APPENDIX F

HERITAGE

Phase 1 Archaeological and Heritage Impact Assessment on the farm Hondekraal 234 JS, in respect of proposed wetland rehabilitation activities in the Loskop Dam Nature Reserve, Mpumalanga Province.

Compiled by:

For **Aurecon South Africa (Pty) Ltd**

Surveyor: Mr JP Celliers

8 December, 2017

I, Jean-Pierre Celliers as duly authorised representative of Kudzala Antiquity CC, hereby confirm my independence as a specialist and declare that neither I nor the Kudzala Antiquity CC have any interest, be it business, financial, personal or other, in any proposed activity, application or appeal in respect of which the client was appointed as Environmental Assessment practitioner, other than fair remuneration for work performed on this project.

SIGNATURE: 

10.4 The Specialist

Note: Duplicate this section where there is more than one specialist.

I JEAN-PIERRE CELLIERS as the appointed specialist hereby declare/affirm the correctness of the information provided as part of the application, and that I:

- In terms of the general requirement to be independent (tick which is applicable):

X	other than fair remuneration for work performed/to be performed in terms of this application, have no business, financial, personal or other interest in the activity or application and that there are no circumstances that may compromise my objectivity; or
	am not independent, but another EAP that is independent and meets the general requirements set out in Regulation 13 has been appointed to review my work (Note: a declaration by the review specialist must be submitted);

- have expertise in conducting specialist work as required, including knowledge of the Act, regulations and any guidelines that have relevance to the proposed activity;
- will ensure compliance with the EIA Regulations 2014;
- will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the application;
- will take into account, to the extent possible, the matters listed in regulation **18** of the regulations when preparing the application and any report, plan or document relating to the application;
- will disclose to the proponent or applicant, registered interested and affected parties 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 or the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority (unless access to that information is protected by law, in which case I will indicate that such protected information exists and is only provided to the competent authority);
- declare that all the particulars furnished by me in this form are true and correct.
- am aware that it is an offence in terms of Regulation 48 to provide incorrect or misleading information and that a person convicted of such an offence is liable to the penalties as contemplated in section 49B(2) of the National Environmental Management Act, 1998 (Act 107 of 1998).

Signature of the specialist

KUDZALA ANTIQUITY CC

Name of company

08/12/2017

Date

Table of Contents

Executive summary

Site name and location: The farm Hondekraal 234 JS, located in the Loskop Dam Nature Reserve, Mpumalanga Province.

Purpose of the study: An archaeological and heritage study in order to identify cultural heritage resources in respect of proposed wetland rehabilitation activities

Topographical Maps: 1:50 000 2529 CA (1965, 1984, 1997), 2529 AD (1964, 1984), 2529 AC (1965), 2529 CB (1965, 1984).

EIA Consultant: Aurecon South Africa (Pty) Ltd

Client:

Heritage Consultant: Kudzala Antiquity CC.

Contact person: Jean-Pierre (JP) Celliers Tel: +27 82 779 3748

E-mail: kudzala@lantic.net

Report date: 20 November 2017

Executive summary:

An Archaeological and Heritage Impact Assessment was undertaken by Kudzala Antiquity CC in respect of proposed rehabilitation activities to wetlands in the Loskop Dam Nature Reserve in Mpumalanga Province. The study was done with the aim of assessing impacts which proposed rehabilitation activities will have on two Middle and Late Stone Age sites which were previously recorded and excavated by archaeologists of the National Cultural History Museum. The assessment is a legislative requirement in terms of section 38 of the National Heritage Resources Act (Act No. 25 of 1999) and the National Environmental Management Act (NEMA, 17 of 1998).

The survey was conducted on foot and with the aid of a motor vehicle in an effort to locate the sites. The archaeologist was accompanied by the Nature Reserve management and officials of the Working for Wetlands programme in order to get familiarized with the proposed activities and their purpose. An archival study including scrutiny of previous heritage surveys of the area formed the baseline information against which the survey was conducted.

A total of nine sites were recorded during the survey. They consist of two main open-air Middle and Late Stone Age sites known as Site D and F. These two sites were previously recorded (Pelser, 1997; Pelser & Teichert, 2001, 2002) and excavated (Pelser, 2005) by archaeologists of the National Cultural History Museum (NCHM). This was a result of an archaeological resources survey conducted by the NCHM's Archaeology Department as requested from the Loskop Dam Nature Reserve Management in 1997 and 2001 resulting in a variety of heritage sites being

recorded including Stone Age, Late Iron Age, Historic, Rock Art, burial grounds and graves and historic building sites (Pelser, personal comm.).
During the current site assessment additional sites were recorded within each respective site (Sites D and F). They were numbered F1-3 and D1-4. These sites are a mixture of areas where the negative effect of current erosion on the landscape and the archaeology is visible, to features previously recorded by archaeologists and places where stone tool scatters occur. This resulted in a wide distribution of artefacts that is out of context and can be classified as background scatter (Orton, 2016).

Soil erosion can be considered as a post-depositional process which together with substantial water flow, resulted in a rounded and weathered appearance on the stone tools at Hondekraal 234 JS. Post-depositional processes as an influence on archaeological material have been discussed by some authors (Wright et al. 2016). Natural and anthropogenic processes that have occurred after the deposition of archaeological material might have transformed them into their present state. Understanding of post-depositional processes is vital to assess the possible biases they might have caused in the archaeological record. Some of the best examples of this include erosion and agricultural activities such as ploughing. Given the fact that soil erosion has had a negative effect on the archaeological deposit in this area, which was intervened by site recording and archaeological excavation since 1997 through 2005, and that the sheet erosion has continued since 2005 (12 years) it is my opinion that the proposed interventions by the Working for Wetlands programme to stop further erosion will also halt ongoing degradation of the archaeological deposit and will therefore be a positive impact. The proposed activities will not impact on in-situ archaeological material or sites (i.e. knapping sites, Pelser & Teichert, 2001, 2002, 2005). Therefore the proposed interventions are supported.
A total of five survey orientation locations were documented (SO 1-5) which includes a GPS location and photographs of the landscape at that particular location.
It is not within the expertise of this report or the surveyor to comment on possible palaeontological remains which may be located in the study area.

Disclaimer: *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. Kudzala Antiquity CC will not be held liable for such oversights or for costs incurred as a result of such oversights.*

whatsoever for or to any other person, without the prior written consent of Kudzala Antiquity CC. The client, on acceptance of any submission by Kudzala Antiquity CC and on condition that the client pays to Kudzala Antiquity CC the full price for the work as agreed, shall be entitled to use for its own benefit and for the specified project only:

- The results of the project;
- The technology described in any report; and
- Recommendations delivered to the client.

Introduction

1.1. Terms of reference

Kudzala Antiquity CC was commissioned to conduct an archaeological and heritage resources assessment on two environmentally and archaeologically sensitive areas on the farm Hondekraal 234 JS located in the Loskop Dam Nature Reserve in Mpumalanga Province. The survey was conducted in respect of the potential impact which proposed erosion intervention and control activities may have on known archaeological resources. The survey was conducted for Aurecon South Africa (Pty) Ltd.

1.1.1 Project overview

The client is in the process of obtaining environmental authorization to stabilize two erosion dongas, which cause a sensitive wetland system to silt up, by introducing environmentally acceptable interventions in the form of structures which are designed to curb and prevent soil erosion in a sensitive wetland system within the Loskop Dam Nature Reserve, Mpumalanga. This will ensure that water quality and quantity as well as the related sensitive biodiversity within this wetland system will be sustained and maintained in the future. The project footprint areas include two erosion dongas which are approximately 2,5 hectares (Site F) and 2,4 hectares (Site D) in extent (see maps Appendix C). These two erosion dongas also contain scatters of Middle and Late Stone Age stone tools which are culturally and archaeologically significant. Erosion control measures and their associated activities will halt the current negative effects of the soil erosion processes on the archaeological material.

South Africa is regarded as being a dry country but has exceptionally rich biodiversity. Estimates that by the year 2025 South Africa will be regarded as one of fourteen African countries classed as having water scarcity (Unesco, 2000). Conservation of wetlands is key to the sustainable management of water quality and quantity therefore wetland rehabilitation is essential to conserve water resources in South Africa.

The guiding principles of the National Water Act (Act 36 of 1998) recognise the need to protect water resources. In order to curb the loss of wetlands and maintain and enhance the benefits they provide, strategies for wetland conservation need to include combinations of proactive measures for maintaining healthy wetlands together with interventions for rehabilitating those wetlands which have been degraded. These objectives are being successfully met in a coordinated and innovative way through the Working for Wetlands Programme (WfWetlands). This programme pursues its mandate to protect wetlands by informed and wise use of wetlands and rehabilitation measures done in a

manner which maximises employment creation, support of small emerging business and skills transfer. The programme has been operational for 13 years and approximately R1 billion has been invested in wetland rehabilitation resulting in large social benefits as well. The Working for Wetlands programme succeeds in raising awareness of wetlands among landowners, workers and the general public and provides adult basic education and training as well as technical skills transfer.

Typical rehabilitation activities and interventions

To successfully rehabilitate a wetland the cause of the damage or degradation must be identified and addressed in order for the natural flow patterns of the wetland system to be re-established. Key objectives for implementing these interventions include:

- Restoration of hydrological integrity (e.g. raising the general water table or redistributing the water across the wetland area);
- Recreation of wetland habitat towards the conservation of biodiversity;
- Job creation and social upliftment

Typical activities undertaken during such projects include:

- Plugging artificial drainage channels created by development or historica agricultural practises to drain wetland area for other land use purposes;
- Constructing structures (gabions, berms or weirs) to divert or redistribute water to more natural flow paths, or to prevent erosion by unnatural flow rates that have resulted from unsustainable land use practises or development; and
- Removing invasive alien or undesirable plant species from wetlands and their immediate catchments

Methods of wetland rehabilitation may include hard engineering interventions and soft engineering interventions.

Hard interventions include:

- Earth berms or gabion systems to block artificial channels that drain water from or divert water to the wetland;
- Concrete and gabion weirs to act as setting ponds, to reduce flow velocity or to re-disperse water across former wetland areas thereby re-establishing natural flow paths;
- Earth or gabion structure plugs to raise channel floors and reduce water velocity;
- Concrete or gabion structures to stabilize head-cut or other erosion and prevent gullies;
- Concrete and/ or reno mattress strips as road crossings to address channels and erosion in wetlands from vehicles; and

- Gabion structures (mattresses, blankets or baskets) to provide a platform for the growth of desired wetland vegetation.

Soft interventions which offer successful rehabilitation and often used in combination with hard interventions, are:

- The use of biodegradable or natural soil retention systems such as eco-logs (tightly wrapped cylinders of fibre held together with mesh wire, fibres typically from coconuts), MacMat-R (mesh reinforced three-dimensional geomat which is applied for erosion control) plant plugs, grass or hay bales and brush-packing techniques.
- Silt fences. These reduce and stops erosion in dongas with small catchment areas by means of cheap and easily constructed structure. The structure requires vertical iron stays to be knocked into the ground, followed by shade netting being draped across and tied firmly to the stays. The structures can also be made with natural materials which are biodegradable.
- The re-vegetation of stabilized areas with appropriate wetland and riparian plant species;
- Alien invasive plant clearing, which is an important part of wetland rehabilitation;
- The fencing off of sensitive areas within the wetland to keep grazers out and to allow for the re-establishment of vegetation;
- In some instances, the use of appropriate fire management and burning regimes. The removal of undesirable plant and animal species; and
- In some wetlands, it may be possible to involve the community to develop a management plan for use within a wetland. This can involve capacity building through educating and training community members who would monitor progress. A plan could involve measures such as rotational grazing with long term benefits for rangeland quality.

At the Hondekraal erosion dongas the soft interventions such as re-vegetation and silt fences are currently desirable as they will be the most effective long term measure in reducing and halting the erosion. Some hard interventions like small stone masonry weirs may also be necessary. Also see Appendix C for maps illustrating possible interventions.

Fig. 1. An example of a typical hard engineering intervention known as a stone masonry weir which may be used at Hondekraal.

Fig. 2. A typical soft intervention (geomat) for erosion control where the outcome is to trap sediment and thereby promote the re-establishment of vegetation which halts further erosion. This will be used at Hondekraal.

Fig. 3. Another example of soft intervention is a silt fence which reduces and stops erosion in dongas with small catchment areas by means of cheap and easily constructed structure. This is a photo shortly after construction.

Fig.4. Silt fences after it has been implemented in an erosion donga resulted in halting the erosion and re-established plant growth.

1.2. Legislative Framework

The National Heritage Resources Act (NHRA) (Act No. 25, 1999) and the National Environmental Management Act (NEMA) (Act No. 107 of 1998) require that individuals or institutions have specialist heritage impact assessment studies undertaken whenever development activities are planned and such activities trigger activities listed in the legislation. This report is the result of an archaeological and heritage study in accordance with the requirements as set out in Section 38 (3) of the NHRA in an effort to ensure that heritage features or sites that qualify as part of the national estate are properly managed and not damaged or destroyed.

The study aims to address the following objectives:

- Analysis of heritage issues;
- Assess the cultural significance of identified places including archaeological sites and features, buildings and structures, graves and burial grounds within a specific historic context;
- Identifying the need for more research;
- Surveying and mapping of identified places including archaeological sites and features, buildings and structures, graves and burial grounds;
- A preliminary assessment of the feasibility of the proposed development or construction from a heritage perspective;
- Identifying the need for alternatives when necessary; and
- Recommending mitigation measures to address any negative impacts on archaeological and heritage resources.

Heritage resources considered to be part of the national estate include those that are of archaeological, cultural or historical significance or have other special value to the present community or future generations.

The national estate may 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 paleontological sites;

- graves and burial grounds including:
    - (i) ancestral graves;
    - (ii) royal graves and graves of traditional leaders;
    - *(iii)* graves of victims of conflict;
    - (iv) graves of individuals designated by the Minister by notice in the *Gazette;*
    - (v) 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 slavery in South Africa;
- movable objects including:

(i) objects recovered from the soil or waters of South Africa, including archaeological and paleontological objects and material, meteorites and rare geological specimens;
(ii) objects to which oral traditions are attached or which are associated with living heritage
(iii) ethnographic art and objects;
(iv) military objects
(v) objects of decorative or fine art;
(vi) objects of scientific or technological interest; and
(vii) 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 of the National Archives of South Africa Act, 1996 (Act No. 43 of 1996).

Cultural resources are unique and non-renewable physical phenomena (of natural occurrence or made by humans) that can be associated with human (cultural) activities (Van Vollenhoven 1995:3). These would be any man-made structure, tool, object of art or waste that was left behind on or beneath the soil surface by historic or pre-historic communities. These remains, when studied in their original context by archaeologists, are interpreted in an attempt to understand, identify and reconstruct the activities and lifestyles of past communities. When these items are removed from their original context, any meaningful information they possess is lost, therefore it is important to locate and identify such remains before construction or development activities commence.

1.2.1. Heritage in Protected areas

In February 2016 Government Gazette no. 40593 the Department of Environmental Affairs published Cultural Heritage Survey Guidelines and Assessment tools for protected areas in South Africa, under the National Environmental Management: Protected Areas Act, 2003 (Act 57, 2003).

In protected areas a basic inventory of the property facilitates confirmation of national heritage resources; conducting of heritage audits; site condition monitoring; prioritising sites by ranking their significance; evaluation of a protected area's heritage; assistance in planning for heritage resources and allocating resources.

Process in compiling the cultural resources inventory for the Loskop Dam Nature Reserve (LDNR) entails significance assessment of the heritage resources, condition assessment and evaluation for grading of the resources (refer to tables 1.1, 1.2). This was already completed during the fieldwork by archaeologists of the National Cultural History Museum as requested by Loskop Dam Nature Reserve Management in 1997 and 2001, 2002 (Pelser, 1997; Pelser & Teichert, 2001, 2002). Involvement of the management and stakeholders of the Nature Reserve or protected area within Loskop Dam Nature Reserve include Ecologist Mr Jannie Engelbrecht and the Working for Wetlands Programme.

Table 1.1. Significance Assessment for heritage resources of the Loskop Dam Nature Reserve (LDNR). Refer to tables 5.1. and 5.2. for guidelines in significance assessment.

Type of heritage resource	**Present or not present in the LDNR**	**Heritage or cultural period**	**Significance**
Archaeological	Yes	MSA,LSA, LIA, Historic	Medium to High
Historical	Yes	South African War (1899-1902)	Medium to High
Intangible heritage	No	-	-
Rock Art	Yes	LSA or LIA ?	Medium to High
Burial grounds and graves	Yes	Historic	High

Table 1.2. Condition and evaluation for grading of heritage resources in the LDNR

Period of heritage resource	**Archaeological**	**Historical**	**Intangible heritage**	**Number of sites**	**Suggested National Grade**
MSA	x	-	-	≤19	Local
LSA	x	-	-	≤19	Local
EIA	-	-	-	-	Local
LIA	x	-	-	>20	Local
Rock Art	x	x	-	1	Local
Historical	-	x	-	>5	Local

1.3. Approach and statutory requirements

The SAHRA Minimum standards of 2007 guideline document, forms the background against which the survey was planned and the report compiled. An Archaeological Impact Assessment (AIA) consists of three phases. This document deals with the first phase. This (phase 1) investigation is aimed at getting an overview of cultural resources in the project area, assigning significance to these resources, assessing the possible impact that the proposed activity may have on these resources, making recommendations pertaining to the management of heritage resources and putting forward mitigation measures where applicable.

When the archaeologist or heritage specialist encounters a situation where the planned project will lead to the destruction or alteration of an archaeological/ heritage site or feature, a second phase investigation is normally recommended. During a phase two investigation mitigation measures are put in place and detailed investigation into the nature of the cultural material is undertaken. Often at this stage, archaeological excavation and detailed mapping of a site is carried out in order to document and preserve the cultural heritage.

Phase three consists of the compiling of a management plan for the safeguarding, conservation, interpretation and utilization of cultural resources (Van Vollenhoven, 2002).

Continuous communication between the developer and heritage specialist after the initial assessment has been carried out may result in the modification of a planned route or development to incorporate or protect existing archaeological and heritage sites.

2. Description of surveyed area

The study area falls within the Nkangala District Municipality and in the Loskop Dam Nature Reserve managed by the Mpumalanga Tourism and Parks Agency (MTPA).

