

Phase 1 Cultural Heritage Impact Assessment:

**MINING RIGHT APPLICATION OF CHROME ORE ON THE FARM BAKHOUTRANTJE 205JP, NEAR
PILANESBERG, MOSES KOTANE LOCAL MUNICIPALITY, BOJANALA MUNICIPAL DISTRICT,
NORTH WEST PROVINCE**

Prepared for:

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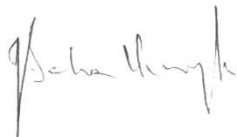


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Specialist competency:

Johan A van Schalkwyk, D Litt et Phil, heritage consultant, has been working in the field of heritage management for more than 40 years. Originally based at the National Museum of Cultural History, Pretoria, he has actively done research in the fields of anthropology, archaeology, museology, tourism and impact assessment. This work was done in Limpopo Province, Gauteng, Mpumalanga, North West Province, Eastern Cape Province, Northern Cape Province, Botswana, Zimbabwe, Malawi, Lesotho and Swaziland. Based on this work, he has curated various exhibitions at different museums and has published more than 70 papers, most in scientifically accredited journals. During this period, he has done more than 2000 Phase 1 and Phase 2 impact assessments (archaeological, anthropological, historical and social) for various government departments and developers. Projects include environmental management frameworks, roads, pipeline-, and power line developments, dams, mining, water purification works, historical landscapes, refuse dumps and urban developments.



J A van Schalkwyk
Heritage Consultant
March 2019

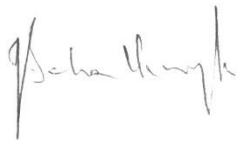


SPECIALIST DECLARATION

I, J A van Schalkwyk, as the appointed independent specialist, in terms of the 2014 EIA Regulations (as amended), hereby declare that I:

- I act as the independent specialist in this application;
- I 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;
- regard the information contained in this report as it relates to my specialist input/study to be true and correct, and do not have and will not have any financial interest in the undertaking of the activity, other than remuneration for work performed in terms of the NEMA, the Environmental Impact Assessment Regulations, 2014 (as amended) and any specific environmental management Act;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I have no vested interest in the proposed activity proceeding;
- 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 have ensured that information containing all relevant facts in respect of the specialist input/study was distributed or made available to interested and affected parties and the public and that participation by interested and affected parties was facilitated in such a manner that all interested and affected parties were provided with a reasonable opportunity to participate and to provide comments on the specialist input/study;
- I have ensured that the comments of all interested and affected parties on the specialist input/study were considered, recorded and submitted to the competent authority in respect of the application;
- all the particulars furnished by me in this specialist input/study are true and correct; and
- I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.

Signature of the specialist



J A van Schalkwyk
March 2019

EXECUTIVE SUMMARY

**Phase 1 Cultural Heritage Impact Assessment:
MINING RIGHT APPLICATION OF CHROME ORE ON THE FARM BAKHOUSRANTJE 205JP, NEAR
PILANESBERG, MOSES KOTANE LOCAL MUNICIPALITY, BOJANALA MUNICIPAL DISTRICT,
NORTH WEST PROVINCE**

Mosikwe Investments (Pty) Ltd propose to for mine chrome ore, depending on the results obtained from prospecting activities, on the farm Bakhoutrandjes 205JP near Pilanesberg, Moses Kotane Local Municipality, Bojanala Municipal District, North West Province.

This report describes the methodology used, the limitations encountered, the heritage features that were identified and the recommendations and mitigation measures proposed relevant to this. It should be noted that the implementation of the mitigation measures is subject to SAHRA/PHRA's approval.

The cultural landscape qualities of the region are made up of a pre-colonial element consisting of very limited Stone Age and a later extensive Iron Age occupation. A later component consists of a colonial (farmer) component, which eventually also gave rise to an urban component.

Identified sites

During the physical survey, the following sites, features or objects of cultural significance were identified:

- 7.2.1 – 7.2.5: A number of similar type of stone walled sites dating to the Late Iron Age (from c. 1600 to 1800), that can be linked to Tswana (Tlokwa) occupation of the larger region. It is probably a continuation of the main settlements known as Marathodi, located some distance to the south on the farm Vlakfontein.
It seems as if the sites are concentrated on outcrops forming low ridges. These locations were chosen as it supplied a ready source of building material (stone), but it is also away from the turf soil which is to unstable to build on.
- 7.3.1: Informal burial site with approximately seven graves. These graves probably originated from people that stayed in the larger region as farm labourers. The graves seem to be very old and has not been visited or cleared of vegetation in a very long time. It is difficult to establish a definite number as all of them are marked only with stone cairns and is currently overgrown with shrubs and aloes.

Impact assessment and proposed mitigation measures

Impact analysis of cultural heritage resources under threat of the proposed development, is based on the present understanding of the development:

| IDENTIFIED HERITAGE RESOURCES | | | | | |
|-------------------------------|------------------|---------------|--------------------------------|--|--|
| Site No. | Site type | NHRA category | Field rating | Impact rating: Before/After mitigation | Proposed mitigation (Refer to definitions in Section 12.3) |
| Iron Age settlement sites | | | | | |
| 7.2.1 – 7.2.5 | Settlement sites | Section 35 | High significance Grade 4-A | 60 | (1) Avoidance/Preserve; (2) Archaeological investigation |
| | | | | 27 | |
| Informal burial site | | | | | |
| 7.3.1 | Burial site | Section 36 | High significance Grade 4-A | 60 | (1) Avoidance/Preserve; (2) Archaeological investigation |
| | | | | 27 | |

Legal requirements

The legal requirements related to heritage specifically are specified in Section 3 of this report. For this proposed project, the assessment has determined that no sites, features or objects of heritage significance occur in the study area. If heritage features are identified during construction, as stated in the management recommendation, these finds would have to be assessed by a specialist, after which a decision will be made regarding the application for relevant permits.

Reasoned opinion as to whether the proposed activity should be authorised:

- From a heritage point of view, it is recommended that the proposed development be allowed to continue on acceptance of the conditions proposed below.

Conditions for inclusion in the environmental authorisation:

- The Palaeontological Sensitivity Map (SAHRIS) indicate that a portion of the study area has sections that has a high sensitivity of fossil remains to be found, whereas the largest section has a moderate sensitivity. Both these areas require palaeontological studies. The section indicated in grey do not require any palaeontological study.
- The boundaries of the areas marked as highly sensitive for the presence of cultural heritage sites (LIA sites) should not be taken as final and should be confirmed when the vegetation cover has gone down by the end of the winter season.
- A heritage assessment should be conducted over each identified localised drill site in order to identify any cultural, heritage and or archaeological features which may be impacted on.
- Should archaeological sites or graves be exposed in other areas during construction work, it must immediately be reported to a heritage practitioner so that an investigation and evaluation of the finds can be made.



J A van Schalkwyk
Heritage Consultant
March 2019

TECHNICAL SUMMARY

| Project description | |
|----------------------------|----------------------|
| Description | Mining of chrome ore |
| Project name | Mosikwe |

| Applicant |
|-------------------------------|
| Mosikwe Investments (Pty) Ltd |

| Environmental assessors |
|--------------------------------|
| Jomela Consulting (Pty) Ltd |
| Ms Y Gutoona |

| Property details | | | | | | |
|-------------------------|----------------------------|-----------|-----------|----|----------|-----------|
| Province | North West | | | | | |
| Magisterial district | Mankwe | | | | | |
| District municipality | Bojanala | | | | | |
| Topo-cadastral map | 2526BD | | | | | |
| Farm name | Bakhoutrantje 205-IP | | | | | |
| Closest town | Rustenburg | | | | | |
| Coordinates | Centre point (approximate) | | | | | |
| | No | Latitude | Longitude | No | Latitude | Longitude |
| | 1 | -25,29375 | 26,90352 | | | |

| Development criteria in terms of Section 38(1) of the NHR Act | Yes/No |
|---|--------|
| Construction of road, wall, power line, pipeline, canal or other linear form of development or barrier exceeding 300m in length | No |
| Construction of bridge or similar structure exceeding 50m in length | No |
| Development exceeding 5000 sq m | Yes |
| Development involving three or more existing erven or subdivisions | No |
| Development involving three or more erven or divisions that have been consolidated within past five years | No |
| Rezoning of site exceeding 10 000 sq m | No |
| Any other development category, public open space, squares, parks, recreation grounds | No |

| Land use | |
|-------------------|---------|
| Previous land use | Farming |
| Current land use | Farming |

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GLOSSARY OF TERMS AND ABBREVIATIONS

TERMS

Bioturbation: The burrowing by small mammals, insects and termites that disturb archaeological deposits.

Cumulative impacts: “Cumulative Impact”, in relation to an activity, means the past, current and reasonably foreseeable future impact of an activity, considered together with the impact of activities associated with that activity, that in itself may not be significant, but may become significant when added to existing and reasonably foreseeable impacts eventuating from similar or diverse activities.

Debitage: Stone chips discarded during the manufacture of stone tools.

Factory site: A specialised archaeological site where a specific set of technological activities has taken place – usually used to describe a place where stone tools were made.

Historic Period: Since the arrival of the white settlers - c. AD 1830 - in this part of the country.

Holocene: The most recent time period, which commenced c. 10 000 years ago.

Iron Age (also referred to as **Early Farming Communities**): Period covering the last 1800 years, when new people brought a new way of life to southern Africa. They established settled villages, cultivated domestic crops such as sorghum, millet and beans, and they herded cattle as well as sheep and goats. As they produced their own iron tools, archaeologists call this the Iron Age.

| | |
|-----------------|-------------------|
| Early Iron Age | AD 200 - AD 900 |
| Middle Iron Age | AD 900 - AD 1300 |
| Later Iron Age | AD 1300 - AD 1830 |

Midden: The accumulated debris resulting from human occupation of a site.

Mitigation, means to anticipate and prevent negative impacts and risks, then to minimise them, rehabilitate or repair impacts to the extent feasible.

National Estate: The collective heritage assets of the Nation.

Pleistocene: Geological time period of 3 000 000 to 20 000 years ago.

Stone Age: The first and longest part of human history is the Stone Age, which began with the appearance of early humans between 3-2 million years ago. Stone Age people were hunters, gatherers and scavengers who did not live in permanently settled communities. Their stone tools preserve well and are found in most places in South Africa and elsewhere.

| | |
|------------------|------------------------------------|
| Early Stone Age | 2 500 000 - 150 000 Before Present |
| Middle Stone Age | 150 000 - 30 000 BP |
| Later Stone Age | 30 000 - until c. AD 200 |

Tradition: As used in archaeology, it is a seriated sequence of artefact assemblages, particularly ceramics.

ACRONYMS and ABBREVIATIONS

| | |
|-------|---|
| ASAPA | Association of Southern African Professional Archaeologists |
| BCE | Before the Common Era (the year 0) |

| | |
|----------|--|
| BP | Before Present (calculated from 1950 when radio-carbon dating was established) |
| CE | Common Era (the year 0) |
| ESA | Early Stone Age |
| EIA | Early Iron Age |
| HIA | Heritage Impact Assessment |
| I & AP's | Interested and Affected Parties |
| LIA | Late Iron Age |
| LSA | Later Stone Age |
| MIA | Middle Iron Age |
| MSA | Middle Stone Age |
| NASA | National Archives of South Africa |
| NHRA | National Heritage Resources Act |
| PHRA | Provincial Heritage Resources Agency |
| SAHRA | South African Heritage Resources Agency |
| SAHRIS | South African Heritage Resources Information System |

COMPLIANCE WITH THE APPENDIX 6 OF THE 2014 EIA REGULATIONS (AS AMENDED)

| Requirements of Appendix 6 – GN R982 | Addressed in the Specialist Report |
|---|---|
| 1. (1) A specialist report prepared in terms of these Regulations must contain- | |
| a) details of- | |
| i. the specialist who prepared the report; and | Front page |
| ii. the expertise of that specialist to compile a specialist report including a curriculum vitae; | Page i Addendum Section 6 |
| b) a declaration that the specialist is independent in a form as may be specified by the competent authority; | Page ii |
| c) an indication of the scope of, and the purpose for which, the report was prepared; | Section 1 |
| (cA) an indication of the quality and age of base data used for the specialist report; | Section 4 |
| (cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change; | Section 7.3 |
| d) the duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment; | Section 4.2.2 |
| e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used; | Section 4 |
| 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; | Addendum Section 5 Fig. 13 & 14 |
| g) an identification of any areas to be avoided, including buffers; | Section 8 |
| 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; | Fig. 13 & 14 Addendum Section 5 |
| i) a description of any assumptions made and any uncertainties or gaps in knowledge; | Section 2 |
| j) a description of the findings and potential implications of such findings on the impact of the proposed activity or activities; | Section 7 |
| k) any mitigation measures for inclusion in the EMPr; | Section 9 & 10 |
| l) any conditions for inclusion in the environmental authorisation; | Section 10 |
| m) any monitoring requirements for inclusion in the EMPr or environmental authorisation; | Section 9 |
| n) a reasoned opinion- | |
| i. whether the proposed activity, activities or portions thereof should be authorised; | Section 10 |
| (iiA) regarding the acceptability of the proposed activity or activities; and | |
| ii. if the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan; | Section 8, 9, 10 |
| o) a description of any consultation process that was undertaken during the course of preparing the specialist report; | - |
| p) a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and | - |
| q) any other information requested by the competent authority. | - |
| (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. | - |

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NORTH WEST PROVINCE**

1. INTRODUCTION

1.1 Background

Mosikwe Investments (Pty) Ltd propose to for mine chrome ore, depending on the results obtained from prospecting activities, on the farm Bakhoutrandjes 205JP near Pilanesberg, Moses Kotane Local Municipality, Bojanala Municipal District, North West Province.

