



PGS HERITAGE

PROPOSED SOLAR PV PLANT FOR THE MOGALAKWENA MINE, SITUATED NEAR MOKOPANE, LIMPOPO PROVINCE

Amended Heritage Impact Assessment

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Declaration of Independence

I, Polke Birkholtz, 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;

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PGS Heritage (Pty) Ltd

CONTACT PERSON:

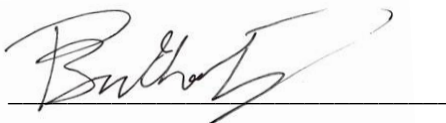
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DETAILS OF CLIENT:

CLIENT: Zutari Pty (Ltd)

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EXECUTIVE SUMMARY

Introduction

PGS Heritage (Pty) Ltd (PGS) was appointed by Zutari Pty (Ltd) to update the Heritage Impact Assessment (HIA) which was conducted for the Proposed Solar PV Plant for the Mogalakwena Mine, situated near Mokopane, Limpopo Province in 2021. This report includes the revised layout footprint for which a new application for environmental authorisation (EA) is being completed.

The PV plant is located on sections of the farm Armoede 823 LR, with transmission lines being located on the farms Vaalkop 819 LR, Blinkwater 820 LR and Zwartfontein 818 LR. The study area falls under the Mapela Traditional Authority and the Mogalakwena Local Municipality, Limpopo Province. The applicant is Anglo American Platinum (AAP).

General Desktop Study

An archival and historical desktop study was undertaken to provide a historic framework for the project area and surrounding landscape. This was augmented by a study of available historical and archival maps. The desktop study revealed that the surroundings of the study area are characterised by a long and significant history. The assessment of the available historical maps did not reveal the presence of any heritage features.

Palaeontology

Banzai Environmental (2022) was appointed by PGS Heritage (Pty) Ltd to conduct the Palaeontological Desktop Assessment (PDA) to assess the Mogalakwena Solar PV Project in Limpopo. To comply with the National Heritage Resources Act (No 25 of 1999, section 38) (NHRA), this PDA is necessary to confirm if fossil material could potentially be present in the planned development area and to evaluate the impact of the proposed development on the Palaeontological Heritage.

The proposed PV development is surrounded by rocks of the Rustenburg Layered Suite and Lebowa Granite Suite of the Bushveld Complex, while the proposed PV facility is underlain by the Hout River Gneiss Suite (Archaean Granitoid Intrusions). The existing Sandsloot Substation and a portion of the eastern transmission line is underlain by the Malmani Subgroup (Chuniespoort Group of the Transvaal Supergroup). According to the PalaeoMap on the South African Heritage Resources Information System database, the Palaeontological Sensitivity of the Houtriver Gneiss Suite (Archaean Granitoid Intrusions) is zero as they are igneous in origin and thus unfossiliferous, while the Malmani Subgroup has a very high Palaeontological Sensitivity (Almond and Pether 2008, SAHRIS website). Groenewald and Groenewald 2014

allocated a high Sensitivity to the Malmani Subgroup. He noted that additionally to the stromatolites, potentially fossiliferous Late Caenozoic Cave breccias within the “Transvaal dolomite” outcrop area could be present. These breccias are not individually mapped on geological maps.

It is thus recommended that a Palaeontological Impact Assessment (PIA) must be conducted to assess the value and prominence of fossils in the Malmani Subgroup of the development area and the effect of the proposed development on the palaeontological heritage. The purpose of the EIA Report is to elaborate on the issues and potential impacts identified during the scoping phase. A Phase 1 field-based assessment would be conducted with research in the site-specific study area, as well as a comprehensive assessment of the impacts identified during the scoping phase (Butler, 2022).

This PDA report is annexed in full under **Appendix C**.

Associated Reports and Processes

PGS compiled a Heritage Screening Assessment for the same project in 2019. The study area for this 2019 screening study and the current report is in the same general area. The screening level fieldwork was undertaken by an experienced team comprising professional archaeologist Polke Birkholtz and fieldwork assistant Derrick James. The fieldwork was undertaken on Wednesday, 2 October and Thursday, 3 October 2019 and was aimed at establishing whether any significant heritage resources are located within the study area. Despite the fact that only a screening level site visit was undertaken, the fieldwork resulted in the identification of five (5) sites (**MGSP 1 to MGSP 5**). The sites identified during the Heritage Screening Assessment include three Stone Age sites (**MGSP 1, MGSP 2 and MGSP 4**), one possible grave site (**MGSP 3**) (which turned out to be a grave), and one historic structure (**MGSP 5**).

PGS was appointed in 2020 to undertake a Heritage Scoping Assessment for the project. Intensive walkthroughs were undertaken over the course of several days by an experienced archaeological fieldwork team consisting of an archaeologist (Cherene de Bruyn) and a field technician (Thomas Mulaudzi). The fieldwork was undertaken from Monday, 21 September 2020 to Wednesday, 23 September 2020. It resulted in the identification of a total of seven (7) additional sites. These were numbered from **MGSP 6 to MGSP 12**. The sites identified during the Heritage Scoping Assessment include farming-related structures such as water troughs and reservoirs (**MGSP 6, MGSP 7 and MGSP 11**), graves and burial grounds (**MGSP 8**), homesteads where the risk for unmarked graves exists (**MGSP 9 and MGSP 10**), and a contemporary shed (**MGSP 12**). It is important to note that site **MGSP 8** identified during the Scoping Assessment is the same site as **MGSP 3** identified during the Screening Assessment.

The Fieldwork for the Heritage Impact Assessment (HIA) was undertaken by two archaeologists (Cherene de Bruyn and Michelle Sachse) and a field assistant (Tshepo Sambo) over several days from Wednesday, 2 June 2021 to Thursday 3 June 2021, with a second site visit undertaken by Michelle Sachse and Tshepo Sambo on Monday 7 June 2021. The fieldwork undertaken resulted in the identification of a total of twenty-one (21) sites. These were numbered from **MGSP 13** to **MGSP 33**. The reason for this is that the same numbering system as the one used for the 2019 screening and 2020 scoping projects was used for the current study.

The sites identified during the recent fieldwork include five Stone Age sites (**MGSP 13, MGSP 14, MGSP 15, MGSP 16** and **MGSP 17**), two Iron Age sites (**MGSP 18** and **MGSP 19**), one homestead with the risk for unmarked graves (**MGSP 20**), one farming-related structure (**MGSP 21**), one historic structure (**MGSP 22**), four possible graves (**MGSP 23, MGSP 24, MGSP 25** and **MGSP 31**), and seven sites comprising graves and burial grounds (**MGSP 26, MGSP 27, MGSP 28, MGSP 29, MGSP 30, MGSP 32** and **MGSP 33**).

It is important to note that site **MGSP 33** identified during the HIA, is the same site as **MGSP 8** identified during the Heritage Scoping Assessment, which in turn is the same site as **MGSP 3** identified during the Screening Assessment. Similarly, site **MGSP 17** identified during the HIA is the same site as **MGSP 4** identified during the Screening Assessment. Lastly, site **MGSP 22** identified during the Heritage Impact Assessment is the same site as **MGSP 5** identified during the Screening Assessment. As a result, three of the 23 sites identified during the HIA were previously identified during the Screening and Scoping Assessments. This means that a total of 17 previously unrecorded sites were identified during the fieldwork for the Impact Assessment.

Fieldwork

The fieldwork component of the amendment study was aimed at assessing all the amended footprint areas currently proposed and which had not been assessed during the fieldwork of the screening and scoping phases. The aim of all this fieldwork was to identify tangible remains of archaeological, historical and heritage significance. The fieldwork was undertaken by way of intensive walkthroughs of the areas which had not been addressed before as well as additional areas. The fieldwork was undertaken by two archaeologists (Cherene de Bruyn and Michelle Sachse) on Wednesday, 8 June 2022. Four (4) sites, that were previously recorded fell within the amended footprint (**MGSP 3, MGSP 5/ MGSP 22, MGSP 7, & MGSP 11**), while four (4) sites fell within a 100m of the proposed amended footprint boundary (**MGSP 4/ MGSP 17, MGSP 9, MGSP 12 & MGSP 21**).

Throughout the fieldwork, hand-held GPS devices were used to record the tracklogs showing the routes followed by the two archaeological fieldwork teams. It is important to note that

although as intensive a fieldwork coverage as possible was undertaken, sections of the study area are located in areas which are densely overgrown, which limited accessibility and visibility in those areas of the study area. No additional heritage sites were found.

Impact Assessment and Mitigation

An overlay of all the archaeological and heritage sites identified during the three fieldwork trips over the proposed development footprint areas was made to assess the impact of the proposed development on these identified archaeological and heritage sites.

Using this information, both pre-mitigation and post-mitigation impact assessments were undertaken. Please refer to **Chapter 8** for the impact assessment calculations. A series of site-specific mitigation measures are outlined in **Chapter 9** of this report.

General Recommendations

The following general recommendations must be implemented:

- An archaeological watching brief is required during construction activities.
- The sections of the two transmission line corridors not covered during the present fieldwork (refer **Section 1.3 Assumptions and Limitations**) must be assessed in the field as soon as possible to allow for the mitigation of any sites located there before construction commences.

Conclusions

The unmitigated impact of the proposed development is expected to result in negative impacts of Medium to High significance in terms of the identified heritage fabric of the study area. With mitigation successfully completed, the impact of the proposed development on the identified heritage sites will result in negative impacts of Low to Medium significance. As a result, on the condition that the recommendations made in this report are adhered to, no heritage reasons can be given for the development not to continue.

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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.

Table 1 – List of abbreviations used in this report.

Abbreviations	Description
AIA	Archaeological Impact Assessment
ASAPA	Association of South African Professional Archaeologists
CRM	Cultural Resource Management
DEA	Department of Environmental Affairs
DWS	Department of Water and Sanitation
ECO	Environmental Control Officer
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
ESA	Early Stone Age
GPS	Global Positioning System
HIA	Heritage Impact Assessment
IAP	Interested and Affected Party
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
PHRA	Provincial Heritage Resources Authority
PSSA	Palaeontological Society of South Africa
SADC	Southern African Development Community
SAHRA	South African Heritage Resources Agency

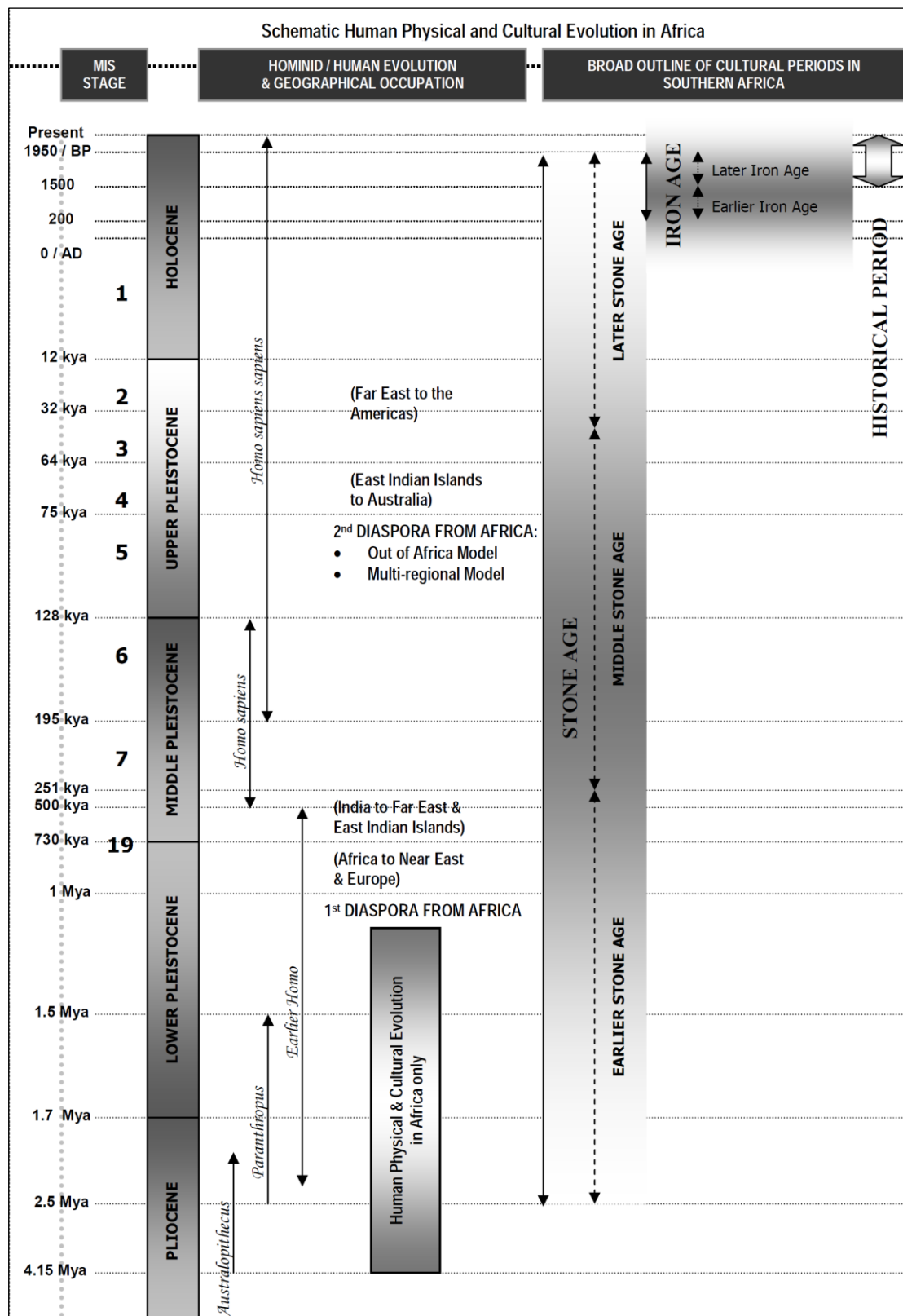


Figure 1 - Human and Cultural Timeline in Africa (Morris, 2008).

1 INTRODUCTION

PGS Heritage (Pty) Ltd (PGS) was appointed by Zutari Pty (Ltd) to undertake an Amendment Heritage Impact Assessment (HIA) for a Proposed Solar PV Plant for the Mogalakwena Mine, situated near Mokopane, Limpopo Province. The PV plant site is located on the farm Armoede 823 LR. The study area falls under the Mapela Traditional Authority and the Mogalakwena Local Municipality, Limpopo Province. The applicant is Anglo American Platinum (AAP).

1.1 Scope of the Study

The aim of the study is to identify possible heritage sites and finds that may occur in the proposed study area.

The HIA aims to inform the Environmental Impact Assessment (EIA) to assist the developer in managing 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. 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.

The following individuals were involved with this study:

- Polke Birkholtz, the project manager and principal heritage specialist, is registered with the Association of Southern African Professional Archaeologists (ASAPA) as a Professional Archaeologist and is also accredited with the Cultural Resources Management (CRM) Section of the same association. He has 20 years of experience in the heritage assessment and management field and holds a B.A. (cum laude) from the University of Pretoria specialising in Archaeology, Anthropology and History and a B.A. (Hons.) in Archaeology (cum laude) from the same institution.
- Cherene de Bruyn, the author of this report is registered with ASAPA as a Professional Archaeologist and is accredited as a Principal Investigator and Field Director. She is also a member of the International Association for Impact Assessment South Africa (IAIASA). She holds an MA in Archaeology from University College London, and a BSc (Hons) in Physical Anthropology and a BA (Hons) in Archaeology from the University of Pretoria.

1.3 Assumptions and Limitations

The following assumptions and limitations regarding this study and report 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. In fact, due to the dense vegetation and steep topographic gradients found within the study area, it is highly likely that the presently identified heritage sites are not a complete record of all the archaeological and heritage resources located within the study area. 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 make an assessment as to the significance of the site (or material) in question. This applies to graves and cemeteries as well. In the event that any graves or burial places are located during the development, the procedures and requirements pertaining to graves and burials will apply as set out below.
- The study area boundaries and development footprints 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.

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:

1.4.1 Statutory Framework: The National Heritage Resources (Act 25 of 1999)

The NHRA has applicability, as the study forms part of an overall HIA in terms of the provisions of Section 34, 35, 36 and 38 of the NHRA and forms part of a heritage scoping study that serves to identify key heritage resources, informants, and issues relating to the palaeontological, archaeological, built environment and cultural landscape, as well as the need to address such issues during the impact assessment phase of the HIA process.

1.4.2 Section 34 – Structures

According to Section 34 of the NHRA, no person may alter, damage or destroy any structure that is older than 60 years, and which forms part of the sites built environment, without the necessary permits from the relevant provincial heritage authority.

1.4.3 Section 35 – Archaeology, Palaeontology and Meteorites

According to Section 35 (Archaeology, Palaeontology and Meteorites) and Section 38 (Heritage Resources Management) of the NHRA, PIAs and AIAs are required by law in the case of developments in areas underlain by potentially fossiliferous (fossil-bearing) rocks, especially where substantial bedrock excavations are envisaged, and where human settlement is known to have occurred during prehistory and the historic period.

1.4.4 Section 36 – Burial Grounds & Graves

A section 36 permit application is made to the SAHRA or the competent provincial heritage authority which protects burial grounds and graves that are older than 60 years and must conserve and generally care for burial grounds and graves protected in terms of this section, and it may make such arrangements for their conservation as it sees fit. SAHRA must also identify and record the graves of victims of conflict and any other graves which it deems to be of cultural significance and may erect memorials associated with these graves and must maintain such memorials. A permit is required under the following conditions:

Permit applications for burial grounds and graves older than 60 years should be submitted to the South African Heritage Resources Agency:

- a) destroy, damage, alter, exhume or remove from its original position or otherwise disturb the grave of a victim of the conflict, or any burial ground or part thereof which contains such graves.
- b) destroy, damage, alter, exhume, remove from its original position or otherwise disturb any grave or burial ground older than 60 years which is situated outside a formal cemetery administered by a local authority; or
- c) bring onto or use at a burial ground or grave referred to in paragraph (a) or (b) any excavation equipment, or any equipment which assists in the detection or recovery of metals.
- d) SAHRA or a provincial heritage resources authority may not issue a permit for the destruction or damage of any burial ground or grave referred to in subsection (3)(a) unless it is satisfied that the applicant has made satisfactory arrangements for the exhumation and re-interment of the contents of such graves, at the cost of the applicant.

1.4.5 Section 38 - HIA as a Specialist Study within the EIA in Terms of Section 38(8)

A NHRA Section 38 (Heritage Impact Assessments) application is required when the proposed development triggers one or more of the following activities:

- a) the construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;
- b) the construction of a bridge or similar structure exceeding 50 m in length;
- c) any development or other activity which will change the character of a site,
 - i. exceeding 5 000 m2 in extent; or
 - ii. involving three or more existing erven or subdivisions thereof; or
 - iii. involving three or more erven or divisions thereof which have been consolidated within the past five years; or
 - iv. the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority;
- d) the re-zoning of a site exceeding 10 000 m2 in extent; or
- e) any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority

In this instance, the heritage assessment for the property is to be undertaken as a component of the EIA for the project. Provision is made for this in terms of Section 38(8) of the NHRA, which states that:

- An HIA report is required to identify, and assess archaeological resources as defined by the NHR Act, assess the impact of the proposal on the said archaeological resources, review alternatives and recommend mitigation (see methodology above).

Section 38 (3) Impact Assessments are required, in terms of the statutory framework, to conform to basic requirements as laid out in Section 38(3) of the NHRA. These are:

- The identification and mapping of heritage resources in the area affected;
- The assessment of the significance of such resources;
- The assessment of the impact of the development on the heritage resources;
- An evaluation of the impact on the heritage resources relative to sustainable socio/economic benefits;
- Consideration of alternatives if heritage resources are adversely impacted by the proposed development;
- Consideration of alternatives; and
- Plans for mitigation.

1.4.6 Notice 648 of the Government Gazette 45421

Although minimum standards for archaeological (2007) and palaeontological (2012) assessments were published by SAHRA (2016), Government Notice (GN) 648 of 2019 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 GN are listed in **Table 2** and the applicable section in this report noted.

Table 2 - Reporting requirements for GN 648 of 2019

GN 648	Relevant section in report	Where not applicable
2.2 (a) a desktop analysis, using satellite imagery	Section 4 and 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 and 5	-
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 1 and 5	-
2.3(b) contains a motivation and evidence (e.g. photographs) of either the verified or different use of the land and environmental sensitivity	Section 4 provides a description of the current use and confirms the status in the screening report	-

An assessment of the Environmental Screening tool provides the following sensitivity ratings for archaeological resources that fall within the proposed project area rated as Low (**Figure 2**), while palaeontological resources are rated as Medium (**Figure 3**).

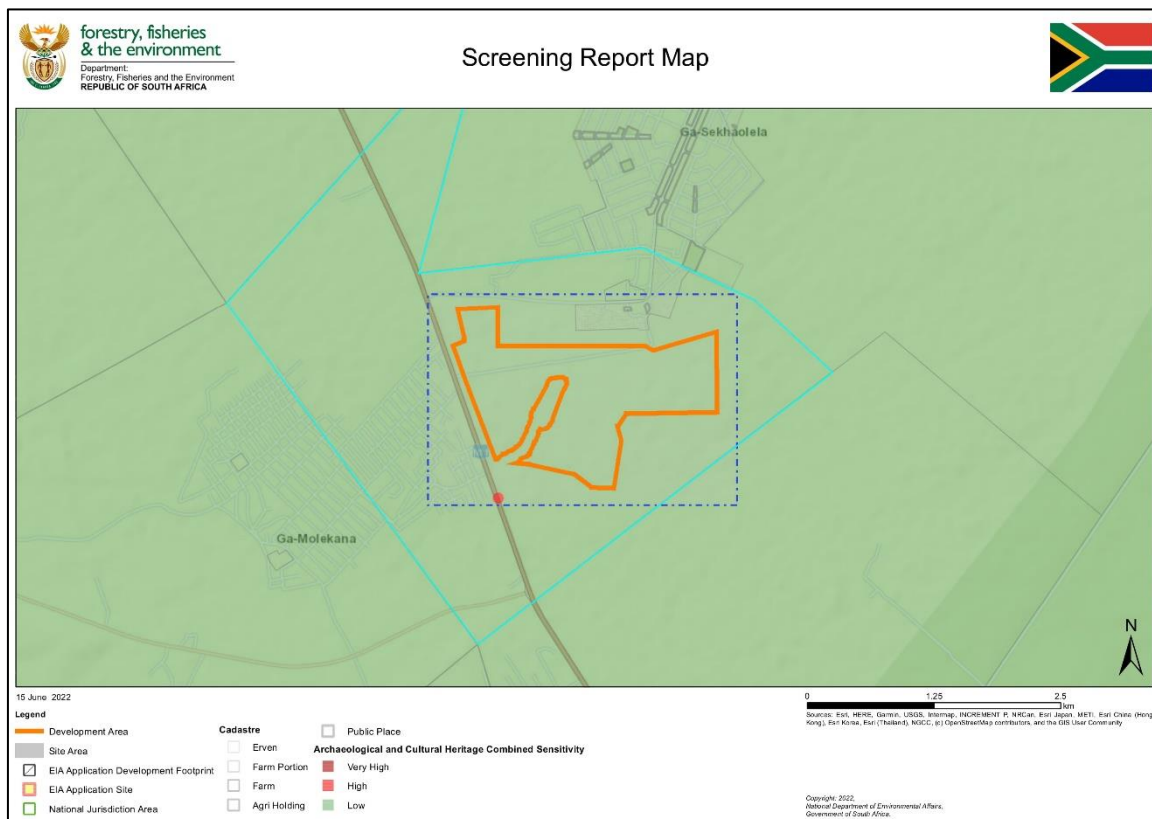


Figure 2 - Environmental screening tool's depiction of the archaeological and heritage sensitivity of the study area and surroundings.

