



NGT ESHS Solutions

PROJECT TITLE:

BASIC ASSESSMENT REPORT AND ENVIRONMENTAL MANAGEMENT PROGRAMME FOR THE PROSPECTING RIGHT AND ENVIRONMENTAL AUTHORISATION FOR THE PROPOSED BIEN VENUE PROJECT ON THE FARMS: BIEN VENUE 255 JU (PORTION 0, 2 AND 3); THREE SISTERS 254 JU (REMAINING EXTENT); THREE SISTERS 254 JU (REMAINING EXTENT); THREE SISTERS 256 JU (PORTION 1) AND THREE SISTERS 262 JU (REMAINING EXTENT) IN NEAR BARBERTON, WITHIN THE CITY OF MBOMBELA LOCAL DISTRICT, MPUMALANGA, SOUTH AFRICA

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SPECIALIST REPORT:

Heritage Impact Assessment for the proposed prospecting rights application and environmental authorisation for the Bien Venue 255 JU (Portion 0, 2 And 3); Three Sisters 254 JU (Remaining Extent); Three Sisters 254 JU (Remaining Extent); and Three Sisters 256 JU (Portion 1) farms near Barberton, within the city of Mbombela Local District, Mpumalanga, South Africa.

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NGT ESHS Solutions takes full responsibility for its specialists working on the project for all heritage related matters based on the information provided by the clients. NGT ESHS Solutions will not be responsible for any changes in design or changes in the nature of prospecting of the proposed project. Furthermore, any changes to the scope of works that may require significant amendments to the current heritage document will result in alteration of the fee schedule agreed upon with Sunshine.

DECLARATION OF INDEPENDENCE

Miss. Cherene de Bruyn for NGT ESHS Solutions has compiled this report (See Appendix 1). The views expressed in this report are entirely those of the author and no other interest was displayed during the decision-making process for the project.

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EXECUTIVE SUMMARY

NGT ESHS Solutions (an independent subsidiary of NGT Holdings) was appointed by NGT on behalf of Sunshine to conduct an HIA study for the proposed Prospecting Rights Application and environmental authorisation on farms: Bien Venue 255 JU (Portion 0, 2 and 3); Three Sisters 254 JU (Remaining Extent); Three Sisters 254 JU (Remaining Extent); Three Sisters 256 JU (Portion 1) and; Three Sisters 262 JU (Remaining Extent) near Barberton, within the Nkomazi Local Municipality (NLM) and the city of Mbombela Local District (CoMLD), Mpumalanga Province, South Africa. The survey for the current HIA report took place on **Portion 3 of the Farm Bien Venue 255 JU**, an area previously prospected by Anglo American between 1978-1986, and from 1990 to 1991 by Gencor. The HIA forms part of the BAR and it also informs the EMPr report on the management and conservation of cultural heritage resources. This study is conducted independently in terms of Section 38 (3) of the National Heritage Resources Act (NHRA), No. 25 of 1999.

The standard NGT ESHS Solutions HIA study process entailed conducting a detailed background information search of the receiving environment. The search assesses among other forms of data, previous studies conducted in and around the proposed study area or the development area. This also includes conducting an on-site investigation (survey) to identify and map out heritage resources on-site and assess impacts of the proposed development on the identified heritage resources. Recommendations are then made with regards to how the identified heritage resources should be managed and/or mitigated to avoid being negatively impacted by development activities. Furthermore, recommendations are made on how the positive project benefits can be enhanced, to ensure a long-term strategy for the conservation and promotion of heritage resources, if any are found.

The survey of the project area was conducted on Wednesday, the 7th of November 2018. The survey was conducted by Miss. Cherene de Bruyn (Archaeologist and Heritage Consultant – NGT ESHS Solutions) and Mr. Yanga Kolisi (Junior Environmental and Social Consultant-NGT ESHS Solutions) assisted by Mr. Nkosinathi Tomose (Executive Director and Principal Consultant– NGT). The survey was conducted on foot. A vehicle was also used to access the site. In terms of the South African Heritage and Resources Agency (SAHRA) Paleontological Sensitivity Layer the area falls within a region defined as low, therefore no palaeontological study is required however a fossil finds protocol for these finds is required.

Based on the results of literature review, field survey and the assessment of identified heritage resources the following conclusions and recommendations are made in terms of the National Heritage Act about the proposed development:

Conclusions:

- It is concluded that the project is located in a region (Mpumalanga Province) that is rich in archaeology and heritage resources.
- The following resources were identified within the receiving environment:
 - TSHR-01 (Upper Grinding Stone) and TSHR-02 (Lower Grinding stone). These stones most likely date to the Late Iron Age (LIA) and are of heritage significance. However, these artefacts are of low density and are out of primary context within a dilapidated camping cottage where they would have been used for decoration purposes and cannot be characterised as a site.
 - Two stoneware jars (TSHR-03) dating to the Historical Period Circa late 19th to the early 20th century (Lastovica & Lastovica 1990). Stoneware jars are often associated with storing of food, ink and chemicals (Lastovica & Lastovica 1990; Klose & Malan 2000). However, these jars are of low density and are out of primary context within a dilapidated camping cottage where they would have been used for decoration purposes and cannot be characterised as a site.
 - Two building structures, a recent dilapidated camping cottage and associated outbuilding were identified at TSHR-04. The two buildings were used as part of the Mbayane Bush Experience Camp. The camp has, however been abandoned and all structure are in a state of disrepair. The two buildings are less than 60 years old having been built by the son of the farm owner and they do not have any heritage value. In the cottage, ox wagon wheels are modified and used as windows. Ox wagon wheels are very rare and considered to be of important heritage value.
- Based on the above findings it is concluded that there proposed prospecting area did not contain any archaeological, heritage resources such as burial grounds and historic built environment and landscape features with exception to artefacts and objects found within Mbayane Bush Experience Camp.

- However, some archaeological, historic resources and unmarked graves are subterranean in nature and might not have been identified during the survey due to the fact that they are located underneath the earth surface.
- According to the SAHRA Paleo-Sensitivity Layer, the proposed prospecting right area is situated in an area of Low Palaeontological Sensitivity. It is therefore concluded that the proposed prospecting activities will not negatively impact on palaeontological resources.
- It is concluded that the proposed prospecting activities, later mining activities, will not have an impact on the heritage and archaeological resources in the broader Barberton area.

Recommendations:

The following recommendations are made with regards to artefacts and objects found on Mbayane Bush Experience Camp, based on an understanding that the camp is a private property and artefacts found within the camp are private collection.

- It is recommended that for:
 - The farm owner should consider donating the Upper Grinding Stone (TSHR-01) and Lower Grinding stone (TSHR-02) found on his property to a nearby museum or research institution. The Barberton Museum or University of Pretoria would be ideal repository centres.
 - The farm owner should consider donating the two stoneware jars (TSHR-03) found on his property to a nearby museum or research institution. The Barberton Museum or University of Pretoria would be ideal repository centres.
 - TSHR-04 (Bush Camp): None of the buildings have heritage value, however the ox wagon wheels that were used as windows are of cultural significance. The farm owner should consider salvaging these very rare objects and possible donating to a museum or research institution.
- Although a thorough survey was conducted some archaeological material, including artefacts and unmarked graves can be buried underground and as such, may not have been identified during the survey. In the case where the proposed development activities such as trenching bring these materials to the surface, they should be treated as **Chance Finds**. Should such resources be unearthed it is recommended that, the development activities be stopped immediately, and an archaeologist should be contacted to conduct a site visit, assess the finds and make

recommendations on how they should be mitigated. SAHRA and MHRA should also be informed immediately on such finds.

- In terms of the SAHRA Paleontological Sensitivity Layer the area falls within an area of Low Palaeontological Sensitivity area. As such no palaeontological study is required, the attached protocol for finds is supplied (*Appendix 2*).
- It is recommended that both the SAHRA and the MHRA grant the project a **Positive Review Comment** and allow the proposed prospecting rights application on the farms Bien Venue and Three Sisters and the application for environmental authorisation proceed as planned.

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LIST OF ABBREVIATIONS

ACRONYMS	DESCRIPTION
AUTHORITIES	
ASAPA	Association of South African Professional Archaeologists
CoMLD	City of Mbombela Local District
MHRA	Mpumalanga Heritage Resources Authority
NGT	Nurture, Grow, Treasure
NGT ESHS	NGT Environmental, Social and Heritage Sustainability Solutions
NLM	Nkomazi Local Municipality
SADC	Southern African Developing Community
SAHRA	South African Heritage Resources Agency
DISCIPLINE	
AIA	Archaeological Impact Assessment
BAR	Basic Assessment Report
ESA	Early Stone Age
EIAs	Environmental Impact Assessment
EMPr	Environmental Management Programme
EIA	Early Iron Age
Ha	Hectares
HIA	Heritage Impact Assessment
LIA	Late Iron Age
LSA	Late Stone Age
MIA	Middle Iron Age
MSA	Middle Stone Age
RQC	Review and Quality Control
SAHRIS	South African Heritage Resources Information System
TSHR	Three Sisters Heritage Resources
LEGAL	
NEMA	National Environmental Management Act
NHRA	National Heritage Resources Act

TERMS AND DEFINITIONS

Archaeological resources

These include:

- Material remains resulting from human activities 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.

Palaeontological

This means 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.

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 the 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.

Heritage resources: This means any place or object of cultural significance

1. INTRODUCTION

1.1. Background Information of Project

NGT was appointed by Sunshine Minerals to manage the environment process for the proposed Prospecting Rights Application on the following farms: Bien Venue 255 JU (Portion 0, 2 and 3); Three Sisters 254 JU (Remaining Extent); Three Sisters 254 JU (Remaining Extent); Three Sisters 256 JU (Portion 1), and; Three Sisters 262 JU (Remaining Extent) (*Figure 1*). NGT appointed its independent subsidiary to conduct an HIA as part of specialist studies required for the environmental authorisation for the proposed Prospecting Right Application. The study area is located near Barberton, within NLM and the CoMLD, Mpumalanga Province, South Africa. It covers a total area of approximately 4 689.74 hectares (ha). The objective of the proposed prospecting project is to explore and quantify the potential of mineral resources in the area. The survey for the current study took place on **Portion 3 of the Farm Bien Venue 255 JU** (*Figure 2*); this is the same area where historic prospecting activities by Anglo American Prospecting Services took place during the period 1978-1986, and from 1990 to 1991 by Gencor (*Figures 2 and 3*).

The applied method for the proposed prospecting activities will include a combination of both non-invasive and invasive process (*Table 1*).

Table 1: Project specific non-invasive and invasive process prospecting activities

NON-INVASIVE PROSPECTING ACTIVITIES	INVASIVE PROSPECTING ACTIVITIES
Database map generation and development of geological models	Sampling of trenches (with a total maximum combined length of 87 metres)
Logging and sampling of historical core (if available)	
Follow-up mapping (detailed mapping)	
Data manipulation and provisional modelling	
Finalisation of geological models and start of resource calculations	
Finalisation of resource calculations	
Scoping and feasibility studies	
Bankable feasibility study and finalisation	

The HIA investigates the potential impacts of the proposed project activities which will include invasive (e.g. trenching) and non-invasive methods on any heritage resources identified within the receiving environment such as archaeological artefacts, burial grounds and historical features of the built environment. The overall objective of the HIA is to give advice on the management of the heritage resources in and around the proposed project area in terms of known heritage resources management measures in line with the NHRA, No. 25 of 1999.