South Africa's heritage resources, also described as the 'national estate', comprise a wide range of sites, features, objects and beliefs. However, according to Section 27(18) of the National Heritage Resources Act (NHRA), No. 25 of 1999, no person may destroy, damage, deface, excavate, alter, remove from its original position, subdivide or change the planning status of any heritage site without a permit issued by the heritage resources authority responsible for the protection of such site.

In accordance with Section 38 of the NHRA, an independent heritage consultant was appointed by *Mosikwe Investments (Pty) Ltd* to conduct a cultural heritage assessment to determine if the proposed mining activities would have an impact on any sites, features or objects of cultural heritage significance.

This report forms part of the Environmental Impact Assessment (EIA) as required by the EIA Regulations in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) as amended and is intended for submission to the South African Heritage Resources Agency (SAHRA).

1.2 Terms and references

The aim of a full HIA investigation is to provide an informed heritage-related opinion about the proposed development by an appropriate heritage specialist. The objectives are to identify heritage resources (involving site inspections, existing heritage data and additional heritage specialists if necessary); assess their significances; assess alternatives in order to promote heritage conservation issues; and to assess the acceptability of the proposed development from a heritage perspective.

The result of this investigation is a heritage impact assessment report indicating the presence/absence of heritage resources and how to manage them in the context of the proposed development.

Depending on SAHRA's acceptance of this report, the developer will receive permission to proceed with the proposed development, on condition of successful implementation of proposed mitigation measures.

1.2.1 Scope of work

The aim of this study is to determine if any sites, features or objects of cultural heritage significance occur within the boundaries of the area where the proposed mining activities is to take place. This included:

- Conducting a desk-top investigation of the area;
- A visit to the proposed development site.

The objectives were to:

- Identify possible archaeological, cultural and historic sites within the proposed development areas;
- Evaluate the potential impacts of construction, operation and maintenance of the proposed development on archaeological, cultural and historical resources;
- Recommend mitigation measures to ameliorate any negative impacts on areas of archaeological, cultural or historical importance.

1.2.2 Assumptions and Limitations

The investigation has been influenced by the following factors:

- It is assumed that the description of the proposed project, provided by the client, is accurate.
- The unpredictability of buried archaeological remains.
- No subsurface investigation (i.e. excavations or sampling) were undertaken, since a permit from SAHRA is required for such activities.
- It is assumed that the public consultation process undertaken as part of the Environmental Impact Assessment (EIA) is sufficient and that it does not have to be repeated as part of the heritage impact assessment.
- The unpredictability of buried archaeological remains.

2. LEGISLATIVE FRAMEWORK

2.1 Background

Heritage Impact Assessments are governed by national legislation and standards and International Best Practise. These include:

- South African Legislation
 - National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA);
 - Mineral and Petroleum Resources Development Act, 2002 (Act No. 22 of 2002) (MPRDA);
 - National Environmental Management Act 1998 (Act No. 107 of 1998) (NEMA); and
 - National Water Act, 1998 (Act No. 36 of 1998) (NWA).
- Standards and Regulations
 - South African Heritage Resources Agency (SAHRA) Minimum Standards;
 - Association of Southern African Professional Archaeologists (ASAPA) Constitution and Code of Ethics;
 - Anthropological Association of Southern Africa Constitution and Code of Ethics.
- International Best Practise and Guidelines
 - ICOMOS Standards (Guidance on Heritage Impact Assessments for Cultural World Heritage Properties); and
 - The UNESCO Convention concerning the Protection of the World Cultural and Natural Heritage (1972).

2.2 Heritage Impact Assessment Studies

South Africa's unique and non-renewable archaeological and palaeontological heritage sites are 'generally' protected in terms of the National Heritage Resources Act (Act No 25 of 1999, Section 35) and may not be disturbed at all without a permit from the relevant heritage resources authority.

The National Heritage Resources Act (Act No. 25 of 1999, Section 38) provides guidelines for Cultural Resources Management and prospective developments:

“38 (1) Subject to the provisions of subsections (7), (8) and (9), any person who intends to undertake a development categorised as:

- (a) the construction of a road, wall, powerline, 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.”*

And:

“38 (3) The responsible heritage resources authority must specify the information to be provided in a report required in terms of subsection (2)(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 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. HERITAGE RESOURCES

3.1 The National Estate

The National Heritage Resources Act (No. 25 of 1999) defines the heritage resources of South Africa which are of cultural significance or other special value for the present community and for future generations that must be considered part of the national estate to include:

- 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, including-
 - ancestral graves;
 - royal graves and graves of traditional leaders;
 - graves of victims of conflict;

- graves of individuals designated by the Minister by notice in the Gazette;
- historical graves and cemeteries; and
- other human remains which are not covered in terms of the Human Tissue Act, 1983 (Act No. 65 of 1983);
- sites of significance relating to the history of slavery in South Africa;
- movable objects, including-
 - objects recovered from the soil or waters of South Africa, including archaeological and palaeontological objects and material, meteorites and rare geological specimens;
 - objects to which oral traditions are attached or which are associated with living heritage;
 - ethnographic art and objects;
 - military objects;
 - objects of decorative or fine art;
 - objects of scientific or technological interest; and
 - books, records, documents, photographic positives and negatives, graphic, film or video material or sound recordings, excluding those that are public records as defined in section 1(xiv) of the National Archives of South Africa Act, 1996 (Act No. 43 of 1996).

3.2 Cultural significance

In the NHRA, Section 2 (vi), it is stated that “cultural significance” means aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance. This is determined in relation to a site or feature’s uniqueness, condition of preservation and research potential.

According to Section 3(3) of the NHRA, a place or object is to be considered part of the national estate if it has cultural significance or other special value because of

- its importance in the community, or pattern of South Africa's history;
- its possession of uncommon, rare or endangered aspects of South Africa's natural or cultural heritage;
- its potential to yield information that will contribute to an understanding of South Africa's natural or cultural heritage;
- its importance in demonstrating the principal characteristics of a particular class of South Africa's natural or cultural places or objects;
- its importance in exhibiting particular aesthetic characteristics valued by a community or cultural group;
- its importance in demonstrating a high degree of creative or technical achievement at a particular period;
- its strong or special association with a particular community or cultural group for social, cultural or spiritual reasons;
- its strong or special association with the life or work of a person, group or organisation of importance in the history of South Africa; and
- sites of significance relating to the history of slavery in South Africa.

A matrix was developed whereby the above criteria were applied for the determination of the significance of each identified site. This allowed some form of control over the application of similar values for similar identified sites – see Section 2 of the Addendum below.

4. STUDY APPROACH AND METHODOLOGY

4.1 Extent of the Study

This survey and impact assessment covers all facets of cultural heritage located in the study area as presented in Section 5 below and illustrated in Figure 5.

4.2 Methodology

4.2.1 Desktop review

4.2.1.1 Survey of the literature

A survey of the relevant literature was conducted with the aim of reviewing the previous research done and determining the potential of the area. In this regard, various anthropological, archaeological and historical sources were consulted – see list of references in Section 11.

- Information on events, sites and features in the larger region were obtained from these sources.

4.2.1.2 Survey of heritage impact assessments (HIAs)

A survey of HIAs done for projects in the region by various heritage consultants was conducted with the aim of determining the heritage potential of the area – see list of references in Section 11.

- Information on sites and features in the larger region were obtained from these sources.

4.2.1.3 Data bases

The *Heritage Atlas Database*, various SAHRA databases, the *Environmental Potential Atlas*, the *Chief Surveyor General* and the *National Archives of South Africa* were consulted.

- Database surveys produced a number of sites located in the larger region of the proposed development.

4.2.1.4 Other sources

Aerial photographs and topocadastral and other maps were also studied - see the list of references below.

- Features such as areas with a lack of vegetation, possible buildings, hills and pans, were identified and marked for investigation during the field survey.

4.2.1.5 Interpretation

The results of the above investigation are summarised in Table 1 below – see list of references in Section 11 – and can be summarised as follows:

- Stone Age tools, dating to the MSA occur as surface scatters on the banks of river, near outcrops and on valley floors in the larger region;
- Sites containing rock art, dating to the Later Stone Age, are known to occur in the larger region to the south;
- Stone walled sites dating to the Late Iron Age and associated with the Tswana occupation of the region, occur in large numbers all over;
- Historic structures, inclusive of buildings, bridges and mining related features, occur mostly in an urban environment, although they also occur sporadically on the various farms;
- Formal burial sites occur in an urban setting, with a number of informal ones occurring sporadically throughout the country side.

*Based on the above assessment, the probability of cultural heritage sites, features and objects occurring in the study area is deemed to be **high**.*

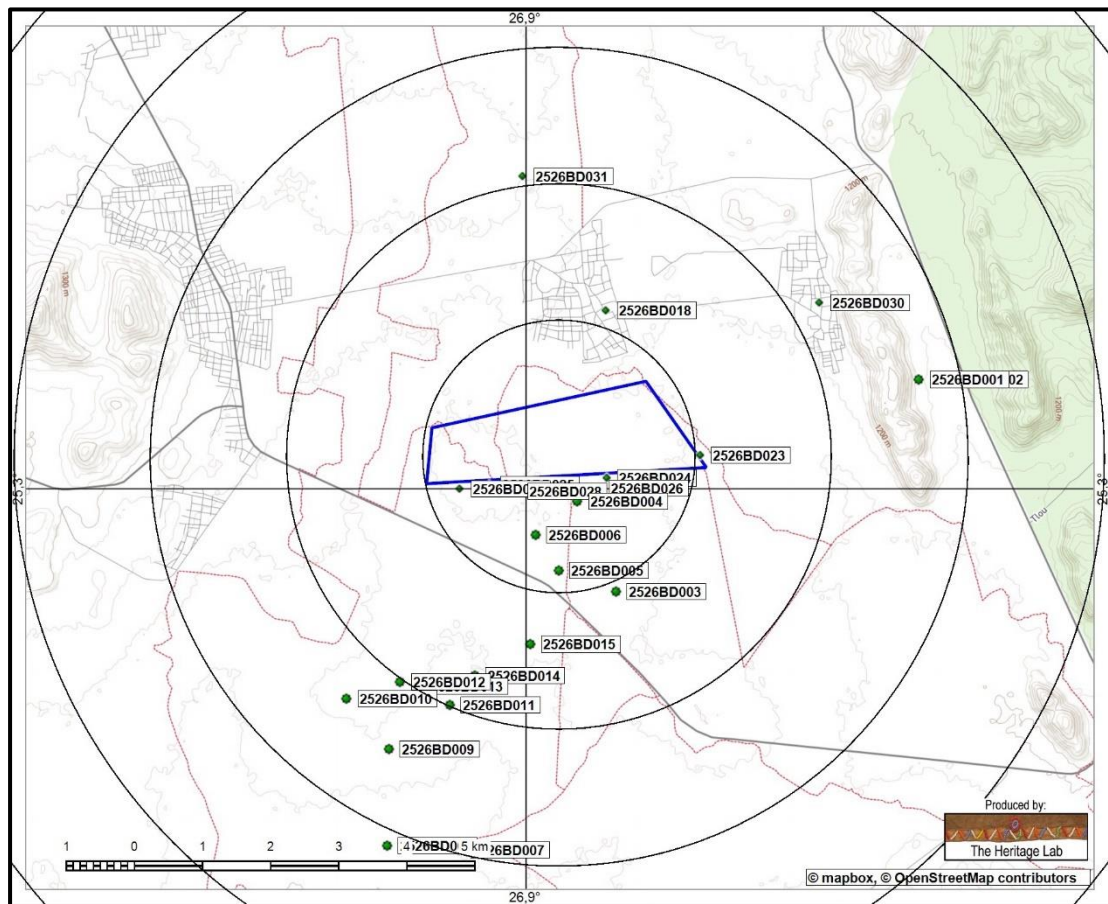


Figure 1. Location of known heritage sites and features in relation to the study area (Circles spaced at a distance of 2km: heritage sites = coded green dots)

4.2.2 Field survey

The field survey was done according to generally accepted archaeological practices, and was aimed at locating all possible sites, objects and structures. The area that had to be investigated was identified by the *Mosikwe Investments (Pty) Ltd* by means of maps and .kml files indicating the development area. This was loaded onto an ASUS digital device and used in Google Earth during the field survey to access the areas.