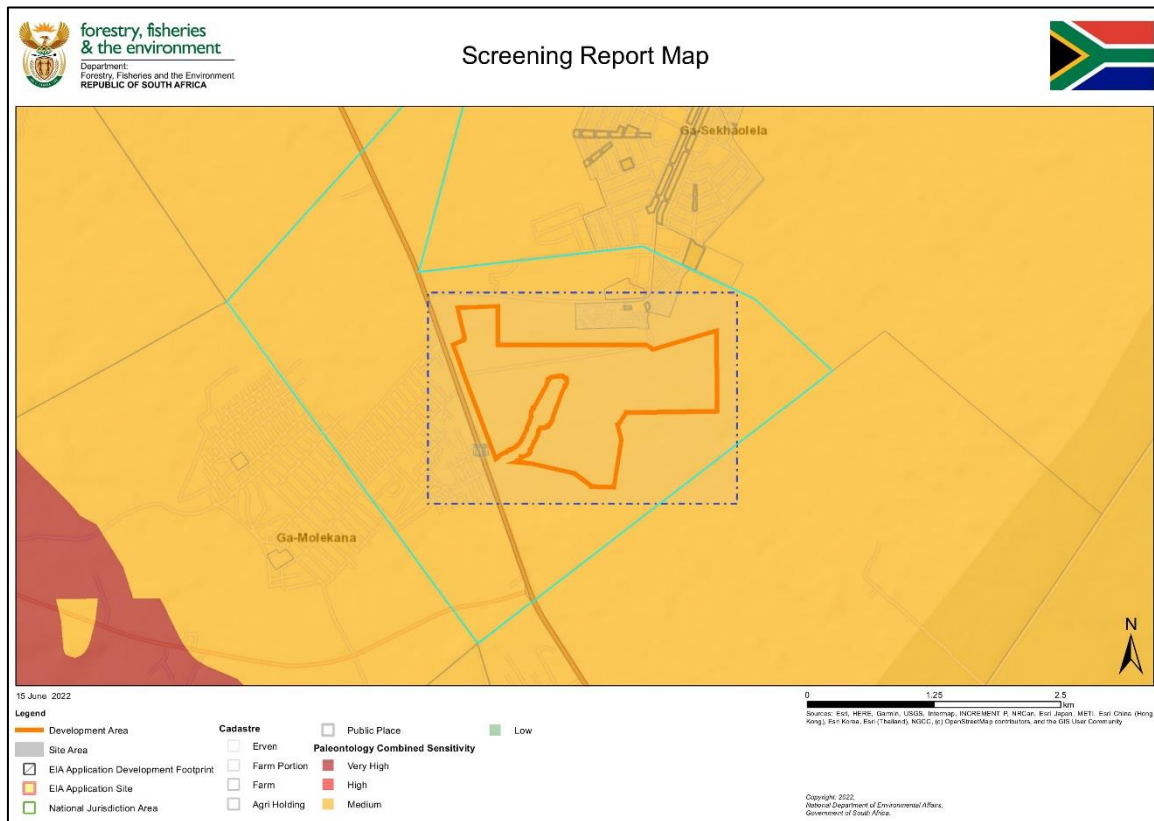


Figure 3 - Environmental screening tool's depiction of the palaeontological sensitivity of the study area and surroundings.

1.4.7 NEMA – Appendix 6 requirements

The HIA report has been compiled considering the National Environmental Management Act (Act No. 107 of 1998) (NEMA) and Environmental Impact Assessment (EIA) Regulations (2014, and as amended in 2017). **Table 3** below sets out the relevant sections as listed in Appendix 6 of the EIA Regulations (2017), which describes the requirements for specialist reports. For ease of reference, **Table 3** provides cross-references to the report sections where these requirements have been addressed. It is important to note that where something is not applicable to this HIA, this has been indicated in the table below.

Table 3 - Reporting requirements as per NEMA, as amended, Appendix 6 for specialist reports.

Requirements of Appendix 6 – GN R326 EIA Regulations of 7 April 2017	Relevant section in report	Comment where not applicable
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 – refer to Appendix B	-

Requirements of Appendix 6 – GN R326 EIA Regulations of 7 April 2017	Relevant section in report	Comment where not applicable
(b) A declaration that the person is independent in a form as may be specified by the competent authority	Page ii of the report	-
(c) An indication of the scope of, and the purpose for which, the report was prepared	Section 1 and 2	-
(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, 7 and 8	-
(d) The duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment	Section 3	-
(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;	Sections 5, 6, 7 and Appendix C	-
(g) An identification of any areas to be avoided, including buffers	Sections 6, 9 and 10	-
(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;	Figures 25 - 29	
(i) A description of any assumptions made and any uncertainties or gaps in knowledge;	Section 1	-
(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	Executive summary, Section 8 and Section 10	
(k) Any mitigation measures for inclusion in the EMPr	Sections 9 and 10	
(l) Any conditions for inclusion in the environmental authorisation	Sections 9 and 10	
(m) Any monitoring requirements for inclusion in the EMPr or environmental authorisation	Sections 9 and 10	
(n)(i) A reasoned opinion as to whether the proposed activity, activities or portions thereof should be authorised and	Executive Summary and Section 10	
(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	Sections 9 and 10	-
(o) A description of any consultation process that was undertaken during the course of carrying out the study		Not applicable. A public consultation process was handled

Requirements of Appendix 6 – GN R326 EIA Regulations of 7 April 2017	Relevant section in report	Comment where not applicable
		as part of the environmental process.
(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.	NEMA Appendix 6 and GN648 SAHRA guidelines on HIAs, PIAs and AIAs	

2 TECHNICAL DETAILS OF THE PROJECT

2.1 Locality

Study Area Coordinates	Northernmost point: S 23.977721 E 28.959296	Easternmost point: S 23.983520 E 28.979302
	Southernmost point: S 23.992330 E 28.968670	Westernmost point: S 23.982909 E 28.956645
Location	The study area is located within the Mapela Traditional Authority and the Mogalakwena Local Municipality. It is located approximately 20km north by north-west of Mokopane, Limpopo Province.	
Property	Portions of the farm Armoede 823 LR	
Topographic Map	2328DD	
Study Area Extent	The combined extent of the study area is approximately 200 hectares.	

544HIA - HIA for the Mogalakwena Solar Pv Project

Locality Map

PGS Heritage (Pty) Ltd
Heritage Management Unit

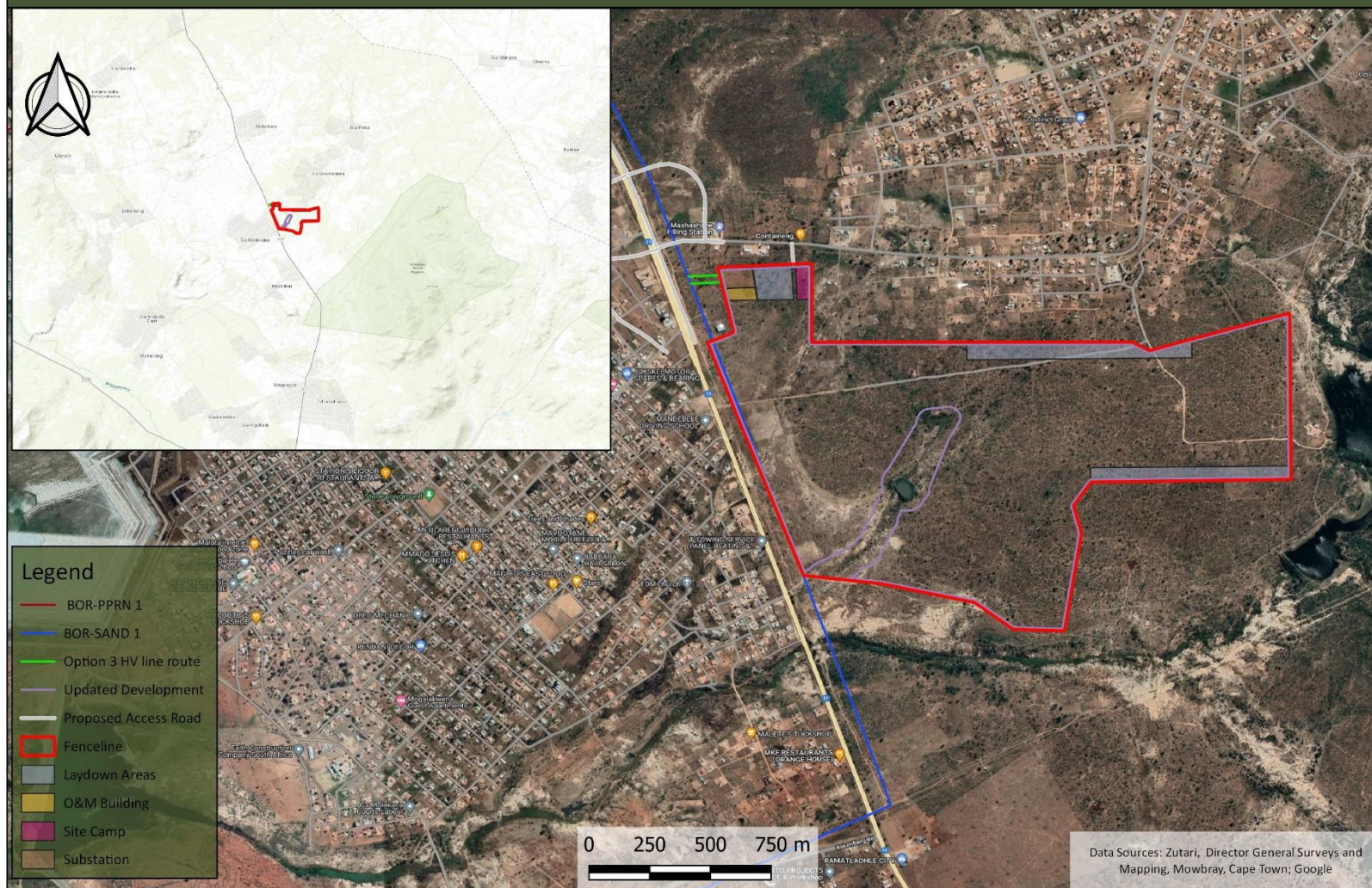


Figure 4 – Google Earth depiction of the study area boundaries and development footprints. The study area is located on the farm Armoede 823 LR.

2.2 Technical Project Description

Anglo American Platinum Limited (AAP) seeks to appoint an Independent Power Producer (IPP) for the development, financing, ownership, construction, operation and maintenance of a Solar photovoltaic (PV) Facility (The Project). The PV Facility will supply energy on an exclusive basis to the AAP's Mogalakwena Mine in Limpopo, South Africa in terms of a Power Purchase Agreement with an operating Term of 25 years, as may be extended or amended in accordance with the terms of the PPA. The Project will not be transferred to AAP or its selected nominee on the expiry or early termination of the Term.

This IPP shall be chosen through a Request for Proposal (RfP) process, which is currently underway and nearing completion. The optimal Solar PV generation capacity shall be determined by the IPP based on their own calculations.

2.2.1 Objectives

The key objectives of the Project (in no particular order) are to:

- Develop the market for platinum group metals through the commercial-scale use of environmentally-friendly hydrogen fuel cells;
- Build company experience and repeatable processes in preparation for the anticipated further installation of solar PV generation equipment near the mine and, potentially, at other operations owned by the company;
- Empower a broader group of people and facilitate local community upliftment by ensuring appropriate local community participation through:
 - Active participation and skills transfer;
 - Shareholding;
 - Job creation for local community members;
 - Local procurement; and
 - Corporate social investment expenditure into projects for the local community.
- Procure a cost-effective project, that provides increased energy cost certainty over time;
- Diversify the energy mix of the Mogalakwena Mine; and
- Reduce the environmental impact of the Mogalakwena Mine.

2.2.2 Overview of the Technical Requirements

The Facility must meet the minimum technical requirements as stipulated in the RfP. The minimum technical requirements were based on the current technology and design good industry practice for large-scale solar PV systems.

The major main technical requirements (which form Schedule 2 of the PPA) were:

- Generation technology must be ground-mounted solar photovoltaic
- The Facility must have a design life of 30 years
- The Facility shall be grid code compliant, as per the South African Grid Codes
- The Facility must safely operate within the environment in which it is located (mine)
- The Facility must allow future expansion on each Delivery Point
- The Facility Minimum Acceptance Performance Ratio shall be greater than or equal to 70%
- The Facility Design Performance Ratio multiplied by Performance Ratio Guarantee Level shall be greater than or equal to 74%
- Other good industry practice design requirements, including reference to specific Codes and Standards, for each main part of the solar PV system
- Other requirements relating to battery limits, operation and maintenance, equipment warranties, health, safety, environment, quality management, construction management, document submission requirements, and power quality

Site assumptions and any technical investigations that had been carried out prior to the RfP release were also provided to Bidders such as:

- Location and specification of the Delivery Points,
- Project site location and high- level site screening results,
- Technical descriptions and assumptions for the Interconnection Facilities including substation, transmission lines and interconnection switchgear,
- Technical description of the Mine's electrical network,
- Status and guidance on the environmental and social impact authorisation process,
- Preliminary/desktop geotechnical findings and assumptions to be used for bidding purposes (including foundation assumptions and erosion control measures) ,
- Satellite derived topographical information,
- Solar resource and weather data,
- Load profiles for each Delivery Point.

3 ASSESSMENT METHODOLOGY

3.1 Methodology for Assessing Heritage Site Significance

Amendment HIA - Proposed Solar PV Plant for the Mogalakwena Mine

14 June 2022

This report was compiled by PGS Heritage for the Solar PV Plant near Mokopane, Limpopo Province. The applicable maps, tables and figures are included as stipulated in the NHRA and NEMA. The HIA process consisted 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 on the South African Heritage Resources Information System (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 – Field Survey: It is important to note that this study also includes observations and findings from two previous fieldwork visits undertaken during the Heritage Screening and Heritage Scoping phases of the project. The screening level fieldwork was undertaken by an experienced team comprising professional archaeologist Polke Birkholtz and fieldwork assistant Derrick James. The fieldwork was undertaken on Wednesday, 2 October and Thursday, 3 October 2019 and was aimed at establishing whether any significant heritage resources are located within the study area. Despite the fact that only a screening level site visit was undertaken, the fieldwork resulted in the identification of five (5) sites (**MGSP 01 to MGSP 05**). The sites identified during the Heritage Screening Assessment include three Stone Age sites (**MGSP 1, MGSP 2 and MGSP 4**), one possible grave site (**MGSP 3**), and one historic structure (**MGSP 5**).

During the Heritage Scoping Assessment undertaken in 2020, intensive walkthroughs were undertaken over the course of several days by an experienced archaeological fieldwork team consisting of an archaeologist (Cherene de Bruyn) and a field technician (Thomas Mulaudzi). The fieldwork was undertaken from Monday, 21 September 2020 to Wednesday, 23 September 2020. It resulted in the identification of a total of seven (7) additional sites. These were numbered from **MGSP 06 to MGSP 12**. The sites identified during the Heritage Scoping Assessment include farming-related structures such as water troughs and reservoirs (**MGSP 6, MGSP 7 and MGSP 11**), graves and burial grounds (**MGSP 8**), historic homesteads where the risk for unmarked graves exist (**MGSP 9 and MGSP 10**), and a recent non-residential structure (**MGSP 12**). It is important to note that site **MGSP 8** identified during the Scoping Assessment is the same site as **MGSP 3** identified during the Screening Assessment.

The fieldwork component of the HIA study was aimed at identifying tangible remains of archaeological, historical and heritage significance. The fieldwork was undertaken by way of intensive walkthroughs of the study area. These intensive walkthroughs were undertaken by an experienced archaeological fieldwork team over the course of several days. The fieldwork was undertaken by two archaeologists (Cherene de Bruyn and Michelle Sacshe) and a field assistant (Tshepo Sambo) over several days from Wednesday, 2 June 2021 to Thursday 3 June 2021, and Monday 7 June 2021.

Throughout the fieldwork, hand-held GPS devices were used to record the tracklogs showing the routes followed by the two archaeological fieldwork teams. All sites identified during the fieldwork were photographically and qualitatively recorded, and their respective localities documented using a hand-held GPS device.

The fieldwork undertaken resulted in the identification of a total of twenty-three (23) sites. These were numbered from **MGSP 13** to **MGSP 35**. The reason for this is that the same numbering system as the one used for the 2019 screening and 2020 scoping projects was used for the current study.

The identified sites comprised five low-density surfaces scatter of stone tools (**MGSP 13 – MGSP 17**), one site containing Iron Age pottery (**MGSP18**), one site containing an Iron Age midden (**MGSP 19**), three sites containing historical structures (**MGSP 20 – MGSP 22**), five possible graves (**MGSP 23 - MGSP 25, MGSP 29 and MGSP 31**) and eight grave and burial ground sites (**MGSP 26 – MGSP 28, MGSP 30 and MGSP 32 – MGSP 35**).

It is important to note that site **MGSP 35** identified during the Heritage Impact Assessment, is the same site as **MGSP 8** identified during the Heritage Scoping Assessment, which in turn is the same site as **MGSP 3** identified during the Screening Assessment. Similarly, site **MGSP 17** identified during the Heritage Impact Assessment is the same site as **MGSP 4** identified during the Screening Assessment. Lastly, site **MGSP 22** identified during the Heritage Impact Assessment is the same site as **MGSP 5** identified during the Screening Assessment. As a result, three of the 23 sites identified during the Heritage Impact Assessment were previously identified during the Screening and Scoping Assessments. This means that a total of 20 previously unrecorded sites were identified during the fieldwork for the Impact Assessment.

The fieldwork component of the amendment study was aimed at assessing all the amended footprint areas. The fieldwork was undertaken by way of intensive walkthroughs of the areas which had not been addressed before as well as additional areas. The fieldwork was undertaken by two archaeologists (Cherene de Bruyn and Michelle Sachse on Wednesday, 8 June 2022. Four (4) sites, that were previously recorded fell within the amended footprint (**MGSP 3, MGSP 5/ MGSP 22, MGSP 7, & MGSP 11**), while four (4) sites fell within a 100m of the proposed amended footprint boundary (**MGSP 4/ MGSP 17, MGSP 9, MGSP 12 & MGSP 21**). These sites have been included in the report.

Step III – Report: The final step involved the recording and documentation of relevant heritage resources, as well as the assessment of resources regarding the heritage impact assessment criteria and report writing, as well as mapping and recommendations.

The significance of heritage sites was based on five 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.

Management actions and recommended mitigation, which will result in a reduction in the impact on the sites, will be expressed as follows:

A - No further action necessary;

B - Mapping of the site and controlled sampling required;

C - No-go or relocate development position

D - Preserve site, or extensive data collection and mapping of the site; and

E - Preserve site

Site Significance

Site significance classification standards prescribed by the South African Heritage Resources Agency (2006) and approved by the ASAPA for the Southern African Development Community (SADC) region, were used for the purpose of this report (see **Table 2**).

Table 4 – Site significance classification as prescribed by SAHRA.

FIELD RATING	GRADE	SIGNIFICANCE	RECOMMENDED MITIGATION
National Significance (NS)	Grade 1	-	Conservation; National Site nomination
Provincial Significance (PS)	Grade 2	-	Conservation; Provincial Site nomination
Local Significance (LS)	Grade 3A	High	Conservation; Mitigation not advised
Local Significance (LS)	Grade 3B	High	Mitigation (Part of site should be retained)
Generally Protected A (GP.A)	Grade 4A	High/Medium	Mitigation before destruction
Generally Protected B (GP.B)	Grade 4B	Medium	Recording before destruction
Generally Protected C (GP.C)	Grade 4D	Low	Destruction

3.2 Methodology for Impact Assessment

The methodology for impact assessment outlined here was provided by Zutari. The assessment of the significance of impacts for a proposed development is by its nature, a matter of judgement. To deal with the uncertainty associated with judgement and ensure repeatable results, Zutari rates impacts using a standardised and internationally recognised methodology.

For each predicted impact, criteria are applied to establish the **significance** of the impact based on likelihood and consequence, both without mitigation being applied and with the most effective mitigation measure(s) in place.

The criteria that contribute to the **consequence** of the impact are **intensity** (the degree to which pre-development conditions are changed); the **duration** (length of time that the impact will continue); and the **extent** (spatial scale) of the impact. The sensitivity of the receiving environment and/or sensitive receptors are incorporated into the consideration of consequence by appropriately adjusting the thresholds or scales of the intensity, duration and extent criteria, based on expert knowledge. For each impact, the specialist applies professional judgement to ascribe a numerical rating for each criterion according to the examples provided in Table 4, Table 5 and Table 6 below. The consequence is then established using the formula:

Consequence = intensity x (+ duration + extent)

Depending on the numerical result, the impact's consequence would be defined as either extremely, highly, moderately or slightly detrimental; or neutral; or slightly, moderately, highly or extremely beneficial. These categories are provided in Table 8.

To determine the significance of an impact, the **probability** (or likelihood) of that impact occurring is also taken into account. In assigning probability, the specialist takes into account the likelihood of occurrence but also takes cognisance of uncertainty and detectability of the impact. The most suitable numerical rating for probability is selected from Table 7 below and applied with the consequence according to the following equation:

Significance = consequence x probability

When assigning a **probability** to an impact, it is vitally important to distinguish this from the concepts of **frequency** and **confidence**, with which it is sometimes confused.