Veld type: The vegetation forms part of the Savanna Biome and the Loskop Dam Nature Reserve has both Loskop Mountain Bushveld and Loskop Thornveld, veld types. Loskop Mountain Bushveld occurs on the mountains in the vicinity of Loskop Dam extending southwestwards to Bronkhorstspruit on mountains such as the Gouwsberge and westwards to Rust de Winter on mountains such as Dithlabane (Mucina and Rutherford, 2009). Altitude about 1050-1500m, it is characterized by low mountains and ridges with open tree savanna on lower-lying areas dominated by Burkea Africana and denser broad-leaved savanna on lower slopes and mid slopes. Herbaceaous layer is dominated by grasses. Loskop thornveld occurs in Mpumalanga and marginally Limpopo Province in the areas of Groblersdal, Stoffberg and Loskop Dam with a varying altitude of between 950-1300m. The landscape is characterised by valleys and plains of parts of the upper Olifants River catchment. The veld is usually open deciduous to semi-deciduous, tall thorny woodland usually dominated by Acacia species (Mucina and Rutherford, 2009).

Geology and soils: Loskop Mountain Bushveld is mostly composed of Rhyolite of the Selons River Formation and sandstone with subordinate conglomerate and minor shale of the Wilge River Formation. Mudrock, sandstone, conglomerate and volcanic rocks of the Loskop Formation is also present. Soils range from sandy to sandy loams sandy clays and some clays (Mucina and Rutherford, 2009). Loskop Thornveld geology comprises Gabbro, norite and anorthosite of the Dsjate Subsuite, olivine diorite, magnetite gabbro and gabbronorite of the Roossenekal subsuite, mudstone, sandstone, conglomerate and volcanic rocks of the Loskop Formation is also present. Soils are vertic melanic clays, plinthic catena, eutrophic and widespread red soils. Red-yellow apedal, freely drained soils and high base status. Deep soils with Hutton, Rensburg and Arcadia forms are common (Mucina & Rutherford, 2009).

3. Methodology

This study consists of a detailed archival study in order to understand the study area in a historical timeframe, an archaeological background study which include scrutiny of previous archaeological reports of the area, obtained through the SAHRIS database, and published as well as unpublished written sources on the archaeology of the area, social consultation with people who live nearby and a lastly a physical survey of the affected and immediate area.

The South African Heritage Resources Agency (SAHRA) and the relevant legislation (NHRA) require that the following components be included in an archaeological impact assessment:

- Archaeology;
- Shipwrecks;
- Battlefields;
- Graves;
- Structures older than 60 years;
- Living heritage;
- Historical settlements;
- Landscapes;
- Geological sites; and
- Paleontological sites and objects.

All the above-mentioned heritage components are addressed in this report, except shipwrecks, geological sites and paleontological sites and objects.

The ***purpose*** of the archaeological, archival and heritage study is to establish the whereabouts and nature of cultural heritage sites should they occur on project area. This includes settlements, structures and artefacts which have value for an individual or group of people in terms of historical, archaeological, architectural and human (cultural) development.

The ***aim*** of this study is to locate and identify such objects or places in order to assess and rate their significance and establish if further investigation is needed. Mitigation measures can then be suggested and put in place when necessary.

3.1. Archaeological and Archival background studies

The purpose of the desktop study is to compile as much information as possible on the heritage resources of the area. This helps to provide an historical context for located sites. Sources used for

this study include published and unpublished documents, archival material and maps. Information obtained from the following institutions or individuals were consulted:

- Lydenburg Museum, Lydenburg;
- Published and unpublished archaeological reports and articles;
- Published and unpublished historical reports and articles;
- Archival documents from the National Archives in Pretoria;
- Historical maps; and
- South African Heritage Resource Information System (SAHRIS) database.

3.1.1. Previous archaeological studies in the area

A number of archaeological surveys and some research including excavation of Middle and Late Stone Age sites have been conducted in the Loskop Dam Nature Reserve.

In 1959 Mr B.D. Malan, compiled a report with the title “Stone Age Remains in Loskop Dam Reserve” in his capacity as “Director of Archaeological Survey in Johannesburg”. In this superficial overview of the archaeology of the reserve he describes an abundance of open-air sites which contain stone implements (cores and flakes) associated with the Fauresmith industry. He also describes Late Iron Age settlements and historic sites associated with European occupation. He also describes a rock art site where painted images were found on the wall of a rock shelter which illustrates ox-wagons pulled by oxen and men riding horses. He suggests that these paintings were made by Late Iron Age herders who observed Europeans settling in the area during the early colonial times.

In later years, 1997, 2001, 2002 two archaeologists of the archaeology department at the National Cultural History Museum (NCHM) in Pretoria (currently part of the Northern Flagship Institute, Ditsong Museums) Mrss Anton Pelser and Frank Teichert, conducted more detailed surveys and research on archaeological sites in the Loskop Dam Nature Reserve (Pelser, 1997; Pelser & Teichert, 2001; Pelser & Teichert, 2002). This was done on request by the Loskop Dam Nature Reserve Management and eventually led to further archaeological research which included excavation of Middle Stone Age sites located in erosion dongas on the farm Hondekraal 234 JS, located in the Loskop Dam Nature Reserve (Pelser & Teichert, 2005). Nearly 70 sites, including 19 Stone Age sites were identified during the fieldwork seasons, eight of these occur on the farm Hondekraal. Other heritage resources indentified included a large number of Late Iron Age settlements, graves and burial grounds, historical buildings, sites associated with the Anglo Boer War (1899-1902), and a rock art site (Personal communication, Mr A. Pelser). The Stone Age sites at Hondekraal are all open-air, surface sites and occur in massive erosion dongas. Large numbers of formal stone tools, cores, flakes, waste flakes and some hammer stones were found on the soil

surface. A number of stone circles with concentrations of stone tools were also observed. As a result of the 2002 fieldwork season and the fact that no detailed archaeological research has ever been conducted on the Reserve, it was decided to conduct in-depth archaeological investigation on the Stone Age occupation of Hondekraal (Pelser & Teichert, 2005). The researchers identified the largest part of the Stone Age artefacts to belong to the Middle Stone Age (MSA) with some Early Stone Age (ESA) and Late Stone Age (LSA) also present. They hypothesized that hunter gatherer communities used the landscape seasonally and avoided it during dry periods. In the two erosion dongas at Hondekraal, which they named Site D and F respectively, they found a number of stone circles which contained concentrations of stone tools and waste flakes which they believed were *in situ* knapping sites which were used seasonally. Similar sites were recorded by Mr Jaco van der Walt and the University of Johannesburg's Palaeo-TrACKS archaeological research team during August 2016 at Barberspan Nature reserve and interpreted as knapping sites due to the high frequency of hammerstones, cores and debitage (Jaco vd Walt personal comm.).

Stone circle sites at both sites D and F were formally excavated and found to contain large numbers of stone tools and flakes which was interpreted to be stone tool manufacturing sites. Two excavations at Site D returned very little formal tools.

3.1.2. Historic maps

Historical maps obtained during the archival study were scrutinized and features that were regarded as important in terms of heritage value were identified and if they were located within the boundaries of the project area they were physically visited in an effort to determine:

(i) whether they still exist;
(ii) their current condition; and
(iii) significance.

3.1.3 Physical survey

- The survey of the erosion dongas was carried out on 2 November 2017.
- The survey took one day to complete.
- The documented sites were numbered sequentially with reference to the sites names allocated by previous researchers, Mr Anton Pelser and Mr Frank Teichert in 1997, 2001, 2002.
- Sites were recorded by using a handheld Garmin Oregon 450 GPS unit and the unit was given time to reach an accuracy of at least 5 metres.

- Sites were plotted on 1:50 000 topographical maps which are geo-referenced (WGS 84) and also on Google Earth.
- The sites were identified as Stone Age background scatters following Orton's definition (Orton, 2016).
- Inside these background scatters higher densities of artefacts were documented/ plotted and not individual artefacts.

3.2. Social Consultation

Social consultation forms an important part of identifying sites which may be of heritage significance. The current reserve ecologist Mr Jannie Engelbrecht, provided valuable information on the location of the two previously recorded Stone Age open-air sites on the farm Hondekraal 234 JS. His career at the Loskop Dam Nature Reserve spans many years and he was involved in the initial archaeological research projects conducted by the Archaeology Department of the National Cultural History Museum (Ditsong Museums).

3.3. Heritage site significance

The South African Heritage Resources Agency (SAHRA) formulated guidelines for the conservation of all cultural resources and therefore also divided such sites into three main categories. These categories might be seen as guidelines that suggest the extent of protection a given site might receive. They include sites or features of local (Grade 3) provincial (Grade 2) national (Grade 1) significance, grades of *local significance* and *generally protected* sites with a variety of degrees of significance.

For practical purposes the surveyor uses his own classification for sites or features and divides them into three groups, those of low or no significance, those of medium significance and those of high significance **(*Also see table 5.2.Significance rating guidelines for sites*).**

Values used to assign significance and impact characteristics to a site include:

- **Types of significance**

The site's scientific, aesthetic and historic significance or a combination of these is established.

- **Degrees of significance**

The archaeological or historic site's rarity and representative value is considered. The condition of the site is also an important consideration.

- **Spheres of significance**

Sites are categorized as being significant in the international, national, provincial, regional or local context. Significance of a site for a specific community is also taken into consideration.

To arrive at the specific allocation of significance of a site or feature, the specialist considers the following:

- Historic context;
- Archaeological context or scientific value;
- Social value;
- Aesthetic value; and
- Research value.

More specific criteria used by the specialist in order to allocate value or significance to a site include:

- The unique nature of a site;
- The integrity of the archaeological deposit;
- The wider historic, archaeological and geographic context of the site;
- The location of the site in relation to other similar sites or features;
- The depth of the archaeological deposit (when it can be determined or is known);
- The preservation condition of the site;
- Quality of the archaeological or historic material of the site; and
- Quantity of sites and site features.

Archaeological and historic sites containing data, which may significantly enhance the knowledge that archaeologists currently have about our cultural heritage, should be considered highly valuable. In all instances these sites should be preserved and not damaged during construction activities. However, when development activities jeopardize the future of such a site, a second and third phase in the Cultural Resource Management (CRM) process is normally advised. This entails the excavation or rescue excavation of cultural material, along with a management plan to be drafted for the preservation of the site or sites.

Graves are considered very sensitive sites and should never under any circumstances be jeopardized by development activities. Graves and burial grounds are incorporated in the NHRA under section 36 and in all instances where graves are found by the surveyor, the recommendation

would be to steer clear of these areas. If this is not possible or if construction activities have for some reason damaged graves, specialized consultants are normally contacted to aid in the process of exhumation and re-interment of the human remains.

4. History and Archaeology

4.1. Historic period

4.1.1. Early History

In Southern Africa the domestication of the environment began only a couple of thousands of years ago, when agriculture and herding were introduced. At some time during the last half of the first millennium BC, people living in the region where Botswana, Zambia and Angola are today, started moving southward, until they reached the Highveld and the Cape in the area of modern South Africa. As time passed and the sub-continent became fully settled, these agro-pastoralists, who spoke Bantu languages, started dominating all those areas which were ecologically suitable for their way of life. This included roughly the eastern half of modern South Africa, the eastern fringe of Botswana and the north of Namibia. Historians agree that the earliest Africans to inhabit in the Lowveld in Mpumalanga were of Sotho, or more particularly Koni-origin.

Up until the 1930s, malaria would have occurred sporadically in the study area during the rainy season. During the first half of the nineteenth century, Tsetse flies also thrived in this area. Pastoralists would have avoided the moist low-lying valleys and thickly wooded regions where these insects preferred to congregate. It is unlikely that populations would be dense in areas where malaria and the “sleeping sickness” transferred by Tsetse flies was a constant threat to humans and their stock (Bergh 1999: 3; Shillington 1995: 32).

In a few decades, the course of history in the old Transvaal province would change forever. The Difaqane (Sotho), or Mfekane (“the crushing” in Nguni) was a time of bloody upheavals in Natal and on the Highveld, which occurred around the early 1820s until the late 1830s. It came about in response to heightened competition for land and trade, and caused population groups like gun-carrying Griquas and Shaka’s Zulus to attack other tribes.

During the time of the Difaqane, a northwards migration of white settlers from the Cape was also taking place. Some travellers, missionaries and adventurers had gone on expeditions to the northern areas in South Africa – some as early as the 1720’s. One such an adventurer was Robert Schoon, who formed part of a group of Scottish travellers and traders who had travelled the northern provinces of South Africa in the late 1820s and early 1830s. Schoon had gone on two long expeditions in the late 1820s and once again ventured eastward and northward of Pretoria in 1836 (Bergh, 1999: 13, 116-121).

By the late 1820s, a mass-movement of Dutch speaking people in the Cape Colony started advancing into the northern areas. This was due to feelings of mounting dissatisfaction caused by economical and other circumstances in the Cape. This movement later became known as the Great Trek. This migration resulted in a massive increase in the numbers of people of European descent.

As can be expected, the movement of whites into the Northern provinces would have a significant impact on the local farmer – herders who populated the land.

By 1860, the population of Europeans in the central Transvaal was already very dense and the administrative machinery of their leaders was firmly in place. Many of the policies that would later be entrenched as legislation during the period of apartheid had already been developed (Ross 2002: 39; Bergh, 1999: 170).

However, relations were at times also interdependent in nature. After the Great Trek, when European farmers had settled at various areas in the northern provinces, wealthier individuals were often willing to lodge needy white families on their property in exchange for odd jobs and commando service. These “bywoners” often arrived with a family and a few cows. He would till the soil and pay a minimal rent to the farmer from the crops he grew. The farmer did not consider him a labourer, but mostly kept native workers for hard labour on the farm.

In the region of Groblersdal, the town nearest Loskop Dam Nature Reserve, the Kôpa under their chief Boleu, resided near a hill named Maleoskop (Boleu’s Hill) near an eastern tributary of the Olifants River. They resided here long before Europeans settled the area (Bergh, 1999:175). In 1860 the Berlin Missionaries Alex Merensky and heinrich Grűtzner started with missionary work among the Kôpa and erected a missionary station named Gerlachshoop on the farm Rietkloof. Relations between the government of the time and even the missionaries and Boleu became strained. This led to the attack of the Kôpa by a unified Pedi and Boer force in 1963. The Pedi seeked revenge after a united Kôpa and Ndzundza Ndebele attack on some of their kraals. This onslaught did not succeed but a subsequent attack by the Swazi on 10 May 1864 annihilated the Kôpa and their king Boleu (Bergh, 1999:175).

The discovery of gold in South Africa had a major impact in the region. In 1873 gold was discovered in Pilgrims Rest, 80 kilometres north of Nelspruit. This drew scores of prospectors into the region. The establishment of Barberton in 1884, after the discovery of the Sheba gold reef, also brought about greater activity in the area.

4.1.2. The Voortrekkers

The Groot Trek of the Voortrekkers started with the Tregardt- van Rensburg trek in 1835. The two men met where Tregardt and his followers crossed the Orange River at Buffelsvlei (Aliwal North). Here van Rensburg joined the trek northwards. On August 23, 1837 the Tregardt trek left for Delagoabay from the Soutpansberg. They travelled eastwards alongside the Olifants River to the eastern foothills of the Drakensberg. From here they travelled through the Lowveld and the current Kruger National Park where they eventually crossed the Lebombo mountains in March 1838. They reached the Fortification at Lourenço Marques on 13 April 1838 (Bergh, 1998:124-125).

Permanent European (Voortrekker) settlement of the eastern areas of Mpumalanga can be traced back to a commission under the leadership of A.H. (Hendrik) Potgieter who negotiated with the Portuguese Governor at Delagoabaai in 1844 for land. It was agreed that these settlers could settle in an area that was four days journey from the east coast of Africa between the 10˚ and 26˚ south latitudes. Voortrekkers started migrating into the area in 1845. Andries-Ohrigstad was the first town established in this area in July 1845 after the Voortrekkers successfully negotiated for land with the Pedi Chief Sekwati. Farms were given out as far west as the Olifants River. The western boundary was not officially defined but at a Volksraad meeting in 1849 it was decided that the Elands River would be the boundary between the districts of Potchefstroom and Lydenburg as this eastern portion of the Transvaal was then known (Bergh, 1998).
Due to internal strife and differences between the various Voortrekker groups that settled in the broader Transvaal region, the settlers in the Ohrigstad area now governed from the town of Lydenburg decided to secede from the Transvaal Republic in 1856. The Republic of Lydenburg laid claim to a large area that included not only the land originally obtained from the Pedi Chief Sekwati in 1849 but also other areas of land negotiated for from the Swazis. The Republic of Lydenburg was a vast area and stretched from the northern Strydpoort mountains to Wakkerstroom in the south and Bronkhortsspruit in the west to the Swazi border and the Lebombo mountains east.

As can be expected, the migration of Europeans into the north would have a significant impact on the indigenous people who populated the land. This was also the case in Mpumalanga. In 1839 Mswati succeeded Sobhuza (also known as Somhlomo) as king of the Swazi. Threatened by the ambitions of his half brothers, including Malambule, who had support from the Zulu king Mpande, he turned to the Ohrigstad Boers for protection. He claimed that the land that the Boers had settled on was Swazi property. The Commandant General of the Ohrigstad settlement, Andries Hendrik Potgieter, responded that the land was ceded to him by the Pedi leader Sekwati, in return for protection of the Pedi from Swazi attacks (Giliomee, 2003).

However, in reaction to the increasingly authoritarian way in which Potgieter conducted affairs at Ohrigstad, the Volksraad of Ohrigstad saw Mswati's offer as a means to obtain more respectable title deeds for the property (Bonner, 1978). According to a sales contract set up between the Afrikaners and the Swazi people on 25 July 1846, the whites were the rightful owners of the land that had its southern border at the Crocodile River, which stretched out in a westerly direction up to Elandspruit; of which the eastern border was where the Crocodile and Komati rivers joined and then extended up to Delagoa bay in the north (Van Rooyen, 1951). The Europeans bought the land for a 100 heads of cattle (Huyser).

4.1.3. History of the Anglo Boer War (1899-1902) in the area

The discovery of diamonds and gold in the Northern provinces had very important consequences for South Africa. After the discovery of these resources, the British, who at the time had colonized the Cape and Natal, had intensions of expanding their territory into the northern Boer republics. This eventually led to the Anglo-Boer War, which took place between 1899 and 1902 in South Africa, and which was one of the most turbulent times in South Africa's history.

Even before the outbreak of war in October 1899 British politicians, including Sir Alfred Milner and Mr. Chamberlain, had declared that should Britain's differences with the Z.A.R. result in violence, it would mean the end of republican independence. This decision was not immediately publicised, and as a consequence republican leaders based their assessment of British intentions on the more moderate public utterances of British leaders. Consequently, in March 1900, they asked Lord Salisbury to agree to peace on the basis of the status quo ante bellum. Salisbury's reply was, however, a clear statement of British war aims (Du Preez, 1977).

During the British advance between February to September 1900, Lord Roberts replaced Genl. Buller as the supreme commander and applied a different tactic in confronting the Boer forces instead of a frontal attack approach he opted to encircle the enemy. This proved successful and resulted for instance in the surrender of Genl. Piet Cronje and 4000 burghers at Paardeberg on 27 February 1900.