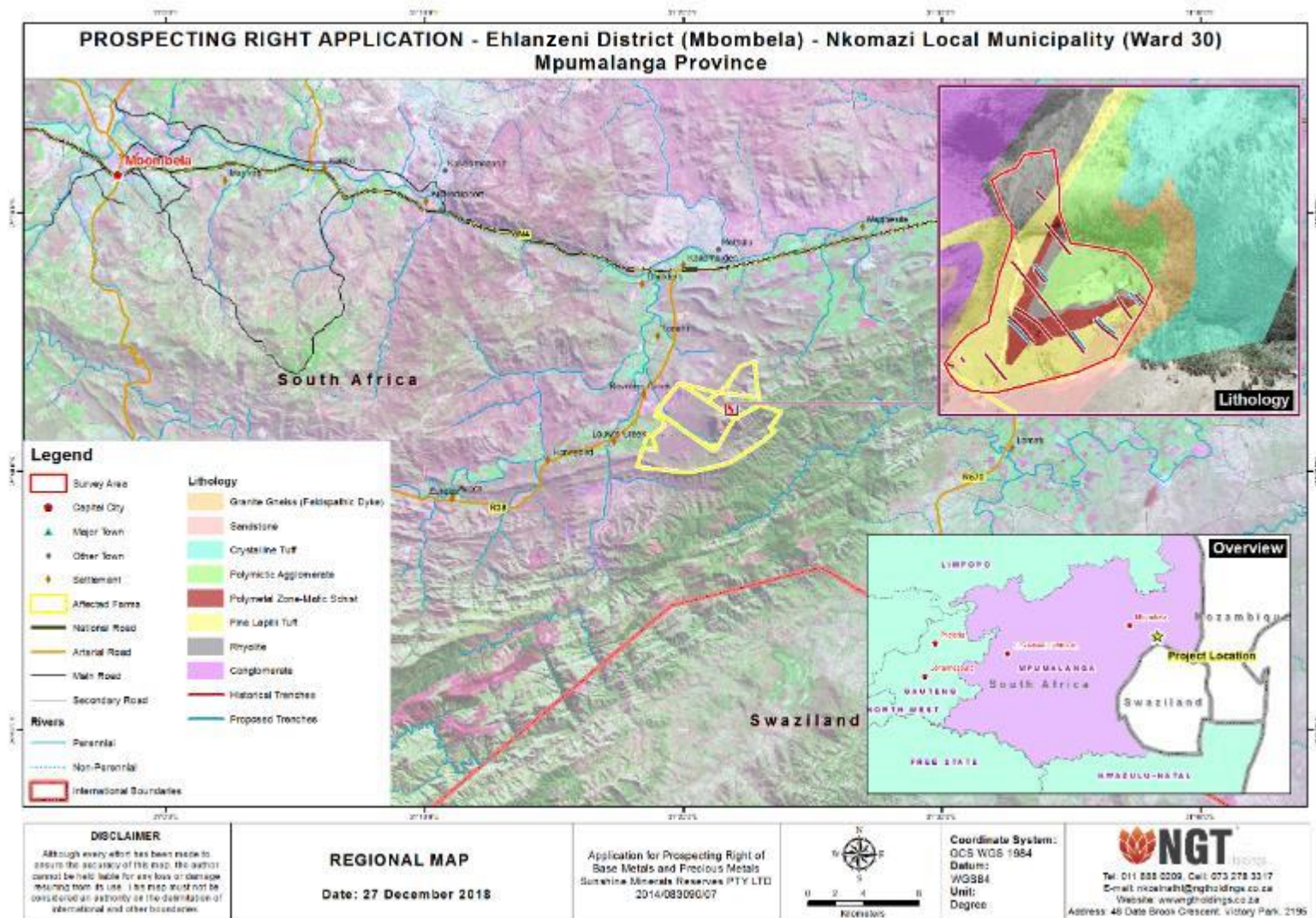


Figure 1: Topographic map showing the location of the project area near Barberton in the Mpumalanga Province.



Figure 2: Google Earth map indication the location of historical trenches.

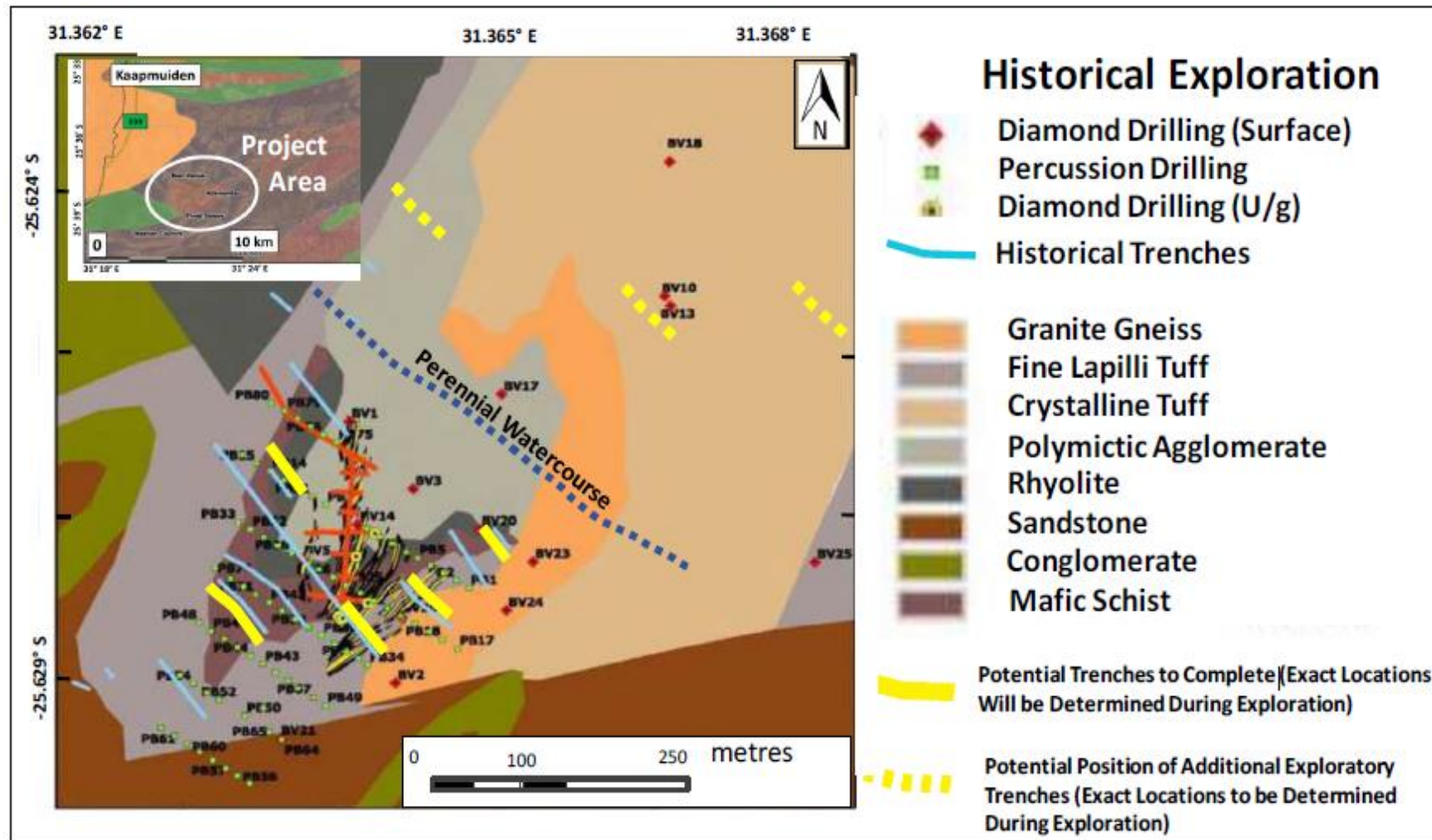


Figure 3: Map showing the historic trenches, proposed trenches and the geology of the area.

1.1. Description of the Affected Environment

1.1.1. Land Use and History

The project area is located near Barberton, within the NLM and the CoMLD, situated in the Mpumalanga Province, South Africa (*Figure 4 and Table 2*). It is located between the towns Barberton and Komatipoort. Historically, the Barberton area has been known for gold mining and agricultural activities. The project area falls within an area currently being used for plantation farming. The project area was also previously prospected by Anglo and JCI (*Figure 2*)

1.1.2. Access

- Follow N12 and N4 to Mpumalanga.
- Exit from N4 and take the R38 (*Figure 3*).
- Turn left onto an unnamed road.

Table 2: Site Location and Property Information

Erf or farm number/s	Bien Venue 255 JU (Portion 0,2 And 3); Three Sisters 254 JU (Remaining Extent); Three Sisters 254 JU (Remaining Extent); Three Sisters 256 JU (Portion 1) and Three Sisters 262 JU (Remaining Extent)
Size of Development Footprint	4689.73 ha
Town	Barberton
Responsible Local Authority	Nkomazi Local Municipality
Ward	30
Magisterial District	Mbombela Local District
Region	Mpumalanga Province
Country	South Africa
Site centre GPS coordinates	<ul style="list-style-type: none"> • 25° 37' 40.68" S • 31° 21' 47.01" E



Figure 4: Google Earth image indicating access to site (yellow arrow).

1.2. Terms of Reference for the Appointment of Archaeologist and Heritage Specialist

The HIA is conducted in terms of Sections 38 the NHRA, No. 25 of 1999. This prescript of the Act Section 38:

“the responsible heritage resources authority must specify the information to be provided in a report required in terms of subsection (3) (a): Provided that the following must be included:

- (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;
- (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 result 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.”

Sunshine appointed NGT as the lead cultural resources management (CRM) consultant to conduct and manage the HIA process. Cherene de Bruyn, Archaeologist and Heritage Consultant for NGT, conducted the HIA study for the proposed development. The appointment of NGT as an independent CRM firm is in terms of the NHRA, No. 25 of 1999.

1.3. Legal Requirements for Completion of the Study

The NHRA, No. 25 of 1999 sets norms and standards for the management of heritage resources in South Africa. Section 35 and 38 (3) of the NHRA, No. 25 of 1999 informs the current HIA study. Table 3 below gives a summary of all the relevant legislations that informed the current study.

Table 3: Legislation and relevance to this HIA Study.

LEGISLATION (INCL. POLICIES, BILLS AND FRAMEWORK)	
<i>Heritage</i>	<ul style="list-style-type: none"> • Heritage resources in South Africa are managed through the NHRA, No. 25 of 1999. This Act sets guidelines and principles for the management of the <i>nation estate</i>. • Section 34 becomes relevant in terms of structures. • Section 35 becomes relevant in terms of terms of archaeology and palaeontology • Section 36 becomes relevant in terms of graves and burial grounds. • Section 38 of the Act becomes relevant in terms of nature of the proposed project in terms of developing the heritage impact assessment study.
<i>Environmental</i>	<ul style="list-style-type: none"> • The National Environmental Management Act (NEMA), No. 107 of 1998. • The cultural environment in South Africa is managed through Section 24 of the NEMA, No. 107 of 1998.

1.4. Limitations and Assumptions

Although a comprehensive physical survey was undertaken it should be noted that some of the archaeological material, including artefacts and graves can be buried underground and as such, may not have been identified during the initial survey and site visit. In the case where the proposed development activities bring these materials to the surface, they should be treated as Chance Finds. Should such resources be unearthed, it is recommended that the development activities be stopped immediately, and an archaeologist be contacted to conduct a site visit and make recommendations on the mitigation of the finds. SAHRA and MPHRA should also be informed immediately on such finds. In this case no archaeological material or graves should be moved from the site, until the heritage specialist has been able to make an assessment regarding the significance of the site and archaeological material, which is also subject to SAHRA approval.

The following chapter outlines the methodology used to assess the current site impacts and cumulative impacts that will result from the proposed project on the identified historic or archaeological sites.

2. METHODOLOGY

2.1. Approach to the Study

Cherene de Bruyn (Archaeologist and Heritage Consultant – NGT ESHS Solutions), is responsible for the compilation of the current HIA report. The Review and Quality Control (RQC) process involved reviewing the First Draft HIA (Revision 01) and revising the Second Draft (Revision 02); the RQC was completed by Mr Nkosinathi Tomose (Executive Director and Principal Consultant – NGT). The RQC is a standard process at NGT; in the case that the Director and Principal Consultant is responsible for the report, another consultant has to undertake the RQC process.

2.2. Step I – Literature Review (Desktop Phase)

Background information search for the proposed development took place following the receipt of appointment letter from the client. Sources used included, but not limited to published HIA studies, academic books, academic journal articles and the internet about the site and the broader area in which it is located. Interpretation of legislation (the NHRA, No. 25 of 1999) and local by-laws forms, form the backbone for the study.