- **Probability** refers to the likelihood that an impact will occur.
- **Frequency** refers to the regularity with which an impact occurs. To illustrate the difference between frequency and probability, it must be considered that something that happens infrequently may still be a certainty (i.e. have a high probability). For instance, Halley's Comet only comes close to the sun every 75 to 76 years (i.e. it has a very low frequency), but it is still a certainty. Table 8 refers to the degree of certainty of a prediction. Confidence

may be related to any of the impact assessment criteria (extent, intensity, duration or probability) and is not necessarily only related to probability. Confidence may be influenced by any factors that introduce uncertainty into a prediction.

Depending on the numerical result of this calculation, the impact would fall into a significance category of negligible, minor, moderate or major, and the type would be either positive or negative. Examples of these categories are provided in Table 9.

Once the significance of an impact occurring without mitigation has been established, the specialist must apply his/her professional judgement to assign ratings for the same impact after the proposed mitigation has been implemented. The tables on the following pages show the scales used to classify the above variables and define each of the rating categories.

Table 5 - Definition of Intensity Ratings.

Rating	Criteria	
	Negative impacts (-)	Positive impacts (+)
Very high (-/+ 4)	Very high degree of damage to natural or social systems or resources. These processes or resources may restore to their pre-project condition over very long periods of time (more than a typical human lifetime).	Great improvement to ecosystem or social processes and services or resources.
High (-/+ 3)	High degree damage to natural or social system components, species or resources.	Intense positive benefits for natural or social systems or resources.
Moderate (-/+ 2)	Moderate damage to natural or social system components, species or resources.	Average, on-going positive benefits for natural or social systems or resources.
Low (-/+ 1)	Minor damage to natural or social system components, species or resources. Likely to recover over time. Ecosystems and valuable social processes not affected.	Low positive impacts on natural or social systems or resources.
Negligible (0)	Negligible damage to individual components of natural or social systems or resources, such that it is hardly noticeable.	Limited low-level benefits to natural or social systems or resources.

Table 6: Definition of Duration Ratings.

Rating	Criteria
2	Long-term: The impact will continue for 6-15 years.
1	Medium-term: The impact will continue for 2-5 years.

0	Short-term: The impact will continue for between 1 month and 2 years.
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Table 7: Definition of Extent Ratings.

Rating	Criteria
2	Regional: The impact will affect the entire region.
1	Local: The impact will extend across the site and to nearby properties.
0	Site specific: The impact will be limited to the site or immediate area.

Table 8: Definition of Probability Ratings.

Rating	Criteria
4	Certain/ Definite: There are sound scientific reasons to expect that the impact will definitely occur.
3	Very likely: It is most likely that the impact will occur.
2	Fairly likely: This impact has occurred numerous times here or elsewhere in a similar environment and with a similar type of development and could very conceivably occur.
1	Unlikely: This impact has not happened yet but could happen.
0	Very unlikely: The impact is expected never to happen or has a very low chance of occurring.

Table 9: Application of Consequence Ratings.

Rating	Consequence rating
-8	Extremely detrimental
-7 to -6	Highly detrimental
-5 to -4	Moderately detrimental
-3 to -2	Slightly detrimental
-1 to 1	Negligible
2 to 3	Slightly beneficial
4 to 5	Moderately beneficial
6 to 7	Highly beneficial
8	Extremely beneficial

Table 10: Application of Significance Ratings.

Rating	Significance rating
-4	Very high - negative
-3	High - negative
-2	Moderate - negative
-1	Low - negative
0	Very low
1	Low - positive
2	Moderate - positive
3	High - positive
4	Very high positive

Despite attempts at ensuring objectivity and impartiality, the environmental assessment remains an act of judgement and can never escape the subjectivity inherent in attempting to define significance. The determination of the significance of an impact depends on context (spatial and duration) and intensity of that impact. Since the rationalisation of context and intensity will ultimately be prejudiced by the observer, there can be no wholly objective measure by which to judge the components of significance, let alone how they are integrated into a single comparable measure.

This notwithstanding, in order to facilitate informed decision-making, environmental assessments must endeavour to come to terms with the significance of the environmental impacts. Recognising this, Zutari has attempted to address potential subjectivity in the current ESIA process as follows:

- Being explicit about the difficulty of being completely objective in the determination of significance, as outlined above;
- Developing an explicit methodology for assigning significance to impacts and outlining this methodology in detail. Having an explicit methodology not only forces the specialist to come to terms with the various facets that contribute to significance (thereby avoiding arbitrary assessment), but also provides the reader with a clear summary of how the specialist derived the significance;
- Wherever possible, differentiating between the significance of potential environmental impacts as experienced by the various affected parties; and
- Utilising a team approach and internal review of the assessment to facilitate a rigorous and defensible system.

Although these measures may not totally eliminate subjectivity, they provide an explicit context within which to review the assessment of impacts.

The specialists appointed to contribute to this impact assessment have empirical knowledge of their respective fields and are thus able to comment on the confidence they have in their findings based on the availability of data and the certainty of their findings (Example provided in Table 10).

Table 11: Definition of Confidence Ratings.

Rating	Criteria
Low	Judgement is based on intuition and there some major assumptions used in assessing the impact may prove to be untrue.
Medium	Determination is based on common sense and general knowledge. The assumptions made, whilst having a degree of uncertainty, are fairly robust.
High	Substantive supportive data or evidence exists to verify the assessment.

4 CURRENT STATUS QUO

The study area is characterised by primarily level areas east of the N11 between Mokopane and Grobler Bridge. West of the N11 the study area has level areas as well as low hills.

In terms of vegetation, the study area is located within the Makhado Sweet Bushveld vegetation type. This vegetation type is described as “...*slightly to moderately undulating plains sloping generally down to the north, with some hills in the southwest. Short and shrubby bushveld with a poorly developed grass layer* (www.sanbi.org). Significant sections of the study area are characterised by reasonably dense vegetation in the form of thorn-bearing trees and bushes. This type of vegetation made the fieldwork difficult in parts in terms of movement and visibility.

In terms of geology and soils, the Makhado Sweet Bushveld vegetation type is “...*underlain by the gneisses and migmatites of the Hout River Gneiss (Randian Erathem) and the potassium-deficient gneisses of the Goudplaats Gneiss (Swazian Erathem). Sandstones and mudstones of the Matlabas Subgroup (Mokolian Waterberg Group) are also found. Soils include deep, greyish sands, eutrophic plinthic catenas, red-yellow apedal freely drained soils with high base status, clayey in bottomlands.*” (www.sanbi.org).

Existing surrounding land uses associated with the project area include a combination of:

- Residential settlement: Ga-Sekhaolelo is located to the north and east of the study area, while Ga-Molekana is located to the west of the project area;
- Powerlines; and
- Sections of the study area were used for the grazing of animals.

Sections of the footprint overlays disturbed terrain. Illegal dumping was observed in areas. Sections of the area are characterised by extensively eroded watercourses.

Overall, the accessibility of the project footprint area was fairly good. Visibility of the site was limited due to the grassy vegetation and dense thorny trees. Several photographs below provide general views of the study area and the landscape within which it is located.



Figure 5 – General view of the central section of the development footprints located east of the N11. This section of the study area is characterised by thorn trees and bushes.



Figure 6 - Another general view of the central section of the development footprints located east of the N11. Houses from Ga- Sekhaolelo can be seen in the background.



Figure 7 - The site was accessed via the N11.



Figure 8 - Power lines observed in the area situated east of the N11.



Figure 9 – Houses from Ga-Sekhaolelo located north of the project area.



Figure 10 - Sections of the project area are used for the grazing of livestock.



Figure 11 – Evidence for dumping activities were observed throughout the project area.

5 DESKTOP STUDY FINDINGS

5.1 Archaeological overview of the Study Area and Surroundings

5.1.1 Early Stone Age (ESA) (>200 000 – 2 million years Before Present/BP)

General characteristics: 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 Early Stone Age:

- *Oldowan*: 1.5 to >2 million years ago - Technological characteristics: Cobble, core or flake tools with little retouch and no flaking to predetermined patterns; Hammerstones, manuports, cores; and polished bone fragments/tools (Lombard *et al.* 2012).
- *Acheulean*: 300 thousand to 1.5 million years ago - Technological characteristics: Bifacially worked handaxes and cleavers, large flakes > 10 cm; some flakes with deliberate retouch, sometimes classified as scrapers; gives the impression of being deliberately shaped, but could indicate result of knapping strategy; sometimes shows core preparation; and 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* or *Sangoan*; *Fauresmith* assemblages have large blades, points, Levallois technology, and the remaining ESA components have small bifaces; the *Sangoan* contains small bifaces (<100 mm), picks, heavy and light-duty denticulated and notched scrapers; The *Sangoan* is less well described than the *Fauresmith* (Lombard *et al.* 2012).

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

5.1.2 Middle Stone Age (MSA) (20 000 – 300 000 BP)

General characteristics: Levallois or prepared core techniques (for definitions see Van Peer 1992; Boeda 1995; Pleurdeau 2005) occur in which triangular flakes with convergent dorsal scars, often with faceted striking platforms are produced; Discoidal systems (for definition see Inizan *et al.* 1999) and intentional blade production from volumetric cores (for definition see Pleurdeau 2005) also occur; formal tools may include unifacially and bifacially retouched points, backed artefacts, scrapers, and denticulates (for definition see Bisson 2000); evidence of hafted tools; occasionally includes marine shell beads, bone points, engraved ochre nodules, engraved OES fragments, engraved bone fragments, and grindstones (Lombard *et al.* 2012). Phases of the MSA:

- *early Middle Stone Age*: 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*: 105 to 130 thousand years ago - Technological characteristics: 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*: 77 to 105 thousand years ago - Technological characteristics: Recurrent uni-polar 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*: 70 to 77 thousand years ago - Technological characteristics: Characterised by thin (<10 mm), bifacially worked foliate or lanceolate points; semi-circular or wide-angled pointed butts; and could include blades and finely serrated points (Lombard et al. 2010).
- *Howieson's Poort*: 58 to 66 thousand years ago - Technological characteristics: Characterised by blade technology; includes small (<4 cm) backed tools, e.g. segments, scrapers, trapezes and backed blades; some denticulated blades; and pointed forms are rare or absent (Lombard et al. 2012).
- *Sibudu*: 45 to 58 thousand years ago – Technological characteristics: Most points are produced using Levallois technique; most formal retouch aimed at producing unifacial points; some plain butts; rare bifacially retouched points; some side scrapers are present; and backed pieces are rare (Lombard et al. 2012).
- *final Middle Stone Age*: 20 to 40 thousand years - Technological characteristics: 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 (Plug 1981; Porraz *et al.* 2015) and Mwulu's Cave (Tobias 1949; Sampson 1974).

5.1.3 Later Stone Age (LSA) (40 000 – < 2 000 BP)

General characteristics: 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 Later Stone Age:

- *Early Later Stone Age*: 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*: 12 to 18 thousand years ago - Technological characteristics: Characterised by systematic bladelet (<26 mm) production and the occurrence of outils écaillés or scaled pieces (for the definition of outils écaillés see Hayden 1980); significant numbers of unretouched bladelets and bladelet cores; few formal tools; and some sites have significant macrolithic element (Lombard et al. 2012).
- *Oakhurst*: 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*: ~4 to 8 thousand years ago - Technological characteristics: Fully developed microlithic tradition with numerous formal tools; highly standardised backed microliths and small convex scrapers (for the definition of standardisation see Eerkens & Bettinger 2001); OES is common; Ochre is common; and bone, shell and wooden artefacts occur (Lombard et al. 2012).
- *Final Later Stone Age*: ~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 Later Stone Age*: Generally <2 thousand years ago - Contemporaneous with, and broadly similar to, final Later Stone Age, but includes ceramics - Economy may be associated with hunter-gatherers or herders - Technological characteristics: Stone tool assemblages are often microlithic (for a definition of 'microlithic' see Elston & Kuhn 2002); 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 is common; 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), Goergap 113 KR (Van der Ryst 1998), New Belgium (Van der Ryst 1998), Schurfpoot 112 KR (Van der Ryst 1998) and Tshisiku Shelter (Van Doornum 2007b).

5.1.4 Rock Art

By the beginning of the Later Stone Age, human behaviours were undoubtedly modern (Huffman 2005). Uniquely human traits, such as rock art and purposeful burials with ornaments, became regular practice (Huffman 2005).

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), 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 a number of 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).

5.1.5 Iron Age Sequence

In the northern regions of South Africa at least three settlement phases have been distinguished for early prehistoric agropastoralist settlements during the Early Iron Age. Diagnostic pottery assemblages can be used to infer group identities and to trace movements across the landscape. The first phase of the Early Iron Age, known as Happy Rest (named after the site where the ceramics were first identified), is representative of the Western Stream of migrations, and dates to AD 400 - AD 600. The second phase of Diamant is dated to AD 600 - AD 900 and was first recognized at the eponymous site of Diamant in the western Waterberg. The third phase, characterised by herringbone-decorated pottery of the Eiland tradition, is regarded as the final expression of the Early Iron Age and occurs over large parts of the North West Province, Northern Province, Gauteng and Mpumalanga. This phase has been dated to about AD 900 - AD 1200. These sites are usually located on low-lying spurs close to water (Coetzee 2015).

The Late Iron Age (LIA) settlements are characterised by stone-walled enclosures situated on defensive hilltops c. AD 1640 - AD 1830). This occupation phase has been linked to the arrival of ancestral Northern Sotho, Tswana and Ndebele (Nguni-speakers) in the northern regions of South Africa with associated sites dating between the sixteenth and seventeenth centuries AD. The terminal LIA is represented by late 18th/early 19th century settlements with multichrome Moloko pottery commonly attributed to the Sotho-Tswana. These settlements can in many instances be correlated with oral traditions on population movements during which African farming communities sought refuge in mountainous regions during the processes of disruption in the northern interior of South Africa, resulting from the so-called difaqane (or mfecane) (Coetzee 2015).

5.2 Historical overview of the Study Area and Surroundings

The archival and desktop research of the history of the study area and surrounding landscape identified a number of historical aspects which can be associated with the study area as well as its

immediate surroundings. These historical facets will be discussed in more detail and in chronological sequence below.

Please note that the authors are aware of the Makapan Valley with its various historical, archaeological and palaeontological significant sites and features such as Makapan's Caves, Cave of Hearths etc. The authors are also aware that the Makapan Valley is both a National Heritage and World Heritage site. However, the Makapan Valley is located approximately 30km south-east of the study area. As a result, the Makapan Valley is not directly associated with the history of the study area and was not included in this section or overall report.

5.2.1 The Northern Transvaal Ndebele

The Ndebele-speaking people in the Mokopane and Polokwane regions (including the small Kekana group around Hammanskraal) were classified by Van Warmelo (1930) as the Northern Transvaal Ndebele. He classified the local Ndebele into Northern Transvaal Ndebele and Southern Transvaal Ndebele on the basis of geographical location; the division roughly mirrored a cultural split between the two groups. He also mapped the common descent of the Transvaal Ndebele from the original chiefdom under Musi, and outlined the succession battle following Musi's death and the formation of several chiefdoms (Lekgoathi, 2009).

The study area and its surrounding landscape are strongly associated with especially two Late Iron Age / Historic agropastoralist groups, namely the Langa Ndebele and the Kekana Ndebele.

5.2.1.1 The Langa Ndebele

The Langa Ndebele originally lived in present-day Kwazulu-Natal and was associated with the extensive and powerful Hlubi kingdom. Centuries before the rise and expansion of the Zulu kingdom, the Langa Ndebele departed from present-day Kwazulu-Natal in c. 1650. This migration was most likely led by Chief Masebe I.

Their migration from present-day Kwazulu-Natal took many years. It is understood that one of the first settlements along their migration was within present-day Swaziland. From here they moved to Ga-Maferera, on the Olifants River. The Langa Ndebele then migrated to Bošega, east of present-day Polokwane. Their closest neighbours at the time were the Matlala of the Matlala Mountains and the Kekana Ndebele of Chief Moletlane at present-day Zebediela. The Langa Ndebele stayed at Bošega for only a short period of time before moving to a hill located south-east of Polokwane known as Thaba Tšhweu. At Thaba Tšhweu a number of the Langa Ndebele chiefs ruled and died, including Masebe I, Mapuso, Podile and Masebe II.

While residing at Thaba Tšhweu, the Langa Ndebele adopted the Sotho custom of circumcision. Some scholars believe that it was the Matlala people who introduced circumcision to the Langa

Ndebele. The first of their leaders to have been circumcised appears to have been Chief Podile. During this same period, the Langa Ndebele obtained the medicated pumpkin for their first fruits ceremony from the Kekana Ndebele of Moletlane. Similarly, it is believed that the Kekana Ndebele had to be notified by the Langa Ndebele before the latter Ndebele group could undertake initiation and form age-sets. These factors suggest that the Langa Ndebele were subject to the Kekana Ndebele, or that as a minimum they recognised the genealogical superiority of the Kekana Ndebele.

Masebe II was succeeded at Thaba Tšhweu as ruler by Chief Seritarita in c. 1775. Shortly after his succession, Seritarita led his people from Thaba Tšhweu to Maleoko, on the present-day farm Bultongfontein 239 KR. This farm adjoins the farm Armoede 823LR on its southern boundary. It is therefore clear that the arrival of the Langa Ndebele at Maleoko represented the first settlement of the Langa Ndebele in the general surroundings of the present study area.

Seritarita remained at Maleoko for approximately three years before moving with his people to Moumong-wa-Matswake, located on the present-day farm Zuid-Holland 773 LR. This settlement of Moumong-wa-Matswake was also known as Mokgokgong. The farm Zuid-Holland is located north-east of the farm Utrecht, and is located approximately 5.5km north of the closest point along the present study area.

Seritarita lived at Moumong-wa-Matswake until his death, and was succeeded by Chief Mapela, the son of his third-ranking wife. Seritarita's principal wife had had no sons, whereas his son by his second-ranking wife, Makgenene (Mamaala) was not deemed fit to hold the office of chief as he was believed to have deserted his father. Furthermore, it also appears that a *ngwetši* (daughter-in-law) was married to produce an heir on behalf of the principal wife. The *ngwetši* bore a son named Mosoge. While Mosoge, as the most senior of Seritarita descendants, was therefore to have become chief in time, this never happened. Some scholars believe that he was unfit to succeed and that he preferred to spend his time farming rather than to succeed as the ruler of the Langa Ndebele. Other scholars believe that by the time that Mosoge was old enough to succeed, Mapela had entrenched his position as chief to such an extent that it was impossible for Mosoge to take over the chieftainship from Mapela. In the end, during the mfecane, Mosoga led his followers away from Moumong-wa-Matswake to settle at a small hill named Mabjanamaswana, immediately east of Thutlane, and located some distance north and west of Moumong-wa-Matswake. Incidentally, Tutlane is located approximately 22km north-west of the present study area.

At the time of his 'desertion', Makgenene moved with his followers away from Moumong-wa-Matswake and settled at Tsotsodi, on the present-day farm Planknek 43 KS, situated east of Mokopane and approximately 19.5km south-east of the present study area. Makgenene also lived at Segodini, located on the present-day farm Makapansgat 39 KS. Their settlement at Segodini was ruled by three successive chiefs, namely Makgenene, Selepe and Mphunye (Mapunya).

During the reign of Mapela, the Langa Ndebele experienced a growth period during which their number and fame increased. During his reign, Mapela incorporated a number of smaller Sotho groups and clans, some voluntary and others by force. He also managed to defeat the Phalane Nareng of Mabuela and the Pedi of Matlou. These two groups had been settled along the Mogalakwena River for some time, and had been unsuccessfully attacked by the Langa Ndebele even before their arrival at Moumong-wa-Matswake and before the succession of Mapela. It is interesting to note that a present-day settlement located approximately 14km west by northwest of the present study area, bears the name Ga-Mabuela (i.e. the place of Mabuela). The Bibidi of Šongwane were also defeated during the reign of Mapela and fled to the Bobibidi hill near Villa Nora. Similarly, the Kwenā of Ramorulane and the Hurutshe of Molokomme were defeated by Mapela's forces at Senta Hill and Swartkop. The Koni of Masenya and Puka, the Tlokwa of Pila and the followers of Tšhokwe joined the Langa Ndebele voluntarily during Mapela's reign.

During his old age, Mapela moved his capital from Moumong-wa-Matswake to Fothane Hill (Moordkoppie) where he died in 1825. Fothane Hill is located approximately 10.6km west by northwest of the study area. After Mapela's death, Mankopane, the son of Mapela's second-ranking son, Masekamiša, was earmarked to succeed. However, at the time Mankopane was still too young and as a result, Maleya, Mapela's son from a lower ranking wife was appointed as chief. Chief Maleya ruled the Kekana Ndebele from his capital on the Ditlotswane Hills, situated approximately 14km north-west of the present study area.

Maleya proved to be an unpopular chief, and as soon as Mankopane was old enough to succeed he ousted Maleya and became ruler of the Langa Ndebele. Mankopane's succession is believed to have taken place around 1835 or 1836.

After Mapela's death, the Mamaala group returned to the Langa Ndebele capital and claimed the chieftainship under their current leader, Mphunye. This was denied and as indicated above, Mankopane succeeded Mapela as the chief of the Langa Ndebele. As a result, the Mamaala group planned to kill Mankopane, but without success.

During Chief Mankopane's reign, the Langa Ndebele attacked and defeated the Bibidi of Šongwane at their settlement Bobididi near Villa Nora. Villa Nora is located approximately 90km north-west of the present study area. The Langa Ndebele also attacked and scattered the copper miners of Musina, near the present-day town bearing the same name (Jackson 1983).

5.2.1.2 The Kekana Ndebele

The Kekana Ndebele group, which is associated specifically with the area around Mokopane and Zebediela, seems to be a sub-group of the so-called Northern Transvaal Ndebele (Bergh 1990) (Skhosana 2010). Skhosana (2010) references Van Warmelo (1930) and other scholars who subscribe to the view that the so-called Southern and Northern Ndebele of the Republic of South

Africa constitutes a single ethnic group that claims its origin from the ancestral chief, Musi (or Msi). According to these scholars, the Ndebele originate from KwaZulu-Natal. They originally split from the main Hlubi group circa 1552 under the chieftainship of Mafana and then travelled northwards.

