

SPOOR ENVIRONMENTAL SERVICES (PTY) LTD: THE PROPOSED IMPACT PIET RETIEF WASTE LICENSE PROJECT, MKHONDO MUNICIPALITY, MPUMALANGA PROVINCE

ARCHAEOLOGICAL IMPACT ASSESSMENT

Submitted subject to Section 38(3) and Section 38(8) of the NHRA

Prepared For:

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Pretoria

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ARCHAEOLOGICAL IMPACT ASSESSMENT (AIA) ON A PORTION OF THE FARM VROEGVELD 509IT FOR THE PROPOSED IMPACT PIET RETIEF WASTE LICENSE PROJECT IN THE MKHONDO MUNICIPALITY, MPUMALANGA PROVINCE

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I, Nelius Kruger, declare that –

- I act as the independent specialist;
- I am conducting any work and activity relating to the proposed Impact Piet Retief Waste License Project in an objective manner, even if this results in views and findings that are not favourable to the client;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have the required expertise in conducting the specialist report and I will comply with legislation, including the relevant Heritage Legislation (National Heritage Resources Act no. 25 of 1999, Human Tissue Act 65 of 1983 as amended, Removal of Graves and Dead Bodies Ordinance no. 7 of 1925, Excavations Ordinance no. 12 of 1980), the Minimum Standards: Archaeological and Palaeontological Components of Impact Assessment (SAHRA, EC-PHRA and the CRM section of ASAPA), regulations and any guidelines that have relevance to the proposed activity;
- I have not, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
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Signature of specialist

Name: Nelius Kruger

Date: 25 June 2022

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Lynnwood Ridge
Pretoria | South Africa

EXECUTIVE SUMMARY

This report details the results of an Archaeological Impact Assessment (AIA) study subject to an Environmental Impact Assessment (EIA) process for the proposed Mpact Piet Retief Waste License Project on a Portion of the Farm Vroegeveld 509IT in the Mkhondo Municipality of the Mpumalanga Province. The project entails the application of a waste license at the MPact Plant for cascading dams and the expansion of a waste disposal site over total project areas of approximately 50ha. The report includes background information on the area's archaeology, its representation in Southern Africa, and the history of the larger area under investigation, survey methodology and results as well as heritage legislation and conservation policies. A copy of the report will be supplied to the South African Heritage Resources Agency (SAHRA) and recommendations contained in this document will be reviewed.

Project Title	Mpact Piet Retief Waste License Project
Project Type / Scope	Waste License Application
Project Impact Footprint/s Area	50ha
Project Location	S26.946890° E30.770213°
1:50 000 Map Sheet	2630DD
Farm Portion / Parcel	A Portion of the Farm Vroegeveld 509IT
Magisterial District / Municipal Area	Mkhondo Municipality
Province	Mpumalanga Province

A number of archaeological and historical studies have been conducted in the Mpumalanga Province. These studies all infer a rich and diverse archaeological landscape. Sites, documenting Earlier, Middle and Later Stone Age habitation occur across the province, mostly in open air locales or in sediments alongside rivers or pans. In addition, a wealth of Later Stone Age rock art sites, most of which are in the form of rock engravings are to be found in the larger landscape. These sites occur on hilltops, slopes, rock outcrops and occasionally in river beds. Later, Bantu-speaking tribes moved into this area from the northern parts of Southern Africa and settled here. These were presumably Sotho-Tswana herder groups. Various historians and ethnographers describe that the Lowveld was frequented by Swazi and Sotho-Tswana groups during historic times i.e. Late Iron Age times during the period AD 1500-1800. Historical trade routes were well established before the period of Colonial expansion and these routes mainly existed as a direct consequence of metallurgy and mining for iron, tin, copper and some gold to make weapons, agricultural equipment and ornaments. During the nineteenth century the Lowveld area of Mpumalanga was extensively settled by both Bantu and European groups that migrated into this area with the area emerging as a major timber-growing region in the 20th century.

A study of aerial photos and archive maps indicate that large portions of the farm Vroegeveld have been converted into timber plantations, agricultural fields and also industrial areas at the MPact and PG Bison Plants. Natural vegetation and landscape features remain relatively intact in some areas along higher ridges and drainage lines. **This inference was confirmed during an archaeological site assessment during which no *in situ* archaeological or heritage remains were encountered.** The following recommendations are made based on general observations in the proposed Mpact Piet Retief Waste License Project in terms of heritage resources management:

- An old regional railway line was noted to occur on historical aerial photos and archive maps, routing along the south-western periphery of the study area. However, a site inspection could not locate any remains of the railway and it is assumed that the line was dismantled in past years. It is recommended

that all development activities in this area be closely monitored in order to avoid the potential destruction of previously undetected heritage remains pertaining to the railway line.

