 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.

Van Vollenhoven, A.C. & A. Pelser. 2002. Report on a Cultural Resources Survey for the Two Rivers Project, done on the Farm Dwarsrivier 372 KT, Mpumalanga Province.

Van Vollenhoven, A, 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.

10.2 Historical Topographic Maps

All the historic topographical maps used in this report were obtained from the Directorate: National Geo-spatial Information of the Department of Rural Development and Land Reform in Cape Town.

10.3 Internet

www.sanbi.org

www.wikipedia.org

CDNGI GEOSPATIAL PORTAL

Council of Geoscience: Geology of South Africa Interactive Online Map

Natural England (2014) An Approach to Landscape Character Assessment. Internet: www.gov.uk/natural-england.

UCT Online Collection. Internet: https://digitalcollections.lib.uct.ac.za/

10.4 Google Earth

All the aerial depictions and overlays used in this report are from Google Earth.

APPENDIX A

ENVIRONMENTAL IMPACT METHODOLOGY

In order to ensure uniformity, a standard impact assessment methodology will be utilised so that a wide range of impacts can be compared. The impact assessment methodology makes provision for the assessment of impacts against the following criteria:

- Significance;
- Spatial scale;
- Temporal scale;
- Probability; and
- Degree of certainty.

A combined quantitative and qualitative methodology will be used to describe the impacts for each of the aforementioned assessment criteria. A summary of each of the qualitative descriptors along with the equivalent quantitative rating scale for each of the aforementioned criteria below.

Quantitative rating and equivalent descriptors for the impact assessment criteria.

RATING	SIGNIFICANCE	EXTENT SCALE	TEMPORAL SCALE
1	VERY LOW	*Isolated corridor / proposed corridor*	Incidental
2	LOW	*Study area*	Short-term
3	MODERATE	*Local*	Medium-term
4	HIGH	*Regional / Provincial*	Long-term
5	VERY HIGH	*Global / National*	Permanent

A more detailed description of each of the assessment criteria is given in the following sections.

Significance Assessment

Significance rating (importance) of the associated impacts embraces the notion of extent and magnitude, but does not always clearly define these since their importance in the rating scale is very relative. For example, the magnitude (i.e. the size) of area affected by atmospheric pollution may be extremely large (1000km^2) but the significance of this effect is dependent on the concentration or level of pollution. If the concentration is great, the significance of the impact would be HIGH or VERY HIGH, but if it is diluted it would be VERY LOW or LOW. Similarly, if 60 ha of a grassland type are destroyed the impact would be VERY HIGH if only 100 ha of that grassland type were known. The impact would be VERY LOW if the grassland type was common. A more detailed description of the impact significance rating scale is given in **the table below.**

Description of the significance rating scale.

RATING		DESCRIPTION
5	VERY HIGH	Of the highest order possible within the bounds of impacts which could occur. In the case of adverse impacts: there is no possible mitigation and/or remedial activity which could offset the impact. In the case of beneficial impacts, there is no real alternative to achieving this benefit.
4	HIGH	Impact is of substantial order within the bounds of impacts, which could occur. In the case of adverse impacts: mitigation and/or remedial activity is feasible but difficult, expensive, time-consuming or some combination of these. In the case of beneficial impacts, other means of achieving this benefit are feasible but they are more difficult, expensive, time-consuming or some combination of these.
3	MODERATE	Impact is real but not substantial in relation to other impacts, which might take effect within the bounds of those which could occur. In the case of adverse impacts: mitigation and/or remedial activity are both feasible and fairly easily possible. In the case of beneficial impacts: other means of achieving this benefit are about equal in time, cost, effort, etc.
2	LOW	Impact is of a low order and therefore likely to have little real effect. In the case of adverse impacts: mitigation and/or remedial activity is either easily achieved or little will be required, or both. In the case of beneficial impacts, alternative means for achieving this benefit are likely to be easier, cheaper, more effective, less time consuming, or some combination of these.
1	VERY LOW	Impact is negligible within the bounds of impacts which could occur. In the case of adverse impacts, almost no mitigation and/or remedial activity is needed, and any minor steps which might be needed are easy, cheap, and simple. In the case of beneficial impacts, alternative means are almost all likely to be better, in one or a number of ways, than this means of achieving the benefit. Three additional categories must also be used where relevant. They are in addition to the category represented on the scale, and if used, will replace the scale.
0	NO IMPACT	There is no impact at all - not even a very low impact on a party or system.