2.3. Step II – Physical Survey

The survey was conducted by Miss. Cherene de Bruyn (Archaeologist and Heritage Consultant – NGT ESHS Solutions) and Mr. Yanga Kolisi (Junior Environmental and Social Consultant-NGT) assisted by Mr. Nkosinathi Tomose (Executive Director and Principal Consultant– NGT). The survey was conducted on foot. A vehicle was also used to access the site. These findings are discussed in detail in this HIA report.

The aim of the survey was to identify archaeological and heritage sites and resources within the area proposed for development activities as well as within the 500m-radius, or zone of influence:

- The survey of the proposed prospecting area was conducted on foot and the site was accessed using a light delivery vehicle (LDV);
- The aim of the surveys was to identify archaeological, burial grounds and graves, and built environment heritage sites and resources in and around the area proposed for development;
- To record and document the sites using applicable tools and technology.

The following technological tools were used for documenting and recording identified resources on site:

- Garmin GPS (i.e. Garmin 62s) – to take Latitude and Longitude coordinates of the identified sites and to track the site;
- Canon SLR – to take photos of the affected environment and the identified sites.

2.4. Step III – Report Writing and Site Rating

The final step involves compilation of the report using desktop research as well as the physical survey results. Archaeological resources, graves and sites found in the project area is rated according to the site significance classification standards as prescribed by SAHRA. The Statement of Heritage Significance does not imply exemption from any national, provincial or local authority legal or other regulatory requirement, including any protection or management or general provision in terms of the NHRA, No. 25 of 1999. The following site significance classification minimum standards as prescribed by the SAHRA (2006) and approved by ASAPA for the Southern African Developing Community (SADC) region were used to grade the identified heritage resources or sites (*Table 3*). Overall project Impact Significance Rating is conducted guided by the requirements of the NEMA EIA Regulations (2014) (*Tables 4-7*). This process rates impacts of the project in four stages (*Table 4*):

- Project Planning Phase
- Construction
- Operation
- Rehabilitation and Closure.

Impacts are also rated in terms of (*Table 5*):

- Pre-mitigation impacts
- Post-mitigation impacts
- Impact prioritisation.

A summary of project risks and mitigation measures (*Table 6*) is then developed in line with the project stages (*Table 4*) and well as impact rating before and post mitigation (*Table 5*).

Table 4: Site significance classification standards as prescribed by SAHRA.

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

Table 5: Table indicating the impact significance rating.

Alternative No	List Alternative Names	
Proposal	Development	
Alternative 1	Development Area 01	
Alternative 2	Development Area 02	
Nature	-1	Negative
	1	Positive
Extent	1	Activity (i.e. limited to the area applicable to the specific activity)
	2	Site (i.e. within the development property boundary),
	3	Local (i.e. the area within 5 km of the site),
	4	Regional (i.e. extends between 5 and 50 km from the site)
	5	Provincial / National (i.e. extends beyond 50 km from the site)
Duration	1	Immediate (<1 year)
	2	Short term (1-5 years),
	3	Medium term (6-15 years),
	4	Long term (the impact will cease after the operational life span of the project),

	5	Permanent (no mitigation measure of natural process will reduce the impact after construction).
Magnitude/ Intensity	1	Minor (where the impact affects the environment in such a way that natural, cultural and social functions and processes are not affected),
	2	Low (where the impact affects the environment in such a way that natural, cultural and social functions and processes are slightly affected),
	3	Moderate (where the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way),
	4	High (where natural, cultural or social functions or processes are altered to the extent that it will temporarily cease), or
	5	Very high / don't know (where natural, cultural or social functions or processes are altered to the extent that it will permanently cease).
Reversibility	1	Impact is reversible without any time and cost.
	2	Impact is reversible without incurring significant time and cost.
	3	Impact is reversible only by incurring significant time and cost.
	4	Impact is reversible only by incurring prohibitively high time and cost.
	5	Irreversible Impact
Probability	1	Improbable (the possibility of the impact materialising is very low as a result of design, historic experience, or implementation of adequate corrective actions; <25%),
	2	Low probability (there is a possibility that the impact will occur; >25% and <50%),
	3	Medium probability (the impact may occur; >50% and <75%),
	4	High probability (it is most likely that the impact will occur- > 75% probability), or
	5	Definite (the impact will occur),
Public feedback	1	Low: Issue not raised in public responses

	2	Medium: Issue has received a meaningful and justifiable public response
	3	High: Issue has received an intense meaningful and justifiable public response
Cumulative Impact	1	Low: Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is unlikely that the impact will result in spatial and temporal cumulative change.
	2	Medium: Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is probable that the impact will result in spatial and temporal cumulative change.
	3	High: Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is highly probable/definite that the impact will result in spatial and temporal cumulative change.
Irreplaceable loss of resources	1	Low: Where the impact is unlikely to result in irreplaceable loss of resources.
	2	Medium: Where the impact may result in the irreplaceable loss (cannot be replaced or substituted) of resources but the value (services and/or functions) of these resources is limited.
	3	High: Where the impact may result in the irreplaceable loss of resources of high value (services and/or functions).
Degree of Confidence	Low	<30% certain of impact prediction
	Medium	>30 and < 60% certain of impact prediction
	High	>60% certain of impact prediction
Priority	Ranking	Prioritisation Factor
3	Low	1,00
4	Medium	1,17
5	Medium	1,33
6	Medium	1,50
7	Medium	1,67
8	Medium	1,83

9	High	2,00
Phase		
Planning		
Construction		
Operation		
Decommissioning		
Rehab and closure		

Table 6: Impact Rating table with impact mitigation.

IMPACT DESCRIPTION		PRE – MITIGATION							POST – MITIGATION							IMPACT PRIORITISATION			
Impact	Phase	Nature	Extent	Duration	Magnitude	Reversibility	Probability	Pre-mitigation ER	Nature	Extent	Duration	Magnitude	Reversibility	Probability	Post-mitigation ER	Confidence	Public response	Cumulative Impact	Irreplaceable loss
1. Heritage Impact Ratings	Planning	-1	3	2	2	2	5	- 11,25	-1	3	1	2	2	4	-8	High	1	2	1
								0	-1						0				
								0							0				

Table 7: Risk assessment.

	Impact Name					
	Alternative					
	Phase					
	Environmental Risk					
	Attribute	Pre-mitigation	Post-mitigation	Attribute	Pre-mitigation	Post-mitigation
	Nature of Impact			Magnitude of Impact		
	Extent of Impact			Reversibility of Impact		
	Duration of Impact			Probability		
	Environmental Risk (Pre-mitigation)					
	Mitigation Measures					
	Heritage Risk (Post-mitigation)					
	Degree of confidence in impact prediction:					
	Impact Prioritisation					
	Public Response					
	Cumulative Impacts					
Degree of potential irreplaceable loss of resources						
Prioritisation Factor						
Final Significance						

Table 8: Final Significance Ratings

SIGNIFICANCE RATINGS	
Value	Description
< -10	Low Negative (i.e. where this impact would not have a direct influence on the decision to develop in the area)
≥ -10 and < -20	Medium Negative (i.e. where the impact could influence the decision to develop in the area)
≥ -20	High Negative (i.e. where the impact must have an influence on the decision process to develop in the area)
< 10	Low Positive (i.e. where this impact would not have a direct influence on the decision to develop in the area)
≥ 10 and < 20	Medium Positive (i.e. where the impact could influence the decision to develop in the area)
≥ 20	High Positive (i.e. where the impact must have an influence on the decision process to develop in the area)

3. BACKGROUND LITERATURE REVIEW

Southern Africa has one of the longest human species occupations record in the world. The occupation dates back to approximately 2 million years ago (Mitchell 2002), therefore South Africa is rich in archaeological material. The archaeology of South Africa is divided into three periods, which are mainly the Stone Age, Iron Age and the Historical Period. Each period is characterised by a unique marker that distinguishes it from other archaeological periods. Both archaeological and historical sites have been identified all over South Africa, including the Mpumalanga Province. From an assessment of the South African Heritage Resources Information System (SAHRIS) database, previous HIA and Archaeological Impact Assessment (AIA) reports of Barberton were reviewed (*Table 9 and Figure 5*).

Table 9: Previous HIA and AIA reports conducted in and surrounding the proposed project area as recorded on the SAHRIS database

NO	AUTHOR/YEAR	TOWN	SITE	SAHRIS ID
1.	Celliers, J. (2005)	Nelspruit	Erven 3613 and 3614 on Portion 22 of the Farm Shandon 194 JU	00693
2.	Murimbika, M. (2008)	Matsulu area	Matsulu area in the Mbombela Local Municipality, Ehlanzeni District	02308
3.	van Schalkwyk, J. (2009)	Barberton	Tailings Dam, Fairview Gold Mine	-
4.	Van Wyk Rowe, C, (2009)	Nelspruit	Portion 62 The Rest 454JT	MAPID_03436
5.	Pelser, A. & Van Vollenhoven, A. (2010)	Amsterdam Area	Portion 1 Of the Farm The Bends 417 It	-
6.	Van Schalkwyk, J. (2010)	Malelane	Malelane Gate, Kruger National Park, Mpumalanga Province	991
7.	Roodt, F. (2008, 2011)	Lydenburg	Plot 74	1808
8.	Becker, E. (2011)	Barberton	Existing Sappi Lomati Saw Mill	7313
9.	Celliers, J. (2012)	Nelspruit	Portions 7, 8, 23, 24, 46 and 69 of the farm Maggiesdal 456 JT	CTS_116785
10.	Pelser, A. (2012)	Barberton	Fairview Mine	204
11.	Van Wyk Rowe, C. (2015)	Barberton	Taurus Forestry Plantation	8248
12.	Birkholtz, P. & Naudé, M. (2017)	Mbombela	Union Farm 130 JU, Karino Farm 134 JU and Kia Ora 134 JU.	11364

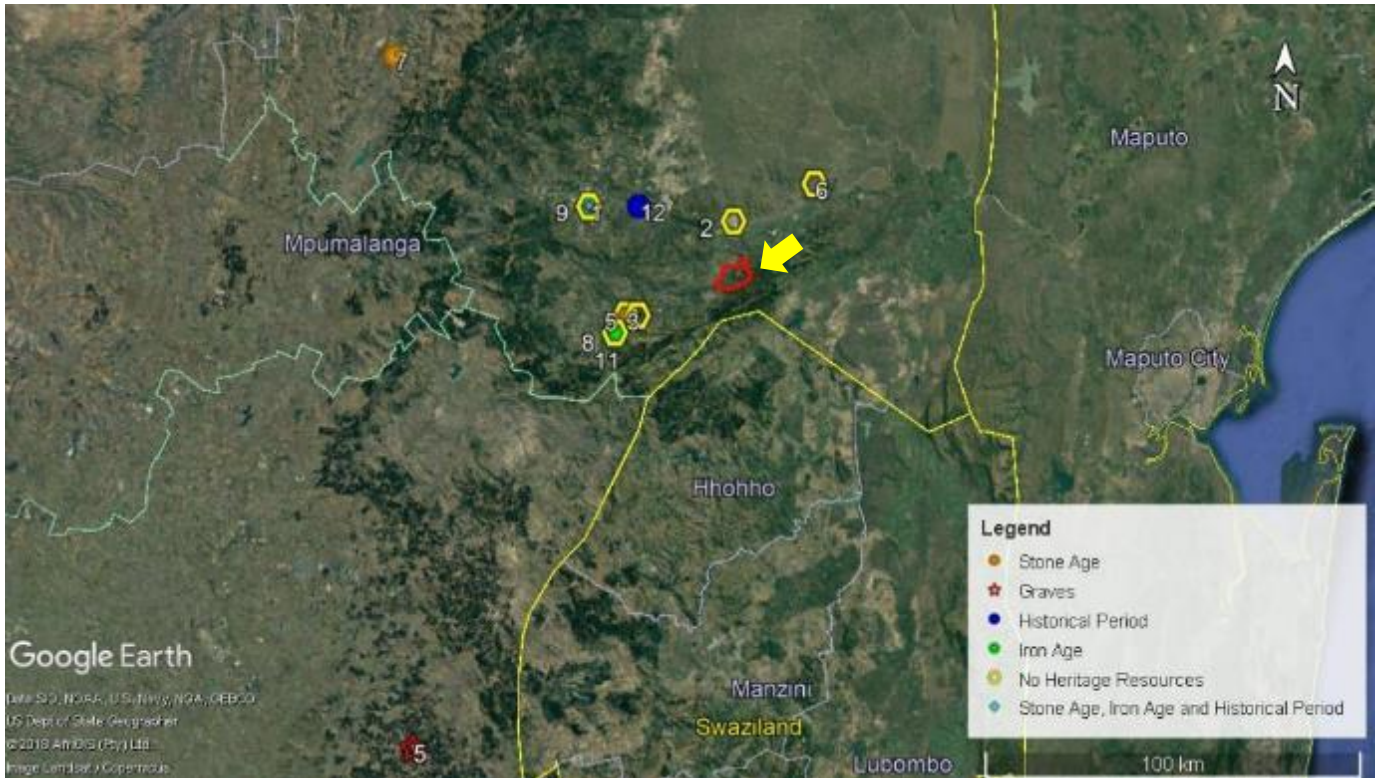


Figure 5: Google Earth image showing project area (yellow arrow) in relation to the HIA/AIA Reports previously conducted in the surrounding areas.