- It should be stated that it is likely that further undetected archaeological remains might occur elsewhere in the project area along water sources and drainage lines, fountains and pans would often have attracted human activity in the past. Burials and historically significant structures dating to the Colonial Period occur on farms in the area and these resources should be avoided during all phases of construction and development, including the operational phases of the development. Generally, the frequent monitoring of the development progress by an ECO or by the heritage specialist is recommended for all stages of the project. Should any subsurface palaeontological, archaeological or historical material, or burials be exposed during construction activities, all activities should be suspended and the archaeological specialist should be notified immediately.

This report details the methodology, limitations and recommendations relevant to these heritage areas, as well as areas of proposed development. It should be noted that recommendations and possible mitigation measures are valid for the duration of the development process, and mitigation measures might have to be implemented on additional features of heritage importance not detected during this Phase 1 assessment (e.g. uncovered during the construction process).

NOTATIONS AND TERMS/TERMINOLOGY

Absolute dating: Absolute dating provides specific dates or range of dates expressed in years.

Archaeological record: The archaeological record minimally includes all the material remains documented by archaeologists. More comprehensive definitions also include the record of culture history and everything written about the past by archaeologists.

Artefact: Entities whose characteristics result or partially result from human activity. The shape and other characteristics of the artefact are not altered by removal of the surroundings in which they are discovered. In the Southern African context examples of artefacts include potsherds, iron objects, stone tools, beads and hut remains.

Assemblage: A group of artefacts recurring together at a particular time and place, and representing the sum of human activities.

Context: An artefact's context usually consists of its immediate *matrix*, its *provenience* and its *association* with other artefacts. When found in *primary context*, the original artefact or structure was undisturbed by natural or human factors until excavation and if in *secondary context*, disturbance or displacement by later ecological action or human activities occurred.

Cultural Heritage Resource: The broad generic term *Cultural Heritage Resources* refers to any physical and spiritual property associated with past and present human use or occupation of the environment, cultural activities and history. The term includes sites, structures, places, natural features and material of palaeontological, archaeological, historical, aesthetic, scientific, architectural, religious, symbolic or traditional importance to specific individuals or groups, traditional systems of cultural practice, belief or social interaction.

Cultural landscape: A cultural landscape refers to a distinctive geographic area with cultural significance.

Cultural Resource Management (CRM): A system of measures for safeguarding the archaeological heritage of a given area, generally applied within the framework of legislation designed to safeguard the past.

Feature: Non-portable artefacts, in other words artefacts that cannot be removed from their surroundings without destroying or altering their original form. Hearths, roads, and storage pits are examples of archaeological features

Impact: A description of the effect of an aspect of the development on a specified component of the biophysical, social or economic environment within a defined time and space.

Lithic: Stone tools or waste from stone tool manufacturing found on archaeological sites.

Matrix: The material in which an artefact is situated (sediments such as sand, ashy soil, mud, water, etcetera). The matrix may be of natural origin or human-made.

Midden: Refuse that accumulates in a concentrated heap.

Microlith: A small stone tool, typically knapped of flint or chert, usually about three centimetres long or less.

Monolith: A geological feature such as a large rock, consisting of a single massive stone or rock, or a single piece of rock placed as, or within, a monument or site.

Phase 1 CRM Assessment: An Impact Assessment which identifies archaeological and heritage sites, assesses their significance and comments on the impact of a given development on the sites. Recommendations for site mitigation or conservation are also made during this phase.

Phase 2 CRM Study: In-depth studies which could include major archaeological excavations, detailed site surveys and mapping / plans of sites, including historical / architectural structures and features. Alternatively, the sampling of sites by collecting material, small test pit excavations or auger sampling is required. Mitigation / Rescue involves planning the protection of significant sites or sampling through excavation or collection (in terms of a permit) at sites that may be lost as a result of a given development.

Phase 3 CRM Measure: A Heritage Site Management Plan (for heritage conservation), is required in rare cases where the site is so important that development will not be allowed and sometimes developers are encouraged to enhance the value of the sites retained on their properties with appropriate interpretive material or displays.

Provenience: Provenience is the three-dimensional (horizontal and vertical) position in which artefacts are found. Fundamental to ascertaining the provenience of an artefact is *association*, the co-occurrence of an artefact with other archaeological remains; and *superposition*, the principle whereby artefacts in lower levels of a matrix were deposited before the artefacts found in the layers above them, and are therefore older.

Random Sampling: A probabilistic sampling strategy whereby randomly selected sample blocks in an area are surveyed. These are fixed by drawing coordinates of the sample blocks from a table of random numbers.

Scoping Assessment: The process of determining the spatial and temporal boundaries (i.e. extent) and key issues to be addressed in an impact assessment. The main purpose is to focus the impact assessment on a manageable number of important questions on which decision making is expected to focus and to ensure that only key issues and reasonable alternatives are examined. The outcome of the scoping process is a Scoping Report that includes issues raised during the scoping process, appropriate responses and, where required, terms of reference for specialist involvement.