Spatial Scale

The spatial scale refers to the extent of the impact i.e. will the impact be felt at the local, regional, or global scale. The spatial assessment scale is described in more detail the table below.

Description of the spatial rating scale.

RATING		DESCRIPTION
5	Global/National	The maximum extent of any impact.
4	Regional/Provincial	The spatial scale is moderate within the bounds of impacts possible, and will be felt at a regional scale (District Municipality to Provincial Level). The impact will affect an area up to 50km from the proposed site / corridor.
3	Local	The impact will affect an area up to 5km from the proposed route corridor / site.
2	Study Area	The impact will affect a route corridor not exceeding the boundary of the corridor / site.
1	Isolated Sites / proposed site	The impact will affect an area no bigger than the corridor / site.

Duration Scale

In order to accurately describe the impact it is necessary to understand the duration and persistence of an impact in the environment. The temporal scale is rated according to criteria set out the table below.

Description of the temporal rating scale.

RATING		DESCRIPTION
1	Incidental	The impact will be limited to isolated incidences that are expected to occur very sporadically.
2	Short-term	The environmental impact identified will operate for the duration of the construction phase or a period of less than 5 years, whichever is the greater.
3	Medium term	The environmental impact identified will operate for the duration of life of the project.
4	Long term	The environmental impact identified will operate beyond the life of operation.
5	Permanent	The environmental impact will be permanent.

Degree of Probability

The probability or likelihood of an impact occurring will be described, as shown in **the table below.**

Description of the degree of probability of an impact occurring.

RATING	DESCRIPTION
1	Practically impossible
2	Unlikely
3	Could happen
4	Very Likely
5	It's going to happen / has occurred

Degree of Certainty

As with all studies it is not possible to be 100% certain of all facts, and for this reason a standard "degree of certainty" scale is used as discussed in the table belowError! Reference source not found.. The level of detail for specialist studies is determined according to the degree of certainty required for decision-making. The impacts are discussed in terms of affected parties or environmental components.

Description of the degree of certainty rating scale.

RATING	DESCRIPTION
Definite	More than 90% sure of a particular fact.
Probable	Between 70 and 90% sure of a particular fact, or of the likelihood of that impact occurring.
Possible	Between 40 and 70% sure of a particular fact, or of the likelihood of an impact occurring.

RATING	DESCRIPTION
Unsure	Less than 40% sure of a particular fact or the likelihood of an impact occurring.
Can't know	The consultant believes an assessment is not possible even with additional research.

Quantitative Description of Impacts

To allow for impacts to be described in a quantitative manner in addition to the qualitative description given above, a rating scale of between 1 and 5 was used for each of the assessment criteria. Thus the total value of the impact is described as the function of significance, spatial and temporal scale as described below.

$$\textit{Impact Risk} = \frac{(\text{SIGNIFICANCE} + \textit{Spatial} + \text{Temporal})}{3} \times \frac{\text{Probability}}{5}$$

An example of how this rating scale is applied is shown in Error! Reference source not found..

Example of Rating Scale.

IMPACT	SIGNIFICANCE	SPATIAL SCALE	TEMPORAL SCALE	PROBABILITY	RATING
	LOW	*Local*	Medium Term	*Could Happen*	
Impact to air	**2**	***3***	**3**	**3**	**1.6**

Note: The significance, spatial and temporal scales are added to give a total of 8, that is divided by 3 to give a criteria rating of 2,67. The probability (3) is divided by 5 to give a probability rating of 0,6. The criteria rating of 2,67 is then multiplied by the probability rating (0,6) to give the final rating of 1,6.

The impact risk is classified according to 5 classes as described below

Impact Risk Classes.

RATING	IMPACT CLASS	DESCRIPTION - NEGATIVE	DESCRIPTION - POSITIVE
0.1 – 1.0	1	Very Low	Very Low
1.1 – 2.0	2	Low	Low
2.1 – 3.0	3	Moderate	Moderate
3.1 – 4.0	4	High	High
4.1 – 5.0	5	Very High	Very High

Therefore with reference to the example used for air quality above, an impact rating of 1.6 will fall in the Impact Class 2, which will be considered to be a low impact.