3.1. Stone Age

In South Africa the Stone Age is divided into three periods (Table 10 and Figure 6). The Early Stone Age (ESA) (2 million to 250 000/200 000 years ago), the Middle Stone Age (MSA) (300 000/250 000 – 22 000 years ago) and the Later Stone Age (LSA) (40 000/25 000 to 200 years ago) (Deacon & Deacon 1999; Lombard *et al.*, 2012). The dates for the Stone Age sequence in South Africa is not fixed or absolute and they do not fit neatly as a result of overlapping between the periods (Lombard *et al.*, 2012). The ESA is comprised of the Oldowan stone tool complex (2 and 1.7 - 1.5 million years ago), and the Acheulean stone tool complex (1.7 - 1.5 million years ago and 250 - 200 000 years ago) (Klein 2000; Mitchell 2002). The Oldowan stone tool complex (2 and 1.7 - 1.5 million years ago), and is characterised by small flakes, flaked cobbles and percussive tools (Klein 2000; Mitchell 2002; Esterhuysen & Smith 2007). In current debates two species of human ancestors, an early form of *Homo* and *Paranthropus robustus* have been identified who are thought to have been skilled enough to craft these stone tools (Esterhuysen & Smith 2007).

The Acheulean stone tool complex spread to Asia and Europe through the migration of hominids in Africa and included large hand axes and cleavers (1.7 - 1.5 million years ago and 250 - 200 000 years ago) (Klein 2000; Mitchell 2002). In South Africa the Acheulean stone tool complex is often associated with *Homo ergaster*, who compared to modern humans in stature, brain size and body as well as facial proportions (Esterhuysen & Smith 2007). Both these ESA stone tool complexes are usually found near water sources in

southern Africa (Esterhuysen & Smith 2007). MSA artefacts including choppers, hand axes and cleavers have been found at Maleoskop on the farm Rietkloof, located 60 km north of Middelburg (Esterhuysen & Smith 2007; Pistorius 2014).

The transition from the ESA to MSA includes a change in technology from large stone tools to smaller blades and flakes. The MSA stone tool assemblage include unifacial and bifacial points, blades, flakes, scrapers and pointed tools that could have been hafted and used as spears or arrowheads and is associated with anatomically modern humans (Williams & Watson 1982; Esterhuysen & Smith 2007; Wadley, 2007). In the Mpumalanga Province, MSA tools have been found at Bushman Rock Shelter, a site continuously occupied during this period, on the farm Klipfonteinhoek in the Ohrigstad District, located 120 km north-west of Barberton (Esterhuysen & Smith 2007; Pistorius 2014). Near Malelane, ochre was mined at Dumaneni during the MSA (Bornman 1995; Celliers 2012; Van Wyk Rowe 2015).

The LSA is characterised by hunter-gather societies who had several technological innovations including smaller stone tools, bone tools, ostrich eggshell beads, rock engravings and paintings (Maggs 1983 Esterhuysen & Smith 2007; Pistorius 2014). Several LSA rock engraving site have been found in the Mpumalanga Province near Lydenburg, Nelspruit, White River, Ermelo and the southern part of the Kruger National Park (Smith & Zubieta 2007; Pistorius 2014). Several LSA artefacts were also found in the upper layers at Bushman Rock Shelter (Esterhuysen & Smith 2007). Near Badplaas, also known as eManzana, several LSA sites were found in close proximity of the Nhlazatshe River on the farm Honingklip (Esterhuysen & Smith 2007). Apart from stone tools several rock art panels, beads, LSA stone-walling and Iron Age pottery of the Eiland facies were also found (Korsman & Plug 1994; Esterhuysen & Smith 2007). Several LSA sites have also been found in the Kruger National Park (Bergh 1999).

Table 10: Archaeological sites located in the Mpumalanga Province.

NO	ARCHAEOLOGICAL SITES	TYPE OF SITE	SAHRIS ID
1.	Blyde Canyon Nature Reserve	Early Stone Age	2391
2.	Farm Honingklip, near Badplaas	Middle Stone Age	8505
3.	Gustav Klingbiel Nature Reserve	Early Iron Age	783
4.	Kruger National Park	Late Stone Age	128313
5.	Lydenburg Heads site, Sterkspruit valley, Lydenburg	Early Iron Age	-
6.	Maleoskop on the farm Rietkloof	Early Stone Age	3861
7.	Sudwala Caves	Stone Age	32071
8.	Plason	Early Stone Age	-

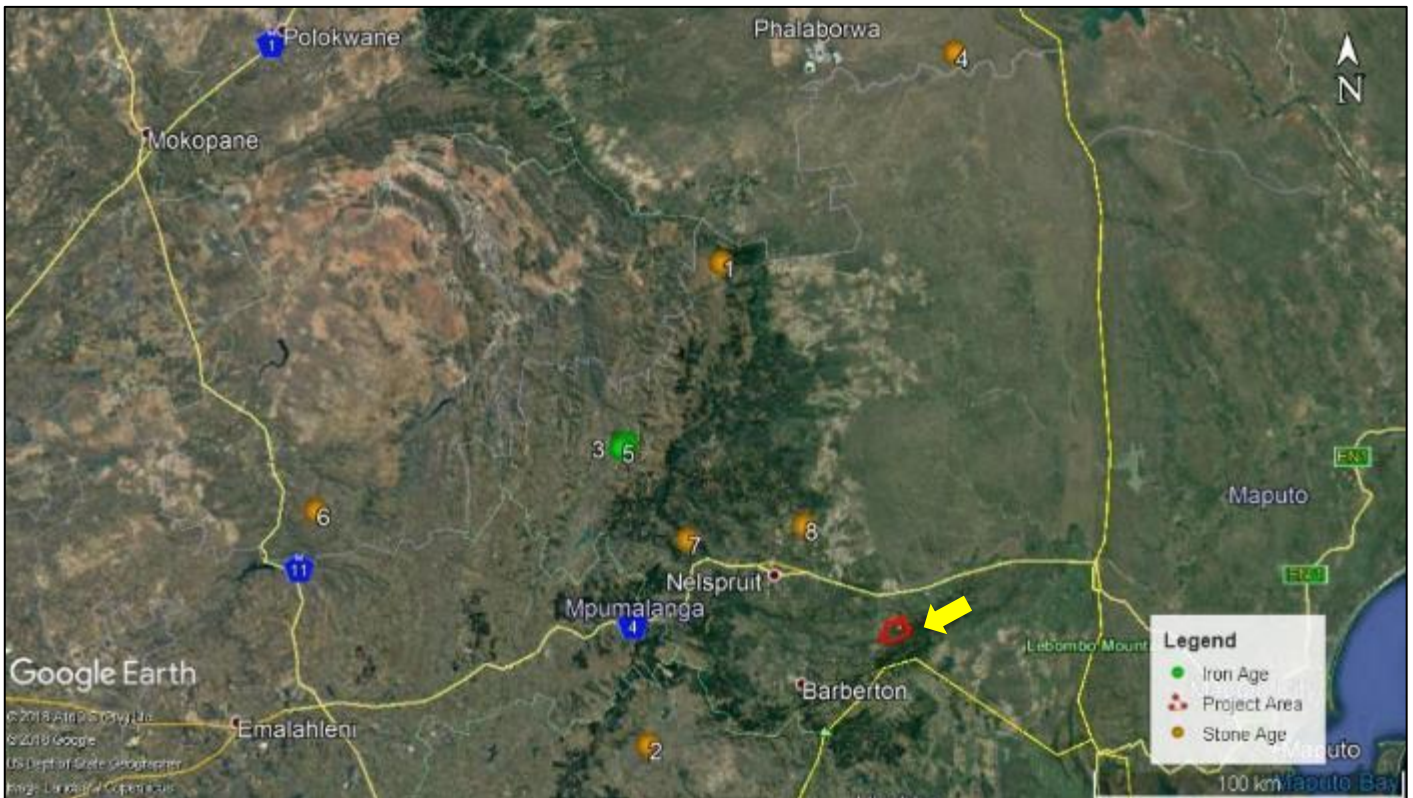


Figure 6: Google Earth image showing project area (yellow arrow) in relation to other archaeological sites in the Mpumalanga Province.

3.2. Iron Age

The Iron Age is typically referred to the period when the first Bantu speakers started migrating south from western Africa (Ross 1999). The Iron Age, according to Huffman (2007) can be divided into the Early Iron Age (EIA) (AD 200 – 900); the Middle Iron Age (MIA) (AD 900 – 1 300); and the LIA (AD 1 300 – 1 840). The Iron Age is characterized by farming communities who domesticated animals, produced various ceramic vessels, smelted iron for weapons and manufactured tools.

The EIA communities throughout eastern and southern Africa share a similar Iron Age culture called the Chifumbaze complex (Phillipson 1994; Huffman 2007). The Chifumbaze complex contains evidence of the first farmers who cultivated crops, herded domestic animals, used iron, and who made pots (Phillipson 1994). It can furthermore be divided into the Kalundu and Urewe Traditions (Huffman 2007). The Kalundu Tradition is also referred to as the western stream, while the Urewe Tradition is known as the eastern stream (Huffman 2007). The Kalundu Tradition can be found in southern Africa where the makers of these pots lived on wetter and more arable land (Mitchell 2013).

Several EIA sites have been found in the Mpumalanga Province. These sites seem to be located near water sources which were most likely played an important role in Iron Age agricultural activities (Esterhuysen & Smith 2007). Welgelegen Shelter located near Ermelo, which is approximately 130 km southwest of Barberton, LSA tools and Iron Age pottery were found which is interpreted as evidence of the co-existence of farming and hunter-gatherer groups on one site (Esterhuysen & Smith 2007).

The earliest occupation to occur in the Lowveld (the section between the Drakensberg, Mozambique and the southern part of the Kruger National Park), was at Silver Leaves, around AD 280 - 450, a site located close to Tzaneen (Van Wyk Rowe 2009). The Silver Leaves pottery collection falls under the Urewe Tradition, within the Kwale Branch (Klapwijk & Huffman 1996). The Broederstroom pottery dates to approximately AD 580 to 700 and is found in the Transvaal (Whitelaw 1996; Mason 1996). According to Huffman (2007) Broederstroom ceramics form part of the Mzonjani facies, which follows the Silver Leaves facies. The Mzonjani pottery dates to AD 450- 750 and is found within the Limpopo, KwaZulu-Natal, Mpumalanga and Gauteng Provinces. The pottery is characterised by punctuates on rim and spaced motifs on shoulder (Maggs 1980; Huffman 2007).

Several EIA villages with huts, pits and furnaces were located around Lydenburg. Ceramics of the Lydenburg phase (AD 500 - 800) have been found at Doornkop, Plaston, Langdraai and Klipspruit (Pistorius 2014). Apart from furnaces and ceramics, several ceramic head sculptures have also been found in Sterkspruit near Lydenburg in 1962 (Evers 1975; Evers *et al.*, 1982; Huffman 2007). These ceramic heads date to the EIA and were most likely used for ritualistic purposes (Evers 1975; Huffman 2007). Evidence from these sites also indicate that the people who occupied these sites were skilled metal-workers, farmers and potters (Marker & Evers 1976). In 1976 several iron age ceramics and ochre pieces were found during rescue excavations (Evers 1977). From the ceramic analysis it was determined that the ceramics found at the Plaston site belong to the same ceramic culture as the Lydenburg Heads site, but that they are different from the Silver Leaves, Eiland and Matola facies (Evers 1980). While Maggs (1980) on the other hand suggested that Silver Leaves, Mzonjani, Matola ceramics should be grouped together in a unit called Matola (Whitelaw 1996).