This was the start of a number of victories for the British and shortly after they occupied Pretoria on 5 June 1900, a skirmish at Diamond Hill resulted in the Boer forces under command of Louis Botha, retreated alongside the Delagoa Bay railway to the east. Between the 21-27 August, Botha and 5000 burghers defended their line at Bergendal but were overwhelmed by superior numbers and artillery. This resulted in the Boer forces retreating even further east and three weeks later the British reached Komatipoort and thus the whole of the Eastern Transvaal south of the Delagoa Bay railway line was now occupied by British Forces. General Louis Botha, with his Boer forces, marched through Nelspruit on 11 September 1900. A week later, on 18 September 1900, the British battalion of Lieutenant General F. Roberts arrived in Nelspruit.

4.1.4. Historic maps of the study area

Since the mid-1800s up until the present, South Africa has been divided and re-divided into various districts. Since 1860, the study area formed part of the Lydenburg district. As of 1872, the farm under investigation would have formed part of the Middelburg district. This remained the case until 1910, when the farm area fell under the jurisdiction of the Pretoria district. In 1925 the Witbank district was proclaimed and the farm formed part thereof. This remained the case up until 199 (Bergh, 1999: 17,

20-27). By 1913, the farm was known as Hondekraal 403. The farm was renamed Hondekraal 114 sometime between 1913 and 1950, and by 1950 it was known as Hondekraal 234 JS.

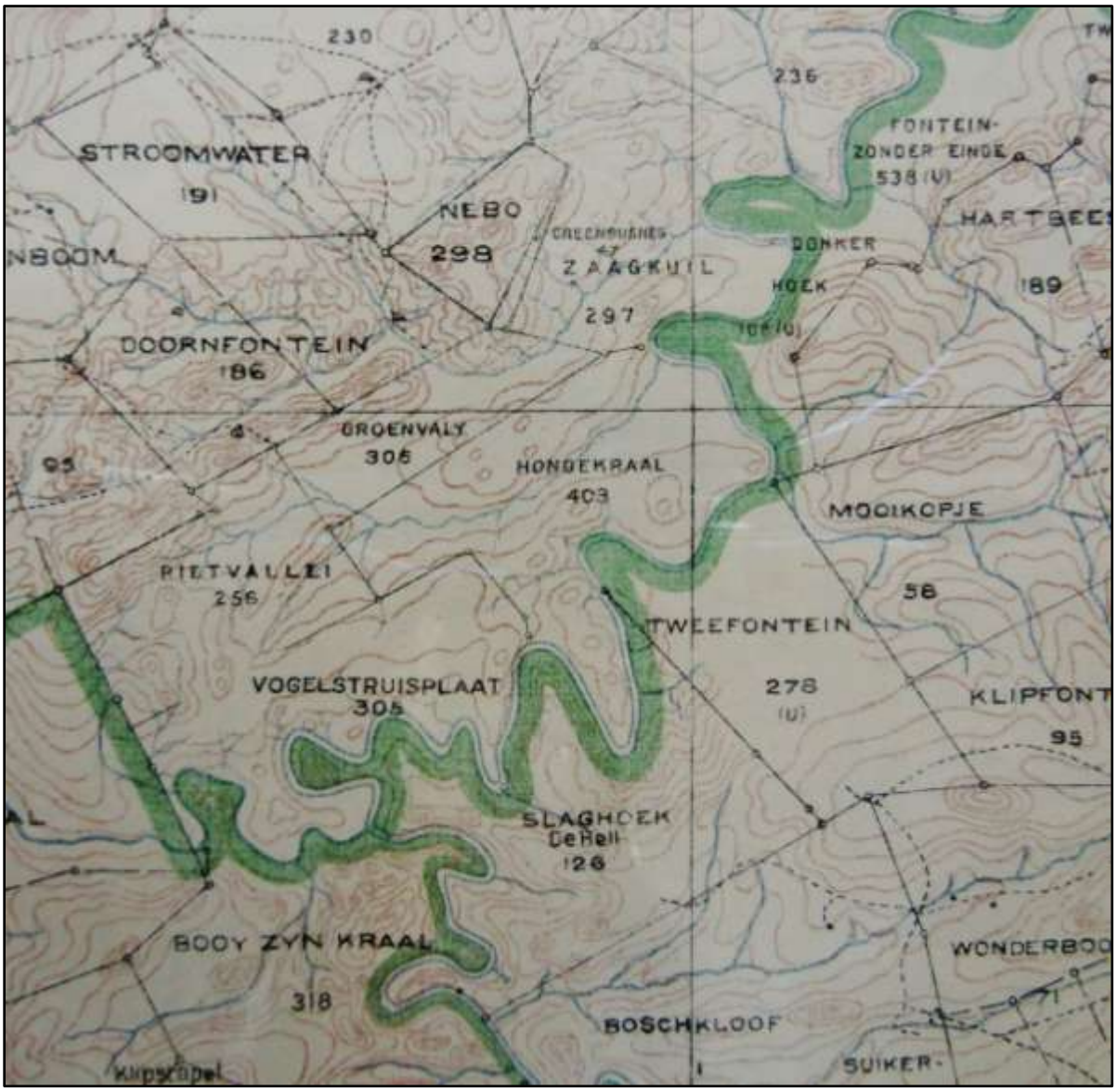


Fig. 4.1. Middelburg district map dated 1913. No homesteads, roads or other developments are visible on Hondekraal 403. The Olifants River forms the southern and eastern boundary of the farm, and this was also the boundary of the Middelburg magisterial district. A number of smaller streams also went through the property (NASA *Maps: 2/784*).

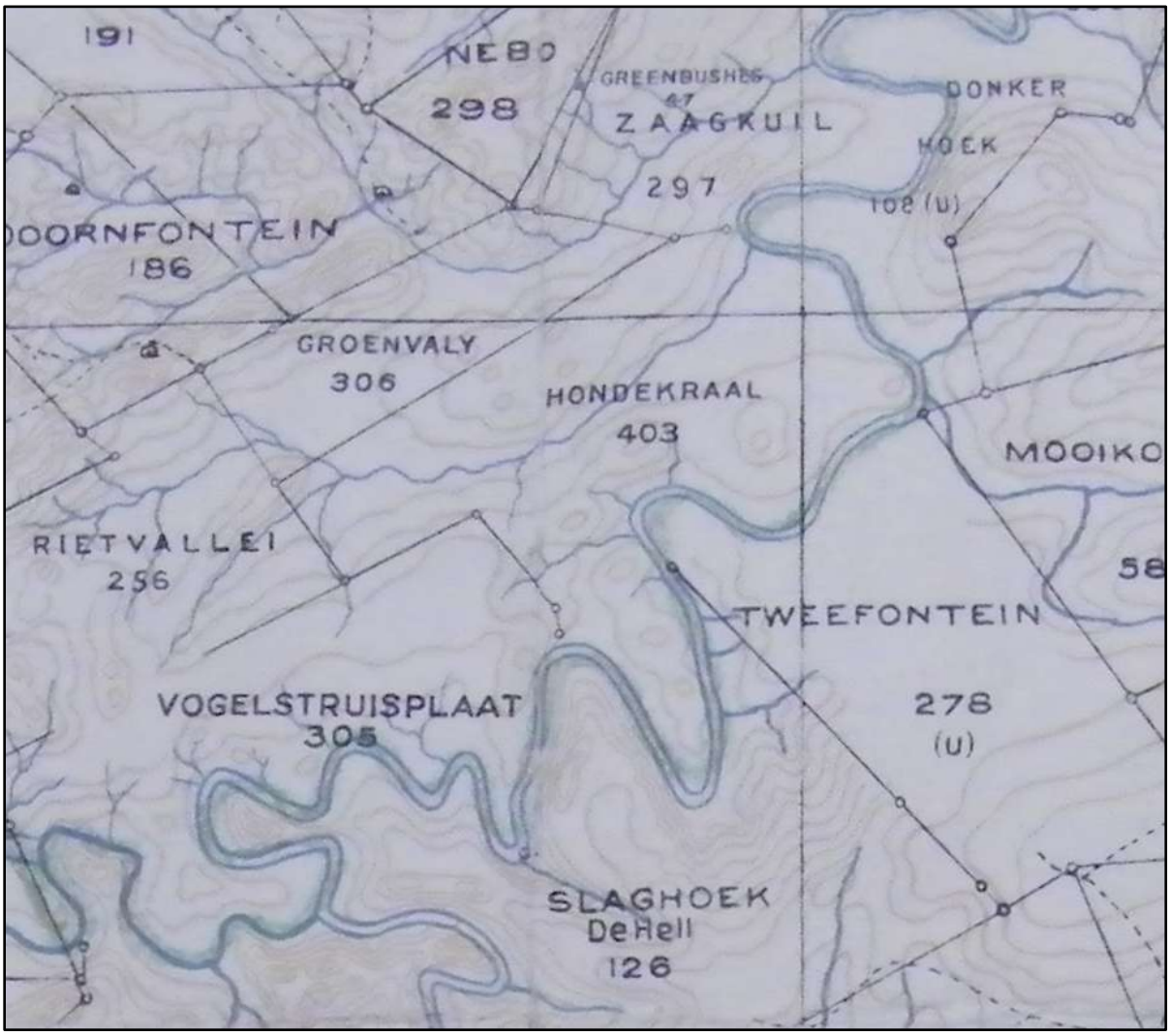


Fig. 4.2. Middelburg district map, dated 1921, showing the farm Hondekraal 403. No developments are visible on the farm (NASA *Maps: 2/189).*

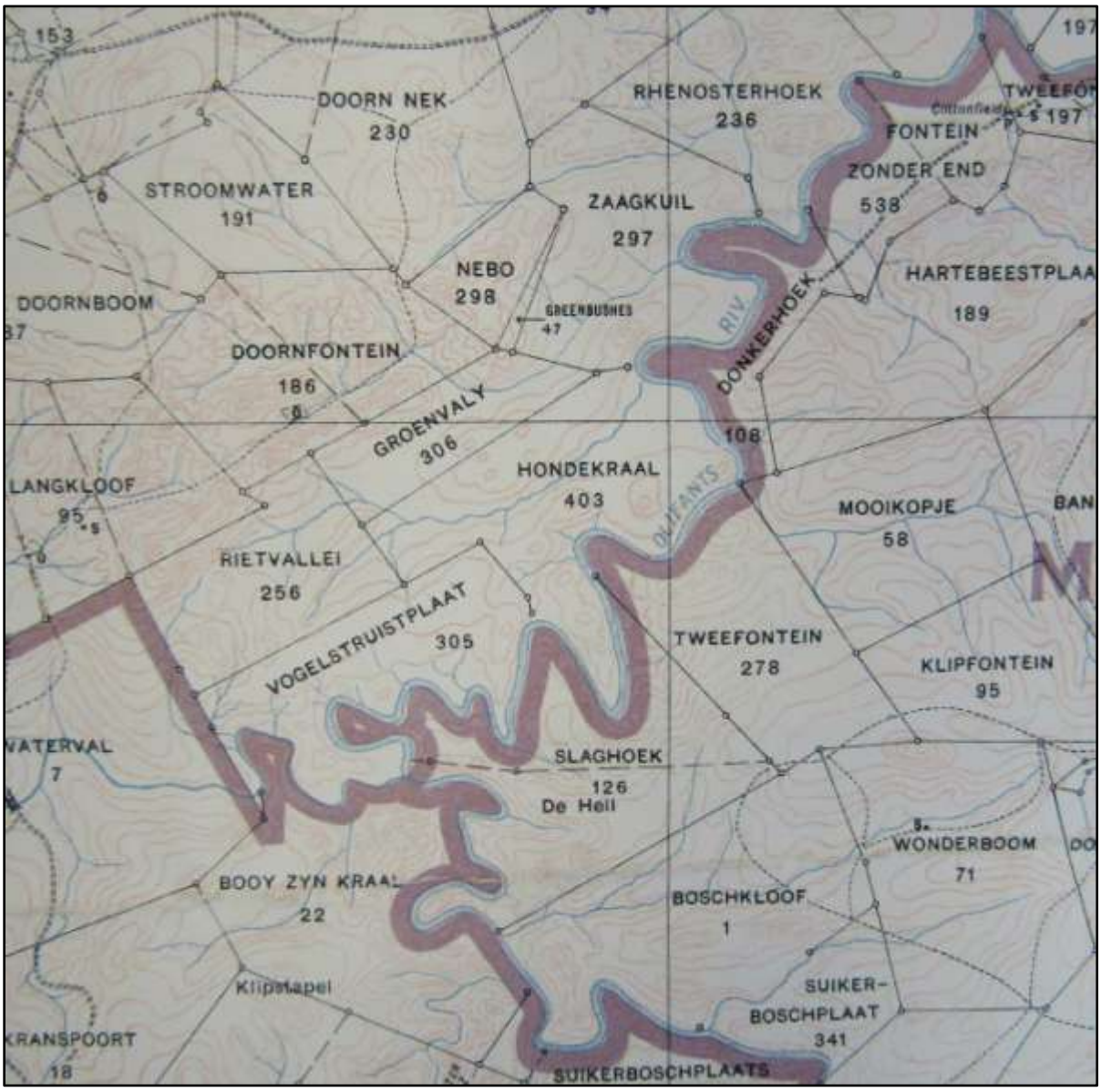


Fig. 4.3. Middelburg District Map, dated 1930, showing the farm Hondekraal 403. No developments are visible on the farm. (NASA *Maps: 2/194*)

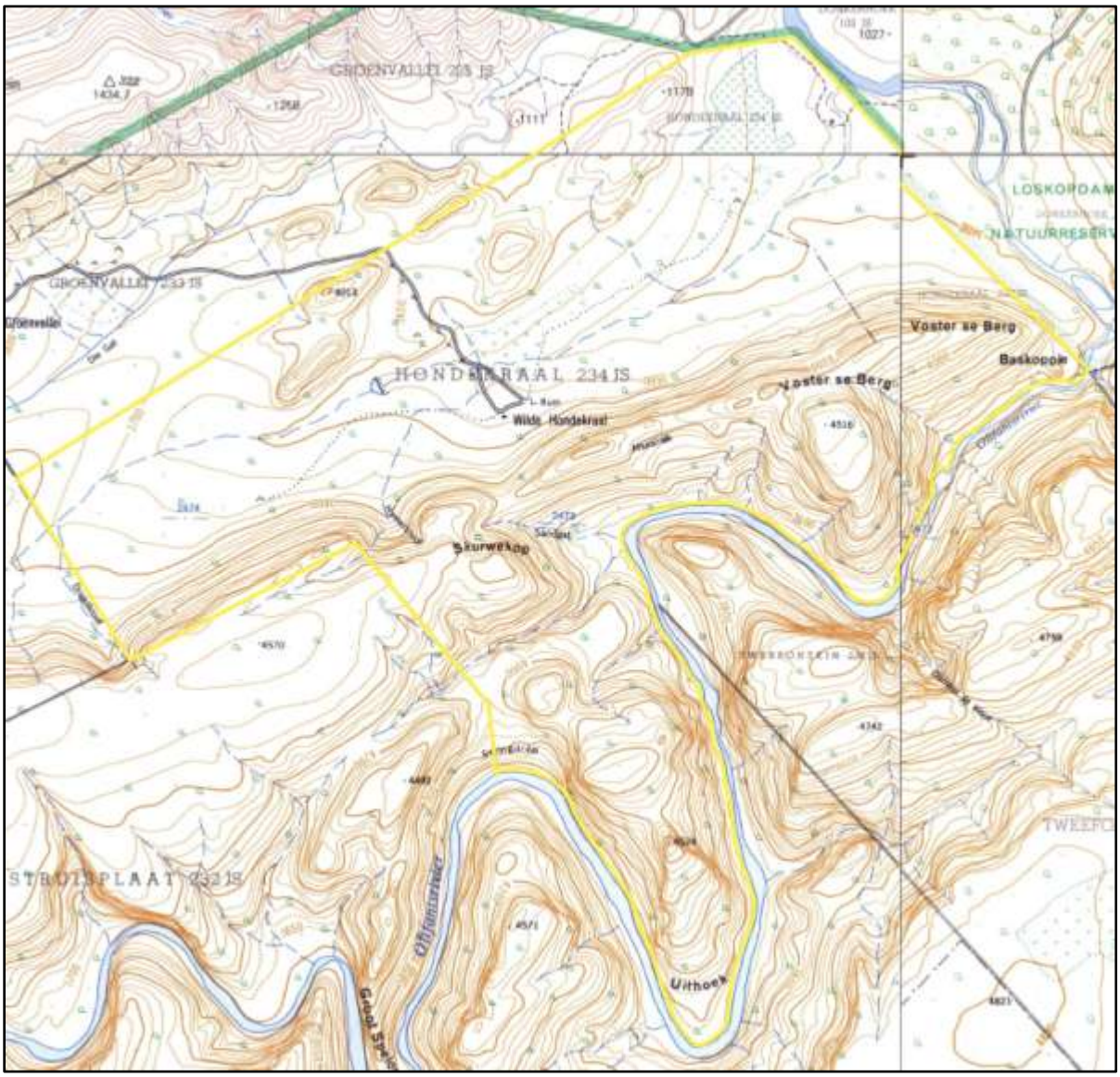


Fig.4.4. Topographical map of the study area, dated 1964-1965. The location of the farm is indicated with a yellow border. The farm was known as Hondekraal 234 JS at the time. The Loskop Dam Nature Reserve can be seen to the north east. The southern half of the farm is rather steep and undulating terrain, with hills such as Skurwekop, Voster se Berg and Baskoppie. The Olifants River can be seen along the south eastern border of the property. Developments on the property included a farm road, and one can see the site of a ruin, as well as a building near this road. The latter site was known as “Wilde Hondekraal”. One can see cultivated lands to the north east of the road, and a small dam to the west of the road. Several streams went through the property (Topographical map 1965; Topographical map 1964; Topographical map 1965; Topographical map 1965).