Site (Archaeological): A distinct spatial clustering of artefacts, features, structures, and organic and environmental remains, as the residue of human activity. These include surface sites, caves and rock shelters, larger open-air sites, sealed sites (deposits) and river deposits. Common functions of archaeological sites include living or habitation sites, kill sites, ceremonial sites, burial sites, trading, quarry, and art sites,

Stratigraphy: This principle examines and describes the observable layers of sediments and the arrangement of strata in deposits

Systematic Sampling: A probabilistic sampling strategy whereby a grid of sample blocks is set up over the survey area and each of these blocks is equally spaced and searched.

Trigger: A particular characteristic of either the receiving environment or the proposed project which indicates that there is likely to be an *issue* and/or potentially significant *impact* associated with that proposed development that may require specialist input. Legal requirements of existing and future legislation may also trigger the need for specialist involvement.

LIST OF ABBREVIATIONS

Abbreviation	Description
ASAPA	Association for South African Professional Archaeologists
AIA	Archaeological Impact Assessment
BP	Before Present
BCE	Before Common Era
BGG	Burial Grounds and Graves
CRM	Culture Resources Management
EIA	Early Iron Age (also Early Farmer Period)
EIA	Environmental Impact Assessment
EFP	Early Farmer Period (also Early Iron Age)
ESA	Earlier Stone Age
GIS	Geographic Information Systems
HIA	Heritage Impact Assessment
ICOMOS	International Council on Monuments and Sites
K2/Map	K2/Mapungubwe Period
LFP	Later Farmer Period (also Later Iron Age)
LIA	Later Iron Age (also Later Farmer Period)
LSA	Later Stone Age
MIA	Middle Iron Age (also Early later Farmer Period)
MRA	Mining Right Area
MSA	Middle Stone Age
NHRA	National Heritage Resources Act No.25 of 1999, Section 35
PFS	Pre-Feasibility Study
PHRA	Provincial Heritage Resources Authorities
SAFA	Society for Africanist Archaeologists
SAHRA	South African Heritage Resources Association
YCE	Years before Common Era (Present)

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1 BACKGROUND

1.1 Scope and Project Brief

SPOOR Environmental Services (PTY) Ltd commissioned an Archaeological Impact Assessment (AIA) as part of an Environmental Basic Assessment (BA) process for the application of a waste license at the MPact Plant on a Portion of the Farm Vroegeveld 509IT in the Mpumalanga Province (hereafter referred to as the “Mpact Piet Retief Waste License Project” or “the Project”). The project entails the application of a waste license at the MPact Plant for the following: (refer to Figure 1-1).

- Cascading Dams (Old): **22.8ha**
- Cascading Dams (New): **31.8ha**
- Waste Disposal Site (Old): **9.69ha**
- Waste Disposal Site (New): **21ha**

The rationale of the AIA is to determine the presence of heritage resources such as archaeological and historical sites and features, graves and places of religious and cultural significance in previously unstudied areas; to consider the impact of the proposed project on such heritage resources, and to submit appropriate recommendations with regard to the cultural resources management measures that may be required at affected sites / features.

1.2 Project Direction

Mr Neels Kruger acts as field director for the project; responsible for the assimilation of all information, the compilation of the final consolidated AIA report and recommendations in terms of heritage resources on the demarcated project areas. Mr Kruger is an accredited archaeologist and Culture Resources Management (CRM) practitioner with the Association of South African Professional Archaeologists (ASAPA), a member of the Society for Africanist Archaeologists (SAFA) and the Pan African Archaeological Association (PAA).

1.3 Project Terms of Reference

Heritage specialist input into the Environmental Impact Assessment (EIA) process is essential to ensure that, through the management of change, developments still conserve our heritage resources. It is also a legal requirement for certain development categories which may have an impact on heritage resources. Thus, EIAs should always include an assessment of heritage resources. The heritage component of the EIA is provided for in the **National Environmental Management Act, (Act 107 of 1998)** and endorsed by section 38 of the **National Heritage Resources Act (NHRA - Act 25 of 1999)**. In addition, the NHRA protects all structures and features older than 60 years, archaeological sites and material and graves as well as burial sites. The objective of this legislation is to ensure that developers implement measures to limit the potentially negative effects that the development could have on heritage resources.