Doornkop facies (AD 750 – 1000) which is found around Lydenburg and Polokwane (Huffman 2007) changes to the Klingbeil facies (AD 1000 – 1300) and then to Maguga (AD 1 300 – 1 500) facies (Huffman 2004). Two Klingbeil sites, containing pottery and teeth forming part of the faunal remains, located in the Gustav Klingbeil Nature Reserve situated close to Lydenburg in the Mpumalanga Province were excavated by Evers (1980). Ceramics of the Klingbeil facies are normally found within the Limpopo, Mpumalanga and KwaZulu-Natal Provinces and dates to AD 1000 to 1200 (Huffman 2007). The key decoration features present on the pottery are multiple facets in first position (Huffman 2007). Hence, its form, function and decoration motifs are similar to those of the Lydenburg Heads site (Celliers 2012). The Eiland and Klingbeil pottery facies fall under the Kalundu Tradition, within the Happy Rest Sub-branch. The Eiland pottery is normally found in the

Limpopo Province. Both Eiland and Klingbeil pottery are mainly decorated with fine incised, hatch marks that alternate in direction creating herringbone patterns (Huffman 2007; Celliers 2012). The Maguga facies (AD 1200 – 1450) characterised by “broadly incised triangles and parallel lines on the neck and shoulder” and is found in Swaziland and the Kruger National Park (Huffman 2007).

The LIA is distinguished from the EIA in Mpumalanga by the change in ceramic styles as well as through the numerous extensive stonewalled sites that are found throughout the region (Marker & Evers 1976). Moorpark type walling have also been found in the Limpopo and Mpumalanga Province, and is associated with Nguni speaking groups who migrated from the KwaZulu-Natal Province (Huffman 2004). Nguni people are part of the larger eastern-Bantu speaking group (Huffman 2004). Nguni speakers built their beehive houses and villages on the slopes of hills and mountains (Huffman 2004). They were pastoralists who farmed and that kept cattle (Huffman 2004). The term Ndebele is broadly used to refer to the Northern Transvaal and Southern Transvaal Ndebele in South Africa as well as to the Ndebele of Mzilikazi who reside in Zimbabwe (Skohosana 2009). Due to political and climate conditions in the 17th century, the Transvaal Ndebele migrated from KwaZulu-Natal (Van Warmelo 1930; Huffman 2007; Skohosana 2009). The Ndebele of Southern Africa are divided into two main groups by the Springbok Flats (Loubser 1981; Huffman 2004; Stokes *et al.*, 2009). They are the Northern Transvaal Ndebele and the Southern Transvaal Ndebele (Loubser 1981; Huffman 2004; Stokes *et al.*, 2009). Various research on the two groups of the Transvaal Ndebele have been done by Massie (1905), Van Warmelo (1930), Loubser (1981), Jackson (1982), Huffman (2007) and Skohosana (2009). The Southern Ndebele claim that Musi was their legendary chief. While the Northern Ndebele claim Langilibalele as their leader (Jackson 1982). These two main Ndebele groups are found in the Mpumalanga, Limpopo, North West and Gauteng Province of South Africa (Skohosana 2009). The Northern Transvaal Ndebele and the Southern Transvaal Ndebele are further divided into smaller groups (Skohosana 2009). The Southern Transvaal Ndebele encompasses the Manala, Nzundza and Mhwaduba tribes (Skohosana 2009). A struggle over the leadership between the six sons of Musi, is the reason behind the split between the clans and the resultant of the two main tribes; Ndzundza and Manala (Delius 1989). The Ndzundza and Manala Ndebele moved out of KwaZulu-Natal to settle north in South Africa around AD 1600 (Huffman 2004; Skohosana 2009). Manala and Nzundza split up once again, after which Manala moved to Walmannsthal while Nzundza and his brother Mthombeni and their people moved east to KwaSimkhulu, near Belfast (Skohosana 2009). At KwaSimkhulu, Mthombeni moved with his people to Zebediela near Mokopane where he established himself as the Kekana chief (Van Warmelo 1930; Skohosana 2009).

The Marateng facies (AD 1650 – 1840) of the Moloko branch have also been found around Lydenburg and Polokwane (Huffman 2007). This ceramic phase is also associated with stonewalled settlements of the Koni in the area (Pistorius 2014). The Koni groups migrated from Swaziland across the KwaZulu-Natal and settled in Mpumalanga around AD 1650 (Huffman 2004). The LIA stone walled settlements can be found in

Mpumalanga from Origstad to Lydenburg, Machadodorp to Carolina (Maggs 2007). The stonewalling formed part of LIA homesteads with cattle enclosures connected to the open grazing areas (Maggs 2007). LIA graves, iron age pottery as well as grinding stones have also been found at sites near Hazyview, Bushbuckridge, Graskop, Sabie and Nelspruit (Van Wyk Rowe 2009). While several extensive stonewalled settlements dating to the LIA have also been found in the Lydenburg area (Esterhuysen & Smith 2007). At the Gustav Klingbeil Nature Reserve LIA layer revealed that agriculture was extensively practiced by the inhabitants, as several grinding stones, animal bones and terracing was observed (Marker & Evers 1976). Badfontein stonewalled LIA settlements have been identified on the farm Geluk 348 JT as well as near Lydenburg (Roodt 2007, 2008). Badfontein type walling found in Mpumalanga Province are identified with Koni or Sotho Speakers (Huffman 2004). Several rock engravings have also been found around Lydenburg, such as the large engraved Iron Age site on the farm Boomplaats 29 JT (Huffman 2004; Mbewe 2009). During the LIA, iron implements were also being fashion. Furnaces as well as iron slag have been found in the area near the Dumaneni mine dating to the LIA (Van Wyk Rowe 2015).

3.3. Historical Period

The Historical Period is associated with the demise of the Late Stone and Iron Ages. The Historical Period dates from AD 1600 and is generally the period related to colonial settlement in South Africa.

In the first half of the nineteenth century the Mpumalanga region as it was infested with Tsetse flies (Shillington 1995; Bergh 1999). However only after the outbreak of Rinderpest in 1897 in the area did farmers settle into the again (Du Preez 2012). Smaller farming communities including the Pai and Pulana settled around the Baberton and Nelspruit regions (Celliers 2012). During the Difiqane or Mfecane, around the early 1820's - 1830's many groups who settled in the Mpumalanga region were displaced as a result of Mzilkazi' Ndebele who moved through the area (Celliers 2012).

The Voortrekkers under leadership of Andries Hendrik Potgieter moved through the Mpumalanga Province in the 1840's to settle at Ohrigstad, which was first established in 1845 (Celliers 2012). It was here that the Voortrekkers and the Pedi Chief entered negotiations that would result in them acquiring farming land for which in turn they would provide protection from the Swazi's (Giliomee 2003; Celliers 2012). The arrival of Europeans in the Barberton area displaced many of the South African tribes who had settled in the area and forced them move away and settle on less arable land (Ross 1999; Du Preez 2012). Gold was discovered in Jamestown in 1881 and at Concession Creek in 1883 (Van Wyk Rowe 2015). With the discovery of gold in Mpumalanga Province, the town of Barberton was established in 1884 (Van Wyk Rowe 2015). Many gold mines opened in the area and several are still active today. Several historical buildings associated with the

railways and dating to around 1936 was identified by Birkholtz & Naude (2017) located approximately 35 km north of Barberton.

3.4. Conclusions on Literature Review

It is concluded that the proposed study area is located in a region rich in archaeology, history and heritage dating back almost 2 million years. Several groups have settled in the region, which lead to several conflicts and battles. The region surrounding Barberton, Nelspruit and the Kruger National Park is particularly well known for heritage resources related to the Stone Age, Iron Age and Historical Period. Throughout the Mpumalanga Province, Stone Age and Iron Age stone-walled sites and ceramics can be found along flat-topped ridges and hills. These settlement types and ceramics indicate that the region was occupied by Sotho-Tswana speaking communities from the EIA (AD 200 – 1 500) and that Swati-speaking groups later moved into the region.

4. STUDY RESULTS

The background information yielded information about known archaeological and heritage resources located in the Mpumalanga Province, and particularly the Barberton region. The physical survey focused on **Portion 3 of the Farm Bien Venue 255 JU** where historical prospecting activities took place in the 1970's to 1991 (*Figures 7 and 8*). The environment of the project area can be characterised as mountainous and hilly, consisting of grass and bushveld type shrubs and trees (*Figures 9 and 10*). The area surrounding the project area is primarily used for plantations (*Figure 11*). The area has been transformed and disturbed by previous prospecting activities, as several historical trenches are located in the area, however, none could be observed on the surface. The survey also focused on the stockpile that will be sampled and processed. The stockpile area consists of a disturbed context (*Appendix 3*). No archaeological material was observed. However, three trenches were observed, most probably dug by illegal miners (*Table 11*).

Table 11: Location of trenches, suspected to be dug by illegal miners.

TRENCH	COORDINATES
1	• 25° 37' 34.56" S 31° 22' 4.79" E
2	• 25° 37' 34.44" S 31° 22' 5.30" E
3	• 25° 37' 33.83" S 31° 22' 5.99" E

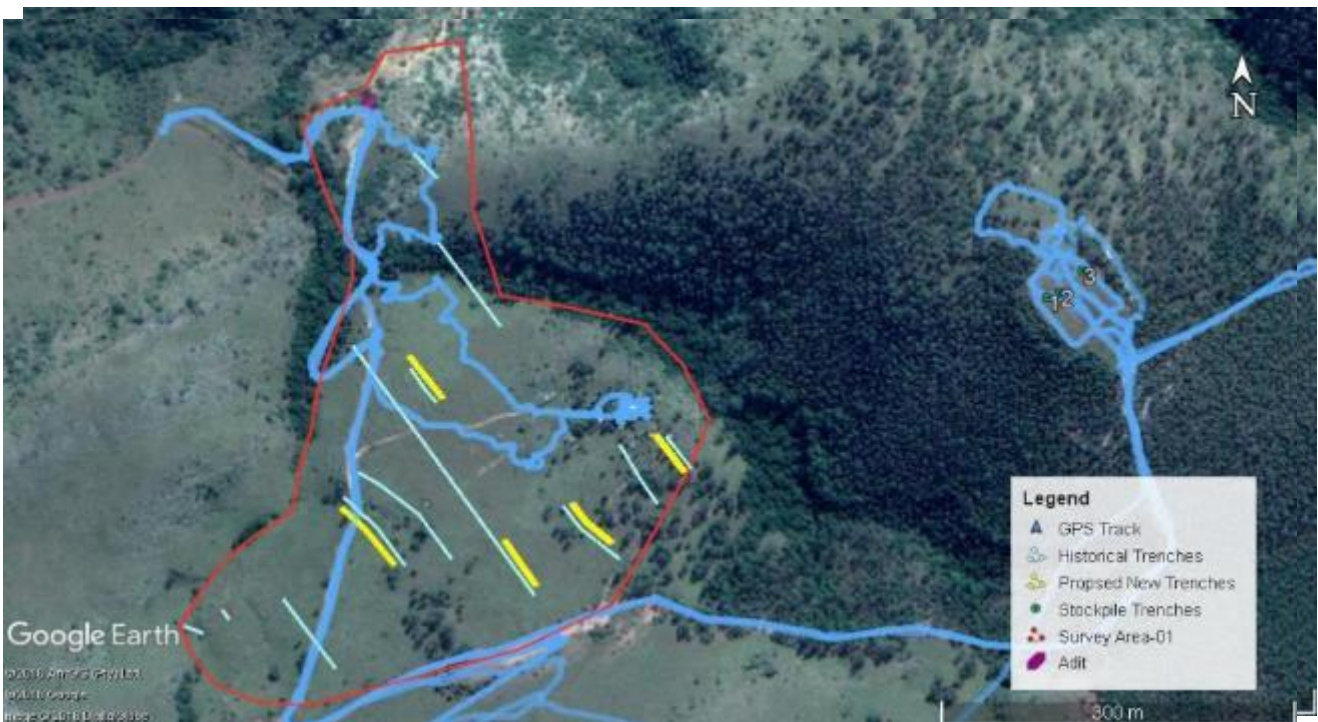


Figure 7: Google Earth map indicating the GPS track of the survey.