The survey was conducted on 14 March 2019. The site was surveyed by an intensive pedestrian investigation – see Fig. 3 below. During the site survey *Kgosana Egmond Mpudi* and elder community member *Molefe Moatshe* accompanied the consultant. They know the area very well as they have been herding cattle here for a very long time. Consequently, they could point out areas of archaeological interest, as well as pointing out impacted areas such as old agricultural fields and previous mining activities.

During the site visit, archaeological visibility was much impacted by high and dense grass (Fig. 2). As this was anticipated, a controlled exclusive approach was followed during the site survey. This is done where ‘sufficient information exists on an area to make solid and defensible assumptions and judgements about where [heritage resource and] sites may and may not be’ and ‘an inspection of the surface of the ground, wherever this surface is visible, is made, with no substantial attempt to clear brush, turf, deadfall, leaves or other material that may cover the surface and with no attempt to look

beneath the surface beyond the inspection of rodent burrows, cut banks and other exposures that are observed by accident' (King 1978):

- Prior knowledge of the region;
- Large areas consist of turf soil, which is not conducive for settling on was scanned;
- Much of the turf areas were previously used as agricultural fields was only scanned;
- Area such as rocky outcrops and banks of streams and rivers were targeted.



Figure 2. The vegetation cover encountered over most of the study area

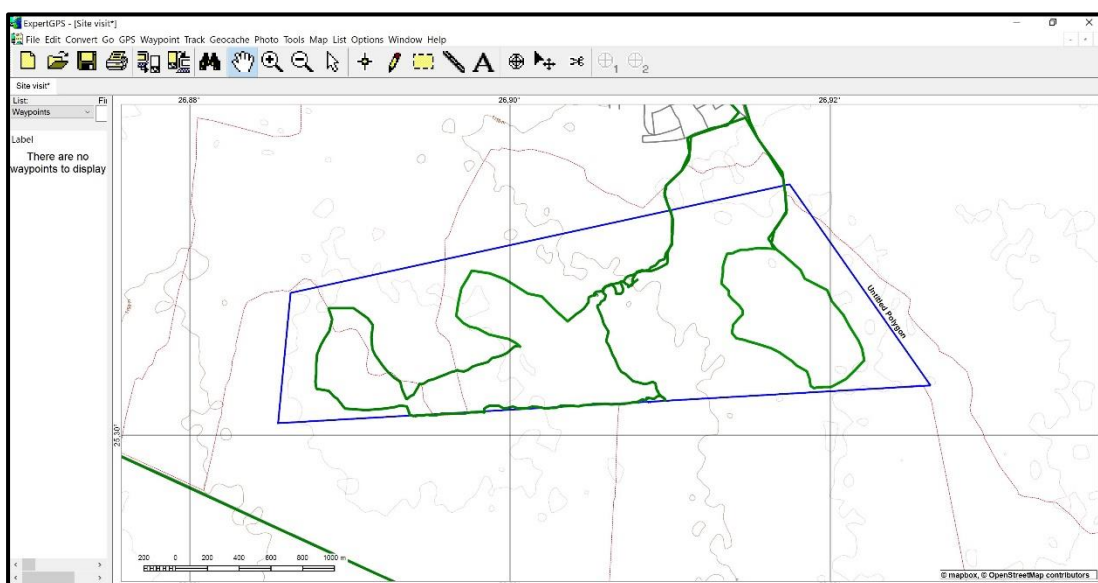


Figure 3. Map indicating the track log of the field survey (Study area = red; tracklog = green)

4.2.3 Documentation

All sites, objects and structures that are identified are documented according to the general minimum standards accepted by the archaeological profession. Coordinates of individual localities are determined by means of the *Global Positioning System* (GPS) and plotted on a map. This information is added to the description in order to facilitate the identification of each locality.

The track log and identified sites were recorded by means of a Garmin Oregon 550 handheld GPS device. Photographic recording was done by means of a Canon EOS 550D digital camera.

Map datum used: Hartebeeshoek 94 (WGS84).

4.3 Public participation

The public participation tasks conducted for the proposed project to date include (from Gutoona 2018):

1. Identification of key Interested and Affected Parties (affected and adjacent landowners) and other stakeholders (organs of state and other parties);
2. Formal notification of the application to key Interested and Affected Parties (all adjacent landowners) and other stakeholders;
3. Consultation and correspondence with I&AP's and Stakeholders and the addressing of their comments; and
4. Newspaper adverts.

I&AP and Stakeholder identification, registration and the creation of an electronic database

The project was announced as follows:

- **Newspaper advertisement**

An advertisement was placed on the 2nd of November in English in the local newspaper Platinum Weekly announcing the project and requesting interested and affected parties to register. The advert announced the availability of the Basis (sic) Assessment report and stating the date and invited interested and affected parties to register and submit their comments regarding the proposed project.

- **Site notice placement**

In order to inform surrounding communities and adjacent landowners of the proposed development, site notices were erected on site and at visible locations close to the site. Site Notices were placed in the vicinity of the project, at the Municipality, Post Office, Farms, notice boards, public roads on the 2nd of November 2018.

- **Written notification**

I&AP's and other key stakeholders were notified of the project and landowner were contacted during the site notice setup. The BAR was available for comment for at least 30 days from the 6th of November 2018 to the 5th of December 2018. Hard Copies were submitted to commenting authorities and their comments have been incorporated in the final BAR.

- **Public Meeting**

No objections have been noted for the project during the consultation between the community leaders and Mosikwe Investments. The public meeting was held on the 24th of November 2018 at the Witrandjie Community Hall at 10.am.

- **Consultation and correspondence with I&AP's and Stakeholders and the addressing of their comments (continuous).**

No objections have been noted for the project during the consultation between the community leaders and Mosikwe Investments.

5. PROJECT DESCRIPTION

5.1 Site location

The site is located approximately 45 km northwest of Rustenburg and 20 km northwest of the Sun City Entertainment Complex, in the Bojanala District Municipality of North West Province. The site is 382 ha in size and consists of the remaining extent and portion 1 of the farm Bakhoutrantje 205JP (Fig. 4). For more information, see the Technical Summary on p. V above.

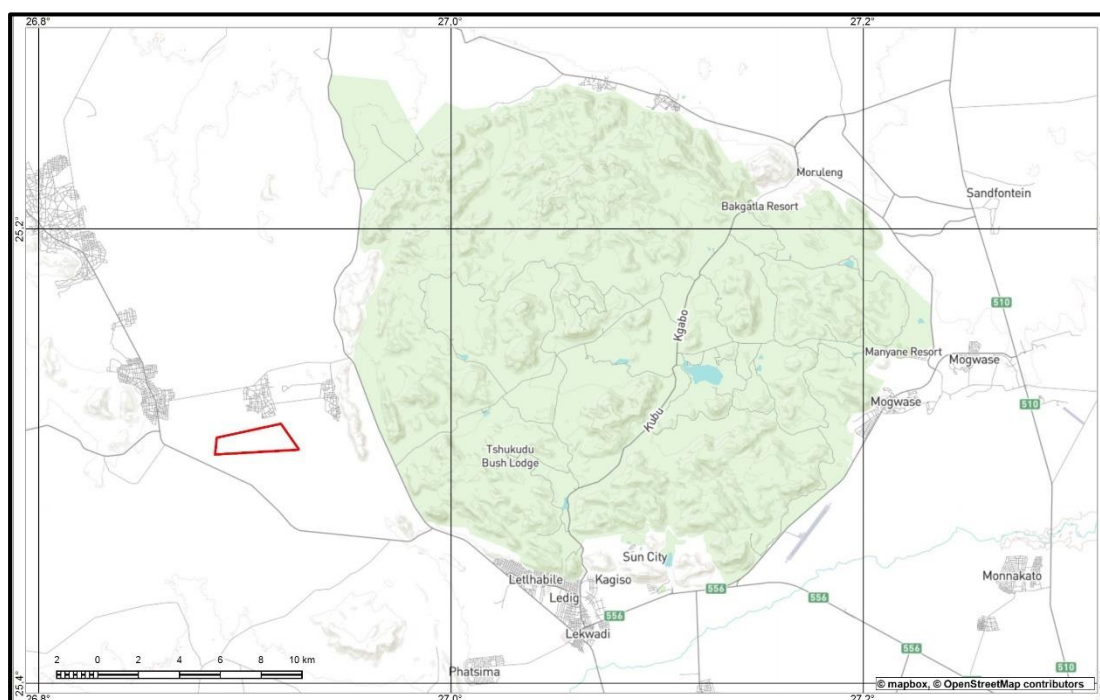


Figure 4. Location of the study area (red polygon) in regional context

5.2 Development proposal

5.2.1 Description of overall activity

The existence and possible size of heavy mineral deposits in the application area will be determined as follows (from Gutooma 2018):

- **Field Mapping**

This method includes the identification of exposed geological structures and lithological outcrops, through aerial photo interpretation, satellite image interpretation and also by walking the farms/folios.

- **Drilling**

A proposed drilling programme of boreholes will be used to further define the ore body. The drilling program will determine the exact outline, shape and size of the ore body. The core drilling is generally done in this target. The different rock sample intersecting the deposit will be sent for assay at one of the accredited laboratories.

RC-drilling- Drilling is done in phases, as outlined elsewhere, over anomalous target areas, using reconnaissance lines or a grid of 100m or 400m x 400m holes will be approximately >50m deep depending on the local depth. The drill holes will be sent to the laboratory for assay.

- **Geophysical Survey**

Ground gravity surveys are applied in order to outline ore deposit positions and size accurately. Ground gravity surveys are carried out on a grid layout. The grid is placed in the field through the use of total station or real time GPS system. Gravity readings and accurate elevations are recorded at each station on the grid. The grid that is used is a 200m x 200m and if there are anomalies in the data the grid is tightened to 100m x 100m. The smaller grid increases the resolution and smaller features then become visible. 1000 gravity points will be needed to delineate the ore bearing lithologies. The gravity data will be evaluated by means of RC Diamond drilling.

Geophysical Survey- Ground geophysical surveys will be conducted over selected target areas on a 200m x 200m grid. Ground gravity surveys is used to outline the ore hosting lithology.

A phased prospecting programme will be applied:

Phase 1- Desktop Studies

It will comprise of gathering geological information about the project area. This will also include visiting organizations like the council of geosciences in order to research on what has been done in the region. This will take about the whole month to complete.

Phase 2- Field Mapping

It mainly consists of a comprehensive field mapping, geologist will complete properly selected transverse while recording their geological observations.

Geophysical Survey

Mainly consist of a comprehensive ground gravity survey to delineate magnetic anomalies and potential target areas.