The AmaNdebele crossed the Vaal River and entered what is today known as Gauteng, and initially settled around eMhlangeni, known as Randfontein, which is on the western side of Johannesburg. From eMhlangeni, they moved to KwaMnyamana near Pretoria and arrived there in 1610. At KwaMnyamana, the AmaNdebele were under the chieftainship of Musi who, according to Van Warmelo (1930), had either five or six sons, namely Manala, Nzunza (or Ndzungza), Mhwaduba, Dlomu, Mthombeni and Siobasa or M'pafuli (or Mphafudi).

Historically, KwaMnyamana is considered to be an important settlement of the AmaNdebele of the Republic of South Africa, because it is the place where the AmaNdebele split into two main groups and numerous smaller sub-groups. When Musi died in 1630, a succession struggle between two of his sons, namely Manala and Nzunza (or Ndzungza), resulted in them splitting into the Southern and Northern Ndebele, respectively, as well as into other smaller groups. The Southern Ndebele comprised the followers of Manala and Nzunza while the Northern Ndebele consisted of the followers of Mthombeni. Together with his brother, Nzunza (or Ndzungza), Mthombeni left KwaMnyamana and travelled to KwaSimkhulu, north of Belfast in the present Mpumalanga Province. At KwaSimkhulu, Mthombeni parted ways with Nzunza (or Ndzungza) and moved northwards along the Olifants River until he reached the area around Zebediela. On his way northwards, Chief Mthombeni became known as Gegana (or Kekana) and his followers were referred to as the 'people of Gegana (or Kekana)' instead of remaining the 'people of Mthombeni'. In explaining how Mthombeni changed his name to Gegana (or Kekana), De Beer (cited in Skhosana, 2010) states that, "*Die naam Gegana is afgelei van die Noord-Ndebele woord, kugega, wat beteken om saam met of parallel met iets te beweeg en verwys na die feit dat Mthombeni en sy volgelinge in hulle noordwaartse migrasie al langs die Olifantsrivier op beweeg het. Daarom word daar ook na hulle verwys as Gegana nomlambo, dit wil se die Gegana wat met die revier (mulambo) opgetrek het.*"

Bergh (1990) states that the Kekana Ndebele (Mathombeni/Yangalala) settled south-east of Potgietersrus at Moletlane. According to him, this community had earlier split from the Ndzungza group. A further split within the Kekana community occurred when the Vaaltyn-Kekana established a separate community closer to the present day town of Mokopane on the farm Pruissen. This group was known as the Kekana Ndebele of Chief Mugombhane (who was also known as Sejwamadi, Mokopane and Makapane) (Bergh, 1999).

5.2.2 The arrival and settlement of the Voortrekkers and the establishment of Potgietersrus

The Historical Period within the study area and surroundings commenced with the arrival of newcomers to this area. The first arrivals would almost certainly have been travellers, traders,

missionaries, hunters and fortune seekers. However, with time, this initial trickle was replaced by a flood of white immigrants during the 1830s, when mass migration of roughly 2 540 Afrikaner families (comprising approximately 12 000 individuals) from the frontier zone of the Cape Colony to the interior of Southern Africa took place. The people who took part in this Great Trek were named Voortrekkers (those who travel ahead) and formed part of the first mass movement of whites into the interior of Southern Africa (Visagie, 2011). The reasons behind this migration are complex, but in general, terms include aspects such as a general discontent with the British authorities and the way in which they dealt with various aspects on the frontier.

In 1836, two pathfinding parties under the leadership of Louis Tregardt and Johannes Jacobus Janse (Lang Hans) van Rensburg passed the outskirts of present-day Heidelberg in a northward direction. While the exact route followed by these Voortrekkers are not always equally clear, Bergh (1999) and others contend that they followed the Olifants River (or alternatively followed a route a short distance west of the river) before passing through a poort in the Strydpoort Mountains. The Strydpoort Mountains are located approximately 50km south-east of the present study area.

However, at the Strydpoort Mountains, the two parties separated, apparently due to differences of opinion the two trek leaders held regarding the purpose of the expedition. Van Rensburg was anxious to reach Lourenço Marques to replenish his store of ammunition (for ivory hunting), while Tregardt was in favour of reaching the Zoutpansberg Mountains, now only seventy miles away. Van Rensburg's party separated from Tregardt's and they never saw each other again. The place where they parted ways has since become known as the Strydpoort—the Pass of the Quarrel (Ransford, 1968). After the separation of the two Voortrekker parties, Louis Tregardt continued northward and passed the present-day town of Polokwane before reaching the Soutpansberg. He eventually reached Delagoa Bay, where, tragically, Louis Trichardt and many of his party died of malaria (Ransford, 1968). The Van Rensburg trek met a violent end in present-day Mozambique when they were attacked and the entire party (with the exception of two children) annihilated by a Zulu impi (www.wikipedia.org).

With time, other Voortrekker parties followed and in 1846 the Voortrekker town of Andries Orie Stad (Ohrigstad) was established. The original Voortrekker town had a short existence, and by 1849 most of its residents had moved to the newly established Voortrekker towns of Schoemansdal (along the Soutpansberg Mountains) and Lydenburg (Changuion 1986).

On 16 January 1852 the Sand River Convention was signed between the British Government and the Transvaal Boers. This convention formally recognised the existence and independence of the Boer Republic north of the Vaal River by the British Government. As a result, this agreement allowed for the creation of a Boer Republic, namely the *Zuid-Afrikaansche Republiek* (South African Republic) (Oberholster, 1972). The *Zuid-Afrikaansche Republiek* remained in existence until the end of the South African War in 1902.

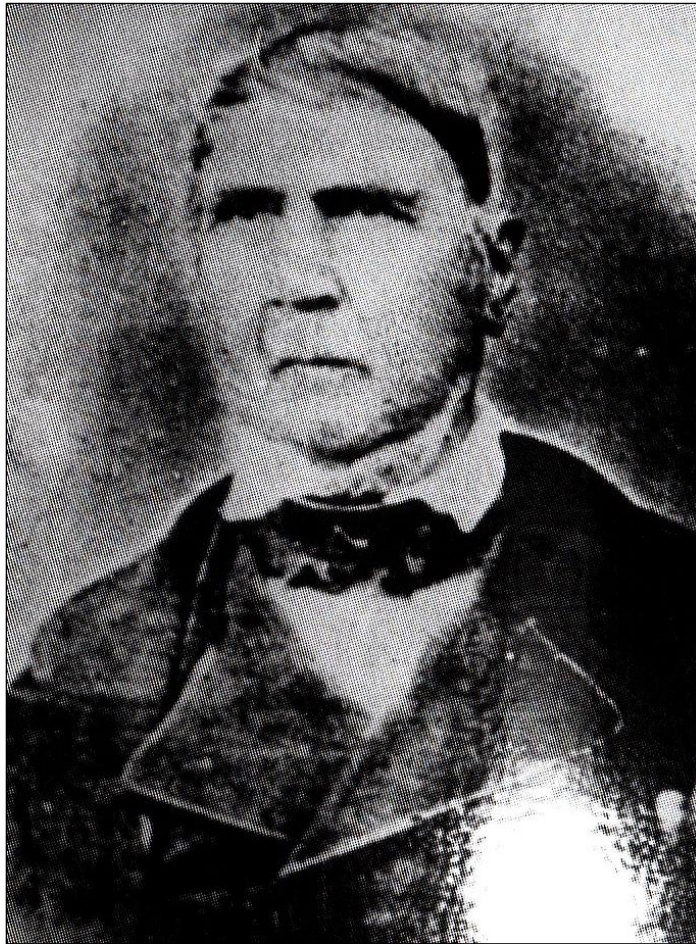


Figure 12 – Voortrekker leader Louis Tregardt (Visagie, 2011:500).

The constitution of the newly established *Zuid-Afrikaansche Republiek* stated that each burger who had established himself within the republic before 1852, could choose and receive two farms of roughly 3 000 morgen each. Those burgers who arrived after 1852 could only obtain one such farm, and had to pay an amount of 10 shillings for it annually. The initial settlement and concentration of Voortrekkers tended to be along the Mooi River (near present-day Potchefstroom), Magaliesberg Mountains (near the present-day towns of Pretoria and Rustenburg) and Lydenburg areas. However, the establishment of farms by the Voortrekkers in the surroundings of the study area appears to have been isolated and sporadic during these early years with some settlement only taking place during the 1850s and early 1860s (Bergh 1999).

5.2.3 Moordkoppie, Moorddrift and Pruizen

In September 1854 three events took place in the surroundings of the study area which were to have a profound impact on the history and characteristics of the surrounding landscape. Moordkoppie, Moorddrift and Pruizen, the three scenes of these events, would echo in the combined memory of both white and black residents of these parts for years to come. In fact, one of these places, Moorddrift, would be proclaimed as a National Monument in 1940, whereas a monument commemorating the victims of all three events was erected in Potgietersrus (present-day Mokopane) in 1909. The events associated with especially Moorddrift and Pruizen also led to

a battle and siege which was to become synonymous with the town of Potgietersrus / Mokopane to this day, namely Makapan's Caves. Makapan's Caves were declared a National Monument in 1938 (Bergh 1999).

During late September 1854, the Langa Ndebele of Mankopane and Kekana Ndebele of Mokopane attacked three groups of Voortrekkers. A total of 28 Voortrekkers were killed during these attacks, which comprised 14 men that were killed by the Langa Ndebele near their capital at Fothane Hill (Moordkoppie), a party of 12 men, women and children killed at Moorddrift by the Kekana Ndebele and two men killed at the capital of the Kekana Ndebele on the farm Pruizen.

The attack at Fothane Hill (Moordkoppie) was first, and those killed included Voortrekker leader Andries Hendrik Potgieter's younger brother Hermanus Philippus Potgieter. The attacks at Moorddrift and Pruizen took place the following day. The three attacks taking place in such a short period of time by two different, though neighbouring Ndebele groups, suggest that the attacks were orchestrated and planned beforehand (Jackson 1983). The reasons for the Ndebele attacks on the three Voortrekker parties are explained by Dr Alex Schoeman of the University of the Witwatersrand as follows: *"Tension between the Ndebele and the Trekkers had been mounting for a number of years prior to the siege. This hostility was fuelled by the Trekkers' interest in the territory of the Kekana and Langa Ndebele because of its strategic importance as a route to the ivory-rich northern Transvaal (now Limpopo Province). In 1852 Commandant-General A.H. Potgieter intended to establish a town (De Vaal 1990: 140) in the Makapanspoort to lay claim to the route and facilitate the movement of goods and people between Schoemansdal and the Magaliesberg (Rustenburg). His objectives remained unrealized because he fell ill and died in December the same year (De Vaal 1990: 140). By 1854 the Kekana, who had fallen repeatedly victim to Trekker raids, demands and various acts of cruelty under the leadership of the Potgieters, joined a growing network of resistance against the Trekkers. In 1854 the Trekkers, who were also finding it increasingly difficult to exert their control over Sekwati's Pedi (Delius & Trapido 1983: 62), shifted their trade route from the Strydpoort to the Makapanspoort (Potgieter 1958: 3), and in doing so triggered a cycle of violence and resistance between themselves and the Ndebele."* (Schoeman 2010:67).

When news of the attacks reached Commandant-General Piet Potgieter at his farm near present-day Modimolle, he set about calling up a commando. Within a relatively short period of time his commando numbered 150 men from essentially the Schoemansdal (Zoutpansberg) Voortrekkers. However, he realised that more men were required, and requested the assistance of Commandant-General Marthinus Wessel Pretorius of the Magaliesberg (Rustenburg) Voortrekkers. The news of the attacks reached Pretorius on 25 September 1854, and he immediately started calling up his men. By 14 October 1854 his commando numbered 334 men, with whom he proceeded northwards to assist Commandant-General Piet Potgieter. For reasons not presently clear, the combined Voortrekker force of nearly 500 men ignored the Langa Ndebele and proceeded to attack the Kekane Ndebele of Mokopane at their defensive stronghold known today as Makapan's Caves. The Voortrekkers placed the cave under siege, which lasted from 25 October to 21 November

1854. By the end of the siege, nearly 2 000 members of the Kekana Ndebele had lost their lives (Jackson 1983). Schoeman (2010) states that a number of Ndebele women and children were also captured during the siege. On the Voortrekker side, Naidoo (1987) indicates that two Voortrekkers were killed during the siege and a number wounded. One of those Voortrekkers killed during the siege was Commandant-General Piet Potgieter, and it was his name that was commemorated in the naming of the nearby town that was established in September 1858, namely Piet Potgietersrust.

After the lifting of the siege, the Voortrekkers proceeded to Fothane Hill to attack the Langa Ndebele. However, fearing reprisals from the Voortrekkers, Mankopane and his Langa Ndebele had fled from Fothane Hill to a flat-topped and steep-sided mountain named Magagamatala on the present-day farm Ruigtevley 710 LR. Magagamatala is located approximately 49km north-west of the present study area.

Moordkoppie (Fothane Hill) is the closest of the three attacks of September 1854 to the present study area. Jackson (1983) states that the scene of the attack on Hermanus Potgieter and his party at Fothane Hill took place in proximity to where the Kgabare Primary School is located today. This school appears to be located approximately 10km west by north-west of the present study area.

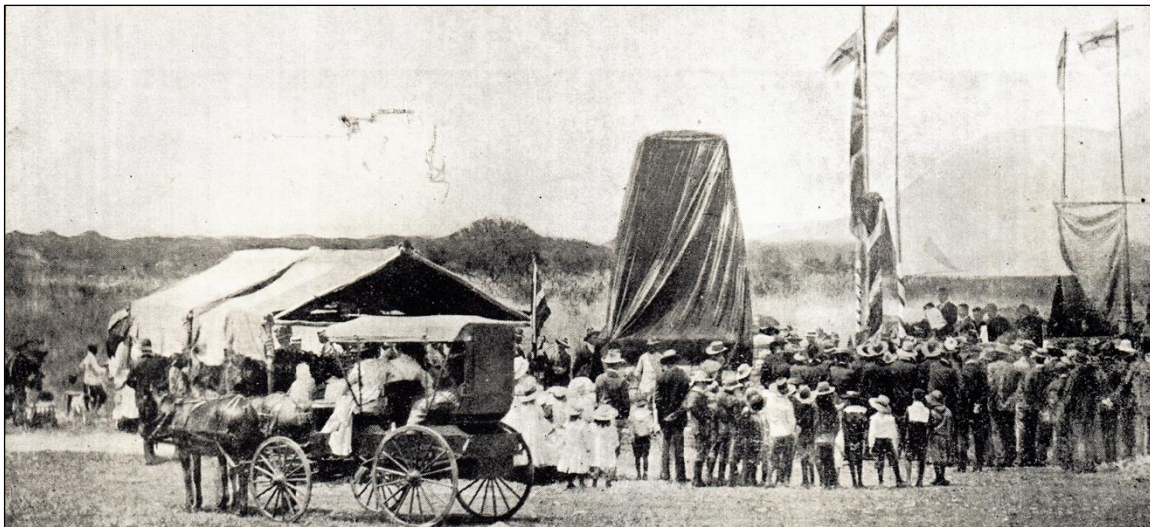


Figure 13 – Historic photograph depicting the unveiling of the memorial to the Voortrekkers who had lost their lives at Moordkoppie, Moorddrift and Pruizen. This monument was erected and unveiled in the square adjacent to the town hall of Potgietersrus in 1909 (Combrink 1954:18).

5.2.4 Establishment of Piet Potgietersrust and the conflict between the Langa Ndebele and the Transvaal Republic

In September 1858 the Volskraad approved the establishment of a new town that was to be named Piet Potgietersrust in honour of Commandant-General Piet Potgieter (the son of Commandant-General Andries Hendrik Potgieter) who was killed during the siege of Mokopane (see the section above). In December 1860 Commandant-General Stephanus Schoeman announced that the laying out of the town would commence on 10 December 1860. Work on the development of the town

proceeded slowly, and by 21 January 1861 only a water furrow had been dug. By September 1862, however, a number of residents had settled down in the newly established town (Bergh 1999).

The establishment and early existence of the town of Piet Potgietersrust became synonymous with the conflict between the Langa Ndebele of Chief Mankopane and the Transvaal Republic. The first serious battle between the two groups took place on 14 April 1858, when in retaliation for incursions and attacks by Mankopane's men, his mountain stronghold named Magagmatata was attacked by a force commanded by Commandant-General Stephanus Schoeman. During the attack, the later President of the *Zuid-Afrikaansche Republiek*, Commandant S.J.P. (Paul) Kruger played a crucial role and the Langa Ndebele suffered a devastating defeat. In the words of Jackson (1983:18) "...it is said that some 800 of Mankopane's subjects were killed that night." As a result of the attack of 14 April 1858, Mankopane moved his capital to Thutlwane Hill on the farm Kromkloof 744 LR. Thutlwane is located approximately 35.8km north-west of the present study area (Jackson 1983).

In January 1868 the town of Piet Potgietersrust was attacked by the Kekana Ndebele of Mogemi, who acted as regent for Mankopane II. His attack on the town was supported by Mankopane's Langa Ndebele. The increasing conflict between the two sides came to a head on 2 March 1868, when a Boer Commando commanded by Commandant Paul Kruger laid siege to Mogemi and his followers at Sefakaulo Hill near Piet Potgietersrust. In the time that Sefakaulo Hill was under siege, Mankopane's men raided a number of farms in the surroundings of the town. Realising the threat posed by Mankopane, and concluding that he did not have the manpower to force Mogemi's surrender, Kruger decided to rather attack Mankopane at Thutlwane. This attack started on 13 June 1868, and continued for a couple of days. Although Kruger's force managed to occupy most of the mountain stronghold at Thutlwane, Chief Mankopane eventually proved victorious in the battle and forced Commandant Kruger, who by now was running low on ammunition and supplies, to order his men back to Piet Potgietersrust (Jackson 1983).

A peace accord between the Boers and the Langa Ndebele was eventually agreed upon on 6 July 1869. However, this provided little stimulus for the growth and development of Piet Potgietersrust. By 1870 the entire white population of town had been evacuated *inter alia* due to the effects of Malaria. The evacuation and abandonment of the town continued from 1870 until 1890, when Piet Potgietersrust was re-occupied (Bergh 1999).

On 30 May 1877, a few years after the evacuation of the white population of Piet Potgietersrust, Chief Mankopane passed away at Thutlwane. He was buried here the following day, and his son Masebe succeeded as chief of the Langa Ndebele on 3 June 1877 (Jackson 1983).



Figure 14 – Historic photograph of various chiefs from the then Zoutpansberg District who were called to a meeting in Pretoria with Captain Oscar Dahl in August 1881. Chief Masebe of the Langa Ndebele is standing behind Dahl and to his right, with Chief Mokopane II of the Kekana Ndebele standing left of Dahl (De V. Pienaar, 1990:166).

Between 1883 and 1886 a war raged between the Langa Ndebele of Masebe and the Kekana Ndebele of Mokopane II. While the exact localities for the various events associated with this war are not presently known, at least one of the battles appear to have taken place along the Mogalakwena River. On this occasion, Masebe's forces slept at Fothane Hill (Moordkoppie) the night before the battle. The war came to an end when State President Paul Kruger visited these parts and ordered Masebe and Mokopane II to appear before him, upon which he insisted that they make peace (Jackson 1983).

From 1890 onwards, and under the leadership of Commandant Henning Pretorius, the town was of Piet Potgietersrus developed and expanded (Bergh 1999). Incidentally, Commandant Pretorius was an early owner of two of the farms from within the study area, namely Utrecht and Overysel.

5.2.5 Establishment of 'Native Locations' in the Surroundings of the Study Area

After the dramatic defeat of the British forces under command of Major General Sir George Pomeroy Colley to the Boers at the Battle of Majuba on 27 February 1881, the First Boer War (also known as the Transvaal War of Independence) came to an end. The formal peace agreement between the British Government and Boers was signed on 5 April 1881 in Pretoria and became known as the Pretoria Convention. The agreement was ratified by the Transvaal Volksraad on 3 August 1881 and was superseded by the London Convention of 1884.

Three sections from the Pretoria Convention are of importance for the present study. These

sections are provided verbatim below, and deal with the creation of a so-called 'Native Location Commission' which had to reserve or proclaim defined locations within the Transvaal Republic for the various black groups who lived within its borders. The three sections are as follows:

XIII. Natives will be allowed to acquire land, but the grant or transfer of such land will in every case be made to, and registered in the name of, the Native Location Commission, hereinafter mentioned, in trust for such natives.

XXI. Forthwith, after the taking effect of this Convention, a Native Location Commission will be constituted, consisting of the President (or in his absence the Vice-President) of the State, or some one deputed by him, the Resident, or some one deputed by him, and a third person to be agreed upon by the President (or the Vice-president, as the case may be) and the Resident; and such Commission will be a standing body for the performance of the duties hereinafter mentioned.

XXII. The Native Location Commission will reserve to the native tribes of the State such locations as they may be fairly and equitably entitled to, due regard being had to the actual occupation of such tribes. The Native Location Commission will clearly define the boundaries of such locations, and for that purpose will, in every instance, first of all ascertain the wishes of the parties interested in such land. In case land already granted in individual titles shall be required for the purpose of any location, the owners will receive such compensation, either in other land or in money, as the Volksraad shall determine. After the boundaries of any location have been fixed no fresh grant of land within such location will be made, nor will the boundaries be altered without the consent of the Location Commission. No fresh grants of land will be made in the districts of Waterberg, Zoutpansberg, and Lijdenberg, until the locations in the said districts respectively shall have been defined by the said Commission (www.sahistory.org.za).

The Transvaal Location Commission as it is sometimes referred to, existed between 1881 and the outbreak of hostilities during the South African War in 1899. Initially, its members were Paul Kruger (Vice-President of the *Zuid-Afrikaansche Republiek*), George Hudson (British Resident in the Transvaal Republic) and H.J. Schoeman. Later, Kruger was replaced by the Superintendent of Native Affairs, General P.J. (Piet) Joubert with Fritz Stiemens as the Commission Secretary.

After the Pretoria Convention was replaced by the London Convention in 1884, the members of the commission also changed. By 1891, the work of the commission was replaced by a meeting that was called in every district of the Transvaal Republic and which was attended by the relevant district's magistrate, commandant field-cornets (Bergh 1999).

In May 1882, shortly after the adoption of the Pretoria Convention, the Executive Council of the *Zuid-Afrikaansche Republiek* was instructed by the Location Commission to already decide which black groups would be allocated locations. Only 17 black groups were included in this initial list, and in terms of the surroundings of the present study area this list included the Langa Ndebele as

well as the Kekana Ndebele of Mugombhane (Makapan) (Bergh 1999).