APPENDIX B

SITE DESCRIPTION FORMS

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
SSP01	-24.94144	30.142	**General Landscape Characteristics** Valleys and Plains, Bushy/Shrubby vegetation, Grassy vegetation **Site Conditions** Disturbed, Erosion **Time Period** Stone Age **Site Type** Lithics Low Density Surface Scatter//Single Find Spot **Site Extent** 5m x 5m **Notes** Several lithics were observed on an eroded surface. The scatter is situated on a gravel slope. It is unlikely that these artefacts were observed in their primary context due to the nature of the environment. The artefacts are exposed due to some sheet erosion which occurs across the surface. The assemblage occurs in heavily deflated and eroded area, so the scientific potential and heritage significance is lowered.	No research potential or other cultural significance	NCW

Figure 38 – Views of the general setting of the site SSP01.

Figure 39 – View of two of the flakes identified at SSP01.

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
SSP02	-24.94099	30.14381	**General Landscape Characteristics** Valleys and Plains, Bushy/Shrubby vegetation, Grassy vegetation **Site Conditions** Erosion **Time Period** Stone Age **Site Type** Lithics Low Density Surface Scatter//Single Find Spot **Site Extent** 15m x 15m **Notes** A low-density surface scatter of flakes. The scatter is situated on a gravel slope. It is unlikely that these artefacts were observed in their primary context due to the nature of the environment. The artefacts are exposed due to some sheet erosion which occurs across the surface. The assemblage occurs in heavily deflated and eroded area, so the scientific potential and heritage significance is lowered.	Low	Grade 3 - C (IIIC)

Figure 40 - Views of the general setting of the site SSP02.

Figure 41 - View of the flakes identified at SSP02.

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
SSP03	-24.93987	30.14119	**General Landscape Characteristics** Valleys and Plains, Perennial streams/rivers, Bushy/Shrubby vegetation, Grassy vegetation **Site Conditions** Erosion **Time Period** Stone Age **Site Type** Lithics Low Density Surface Scatter//Single Find Spot **Site Extent** 10m x 10m **Notes** A low-density surface scatter of flakes and a core. The scatter is situated on a gravel slope. It is unlikely that these artefacts were observed in their primary context due to the nature of the environment. The artefacts are exposed due to some sheet erosion which occurs across the surface. The assemblage occurs in heavily deflated and eroded area, so the scientific potential and heritage significance is lowered.	No research potential or other cultural significance	NCW

Figure 42 – View of the general setting of the site SSP03.

Figure 43 - View of some of the flakes identified at SSP03.

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
SSP04	-24.93976	30.14098	**General Landscape Characteristics** Valleys and Plains, Bushy/Shrubby vegetation, Grassy vegetation **Site Conditions** Erosion **Time Period** Stone Age **Site Type** Lithics Low Density Surface Scatter//Single Find Spot **Site Extent** 10m x 10m **Notes** Low density scatter of flakes. The scatter is situated on a gravel slope. It is unlikely that these artefacts were observed in their primary context due to the nature of the environment. The artefacts are exposed due to some sheet erosion which occurs across the surface. The assemblage occurs in heavily deflated and eroded area, so the scientific potential and heritage significance is lowered.	Low	Grade 3 - C (IIIC)

Figure 44 – View of the general setting of the site SSP04.

Figure 45 -View of the flakes identified at SSP04.

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
SSP05	-24.93976	30.14121	**General Landscape Characteristics** Valleys and Plains, Bushy/Shrubby vegetation, Grassy vegetation **Site Conditions** Erosion **Time Period** Stone Age **Site Type** Grinding Stones **Site Extent** 5m x 5m **Notes** Lower grindstone.	Low	Grade 3 - C (IIIC)

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating

Figure 46 – View of the general setting of the site SSP05.

Figure 47 – View of the lower grindstone.

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
SSP06	-24.94009	30.14134	**General Landscape Characteristics** Valleys and Plains, Perennial streams/rivers, Bushy/Shrubby vegetation, Grassy vegetation **Site Conditions** Erosion **Time Period** Stone Age **Site Type** Lithics Cluster **Site Extent** 40m x 40m **Notes** The medium-low density scatter is situated on an eroded surface. It is unlikely that these artefacts were observed in their primary context due to the nature of the environment. The artefacts are exposed due to some sheet erosion which occurs across the surface. The assemblage occurs in heavily deflated and eroded area, so the scientific potential and heritage significance is lowered.	Low	Grade 3 - C (IIIC)

Figure 48 – View of the general setting of the site SSP06.