Preliminary Drilling and assaying

It consists of reconnaissance drilling. The proposed drilling program consists of 20 holes.

Detailed drilling and assaying

It consists of detailed drilling within the determined target areas, to delineate the ore body accurately, and to determine depth to bedrock and internal stratigraphic composition of the ore body.

Geological Modelling

This will be comprised by detailed geological modelling.

5.2.1 Description of the activities to be undertaken

The following section presents a detailed description of all the activities associated with the proposed Prospecting Application (from Gutooma 2018).

- Access Roads

Access to the site will be required during mapping, drilling and sampling activities. A number of existing roads and tracks already traverse the proposed prospecting site and where practicable, these roads will be used.

During mapping activities, there should be no vehicle access required into the veld. Driving off existing roads at this stage will not be permitted. Driving once off over undisturbed veld is seen as a disturbance and needs to be treated as such. Once drilling and sampling activities are underway, temporary access roads may be established for repeated access to the drill site if the identified drill site cannot be access via existing roads and tracks.

The roads should not exceed a width of 3m and a length of 1000m.

- Water supply

It is anticipated that water brought onto the site, will be sourced locally from Potchefstroom or Ventersdorp (sic). Water will be trucked from these sources to the identified drill sites, water bowsers will be deployed to these sites as and when required.

Continuous water supply will be required during drilling, and on-site water storage tanks with a capacity of 15,000 for water supply to the drill, will be installed.

Additional water requirements relate to the potable water supply for employees and workers. A temporary 260 litre on-site vertical water storage tank for drinking water and generalise by persons will be provided at the drill site.

- Ablution facilities

Ablution facilities at the drill site will involve the installation of drum or tank type portable toilets.

- Temporary Office Area

A temporary container site office shaded area will be erected at the drill sites. No on-site electricity generation using generators will be undertaken as the drilling will come fully equipped. It is expected that the container office will be 25m².

Meals will be provided to the staff and workers as no heating and/or cold storage facilities will be available. A shaded eating area will be provided.

- Accommodation

No accommodation for staff and workers will be provided on- site and all persons will be accommodated in nearby towns. Workers will be transported to and from the prospecting site on a daily basis. Night security staff will be employed once equipment has been established onsite.

- Blasting

As the Prospecting Works Programme does not allow for bulk sampling, **NO** blasting will take place.

- Storage of Dangerous Goods

During the drilling and sampling activities limited quantities of diesel fuel, oil and lubricants which will arranged off-site or can be sourced directly from Witrantje.



Figure 5. Layout of the study area
(From Gutoona 2018)

6. DESCRIPTION OF THE AFFECTED ENVIRONMENT

6.1 Natural Landscape

The geology of the study area is made up of pyroxenite, harzburgite and norite, forming part of the Bushveld Igneous Complex. The topography is described as plains, with hills occurring to the west and east. The vegetation of the study area is classified as Zeerust Thornveld, forming part of the Central Bushveld Bioregion. No river or streams pass through the area

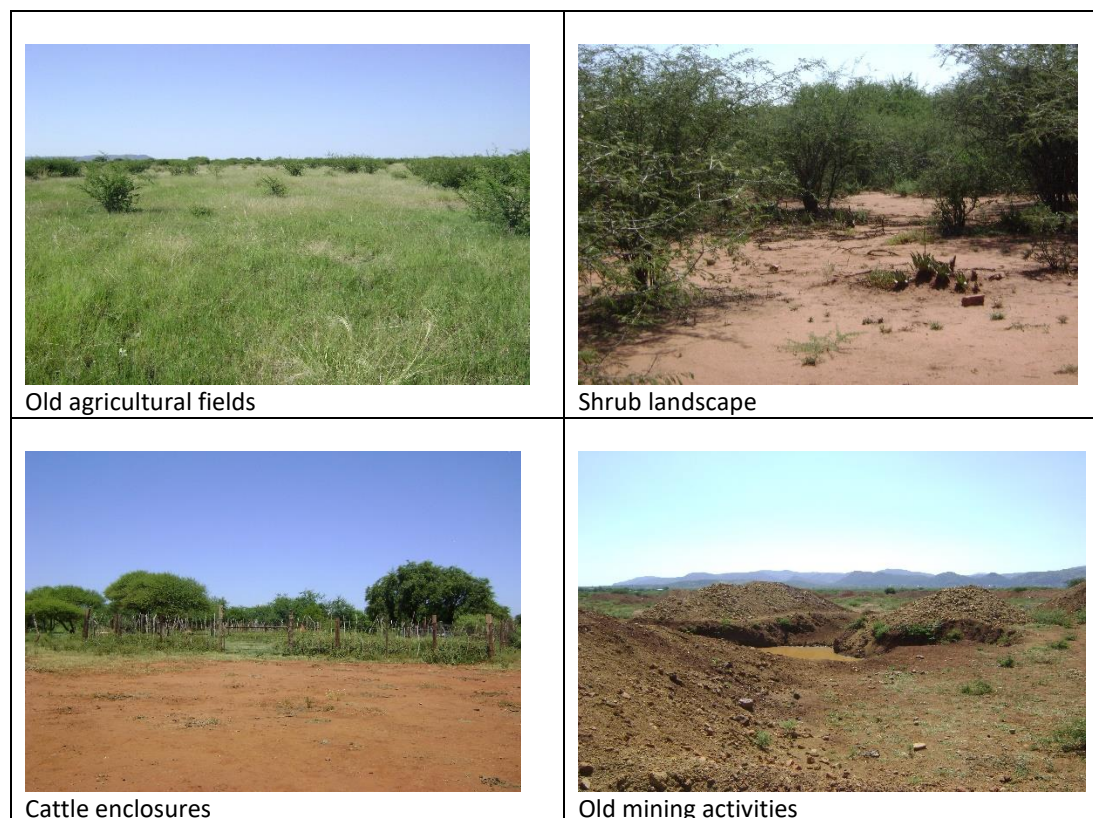


Figure 6. Overviews of the study area

The Palaeontological Sensitivity Map (SAHRIS) indicate that a portion of the study area (Fig. 7) has sections (orange) that has a high sensitivity of fossil remains to be found, whereas the largest section has a moderate (green) sensitivity. Both these areas require palaeontological studies at level. The section indicated in grey do not require any palaeontological study.

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

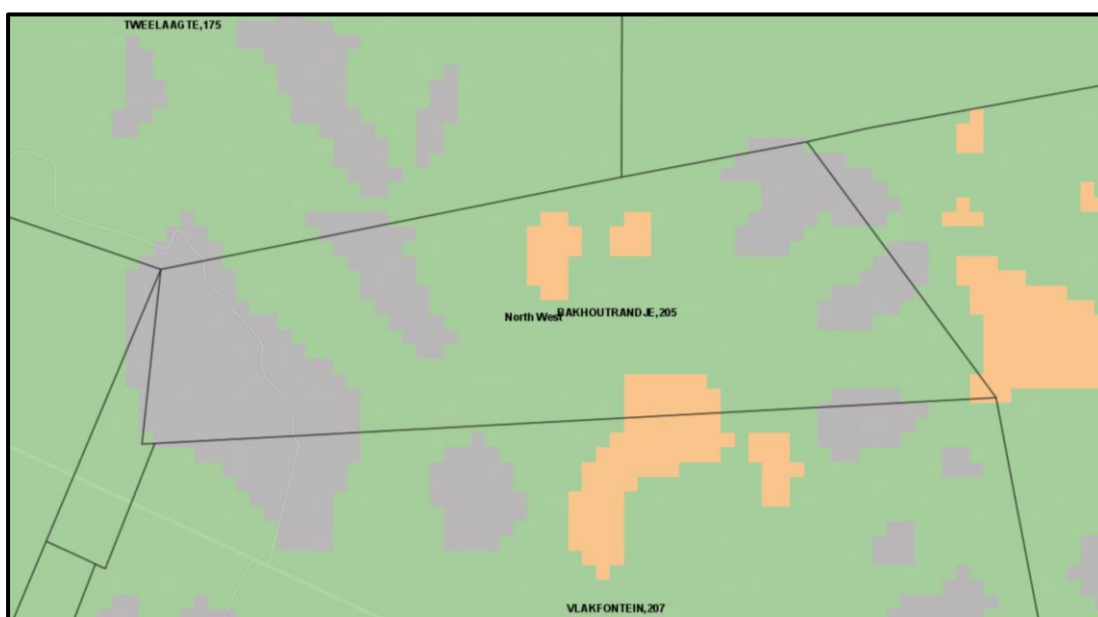


Figure 7. The palaeontological sensitivity of the study area

6.2 Cultural Landscape

The aim of this section is to present an overview of the history of the larger region in order to eventually determine the significance of heritage sites identified in the study area, within the context of their historic, aesthetic, scientific and social value, rarity and representivity.

The cultural landscape qualities of the region are made up of a pre-colonial element consisting of very limited Stone Age and a later extensive Iron Age occupation. A later component consists of a colonial (farmer) component, which eventually also gave rise to an urban component.

6.2.1 Stone Age

Habitation of the larger geographical area took place since Stone Age times. This is confirmed by the occurrence of stone tools dating to the Middle and Late Stone Age found in a number of places, e.g. to the south in the Bospoort region, as well as in the Pilanesberg area. Stone Age tools associated with the Middle Stone Age are common in the area, especially along the spruits where they cut through poorts and valleys and at the lower parts of the ridges and mountains. These indicate that the area was inhabited and exploited by humans as far back as about 100 000 years ago.

6.2.2 Iron Age

Iron Age people started to settle in southern Africa c. AD 300, with one of the oldest known sites at Broederstroom south of Hartebeespoort Dam dating to AD 470. Having only had cereals (sorghum, millet) that need summer rainfall, Early Iron Age (EIA) people did not move outside this rainfall zone, and neither did they occupy the central interior highveld area. Because of their specific technology and economy, Iron Age people preferred to settle on the alluvial soils near rivers for agricultural purposes, but also for firewood and water.

The occupation of the larger geographical area (including the study area) did not start much before the 1500s. By the 16th century things changed, with the climate becoming warmer and wetter, creating conditions that allowed Late Iron Age (LIA) farmers to occupy areas previously unsuitable, for example the Witwatersrand and the treeless plains of the Free State.

The settlement of these stone walled sites has been attributed to a branch of the Tlokwa people that settled along the Kgetleng (Elands) River in the Rustenburg region of present-day North West Province. The stone ruins on Vlakfontein and adjoining farms has been identified as Marothodi, the capital of the Rustenburg Tlokwa, prior to their dispersal during the *difaqane*. Though it was renowned for its copper industry and constituted one of the largest African towns in the interior prior to the *difaqane*, Marothodi has largely faded from historical memory (Breutz 1953; Boeyens & Hall 2009).



Figure 8. Foundations of a house excavated at Marathodi (Vlakfontein)
(Image allowed by courtesy of Jan Boeyens (Unisa) & Simon Hall (UCT))

6.2.3 Historic period

Once the white farmers had established what they saw as their right to the land they set about distributing it among themselves. The land was demarcated into large farms and title deeds were issued. The initial policy was that all burghers (citizens) were entitled to two farms of 3 000 morgen each (about 6 330 acres or 2 564 hectares) from the state. White newcomers to the Transvaal were quickly granted citizenship and the land that went with it. Farms, which were not distributed, remained government property and the ZAR, which battled to raise revenue, increasingly fell back on its principal asset – land. This profligate distribution of land could not be sustained. From 1860 land grants to burghers were reduced to one 3 000 morgen farm each. After 1866 newcomers no longer

received any grant of land and from 1871 this prohibition applied even to the sons of burghers. Voortrekker farmers established the farms that today form the area around Pilanesberg. These farms were subdivided many times over in more recent years and more farmsteads were established. Gradually the entire area was divided into farms. However, it was only since the 1870s that these farms were formally surveyed and mapped, and when not only their names but also the names of rivers and other features became permanent fixtures on maps.

6.3 Site specific review

Although landscapes with cultural significance are not explicitly described in the NHRA, they are protected under the broad definition of the National Estate (Section 3): Section 3(2)(c) and (d) list "historical settlements and townscape" and "landscapes and natural features of cultural significance" as part of the National Estate.

The examination of historical maps and aerial photographs help us to reconstruct how the cultural landscape has changed over time as is show how humans have used the land.