On 26 May 1890 the Location Commission visited Potgietersrus, and found that Chief Mugombhane had passed away a few months before. As a result, the commission met and negotiated with the regent Ntala (known to the commission members as Willem Makapan). The Location Commission proceeded to demarcate the farms Makalakaskop 2324, Knapdaar 1548 (portion), Tweefontein 1033 (portion), Rietfontein 1562, Turfspruit 2323 and Pietpotgietersrust 2247 (portion) as a location for the Kekana Ndebele.

In January 1894 the Location Commission declared that the Mogalakwena River would define the south-western boundary of the reservation, through which small sections of the following farms were added to the reservation: De Hoogedoorn 706, Blinkwater 707 and Lisbon 2366.

At the same time, the portion of the farm Pietpotgietersrust 2247 that was originally included, was now excluded from the reservation (Bergh, 1999).



*Figure 15 – Historic photograph of a meeting between an official of the Transvaal Republic and a person believed to be Chief Mugombhane of the Kekana Ndebele (Cartwright & Cowan 1978:10).
The Location Commission visited the Langa Ndebele between 10 and 13 June 1890.*

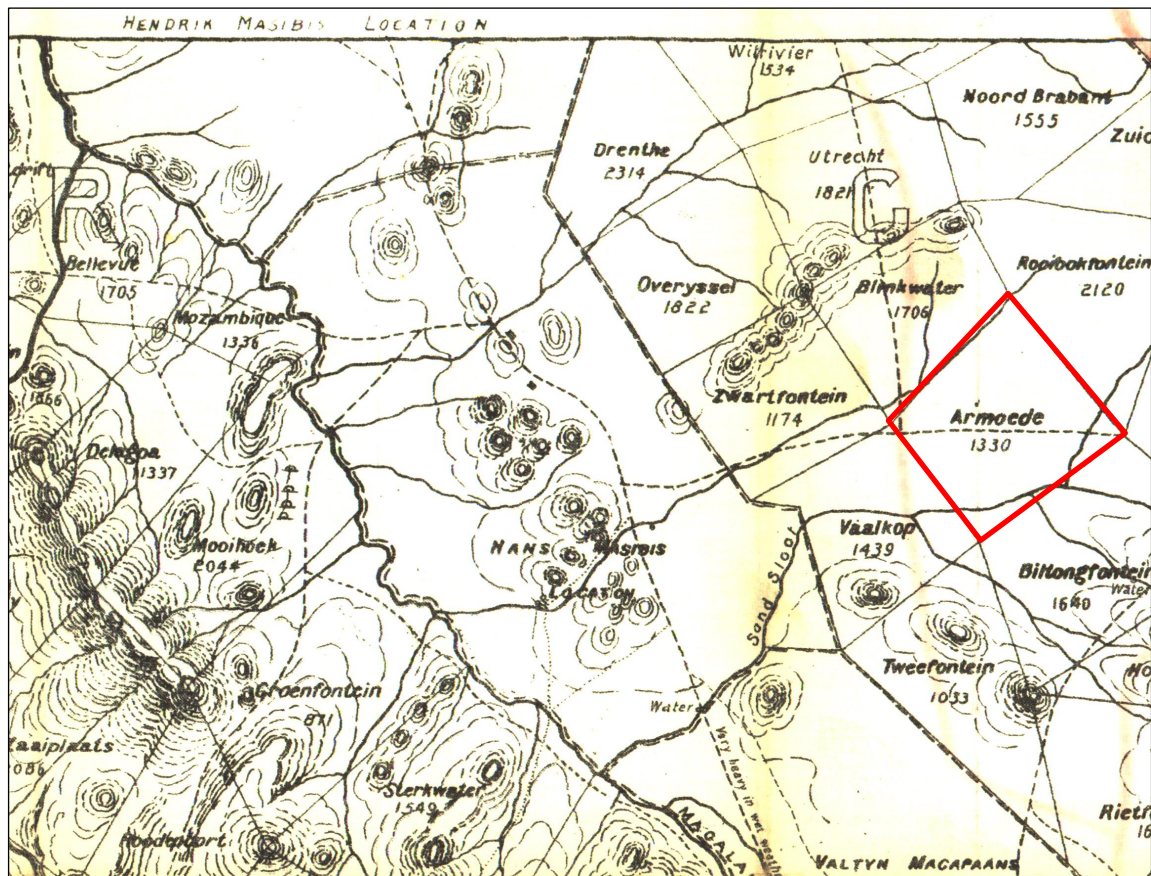


Figure 16 – Detail view of the Nylstroom-Pietersburg Sheet of the Major Jackson Map Series that was compiled during the South African War. This particular sheet is the revised edition dated to June 1901. The boundaries of the three 'native locations' located closest to the study area are shown in stippled line. The farm Armoede is outlined.

5.2.6 From Location to Lebowa: the Study Area and Surroundings from c. 1890 into the Twentieth Century

The partition of the Langa Ndebele into sections falling under the two sons of Mapela had a profound impact on this Nguni group. The southern section of the overall location that was allocated to the Langa Ndebele in 1890, was established as the land of Chief Hans Masibi and his followers whereas the northern section of the location was given to Chief Backenberg Masibi. Incidentally, the southern section included Fothane Hill where the old capital of Chief Mapela was once located. As a result, this southern chiefdom became known as *ba ga Mapela* (those of Mapela's place) (Jackson 1983).

Jackson (1983:39) makes the following interesting comment regarding the composition of the two partitioned Langa Ndebele groups. He states that "...almost all the Sotho subjects of the Langa supported Hans, whereas the majority of the Langa clansmen supported Bakenberg. In this way, the chiefdom that went to Hans comprised a high percentage of people of alien (mainly Sotho) stock and a small percentage of Lange clansmen."

With the partition of the Langa Ndebele, Chief Hans Masibi moved his capital from his father's seat of residence at Thutlwane to the eastern foot of Mogope Hill. Mogope Hill is located approximately

4.1km west by south-west of the present study area, and the Mapela capital was situated here from 1890 to 1957 (Jackson 1983).

The years of the partition saw conflict between the Mapela on the one side and followers of Chief Backenberg Masibi on the other. Raids and attacks were undertaken from both sides during these years and lasted until April 1901, when the British Army occupied Pietersburg (present-day Polokwane) and ordered the two chiefs to stop fighting. During the period of war and bloodshed associated with the partition, Chief Hans Masibi had four of his uncles who had supported his brother's succession, shot at Raphaga Hill. This event took place in 1900. Raphaga Hill is located approximately 3.3km south-west of the study area.

After the death of Chief Hans Masibi on 29 November 1905, his uterine brother Marcus Masibi was appointed as regent. On 8 August 1913, the farm Zwartfontein 818 LR was registered in the name of Chief Marcus in trust for the Mapela people. The farm was purchased by the people of Mapela (Jackson 1983). As a result, the section of the study area falling within the farm Zwartfontein became the property of the Mapela in 1913.

The Mapela chieftdom purchased the farms Bavaria 678 LR, Blinkwater 680 LR and Scirappes 681 LR in 1926. The funds for the purchase of the three farms came from the sale of the mineral rights of the farm Zwartfontein 818 LR, where platinum had been mined for some time (Jackson 1983). The present study area includes a section of this farm.



Figure 17 - Chief Hans Masibi, the ruler of the Langa Ndebele and Mapela from 1890 to 1905 (Jackson 1983:38).

In 1941, during the reign of Nkgalabe Johannes Masibi, the farms Blinkwater 820 LR, Leyden 804 LR, Overysel 815 LR and Vaalkop 819 LR, which had been purchased by the South African Development Trust, were transferred to the Mapela in exchange for three farms, namely Bavaria, Blinkwater and Scirapps (Jackson 1983). In this way, the sections of the study area falling within the farms Blinkwater and Overysel became the property of the Mapela in 1941.

The apartheid-created bantustan or “homeland” of Lebowa was given internal self-government on 2 October 1972, with its capital initially at Seshego and later at Lebowakgomo (Bergh 1999). It is expected that during the existence of Lebowa, all the farms from within the study area fell or came to fall within the boundaries of this bantustan. In 1994, all the former bantustans were fully incorporated into South Africa again.

5.3 Archival and Historical Maps

An assessment of available archival and historical maps was undertaken as a way to establish a historic layering for the study area. These historic maps are also valuable resources in identifying possible heritage sites and features located within the study area.

5.3.1 First Edition of the 2328DD Tinmyne Topographic Sheet

This section deals with the First Editions of the 2328DD Limburg Topographical Sheets. This sheet was based on aerial photography undertaken in 1965, was surveyed in 1970 and drawn in 1971 by the Trigonometrical Survey Office.

Overlays of the study area over this map sheet are provided in the image below. The following observations can be made from this overlay:

- Significant sections of the study area are depicted as cultivated lands; and
- A landing strip is located to the west of the N11, between the Northern and Southern Corridor;
- No homesteads or structures are depicted within the proposed study area.

Table 12 - Features that were identified within the present study area from the First Edition of the 2328DD Limburg Topographic Sheet.

Feature Number	Coordinates (WGS84)	Description
Feature 1	S 23.979505 E 28.972015	A single structure, most likely a homestead was observed. The structure forms part of the Armoede Village.

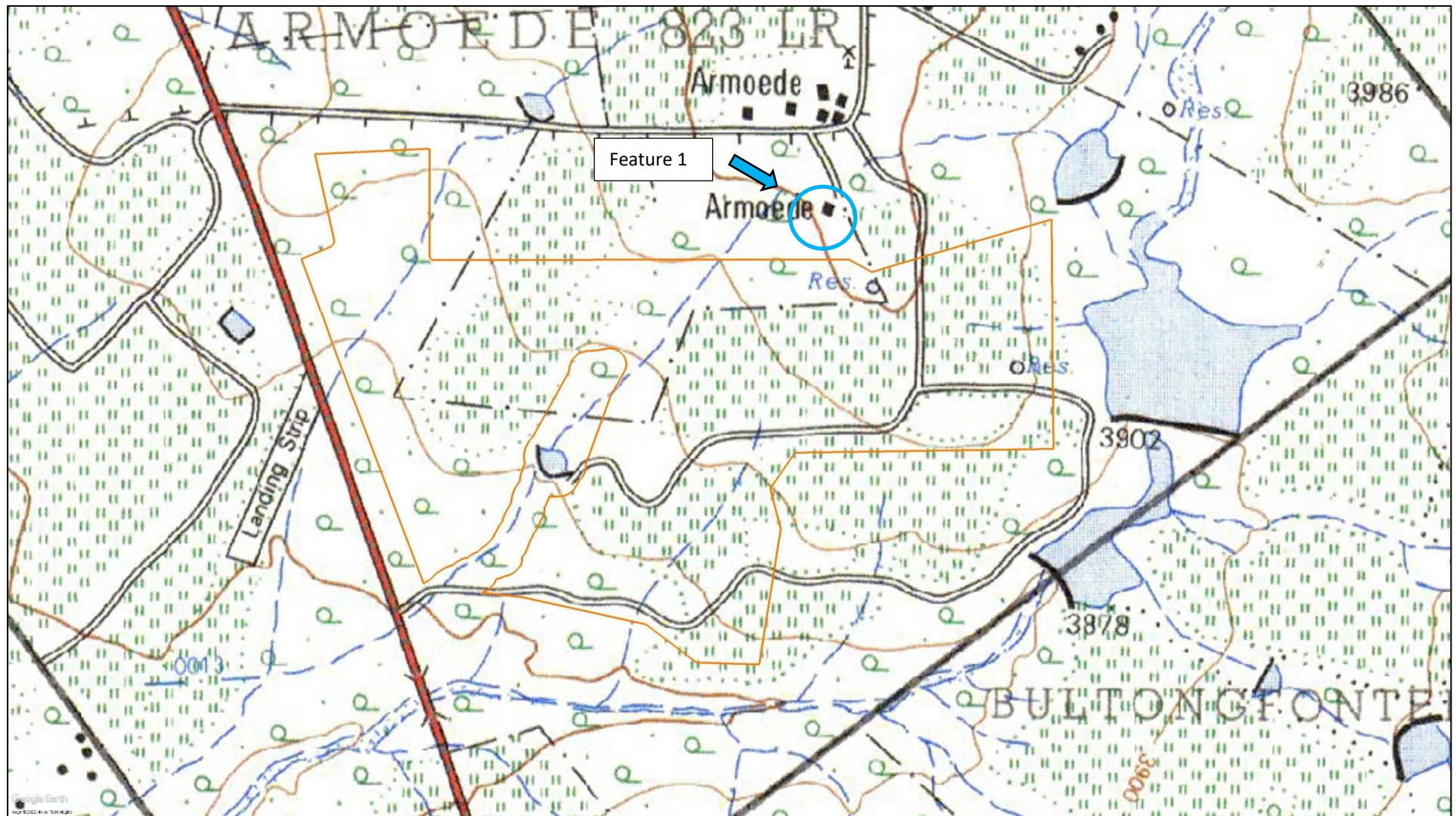


Figure 18 – Detail view of the depiction of the study area on the First Edition of the 2328DD Limburg Topographic Sheet.

5.3.2 Second Edition of the 2328DD Limburg Topographic Sheet

This section deals with the Second Edition of the 2328DD Limburg Topographical Sheet. The map sheet was compiled in 1983 by the Chief Directorate: Surveys and Land Information.

Overlays of the study area over this map sheet are provided in the image below. The following observations can be made from this overlay:

- Significant sections of the study area are depicted as cultivated lands; and
- The landing strip that was located to the west of the N11, between the Northern and Southern Corridor, is no longer visible.
- No homesteads or structures are depicted within the proposed study area.

Table 13 - Features that were identified within the present study area from the Second Edition of the 2328DD Limburg Topographic Sheet.

Feature Number	Coordinates (WGS84)	Description
Feature 1	S 23.979505 E 28.972015	A single structure, most likely a homestead was observed. The structure forms part of the Armoede Village.

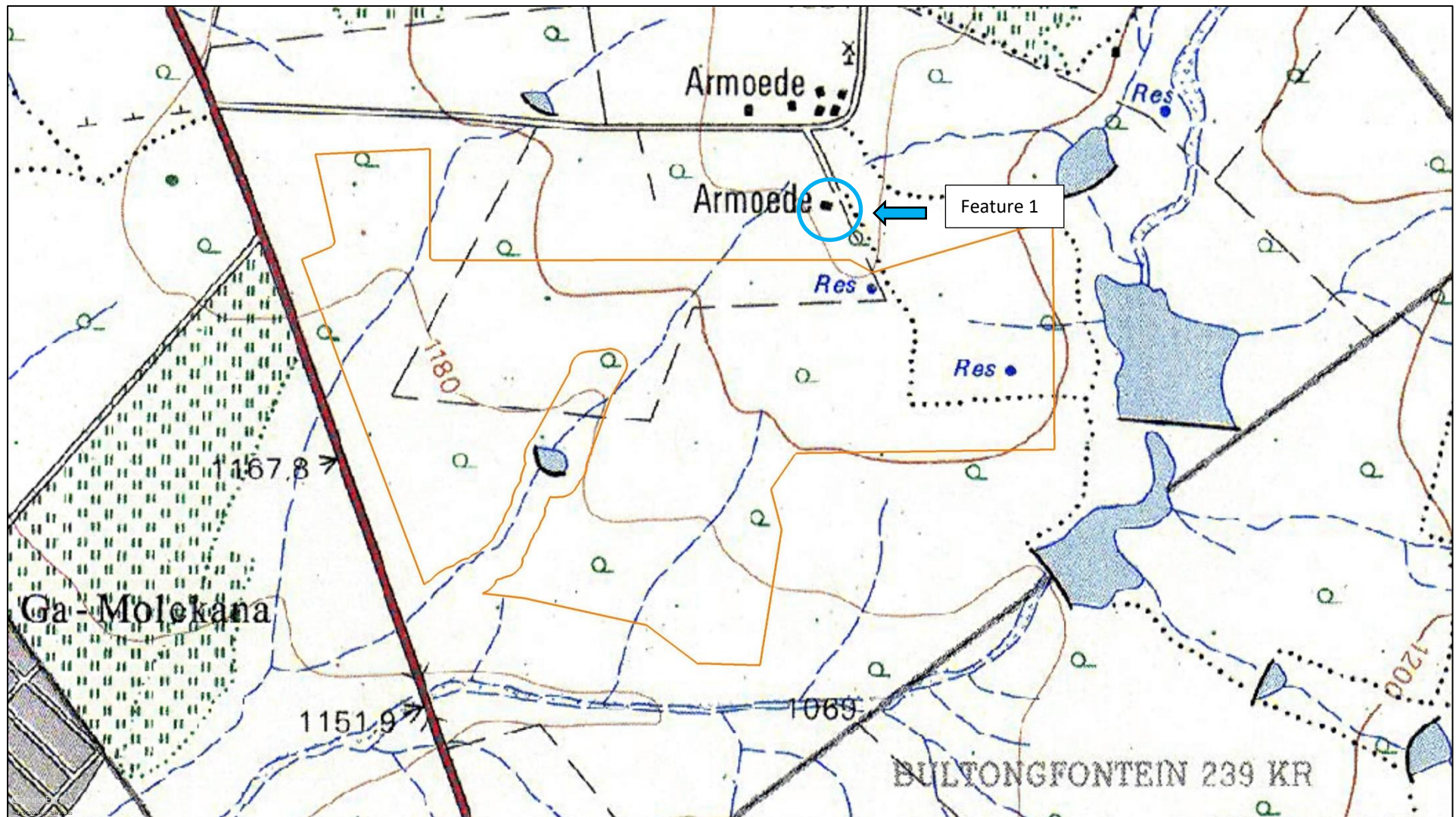


Figure 19 – Detail view of the depiction of the study area on the Second Edition of the 2328DD Limburg Topographic Sheet.

5.4 Previous Heritage Impact Assessment Reports from the Study Area and Surroundings

An assessment of the South African Heritage Resources Information System (SAHRIS) of SAHRA was undertaken to establish whether any previous archaeological and heritage impact assessments had revealed archaeological and heritage sites within, and in close proximity, to the present study area footprints.

This assessment has revealed that a number of previous studies had been undertaken in the surroundings of the study area, with various heritage and archaeological site types identified.

All these previous studies located on the SAHRIS system will be briefly discussed in chronological order below. In each case, the results of each study are shown in bold.

- PISTORIUS, J. C. 2002. A cultural heritage impact assessment for the proposed new open pit for prust on the farm Zwartfontein 818lr In The Northern Province Of South Africa. Amendment To The Prust Environmental Management Programme Report (EMPR). **Heritage resources consisting of the ruins of dwellings and old abandoned mines were discovered in and near the proposed new open pit area. Six sites with graves and the ruins of dwellings dating from the relatively recent past also occur in and near the open pit area.**
- ROODT, F. 2008. Phase 1 Heritage Resources Scoping Report Mogalakwena Bulk Water Supply Scheme - Phase 1 of Zone 1 Mokopane: Limpopo. **No historical or archaeological resources were uncovered in this assessment except for several burial grounds.**
- ROODT, F. 2008. Phase 1 Heritage Impact Assessment (Scoping & Evaluation) Landfill and Salvage Yard, Anglo Platinum: Mogalakwena Section, Limpopo. **A low significance MSA stone tool scatter was uncovered in this assessment.**
- COETZEE, F.P. 2011. Cultural Heritage Survey of the Proposed Provincial Road Deviation (P4380) Project for the Mogalakwena Platinum Mine, near Mokopane, Mogalakwena Municipality, Limpopo Province. **Several historical structures and burial grounds were uncovered in this assessment.**
- MURIMBIKA, E. 2012. Proposed Eskom Platreef Power Line and Substation Project within Mogalakwena Local Municipality, Waterberg District in Limpopo Province: Archaeological and Heritage Impact Assessment Report. **Low significance historical homestead remains as well as several burial grounds were uncovered in this assessment.**

- ROODT, F. 2012. Phase 1 Heritage Resource Impact Assessment (Scoping & Evaluation): Maruteng Waste Water Treatment Works Mokopane, Limpopo. **No heritage resources were uncovered in this assessment.**
- HUTTEN, M. 2013. Proposed Water Supply Infrastructure for the Residential Clusters of Tshamahansi, Sekuruwe, Seema, Phafola, Maala Perekisi, Witrivier and Millennium Park in the Mogalakwena Local Municipality, Waterberg District, Limpopo Province. **A living heritage site was uncovered in this assessment.**
- HUTTEN, M. 2014. Proposed Development of a Shopping Centre on Portion 1 of the Farm Kroonstad 468 LR, west of Marken in the Mogalakwena Local Municipality, Waterberg District, Limpopo Province. **No heritage resources were uncovered in this assessment.**
- VAN DER WALT, J. 2016. Archaeological Impact Assessment for the Proposed Bulk Water Supply Pipelines from Pruissen to Piet-Se-Kop Reservoir, as Part of the Mogalakwena Water Master Plan, Mogalakwena Municipality Area, Limpopo Province. **Low significance Iron Age remains as well as some MSA stone tool scatters were uncovered in this assessment.**
- VAN SCHALKWYK, J. 2017. Phase 1 Cultural Heritage Impact Assessment: the proposed development of the Mogalakwena Mini Water Scheme Pipeline, Waterberg District Municipality, Limpopo Province. **Scattered surface occurrences of Middle Stone Age stone tools and flakes were identified in a few areas across the pipeline route, four graves, and the remains of old homesteads.**
- ROODT, F. 2017. Proposed filling station and shopping complex at Bakenberg. Mogalakwena Local Municipality. Waterberg District. Limpopo Province. **A stone-walled settlement of the Langa Ndebele was uncovered just outside of the proposed study area in this assessment. This stonewalled site is located approximately 16km north-west of the present study area on top of Basogadi Hill, just outside of Bakenberg. The site exhibits the typical stone-walled settlement pattern for the area and according to local residents, the site is ancestral to the Langa Ndebele.**
- VAN DER WALT, J. 2017. Heritage Impact Assessment (Required under Section 38(8) of the NHRA (No. 25 of 1999) Mogalakwena Municipality Water Master Plan: Phase 2A Bulk Water Supply Zone 1, Waterberg District Municipality, Limpopo Province. **Middle Stone Age stone tool scatters, Late Iron Age structural remains, historical stone-walled structural remains and several burial grounds were uncovered in this assessment.**

- VAN DER WALT, J. 2017. Heritage Impact Assessment for the proposed water supply pipelines and associated infrastructure, as part of the Mogalakwena Water Master Plan, Mokopane Area, Waterberg District Municipality. **During the survey, Iron Age Scatters (FS 1 and 2), stone-walled enclosures (MIW 4 and 5) as well as three grave/ burial sites (MIW 1-3) were recorded.**
- BIRKHOLTZ, P. AND SMEYATSKY, I. 2019. Heritage Impact Assessment for the Mogalakwena Mine Expansion Project near Mokopane, Limpopo Province. **The fieldwork resulted in the identification of a total of seventy-one (71) archaeological and heritage sites. Eleven sites containing confirmed graves and burial grounds, four sites containing possible graves, two sites containing relocated burial grounds which may still contain graves, twenty-eight black homesteads, one historic farmstead, twelve stone age sites, one possible rain-making site, one late iron age stonewalled site, eight sites comprising historic to recent stonewalling, one site comprising a single lower grinding stone, one site comprising a rock boulder associated with cupules and stonewalling and one site comprising a rubbing post.**
- BIRKHOLTZ, P. 2019. Heritage Screening Assessment for the proposed Solar PV Plant at Armoede, near Mokopane, Limpopo Province. **The fieldwork resulted in the identification of five sites, including three MSA sites, a possible grave, and a historical structure.**
- BIRKHOLTZ, P. AND DE BRUYN, C. 2020. Heritage impact assessment for the proposed Mogalakwena Mine Integrated Permitting Project near Mokopane, Limpopo Province. **No evidence for any archaeological or heritage sites could be identified.**
- BIRKHOLTZ, P. AND DE BRUYN, C. 2020. Heritage Impact Assessment for the Proposed Solar PV Plant at Armoede, near Mokopane, Limpopo Province. **The fieldwork undertaken resulted in the identification of a total of seven (7) sites. These were numbered from MGSP 06 to MGSP 12.**

6 FIELDWORK FINDINGS

6.1 Introduction

The fieldwork findings presented here resulted from the fieldwork undertaken during the Heritage Screening Assessment, Heritage Scoping Assessment, the HIA and the Amendment HIA.