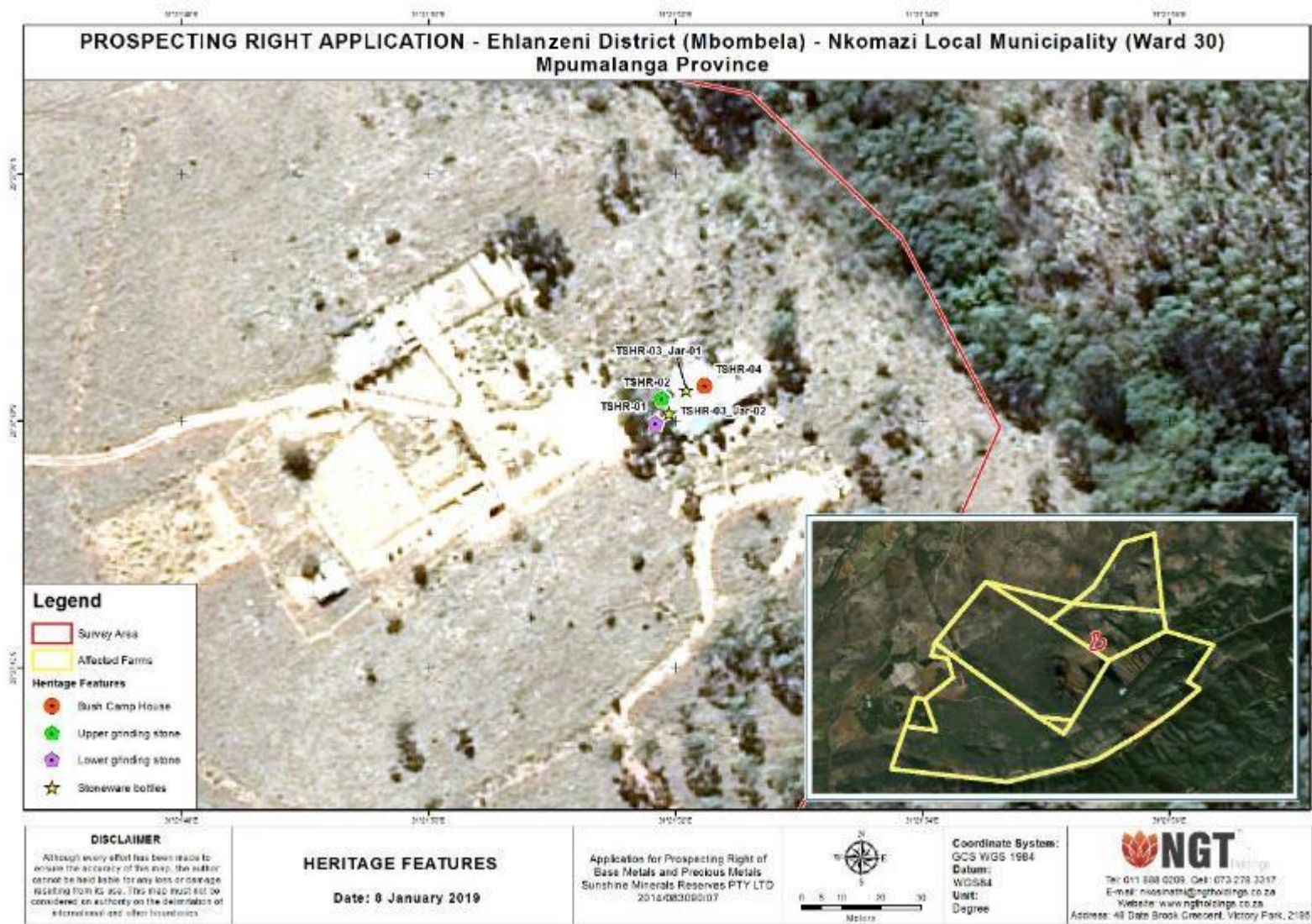


Figure 8: Google Earth image of heritage resources and areas of interest identified during the survey.



Figure 9: General view of site (facing south).



Figure 10: General view of site (facing north).



Figure 11: Plantations surrounding the project area.

4.1. Archaeological sites

Table 12: TSHR-01

Site Name:	TSHR – 01
Type:	Lower grinding stone
Density:	Low
Location/GPS Coordinates:	<ul style="list-style-type: none"> • 25° 37' 38.02" S • 31° 21' 51.84" E
Approximate Age:	Iron Age
Applicable Sections of the Relevant Acts:	<ul style="list-style-type: none"> • Section 35 of the NHRA, No. 25 of 1999
Description:	
<p>A lower grinding stone, dating to the Iron Age, was found close to a house in the project area (<i>Figure 8</i>). The grinding stone was placed on a wooded post and most likely used as a bird bath (<i>Figures 12 and 13</i>). Grinding stones (usually a lower and upper grinding stone) were used to grind maize into a powder. Unfortunately, the grinding stone has been removed from its original context.</p>	
Mitigation Measures:	
<ul style="list-style-type: none"> • The lower grinding stone is of heritage value. • If the land owner agrees, the artefacts should be donated and moved from the site. It should be placed within the study collection of a heritage institution such as the Barberton Museum or University of Pretoria. • Subject to SAHRA approval. 	



Figure 12: Lower grinding stone found on-site.



Figure 13: Lower grinding stone (yellow arrow) placed on a wooden stump used as a bird bath.

Table 13: TSHR-02

Site Name:	TSHR - 02
Type:	Upper grinding stone
Density:	Low
Location/GPS Coordinates:	<ul style="list-style-type: none"> • 25° 37' 37.82" S • 31° 21' 51.89" E
Approximate Age:	Iron Age
Applicable Sections of the Relevant Acts:	<ul style="list-style-type: none"> • Section 35 of the NHRA, No. 25 of 1999
Description:	
<p>An upper Quern stone often used with a lower grinding stone to ground maize was found a few metres north of the lower grinding stone (<i>Figures 14 and 15</i>). The stone has a small perforated hole on its upper surface. Unfortunately, the grinding stone has been removed from its original context.</p>	
Mitigation Measures:	
<ul style="list-style-type: none"> • The upper grinding stone is of heritage value. • If the land owner agrees, the artefacts should be donated and moved from the site. It should be placed within the study collection of a heritage institution such as the Barberton Museum or University of Pretoria. • Subject to SAHRA approval. 	



Figure 14: Upper grinding stone found near the main house.



Figure 15: Location of the upper grinding stone (yellow arrow).

Table 14: TSHR-03

Site Name:	TSHR - 03
Type:	Stoneware bottles
Density:	Low
Location/GPS Coordinates:	<p>Jar-01</p> <ul style="list-style-type: none"> • 25° 37' 37.75" S • 31° 21' 52.09" E <p>Jar-02</p> <ul style="list-style-type: none"> • 25° 37' 37.94" S • 31° 21' 51.95" E
Approximate Age:	Historical/Contemporary
Applicable Sections of the Relevant Acts:	<ul style="list-style-type: none"> • Section 35 of the NHRA, No. 25 of 1999
Description:	
<p>Two big stoneware jars were found at the Main house. Jar-01 was found inside the house, while Jar-02 was found outside next to the southwest wall.</p> <p>Jar-01 had the following inscription (<i>Figure. 16</i>):</p> <p><i>B. Owens Jones Ltd</i> <i>24 Caithness St Ophirton JHB</i> <i>& Market St Boksburg</i></p> <p>The stoneware bottle most likely dates to the late 19th to early 20th century and was used as storage vessels for food, drinks, ink and chemicals (Lastovica & Lastovica 1990; Klose & Malan 2000). No information could be found for <i>B. Owens Jones Ltd</i>.</p> <p>Jar-02 had the following inscription (<i>Figure. 17</i>):</p> <p><i>A.E & C. I LTD</i></p> <p>This stoneware bottle has been broken and several pieces of the bottle are missing. It dates to somewhere after 1944. The African Explosives and Industries company changed its name to African Explosives and Chemical industry AE&CI when the company diversified into producing fertiliser, paint, veterinary preparation and other chemical products. As such, only after 1944 would the new company name has appeared on any of</p>	

their products. Unfortunately, an exact date of production for the bottle could not be determined. Similar bottles were most likely manufactured by AE&CI between 1944 – 1960. The bottle is of heritage significance.

Mitigation Measures:

- The two stoneware jars are of heritage value.
- If the land owner agrees the artefacts should be donated and moved from the site. It should be placed within the study collection of a heritage institution such as the Barberton Museum or University of Pretoria.
- Subject to SAHRA approval.



Figure 16: Jar-01



Figure 17: Jar-02

4.2. Built Environment Features

Table 15: TSHR-04

Site Name:	TSHR - 04
Type:	Bush Camp House
Density:	Low
Location/GPS Coordinates:	<ul style="list-style-type: none"> • 25° 37' 37.72" S • 31° 21' 52.24" E
Approximate Age:	Contemporary
Applicable Sections of the Relevant Acts:	<ul style="list-style-type: none"> • Section 34 of the NHRA, No. 25 of 1999
Description:	
<p>The Mbayane Bush Experience camp is located in the middle of the project area (Figure 21). The camp is accessed through a dirt road (Figure 18). Several structures including a main house, camping areas, storage areas and rooms were observed (Figures 19 and 20). Ox wagon wheels have been incorporated into the walls like windows. The ox wagon wheels, although out of context, is of cultural significance and should be preserved if the buildings are demolished.</p>	

The camp appears to be unkept and abandoned. Several of the doors, windows and roofs of the structures have been damaged. Ox wagon wheels have been repurposed and used as windows in the main buildings (Figure 21). The wheels are of cultural significance. None of the other structures identified have heritage value.

Mitigation Measures:

- If the land owner agrees the ox wagon wheels should be donated and moved from the site. It should be placed within the study collection of a heritage institutions such as the Barberton Museum or University of Pretoria.
- The buildings have no heritage significance, they can be destroyed or be repurposed and used as a site office by Sunshine.
- Subject to SAHRA approval.



Figure 18: Entrance to the bush camp.



Figure 19: Dirt road providing access to the bush camp.



Figure 20: General view of some of the buildings found on site.



Figure 21: Northwest and southwest corners of the main house.

4.3. Burial Grounds and Graves

No graves or burial sites were identified during the survey and site visit.

4.4. Paleontological Sensitivity

The SAHRA Palaeo-Sensitivity Layer (*Figure 22*) shows that the project area that is in a low sensitivity area. It applies to the farms Bien Venue 255 JU (Portion 0,2 And 3); Three Sisters 254 JU (Remaining Extent); Three Sisters 254 JU (Remaining Extent); Three Sisters 256 JU (Portion 1) and; Three Sisters 262 JU (Remaining Extent) and an application for Environmental Authorisation, within the NLM and the CoMLD, Mpumalanga Province. As such no palaeontological studies are required however, a protocol for finds is required (*See Appendix 2*).