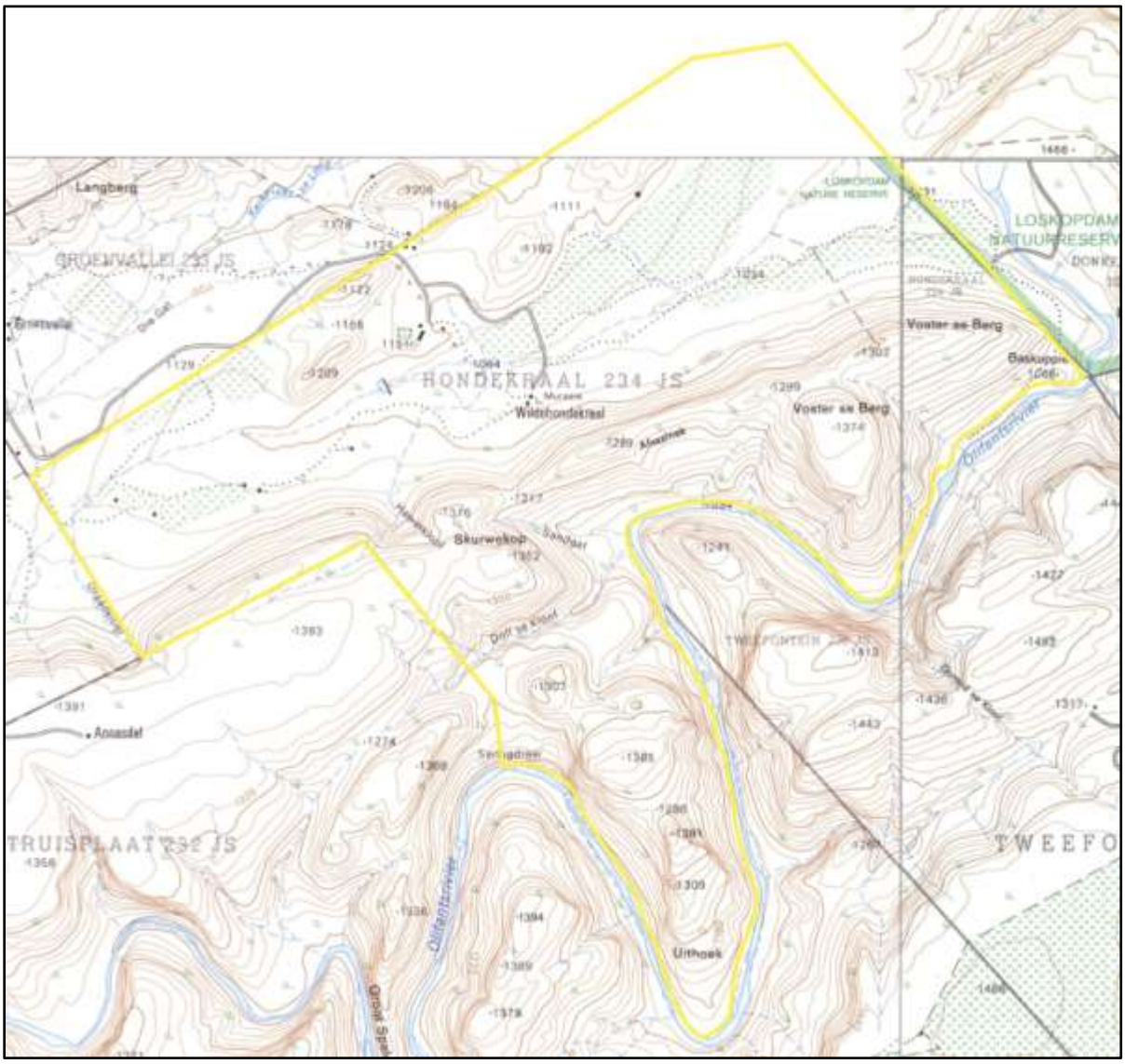


Fig.4.5. Topographical map of the study area, dated 1984. The location of the farm is indicated with a yellow border. The undulating terrain in the south eastern half of the farm was still undeveloped. To the north, near the most western corner of the farm, one can see tracks / hiking trails and cultivated fields. About five buildings can be seen scattered throughout this area. To the north east, near the farm road, one can see a small dam, telephone lines, a very small orchard, about five buildings and a ruin. To the north east of the road, one can see tracks / hiking trail leading to cultivated lands, as well as one building (Topographical map 1984; Topographical map 1984; Topographical map 1984).

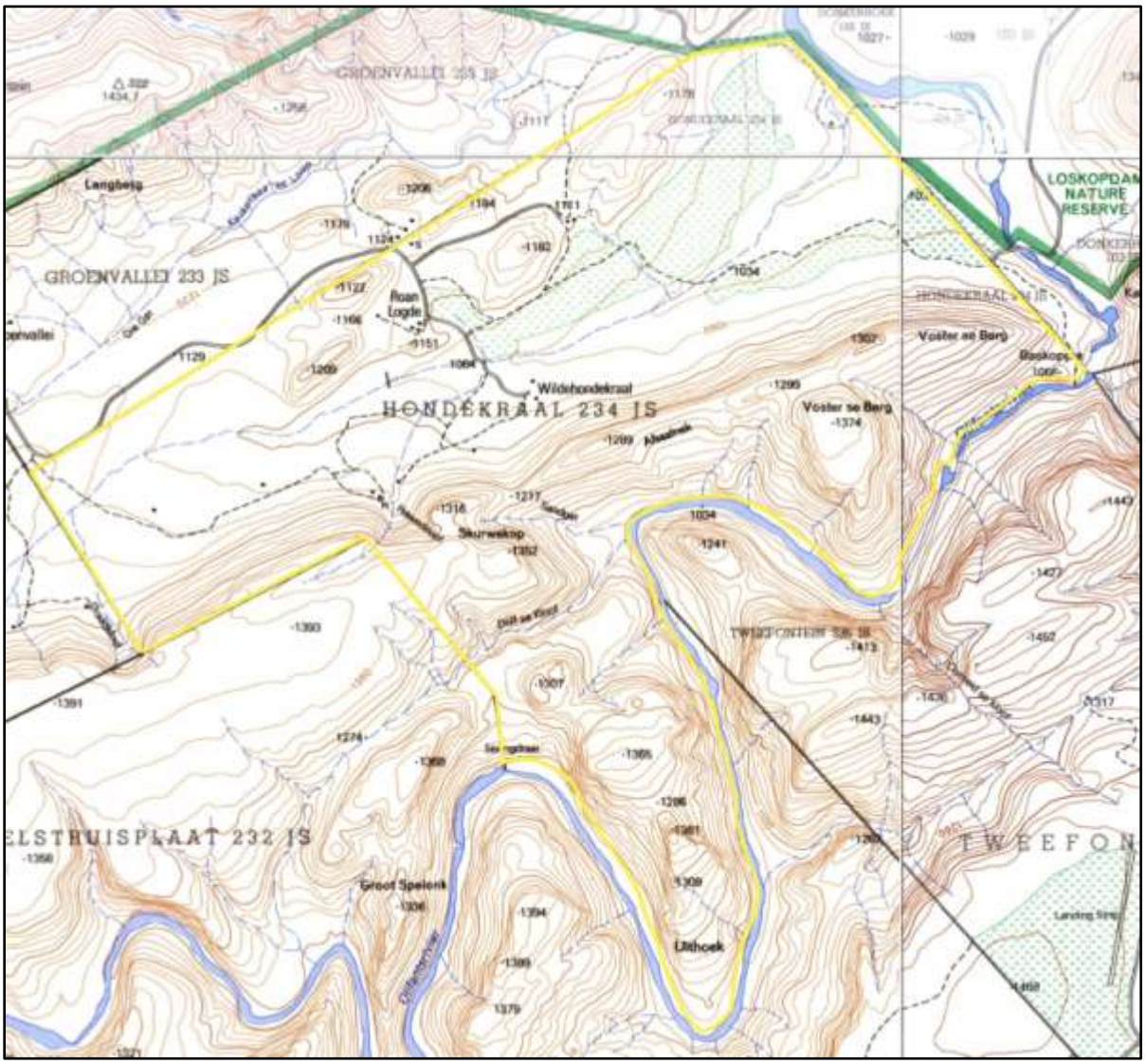


Fig.4.6. Topographical map of the study area, dated 1997. The location of the farm is indicated with a yellow border. The undulating terrain in the south eastern half of the farm was still undeveloped. A number of tracks / hiking trails, as well as about ten buildings, including a hotel and a cluster of buildings known as Roan Lodge, can be seen to the west of the farm road in the northern half of the property. To the east of this road, one can see two buildings at Wildehondekraal, as well as a number of tracks / hiking trails and cultivated fields, and about four buildings, including a school near the north eastern border of Hondekraal (Topographical map 1997; Topographical map 1997; Topographical map 1997; Topographical map 1997).

4.1.5. The development of Loskop Dam and the Loskop Dam Nature Reserve

In the mid-1920s there was a petition by settlers in the Middelburg district for a reservoir to be built in the Great Olifants River. This dam would then form part of an irrigation scheme that would feed into the surrounding farms. The reservoir would be built on the farm Loskop 197. This was not a new idea, a Mr Hurley (an engineer) had surveyed the same area for a dam in 1906, as there was a surface water scarcity in that part of the Transvaal (NASA *SAB, BES: 79 30*).

By October 1928 the Minister of Agriculture had reviewed the plans for the dam and irrigation scheme and was of the opinion that this would be one of the most lucrative schemes of its nature in the country. The minister requested that immediate steps would be taken to survey the area as soon as possible, in order to obtain funds in that year's budget. It was proposed that a relatively narrow gorge, named Loskop, would be used to dam up water from the Olifants River (NASA *SAB, BES: 79 30*).

By August 1932 the construction of the Loskop Dam had however not yet commenced. Once again, farmers in the surrounding area signed a petition asking for the start of the construction of this dam. (NASA *SAB, BES: 79 30*)

In 1934, it was reported in the Johannesburg Star that the construction of the Loskop Irrigation Scheme would cost approximately £1,500,000 and would greatly contribute to the development of the Bushveld area. The expenditure on the irrigation scheme would be spread over a number of years. The greater part of the land to be irrigated was in the Pretoria district, and 3000 morgen in that area belonged to the government. The remainder of the land was in the Middelburg district (NASA *SAB, BES: 79 30*).

The area was finally surveyed in 1934, and preliminary works started in the same year. The Loskop Dam wall was built across the Olifants River gorge in the 1930s, and was raised in the 1970s (NASA *SAB, BES: 79 30;* Mpumalanga Tourism and Parks Agency N/d).

Today, the Loskop Dam is approximately 30 kilometres long, which makes it the longest dam in the Southern Hemisphere, and supplies water to a vast irrigation scheme in the areas of Loskop, Groblersdal and Marble Hall (Mpumalanga Tourism and Parks Agency N/d; Friends of Loskop 2014).

In 1973, a proclamation was issued by the State President of the Republic of South Africa that abstraction, utilization, supply and distribution of the water of any public stream in the districts of Witbank, Groblersdal, Potgietersrus, Middelburg, Bronkhorstspruit, Delmas and Bethal would be controlled by the government. This would be done with a view of raising the standard of beneficial utilization of water by the persons entitled to the use of the water. All government irrigation areas

would also form part of this government water control area. This included the public water in the catchment area of the Loskop Dam (NASA *SAB, URU: 6378 1204*).

The Loskop Dam Nature Reserve was originally proclaimed as a small reserve in the 1950s. Today it is about 23 000 hectares in extent, and around 1014 recorded plant species and 70 species of mammals can be found in the reserve. The remarkably varied nature of the vegetation in this part of the country can be ascribed to the fact that the Loskop Dam and the adjoining nature reserve stretches over two very distinct ecological zones: the Highveld, with its rolling grasslands, and the Lowveld, with its abundance of thorny trees and shrubs. The Loskop Dam Nature Reserve is currently under the management of the Mpumalanga Tourist and Parks Agency. The Forever Resort at Loskop Dam (previously an Aventura Resort) is situated two kilometres from the dam wall, and offers accommodation and a number of amenities including a restaurant, swimming pool and a shop (Friends of Loskop 2014; Reader's Digest 2001: 54; Loskopdam 2017).

4.1.6. Historical overview of the ownership and development of Hondekraal 234 JS

The farm Hondekraal is located within the boundaries of the Loskop Dam Nature Reserve and was used for commercial farming before it was incorporated into the nature reserve in 1998.

Unfortunately a complete record of landowners on Hondekraal 234 JS could not be located but all available information regarding historical landowners of the farm is provided here.

In June 1873, Mr W. Skinner wrote to the Commission of Special Transport of the South African Republic. He was the Field Cornet in his area and was in charge of about forty troops and charged with protecting thirty households. In his view, his wages were lower than the average field cornet salary of the time, and it is likely for this reason that he requested that a special transport of the farm Hondekraal would be granted to him. His request was granted on 26 September 1873, when the Commission of Special Transport recommended that the farm Hondekraal would be transported to him (NASA *TAB, SS: 158 R937/73;* NASA *TAB, SS: 161 R1486/73*).

By 1943, Mr W. F. Bezuidenhout was the owner of the farm Hondekraal 114 (NASA *SAB, NTS: 7146 905/323*).

Windeed history of land ownership

Date	Portion	Transferred from	Transferred to	Purchase price
1974	RE	-	Hondekraal Pty Ltd	Unknown
1977	Portion 1	-	Republiek van Suid-Afrika	Unknown
1990	RE	Hondekraal Pty Ltd	Alpha Bank Ltd	Unknown

(Windeed Search Engine 2017)

The farm Hondekraal 234 JS is currently subdivided into two portions: Portion 1 and the Remaining Extent (RE). Portion 1 of Hondekraal is currently owned by the National Government of the Republic of South Africa, which acquired the property in 1977. The RE of the property was purchased by the Mpumalanga Parks Board in 1998 (Windeed Search Engine 2017).

History of land use

In 1943, Mr W. F. Bezuidenhout wrote to the Native Commissioner of Witbank, complaining that three squatters living on his farm Hondekraal 114 were unwilling to move. The names of the people squatting on the farm were Augus, Jan and Kleinbooi, and they had already appeared in the Magistrate Court due to the transgression. They were fined, but still refused to leave the property. The Magistrate was of the opinion that transgressors could not be brought before the court twice for the same misdemeanour. Hondekraal 114 was not in a Scheduled Native Area or a released area. By June 1943 the matter between Bezuidenhout and the squatters had been dealt with in the Civil Court, and the latter had most likely left the property of their own accord (NASA *SAB, NTS: 7146 905/323*).

In 1987, the Executive Director of Community Services in the Witbank district applied for the establishment of a public resort on the farms Hondekraal 234 JS and Groenvallei 233 JS. The resort would consist of the following:

- A caravan park with 60 caravan stands;
- A tent park with 30 tent stands;
- A rest camp comprising 400 chalets with 2 bedrooms and 5 beds each;
- A picnic site for a total of 200 daily visitors;
- A hotel with 130 bedrooms and a total of 260 beds
- Numerous recreational and sports facilities including swimming pools, restaurants, bars, discotheque etc.

It seems that most state departments had no objection to the scheme at the time, but it was recommended that the resort would be developed in such a way to fit in with the natural environment. It was, for example, recommended that the cableway be dropped from the scheme, as it would have a negative impact on the visual quality of the natural environment. A 45 kilometre hiking trail would be

provided at the resort, and this would also be used as a horse riding trail (NASA *SAB, CDB: 1753 PB3/2/3/111/246*).

Consequently, the Administrator of the Province Transvaal issued a proclamation that the following areas would be included in the area of jurisdiction of the Transvaal Board for the Development of Peri-Urban Areas, with effect from 19th August 1988:

1. RE of Groenvallei 233 JS
2. Portion 1 of Groenvallei 233 JS
3. RE of Hondekraal 234 JS
4. Portion 1 of Hondekraal 234 JS

This development was demarcated as a public resort. (NASA *SAB, CDB: 1753 PB3/2/3/111/246*)

This development was never completed and only parts of the half-built infrastructure remain.

4.2. Archaeology

4.2.1. Stone Age

In Mpumalanga Province the Drakensberg separates the interior plateau also known as the Highveld from the low-lying subtropical Lowveld, which stretches to the Indian Ocean. A number of rivers amalgamate into two main river systems, the Olifants River and the Komati River. This fertile landscape has provided resources for humans and their predecessors for more than 1.7 million years (Esterhuizen & Smith in Delius, 2007).

The initial attraction of abundant foods in the form of animals and plants eventually also led to the discovery of and utilisation of various minerals including ochre, iron and copper. People also obtained foreign resources by means of trade from the coast. From 900 AD this included objects brought across the ocean from foreign shores.

The Early Stone Age (ESA)

In South Africa the ESA dates from about 2 million to 250 000 years ago, in other words from the early to middle Pleistocene. The archaeological record shows that as the early ancestors progressed physically, mentally and socially, bone and stone tools were developed. One of the most influential advances was their control of fire and diversifying their diet by exploitation of the natural environment (Esterhuizen & Smith in Delius, 2007).

The earliest stone tools used date to around 2.5 million years ago from the site of Gona in Ethiopia. Stone tools from this site shows that early hominids had to cognitive ability to select raw material and shape it for a specific application. Many bones found in association with stone tools like these have cut marks which lead scientists to believe that early hominids purposefully chipped cobblestones to produce flakes with a sharp edge capable of cutting and butchering animal carcasses. This supplementary diet of higher protein quantities ensured that brain development of hominids took place more rapidly.

Mary Leaky discovered stone tools like these in the Olduwai Gorge in Tanzania during the 1960s. The stone tools are named after this gorge and are known as relics from the Oldowan industry. These tools, only found in Africa, are mainly simple flakes, which were struck from cobbles. This method of manufacture remained for about 1.5 million years. Although there is continuing debate about who made these tools, two hominids may have been responsible. The first of these was an early form of *Homo* and the second was *Paranthropus robustus*, which became extinct about 1 million years ago (Esterhuizen & Smith in Delius, 2007).

Some time later, around 1.7 million years ago, more specialised tools known as Acheulean tools, appeared. These are named after tools from a site in France by the name of Saint Acheul, where they were first discovered in the 1800s. It is argued that these tools had their origin in Africa and then

spread towards Europe and Asia with the movement of hominids out of Africa. These tools had longer and sharper edges and shapes, which suggest that they could be used for a larger range of activities, including the butchering of animals, chopping of wood, digging roots and cracking bone. *Homo ergaster* was probably responsible for the manufacture of Acheulean tools in South Africa. This physical type was arguably physically similar to modern humans, had a larger brain and modern face, body height and proportion very similar to modern humans. *Homo ergaster* was able to flourish in a variety of habitats in part because they were dependent on tools. They adapted to drier, more open grassland settings. Because these early people were often associated with water sources such as rivers and lakes, sites where they left evidence of their occupation are very rare. Most tools of these people have been washed into caves, eroded out of riverbanks and washed downriver. An example in Mpumalanga is Maleoskop on the farm Rietkloof where Early Stone Age (ESA) tools have been found. This is one of only a handful such sites in Mpumalanga.

Middle Stone Age (MSA)

A greater variety of tools with diverse sizes and shapes appeared by 250 000 before present (BP). These replaced the large hand axes and cleavers of the ESA. This technological advancement introduces the Middle Stone Age (MSA). This period is characterised by tools that are smaller in size but different in manufacturing technique (Esterhuizen & Smith in Delius, 2007).