The screening level fieldwork was undertaken by an experienced team comprising professional archaeologist Polke Birkholtz and fieldwork assistant Derrick James. The fieldwork was undertaken on Wednesday, 2 October and Thursday, 3 October 2019 and was aimed at establishing whether any significant heritage resources are located within the study area. Despite the fact that only a screening level site visit was undertaken, the fieldwork resulted in the identification of five (5) sites (**MGSP 1 to MGSP 5**). The sites identified during the Heritage Screening Assessment include three Stone Age sites (**MGSP 1, MGSP 2 and MGSP 4**), one possible grave site (**MGSP 3**) (which turned out to be a grave), and one historic structure (**MGSP 5**).

PGS was appointed in 2020 to undertake a Heritage Scoping Assessment for the project. Intensive walkthroughs were undertaken over the course of several days by an experienced archaeological fieldwork team consisting of an archaeologist (Cherene de Bruyn) and a field technician (Thomas Mulaudzi). The fieldwork was undertaken from Monday, 21 September 2020 to Wednesday, 23 September 2020. It resulted in the identification of a total of seven (7) additional sites. These were numbered from **MGSP 6 to MGSP 12**. The sites identified during the Heritage Scoping Assessment include farming-related structures such as water troughs and reservoirs (**MGSP 6, MGSP 7 and MGSP 11**), graves and burial grounds (**MGSP 8**), homesteads where the risk for unmarked graves exist (**MGSP 9 and MGSP 10**), and a contemporary shed (**MGSP 12**). It is important to note that site **MGSP 8** identified during the Scoping Assessment is the same site as **MGSP 3** identified during the Screening Assessment.

The fieldwork component of the study for the HIA was aimed at assessing all the footprint areas currently proposed and which had not been assessed during the fieldwork of the screening and scoping phases. The aim of all this fieldwork was to identify tangible remains of archaeological, historical and heritage significance. The fieldwork was undertaken by way of intensive walkthroughs of the areas which had not been addressed before. The fieldwork was undertaken by two archaeologists (Cherene de Bruyn and Michelle Sachse) and a field assistant (Tshepo Sambo) over several days from Wednesday, 2 June 2021 to Thursday 3 June 2021, with a second site visit undertaken by Michelle Sachse and Tshepo Sambo on Monday 7 June 2021.

The fieldwork undertaken resulted in the identification of a total of twenty-one (21) sites. These were numbered from **MGSP 13 to MGSP 33**. The reason for this is that the same numbering system as the one used for the 2019 screening and 2020 scoping projects was used for the current study.

The sites identified during the recent fieldwork include five Stone Age sites (**MGSP 13, MGSP 14, MGSP 15, MGSP 16 and MGSP 17**), two Iron Age sites (**MGSP 18 and MGSP 19**), one homestead with the risk for unmarked graves (**MGSP 20**), one farming-related structure (**MGSP 21**), one historic structure (**MGSP 22**), four possible graves (**MGSP 23, MGSP 24, MGSP 25 and MGSP 31**), and seven sites comprising graves and burial grounds (**MGSP 26, MGSP 27, MGSP 28, MGSP 29, MGSP 30, MGSP 32 and MGSP 33**).

It is important to note that site **MGSP 33** identified during the Heritage Impact Assessment, is the same site as **MGSP 8** identified during the Heritage Scoping Assessment, which in turn is the same site as **MGSP 3** identified during the Screening Assessment. Similarly, site **MGSP 17** identified during the Heritage Impact Assessment is the same site as **MGSP 4** identified during the Screening Assessment. Lastly, site **MGSP 22** identified during the Heritage Impact Assessment is the same site as **MGSP 5** identified during the Screening Assessment. As a result, three of the 23 sites identified during the Heritage Impact Assessment were previously identified during the Screening and Scoping Assessments. This means that a total of 17 previously unrecorded sites were identified during the fieldwork for the Impact Assessment.

The fieldwork component of the amendment HIA study was aimed at assessing all the amended footprint areas. The fieldwork was undertaken by way of intensive walkthroughs of the areas which had not been addressed before as well as additional areas. The fieldwork was undertaken by two archaeologists (Cherene de Bruyn and Michelle Sachse on Wednesday, 8 June 2022). Four (4) sites, that were previously recorded fell within the amended footprint (**MGSP 3, MGSP 5/ MGSP 22, MGSP 7, & MGSP 11**), while four (4) sites fell within a 100m of the proposed amended footprint boundary (**MGSP 4/ MGSP 17, MGSP 9, MGSP 12 & MGSP 21**).

The distribution of these identified sites in relation to the study area boundaries is shown on one of the maps appearing below.

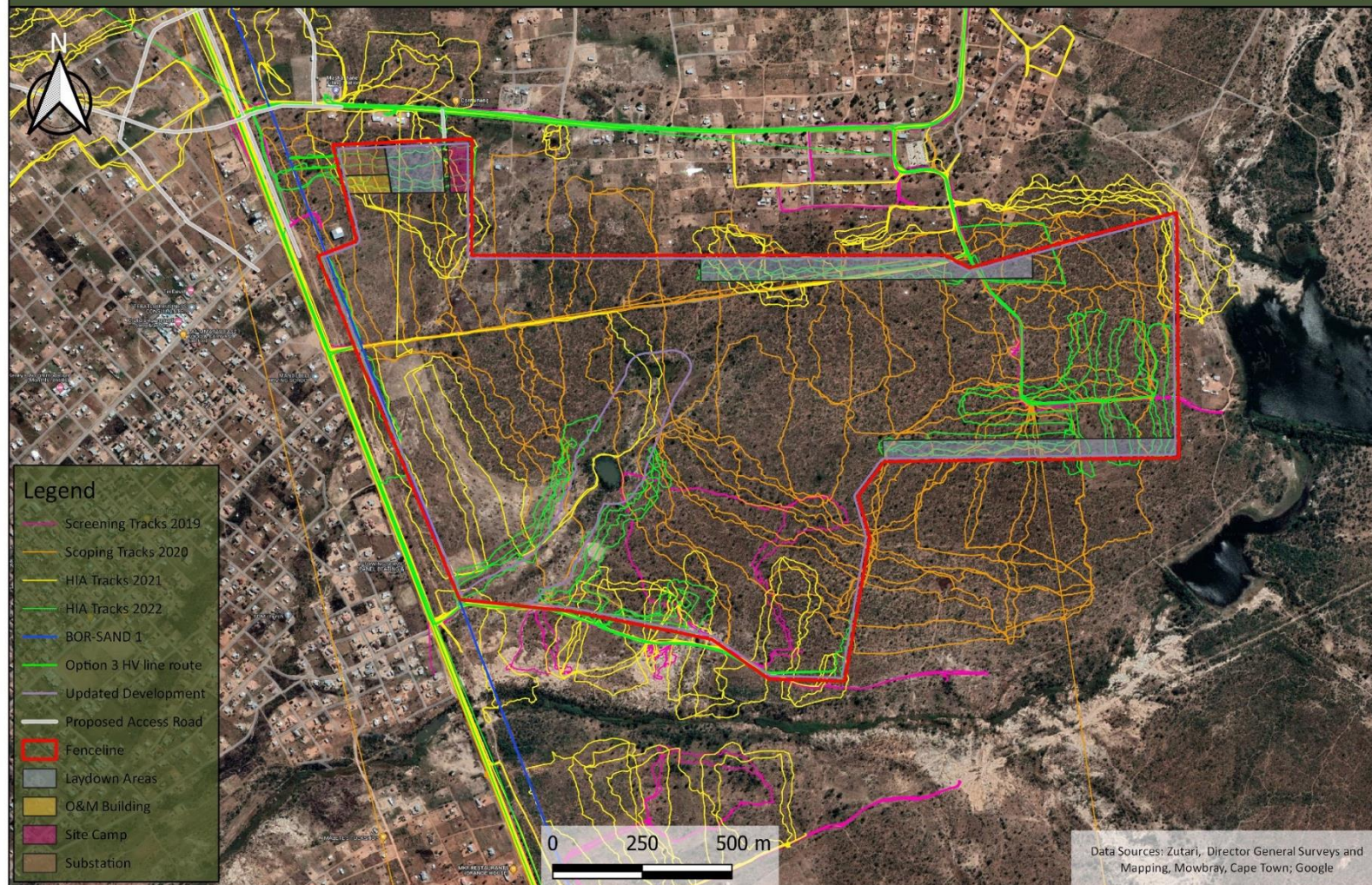


Figure 20 – Google Earth image depicting the tracklogs that were recorded in the field. The tracklogs from the 2019 screening survey, 2020 scoping assessment, 2021 HIA fieldwork and 2022 amendment HIA fieldwork are depicted in pink, orange, yellow and green respectively.

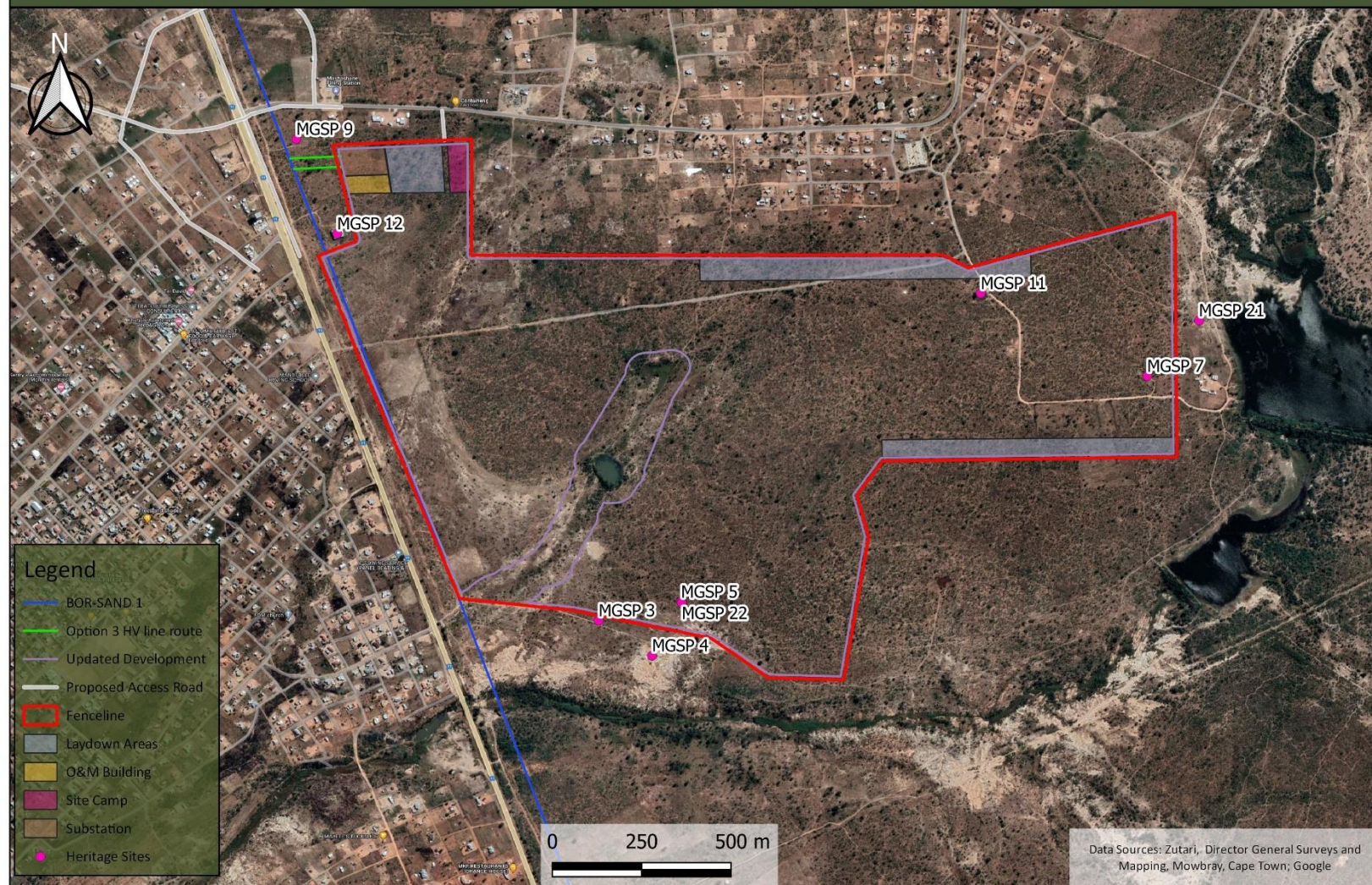


Figure 21 – Google Earth image depicting just the proposed development footprints with the identified heritage sites.

6.2 Heritage Sites identified during the Fieldwork

6.2.1 MGSP 3

Other Site Numbers: MGSP 8 & MGSP 35

GPS Coordinates:

S 23.99077

E 28.96346

Type: Grave

Description:

During the fieldwork undertaken for the Heritage Screening Assessment (Birkholtz, 2019), an oval, loosely packed stone-lined feature was identified and included in that report as site **MGSP 3**. The site was defined as a possible grave. During the fieldwork undertaken for the Heritage Scoping Assessment (Birkholtz & De Bruyn, 2020), no evidence for the stone feature identified the previous year could be found. However, a formal grave with a granite dressing and headstone was identified in close proximity to the place where the stone feature had been observed in 2019. As such, it seems likely that the family of the deceased replaced the stone feature with a formal grave dressing in the period between the fieldwork trips of 2019 and 2020. The grave was included in the Heritage Scoping Assessment as site **MGSP 8**. The site was again recorded during the fieldwork undertaken for the Heritage Impact Assessment. It was given the site number **MGSP 35**.

Significance:

All graves have high levels of emotional, religious and in some cases historical significance. As such the site is of **Generally Protected A (GP. A)** or **High/Medium Significance**.

Site Extent:

The site is approximately 10m x 10m in extent.

Impact Assessment and Mitigation:

See **Chapter 8** for impact assessment calculations and **Chapter 9** for required mitigation measures.



Figure 22 – The stone-lined feature identified as a possible grave in 2019. The scale is in 10cm increments.



Figure 23 - View of the grave that was identified in close proximity to the previous stone feature in 2020. This grave was given the site number MGSP 8. The scale is in 10cm increments.

6.2.2 MGSP 4

Other Site Numbers: MGSP 17

GPS Coordinates:

S 23.99173

E 28.96493

Type: MSA Site

Description:

The site comprises a medium density MSA stone tool scatter located in an eroded watercourse. The erosion exposed a pebble layer, and the lithics are associated with the pebble layer. It is not presently certain whether the erosion exposed the Stone Age site, or whether the Stone Age people accessed the raw material in the form of the pebble layer exposed by erosion.

The highest lithic density observed at the site is 12 lithics per square meter.

The noticeable lithic types consist of points, flakes, blades and chunks made on a variation of raw materials. Some of the lithics observed on the site also contain retouch.

Significance:

The site is extensive and has a medium lithic density. Some of the lithics are also retouched. As a result, the site is deemed to be of **Generally Protected B (GP. B)** or **Medium Significance**.

Site Extent:

The site is approximately 100m x 100m in extent.

Impact Assessment and Mitigation:

See **Chapter 8** for impact assessment calculations and **Chapter 9** for required mitigation measures.



Figure 24 – General view of a section of site MGSP 4. The scale used in this photograph is in 10cm increments.



Figure 25 – Sample of lithics from site MGSP 4. The scale used in this photograph is in 1cm increments.

6.2.3 MGSP 5

Other Site Numbers: MGSP 22

GPS Coordinates:

S 23.99025

E 28.96573

Type: Historic Structure

Description:

The site comprises the remains of a historic farm dwelling that appears to have been built and used at a time when the farm was still utilise as a farm. This would have been before the establishment of the settlement of Armoede. From the tangible remains still evident on site, it seems that the farmhouse was originally comprised a rondavel, which over time was extended by adding a second rondavel and finally by linking the two rondavels into one dwelling.

The exact age of the structure is not presently known. It is also not depicted on any of the available historic maps. As it is not depicted on the topographic maps that were surveyed from 1970 onwards, it would appear that the structure is likely older than the surveying of these maps. However, it is not certain whether the structure is in fact older than 60 years.

Significance:

The site is poorly preserved and doubt exists as to whether it is older than 60 years or not. As a result, based on information that is presently available, the site is deemed to be of **Generally Protected C (GP. C)** or **Low Significance**. This significance level may change should further information come to light indicating that the structure is older than 60 years.

Site Extent:

The site is 40m x 40m in extent.

Impact Assessment and Mitigation:

See **Chapter 8** for impact assessment calculations and **Chapter 9** for required mitigation measures.



Figure 26 – General view of the structure at site MGSP 5 (MGSP 22). The scale is in 10cm increments.



Figure 27 – This heap of bricks and collapsed walling was observed on the surface of the structure. The Scale is in 10cm increments.

6.2.4 MGSP 7

GPS Coordinates:

S 23.984041

E 28.978550

Type: Farming-Related Structures

Description:

Site MGSP 7 consists of the remains of the foundations of a structure as well as a reservoir. It would appear that the water trough identified at MGSP 6 once connected to the reservoir. The reservoir is currently used as an enclosure for pigs.

A reservoir is depicted close to the location of MGSP 7 on the First Edition of the 2328DD Topographical Map Sheet that was surveyed in 1970.

Significance:

The site is preserved and doubt exists as to whether it is older than 60 years or not. As a result, based on information that is presently available, the site is deemed to be of **Generally Protected C (GP. C)** or **Low Significance**. This significance level may change should further information come to light indicating that the structure is older than 60 years.

Site Extent:

The site is 42m x 28m in extent.

Impact Assessment and Mitigation:

See **Chapter 8** for impact assessment calculations and **Chapter 9** for required mitigation measures.



Figure 28 – General view of site MGSP 7. The scale is in 10cm increments.



Figure 29 - View of the remains of a structure at site MGSP 7. The scale is in 10cm increments.



Figure 30 – General view of the reservoir at site MGSP 7. The scale is in 10cm increments.

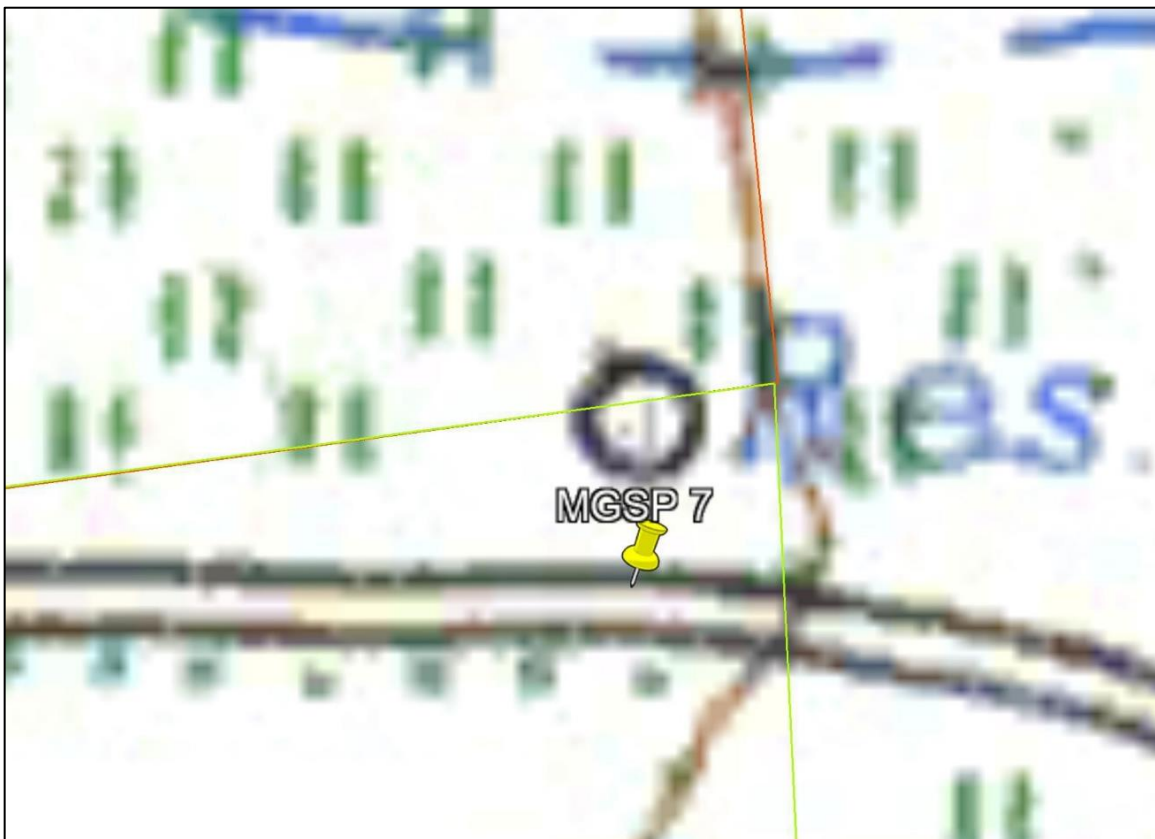


Figure 31 – Map indicating the location of MGSP 7 near a reservoir identified on the First Edition of the 2328DD Topographical Map Sheet that was surveyed in 1970.