Based hereon, this project **terms of reference** for heritage specialist input area:

- *Provide a detailed description of all archaeological artefacts, structures (including graves) and settlements which may be affected, if any.*
- *Assess the nature and degree of significance of such resources within the area.*
- *Establish heritage informants/constraints to guide the development process through establishing thresholds of impact significance;*
- *Assess and rate any possible impact on the archaeological and historical remains within the area emanating from the proposed development activities. Propose possible heritage management measures provided that such action is necessitated by the development.*
- *Liaise and consult with the South African Heritage Resources Agency (SAHRA). A Notification of Intent to Develop (NID) will be submitted to SAHRA at the soonest opportunity.*

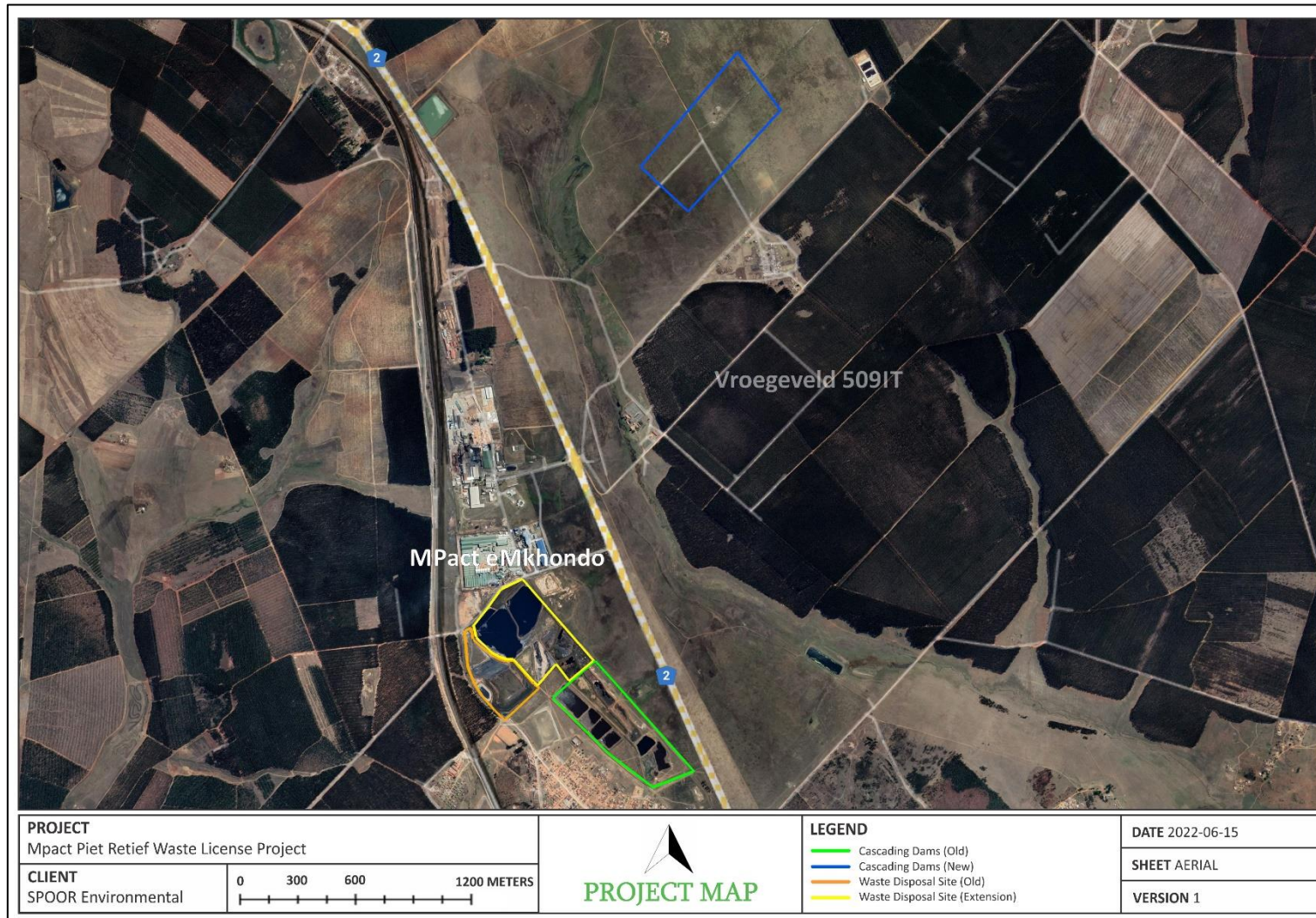


Figure 1-1: Aerial map indicating the project components of the Mpact Piet Retief Waste License Project.

2 LEGISLATIVE FRAMEWORK

2.1 CRM: Legislation, Conservation and Heritage Management

The broad generic term *Cultural Heritage Resources* refers to any physical and spiritual property associated with past and present human use or occupation of the environment, cultural activities and history. The term includes sites, structures, places, natural features and material of palaeontological, archaeological, historical, aesthetic, scientific, architectural, religious, symbolic or traditional importance to specific individuals or groups, traditional systems of cultural practice, belief or social interaction.