In contrast to the ESA technology of removing flakes from a core, MSA tools were flakes to start with. They were of a predetermined size and shape and were made by preparing a core of suitable material and striking off the flake so that it was flaked according to a shape which the toolmaker desired. Elongated, parallel-sided blades, as well as triangular flakes are common finds in these assemblages. Mounting of stone tools onto wood or bone to produce spears, knives and axes became popular during the MSA. These early humans not only settled close to water sources but also occupied caves and shelters. The MSA represents the transition of more archaic physical type (*Homo)* to anatomically modern humans, *Homo sapiens.*

The MSA has not been extensively studied in Mpumalanga but evidence of this period has been excavated at Bushman Rock Shelter, a well-known site on the farm Klipfonteinhoek in the Ohrigstad district. This cave was excavated twice in the 1960s by Louw and later by Eloff. The MSA layers show that the cave was repeatedly visited over a long period. Lower layers have been dated to over 40 000 BP while the top layers date to approximately 27 000 BP (Esterhuizen & Smith in Delius, 2007; Bergh, 1998).

Later Stone Age (LSA)

Early hunter gatherer societies were responsible for a number of technological innovations and social transformations during this period starting at around 20 000 years BP. Hunting of animals proved

more successful with the innovation of the bow and link-shaft arrow. These arrows were made up of a bone tip which was poisoned and loosely linked to the main shaft of the arrow. Upon impact, the tip and shaft separated leaving the poisoned arrow-tip imbedded in the prey animal. Additional innovations include bored stones used as digging stick weights to uproot tubers and roots; small stone tools, mostly less than 25mm long, used for cutting of meat and scraping of hides; polished bone tools such as needles; twine made from plant fibres and leather; tortoiseshell bowls; ostrich eggshell beads; as well as other ornaments and artwork (Esterhuizen & Smith in Delius, 2007).

At Bushman Rock Shelter the MSA is also represented and starts at around 12 000 BP but only lasted for some 3 000 years. The LSA is of importance in geological terms as it marks the transition from the Pleistocene to the Holocene, which was accompanied by a gradual shift from cooler to warmer temperatures. This change had its greatest influence on the higher-lying areas of South Africa. Both Bushman Rock Shelter and a nearby site, Heuningneskrans, have revealed a greater use in plant foods and fruit during this period (Esterhuizen & Smith in Delius, 2007; Bergh, 1998).

Faunal evidence suggests that LSA hunter-gatherers trapped and hunted zebra, warthog and bovids of various sizes. They also diversified their protein diet by gathering tortoises and land snails *(Achatina*) in large quantities.

Ostrich eggshell beads were found in most of the levels at these two sites. It appears that there is a gap of approximately 4 000 years in the Mpumalanga LSA record between 9 000 BP and 5 000 BP. This may be a result of generally little Stone Age research being conducted in the province. It is, however, also a period known for rapid warming and major climate fluctuation, which may have led people to seek out protected environments in this area. The Mpumalanga Stone Age sequence is visible again during the mid-Holocene at the farm Honingklip near Badplaas in the Carolina district (Esterhuizen & Smith in Delius, 2007; Bergh, 1998).

At this location, two LSA sites were located on opposite sides of the Nhlazatshe River, about one kilometre west of its confluence with the Teespruit. These two sites are located on the foothills of the Drakensberg, where the climate is warmer than the Highveld but also cooler than the Lowveld (Esterhuizen & Smith in Delius, 2007; Bergh, 1998).

Nearby the sites, dated to between 4 870 BP and 200 BP are four panels, which contain rock art. Colouring material is present in all the excavated layers of the site, which makes it difficult to determine whether the rock art was painted during the mid- or later Holocene. Stone walls at both sites date from the last 250 years of hunter gatherer occupation and they may have served as protection from predators and intruders (Esterhuizen & Smith in Delius, 2007; Bergh, 1998).

4.2.3. Early Iron Age

The period referred to as the Early Iron Age (AD 200-1500 approx.) started when presumably Karanga (north-east African) herder groups moved into the north eastern parts of South Africa. It is believed that these people may have been responsible for making of the famous Lydenburg Heads, ceramic masks dating to approximately 600AD.

Ludwig von Bezing was a boy of more or less 10 years of age when he first saw pieces of the now famous Lydenburg heads in 1957 while playing in the veld on his father's farm near Lydenburg. Five years later von Bezing developed an interest in archaeology and went back to where he first saw the shards. Between 1962 and 1966 he frequently visited the Sterkspruit valley to collect pieces of the seven clay heads. Von Bezing joined the archaeological club of the University of Cape Town when he studied medicine at this institution.

He took his finds to the university at the insistence of the club. He had not only found the heads, but potsherds, iron beads, copper beads, ostrich eggshell beads, pieces of bones and millstones. Archaeologists of the University of Cape Town and WITS Prof. Ray Innskeep and Dr Mike Evers excavated the site where von Bezing found the remains. This site and in particular its unique finds (heads, clay masks) instantly became internationally famous and was henceforth known as the Lydenburg Heads site.

Two of the clay masks are large enough to probably fit over the head of a child, the other five are approximately half that size. The masks have both human and animal features, a characteristic that may explain that they had symbolic use during initiation- and other religious ceremonies. Carbon dating proved that the heads date to approximately 600 AD and was made by Early Iron Age people. These people were Bantu herders and agriculturists and probably populated Southern Africa from areas north-east of the Limpopo river. Similar ceramics were later found in the Gustav Klingbiel Nature Reserve and researchers believe that they are related to the ceramic wares (pottery) of the Lydenburg Heads site in form, function and decorative motive. This sequence of pottery is formally known as the Klingbiel type pottery. No clay masks were found in a context similar to this pottery sequence.

Two larger heads and five smaller ones make up the Lydenburg find. The Lydenburg heads are made of the same clay used in making household pottery. It is also made with the same technique used in the manufacture of household pottery. The smaller heads display the 37odelling of a curved forehead and the back neck as it curves into the skull. Around the neck of each of the heads, two or three rings are engraved horizontally and are filled in with hatching marks to form a pattern. A ridge

of clay over the forehead and above the ears indicates the hairline. On the two larger heads a few rows of small clay balls indicate hair decorations. The mouth consists of lips – the smaller heads also have teeth. The seventh head has the snout of an animal and is the only head that represents an animal.

Some archaeological research was done during the 1970's at sites belonging to the Early Iron Age (EIA), location Plaston, a settlement close to White River (Evers, 1977). This site is located on a spur between the White River and a small tributary. It is situated on holding 119 at Plaston.

The site was discovered during house building operations when a collection of pottery sherds was excavated. The finds consisted of pottery shards both on the surface and excavated.

Some of the pottery vessels were decorated with a red ochre wash. Two major decoration motifs occurred on the pots:

- Punctuation, using a single stylus; and
- Broad line incision, the more common motif.

A number of EIA pottery collections from Mpumalanga and Limpopo may be compared to the Plaston sample. They include Silver Leaves, Eiland, Matola, Klingbiel and the Lydenburg Heads site. The Plaston sample is distinguished from samples of these sites in terms of rim morphology, the majority of rims from Plaston are rounded and very few bevelled. Rims from the other sites show more bevelled rims (Evers, 1977:176).

Early Iron Age pottery was also excavated by archaeologist, Prof. Tom Huffman during 1997 on location where the Riverside Government complex is currently situated (Huffman, 1998). This site is situated a few km north of Nelspruit next to the confluence of the Nelspruit and Crocodile River. It was discovered during the course of an environmental impact assessment for the new Mpumalanga Government complex offices. A bulldozer cutting exposed storage pits, cattle byres, a burial and midden on the crest of a gentle slope. Salvage excavations conducted during December 1997 and March 1998 recovered the burial and contents of several pits.

One of the pits contained, among other items, pottery dating to the eleventh century (AD 1070 ± 40 BP). This relates the pottery to the Mzonjani and Broederstroom phases. The early assemblage belongs to the Kwale branch of the Urewe tradition.

During the early 1970s Dr Mike Evers of the University of the Witwatersrand conducted fieldwork and excavations in the Eastern Transvaal. Two areas were studied: the first area was the Letaba area south of the Groot Letaba River, west of the Lebombo Mountains, east of the great escarpment and north of the Olifants River. The second area was the Eastern Transvaal escarpment area between Lydenburg and Machadodorp.

These two areas are referred to as the Lowveld and escarpment respectively. The earliest work on Iron Age archaeology was conducted by Trevor and Hall in 1912. This revealed prehistoric copper-, gold- and iron mines. Schwelinus (1937) reported smelting furnaces, a salt factory and terraces near Phalaborwa. In the same year D.S. van der Merwe located ruins, graves, furnaces, terraces and soapstone objects in the Letaba area.

Mason (1964, 1965, 1967, 1968) started the first scientific excavation in the Lowveld, followed by N.J. van der Merwe and Scully. M. Klapwijk (1973, 1974) also excavated an EIA site at Silverleaves and Evers and van den Berg (1974) excavated at Harmony and Eiland, both EIA sites.

Research by the National Cultural History Museum resulted in the excavation of an EIA site in Sekhukuneland, known as Mototolong (Van Schalkwyk, 2007). The site is characterized by four large cattle kraals containing ceramics, which may be attributed to the Mzonjani and Doornkop occupational phases.

4.2.4. Late Iron Age

The later phases of the Iron Age (AD 1600-1800's) are represented by various tribes including Ndebele, Swazi, BaKoni, and Pedi, marked by extensive stonewalled settlements found throughout the escarpment and particularly around Machadodorp, Lydenburg, Badfontein, Sekhukuneland, Roossenekal and Steelpoort. The BaKoni were the architects of a unique archaeological stone building complex who by the 19th century spoke seKoni which was similar to Sepedi. The core elements of this tradition are stone-walled enclosures, roads and terraces. These settlement complexes may be divided into three basic features: homesteads, terraces and cattle tracks. Researchers such as Mike Evers (1975) and David Collett (1982) identified three basic settlement layouts in this area. Basically these sites can be divided into simple and complex ruins. Simple ruins are normally small in relation to more complex sites and have smaller central cattle byres and fewer huts. Complex ruins consist of a central cattle byre, which has two opposing entrances and a number of semi-circular enclosures surrounding it. The perimeter wall of these sites is sometimes poorly visible. Huts are built between the central enclosure and the perimeter wall. These are all connected by track-ways referred to as cattle tracks. These tracks are made by building stone walls, which forms a walkway for cattle to the centrally located cattle byres.

5. Site descriptions, locations and impact significance assessment

A total of nine sites were recorded during the survey. They consist of two main open-air Middle and Late Stone Age sites known as Site D and F which was previously recorded by archaeologists of the National Cultural History Museum in 1997, 2001, 2002 and excavated in 2005. During the current site assessment additional sites were recorded within each respective site (Sites D and F). They were numbered F1-3 and D1-4. These sites are a mixture of areas where the negative effect of current erosion on the landscape and the archaeology is visible, to features previously recorded by archaeologists and places where stone tool scatters occur. Currently the artefacts are washed and displaced by water flow and erosion processes. Individual artefacts are spread widely and all over the erosion dongas. Therefore the sites are currently of low significance.

The survey orientation sites are tabled in Appendix B and their photos in Appendix D. A map of their location is also provided in Appendix C.

A total of five survey orientation locations were documented (SO 1-5) which includes a GPS location and photographs of the landscape at that particular location.

Tables indicate the ***site significance rating scales and status*** in terms of possible impacts of the proposed actions on any located or identified heritage sites (**Table 5.5 & 5.6). Survey orientation sites are not discussed in tables 5.3-5.6 as they are not sites with any heritage significance.**

Table 5.1. Summary of located sites and their heritage significance

Type of site	**Identified sites**	**Significance**
Graves and graveyards	None	N/A
Late Iron Age	None	N/A
Early Iron Age	None	N/A
Historical buildings or structures	None	N/A
Historical features and ruins	None	N/A
Stone Age sites	Two	Medium to Low GP C

Table 5.2. Significance rating guidelines for sites

Field Rating	Grade	Significance	Recommended Mitigation
National Significance (NS)	Grade 1	High Significance	Conservation, nomination as national site
Provincial Significance (PS)	Grade 2	High Significance	Conservation; Provincial site nomination
Local significance (LS 3A)	Grade 3A	High Significance	Conservation, No mitigation advised
Local Significance (LS 3B)	Grade 3B	High Significance	Mitigation but at least part of site should be retained
Generally Protected A (GPA)	GPA	High/ Medium Significance	Mitigation before destruction
Generally Protected B (GPB)	GPB	Medium Significance	Recording before destruction
Generally Protected C (GPC)	GPC	Low Significance	Destruction

5.1. Description of located sites

5.1.1. Site F.

Location: See Appendix B and D (fig. 1-8).

Description: This is a large erosion donga (see maps Appendix C and photos Appendix D). Initially described by Pelser & Teichert during their field surveys in 1997, 2001, 2002 and excavated in 2005. The site has surface scatters of a mixture of MSA and LSA stone tools as well as a few stone circles as described by Pelser & Teichert (2005). The site has since undergone seasons of continuous sheet erosion and degradation of the archaeological material and its context (post depositional forces). Currently the artefacts are washed and displaced by water flow and erosion processes. Individual artefacts are spread widely and all over the erosion donga.

Impact of the proposed development/ activity:

Probable impact as the site is located within the project area.

Recommendation:

Halting or stabilization of the ongoing soil erosion in an effort to minimize further impact on the archaeological assemblage.

5.1.2. Site F1.

Location: See Appendix B and D (fig. 9, 10).

Description: A location inside the erosion donga (site F) where the effects of erosion is clearly visible (see photos in Appendix D fig. 9, 10).

Impact of the proposed development/ activity:

Probable impact as the site is located within the project area.

Recommendation:

Halting or stabilization of the ongoing soil erosion in an effort to minimize further impact on the archaeological assemblage.

5.1.3. Site F2.

Location: See Appendix B and D (fig. 11).

Description: A location on the perimeter (northwest) of the erosion donga (site F) that may be one of Pelser and Teichert's stone circles or platforms. It has since been disturbed by tree growth.

Impact of the proposed development/ activity:

Probable impact as the site is located within the project area.

Recommendation:

Halting or stabilization of the ongoing soil erosion in an effort to minimize further impact on the archaeological assemblage.

5.1.4. Site F3.

Location: See Appendix B and D (fig. 12, 13).

Description: A location inside the erosion donga (site F) where the speedy effect of erosion is clearly visible. Soil below a dead tree has eroded some metres in the relatively short time since it died, an indicator that the site is rapidly deteriorating.

Impact of the proposed development/ activity:

Probable impact as the site is located within the project area.

Recommendation:

Halting or stabilization of the ongoing soil erosion in an effort to minimize further impact on the archaeological assemblage.

5.1.5. Site D.

Location: See Appendix B and D (fig. 14-17).

Description: This is a second large erosion donga which contains surface scatters of a mixture of MSA and LSA stone tools. According to Pelser and Teichert (2001, 2002, 2005) it was also the location of a few stone circles or platforms on the perimeter of the eroded donga. The site has since undergone seasons of continuous sheet erosion and degradation of the archaeological material and its context (post depositional forces). The artefacts collected from the surface seem weathered and edges rounded which is probably due to them being rolled about when water flow is high during heavy rains. Individual artefacts are spread widely and all over the erosion donga.

Impact of the proposed development/ activity:

Probable impact as the site is located within the project area.

Recommendation:

Halting or stabilization of the ongoing soil erosion in an effort to minimize further impact on the archaeological assemblage.

5.1.6. Site D1.

Location: See Appendix B and D (fig. 18-20).

Description: A location inside the erosion donga (site F) where the speedy effect of erosion is clearly visible. The deep nature of the erosion donga is clearly visible here (see Appendix D, fig. 18-20). A few hand axes and flakes were collected here.

Impact of the proposed development/ activity:

Probable impact as the site is located within the project area.

Recommendation:

Halting or stabilization of the ongoing soil erosion in an effort to minimize further impact on the archaeological assemblage.

5.1.7. Site D2.

Location: See Appendix B and D (fig. 21, 22).

Description: A location inside the erosion donga (site F) where the speedy effect of erosion is clearly visible. The deep nature of the erosion donga is clearly visible here.

Impact of the proposed development/ activity:

Probable impact as the site is located within the project area.

Recommendation:

Halting or stabilization of the ongoing soil erosion in an effort to minimize further impact on the archaeological assemblage.

5.1.8. Site D3.

Location: See Appendix B and D (fig. 23).

Description: This is the southern, upslope perimeter of the erosion donga (site D). Silting downslope as a result of sheet erosion is characteristic here.

Impact of the proposed development/ activity:

Probable impact as the site is located within the project area.

Recommendation:

Halting or stabilization of the ongoing soil erosion in an effort to minimize further impact on the archaeological assemblage.

5.1.9. Site D4.

Location: See Appendix B and D (fig. 24).

Description: A location inside the erosion donga (Site D). A few stone tools (Site D1) were collected nearby.

Impact of the proposed development/ activity:

Probable impact as the site is located within the project area.

Recommendation:

Halting or stabilization of the ongoing soil erosion in an effort to minimize further impact on the archaeological assemblage

Survey orientations:

5.1.10. Site SO 1.

Location: See Appendix B and D (fig. 25, 26).

Description: Survey orientation location. A place where the storm water flow is concentrated and substantial silting is visible.

Impact of the proposed development/ activity: N/A

Recommendation: N/A

5.1.11. Site SO 2.

Location: See Appendix B and D (fig. 27-29).

Description: Survey orientation location.

Impact of the proposed development/ activity: N/A

Recommendation: N/A

5.1.12. Site SO 3.

Location: See Appendix B and D (fig. 30).

Description: Survey orientation location.

Impact of the proposed development/ activity: N/A

Recommendation: N/A

5.1.13. Site SO 4.

Location: See Appendix B and D (fig. 31, 32).

Description: Survey orientation location.

Impact of the proposed development/ activity: N/A

Recommendation: N/A

5.1.14. Site SO 5.

Location: See Appendix B and D (fig.33).

Description: Survey orientation location.

Impact of the proposed development/ activity: N/A

Recommendation: N/A

TABLE 5.3. General description of located sites and field rating.

Site No.	Description	Type of significance	Degree of significance	NHRA heritage resource & rating
F	Erosion donga with MSA & LSA surface scatter	Archaeological	Archaeological: Medium Historic: N/A	Archaeology. Medium. **GP B.**
F1	Erosion donga with MSA & LSA surface scatter	Archaeological	Archaeological: Medium Historic: N/A	Archaeology. Medium. **GP B.**
F2	Erosion donga with MSA & LSA surface scatter	Archaeological	Archaeological: Medium Historic: N/A	Archaeology. Medium. **GP B.**
F3	Erosion donga with MSA & LSA surface scatter	Archaeological	Archaeological: Medium Historic: N/A	Archaeology. Medium. **GP B.**
D	Erosion donga with MSA & LSA surface scatter	Archaeological	Archaeological: Medium Historic: N/A	Archaeology. Medium. **GP B.**
D1	Erosion donga with MSA & LSA surface scatter	Archaeological	Archaeological: Medium Historic: N/A	Archaeology. Medium. **GP B.**
D2	Erosion donga with MSA & LSA surface scatter	Archaeological	Archaeological: Medium Historic: N/A	Archaeology. Medium. **GP B.**
D3	Erosion donga with MSA & LSA surface scatter	Archaeological	Archaeological: Medium Historic: N/A	Archaeology. Medium. **GP B.**
D4	Erosion donga with MSA & LSA surface scatter	Archaeological	Archaeological: Medium Historic: N/A	Archaeology. Medium. **GP B.**

TABLE 5.4. Site condition assessment and management recommendations.