6.2.5 MGSP 9

GPS Coordinates:

S 23.977524

E 28.955145

Type: Homestead with the Risk for Unmarked Graves

Description:

Site MGSP 9 is comprised of the ruins of a house. The site is located 120m east of the N11 and most likely formed part of the Ga-Sekhaolelo settlement nearby.

It is possible for stillborn babies to have been buried in association with this structure. Past experience has shown that in some cases stillborn babies were buried in close proximity to such homesteads and especially along the sides of the parents' dwelling. This seems to be especially true for older sites. No direct information with regards to the presence (or not) of stillborn graves are currently available.

Significance:

Until such time that the presence of graves here has been confirmed or disproved, the site must be viewed as containing graves. All graves have high levels of emotional, religious and in some cases historical significance. As such the site is of **Generally Protected B (GP. B)** or **Medium Significance**. This indicates that the site may not be impacted upon without prior mitigation.

Site Extent:

The site is 10m x 10m in extent.

Impact Assessment and Mitigation:

See **Chapter 8** for impact assessment calculations and **Chapter 9** for required mitigation measures.



Figure 32 – General view of site MGSP 9. The scale is in 10cm increments.

6.2.6 MGSP 11

GPS Coordinates:

S 23.981757

E 28.973971

Type: Farming-Related Structure

Description:

Site MGSP 11 consists of the remains of a circular reservoir. It would appear that the water trough identified at MGSP 6 once connected to this reservoir as well.

A reservoir is located close to the location of MGSP 11 on the First Edition of the 2328DD Topographical Map Sheet that was surveyed in 1970.

Significance:

The site is reasonably well preserved but its exact age is not known. Based on the information that is presently available, the site is deemed to be of **Generally Protected C (GP. C)** or **Low Significance**.

Site Extent:

The site is 10m x 15m in extent.

Impact Assessment and Mitigation:

See **Chapter 8** for impact assessment calculations and **Chapter 9** for required mitigation measures.



Figure 33 – General view of site MGSP 11. The scale is in 10cm increments.



Figure 34 - Map indicating the position of site MGSP 11 near a reservoir identified on the First Edition of the 2328DD Topographical Map Sheet.

6.2.7 MGSP 12

GPS Coordinates:

S 23.980078

E 28.956190

Type: Contemporary Shed

Description:

Site MGSP 12 consists of a contemporary brick shed. A second structure, which appeared to be under construction during the fieldwork undertaken in 2020, is located approximately 20m north of the shed.

The site is located approximately 800m south-west of the settlement at Ga-Sekhaolelo.

Significance:

The structures are younger than 60 years and not of heritage significance. As a result, based on information that is presently available, the site is deemed to be of **Generally Protected C (GP. C)** or **Low Significance**.

Site Extent:

The site is 80m x 50m in extent.

Impact Assessment and Mitigation:

See **Chapter 8** for impact assessment calculations and **Chapter 9** for required mitigation measures.



Figure 35 – General view of site MGSP 12. The brick shed can be seen on the right with the structure currently under construction visible on the left.



Figure 36 – Closer view of the contemporary brick structure.

6.2.8 MGSP 21

GPS Coordinates:

S 23.982511

E 28.979970

Type: Farming-Related Structure

Description:

The site consists of the remains of a kraal (livestock enclosure). The walls of the enclosure were built from natural stone and cement. Sections of the northern and western walls of the kraal have collapsed. The kraal is located approximately 170m north of a homestead. The homestead falls outside of the proposed project area.

Significance:

The site is deemed to be of **Generally Protected C (GP. C)** or **Low Significance**.

Site Extent:

The site is approximately 20m x 20m in extent.

Impact Assessment and Mitigation:

See **Chapter 8** for impact assessment calculations and **Chapter 9** for required mitigation measures.



Figure 37 - General view of the kraal identified at site MGSP 21. The scale is in 10cm increments.



Figure 38 – Another view of the site. The scale is in 10cm increments.

7 PALAEOLOGY

Banzai Environmental was appointed by PGS Heritage (Pty) Ltd to conduct the Palaeontological Desktop Assessment (PDA) to assess the Mogalakwena Solar PV Project in Limpopo. To comply with the National Heritage Resources Act (No 25 of 1999, section 38) (NHRA), this PDA is necessary to confirm if fossil material could potentially be present in the planned development area and to evaluate the impact of the proposed development on the Palaeontological Heritage.

The proposed PV development is surrounded by rocks of the Rustenburg Layered Suite and Lebowa Granite Suite of the Bushveld Complex, while the proposed PV facility is underlain by the Hout River Gneiss Suite (Archaean Granitoid Intrusions). The existing Sandsloot Substation and a portion of the eastern transmission line is underlain by the Malmani Subgroup (Chuniespoort Group of the Transvaal Supergroup). According to the PalaeoMap on the South African Heritage Resources Information System database, the Palaeontological Sensitivity of the Houtriver Gneiss Suite (Archaean Granitoid Intrusions) is zero as they are igneous in origin and thus un-fossiliferous, while the Malmani Subgroup has a very high Palaeontological Sensitivity (Almond and Pether 2008, SAHRIS website). Groenewald and Groenewald 2014 allocated a high Sensitivity to the Malmani Subgroup. He noted that additionally to the stromatolites, potentially fossiliferous Late Caenozoic Cave breccias within the “Transvaal dolomite” outcrop area could be present. These breccias are not individually mapped on geological maps.

It is thus recommended that an EIA level palaeontology report must be conducted to assess the value and prominence of fossils in the Malmani Subgroup of the development area and the effect of the proposed development on the palaeontological heritage. The purpose of the EIA Report is to elaborate on the issues and potential impacts identified during the scoping phase. A Phase 1 field-based assessment would be conducted with research in the site-specific study area, as well as a comprehensive assessment of the impacts identified during the scoping phase (Butler, 2022).

This PDA report is annexed in full under **Appendix C**.

8 IMPACT OF PROPOSED DEVELOPMENT ON HERITAGE

8.1 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 archaeological and heritage sites identified during the three fieldwork trips over the proposed development footprint areas was made to assess the impact of the proposed development on these identified archaeological and heritage sites. This overlay resulted in the following observations:

- **MGSP 4 (MGSP 17)** is located approximately 74m from the nearest development footprint. As a result, this site will not be included in this Heritage Impact Assessment;
- **MGSP 9** is located approximately 60m from the nearest development footprint. As a result, this site will not be included in this Heritage Impact Assessment
- **MGSP 12** is located approximately 46m from the nearest development footprint. As a result, this site will not be included in this Heritage Impact Assessment
- **MGSP 21** is located approximately 74m from the nearest development footprint. As a result, this site will not be included in this Heritage Impact Assessment
- **MGSP 3 (MGSP 8 or MGSP 33), MGSP 5 (MGSP 22), MGSP 7, and MGSP 11**, are located within the proposed development footprints and will be included in this Heritage Impact Assessment;

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

- The impact assessment methodology utilised in this section was provided by the client and is outlined and explained in more detail in **Section 3.2** of 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 **MGSP 5 (MGSP 22)**, **MGSP 7**, **MGSP 11**, **MGSP 12**, and **MGSP 21**.

With the above-mentioned as background, the sites that will be included in the impact assessment, are as follows:

- Graves and Burial Grounds: **MGSP 3**
- Homesteads with the Risk for Unmarked Graves: **MGSP 9**

- Stone Age Sites: **MGSP 4 (MGSP 17)**

In terms of the project phases, and without mitigation undertaken, all these sites are expected to be completely destroyed/impacted during the Construction Phase. With their destruction completed during the Construction Phase, no impacts are expected during the Operational and Decommissioning Phases.

8.2 Impact Assessment

8.2.1 Assessment of the Impact on Graves and Burial Grounds

In this section, the unmitigated and mitigated impact of the proposed development on sites **MGSP 3** will be assessed.

All six these sites are grouped together in this impact assessment as they are confirmed graves and burial grounds.

Table 14 - Assessment of the Impact on Burial Grounds and Graves.

Project phase	Construction			
Impact	Impact on Burial Grounds and Graves.			
Description of impact	Destruction of /Damage to Graves and Burial Grounds.			
Mitigability	High	Mitigation exists and will considerably reduce the significance of impacts		
Potential mitigation	See Chapter 9			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Permanent	Impact may be permanent, or in excess of 20 years	Medium term	Impact will last between 5 and 10 years
Extent	Municipal area	Impacts felt at a municipal level	Local	Extending across the site and to nearby settlements
Intensity	Very high	Natural and/ or social functions and/ or processes are majorly altered	Moderate	Natural and/ or social functions and/ or processes are moderately altered
Probability	Almost certain / Highly probable	It is most likely that the impact will occur	Probable	The impact has occurred here or elsewhere and could therefore occur
Confidence	High	Determination is based on common sense and general knowledge	Low	Judgement is based on intuition
Reversibility	Medium	The affected environmental will only recover from the	Medium	The affected environment will only recover from the impact with

		impact with significant intervention		significant intervention
Resource irreplaceability	High	The resource is irreparably damaged and is not represented elsewhere	Medium	The resource is damaged irreparably but is represented elsewhere
Significance	Moderate - negative		Minor - negative	
Comment on significance	All graves have high levels of emotional, religious and in some cases historical significance. As such the site is of Generally Protected A (GP. A) or High/Medium Significance . This indicates that the site may not be impacted upon without prior mitigation.			
Cumulative impacts	The cumulative impact on all Burial Grounds and Graves in the region is high. Mitigation measures as proposed in the HIA, and approved by SAHRA and the SAHRA BGG Unit, must be implemented in line with the NHRA 25 of 1999 and National Health Act regulations.			

8.3 Assessment of the Impact on Possible Graves and Homesteads with the Risk for Unmarked Graves

In this section, the unmitigated and mitigated impact of the proposed development on sites **MGSP 9**. These two site types are grouped together the existence of graves at these sites is a possible risk for both site types and had not been confirmed. This possible risk is included in the impact assessment calculations shown below.

It is expected that should the development proceed without any mitigation, these sites will be destroyed. In the table below, an assessment of the pre-mitigation and post-mitigation impacts is undertaken and calculated.

Table 15 - Assessment of the Impact on Possible Graves and Homesteads with the Risk for Unmarked Graves

Project phase	Construction and Operation			
Impact	Impact on Possible Graves and Homesteads with the Risk for Unmarked Graves			
Description of impact	Destruction of / Damage to Graves			
Mitigability	High	Mitigation exists and will considerably reduce the significance of impacts		
Potential mitigation	See Chater 9			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Permanent	Impact may be permanent, or in excess of 20 years	Medium term	Impact will last between 5 and 10 years
Extent	Municipal area	Impacts felt at a municipal level	Local	Extending across the site and to nearby settlements
Intensity	High	Natural and/ or social functions and/ or processes are notably altered	Low	Natural and/ or social functions and/ or processes are somewhat altered

Probability	Likely	The impact may occur.	Unlikely	Has not happened yet but could happen once in the lifetime of the project.
Confidence	Medium	Determination is based on common sense and general knowledge	Low	Judgement is based on intuition
Reversibility	High	The affected environmental will be able to recover from the impact	Medium	The affected environment will only recover from the impact with significant intervention
Resource irreplaceability	High	The resource is irreparably damaged and is not represented elsewhere	Medium	The resource is damaged irreparably but is represented elsewhere
Significance	Moderate - negative		Negligible - negative	
Comment on significance	The risk exists for graves to be located here. To address this risk, these sites are rated as Generally Protected B (GP. B) or Medium Significance . This indicates that the site may not be impacted upon without prior mitigation.			
Cumulative impacts	The cumulative impact on these sites are all in the region is medium to high. Mitigation measures as proposed in the HIA, and approved by SAHRA and the SAHRA BGG Unit, must be implemented in line with the NHRA 25 of 1999 and National Health Act regulations.			

8.4 Assessment of the Impact on Stone Age and Iron Age Sites

In this section, the unmitigated and mitigated impact of the proposed development on sites **MGSP 4 (MGSP 17)** will be assessed. This site types are grouped together as both sites represent archaeological sites of Medium Significance, the former being a Stone Age site and the latter an Iron Age site. It is expected that should the development proceed without any mitigation, these sites will be destroyed. In the table below, an assessment of the pre-mitigation and post-mitigation impacts is undertaken and calculated.

Table 16 - Assessment of the Impact on Stone Age Project phase	Construction				
Impact	Impact on Stone Age				
Description of impact	Destruction of /Damage to Stone Age				
Mitigability	High	Mitigation exists and will considerably reduce the significance of impacts			
Potential mitigation	See Chapter 9				
Assessment	Without mitigation			With mitigation	
Nature	Negative			Negative	
Duration	Permanent	Impact may be permanent, or in excess of 20 years	Medium term	Impact will last between 5 and 10 years	
Extent	Limited	Limited to the site and its immediate surroundings	Limited	Limited to the site and its immediate surroundings	
Intensity	Moderate	Natural and/ or social functions and/ or processes are moderately altered	Low	Natural and/ or social functions and/ or processes are somewhat altered	

Probability	Almost certain / Highly probable	It is most likely that the impact will occur	Unlikely	Has not happened yet but could happen once in the lifetime of the project, therefore there is a possibility that the impact will occur
Confidence	Medium	Determination is based on common sense and general knowledge	Medium	Determination is based on common sense and general knowledge
Reversibility	High	The affected environmental will be able to recover from the impact	High	The affected environmental will be able to recover from the impact
Resource irreplaceability	Medium	The resource is damaged irreparably but is represented elsewhere	Medium	The resource is damaged irreparably but is represented elsewhere
Significance	Moderate - negative		Negligible - negative	
Comment on significance	These sites are rated to be of Generally Protected B (GP. B) or Medium Significance . These sites may not be impacted upon without prior mitigation.			
Cumulative impacts	The cumulative impact on all the archaeological sites found in the region is high. Mitigation measures as proposed in the HIA, and approved by SAHRA, that reduce negative impacts on these sites must be implemented in line with the NHRA 25 of 1999.			

9 REQUIRED MITIGATION MEASURES

9.1 Introduction

In this chapter, required mitigation measures for each of the sites affected by the proposed

development are outlined.

As shown in **Chapter 8**, mitigation measures are required for the following sites:

- Graves and Burial Grounds: **MGSP 3**,
- Homesteads with the Risk for Unmarked Graves: **MGSP 9**
- Stone Age Sites: **MGSP 4 (MGSP 17)**

9.2 Required Mitigation Measures

9.2.1 Mitigation for Graves and Burial Grounds

These sites are **MGSP 3**

As cemeteries and graves have Medium to High Heritage Significance, the best option is to change the development footprint to allow for the *in situ* preservation of these sites. This can only be achieved if a buffer area of at least 100m between the proposed development footprints and the sites can be established. However, should it not be possible to preserve these sites *in situ*, the required mitigation measures are outlined below.

- A grave relocation process must be undertaken.
- A detailed social consultation process, at least 60 days in length, comprising the attempted identification of the next-of-kin in order to obtain their consent for the relocation.
- Bilingual site and newspaper notices indicating the intent of the relocation.
- Permits from all the relevant and legally required authorities.
- An exhumation process that keeps the dignity of the remains and family intact.
- An exhumation process that safeguards the legal rights of the families as well as that of the mining company.
- The process must be done by a reputable company well versed in the mitigation of graves.
-

9.2.2 Mitigation for Possible Graves and Homesteads with the Risk for Unmarked Graves

These sites are **MGSP 9**

The following initial mitigation measure is required:

- A social consultation process to assess whether any local residents or the wider public is aware of the presence of graves at these sites.

Depending on the outcome of the social consultation process, three different outcomes would be

the result, namely:

- Outcome 1: The social consultation absolutely confirms that no graves are located here.
- Outcome 2: The social consultation absolutely confirms that graves are located here.
- Outcome 3: The social consultation does not yield any confident results.

The following mitigation measures would be required for sites falling under Outcome 1:

- No further grave-related mitigation would be required.

The following mitigation measures would be required for sites falling under Outcome 2:

- A grave relocation process must be undertaken.
- A detailed social consultation process, at least 60 days in length, comprising the attempted identification of the next-of-kin in order to obtain their consent for the relocation.
- Bilingual site and newspaper notices indicating the intent of the relocation.
- Permits from all the relevant and legally required authorities.
- An exhumation process that keeps the dignity of the remains and family intact.
- An exhumation process that safeguards the legal rights of the families as well as that of the mining company.
- The process must be done by a reputable company well versed in the mitigation of graves.

The following mitigation measures would be required for sites falling under Outcome 3:

- Test excavations to physically confirm the presence or absence graves.
- If no evidence for graves is found, the site will fall within Outcome 1 as outlined above. This means that no further mitigation measures would be required.
- If evidence for graves is found, the site will fall within Outcome 2 as outlined above. This means that a full grave relocation process must be implemented.

Additionally, the following mitigation measures must be undertaken for all these sites:

- All structures and site layouts from each site must be recorded using standard survey methods. The end result would be site layout plans for all these sites.
- A mitigation report must be compiled for these sites within which all the mitigation measures and its findings will be outlined. The recorded drawings from the previous item must also be included in this mitigation report.
- The completed mitigation report must be submitted to the relevant heritage authorities.

9.2.3 Required Mitigation for Stone Age

These sites are **MGSP 4 (MGSP 17)**

The following mitigation measure is required for the six sites:

- The sites must be assessed in the field by a suitably qualified Stone Age specialist (for site **MGSP 4**).
- The recommendations made by the respective specialist for each site must be adhered to. Such recommendations may include archaeological excavation.

10 CONCLUSIONS AND RECOMMENDATIONS

10.1 Introduction

PGS was appointed by Zutari Pty (Ltd) to undertake an amendment HIA for a Proposed Solar PV Plant for the Mogalakwena Mine, situated near Mokopane, Limpopo Province. The study area is located on sections of the farm Armoede 823 LR and falls under the Mapela Traditional Authority and the Mogalakwena Local Municipality, Limpopo Province. The applicant is Anglo American Platinum (AAP).

10.2 General Desktop Study

An archival and historical desktop study was undertaken to provide a historic framework for the project area and surrounding landscape. This was augmented by a study of available historical and archival maps. The desktop study revealed that the surroundings of the study area is characterised by a long and significant history. The assessment of the available historical maps did not reveal the presence of any heritage features.

10.3 Palaeontology

Banzai Environmental (2022) was appointed by PGS Heritage (Pty) Ltd to conduct the Palaeontological Desktop Assessment (PDA) to assess the Mogalakwena Solar PV Project in Limpopo. To comply with the National Heritage Resources Act (No 25 of 1999, section 38) (NHRA), this PDA is necessary to confirm if fossil material could potentially be present in the planned mining area and to evaluate the impact of the proposed development on the Palaeontological Heritage.

The proposed PV development is surrounded by rocks of the Rustenburg Layered Suite and Lebowa Granite Suite of the Bushveld Complex, while the proposed PV facility is underlain by the Hout River Gneiss Suite (Archaean Granitoid Intrusions). The existing Sandsloot Substation and a portion of the eastern transmission line is underlain by the Malmani Subgroup (Chuniespoort Group of the Transvaal Supergroup). According to the PalaeoMap on the South African Heritage Resources Information System database, the Palaeontological Sensitivity of the Houtriver Gneiss Suite (Archaean Granitoid Intrusions) is zero as they are igneous in origin and thus unfossiliferous, while the Malmani Subgroup has a very high Palaeontological Sensitivity (Almond and Pether 2008, SAHRIS website). Groenewald and Groenewald 2014 allocated a high Sensitivity to the Malmani Subgroup. He noted that additionally to the stromatolites, potentially fossiliferous Late Caenozoic Cave breccias within the "Transvaal dolomite" outcrop area could be present. These breccias are not individually mapped on geological maps.

It is thus recommended that an EIA level palaeontology report must be conducted to assess the value and prominence of fossils in the the Malmani Subgroup of the development area and the effect of the proposed development on the palaeontological heritage. The purpose of the EIA

Report is to elaborate on the issues and potential impacts identified during the scoping phase. A Phase 1 field-based assessment would be conducted with research in the site-specific study area, as well as a comprehensive assessment of the impacts identified during the scoping phase (Butler, 2022).

This PDA report is annexed in full under **Appendix C**.

10.4 Associated Reports and Processes

PGS compiled a Heritage Screening Assessment for the same project in 2019. The study area for this 2019 screening study and the current report is in the same general area, however, it did not include all sections of the development as currently proposed. The screening level fieldwork was undertaken by an experienced team comprising professional archaeologist Polke Birkholtz and fieldwork assistant Derrick James. The fieldwork was undertaken on Wednesday, 2 October and Thursday, 3 October 2019 and was aimed at establishing whether any significant heritage resources are located within the study area. Despite the fact that only a screening level site visit was undertaken, the fieldwork resulted in the identification of five (5) sites (**MGSP 1 to MGSP 5**). The sites identified during the Heritage Screening Assessment include three Stone Age sites (**MGSP 1, MGSP 2 and MGSP 4**), one possible grave site (**MGSP 3**) (which turned out to be a grave), and one historic structure (**MGSP 5**).

PGS was appointed in 2020 to undertake a Heritage Scoping Assessment for the project. Intensive walkthroughs were undertaken over the course of several days by an experienced archaeological fieldwork team consisting of an archaeologist (Cherene de Bruyn) and a field technician (Thomas Mulaudzi). The fieldwork was undertaken from Monday, 21 September 2020 to Wednesday, 23 September 2020. It resulted in the identification of a total of seven (7) additional sites. These were numbered from **MGSP 6 to MGSP 12**. The sites identified during the Heritage Scoping Assessment include farming-related structures such as water troughs and reservoirs (**MGSP 6, MGSP 7 and MGSP 11**), graves and burial grounds (**MGSP 8**), homesteads where the risk for unmarked graves exist (**MGSP 9 and MGSP 10**), and a contemporary shed (**MGSP 12**). It is important to note that site **MGSP 8** identified during the Scoping Assessment is the same site as **MGSP 3** identified during the Screening Assessment.

The Fieldwork for the HIA was undertaken by two archaeologists (Cherene de Bruyn and Michelle Sachse) and a field assistant (Tshepo Sambo) over several days from Wednesday, 2 June 2021 to Thursday 3 June 2021, with a second site visit undertaken by Michelle Sachse and Tshepo Sambo on Monday 7 June 2021. The fieldwork undertaken resulted in the identification of a total of twenty-one (21) sites. These were numbered from **MGSP 13 to MGSP 33**. The reason for this is that the same numbering system as the one used for the 2019 screening and 2020 scoping projects was used for the current study.