2.1.1 Legislation regarding archaeology and heritage sites

The South African Heritage Resources Agency (SAHRA) and its provincial offices aim to conserve and control the management, research, alteration and destruction of cultural resources of South Africa. It is therefore vitally important to adhere to heritage resource legislation at all times.

a. National Heritage Resources Act No 25 of 1999, section 35

According to the National Heritage Resources Act No 25 of 1999 (section 35) the following features are protected as cultural heritage resources:

- a. Archaeological artefacts, structures and sites older than 100 years
- b. Ethnographic art objects (e.g. prehistoric rock art) and ethnography
- c. Objects of decorative and visual arts
- d. Military objects, structures and sites older than 75 years
- e. Historical objects, structures and sites older than 60 years
- f. Proclaimed heritage sites
- g. Grave yards and graves older than 60 years
- h. Meteorites and fossils
- i. Objects, structures and sites of scientific or technological value.

In addition, the national estate includes the following:

- a. Places, buildings, structures and equipment of cultural significance
- b. Places to which oral traditions are attached or which are associated with living heritage
- c. Historical settlements and townscapes
- d. Landscapes and features of cultural significance
- e. Geological sites of scientific or cultural importance
- f. Archaeological and paleontological sites
- g. Graves and burial grounds
- h. Sites of significance relating to the history of slavery
- i. Movable objects (e.g. archaeological, paleontological, meteorites, geological specimens, military, ethnographic, books etc.)

With regards to activities and work on archaeological and heritage sites this Act states that:

"No person may alter or demolish any structure or part of a structure which is older than 60 years without a permit by the relevant provincial heritage resources authority." (34. [1] 1999:58)

and

"No person may, without a permit issued by the responsible heritage resources authority-

- (a) *destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or palaeontological site or any meteorite;*
- (b) *destroy, damage, excavate, remove from its original position, collect or own any archaeological or palaeontological material or object or any meteorite;*
- (c) *trade in, sell for private gain, export or attempt to export from the Republic any category of archaeological or palaeontological material or object, or any meteorite; or*
- (d) *bring onto or use at an archaeological or palaeontological site any excavation equipment or any equipment which assist in the detection or recovery of metals or archaeological and palaeontological material or objects, or use such equipment for the recovery of meteorites. (35. [4] 1999:58)."*

and

"No person may, without a permit issued by SAHRA or a provincial heritage resources agency-

- (a) *destroy, damage, alter, exhume or remove from its original position or otherwise disturb the grave of a victim of conflict, or any burial ground or part thereof which contains such graves;*
- (b) *destroy, damage, alter, exhume, remove from its original position or otherwise disturb any grave or burial ground older than 60 years which is situated outside a formal cemetery administered by a local authority;*
- (c) *bring onto or use at a burial ground or grave referred to in paragraph (a) or (b) and excavation equipment, or any equipment which assists in the detection or recovery of metals (36. [3] 1999:60)."*

b. Human Tissue Act of 1983 and Ordinance on the Removal of Graves and Dead Bodies of 1925

Graves and burial grounds are commonly divided into the following subsets:

- a. ancestral graves
- b. royal graves and graves of traditional leaders
- c. graves of victims of conflict
- d. graves designated by the Minister
- e. historical graves and cemeteries
- f. human remains

Graves 60 years or older are heritage resources and fall under the jurisdiction of both the National Heritage Resources Act and the Human Tissues Act of 1983. However, graves younger than 60 years are specifically protected by the Human Tissues Act (Act 65 of 1983) and Ordinance on Excavations (Ordinance no. 12 of 1980) as well as any local and regional provisions, laws and by-laws. Such burial places also fall under the jurisdiction of the National Department of Health and the Provincial Health Departments.

c. National Heritage Resources Act No 25 of 1999, Section 35

This act (Act 107 of 1998) states that a survey and evaluation of cultural resources must be done in areas where development projects, that will change the face of the environment, will be undertaken. The impact of the development on these resources should be determined and proposals for the mitigation thereof are made. Environmental management should also take the cultural and social needs of people into account. Any disturbance of landscapes and sites that constitute the nation's cultural heritage should be avoided as far as possible and where this is not possible the disturbance should be minimized and remedied.

2.1.2 Background to HIA and AIA Studies

South Africa's unique and non-renewable archaeological and palaeontological heritage sites are 'generally' protected in terms of the National Heritage Resources Act (Act No 25 of 1999, section 35) and may not be disturbed at all without a permit from the relevant heritage resources authority. Heritage sites are frequently threatened by development projects and both the environmental and heritage legislation require impact

assessments (HIAs & AIAs) that identify all heritage resources in areas to be developed. Particularly, these assessments are required to make recommendations for protection or mitigation of the impact of the sites. HIAs and AIAs should be done by qualified professionals with adequate knowledge to (a) identify all heritage resources including archaeological and palaeontological sites that might occur in areas of developed and (b) make recommendations for protection or mitigation of the impact on the sites.

A detailed guideline of statutory terms and requirements is supplied in Addendum 1.