Site no.	Type of Heritage resource	Integrity of cultural material	Preservation condition of site	Relative location	Quality of archaeological/ historic material	Quantity of site features	Recommended conservation management
F	Archaeology	Disturbed	Poor	Hondekraal 234 JS	Archaeology: Fair-Poor Historically: N/A	>100	Halt erosion and stabilize if possible
F1	Archaeology	Disturbed	Poor	Hondekraal 234 JS	Archaeology: Fair-Poor Historically: N/A	1	Halt erosion and stabilize if possible
F2	Archaeology	Disturbed	Poor	Hondekraal 234 JS	Archaeology: Fair-Poor Historically: N/A	1	Halt erosion and stabilize if possible
F3	Archaeology	Disturbed	Poor	Hondekraal 234 JS	Archaeology: Fair-Poor Historically: N/A	1	Halt erosion and stabilize if possible
D	Archaeology	Disturbed	Poor	Hondekraal 234 JS	Archaeology: Fair-Poor Historically: N/A	>100	Halt erosion and stabilize if possible
D1	Archaeology	Disturbed	Poor	Hondekraal 234 JS	Archaeology: Fair-Poor Historically: N/A	1	Halt erosion and stabilize if possible
D2	Archaeology	Disturbed	Poor	Hondekraal 234 JS	Archaeology: Fair-Poor Historically: N/A	1	Halt erosion and stabilize if possible
D3	Archaeology	Disturbed	Poor	Hondekraal 234 JS	Archaeology: Fair-Poor Historically: N/A	1	Halt erosion and stabilize if possible
D4	Archaeology	Disturbed	Poor	Hondekraal 234 JS	Archaeology: Fair-Poor Historically: N/A	1	Halt erosion and stabilize if possible

TABLE 5.5. Significance Rating Scales of Impact

Site No.	Nature of impact	Type of site	Extent	Duration	Intensity	Probability	Score total
F	Erosion intervention activities	MSA & LSA surface assem.	Site	Permanent	Low	Possible	3
F1	Erosion intervention activities	MSA & LSA surface assem.	Site	Permanent	Low	Possible	3
F2	Erosion intervention activities	MSA & LSA surface assem.	Site	Permanent	Low	Possible	3
F3	Erosion intervention activities	MSA & LSA surface assem.	Site	Permanent	Low	Possible	3
D	Erosion intervention activities	MSA & LSA surface assem.	Site	Permanent	Low	Possible	3
D1	Erosion intervention activities	MSA & LSA surface assem.	Site	Permanent	Low	Possible	3
D2	Erosion intervention activities	MSA & LSA surface assem.	Site	Permanent	Low	Possible	3
D3	Erosion intervention activities	MSA & LSA surface assem.	Site	Permanent	Low	Possible	3
D4	Erosion intervention activities	MSA & LSA surface assem.	Site	Permanent	Low	Possible	3

***Notes:** Short term ≥ 5 years, Medium term 5-15 years, Long term 15-30 years, Permanent 30+ years

Intensity: Very High (4), High (3), Moderate (2), Low (1)

Probability: Improbable (1), Possible (2), Highly probable (3), Definite (4)

TABLE 5.6. Site current status and future impact scores

Site No.	Current Status	Low impact (4-6 points)	Medium impact (7-9 points)	High impact (10-12 points)	Very high impact (13-16 points)	Score Total
F	Impacted	Low (6)	-	-	-	6
F1	Impacted	Low (6)	-	-	-	6
F2	Impacted	Low (6)	-	-	-	6
F3	Impacted	Low (6)	-	-	-	6
D	Impacted	Low (6)	-	-	-	6
D1	Impacted	Low (6)	-	-	-	6
D2	Impacted	Low (6)	-	-	-	6
D3	Impacted	Low (6)	-	-	-	6
D4	Impacted	Low (6)	-	-	-	6

5.2. Cumulative impacts on the heritage landscape

Cumulative impacts can occur when a range of impacts which result from several concurrent processes have impact on heritage resources. The importance of addressing cumulative impacts is that the total impact of several factors together is often greater than one single process or activity that may impact on heritage resources. The historic and current soil erosion has a negative impact on the archaeological resources in the area. It forms part of post-depositional processes which results in a rounded and weathered appearance on the stone tools. Impact of the proposed soil erosion stabilization activities should be minimal and the result is the stabilization of the archaeological resources and prevention of further degradation. Also see section 6.1, Recommended management measures.

6. Summary of findings and recommendations

A total of nine sites were recorded during the survey. They consist of two main open-air Middle and Late Stone Age sites known as Site D and F. These two sites were previously recorded (Pelser, 1997; Pelser & Teichert, 2001, 2002) and excavated (Pelser, 2005) by archaeologists of the National Cultural History Museum (NCHM). This was a result of an archaeological resources survey conducted by the NCHM's Archaeology Department as requested from the Loskop Dam Nature Reserve Management in 1997 and 2001 resulting in a variety of heritage sites being recorded including Stone Age, Late Iron Age, Historic, Rock Art, burial grounds and graves and historic building sites (Pelser, personal comm.).

During the current site assessment additional sites were recorded within each respective site (Sites D and F). They were numbered F1-3 and D1-4. These sites are a mixture of areas where the negative effect of current sheet erosion on the landscape and the archaeology is visible, to features previously recorded by archaeologists and places where stone tool scatters occur. The sites are characterized by a wide distribution of artefacts that is out of context and can be classified as background scatter (Orton, 2016). Soil erosion can be considered as a post-depositional process which together with substantial water flow, resulted in a rounded and weathered appearance on the stone tools at Hondekraal 234 JS.

Post-depositional processes as an influence on archaeological material have been discussed by some authors (Wright et al. 2016). Natural and anthropogenic processes that have occurred after the deposition of archaeological material might have transformed them into their present state. Understanding of post-depositional processes is vital to assess the possible biases they might have caused in the archaeological record. Some of the best examples of this include erosion and agricultural activities such as ploughing. Given the fact that soil erosion has had a negative effect on the archaeological deposit at the Hondekraal sites, which was intervened by site recording and archaeological excavation since 1997 through 2005, and that the sheet erosion has continued since 2005 (12 years) it is my opinion that the proposed interventions by the Working for Wetlands programme to stop further erosion, will also halt ongoing degradation of the archaeological deposit and stabilize the sites. Therefore the proposed interventions are supported.

The bulk of archaeological remains are normally located beneath the soil surface. It is therefore possible that some significant cultural material or remains were not located during this survey and will only be revealed when the soil is disturbed. Should excavation or large scale earth moving activities reveal any human skeletal remains, broken pieces of ceramic pottery, large quantities of sub-surface charcoal or any material that can be associated with previous occupation, a qualified archaeologist should be notified immediately. This will also temporarily halt such activities until an

archaeologist has assessed the situation. It should be noted that if such a situation occurs it may have further financial implications.

6.1. Recommended management measures

- The contractors and workers should be sensitized that archaeological resources in the form of MSA and LSA artefacts do occur in the project area.
- The Environmental Control Officer should sensitize the contractors that no stones be collected for use in gabiens near the erosion dongas as they may unwittingly collect Stone Age artefacts in the process.
- 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).

7. Bibliography

1. Amery, L.S. (ed),1909. ***The times history of the war in South Africa 1899-1902*****,** Vol VI. London,

2. Barnard, C. 1975**.** ***Die Transvaalse Laeveld. Komee van 'n Kontrei.***

3. Bergh, J.S. (ed.) 1998. ***Geskiedenisatlas van Suid-Afrika. Die vier noordelike provinsies****.* (J.L. van Schaik, Pretoria).

4. Bornman, H. 1995. ***Pioneers of the Lowveld***.

5. Bornman, H. (red.) 1979. ***Nelspruit: 75 in '80***. Stadsraad van Nelspruit.

6. Breutz, P.L. 1985. ***Pre-Colonial Africa: The South-Eastern Bantu Cultural Province.***

7. Delius, P. 2007. ***Mpumalanga History and Heritage.*** University of KwaZulu-Natal Press.

8. De Jong, R.C, & van der Waal, G.M. and Heydenrych, D.H. 1988. ***ZAZM 100: 1887-1889, The buildings, steam engines and structures of the Netherlands South African Railway Company****.* Johannesburg.

9. Du Preez, S. J. ***Peace attempts during the Anglo Boer War until March 1901.*** Magister Artium thesis in History. Pretoria: University of Pretoria.

10. Evers, T.M. in Voight, E.A. 1981. ***Guide to Archaeological Sites in the Northern and Eastern Transvaal.*** Transvaal Museum, Pretoria.

11. Hall, H.L. 1938 (1990). ***I Have Reaped my Mealies. An Autobiography***. Whitnall Simonsen.

12. Huffman, T. N. 2007. ***Handbook to the Iron Age: The Archaeology of Pre-Colonial Farming Societies in Southern Africa***. Kwa-Zulu Natal Press.

13. Jones, H. M. & Jones G. M. 1999. ***A Gazetteer of the Second Anglo-Boer War. 1899-1902.*** Buckinghamshire: The Military Press.

14. Mason, R. 1962. ***Prehistory of the Transvaal: a record of human activity.*** Witwatersrand University Press, Johannesburg.

15. Massie, R.H. 1905. **The Native tribes of Transvaal. Prepared for the general staff war office.** Harrison and Sons, London.

16. Myburgh, A.C. 1956. ***Die Stamme van die Distrik Carolin*****a.** Staatsdrukker. Pretoria.

17. Orton, J. 2016. **Prehistoric cultural landscapes in South Africa: A typology and discussion.** *South African Archaeological Bulletin Vol. 71 No. 204, Dec 2016: 119-129.*

18. Packard, P. 2001. ***"Malaria blocks development" revisited: the role of disease in the history of agricultural development in the Eastern and Northern Transvaal Lowveld. 1890-1960.***

Journal of Southern African Studies 27 (3), September 2001.

19. Pelser, A.J. 1997. A survey of cultural resources on the farm Hondekraal 234 JS, Loskopdam Nature Reserve, Groblersdal District, Mpumalanga. *National Cultural History Museum: Unpublished Report* **97KH11.**

20. Pelser, A.J. & Teichert, F.E. 2001. A Survey of Cultural Resources on the farm Hondekraal 234 JS, Loskopdam Nature Reserve, Groblersdal District, Mpumalanga. *National Cultural History Museum: Unpublished Report* **2001KH16.**

21. Pelser, A.J. & Teichert, F.E. 2002. Stone Age Research in the Loskopdam Nature Reserve: Excavating a large surface site on the farm Hondekraal 234 JS. *Research by the National Cultural History Museum* 11: 54-77.

22. Pelser, A.J. & Teichert, F.E. 2005. A report on Archaeological excavations at a large open-air stone age site on the farm Hondekraal 234 JS, Loskopdam Nature Reserve, Mpumalanga.

23. Reader's Digest. 2001. *The illustrated guide to places to visit in Southern Africa.* Cape Town: Heritage Publishers (Pty) Ltd.

24. Ross, R. 2002. **A Concise History of South Africa.** Cambridge.

25. Surplus people project: forced removal in South Africa. Volume 5: *Transvaal*. Cape Town. 1983.

26. Union of South Africa. 1918. *Majority Report of the Eastern Transvaal Natives Land Committee.* Cape Town.

27. Van Schalkwyk, J.A. 2002. ***Archaeological survey of a section of the Secunda-Mozambique Gas Pipeline, Barberton District, Mpumalanga.*** An unpublished report by the National Cultural History Museum on file at SAHRA as: 2002-SAHRA-0110.

28. Van Vollenhoven, A.C. 2002. ***Die Metodiek van Kultuurhulpbronbestuur (KHB).*** S.A. Tydskrif vir Kultuurgeskiedenis 16(2).

29. Van Vollenhoven, A.C. 1995. ***Die bydrae van Argeologie tot Kultuurhulpbronbestuur.*** Referaat gelewer voor die Suid-Afrikaanse Vereniging vir Kultuurgeskiedenis, Transvaal Streektak, Sunnyside.

30. Wright et al. 2016. ***Approaches to Middle Stone Age landscape archaeology in tropical Africa.*** Journal of Archaeological Science, 2016:1-14.

ARCHIVAL SOURCES

1. National Archives of South Africa. 1873. *TAB, SS: 161 R1486/73. Commissie Buitengewone Transporten Pretoria. Recommandeert dat aan W Skinner der plaats Hondekraal transport verleend worde.*

2. National Archives of South Africa. 1873.*TAB, SS: 158 R937/73. W Skinner Pretoria. Verzoek Transport der plaats Hondekraal. Commissie: Buitengewone Transport.*
3. National Archives of South Africa. 1913. *Maps: 2/784. Middelburg Dist (Tvl), kaart. Landmeter-gen, Pta. Gekleurde litografie.*
4. National Archives of South Africa. 1921. *Maps: 2/189. Middelburg District Map.*
5. National Archives of South Africa. 1925-1934. *SAB, BES: 79 30. Loskop Dam. General. Middelburg Transvaal.*
6. National Archives of South Africa. 1930. *Maps: 2/194. Middelburg Dist, kaart. Landmeter-gen, Pta. Gekleurde litografie.*
7. National Archives of South Africa. 1943. *SAB, NTS: 7146 905/323. Witbank. Natives on farm Hondekraal 114.*
8. National Archives of South Africa. 1959. *SAB, ASW: 33 B12/29. Archaeological survey. Archaeology Loskop Dam.*
9. National Archives of South Africa. 1973. *SAB, URU: 6378 1204. Minuut en proklamasie: Voorgestelde proklamasie van die Loskopdam-Opdrangstaatwaterbeheergebied.*
10. National Archives of South Africa. 1973-1980. *SAB, BAO: 3/4217 A12/2/6/M52/11. Voorsiening/Instandhouding. Swartdienste. Geriewe op spesifieke myne en bedrywe. Behuising. Loskopdam Openbare Oord. Middelburg Transvaal.*
11. National Archives of South Africa. 1987-1988. *SAB, CDB: 1753 PB3/2/3/111/246. Beheer oor Plaaslike owerhede. Verandering van grense. Inlywing van die plaas Hondekraal 234JS. Groenvallei 233JS. Witbank. Transvaalse Raad vir die Ontwikkeling van Buitestedelike Gebiede.*

ELECTRONIC SOURCES:

1. Google Earth. 2017. 25°31’42.24” S 29°*13’15.42” E elev 1204 m.* [Online]. [Cited 25 November 2017].
2. Google Earth. 2017. 25°31’33.75” S 29°*12’49.46” E elev 1290 m.* [Online]. [Cited 25 November 2017].
3. Friends of Loskop. 2014. *History. Loskop Dam Nature Reserve.* [Online]. Available: http://www.friendsofloskop.org/home/31-2/history/. [Accessed: 28 November 2017].
4. Loskopdam. 2017. *Loskopdam. A Forever Resort.* [Online]. Available: http://www.foreverloskopdam.co.za/. [Accessed: 28 November 2017].
5. Mpumalanga Tourism and Parks Agency. N/d. *Loskop Dam Nature Reserve.* [Online]. Available: http://www.mtpa.co.za/index.php?parks+1812. [Accessed: 28 November 2017].

6. Windeed Search Engine. 2017. *Deeds Office Property. Hondekraal, 234, 0 (Remaining Extent) (Mpumalanga).* [Accessed: 28 November 2017].
7. Windeed Search Engine. 2017. *Deeds Office Property. Hondekraal, 234, 1 (Mpumalanga).* [Accessed: 28 November 2017].
8. Survey Archaeology http://www.surveyarchaeology.eu/tiki-index.php?page=Post-depositional+Processes [cited 5 Dec 2017].

MAPS

1. Topographical Map. 1964. *South Africa. 1:50 000 Sheet. 2529AD Loskopdam. First Edition. Pretoria: Government Printer.*
2. Topographical Map. 1965. *South Africa. 1:50 000 Sheet. 2529AC Dennilton. First Edition. Pretoria: Government Printer.*
3. Topographical Map. 1965. *South Africa. 1:50 000 Sheet. 2529CA Mackmaar. First Edition. Pretoria: Government Printer.*
4. Topographical Map. 1965. *South Africa. 1:50 000 Sheet. 2529CB Lammerkop. First Edition. Pretoria: Government Printer.*
5. Topographical Map. 1984. *South Africa. 1:250 000 Sheet. 2529 Middelburg. Fourth Edition. Pretoria: Government Printer.*
6. Topographical Map. 1984. *South Africa. 1:50 000 Sheet. 2529AD Loskopdam. Second Edition. Pretoria: Government Printer.*
7. Topographical Map. 1984. *South Africa. 1:50 000 Sheet. 2529CA Mackmaar. Second Edition. Pretoria: Government Printer.*
8. Topographical Map. 1984. *South Africa. 1:50 000 Sheet. 2529CB Lammerkop. Second Edition. Pretoria: Government Printer.*
9. Topographical Map. 1997. *South Africa. 1:50 000 Sheet. 2529AC Dennilton. Third Edition. Pretoria: Government Printer.*
10. Topographical Map. 1997. *South Africa. 1:50 000 Sheet. 2529AD Loskopdam. Third Edition. Pretoria: Government Printer.*
11. Topographical Map. 1997. *South Africa. 1:50 000 Sheet. 2529CA Sehlakwane. Third Edition. Pretoria: Government Printer.*
12. Topographical Map. 1997. *South Africa. 1:50 000 Sheet. 2529CB Lammerkop. Third Edition. Pretoria: Government Printer.*

Appendix A

Terminology

"Alter" means any action affecting the structure, appearance or physical properties of a place or object, whether by way of structural or other works, by painting, plastering or other decoration or any other means.