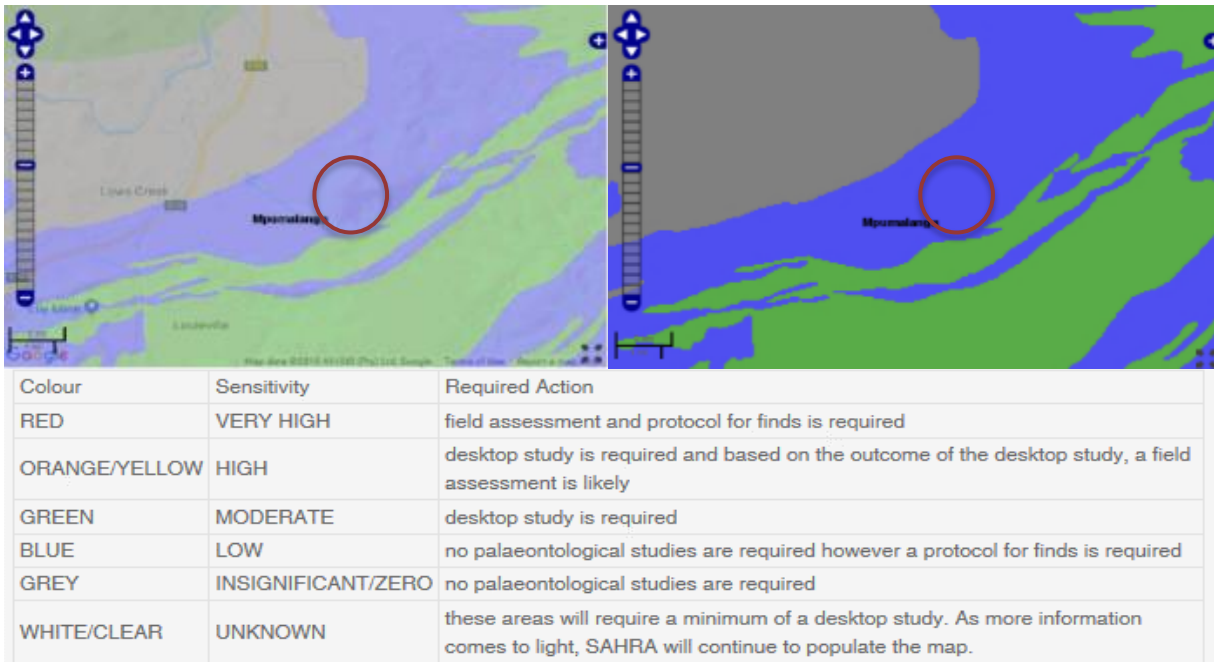


Figure 22: Palaeo-Sensitivity layer of the proposed prospecting rights application.

4.5. Site Ratings

Table 16: Impact and risk assessment rating for the project Planning phase in relation to the identified heritage resources in the project area.

Destruction of heritage resources						
Heritage Impact Assessment	Impact Name	Destruction of heritage resources				
	Alternative	Preferred Alternative				
	Phase	Planning				
	Environmental Risk					
	Attribute	Pre-mitigation	Post-mitigation	Attribute	Pre-mitigation	Post-mitigation
	Nature of Impact	-1	-1	Magnitude of Impact	4	3
	Extent of Impact	2	2	Reversibility of Impact	4	4
	Duration of Impact	5	4	Probability	5	3
	Environmental Risk (Pre-mitigation)					-18,75
	Mitigation Measures					
	<i>See Recommended mitigation measures in Table. 11-15</i>					
	Environmental Risk (Post-mitigation)					-9,75
	Degree of confidence in impact prediction:					Medium
	Impact Prioritisation					
	Public Response					1
	<i>Low: Issue not raised in public responses</i>					
	Cumulative Impacts					1
	<i>Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is unlikely that the impact will result in spatial and temporal cumulative change.</i>					
	Degree of potential irreplaceable loss of resources					1
	<i>The impact is unlikely to result in irreplaceable loss of resources.</i>					
Prioritisation Factor					1,00	
Final Significance					-9,75	

Table 17: Impact and risk assessment rating for the project Construction phase in relation to the identified heritage resources in the project area.

		Destruction of heritage resources				
Heritage Impact Assessment	Impact Name	Destruction of heritage resources				
	Alternative	Preferred Alternative				
	Phase	Construction				
	Environmental Risk					
	Attribute	Pre-mitigation	Post-mitigation	Attribute	Pre-mitigation	Post-mitigation
	Nature of Impact	-1	-1	Magnitude of Impact	4	4
	Extent of Impact	2	2	Reversibility of Impact	4	3
	Duration of Impact	5	4	Probability	3	3
	Environmental Risk (Pre-mitigation)					-11,25
	Mitigation Measures					
	<i>See Recommended mitigation measures in Table. 11-15</i>					
	Environmental Risk (Post-mitigation)					-9,75
	Degree of confidence in impact prediction:					Medium
	Impact Prioritisation					
	Public Response					1
	<i>Low: Issue not raised in public responses</i>					
	Cumulative Impacts					1
<i>Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is unlikely that the impact will result in spatial and temporal cumulative change.</i>						
Degree of potential irreplaceable loss of resources					1	
<i>The impact is unlikely to result in irreplaceable loss of resources.</i>						
Prioritisation Factor					1,00	
Final Significance					-9,75	

Table 18: Impact and risk assessment rating for the project Operational phase in relation to the identified heritage resources in the project area.

		Destruction of heritage resources				
Heritage Impact Assessment	Impact Name	Destruction of heritage resources				
	Alternative	Preferred Alternative				
	Phase	Operation				
	Environmental Risk					
	Attribute	Pre-mitigation	Post-mitigation	Attribute	Pre-mitigation	Post-mitigation
	Nature of Impact	-1	-1	Magnitude of Impact	4	2
	Extent of Impact	3	3	Reversibility of Impact	5	3
	Duration of Impact	5	4	Probability	2	2
	Environmental Risk (Pre-mitigation)					-8,50
	Mitigation Measures					
	<i>See Recommended mitigation measures in Table. 11-15</i>					
	Environmental Risk (Post-mitigation)					-6,00
	Degree of confidence in impact prediction:					Low
	Impact Prioritisation					
	Public Response					1
	<i>Low: Issue not raised in public responses</i>					
	Cumulative Impacts					1
<i>Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is unlikely that the impact will result in spatial and temporal cumulative change.</i>						
Degree of potential irreplaceable loss of resources					1	
<i>The impact is unlikely to result in irreplaceable loss of resources.</i>						
Prioritisation Factor					1,00	
Final Significance					-6,00	

Table 19: Impact and risk assessment rating for the project Rehab and Closure phase in relation to the identified heritage resources in the project area.

		Destruction of heritage resources				
Heritage Impact Assessment	Impact Name	Destruction of heritage resources				
	Alternative	Preferred Alternative				
	Phase	Rehab and Closure				
	Environmental Risk					
	Attribute	Pre-mitigation	Post-mitigation	Attribute	Pre-mitigation	Post-mitigation
	Nature of Impact	-1	-1	Magnitude of Impact	4	4
	Extent of Impact	3	3	Reversibility of Impact	5	4
	Duration of Impact	5	5	Probability	4	3
	Environmental Risk (Pre-mitigation)					-17,00
	Mitigation Measures					
	<i>See Recommended mitigation measures in Table. 11-15</i>					
	Environmental Risk (Post-mitigation)					-12,00
	Degree of confidence in impact prediction:					Low
	Impact Prioritisation					
	Public Response					1
	<i>Low: Issue not raised in public responses</i>					
	Cumulative Impacts					2
<i>Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is probable that the impact will result in spatial and temporal cumulative change.</i>						
Degree of potential irreplaceable loss of resources					1	
<i>The impact is unlikely to result in irreplaceable loss of resources.</i>						
Prioritisation Factor					1,17	
Final Significance					-14,00	

Table 20: Site significance classification and ratings for the buildings located in the project area.

FEATURE	FIELD RATING	GRADE	SIGNIFICANCE	RECOMMENDED MITIGATION
TSHR- 01	Generally Protected A (GP. A)	-	High / Medium Significance	Mitigation before destruction
TSHR- 02	Generally Protected A (GP. A)	-	High / Medium Significance	Mitigation before destruction
TSHR- 03	Generally Protected A (GP. A)	-	High / Medium Significance	Mitigation before destruction
TSHR- 04	Generally Protected C (GP. A)	-	Low Significance	Destruction

5. CONCLUSIONS AND RECOMMENDATIONS

Conclusions:

- It is concluded that the project is located in a region (Mpumalanga Province) that is rich in archaeology and heritage resources.
- The following resources were identified within the receiving environment:
 - TSHR-01 (Upper Grinding Stone) and TSHR-02 (Lower Grinding Stone). These stones most likely date to the Late Iron Age (LIA) and are of heritage significance. However, these artefacts are of low density and are out of primary context within a dilapidated camping cottage where they would have been used for decoration purposes and cannot be characterised as a site.
 - Two stoneware jars (TSHR-03) dating to the Historical Period Circa late 19th to the early 20th century (Lastovica & Lastovica 1990). Stoneware jars are often associated with storing of food, drinks, ink and chemicals (Lastovica & Lastovica 1990; Klose & Malan 2000). However, these jars are of low density and are out of primary context within a dilapidated camping cottage where they would have been used for decoration purposes and cannot be characterised as a site.
 - Two building structures, a recent dilapidated camping cottage and associated outbuilding were identified at TSHR-04. The two buildings were used as part of the Mbayane Bush Experience Camp. The camp has however, been abandoned and all structures are in a state of disrepair. The two buildings are less than 60 years old, having been built by the son of the farm owner and they do not have any heritage value. In the cottage, ox wagon wheels are modified and used as windows. Ox wagon wheels are very rare and considered to be of important heritage value.
- Based on the above findings it is concluded that there proposed prospecting area did not contain any archaeological, heritage resources such as burial grounds and historic built environment and landscape features with exception to artefacts and objects found within Mbayane Bush Experience Camp.
- However, some archaeological, historic resources and unmarked graves are subterranean in nature and might not have been identified during the survey due to the fact that they are located underneath the earth surface.
- According to the SAHRA Paleo-Sensitivity Layer, the proposed prospecting right area is situated in an area of Low Palaeontological Sensitivity. It is therefore concluded that the proposed prospecting activities will not negatively impact on palaeontological resources.
- It is concluded that the proposed prospecting activities and future mining activities, will not have an impact on the heritage and archaeological resources in the broader Barberton area.

Recommendations:

The following recommendations are made with regards to artefacts and objects found on Mbayane Bush Experience Camp, based on an understanding that the camp is private property and artefacts found within the camp are private collection.

- It is recommended that:
 - The farm owner should consider donating the observed artefacts, the Upper Grinding Stone (TSHR-01) and Lower Grinding Stone (TSHR-02), to a nearby museum or research institution. The Barberton Museum or University of Pretoria would be ideal repository centres.
 - The farm owner should consider donating the two stoneware jars (TSHR-03) found on the property, to a nearby museum or research institution. The Barberton Museum or University of Pretoria would be ideal repository centres.
 - TSHR-04 (Bush Camp): None of the buildings have heritage value, however the ox wagon wheels that were used as windows are of cultural significance. The farm owner should consider salvaging these very rare objects and donate them to a museum or research institution.
- Although a thorough survey was conducted some archaeological material, including artefacts and unmarked graves can be buried underground and as such, may not have been identified during the survey. In the case where the proposed development activities such as trenching bring these materials to the surface, they should be treated as **Chance Finds**. Should such resources be unearthed it is recommended that, the development activities should be stopped immediately, and an archaeologist should be contacted to conduct a site visit, assess the finds and make recommendations on how they should be mitigated. SAHRA and MHRA should also be informed immediately on such finds.
- In terms of the SAHRA Paleontological Sensitivity Layer, the area falls within an area of Low Palaeontological Sensitivity area. As such no palaeontological study is required, the attached protocol for finds is provided (*Appendix 2*).
- It is recommended that both the SAHRA and the MHRA grant the project a **Positive Review Comment** and allow the proposed prospecting rights application on the Farms Bien Venue 255 JU (Portion 0 ,2 and 3); Three Sisters 254 JU (Remaining Extent); Three Sisters 254 JU (Remaining Extent); Three Sisters 256 JU (Portion 1) and Three Sisters 262 JU (Remaining Extent) and the application for Environmental Authorisation proceed as planned.

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7. APPENDIX 1: SPECIALIST CV

Name : Cherene de Bruyn
Profession : Archaeology
Date of Birth : 1991/03/01
Parent Firm : NGT Holdings (Pty) Ltd
Position in Firm : Archaeologist and Heritage Consultant
Years with Firm : 4 Months
Nationality : South Africa
BI & Male/Female Status : White South African Female
Languages :

Language	Speak	Read	Write
English	X	X	X
Afrikaans	X	X	X

Country of Work Experience : South Africa
Proposed Position on Team : Archaeologist and Heritage Consultant

KEY QUALIFICATIONS

Cherene is a hard-working Archaeologist who has developed a mature and responsible approach to any task she undertakes. She received the British High Commissions Chevening Scholarship to complete a Master's degree in Archaeology at UCL in 2016/2017. She is skilled in excavating and analysing archaeological artefacts such as pottery and skeletal human remains, and has an interest in Egyptian, African and burial archaeology. Cherene is a motivated individual who gained relevant professional experience in the heritage sector through Internships as well as through volunteering on archaeological projects.