2.2 Rating of significance

The National Heritage Resources Act (Act no 25 of 1999) also stipulates the assessment criteria and grading of archaeological sites. The following categories are distinguished in Section 7 of the Act:

- *Grade I:* Heritage resources with qualities so exceptional that they are of special national significance;
- *Grade II:* Heritage resources which, although forming part of the national estate, can be considered to have special qualities which make them significant within the context of a province or a region;
- *Grade III:* Other heritage resources worthy of conservation, and which prescribes heritage resources assessment criteria, as set out in section 3(3) of the act.

Significance is influenced by the context and state of the archaeological site. Six criteria were considered following Kruger (2019):

- Site integrity (i.e. primary vs. secondary context),
- Amount of deposit, range of features (e.g., stonewalling, stone tools and enclosures),
- Density of scatter (dispersed scatter),
- Social value,
- Uniqueness, and
- Potential to answer current and future research questions.

The categories of significance were based on the above criteria the above and the grading system outlined in NHRA and summarised below:

Significance	Rating Action
No significance: sites that do not require mitigation.	None
Low significance: sites, which may require mitigation.	2a. Recording and documentation (Phase 1) of site; no further action required 2b. Controlled sampling (shovel test pits, auguring), mapping and documentation (Phase 2 investigation); permit required for sampling and destruction
Medium significance: sites, which require mitigation.	3. Excavation of representative sample, C14 dating, mapping and documentation (Phase 2 investigation); permit required for sampling and destruction [including 2a & 2b]
High significance: sites, where disturbance should be avoided.	4a. Nomination for listing on Heritage Register (National, Provincial or Local) (Phase 2 & 3 investigation); site management plan; permit required if utilised for education or tourism
High significance: Graves and burial places	4b. Locate demonstrable descendants through social consulting; obtain permits from applicable legislation, ordinances and regional by-laws; exhumation and reinternment [including 2a, 2b & 3]

3 REGIONAL CONTEXT

3.1 Area Location

The Mpac Piet Retief Waste License occurs in the larger Piet Retief / eMkhondo area in the Mkhondo Municipality, Mpumalanga Province. The project is situated approximately 7km north-west of the town of Piet Retief / eMkhondo at the MPact eMkhondo Plant. The town of Piet-Retief is located along three major routes; the N2, R33 and the N543 where the N2 routes through the project area. The study area appears on 1:50000 map sheet 2630DD (see Figure 2-1).

More specifically, the study areas are situated generally at the following locations:

- **S26.946890° E30.770213°**

3.2 Area Description: Receiving Environment

The Mpac Piet Retief Waste License is situated within the Mesic Highveld Grassland of the Grassland Biome, in particular within its Eastern Highveld Grassland vegetation unit. The terrain morphology is gently to moderately undulating plains on the Highveld plateau supporting short to medium high, dense, tufted grassland. In places not disturbed, only scattered small wetlands, narrow stream alluvia, pans and occasional ridges or rocky outcrops interrupt the continuous grassland cover. Both vegetation types have been degraded to a large extent through extensive forestry, agricultural activities and livestock farming. This vegetation type occurs on slightly to moderately undulating plains with short open tree layer with a well-developed grass layer to grass plains with occasional trees at higher altitudes. The gently undulating highland topography is characterised by gentle rolling grass covered hills. Generally, the study area has been disturbed in the past through agricultural activities, the development of timber plantations, industries, rural residential developments (currently occupied) and power lines and roads.

3.3 Site Description

The landscape on the farm Vroegeveld is generally timber plantations with pockets of open land with undulating rolling hills in places. Existing infrastructure on the property comprises the Mpac Plant, offices and workers housing as well as cascading dams, roads and a railway line. As a result, large portions of land have been converted into timber plantations and crop fields but natural vegetation remain relatively intact in places on high ridges and along drainage lines. The site of the proposed new cascading dams is currently grasslands vegetating disused crop fields whereas the waste disposal facility occurs within transformed areas at the Mpac plant.