Based on a study of old maps and aerial photographs of the larger region in general and the study area specifically, the following can be said.

By the end of the 19th century, little information regarding this area existed, as is presented on the military map dating to 1899 (Fig. 9). This is probably the result of the fact that this was largely a rural area with populated by Tswana-speaking communities as well as some white owned farms. Only a few tracks are indicated and some mission stations. However, all the rivers are already named, by whites, and it probably served to help soldiers to navigate the region.

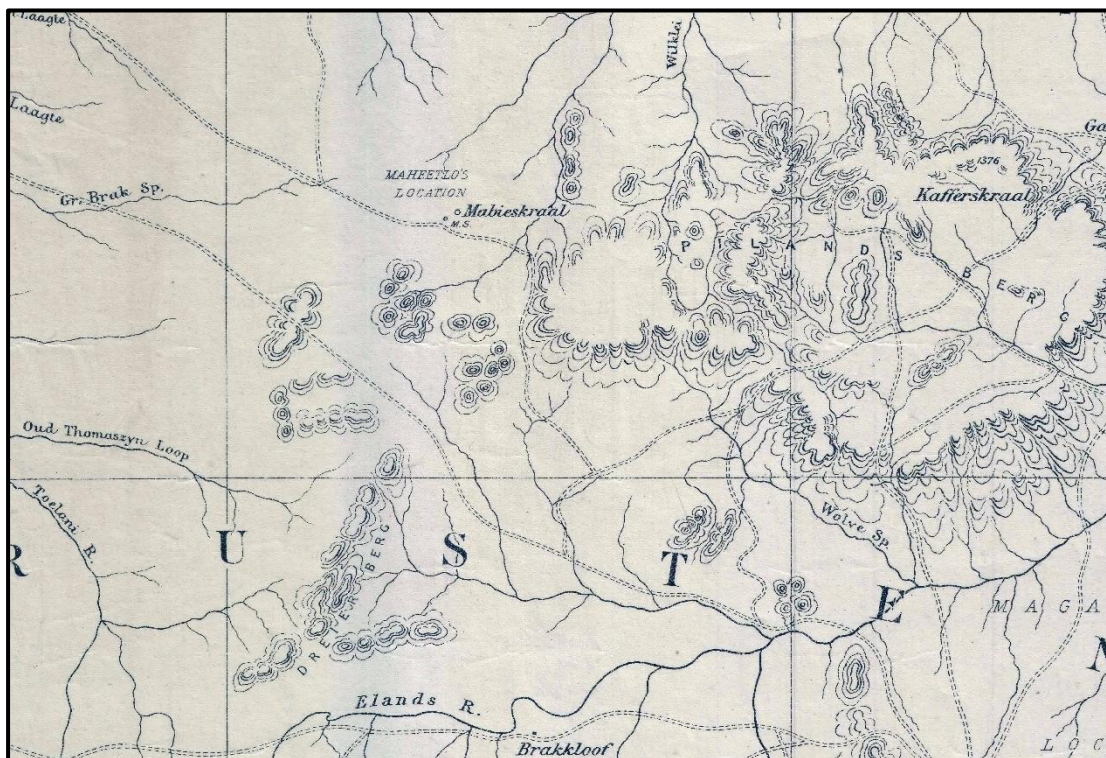


Figure 9. Military map of the region, dating to 1899
(Map: Intelligence Division, War Office, No. 1367)

The next image (Fig. 10) is the official aerial photograph dating to 1948. It indicates a situation that is still current today, i.e. no built features are indicated, but agricultural fields occur over the largest section of the site. This situation remains the same for the next couple of years, as is indicated on the 1967 version of the 1:50 000 topographic map (Fig. 11).



Figure 10. The study area as indicated on aerial photographs dating to 1948 (Photo: 218_031_01283)

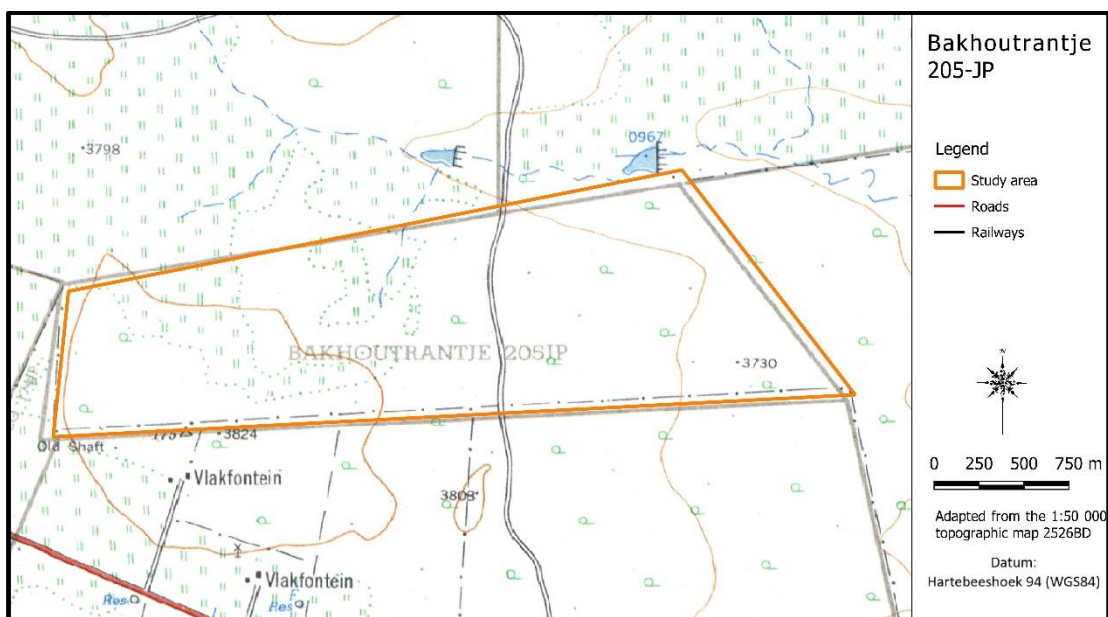


Figure 11. The study area as indicated on topographic map dating to 1967

In recent times (Fig. 12), there are still no built features on the farm, and it seems as if the size of the area that was used for agricultural activities has become much smaller. The different rocky outcrop areas are clearly to be seen.

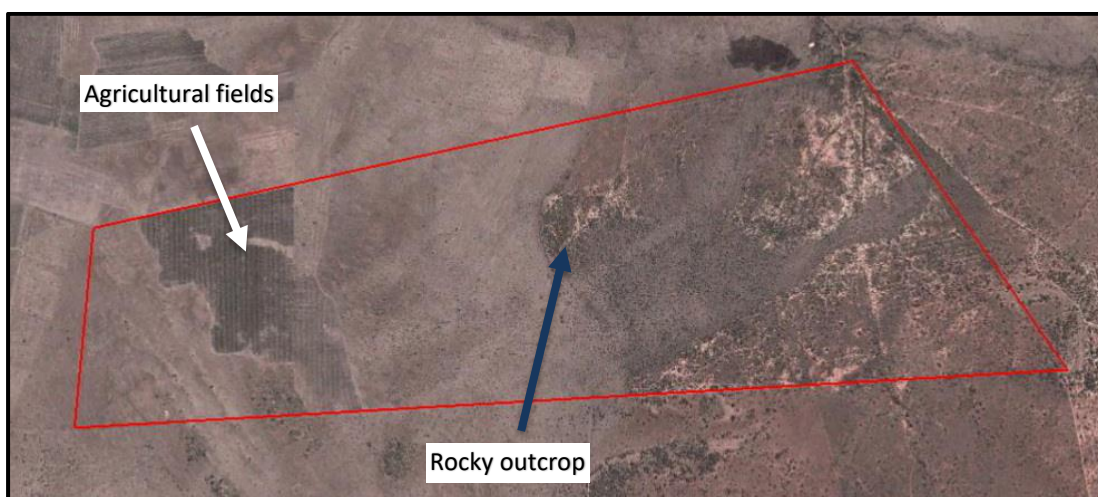


Figure 12. The study area as indicated on the aerial photograph dating to 2018 (Image: Google Earth)

7. SURVEY RESULTS

During the physical survey, the following sites, features and objects of cultural significance were identified in the study area (Fig. 13) – see **Section 5** of the **Addendum** for a more detailed discussion of each of the identified sites, features or objects:

7.1 Stone Age

- No sites, features or objects of cultural significance dating to the Stone Age were identified in the study area

7.2 Iron Age

- 7.2.1 – 7.2.5: A number of similar type of stone walled sites dating to the Late Iron Age (from c. 1600 to 1800), that can be linked to Tswana (Tlokwa) occupation of the larger region. It is probably a continuation of the main settlements known as Marathodi, located some distance to the south on the farm Vlakfontein.

It seems as if the sites are concentrated on outcrops forming low ridges. These locations were chosen as it supplied a ready source of building material (stone), but it is also away from the turf soil which is too unstable to build on.

7.3 Historic period

- 7.3.1: Informal burial site with approximately seven graves. These graves probably originated from people that stayed in the larger region as farm labourers. The graves seem to be very old and has

not been visited or cleared of vegetation in a very long time. It is difficult to establish a definite number as all of them are marked only with stone cairns and is currently overgrown with shrubs and aloes.

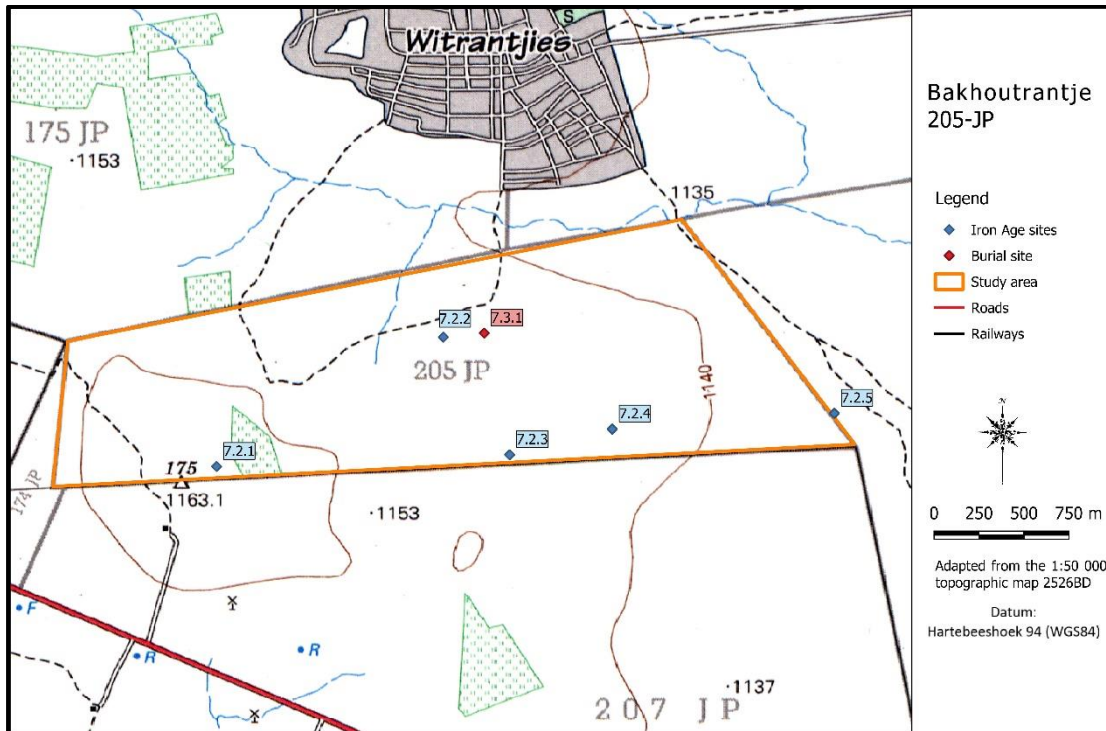


Figure 13. Location of the identified heritage sites in the study region

8. RESULTS: STATEMENT OF SIGNIFICANCE AND IMPACT RATINGS

8.1 Impact assessment

Heritage impacts are categorised as:

- Direct or physical impacts, implying alteration or destruction of heritage features within the project boundaries;
- Indirect impacts, e.g. restriction of access or visual intrusion concerning the broader environment;
- Cumulative impacts that are combinations of the above.