●●●●● = Excellent ●●●● = Proficient ●●● = Intermediate ●● = Developing ● = Novice

Communication ●●●●●
 Teamwork ●●●●●
 Time Management ●●●●●
 Adaptability ●●●●●
 Creativity ●●●●
 Leadership ●●●●
 Excavation ●●●●●
 Recording ●●●●●
 MS Office ●●●●
 Google Earth ●●●●
 QGIS ●●●
 Total Station ●●●

EDUCATION

NAME OF INSTITUTION	DEGREE OBTAINED	DATES ATTENDED
University College London	MA in Archaeology	2016 - 2017
University of Pretoria	BSC Honours in Physical Anthropology	2015
University of Pretoria	BA Honours in Archaeology	2013
University of Pretoria	BA in Archaeology	2010 – 2012

RELEVANT EXPERIENCE

DATE	ASSIGNMENT	POSITION	LOCATION
2018- Current	Employer - NGT Holdings (Pty) Ltd	Archaeologist and Heritage Consultant	RSA
2018	Letter of Recommendation for Exemption from Conducting a full Heritage Impact Assessment Study for the Matlala Park, Ekurhuleni Metropolitan Municipality, Gauteng Province.	Author	
2018	Heritage Impact Assessment for the Proposed KwaThema to Grundlingh WWTW Bulk Outfall Sewer: Capital Project Implementation near Nigel, Gauteng Province, South Africa.	Author	
2018	Heritage Impact Assessment the prospecting right and environmental authorisation application for Kroonstad South situated in the Free State Province.	Author	
2018	Heritage Impact Assessment the prospecting right and environmental authorisation application for Vredefort West situated in the Free State Province.	Author	
2018	Archaeological impact assessment for a mining permit application for portion 19 of the farm Syferfontein 303 IP within the city of Matlosana Local Municipality in the North West Province, South Africa.	Author	
2018	Background literature study on the archaeology and history of Madimatle Mountain and the Gatkop Caves situated within the Thabazimbi Local Municipal area of Waterberg District, Limpopo Province, south Africa.	Author	

DATE	ASSIGNMENT	POSITION	LOCATION
2018	Heritage Impact Assessment report for the proposed development of a SMME Training Centre and Youth Enterprise Park on Erf 1977 Edendale-CC located in the Msunduzi Local Municipality, Pietermaritzburg, KwaZulu-Natal Province, South Africa.	Author	
2018	Prospecting Right and Environmental Authorisation for the proposed WRE Nkunzana Prospecting Right Project.	Researcher	
2014-2015	<i>Forensic Anthropological Research Centre, University of Pretoria</i>	<i>DST-NRF Archaeological Intern</i>	<i>RSA</i>
2015	Report on rescue excavations and skeletal analyses of two archaeological graves inadvertently uncovered in Boitekong, North-West.	Field Assistant and Researcher	
2015	Report on Follow-up site visit excavation and physical anthropological analyses of archaeological human remains transferred from SAPA Victim Identification Center to Department of Anatomy. Mamelodi East Phase 2 House 566.	Field Assistant and Researcher	
2014	<i>Archaeological Assistant</i>	<i>Archaeos Ltd</i>	<i>RSA</i>
2014	A report on a cultural heritage impact assessment for the proposed development on portion 91 of the farm Waterkloof 305 JQ, close to Rustenburg, Northwest Province.	Field Assistant	
2014	A report on the phase II heritage investigation of a farmstead on portion 470 of the farm Waterkloof 305 JQ near Rustenburg in the Northwest Province.	Field Assistant	
2014	A report on the heritage impact assessment for the proposed new bulk water and sewer pipeline from Cosmo City to Lanseria, Gauteng Province.	Field Assistant	
2014	A report on the updating of a previous cultural heritage impact assessment for the EMPR alignment and consolidation process at Anglo American Platinum: Rustenburg platinum mines – Rustenburg section, Northwest Province.	Field Assistant and Researcher	

DATE	ASSIGNMENT	POSITION	LOCATION
2014	A report on a cultural heritage impact assessment for the proposed Thusanang housing development, close to Rustenburg, Northwest Province.	Field Assistant and Researcher	
2014	A report on the cultural heritage impact assessment for the Tshepong extension 1, 2 and 3 housing development, close to Vereeniging, Gauteng Province.	Field Assistant	
2014	A report on the cultural heritage impact assessment for the proposed Isibonelo Colliery Block Z opencast mine, close to Kriel, Mpumalanga Province.	Field Assistant	
2014	A report on a cultural heritage impact assessment for a proposed transport facility on portion 33 of the farm Vaalbank 289 JS, close to Middelburg, Mpumalanga Province.	Field Assistant	
2014	Report on a cultural heritage Impact assessment done for the Anglo-American Platinum and African Rainbow Minerals Modikwa Platinum Mine South Shaft 2 project, close to Burgersfort, Limpopo Province.	Field Assistant	

SUMMARY OF OTHER EXPERIENCE

DATE	EMPLOYER	POSITION	LOCATION
2018	Sci-bono Discovery Centre	Lascaux Exhibition Tour Guide	Newton, SA
2018, 2016	Umbeli Belli Middle Stone Age Excavation	Field and Lab Assistant	Kwazulu-Natal, SA
2015-2016	Bio-Archaeological Analysis and Archaeological Geophysics Unit, University of Pretoria	Archaeological Contractor	Pretoria, SA
2016, 2015	Wenner-Gren Foundation Funded Grassridge Archaeological and Palaeoenvironmental Project	Field and Lab Assistant	Eastern Cape, SA
2015	Department of Anatomy, University of Pretoria	Student Teaching Assistant	Pretoria, SA

MEMBERSHIPS

DATE	ORGANIZATION	POSITION
2018-Present	International Association for Impact Assessment South Africa (IAIASA)	Member
2015 - Present	Association of Southern African Professional Archaeologists (ASAPA)	Professional Member
2014 - Present	South African Archaeological Society	Member
2018 - Present	Association of Critical Heritage	Member

DECLARATION

I confirm that the above information contained in the CV is an accurate description of my experience and qualifications and that, at the time of signature, I am available and willing to serve in the position indicated for me in the Proposal, for the durations and at the locations indicated therein.



Cherene de Bruyn

11 January 2019

8. APPENDIX 2: CHANCE FINDS OF PALAEOLOGICAL MATERIAL

Introduction

This document is aimed to inform workmen and foremen working on a construction and/or mining site. It describes the procedure to follow in instances of accidental discovery of palaeontological material during construction/mining activities. This protocol does not apply to resources already identified under an assessment undertaken under section 38 of the NHRA no 25 of 1999.

Fossils are rare and irreplaceable. Fossils tell us about the environmental conditions that existed in a specific geographical area millions of years ago. As heritage resources that inform us of the history of a place, fossils are public property that the State is required to manage and conserve on behalf of all the citizens of South Africa. Fossils are therefore protected by the NHRA and are the property of the State. Ideally, a qualified person should be responsible for the recovery of fossils noticed during construction/mining to ensure that all relevant contextual information is recorded. Heritage Authorities often rely on workmen and foremen to report finds, and thereby contribute to our knowledge of South Africa's past and contribute to its conservation for future generations.

Training workmen and foremen need to be trained in the procedure to follow in instances of accidental discovery of fossil material, in a similar way to the Health and Safety protocol. A brief introduction to the process to follow in the event of possible accidental discovery of fossils should be conducted by the designated Environmental Control Officer (ECO) for the project, or the foreman or site agent in the absence of the ECO.

It is recommended that copies of the attached poster and procedure are printed out and displayed on-site so that workmen may familiarise themselves with them and are thereby prepared in the event that accidental discovery of fossil material takes place.

Actions to be taken: one person in the team must be identified and appointed as responsible for the implementation of the attached protocol in instances of accidental fossil discovery and must report to the ECO or site agent. If the ECO or site agent is not present on site, then the responsible person on-site should follow the protocol correctly in order to not jeopardise the conservation and well-being of the fossil material. Once a workman notices possible fossil material, he/she should report this to the ECO or site agent.

Procedure to follow if it is likely that the material identified is a fossil:

- I. The ECO or site agent must ensure that all work ceases immediately in the vicinity of the area where the fossil or fossils have been found;
- II. The ECO or site agent must inform SAHRA of the find immediately. This information must include photographs of the findings and GPS co-ordinates;
- III. The ECO or site agent must compile a Preliminary Report and fill in the Fossil Discoveries: SAHRA Preliminary Record Form within 24 hours without removing the fossil from its original position. The Preliminary Report records basic information about the find including:
 - The date
 - A description of the discovery
 - A description of the fossil and its context (e.g. position and depth of find)
 - Where and how the find has been stored
 - Photographs to accompany the preliminary report (the more the better):
 - A scale must be used
 - Photos of location from several angles
 - Photos of vertical section should be provided
 - Digital images of hole showing vertical section (side);
 - Digital images of fossil or fossils.
- IV. Upon receipt of this Preliminary Report, SAHRA will inform the ECO or site agent whether or not a rescue excavation or rescue collection by a palaeontologist is necessary.
- V. Exposed finds must be stabilised where they are unstable, and the site capped, e.g. with a plastic sheet or sand bags. This protection should allow for the later excavation of the finds with due scientific care and diligence. SAHRA can advise on the most appropriate method for stabilisation.
- VI. If the find cannot be stabilised, the fossil may be collected with extreme care by the ECO or the site agent and put aside and protected until SAHRA advises on further action. Finds collected in this way must be safely and securely stored in tissue paper and an appropriate box. Care must be taken to remove all fossil material and any breakage of fossil material must be avoided at all costs.

No work may continue in the vicinity of the find until SAHRA has indicated, in writing, that it is appropriate to proceed.

9. APPENDIX 3: ENVIRONMENTAL RISKS FOUND ON-SITE

Environmental risks found on-site.



Figure 23: General view of stockpile.



Figure 24: Google Earth map indicating the location of the excavations on top of the stockpile.

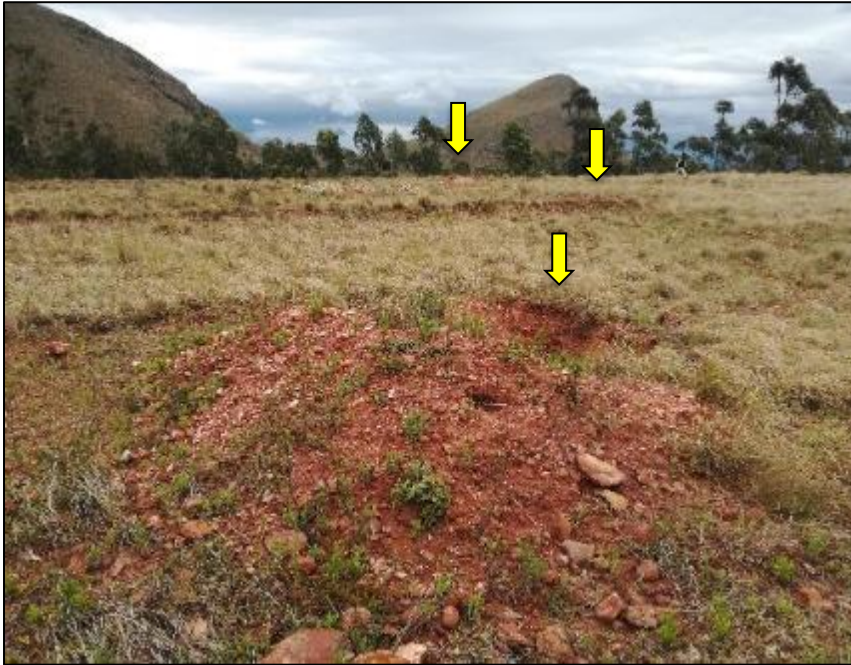


Figure 25: General view of the locations of the excavations (photo taken from the east).



Figure 26: Three excavations identified on the stockpile.