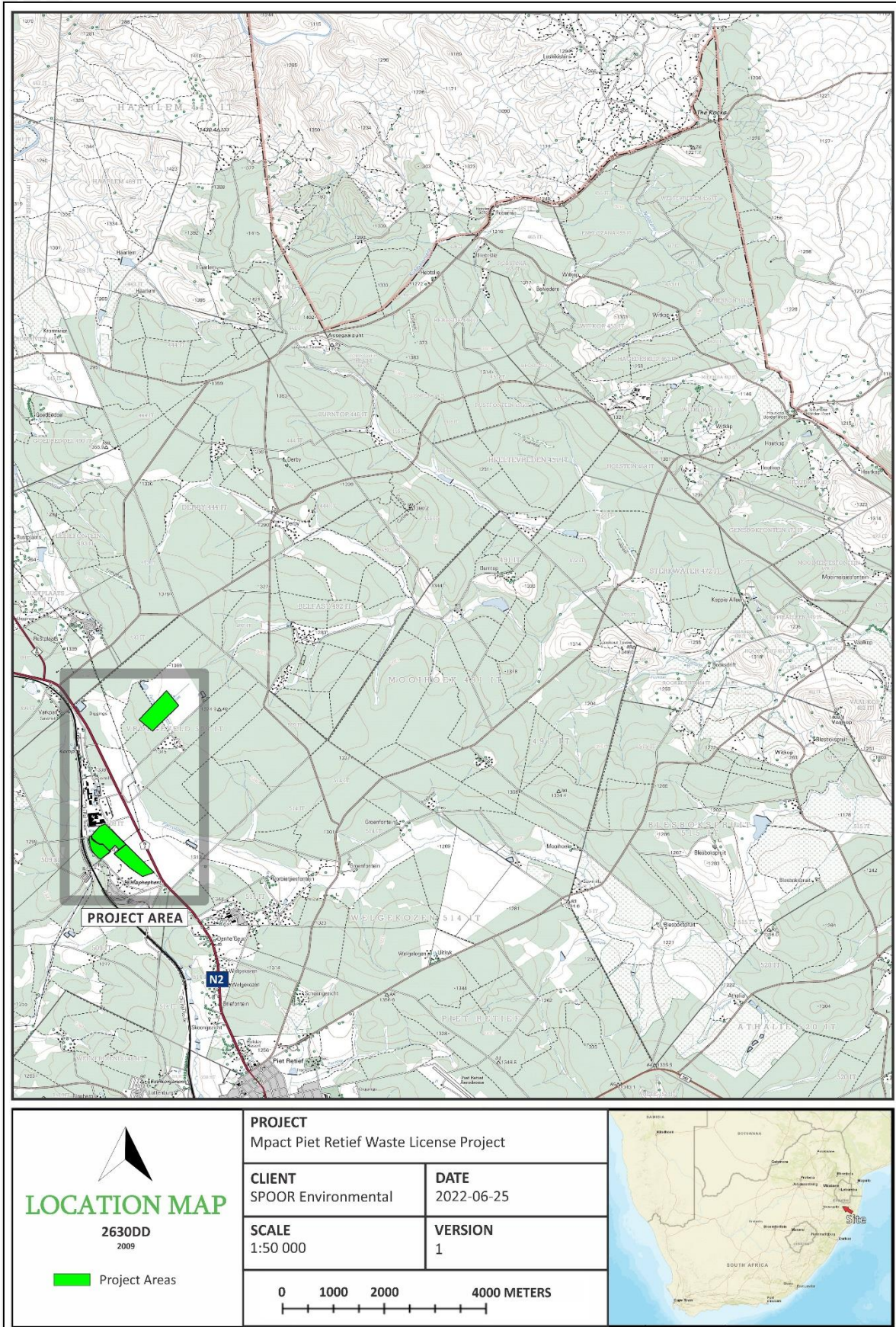


Figure 3-1: 1:50 00 Map representation of the location of the proposed Mpac Piet Retief Waste License Project (sheet 2630DD).