Impact analysis of cultural heritage resources under threat of the proposed development, is based on the present understanding of the development and its significance is calculated and presented below:

- **The areas marked in red in Fig. 13 has been identified as highly sensitive for the presence of cultural heritage sites (LIA sites). However, these boundaries should not be taken as final and can only be confirmed when the vegetation cover (see Fig. 2) has gone down by the end of the winter season.**

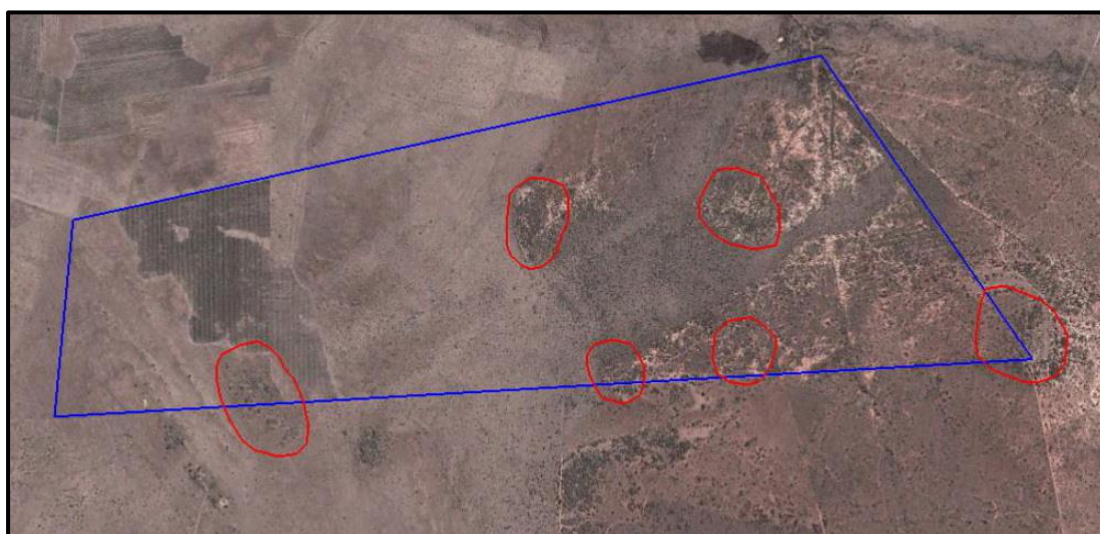


Figure 14. Highly sensitive areas indicated by the red polygons

Table 1: Impact assessment

| IDENTIFIED HERITAGE RESOURCE: Iron Age stone walled sites | | | | | |
|---|--------------------|---------------|-----------------------------|--|--|
| Nature: Mining activities would have a permanent and irreversible impact on these sites. | | | | | |
| | Without mitigation | | With mitigation | | |
| Extent | Region | | Site | | |
| Duration | Permanent | | Permanent | | |
| Intensity | Low | | Low | | |
| Probability | Definite | | Probable | | |
| Significance | Medium (60) | | Low (30) | | |
| Status (positive or negative) | Negative | | Neutral | | |
| Reversibility | Non-reversible | | Non-reversible | | |
| Irreplaceable loss of resources? | Yes | | No | | |
| Can impacts be mitigated | Yes | | | | |
| Mitigation: Full documentation | | | | | |
| Cumulative impact: Loss of information regarding early settlement in the region. | | | | | |
| Site No. | Site type | NHRA category | Field rating | Impact rating: Before/After mitigation | Proposed mitigation (Refer to definitions in Section 12.3) |
| Informal burial site | | | | | |
| 7.2.1 – 7.2.5 | Settlement sites | Section 35 | High significance Grade 4-A | 60 27 | (1) Avoidance/Preserve; (2) Archaeological investigation |

| IDENTIFIED HERITAGE RESOURCE: Informal burial site | | | | | |
|--|--------------------|--|-----------------|--|--|
| Nature: Mining activities would have a permanent and irreversible impact on this structure. | | | | | |
| | Without mitigation | | With mitigation | | |
| Extent | Region | | Site | | |
| Duration | Permanent | | Permanent | | |
| Intensity | Low | | Low | | |
| Probability | Definite | | Probable | | |
| Significance | Medium (60) | | Low (30) | | |
| Status (positive or negative) | Negative | | Neutral | | |
| Reversibility | Non-reversible | | Non-reversible | | |
| Irreplaceable loss of resources? | Yes | | No | | |
| Can impacts be mitigated | Yes | | | | |
| Mitigation: Full documentation | | | | | |

| Cumulative impact: Loss of information regarding early settlement in the region. | | | | | |
|--|-------------|---------------|--------------------------------|--|---|
| Site No. | Site type | NHRA category | Field rating | Impact rating: Before/After mitigation | Proposed mitigation (Refer to definitions in Section 12.3) |
| Informal burial site | | | | | |
| 7.3.1 | Burial site | Section 36 | High significance Grade 4-A | 60 | (1) Avoidance/Preserve; (2) Archaeological investigation |
| | | | | 27 | |

9. MANAGEMENT AND MITIGATION MEASURES

Heritage sites are fixed features in the environment, occurring within specific spatial confines. Any impact upon them is permanent and non-reversible. Those resources that cannot be avoided and that are directly impacted by the proposed development can be excavated/recorded and a management plan can be developed for future action. Those sites that are not impacted on can be written into the management plan, whence they can be avoided or cared for in the future.

Sources of risk were considered with regards to development activities defined in Section 2(viii) of the NHRA that may be triggered and are summarised in Table 3A and 3B below. These issues formed the basis of the impact assessment described. The potential risks are discussed according to the various phases of the project below.

9.1 Objectives

- Protection of archaeological, historical and any other site or land considered being of cultural value within the project boundary against vandalism, destruction and theft.
- The preservation and appropriate management of new discoveries in accordance with the NHRA, should these be discovered during construction activities.

The following shall apply:

- Known sites should be clearly marked in order that they can be avoided during construction activities.
- The contractors and workers should be notified that archaeological sites might be exposed during the construction activities.
- Should any heritage artefacts be exposed during excavation, work on the area where the artefacts were discovered, shall cease immediately and the Environmental Control Officer shall be notified as soon as possible;
- All discoveries shall be reported immediately to a heritage practitioner so that an investigation and evaluation of the finds can be made. Acting upon advice from these specialists, the Environmental Control Officer will advise the necessary actions to be taken;
- Under no circumstances shall any artefacts be removed, destroyed or interfered with by anyone on the site; and
- Contractors and workers shall be advised of the penalties associated with the unlawful removal of cultural, historical, archaeological or palaeontological artefacts, as set out in the National Heritage Resources Act (Act No. 25 of 1999), Section 51. (1).

9.2 Control

In order to achieve this, the following should be in place:

- A person or entity, e.g. the Environmental Control Officer, should be tasked to take responsibility for the heritage sites and should be held accountable for any damage.

- Known sites should be located and isolated, e.g. by fencing them off. All construction workers should be informed that these are no-go areas, unless accompanied by the individual or persons representing the Environmental Control Officer as identified above.
- In areas where the vegetation is threatening the heritage sites, e.g. growing trees pushing walls over, it should be removed, but only after permission for the methods proposed has been granted by SAHRA. A heritage official should be part of the team executing these measures.

Table 2A: Construction Phase: Environmental Management Programme for the project

| | | | |
|--|--|-------------------------------|---------------------|
| Action required | Protection of heritage sites, features and objects | | |
| Potential Impact | The identified risk is damage or changes to resources that are generally protected in terms of Sections 27, 28, 31, 32, 34, 35, 36 and 37 of the NHRA that may occur in the proposed project area. | | |
| Risk if impact is not mitigated | Loss or damage to sites, features or objects of cultural heritage significance | | |
| Activity / issue | Mitigation: Action/control | Responsibility | Timeframe |
| 1. Removal of Vegetation 2. Construction of required infrastructure, e.g. access roads, water pipelines 3. Drilling and sampling sites | See discussion in Section 9.1 above | Environmental Control Officer | During construction |
| Monitoring | See discussion in Section 9.2 above | | |

Table 2B: Operation Phase: Environmental Management Programme for the project

| | | | |
|--|--|-------------------------------|------------------------|
| Action required | Protection of heritage sites, features and objects | | |
| Potential Impact | It is unlikely that the negative impacts identified for pre-mitigation will occur if the recommendations are followed. | | |
| Risk if impact is not mitigated | Loss or damage to sites, features or objects of cultural heritage significance | | |
| Activity / issue | Mitigation: Action/control | Responsibility | Timeframe |
| 1. Removal of Vegetation 2. Construction of required infrastructure, e.g. access roads, water pipelines 3. Decommissioning | See discussion in Section 9.1 above | Environmental Control Officer | During operations only |
| Monitoring | See discussion in Section 9.2 above | | |

9.3 Mitigation measures

Mitigation: means to anticipate and prevent negative impacts and risks, then to minimise them, rehabilitate or repair impacts to the extent feasible.

For the current study, the following mitigation measures are proposed (see Section 4 of the Addendum for a discussion of all mitigation measures):

A heritage assessment should be conducted over each identified localised drill sites in order to identify any cultural, heritage and or archaeological features which may be impacted on.

- Site 7.2.1 – 7.2.5: Iron Age stone walled sites
(1) Avoidance/Preserve: This is viewed to be the primary form of mitigation and applies where any type of development occurs within a formally protected or significant or sensitive heritage context and is likely to have a high negative impact; or, alternatively;

(2) Archaeological investigation: This is appropriate where development occurs in a context of heritage significance and where the impact is such that it can be mitigated. Mitigation is to excavate the site by archaeological techniques, document the site (map and photograph) and analyse the recovered material to acceptable standards.

- Site 7.3.1: Burial site

(1) Avoidance/Preserve: This is viewed to be the primary form of mitigation and applies where any type of development occurs within a formally protected or significant or sensitive heritage context and is likely to have a high negative impact; or, alternatively;

(2) Archaeological investigation/relocation: This is appropriate where development occurs in a context of heritage significance and where the impact is such that it can be mitigated. Mitigation is to excavate the site by archaeological techniques, document the site (map and photograph) and analyse the recovered material to acceptable standards.

10. CONCLUSIONS AND RECOMMENDATIONS

Mosikwe Investments (Pty) Ltd propose to for mine chrome ore, depending on the results obtained from prospecting activities, on the farm Bakhoutrandjes 205JP near Pilanesberg, Moses Kotane Local Municipality, Bojanala Municipal District, North West Province.

This report describes the methodology used, the limitations encountered, the heritage features that were identified and the recommendations and mitigation measures proposed relevant to this. It should be noted that the implementation of the mitigation measures is subject to SAHRA/PHRA's approval.

The cultural landscape qualities of the region are made up of a pre-colonial element consisting of very limited Stone Age and a later extensive Iron Age occupation. A later component consists of a colonial (farmer) component, which eventually also gave rise to an urban component.

Identified sites

During the physical survey, the following sites, features or objects of cultural significance were identified:

- 7.2.1 – 7.2.5: A number of similar type of stone walled sites dating to the Late Iron Age (from c. 1600 to 1800), that can be linked to Tswana (Tlokwa) occupation of the larger region. It is probably a continuation of the main settlements known as Marathodi, located some distance to the south on the farm Vlakfontein.

It seems as if the sites are concentrated on outcrops forming low ridges. These locations were chosen as it supplied a ready source of building material (stone), but it is also away from the turf soil which is to unstable to build on.

- 7.3.1: Informal burial site with approximately seven graves. These graves probably originated from people that stayed in the larger region as farm labourers. The graves seem to be very old and has not been visited or cleared of vegetation in a very long time. It is difficult to establish a definite number as all of them are marked only with stone cairns and is currently overgrown with shrubs and aloes.