"Archaeological" means –

- Material remains resulting from human activity which are in a state of disuse and are in or on land and which are older than 100 years, including artifacts, human and hominid remains and artificial features or structures;
- Rock Art, being any form of painting, engraving or other graphic representation on a fixed rock surface or loose rock or stone, which was executed by human agency and which is older than 100 years, including any area within 10m of such representation;
- Wrecks, being any vessel or aircraft, or any part thereof, which was wrecked in South Africa, whether on land, in the internal waters, the territorial waters or in the maritime culture zone of the Republic, as defined respectively in sections 3, 4 and 6 of the Maritime Zones Act, 1994 (Act No. 15 of 1994), and any cargo, debris or artifacts found or associated therewith, which is older than 60 years or which SAHRA considers to be worthy of conservation; and
- Features, structures and artefacts associated with military history which are older than 75 years and the sites on which they are found;

"Conservation", in relation to heritage resources, includes protection, maintenance, preservation and sustainable use of places or objects so as to safeguard their cultural significance;

"Cultural significance" means aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance;

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

- construction, alteration, demolition, removal or change of use of a place or a structure at a place;
- carrying out any works on or over or under a place;

- subdivision or consolidation of land comprising, a place, including the structures or airspace of a place;
- constructing or putting up for display signs or hoardings;
- any change to the natural or existing condition or topography of land; and
- any removal or destruction of trees, or removal of vegetation or topsoil;

"Expropriate" means the process as determined by the terms of and according to procedures described in the Expropriation Act, 1975 (Act No. 63 of 1975);

"Foreign cultural property", in relation to a reciprocating state, means any object that is specifically designated by that state as being of importance for archaeology, history, literature, art or science;

"Grave" means a place of internment and includes the contents, headstone or other marker of such a place, and any other structure on or associated with such place;

"Heritage resource" means any place or object of cultural significance;

"Heritage register" means a list of heritage resources in a province;

"Heritage resources authority" means the South African Heritage Resources Agency, established in terms of section 11, or, insofar as this Act (25 of 1999) is applicable in or in respect of a province, a provincial heritage resources authority (PHRA);

"Heritage site" means a place declared to be a national heritage site by SAHRA or a place declared to be a provincial heritage site by a provincial heritage resources authority;

"Improvement" in relation to heritage resources, includes the repair, restoration and rehabilitation of a place protected in terms of this Act (25 of 1999);

"Land" includes land covered by water and the air space above the land;

"Living heritage" means the intangible aspects of inherited culture, and may include –

- cultural tradition;
- oral history;
- performance;
- ritual;
- popular memory;
- skills and techniques;
- indigenous knowledge systems; and
- the holistic approach to nature, society and social relationships;

"Management" in relation to heritage resources, includes the conservation, presentation and improvement of a place protected in terms of the Act;

"Object" means any moveable property of cultural significance which may be protected in terms of any provisions of the Act, including –

- any archaeological artifact;
- palaeontological and rare geological specimens;
- meteorites;
- other objects referred to in section 3 of the Act;

"Owner" includes the owner's authorized agent and any person with a real interest in the property and –

- in the case of a place owned by the State or State-aided institutions, the Minister or any other person or body of persons responsible for the care, management or control of that place;
- in the case of tribal trust land, the recognized traditional authority;

"Place" includes –

- a site, area or region;
- a building or other structure which may include equipment, furniture, fittings and articles associated with or connected with such building or other structure;
- a group of buildings or other structures which may include equipment, furniture, fittings and articles associated with or connected with such group of buildings or other structures;
- an open space, including a public square, street or park; and
- in relation to the management of a place, includes the immediate surroundings of a place;

"Site" means any area of land, including land covered by water, and including any structures or objects thereon;

"**Structure"** means any building, works, device or other facility made by people and which is fixed to land, and includes any fixtures, fittings and equipment associated therewith.

Appendix B

List of sites

Nine sites and five survey orientation locations were recorded. The survey orientation sites were named SO 1-5 and the heritage sites named after the original recording of the sites by Pelser and Teichert (2002, 2005) namely Sites D and F with respective sites at each (F1, F2, D1, D2 etc.).

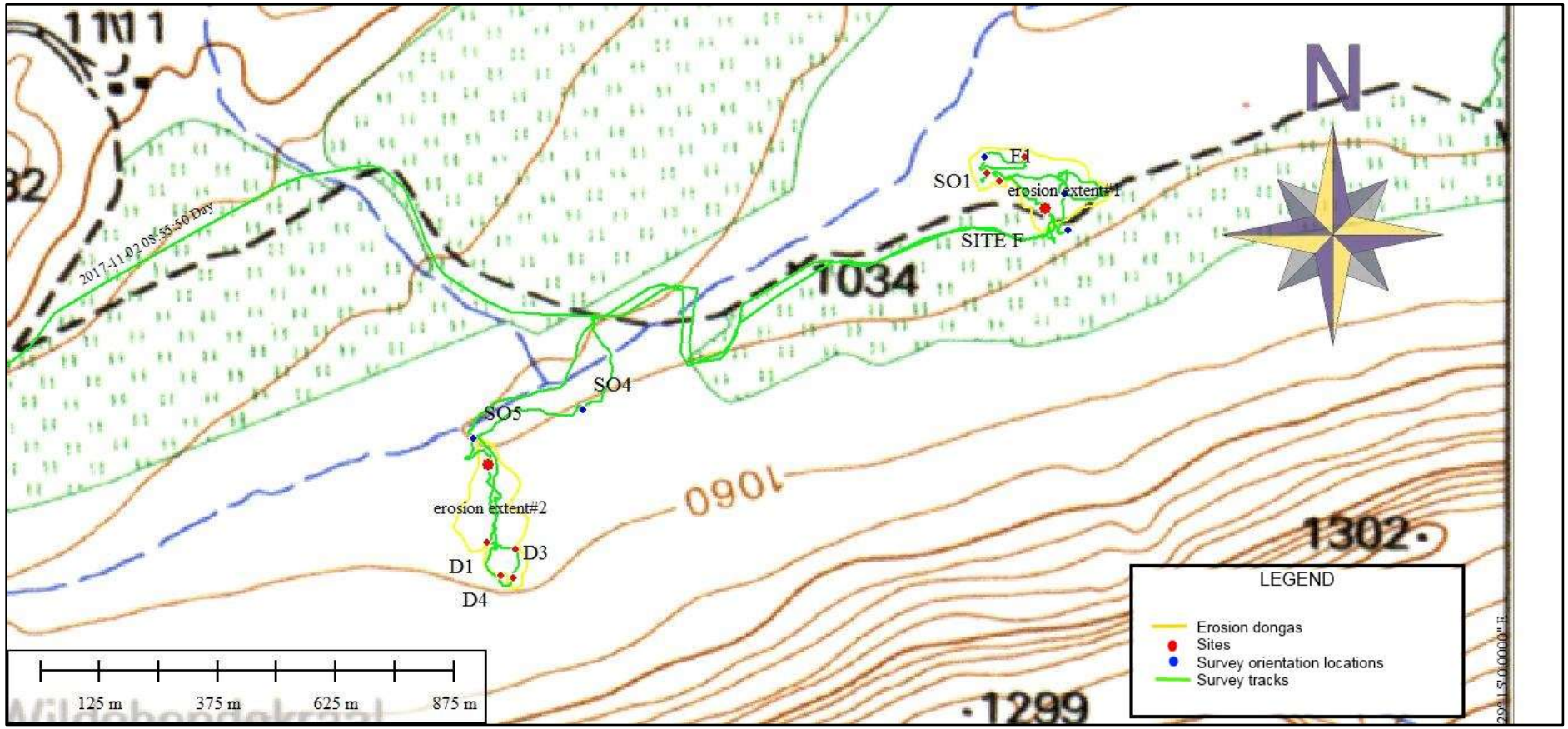
Table A. Sites.

Site Name	Date of compilation	GPS Coordinates		Photo figure No.
Site F	02/11/2017	S25°30'26.78"	E029°14'27.91"	1-8
F1	02/11/2017	S25°30'24.85"	E029°14'24.81"	9, 10
F2	02/11/2017	S25°30'23.19"	E029°14'26.50"	11
F3	02/11/2017	S25°30'24.31"	E029°14'23.94"	12, 13
Site D	02/11/2017	S25°30'44.29"	E029°13'49.78"	14-17
D1	02/11/2017	S25°30'49.55"	E029°13'49.70"	18-20
D2	02/11/2017	S25°30'50.05"	E029°13'51.65"	21, 22
D3	02/11/2017	S25°30'52.00"	E029°13'51.47"	23
D4	02/11/2017	S25°30'51.83"	E029°13'50.62"	24

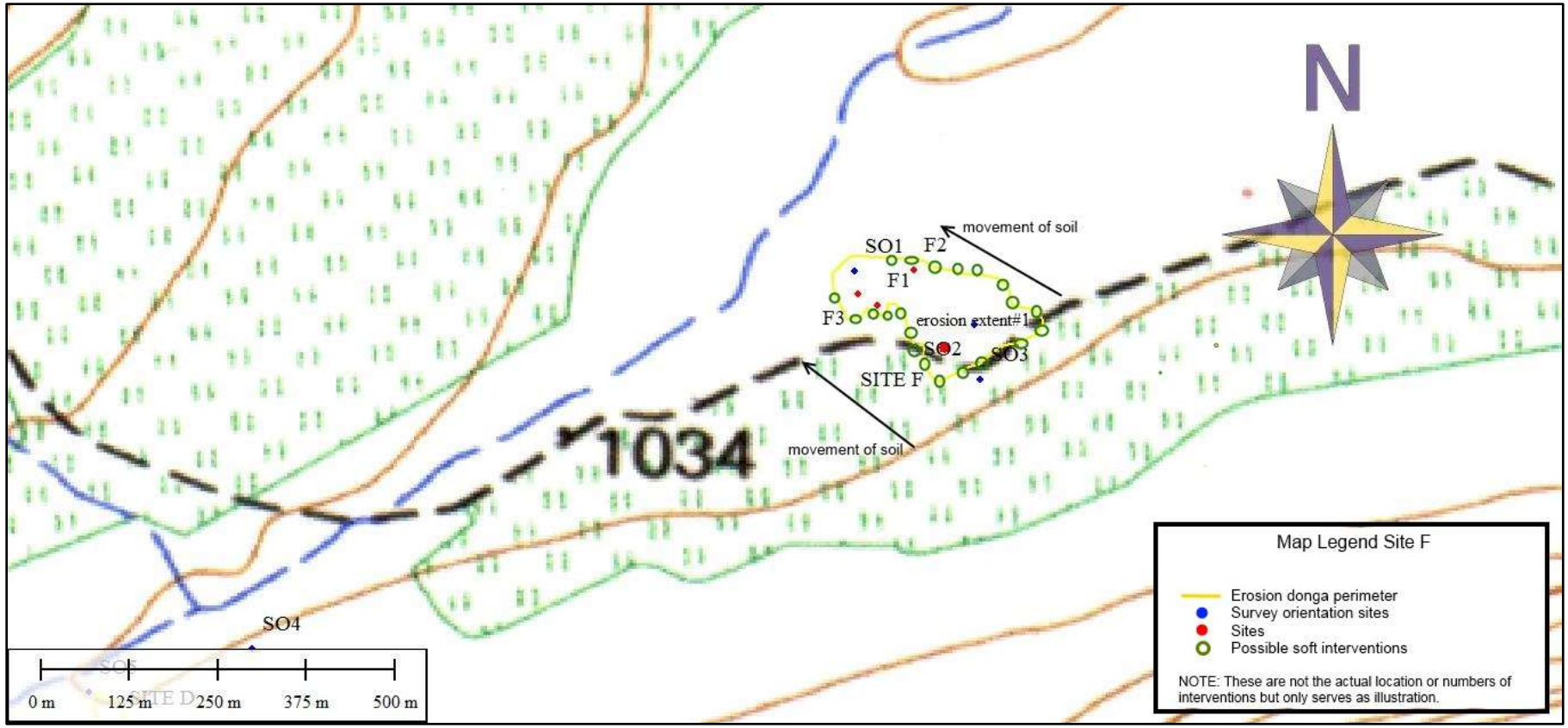
Table B. Survey orientation locations.

Site Name	Date of compilation	GPS Coordinates		Photo figure No.
SO 1	02/11/2017	S25°30'23.25"	E029°14'23.78"	25, 26
SO 2	02/11/2017	S25°30'25.74"	E029°14'29.24"	27-29
SO 3	02/11/2017	S25°30'28.24"	E029°14'29.52"	30
SO 4	02/11/2017	S25°30'40.51"	E029°13'56.28"	31, 32
SO 5	02/11/2017	S25°30'42.49"	E029°13'48.79"	33

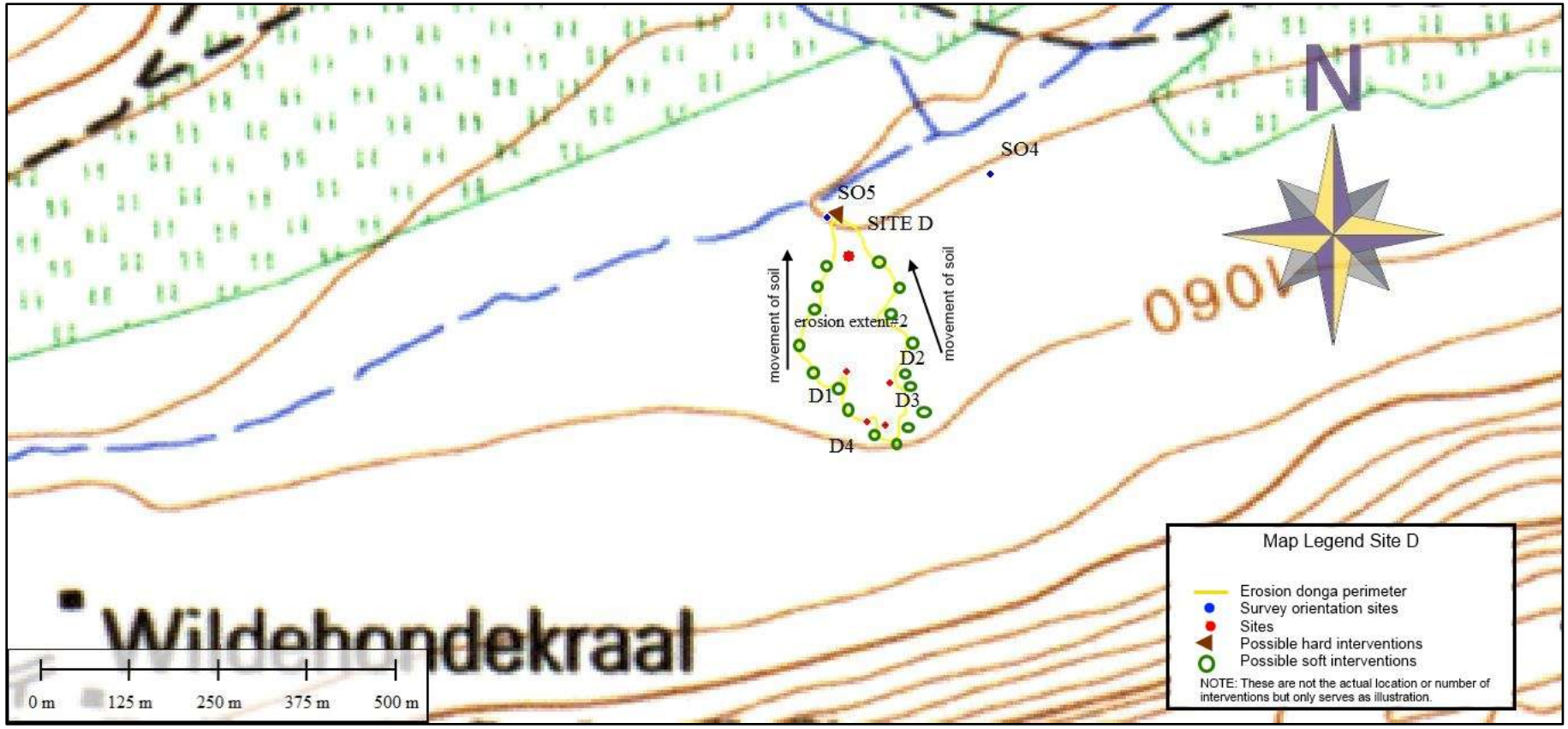
Appendix C



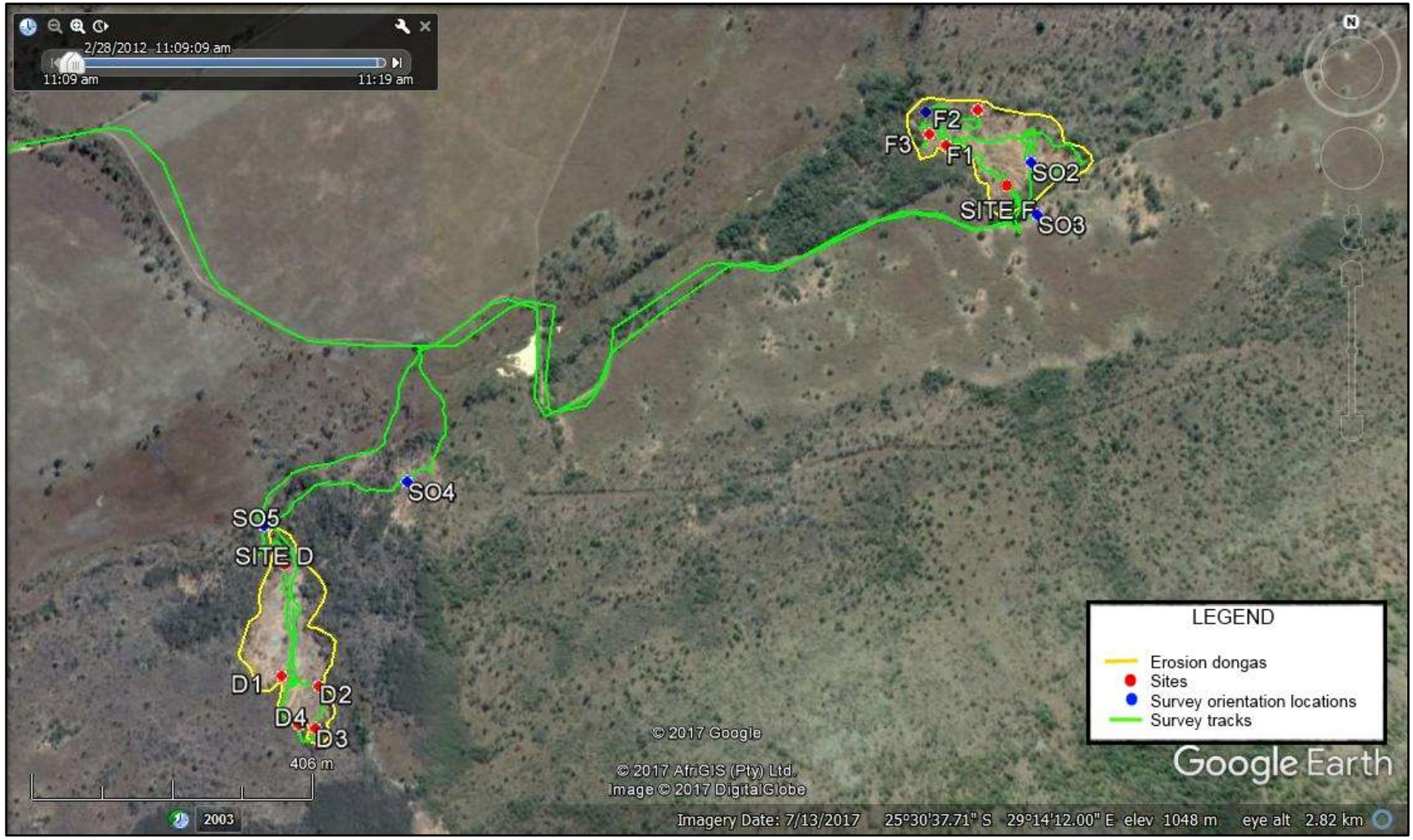
1:50 000 Topographical Map 2529 CA (1997).