The sites identified during the recent fieldwork include five Stone Age sites (**MGSP 13, MGSP 14, MGSP 15, MGSP 16 and MGSP 17**), two Iron Age sites (**MGSP 18 and MGSP 19**), one homestead with the risk for unmarked graves (**MGSP 20**), one farming-related structure (**MGSP 21**), one historic structure (**MGSP 22**), four possible graves (**MGSP 23, MGSP 24, MGSP 25 and MGSP 31**), and seven sites comprising graves and burial grounds (**MGSP 26, MGSP 27, MGSP 28, MGSP 29, MGSP 30, MGSP 32 and MGSP 33**).

It is important to note that site **MGSP 33** identified during the Heritage Impact Assessment, is the same site as **MGSP 8** identified during the Heritage Scoping Assessment, which in turn is the same site as **MGSP 3** identified during the Screening Assessment. Similarly, site **MGSP 17** identified during the Heritage Impact Assessment is the same site as **MGSP 4** identified during the Screening Assessment. Lastly, site **MGSP 22** identified during the Heritage Impact Assessment is the same site as **MGSP 5** identified during the Screening Assessment. As a result, three of the 23 sites identified during the Heritage Impact Assessment were previously identified during the Screening and Scoping Assessments. This means that a total of 17 previously unrecorded sites were identified during the fieldwork for the Impact Assessment.

10.5 Fieldwork

The fieldwork component of the amendment study was aimed at assessing all the amended footprint areas currently proposed and which had not been assessed during the fieldwork of the screening and scoping phases. The aim of all this fieldwork was to identify tangible remains of archaeological, historical and heritage significance. The fieldwork was undertaken by way of intensive walkthroughs of the areas which had not been addressed before as well as additional areas. The fieldwork was undertaken by two archaeologists (Cherene de Bruyn and Michelle Sachse on Wednesday, 8 June 2022). Four (4) sites, that were previously recorded fell within the amended footprint (**MGSP 3, MGSP 5/ MGSP 22, MGSP 7, & MGSP 11**), while four (4) sites fell within a 100m of the proposed amended footprint boundary (**MGSP 4/ MGSP 17, MGSP 9, MGSP 12 & MGSP 21**).

Throughout the fieldwork, hand-held GPS devices were used to record the tracklogs showing the routes followed by the two archaeological fieldwork teams. It is important to note that although as intensive a fieldwork coverage as possible was undertaken, sections of the study area are located in areas which are densely overgrown, which limited accessibility and visibility in those areas of the study area. No additional heritage sites were found.

10.6 Impact Assessment and Mitigation

An overlay of all the archaeological and heritage sites identified during the three fieldwork trips over the proposed development footprint areas was made to assess the impact of the proposed development on these identified archaeological and heritage sites.

Using this information, both pre-mitigation and post-mitigation impact assessments were undertaken. Please refer to **Chapter 8** for the impact assessment calculations. A series of site-specific mitigation measures are outlined in **Chapter 9** of this report.

10.7 General Recommendations

The following general recommendations must be implemented:

- An archaeological watching brief is required during construction activities.
- The sections of the two transmission line corridors not covered during the present fieldwork (refer **Section 1.3 Assumptions and Limitations**) must be assessed in the field as soon as possible to allow for the mitigation of any sites located there before construction commences.

10.8 Conclusions

The unmitigated impact of the proposed development is expected to result in negative impacts of Medium to High significance in terms of the identified heritage fabric of the study area. With mitigation successfully completed, the impact of the proposed development on the identified heritage sites will result in negative impacts of Low to Medium significance. As a result, on the condition that the recommendations made in this report are adhered to, no heritage reasons can be given for the development not to continue.

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10.3 Historical Topographic Maps

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10.4 Internet

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<https://screening.environment.gov.za/screeningtool/>

www.sahistory.org.za

www.sanbi.org

www.wikipedia.org

10.5 Google Earth

At least some of the aerial depictions of the study area were obtained using Google Earth.

Appendix A
HERITAGE MANAGEMENT GUIDELINES

1. **General Management Guidelines**

1. The National Heritage Resources Act (Act 25 of 1999) states that, any person who intends to undertake a development categorised as-
 - (a) the construction of a road, wall, transmission line, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;
 - (b) the construction of a bridge or similar structure exceeding 50m in length;
 - (c) any development or other activity which will change the character of a site-
 - (i) exceeding 5 000 m² in extent; or
 - (ii) involving three or more existing erven or subdivisions thereof; or
 - (iii) involving three or more erven or divisions thereof which have been consolidated within the past five years; or
 - (iv) the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority;
 - (d) the re-zoning of a site exceeding 10 000 m² in extent; or
 - (e) any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority, must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development.

In the event that an area previously not included in an archaeological or cultural resources survey is to be disturbed, the SAHRA needs to be contacted. An enquiry must be lodged with them into the necessity for a Heritage Impact Assessment.

2. In the event that an additional heritage assessment is required, it is advisable to utilise a qualified heritage practitioner, preferably registered with the Cultural Resources Management Section (CRM) of the Association of Southern African Professional Archaeologists (ASAPA). This survey and evaluation must include:
 - (a) The identification and mapping of all heritage resources in the area affected;
 - (b) An assessment of the significance of such resources in terms of the heritage assessment criteria set out in section 6 (2) or prescribed under section 7 of the National Heritage Resources Act;
 - (c) An assessment of the impact of the development on such heritage resources;
 - (d) An evaluation of the impact of the development on heritage resources relative to the sustainable social and economic benefits to be derived from the development;
 - (e) The results of consultation with communities affected by the proposed development and other interested parties regarding the impact of the development on heritage resources;

- (f) If heritage resources will be adversely affected by the proposed development, the consideration of alternatives; and
 - (g) Plans for mitigation of any adverse effects during and after the completion of the proposed development.
3. In the event that a possible find is discovered during construction, the following steps must be taken:
- (a) All activities must be halted in the area of the discovery and a qualified archaeologist contacted;
 - (b) The archaeologist needs to evaluate the finds on site and make recommendations towards possible mitigation measures;
 - (c) If mitigation is necessary, an application for a rescue permit must be lodged with SAHRA; and
 - (d) After mitigation, an application must be lodged with SAHRA for a destruction permit. This application must be supported by the mitigation report generated during the rescue excavation. Only after the permit is issued may such a site be destroyed.
4. In the case where a grave is identified during construction, the following measures must be taken:
- a. Upon the accidental discovery of graves, a buffer of at least 20 meters should be implemented;
 - b. If graves are accidentally discovered during construction, activities must cease in the area and a qualified archaeologist be contacted to evaluate the find;
 - c. To remove the remains, a permit must be applied for from SAHRA and other relevant authorities. The local South African Police Services must immediately be notified of the find; and
 - d. Where it is recommended that the graves be relocated, a full grave relocation process that includes a comprehensive social consultation must be followed. Such a grave relocation process must include the following:
 - (i) A detailed social consultation process that aims to trace the next-of-kin and obtain their consent for the relocation of the graves, that will be at least 60 days in length;
 - (ii) Site notices indicating the intent of the relocation;
 - (iii) Newspaper notices indicating the intent of the relocation;
 - (iv) Permits from the relevant permitting authorities, including the local authority; the Provincial Department of Health; the South African Heritage Resources Agency (SAHRA) (if the graves are older than 60 years or unidentified and thus presumed older than 60 years) etc.

- (vii) An exhumation process that keeps the dignity of the remains intact;
- (viii) The whole process must be done by a reputable company that is well versed in relocations; and
- (ix) The exhumation process must be conducted in such a manner as to safeguard the legal rights of the families as well as that of the mining company.

PGS Heritage can be contacted on the way forward in this regard.

Table 17: Roles and responsibilities of archaeological and heritage management.

ROLE	RESPONSIBILITY	IMPLEMENTATION
A responsible specialist needs to be allocated and should attend all relevant meetings, especially when changes in design are discussed, and liaise with SAHRA.	The client	Archaeologist and a competent archaeological support team
If chance finds and/or graves or burial grounds are identified during construction or operational phases, a specialist must be contacted for evaluation.	The client	Archaeologist and a competent archaeological support team
Comply with defined national and local cultural heritage regulations on management plans for identified sites.	The client	Environmental Consultancy and the Archaeologist
Consult the managers, local communities and other key stakeholders on mitigation of archaeological sites.	The client	Environmental Consultancy and the Archaeologist
Implement additional programs, as appropriate, to promote the safeguarding of our cultural heritage.	The client	Environmental Consultancy and the Archaeologist
If required, conservation or relocation of burial grounds and/or graves according to the applicable regulations and legislation.	The client	Archaeologist, and/or competent authority for relocation services
Ensure that recommendations made in the Heritage Report are adhered to.	The client	The client
Provision of services and activities related to the management and monitoring of significant archaeological sites.	The client	Environmental Consultancy and the Archaeologist
After the specialist/archaeologist has been appointed, comprehensive feedback reports should be submitted to relevant authorities during each phase of development.	Client and Archaeologist	Archaeologist

PROFESSIONAL CURRICULUM VITAE

FOR POLKE DOUSSY BIRKHOLTZ

Name: *Polke Doussy Birkholtz*

Date & Place of Birth: *9 February 1975 – Klerksdorp, North West Province, South Africa*

Place of Tertiary Education & Dates Associated:

Institution: University of Pretoria

Qualification: BA (Cum Laude) - Bachelor of Arts Specializing in Archaeology, History & Anthropology

Date: 1996

Institution: University of Pretoria

Qualification: BA Hons (Cum Laude) - Bachelor of Arts with Honours Degree Specializing in Archaeology

Date: 1997

Qualifications:

BA - Degree specialising in Archaeology, History and Anthropology

BA Hons - Professional Archaeologist

Memberships:

Association of Southern African Professional Archaeologists (ASAPA)

Professional Member of the CRM Section of ASAPA

Overview of Post Graduate Experience:

1997 – 2000 – Member/Archaeologist – Archaeo-Info

2001 – 2003 – Archaeologist/Heritage Specialist – Helio Alliance

2000 – 2008 – Member/Archaeologist/Heritage Specialist – Archaeology Africa

2003 - Present – Director / Archaeologist / Heritage Specialist – PGS Heritage

Languages: English: Speak, Read & Write & Afrikaans: Speak, Read & Write

Total Years' Experience: 20 Years

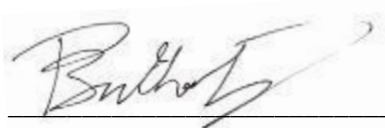
Experience Related to the Scope of Work:

- Polke has worked as a **HERITAGE SPECIALIST / ARCHAEOLOGIST / HISTORIAN** on more than 300 projects and acted as **PROJECT MANAGER** on almost all of these projects. His experience includes the following:
 - Development of New Sedimentation and Flocculation Tanks at Rand Water's Vereeniging Pumping Station, Vereeniging, Gauteng Province. Heritage Impact Assessment for *Greenline*.
 - EThekweni Northern Aqueduct Project, Durban, KwaZulu-Natal. Heritage Impact Assessment for *Strategic Environmental Focus*.
 - Johannesburg Union Observatory, Johannesburg, Gauteng Province. Heritage Inventory for *Holm Jordaan*.
 - Development at Rand Water's Vereeniging Pumping Station, Vereeniging, Gauteng Province. Heritage Impact Assessment for *Aurecon*.
 - Comet Ext. 8 Development, Boksburg, Gauteng Province. Phase 2 Heritage Impact Assessment for *Urban Dynamics*.
 - Randjesfontein Homestead, Midrand, Gauteng Province. Baseline Heritage Assessment with Nkosinathi Tomose for Johannesburg City Parks.
 - Rand Leases Ext. 13 Development, Roodepoort, Gauteng Province. Heritage Impact Assessment for *Marsh*.
 - Proposed Relocation of the Hillendale Heavy Minerals Plant (HHMP) from Hillendale to Fairbreeze, KwaZulu-Natal. Heritage Impact Assessment for *Goslar Environmental*.
 - Portion 80 of the farm Eikenhof 323 IQ, Johannesburg, Gauteng Province. Heritage Inventory for *Khare Incorporated*.
 - Comet Ext. 14 Development, Boksburg, Gauteng Province. Heritage Impact Assessment for *Marsh*.
 - Rand Steam Laundries, Johannesburg, Gauteng Province. Archival and Historical Study for *Impendulo* and *Imperial Properties*.
 - Mine Waste Solutions, near Klerksdorp, North West Province. Heritage Inventory for *AngloGold Ashanti*.
 - Consolidated EIA and EMP for the Kroondal and Marikana Mining Right Areas, North West Province. Heritage Impact Assessment for *Aquarius Platinum*.
 - Wilkoppies Shopping Mall, Klerksdorp, North West Province. Heritage Impact Assessment for the *Center for Environmental Management*.
 - Proposed Vosloorus Ext. 24, Vosloorus Ext. 41 and Vosloorus Ext. 43 Developments, Ekurhuleni District Municipality, Gauteng Province. Heritage Impact Assessment for *Enkanyini Projects*.
 - Proposed Development of Portions 3, 6, 7 and 9 of the farm Olievenhoutbosch 389 JR, City of Tshwane Metropolitan Municipality, Gauteng Province. Heritage Impact Assessment for *Marsh*.
 - Proposed Development of Lotus Gardens Ext. 18 to 27, City of Tshwane Metropolitan Municipality, Gauteng Province. Heritage Impact Assessment for *Pierre Joubert*.

- Proposed Development of the site of the old Vereeniging Hospital, Vereeniging, Gauteng Province. Heritage Scoping Assessment for *Lekwa*.
- Proposed Demolition of an Old Building, Kroonstad, Free State Province. Phase 2 Heritage Impact Assessment for *De Beers Consolidated Mines*.
- Proposed Development at Westdene Dam, Johannesburg, Gauteng Province. Heritage Impact Assessment for *Newtown*.
- West End, Central Johannesburg, Gauteng Province. Phase 1 Heritage Impact Assessment for the *Johannesburg Land Company*.
- Kathu Supplier Park, Kathu, Northern Cape Province. Heritage Impact Assessment for *Synergistics*.
- Matlosana 132 kV Line and Substation, Stilfontein, North West Province. Heritage Impact Assessment for *Anglo Saxon Group* and *Eskom*.
- Marakele National Park, Thabazimbi, Limpopo Province. Cultural Resources Management Plan for *SANParks*.
- Cullinan Diamond Mine, Cullinan, Gauteng Province. Heritage Inventory for *Petra Diamonds*.
- Highveld Mushrooms Project, Pretoria, Gauteng Province. Heritage Impact Assessment for *Mills & Otten*.
- Development at the Reserve Bank Governor's Residence, Pretoria, Gauteng Province. Archaeological Excavations and Mitigation for the *South African Reserve Bank*.
- Proposed Stones & Stones Recycling Plant, Johannesburg, Gauteng Province. Heritage Scoping Report for *KV3*.
- South East Vertical Shaft Section of ERPM, Boksburg, Gauteng Province. Heritage Scoping Report for *East Rand Proprietary Mines*.
- Proposed Development of the Top Star Mine Dump, Johannesburg, Gauteng Province. Detailed Archival and Historical Study for *Matakoma*.
- Soshanguve Bulk Water Replacement Project, Soshanguve, Gauteng Province. Heritage Impact Assessment for *KWP*.
- Biodiversity, Conservation and Participatory Development Project, Swaziland. Archaeological Component for *Africon*.
- Camdeboo National Park, Graaff-Reinet, Eastern Cape Province. Cultural Resources Management Plan for *SANParks*.
- Main Place, Central Johannesburg, Gauteng Province. Phase 1 Heritage Impact Assessment for the *Johannesburg Land Company*.
- Modderfontein Mine, Springs, Gauteng Province. Detailed Archival and Historical Study for *Consolidated Modderfontein Mines*.
- Proposed New Head Office for the Department of Foreign Affairs, Pretoria, Gauteng Province. Heritage Impact Assessment for *Holm Jordaan Group*.
- Proposed Modification of the Lukasrand Tower, Pretoria, Gauteng Province. Heritage Assessment for *IEPM*.

- Proposed Road between the Noupoort CBD and Kwazamukolo, Northern Cape Province. Heritage Impact Assessment for *Gill & Associates*.
- Proposed Development at the Johannesburg Zoological Gardens, Johannesburg, Gauteng Province. Detailed Archival and Historical Study for *Matakoma*.
- Polke's **KEY QUALIFICATIONS:**
 - Project Management
 - Archaeological and Heritage Management
 - Archaeological and Heritage Impact Assessment
 - Archaeological and Heritage Fieldwork
 - Archival and Historical Research
 - Report Writing
- Polke's **INFORMATION TECHNOLOGY EXPERIENCE:**
 - *MS Office – Word, Excel, & Powerpoint*
 - *Google Earth*
 - *Garmin Mapsource*
 - *Adobe Photoshop*
 - *Corel Draw*

I, Polke Doussy Birkholtz, hereby confirm that the above information contained in my CV is true and correct.



PD Birkholtz

14 June 2021

Date

PROFESSIONAL CURRICULUM VITAE FOR CHERENE DE BRUYN

Professional Archaeologist for PGS Heritage

2016-2017	MA in Archaeology University College London, United Kingdom
2015	BSC Honours in Physical Anthropology, University of Pretoria, South Africa
2013	BA Honours in Archaeology University of Pretoria, South Africa
2010-2012	BA (General)

PROFESSIONAL QUALIFICATIONS:

- Association of Southern African Professional Archaeologists - Professional Member (#432)
- International Association for Impact Assessment South Africa - Member (#6082)
- Association of Southern African Professional Archaeologists - CRM Accreditation
 - Principal Investigator: Grave relocation
 - Field Director: Colonial period archaeology, Iron Age archaeology
 - Field Supervisor: Rock art, Stone Age archaeology
 - Laboratory Specialist: Human Skeletal Remains
- KZN Amafa and Research Institute - Accredited Professional Heritage Practitioner

Languages:

Afrikaans & English

SUMMARY OF EXPERIENCE

Expertise in Heritage Impact Assessment Management, Historical and Archival Research, Archaeology, Physical Anthropology, Grave Relocations, Fieldwork, Geographic Information Systems and Project Management including *inter alia* -

Involvement in various grave relocation projects

- Grave exhumation, test excavations and grave “rescue” excavations in the various provinces of South Africa.
- Permit applications with SAHRA BGG and AMAFA, including relevant Municipalities and Authorities for grave relocation projects.

Involvement with various Heritage Impact Assessments,

- Heritage Impact Assessments and Management for various projects within Eastern Cape, Free State, Gauteng, KwaZulu-Natal, Limpopo, Mpumalanga, Northern Cape, North West and Western Cape Province.
- Archaeological Walkdowns for various projects.
- Instrument Survey and recording for various projects.
- Desktop, archival and heritage screening for projects.

INFORMATION TECHNOLOGY EXPERIENCE:

- MS Office – Word, Excel, Publisher & Powerpoint
- Google Earth
- QGIS, ArcGIS Online, ArcGIS Collector
- Inkscape

Heritage Assessment Projects

Below a selected list of Heritage Impact Assessments (HIA) Projects involvement:

- Heritage Management Plan for the proposed development of the 305MW Oya solar photovoltaic (PV) facility and associated infrastructure near Matjiesfontein, Western Cape.
- Heritage Impact Assessment for the Proposed Township Establishment on the Remainder of Portion 8 of the Farm Boschoek 103 JQ, near Boschoek, North West Province.
- The Proposed Irenedale Water Pipeline Between Bosjesspruit Colliery And A Local Reservoir, Located In The Lekwa Local Municipality And The Govan Mbeki Local Municipality, Gert Sibande District Municipality, Mpumalanga Province.
- Heritage Impact Assessment for the proposed development of the Msobo Coal Tselentis Colliery: Albion Opencast project, Near Breyten, Mpumalanga Province.

- Heritage Impact Assessment for the proposed development of an Airport For Kolomela Mine In Postmasburg, Northern Cape.
- Heritage Impact Assessment for the Proposed South African Coal Estates (SACE) Clydesdale Pit Project, near Emalahleni, Mpumalanga Province.
- Heritage Impact Assessment for the Amendment of the Mogalakwena Mine Expansion Project, near Mokopane, Limpopo Province.
- Heritage Impact Assessment for the Mogalakwena Mine Integrated Permitting Project near Mokopane, Limpopo Province.
- Heritage Impact Assessment for the Proposed Solar PV Plant at Armoede, near Mokopane, Limpopo Province.
- Heritage Impact Assessment for the Proposed New Cargo Precinct For The O.R. Tambo International Airport On The Farm Witkoppe 64, Gauteng Province.
- Heritage Impact Assessment for the upgrade of road d4407 between Hluvukani and Timbavati, road d4409 at Welverdiend and road d4416/2 between Welverdiend and road P194/1 in the Bohlabela region of the Mpumalanga Province.
- Heritage Impact Assessment for the proposed Piggery on Portion 46 of the farm Brakkefontien 416, within the Nelson Mandela Bay Municipality, Eastern Cape.
- Heritage Impact Assessment for proposed development On Erf 30, Letamo Town, Farm Honingklip 178 Iq, Mogale Local Municipality, Gauteng Province.

Grave Relocation Projects

Below, a selection of grave relocation projects involvement:

- Report On Test Excavations. Ivn_078 Maruma Graves, Farm Turfspruit 241 Kr, Mokopane, Limpopo Province. Test Excavation Of Possible Burial Ground As Identified By The Maruma Family.
- Relocation Of Two Infant Graves From The Farm Wonderfontein 428 Js, Belfast, Mpumalanga Province.
- Relocation Of Approximately 4 Stillborn Graves From Farm Wonderfontein 428 Js, Umsimbithi Mining (Pty) Ltd, Belfast, Chief Albert Luthuli Local Municipality, Mpumalanga Province.

EMPLOYMENT SUMMARY:

Positions Held

- 2020 – to date: Archaeologist - PGS Heritage (Pty) Ltd
- 2018 – 2019: Manager of the NGT ESHS Heritage Department – NGT Holdings (Pty) Ltd
- 2015-2016: Archaeologist and Heritage Consultant – NGT Holdings (Pty) Ltd
- 2015-2016: Archaeological Contractor - BA3G, University of Pretoria
- 2014 – 2015: DST-NRF Archaeological Intern, Forensic Anthropological Research Centre

Appendix C

Palaeontological Desktop Assessment