Impact assessment and proposed mitigation measures

Impact analysis of cultural heritage resources under threat of the proposed development, is based on the present understanding of the development:

| IDENTIFIED HERITAGE RESOURCES | | | | | |
|-------------------------------|------------------|---------------|-----------------------------|--|--|
| Site No. | Site type | NHRA category | Field rating | Impact rating: Before/After mitigation | Proposed mitigation (Refer to definitions in Section 12.3) |
| Iron Age settlement sites | | | | | |
| 7.2.1 – 7.2.5 | Settlement sites | Section 35 | High significance Grade 4-A | 60 27 | (1) Avoidance/Preserve; (2) Archaeological investigation |
| Informal burial site | | | | | |
| 7.3.1 | Burial site | Section 36 | High significance Grade 4-A | 60 27 | (1) Avoidance/Preserve; (2) Archaeological investigation |

Legal requirements

The legal requirements related to heritage specifically are specified in Section 3 of this report. For this proposed project, the assessment has determined that no sites, features or objects of heritage significance occur in the study area. If heritage features are identified during construction, as stated in the management recommendation, these finds would have to be assessed by a specialist, after which a decision will be made regarding the application for relevant permits.

Reasoned opinion as to whether the proposed activity should be authorised:

- From a heritage point of view, it is recommended that the proposed development be allowed to continue on acceptance of the conditions proposed below.

Conditions for inclusion in the environmental authorisation:

- The Palaeontological Sensitivity Map (SAHRIS) indicate that a portion of the study area has sections that has a high sensitivity of fossil remains to be found, whereas the largest section has a moderate sensitivity. Both these areas require palaeontological studies. The section indicated in grey do not require any palaeontological study.
- The boundaries of the areas marked as highly sensitive for the presence of cultural heritage sites (LIA sites) should not be taken as final and should be confirmed when the vegetation cover has gone down by the end of the winter season.
- A heritage assessment should be conducted over each identified localised drill site in order to identify any cultural, heritage and or archaeological features which may be impacted on.
- Should archaeological sites or graves be exposed in other areas during construction work, it must immediately be reported to a heritage practitioner so that an investigation and evaluation of the finds can be made.

11. REFERENCES

11.1 Data bases

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11.2 Literature

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Van Schalkwyk, J.A. 2013a. *Cultural heritage assessment for the proposed construction of a boundary fence around the Sun City Entertainment Centre, North West Province*. Pretoria: Unpublished report.

Van Schalkwyk, J.A. 2013b. *Cultural heritage impact assessment report for the proposed development of a township on Portion 90 of the farm Boschhoek 103JQ, Rustenburg region, North West Province*. Pretoria: Unpublished report 2013JvS072.

Van Schalkwyk, J.A. 2017. *Phase 1 Cultural Heritage Impact Assessment: the proposed Bakubung Integrated Mixed Use Development on Portion 15 of the farm Ledig 909JQ, Bojanala District Municipality, North West Province*. Pretoria: Unpublished report 2017JvS017.

11.3 Archival sources, maps and aerial photographs

1: 50 000 Topographic maps

Google Earth

Aerial photographs: Chief Surveyor General

12. ADDENDUM

1. Indemnity and terms of use of this report

The findings, results, conclusions and recommendations given in this report are based on the author's best scientific and professional knowledge as well as available information. The report is based on survey and assessment techniques which are limited by time and budgetary constraints relevant to the type and level of investigation undertaken and the author reserve the right to modify aspects of the report including the recommendations if and when new information may become available from ongoing research or further work in this field, or pertaining to this investigation.

Although all possible care is taken to identify all sites of cultural importance during the investigation of study areas, it is always possible that hidden or sub-surface sites could be overlooked during the study. The author of this report will not be held liable for such oversights or for costs incurred as a result of such oversights.

Although the author exercises due care and diligence in rendering services and preparing documents, he accepts no liability and the client, by receiving this document, indemnifies the author against all actions, claims, demands, losses, liabilities, costs, damages and expenses arising from or in connection with services rendered, directly or indirectly by the author and by the use of the information contained in this document.

This report must not be altered or added to without the prior written consent of the author. This also refers to electronic copies of this report which are supplied for the purposes of inclusion as part of other reports, including main reports. Similarly, any recommendations, statements or conclusions drawn from or based on this report must make reference to this report. If these form part of a main report relating to this investigation or report, this report must be included in its entirety as an appendix or separate section to the main report.

2. Assessing the significance of heritage resources and potential impacts

A system for site grading was established by the NHRA and further developed by the South African Heritage Resources Agency (SAHRA 2007) and has been approved by ASAPA for use in southern Africa and was utilised during this assessment.

2.1 Significance of the identified heritage resources

According to the NHRA, Section 2(vi) the **significance** of a heritage sites and artefacts is determined by it aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technical value in relation to the uniqueness, condition of preservation and research potential. It must be kept in mind that the various aspects are not mutually exclusive, and that the evaluation of any site is done with reference to any number of these.

Matrix used for assessing the significance of each identified site/feature

| 1. SITE EVALUATION | | | | |
|---|---|------|--------|-----|
| 1.1 Historic value | | | | |
| Is it important in the community, or pattern of history | | | | |
| Does it have strong or special association with the life or work of a person, group or organisation of importance in history | | | | |
| Does it have significance relating to the history of slavery | | | | |
| 1.2 Aesthetic value | | | | |
| It is important in exhibiting particular aesthetic characteristics valued by a community or cultural group | | | | |
| 1.3 Scientific value | | | | |
| Does it have potential to yield information that will contribute to an understanding of natural or cultural heritage | | | | |
| Is it important in demonstrating a high degree of creative or technical achievement at a particular period | | | | |
| 1.4 Social value | | | | |
| Does it have strong or special association with a particular community or cultural group for social, cultural or spiritual reasons | | | | |
| 1.5 Rarity | | | | |
| Does it possess uncommon, rare or endangered aspects of natural or cultural heritage | | | | |
| 1.6 Representivity | | | | |
| Is it important in demonstrating the principal characteristics of a particular class of natural or cultural places or objects | | | | |
| Importance in demonstrating the principal characteristics of a range of landscapes or environments, the attributes of which identify it as being characteristic of its class | | | | |
| Importance in demonstrating the principal characteristics of human activities (including way of life, philosophy, custom, process, land-use, function, design or technique) in the environment of the nation, province, region or locality. | | | | |
| 2. Sphere of Significance | | High | Medium | Low |
| International | | | | |
| National | | | | |
| Provincial | | | | |
| Regional | | | | |
| Local | | | | |
| Specific community | | | | |
| 3. Field Register Rating | | | | |
| 1. | National/Grade 1: High significance - No alteration whatsoever without permit from SAHRA | | | |
| 2. | Provincial/Grade 2: High significance - No alteration whatsoever without permit from provincial heritage authority. | | | |
| 3. | Local/Grade 3A: High significance - Mitigation as part of development process not advised. | | | |

| | | |
|----|--|--|
| 4. | Local/Grade 3B: High significance - Could be mitigated and (part) retained as heritage register site | |
| 5. | Generally protected Grade 4A: High/medium significance - Should be mitigated before destruction | |
| 6. | Generally protected Grade 4B: Medium significance - Should be recorded before destruction | |
| 7. | Generally protected Grade 4C: Low significance - Requires no further recording before destruction | |

2.2 Significance of the anticipated impact on heritage resources

All impacts identified during the HIA stage of the study will be classified in terms of their significance. Issues would be assessed in terms of the following criteria:

Nature of the impact

A description of what causes the effect, what will be affected and how it will be affected.

Extent

The physical **extent**, wherein it is indicated whether:

- 1 - The impact will be limited to the site;
- 2 - The impact will be limited to the local area;
- 3 - The impact will be limited to the region;
- 4 - The impact will be national; or
- 5 - The impact will be international.

Duration

Here it should be indicated whether the lifespan of the impact will be:

- 1 - Of a very short duration (0–1 years);
- 2 - Of a short duration (2-5 years);
- 3 - Medium-term (5–15 years);
- 4 - Long term (where the impact will persist possibly beyond the operational life of the activity); or
- 5 - Permanent (where the impact will persist indefinitely).

Magnitude (Intensity)

The magnitude of impact, quantified on a scale from 0-10, where a score is assigned:

- 0 - Small and will have no effect;
- 2 - Minor and will not result in an impact;
- 4 - Low and will cause a slight impact;
- 6 - Moderate and will result in processes continuing but in a modified way;
- 8 - High, (processes are altered to the extent that they temporarily cease); or
- 10 - Very high and results in complete destruction of patterns and permanent cessation of processes.

Probability

This describes the likelihood of the impact actually occurring and is estimated on a scale where:

- 1 - Very improbable (probably will not happen);
- 2 - Improbable (some possibility, but low likelihood);
- 3 - Probable (distinct possibility);
- 4 - Highly probable (most likely); or
- 5 - Definite (impact will occur regardless of any prevention measures).

Significance

The significance is determined through a synthesis of the characteristics described above (refer to the formula below) and can be assessed as low, medium or high:

$S = (E+D+M) \times P$; where
 S = Significance weighting
 E = Extent
 D = Duration
 M = Magnitude
 P = Probability

| Significance of impact | | |
|------------------------|-----------------------|--|
| Points | Significant Weighting | Discussion |
| < 30 points | Low | Where this impact would not have a direct influence on the decision to develop in the area. |
| 31-60 points | Medium | Where the impact could influence the decision to develop in the area unless it is effectively mitigated. |
| > 60 points | High | Where the impact must have an influence on the decision process to develop in the area. |

Confidence

This should relate to the level of confidence that the specialist has in establishing the nature and degree of impacts. It relates to the level and reliability of information, the nature and degree of consultation with I&AP's and the dynamic of the broader socio-political context.

- High, where the information is comprehensive and accurate, where there has been a high degree of consultation and the socio-political context is relatively stable.
- Medium, where the information is sufficient but is based mainly on secondary sources, where there has been a limited targeted consultation and socio-political context is fluid.
- Low, where the information is poor, a high degree of contestation is evident and there is a state of socio-political flux.

Status

- The status, which is described as either positive, negative or neutral.

Reversibility

- The degree to which the impact can be reversed.

Mitigation

- The degree to which the impact can be mitigated.

| Nature: | | |
|----------------------------------|--------------------|-----------------|
| | Without mitigation | With mitigation |
| Construction Phase | | |
| Probability | | |
| Duration | | |
| Extent | | |
| Magnitude | | |
| Significance | | |
| Status (positive or negative) | | |
| Operational Phase | | |
| Probability | | |
| Duration | | |
| Extent | | |
| Magnitude | | |
| Significance | | |
| Status (positive or negative) | | |
| Reversibility | | |
| Irreplaceable loss of resources? | | |
| Can impacts be mitigated | | |

3. Mitigation measures

- *Mitigation: means to anticipate and prevent negative impacts and risks, then to minimise them, rehabilitate or repair impacts to the extent feasible.*

Impacts can be managed through one or a combination of the following mitigation measures:

- Avoidance
- Investigation (archaeological)
- Rehabilitation
- Interpretation
- Memorialisation
- Enhancement (positive impacts)

For the current study, the following mitigation measures are proposed, to be implemented only if any of the identified sites or features are to be impacted on by the proposed development activities:

- (1) Avoidance/Preserve: This is viewed to be the primary form of mitigation and applies where any type of development occurs within a formally protected or significant or sensitive heritage context and is likely to have a high negative impact. This measure often includes the change / alteration of development planning and therefore impact zones in order not to impact on resources. The site should be retained *in situ* and a buffer zone should be created around it, either temporary (by means of danger tape) or permanently (wire fence or built wall). Depending on the type of site, the buffer zone can vary from
 - 10 metres for a single grave, or a built structure, to
 - 50 metres where the boundaries are less obvious, e.g. a Late Iron Age site.
- (2) Archaeological investigation: This option can be implemented with additional design and construction inputs. This is appropriate where development occurs in a context of heritage significance and where the impact is such that it can be mitigated. Mitigation is to excavate the site by archaeological techniques, document the site (map and photograph) and analyse the recovered material to acceptable standards. This can only be done by a suitably qualified archaeologist.
 - This option should be implemented when it is impossible to avoid impacting on an identified site or feature.
 - This also applies for graves older than 60 years that are to be relocated. For graves younger than 60 years a permit from SAHRA is not required. However, all other legal requirements must be adhered to.
 - Impacts can be beneficial – e.g. mitigation contribute to knowledge
- (3) Rehabilitation: When features, e.g. buildings or other structures are to be re-used. Rehabilitation is considered in heritage management terms as an intervention typically involving the adding of a new heritage layer to enable a new sustainable use.
 - The heritage resource is degraded or in the process of degradation and would benefit from rehabilitation.
 - Where rehabilitation implies appropriate conservation interventions, i.e. adaptive reuse, repair and maintenance, consolidation and minimal loss of historical fabric.
 - Conservation measures would be to record the buildings/structures as they are (at a particular point in time). The records and recordings would then become the 'artefacts' to be preserved and managed as heritage features or (movable) objects.
 - This approach automatically also leads to the enhancement of the sites or features that are re-used.