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating

Figure 49 - View of the flakes identified at SSP06.

APPENDIX C

PGS TEAM CVS

WOUTER FOURIE

Professional Heritage Practitioner

PROFILE

Project Manager and Principal Heritage Specialist holds a post-graduate degree in Archaeology and is registered with the Association of Southern African Professional Archaeologists as a Professional Archaeologist and is accredited as a Principal Investigator; he is further an Accredited Professional Heritage Practitioner with the Association of Professional Heritage Practitioners in South Africa.

My work focuses on heritage management through Heritage Impact Assessments, implementation of recommendations and large-scale heritage mitigation projects. I have worked, completed and implemented heritage projects in South Africa, Botswana, Mozambique, Mauritius, Zambia, Lesotho, and the Democratic Republic of the Congo.

CONTACT

PHONE NUMBER:
+27 82 851 3575
+258 84 774 6768
WEBSITE:
www.pgsheritage.com
EMAIL ADDRESS:
wouter@pgsheritage.com

PGS HERITAGE

EDUCATION

University of Pretoria
1993-1996
BA Degree - Majors in Archaeology, Anthropology and Geography

University of Pretoria
1997
BA Hon Archaeology, with further specialisation in environmental management.

University of Cape Town
2016 – present
MPhil Conservation of the Built Environment

WORK EXPERIENCE

PGS Heritage Group of Companies
(***South Africa, Lesotho, Mozambique, and Portugal***)
Director – Heritage Specialist
2003- present
I am actively involved in the management of the business and focus on marketing and new business for PGS, specifically the broader SADC region. Acting as heritage specialist in multidisciplinary teams

The University of the Witwatersrand - Project Manager – Archaeological Contracts Unit
2007-2008
Responsible for conducting heritage and archaeological impact studies, archaeological excavations and general management of the unit

Matakoma Consultants – Director – Heritage Specialist
2000 – 2008
Heritage specialist and Director responsible for heritage and archaeological impact studies

Randfontein Estate Gold Mine – Environmental Coordinator
Oct 1998- Feb 2000
Coordinating all environmental Rehabilitation work

Department of Minerals and Energy Environmental Officer
Oct 1997– Sept 1998

PROFESSIONAL AFFILIATION

Accredited Professional Heritage Practitioner
Association of Professional Heritage Practitioners
Since 2014

Accredited Professional Archaeologist
Association of Southern African Professional Archaeologists – Since 2001

NIKKI MANN

Professional Archaeologist

PROFILE

I have been involved in conducting field work for heritage and archaeological impact studies for the past 5 years. My background is in Stone Age archaeology. Since 2014, I have been involved in numerous archaeological excavation projects, working alongside American, Australian and European academics. I have worked in various countries, including South Africa, Lesotho, Ethiopia, Kenya and Ireland.

I enjoy doing field work and being involved in heritage projects across the country.

CONTACT

PHONE NUMBER:
+27 78 140 2424

WEBSITE:
www.pgsheritage.com

EMAIL ADDRESS:
nikki@pgsheritage.co.za

PGS HERITAGE

EDUCATION

University of Cape Town
2011-2013
BSc Degree - Majors in Archaeology and Environmental and Geographical Sciences

University of Cape Town
2014
BSc Hon Archaeology

University of Cape Town
2016 – 2017
MSc Archaeology (phytolith analysis)

WORK EXPERIENCE

PGS Heritage (Pty) Ltd - Archaeologist
Present
Responsible for conducting heritage and archaeological impact studies.

PGS Heritage (Pty) Ltd Lesotho - Archaeologist
2019-2020
Responsible for conducting archaeological excavations and general site management.

CTS Heritage – Contract Archaeologist
2018, 2019, 2020
Contracted to conduct several heritage and archaeological impact studies. Also involved with digitalization work for local and Kenyan projects.

Contract Archaeologist
2014, 2015, 2018, 2020
Archaeological excavations in South Africa (West Coast, Cederberg, Knysna), Ethiopia (Afar Region), Kenya and Ireland.

PROFESSIONAL AFFILIATION

Accredited Professional Archaeologist
Association of Southern African Professional Archaeologists
Since 2017.