A map of the erosion donga Site F indicating the direction of water and sheet erosion and possible location of soft erosion control interventions. Note that this is for illustration purposes only and not the actual proposed location of interventions.



A map of the erosion donga Site D indicating the direction of water and sheet erosion and possible location of soft and hard erosion control interventions. Note that this is for illustration purposes only and not the actual proposed location of interventions.



Aerial view: Google Earth 2017.

Appendix D

Site Photos

Fig. 1. Site F. Photo taken in a northern direction.

Fig. 2. Site F. Photo taken in a southwestern direction.

Fig. 3. Site F. Photo taken in a eastern direction.

Fig. 4. Site F. (l-r) Cores and flakes on the surface of the erosion donga at site F. Larger tools has blunt edges appearing rounded and weathered, possibly as a consequence of continuing sheet erosion.

Fig. 5. Site F. Photo taken east.

Fig. 6. Site F. Photo taken north. Note that some plants have resettled in some areas of the erosion donga which helps to lessen the effect of the erosion.

Fig. 7. Site F. Photo taken northeast.

Fig. 8. Site F. Photo taken east.

Fig. 9. Site F1. An example of the typical effect of soil erosion. The arrow indicates a puddle of fresh water which is indicative of continuing soil erosion. Scale is 50cm. Photo taken in a southern direction.

Fig. 10. Site F1. Photo taken in a eastern direction.

Fig. 11. Site F2. A possible stone circle site previously documented by Pelser and Teichert 2001, 2002. Photo taken in a north western direction.

Fig. 12. Site F3. Photo taken in a southern direction.

Fig. 13. Site F3. Photo taken in an eastern direction. The dead tree on top of the soil is evidence of the rapid nature of the erosion process. Scale is 50cm.

Fig. 14. Site D. Photo taken in an eastern south-eastern direction.

Fig. 15. Site D. Photo taken in a southern direction.

Fig. 16. Site D. Some handaxes and flakes collected from the surface. Most tools have blunt edges appearing rounded and weathered, possibly as a consequence of continuing sheet erosion.

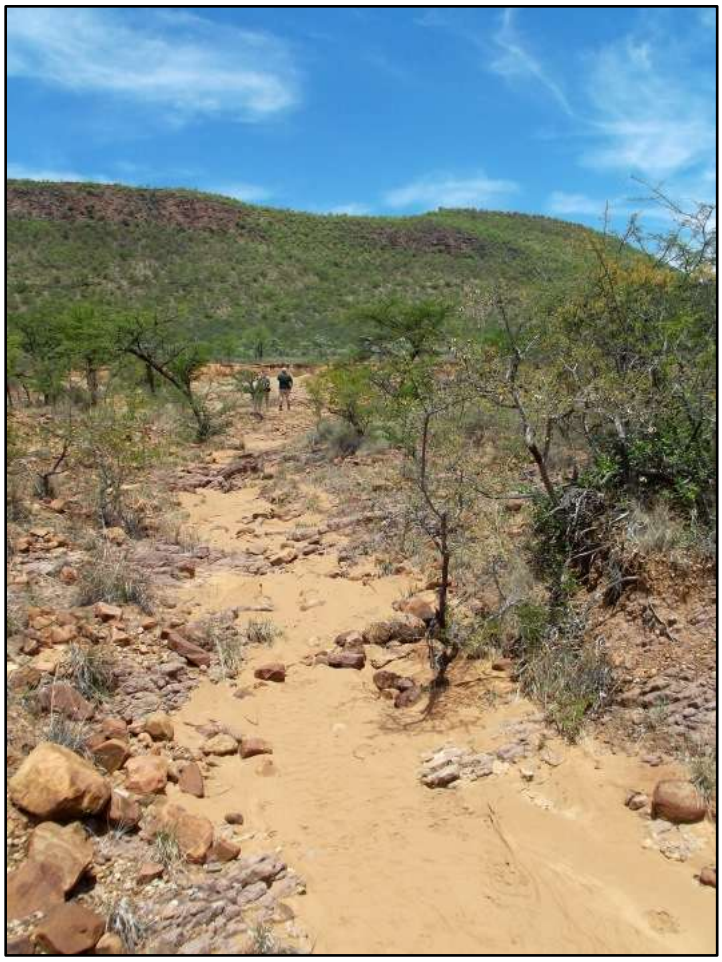


Fig. 17. Site D. Approximately 100m north of site D where the silting is obvious. This is potentially a place where a “hard intervention” structure can be placed.

Fig. 18. Site D1. Photo taken in a southern direction. Scale is 50cm. The soil colour and texture is uniform.

Fig. 19. Site D1. Photo taken in a south-eastern direction.

Fig. 20. Surface scatter in the proximity of Site D1. Some handaxes and flakes collected in this area on the surface. The tools are often rounded with weathered edges probably as a result of continued sheet erosion.

Fig. 21. Site D2. Photo taken in a north eastern direction. Scale is 50cm. The soil colour and texture is uniform.

Fig. 22. Site D2. Photo taken in a southern direction.

Fig. 23. Site D3. Photo taken in a northern direction. This is the southern edge of the erosion donga. Note the silting which indicates the direction of water flow north.

Fig. 24. Site D4. Photo taken in a southern direction. This is a location on the south western edge of the erosion donga. Scale is 50cm.

Survey Orientation Photos

Fig. 25. Site SO1. Photo taken in an eastern direction. Silting of the eroded soil is clearly visible.

Fig. 26. Site SO1. Photo taken in a south western direction.

Fig. 27. Site SO2. Photo taken in a north eastern direction.

Fig. 28. Site SO2. Photo taken in north western direction.

Fig. 29. Site SO 2. Photo taken in a south western direction.

Fig. 30. Site SO3. Photo taken in an eastern direction.

Fig. 31. Site SO4. Photo taken in a north western direction. The effects of erosion and silting is visible.

Fig. 32. Site SO4. Photo taken in a south western direction. The effects of erosion and silting is visible.

Fig. 33. Site SO 5. Photo taken in an eastern direction. The silting is visible in the foreground of the photo. A few metres south this reaches the wetland.

Palaeontological Impact Assessment for the proposed Rehabilitation of the wetland, Loskop Dam Nature Reserve, Farm Hondekraal 234, Mpumalanga Province

Desktop Study

For

JP Celliers, Kudzala

27 November 2017

Prof Marion Bamford
Palaeobotanist
P Bag 652, WITS 2050
Johannesburg, South Africa
Marion.bamford@wits.ac.za

Expertise of Specialist

The Palaeontologist Consultant is: Prof Marion Bamford
Qualifications: PhD (Wits Univ, 1990); FRSSAf, ASSAf
Experience: 30 years research; 20 year PIA studies

Declaration of Independence

This report has been compiled by Professor Marion Bamford, of the University of the Witwatersrand, sub-contracted by JP Celliers, Kudzala. The views expressed in this report are entirely those of the author and JP Celliers, and no other interest was displayed during the decision making process for the project.

Specialist: …….. Prof Marion Bamford……..

Signature: ……. 

Executive Summary

The desktop Palaeontological Impact Assessment for the proposed rehabilitation of the wetland at Loskop Dam has been completed. The site is in the shales, sandstones and conglomerates of the Loskop Formation (proto-Waterberg Group) and over 2050 million years old. This is too old for body fossils and to date no microfossils or trace fossils have been reported from this formation. Since there is an extremely small chance that microfossils could be discovered when clearing and rehabilitation commences it is concluded that the project may continue as far as the palaeontology is concerned.

Palaeontological Impact Assessment for the proposed rehabilitation of the wetland, Loskop Dam Nature Reserve, Farm Hondekraal 234, Mpumalanga Province

1. Background

A desktop palaeontological assessment for the proposed rehabilitation of the wetland, Loskop Dam Nature Reserve, Farm Hondekraal 234, has been requested. The area is to the southwest of the dam and is indicated as green on the SAHRIS palaeosensitivity map indicates that the area is of low sensitivity to no sensitivity.

The National Heritage Resources Act (Act 25 of 1999) and the National Environmental Management Act (Act 107 of 1998) requires that the proposed development must be preceded by the relevant impact assessment, in this case for palaeontology.

This report complies with the requirements of the NEMA and environmental impact assessment (EIA) regulations (GNR 982 of 2014). The table below provides a summary of the requirements, with cross references to the report sections where these requirements have been addressed.

Table 1: Specialist report requirements in terms of Appendix 6 of the EIA Regulations (2014)

A specialist report prepared in terms of the Environmental Impact Regulations of 2014 must contain:	**Relevant section in report**
Details of the specialist who prepared the report	Prof Marion Bamford
The expertise of that person to compile a specialist report including a curriculum vitae	Palaeontologist (PhD Wits 1990) CV attached
A declaration that the person is independent in a form as may be specified by the competent authority	Page 2
An indication of the scope of, and the purpose for which, the report was prepared	Section 1, page 3
The date and season of the site investigation and the relevance of the season to the outcome of the assessment	n/a Seasons make no difference to fossils
A description of the methodology adopted in preparing the report or carrying out the specialised process	Section 2, page 4
The specific identified sensitivity of the site related to the activity and its associated structures and infrastructure	See table 2
An identification of any areas to be avoided, including buffers	n/a
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;	n/a
A description of any assumptions made and any uncertainties or gaps in knowledge;	Section 6, page 8
A description of the findings and potential implications of such findings on the impact of the proposed activity, including identified alternatives, on the environment	n/a
Any mitigation measures for inclusion in the EMPr	n/a
Any conditions for inclusion in the environmental authorisation	n/a
Any monitoring requirements for inclusion in the EMPr or environmental authorisation	Section 8, page 8

A reasoned opinion as to whether the proposed activity or portions thereof should be authorised and	n/a
If the opinion is that the proposed activity 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	n/a
A description of any consultation process that was undertaken during the course of carrying out the study	Section 3 page 4
A summary and copies if any comments that were received during any consultation process	n/a
Any other information requested by the competent authority.	n/a

2. Methods and Terms of Reference

1. In order to determine the likelihood of fossils occurring in the affected area geological maps, literature, palaeontological databases and published and unpublished records must be consulted.

2. If fossils are likely to occur then a site visit must be made by a qualified palaeontologist to locate and assess the fossils and their importance.

3. Unique or rare fossils should either be collected (with the relevant South African Heritage Resources Agency (SAHRA) permit) and removed to a suitable storage and curation facility, for example a Museum or University palaeontology department or protected on site.

4. Common fossils can be sacrificed if they are of minimal or no scientific importance but a representative collection could be made if deemed necessary.

The published geological and palaeontological literature, unpublished records of fossil sites, catalogues and reports housed in the Evolutionary Studies Institute, University of the Witwatersrand, and SAHRA databases were consulted to determine if there are any records of fossils from the sites and the likelihood of any fossils occurring there.

3. Consultation Process

No consultations were carried out during the palaeontological desktop study.

4. Geology and Palaeontology

<u>Project location and geological setting</u>

According to the geological map (Fig 2) the farm Hondekraal 234, at the south western part of the dam where the Oliphants River enters the dam, lies in the Loskop Formation with other ancient rocks surrounding the dam and wetlands. This region however is recorded as “green” in the SAHRIS palaeosensitivity map (Fig 1).

Figure 1: SAHRIS Palaeosensitivity map for the area around Loskop Dam, north of Middelburg and close to the Limpopo-Mpumalanga boundary. Colours indicate the following degrees of sensitivity: red = very highly sensitive; orange/yellow = high; green = moderate; blue = low; grey = insignificant/zero.

Figure 2: Geological map of the area around Loskop Dam Nature Reserve north of Middelburg on the farm Hondekraal 234, Mpumalanga. The approximate location of the proposed project is indicated with the arrow. Abbreviations of the rock types are explained in Table 2. Map enlarged from the Geological Survey 1: 1 000 000 map 1984.

Table 2: Explanation of symbols for the geological map and approximate ages (Barker et al., 2006; Cawthorn et al., 2006). SG = Supergroup; Fm = Formation.

Symbol	Group/Formation	Lithology	Approx. Age
Mle	Lebowa Granite Suite, Bushveld Complex	Horneblende, biotite granite	>2050 Ma
Mwi	Wilge River Formation, Waterberg Group	Sandstone, conglomerate	2050 - 1800 Ma
Vlo	Loskop Fm, proto-Waterberg Group	Shale, sandstone, conglomerate, volcanic rocks	Ca 2050 Ma
Vse	Selons River, Rooiberg Group	Red porphyritic rhyolite	Ca 2050 Ma
Vdm	Damwal Fm, Rooiberg Group	Black porphyritic and amygdaloidal rhyolite	Ca 2050 Ma
Vds	Dsjate Subsuite, Rustenburg Layered Suite, Main Zone	Gabbro, norite	>2050 Ma

Geology and palaeontology

The Wilge River Formation overlies the Loskop Formation unconformably along its northern, eastern and north eastern margins (Barker et al., 2006). Palaeocurrent data suggests a predominant sediment influx from the west. An alluvial plane model is proposed for the Wilge Formation in this large middle Proterozoic Middelburg Basin with alluvial fan lobes (Barker et al., 2006). The Loskop Formation is predominantly argillaceous clastic sediments with a basal conglomerate of reworked volcanic material and interbedded lavas. It may represent a short-lived molasse deposit and is considered to be the proto-Waterberg (Barker et al., 2006). The Selons River Formation, now superseded by the Kwaggasnek and Schrikkloof Formations, is a continuation of the underlying Damwal and Dullstroom Formations and are all of volcanic origin, rhyolite amongst other igneous rocks.

The wetland lies on the Loskop Formation with the Wilge River Formation to the south and the Selons River Formation to the north and northwest.

Palaeontology

The volcanic rocks do not contain fossils but the Wilge and Loskop Formations contain shale and sandstones. They are, however, too old to contain body fossils. Microorganisms, such as bacteria and algae, had evolved by this time and could be preserved in tidal pools and the like, but none has yet been reported from the fan delta lobes in this area. Although the SAHRIS palaeosensitivity map, Fig 1, indicates that the area around the dam is green, from the geology there is no indication of any fossils being preserved.

The wetland is likely to comprise muds and sands of the modern land surface that is highly bioturbated by plants and animals.

5. Impact assessment

Using the criteria in the table below, the impact of the relatively shallow excavations for the buildings and infrastructure has been assessed.

TABLE 3: CRITERIA FOR ASSESSING IMPACTS

PART A: DEFINITION AND CRITERIA		
Criteria for ranking of the SEVERITY/NATURE of environmental impacts	**H**	Substantial deterioration (death, illness or injury). Recommended level will often be violated. Vigorous community action.
	M	Moderate/ measurable deterioration (discomfort). Recommended level will occasionally be violated. Widespread complaints.
	L	Minor deterioration (nuisance or minor deterioration). Change not measurable/ will remain in the current range. Recommended level will never be violated. Sporadic complaints.
	L+	Minor improvement. Change not measurable/ will remain in the current range. Recommended level will never be violated. Sporadic complaints.
	M+	Moderate improvement. Will be within or better than the recommended level. No observed reaction.
	H+	Substantial improvement. Will be within or better than the recommended level. Favourable publicity.
Criteria for ranking the DURATION of impacts	**L**	Quickly reversible. Less than the project life. Short term
	M	Reversible over time. Life of the project. Medium term
	H	Permanent. Beyond closure. Long term.
Criteria for ranking the SPATIAL SCALE of impacts	**L**	Localised - Within the site boundary.
	M	Fairly widespread – Beyond the site boundary. Local
	H	Widespread – Far beyond site boundary. Regional/ national
PROBABILITY (of exposure to impacts)	**H**	Definite/ Continuous
	M	Possible/ frequent
	L	Unlikely/ seldom

The project is aimed at rehabilitating the wetland which means that the vegetation and possibly paths, fencing or channels would be affected and these are surface activities. No fossils would be in the soils so there would be no impact on the fossil heritage. The IMPACT is very low (according to the scheme in Table 3).

No excavation for infrastructure is expected. Therefore the SEVERITY/NATURE of the environmental impact would be L.

DURATION of the impact would be permanent: H.

Since only the possible fossils within the area would be microfossils or trace fossils the SPATIAL SCALE will be localised within the site boundary: L.

There is no chance of finding any body fossils and an extremely small chance of finding microfossils or trace fossil since none has been recorded from sediments of this type and age. However, the PROBABILITY of affecting any fossils is unlikely or seldom: L

6. Assumptions and uncertainties

Based on the geology of the area and the palaeontological record as we know it, it can be assumed that the formation and layout of the basement rocks, sandstones, shales, quartzites, basalts and volcanic rocks are typical for the country and do not contain any fossil material. No fossils have been reported from rocks of these Formations.

7. Recommendation

It is extremely unlikely that any fossils occur in the wetlands that will be rehabilitated. Furthermore, no fossils have been recorded from this area.

As far as the palaeontology is concerned the proposed development can go ahead. Any further palaeontological assessment would only be required if and when excavations have commenced and if microfossils or trace fossils are found by the geologist or environmental personnel.

9. References

Barker, O B., Brandl, G., Callaghan, C.C., Erikssen, P.G., van der Neut, M., 2006. The Soutspanberg and Waterberg Groups and the Blouberg Formation. In: Johnson, M.R., Anhaeusser, C.R. and Thomas, R.J., (Eds). The Geology of South Africa. Geological Society of South Africa, Johannesburg / Council for Geoscience, Pretoria. Pp 301-318.

Cawthorn, R.G., Eales, H.V., Walraven, F., Uken, R., Watkeys, M.K., 2006. The Bushveld Complex. In: Johnson, M.R., Anhaeusser, C.R. and Thomas, R.J., (Eds). The Geology of South Africa. Geological Society of South Africa, Johannesburg / Council for Geoscience, Pretoria. pp 261-281.

Erikssen, P.G., Altermann, W., Hartzer, F.J., 2006. The Transvaal Supergroup and its pre-cursors. In: Johnson, M.R., Anhaeusser, C.R. and Thomas, R.J., (Eds). The Geology of South Africa. Geological Society of South Africa, Johannesburg / Council for Geoscience, Pretoria. pp 237-260.