- (4) Mitigation is also possible with additional design and construction inputs. Although linked to the previous measure (rehabilitation) a secondary though 'indirect' conservation measure would be to use the existing architectural 'vocabulary' of the structure as guideline for any new designs.
 - The following principle should be considered: **heritage informs design**.
 - This approach automatically also leads to the enhancement of the sites or features that are re-used.

- (5) No further action required: This is applicable only where sites or features have been rated to be of such low significance that it does not warrant further documentation, as it is viewed to be fully documented after inclusion in this report.
 - Site monitoring during development, by an ECO or the heritage specialist are often added to this recommendation in order to ensure that no undetected heritage/remains are destroyed.

4. Relocation of graves

If the graves are younger than 60 years, an undertaker can be contracted to deal with the exhumation and reburial. This will include public participation, organising cemeteries, coffins, etc. They need permits and have their own requirements that must be adhered to.

If the graves are older than 60 years old or of undetermined age, an archaeologist must be in attendance to assist with the exhumation and documentation of the graves. This is a requirement by law.

Once it has been decided to relocate particular graves, the following steps should be taken:

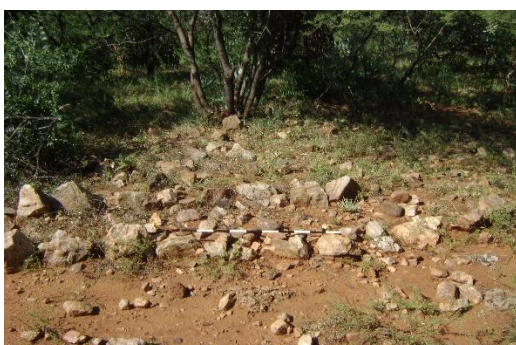
- Notices of the intention to relocate the graves need to be put up at the burial site for a period of 60 days. This should contain information where communities and family members can contact the developer/archaeologist/public-relations officer/undertaker. All information pertaining to the identification of the graves needs to be documented for the application of a SAHRA permit. The notices need to be in at least 3 languages, English, and two other languages. This is a requirement by law.
- Notices of the intention needs to be placed in at least two local newspapers and have the same information as the above point. This is a requirement by law.
- Local radio stations can also be used to try contact family members. This is not required by law, but is helpful in trying to contact family members.
- During this time (60 days) a suitable cemetery need to be identified close to the development area or otherwise one specified by the family of the deceased.
- An open day for family members should be arranged after the period of 60 days so that they can gather to discuss the way forward, and to sort out any problems. The developer needs to take the families requirements into account. This is a requirement by law.
- Once the 60 days has passed and all the information from the family members have been received, a permit can be requested from SAHRA. This is a requirement by law.
- Once the permit has been received, the graves may be exhumed and relocated.
- All headstones must be relocated with the graves as well as any items found in the grave.

Information needed for the SAHRA permit application

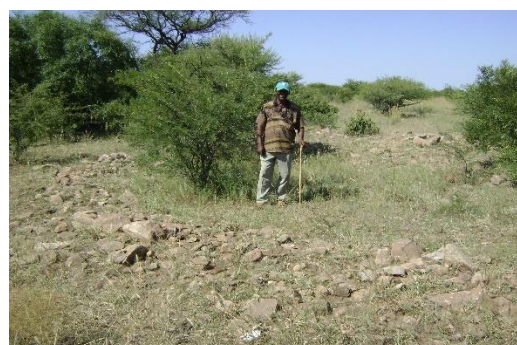
- The permit application needs to be done by an archaeologist.
- A map of the area where the graves have been located.
- A survey report of the area prepared by an archaeologist.
- All the information on the families that have identified graves.
- If graves have not been identified and there are no headstones to indicate the grave, these are then unknown graves and should be handled as if they are older than 60 years. This information also needs to be given to SAHRA.
- A letter from the landowner giving permission to the developer to exhume and relocate the graves.
- A letter from the new cemetery confirming that the graves will be reburied there.
- Details of the farm name and number, magisterial district and GPS coordinates of the gravesite.

5. Inventory of identified cultural heritage sites

| NHRA Category | Archaeological Site or Material - Section 35 |
|--|--|
| <p>7.3.2 Type: Iron Age stone walled sites. Farm: Bakhoutrantje 205-JP. Coordinates (approximate centre point): 7.3.2.1 - S 25,29831; E 26,89384 7.3.2.2 - S 25,29175; E 26,90535 7.3.2.3 - S 25,29771; E 26,90872 7.3.2.4 - S 25,29641; E 26,91393 7.3.2.5 - S 25,29561; E 26,92521</p> | |
| Description | |
| <p>A number of similar type of stone walled sites dating to the Late Iron Age (from c. 1600 to 1800), that can be linked to Tswana (Tlokwa) occupation of the larger region. It is probably a continuation of the main settlements known as Marathodi, located some distance to the south on the farm Vlakfontein.</p> <p>It seems as if the sites are concentrated on outcrops forming low ridges. These locations were chosen as it supplied a ready source of building material (stone), but is also away from the turf soil which is to unstable to build on.</p> <p>Unfortunately, due to the fact that the vegetation cover is so dense, it was impossible to determine the size and extent of the various settlements. However, based on aerial imagery, it is possible to obtain an approximate size. It should be noted that some of the sites are located on both sides of the different farm boundaries</p> | |



Outer perimeter wall



Circular structure



Inner walling



Surface scatter of pottery

| | |
|---|---|
| Significance of site/feature | Generally protected: High significance – Grade IV-A |
| <p>Reasoned opinion: These sites represent a way of life which has long since disappeared of which, unfortunately, we do not know enough. They should therefore be protect, or, alternatively suitably researched prior to any impact on them.</p> | |

| |
|--------------------------|
| Impact assessment |
|--------------------------|

These sites are located inside the proposed development area and therefore there is a high likelihood that it would be impacted on by the proposed development.

Mitigation

(1) Avoidance/Preserve: This is the first choice of mitigation, however, because of their location within the larger project development area, it would be difficult to avoid them;
 (2) Archaeological investigation: If the former is not possible, the site should be documented in full before destruction – excavated, mapped and photographed.

Significance of impact: before/after mitigation

| Extent | Duration | Intensity | Probability | Significance | Weight |
|--------|----------|-----------|-------------|--------------|--------|
| 3 | 5 | 4 | 5 | 60 | Medium |
| 1 | 5 | 3 | 3 | 27 | Low |

Requirements

Conservation by local authority. Sites should be mitigated before impact. Permit required from SAHRA.

References

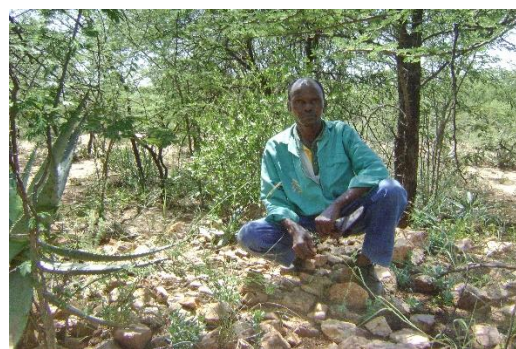
Hall *et al.* (2008); Boeyens & Hall (2009)

| | |
|----------------------|---|
| NHRA Category | Graves, Cemeteries and Burial Grounds - Section 36 |
|----------------------|---|

7.3.1 Type: Burial site. **Farm:** Bakhoutrantje 205-JP **Coordinates:** S 26,36075; E 28,43305

Description

Informal burial site with approximately seven graves. These graves probably originated from people that stayed in the larger region as farm labourers. The graves seem to be very old and has not been visited or cleared of vegetation in a very long time. It is difficult to establish a definite number as all of them are marked only with stone cairns and is currently overgrown with shrubs and aloes.



Significance of site/feature

Generally protected: High significance – Grade IV-A

Reasoned opinion: Burial sites are viewed as having high emotional and sentimental value. However, mitigation is possible if proper procedures have been followed.

Impact assessment

This site is located inside the proposed development area and therefore there is a high likelihood that it would be impacted on by the proposed development.

Mitigation

- (1) Avoidance/Preserve: Because of its location within the larger project development area, it would be possible to avoid this site as it actually occupies a small footprint;
- (2) Archaeological investigation: If the former is not possible, the site should be documented in full before destruction.

Significance of impact: before/after mitigation

| Extent | Duration | Intensity | Probability | Significance | Weight |
|--------|----------|-----------|-------------|--------------|--------|
| 3 | 5 | 4 | 5 | 60 | Medium |
| 1 | 5 | 3 | 3 | 27 | Low |

Requirements

Conservation by local authority. Sites should be mitigated before impact. Permit required from provincial heritage authority, as well as other institutions – see Section 4 of the Addendum.

References

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6. Curriculum vitae

Johan Abraham van Schalkwyk

Personal particulars

Date of birth: 14 April 1952
Identity number: 520414 5099 08 4
Marital status: Married; one daughter
Nationality: South African

Current address: home

62 Coetzer Ave, Monument Park, Pretoria, 0181
Mobile: 076 790 6777; E-mail: jvschalkwyk@mweb.co.za

Qualifications

1995 DLitt et Phil (Anthropology), University of South Africa
1985 MA (Anthropology), University of Pretoria
1981 BA (Hons), Anthropology, University of Pretoria
1979 Post Graduate Diploma in Museology, University of Pretoria
1978 BA (Hons), Archaeology, University of Pretoria
1976 BA, University of Pretoria

Non-academic qualifications

12th HSRC-School in Research Methodology - July 1990
Dept. of Education and Training Management Course - June 1992
Social Assessment Professional Development Course - 1994
Integrated Environmental Management Course, UCT - 1994

Professional experience

Private Practice
2017 - current: Professional Heritage Consultant

National Museum of Cultural History

1992 - 2017: Senior researcher: Head of Department of Research. Manage an average of seven researchers in this department and supervise them in their research projects. Did various projects relating to Anthropology and Archaeology in Limpopo Province, Mpumalanga, North West Province and Gauteng. Headed the Museum's Section for Heritage Impact Assessments.
1978 - 1991: Curator of the Anthropological Department of the Museum. Carried out extensive fieldwork in both anthropology and archaeology

Department of Archaeology, University of Pretoria

1976 - 1977: Assistant researcher responsible for excavations at various sites in Limpopo Province and Mpumalanga.

Awards and grants

1. Hanisch Book Prize for the best final year Archaeology student, University of Pretoria - 1976.
2. Special merit award, National Cultural History Museum - 1986.
3. Special merit award, National Cultural History Museum - 1991.
4. Grant by the Department of Arts, Culture, Science and Technology, to visit the various African countries to study museums, sites and cultural programmes - 1993.
5. Grant by the USA National Parks Service, to visit the United States of America to study museums, sites, tourism development, cultural programmes and impact assessment programmes - 1998.
6. Grant by the USA embassy, Pretoria, under the Bi-national Commission Exchange Support Fund, to visit cultural institutions in the USA and to attend a conference in Charleston - 2000.
7. Grant by the National Research Foundation to develop a model for community-based tourism - 2001.

8. Grant by the National Research Foundation to develop a model for community-based tourism - 2013. In association with RARI, Wits University.

Publications

Published more than 70 papers, mostly in scientifically accredited journals, but also as chapters in books.

Conference Contributions

Regularly present papers at conferences, locally as well as internationally, on various research topics, ranging in scope from archaeology, anthropological, history, cultural historical and tourism development.

Heritage Impact Assessments

Since 1992, I have done more than 2000 Phase 1 and Phase 2 impact assessments (archaeological, anthropological, historical and social) for various government departments and developers. Projects include environmental management frameworks, roads, pipeline-, and power line developments, dams, mining, water purification works, historical landscapes, refuse dumps and urban developments.