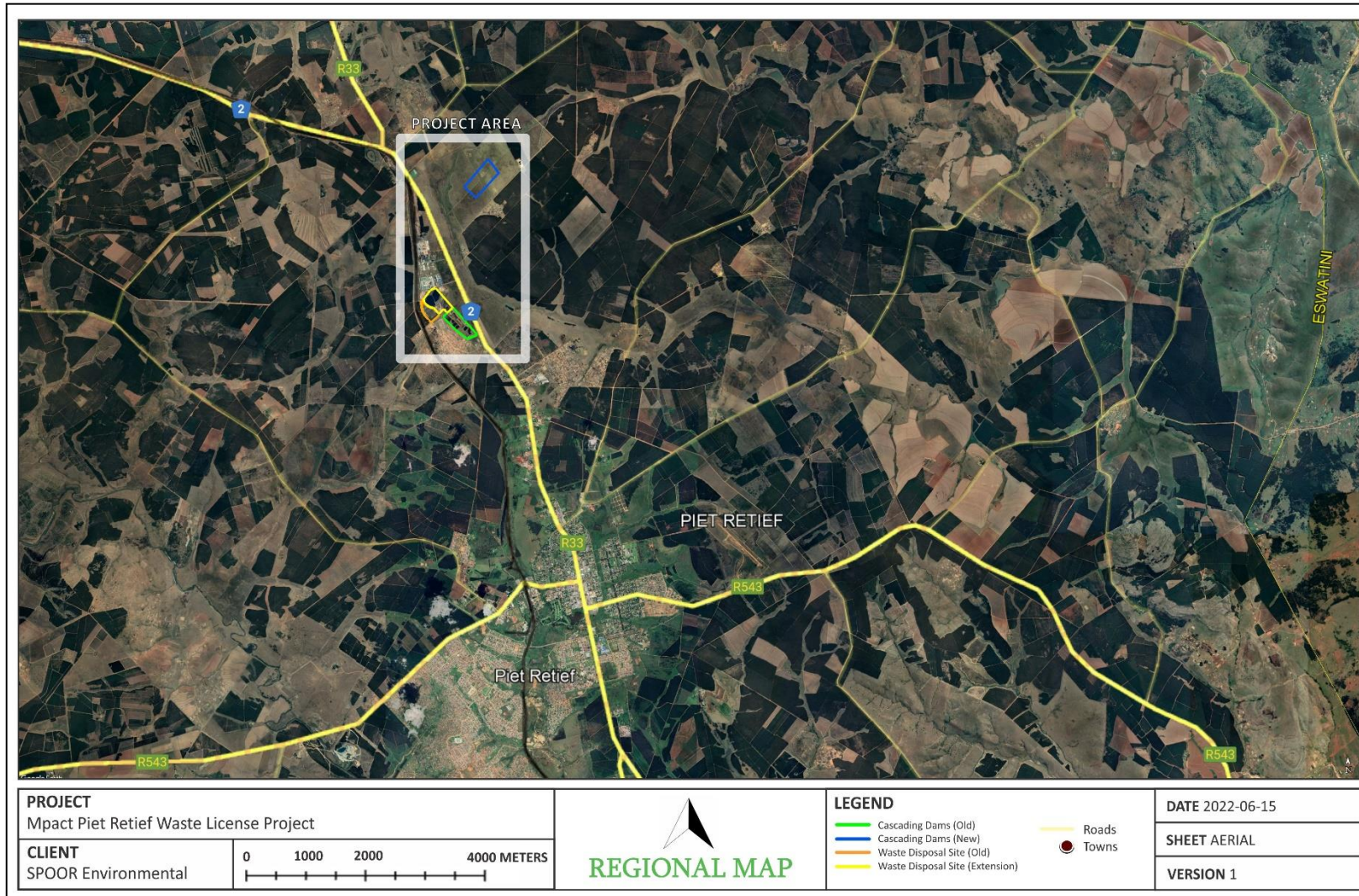


Figure 3-2: Aerial map providing a regional context for the proposed Mpac Piet Retief Waste License Project area.

4 METHOD OF ENQUIRY

4.1 Sources of Information

Data from detailed desktop, aerial and field studies were employed in order to sample surface areas systematically and to ensure a high probability of heritage site recording.

4.1.1 Desktop Study

The larger landscape around Piet Retief / eMkhondo has been well documented in terms of its archaeology and history. A desktop study was prepared in order to contextualize the proposed project within a larger historical milieu. The study focused on relevant previous studies, archaeological and archival sources, aerial photographs, historical maps and local histories, all pertaining to the project area and the larger landscape of this section of the Mpumalanga Province. In addition, a number of Cultural Resources Management (CRM) projects have been conducted in the Piet Retief / eMkhondo area.

4.1.2 Remote Sensing

Aerial photography is often employed to locate and study archaeological sites, particularly where larger scale area surveys are performed. The site assessment of the project area relied on this method to assist the foot site survey. Here, depressions, variation in vegetation, soil marks and landmarks were examined and specific attention was given to shadow sites (shadows of walls or earthworks which are visible early or late in the day), crop mark sites (crop mark sites are visible because disturbances beneath crops cause variations in their height, vigour and type) and soil marks (e.g. differently coloured or textured soil (soil marks) might indicate ploughed-out burial mounds). Attention was also given to moisture differences, as prolonged dampening of soil as a result of precipitation frequently occurs over walls or embankments. In addition, historical aerial photos obtained during the archival search 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 whether they still exist and in order to assess their current condition and significance. By superimposing high frequency aerial photographs with images generated with Google Earth as well as historical aerial imagery, potential sensitive areas were subsequently identified, geo-referenced and transferred to a handheld GPS device. These areas served as reference points from where further vehicular and pedestrian surveys were carried out.

4.1.3 Map Data

Similar to the aerial survey, the site assessment of the project area relied on archive and more recent map renderings of the Piet Retief / eMkhondo area to assist the foot and vehicular site survey where historical and current maps of the project area were examined. By merging data obtained from the desktop study and the aerial survey, sites and areas of possible heritage potential were plotted on these maps of the larger region using GIS software. These maps were then superimposed on high definition aerial representations in order to graphically demonstrate the geographical locations and distribution of potentially sensitive landscapes.

4.1.4 Field Survey

Archaeological survey implies the systematic procedure of the identification of archaeological sites. An archaeological survey of the project area was conducted in May 2022. The process encompassed a random field survey in accordance with standard archaeological practice by which heritage resources are observed and documented. As portions of the project area is more densely vegetated, particular focus was placed on GPS reference points identified during the aerial and mapping survey. Where possible, random spot checks were made and potentially sensitive heritage areas were investigated. Using a Garmin GPS, the survey was tracked and general surroundings were photographed with a Samsung Digital camera. Real time aerial

orientation, by means of a mobile Google Earth application was also employed to investigate possible disturbed areas during the survey.

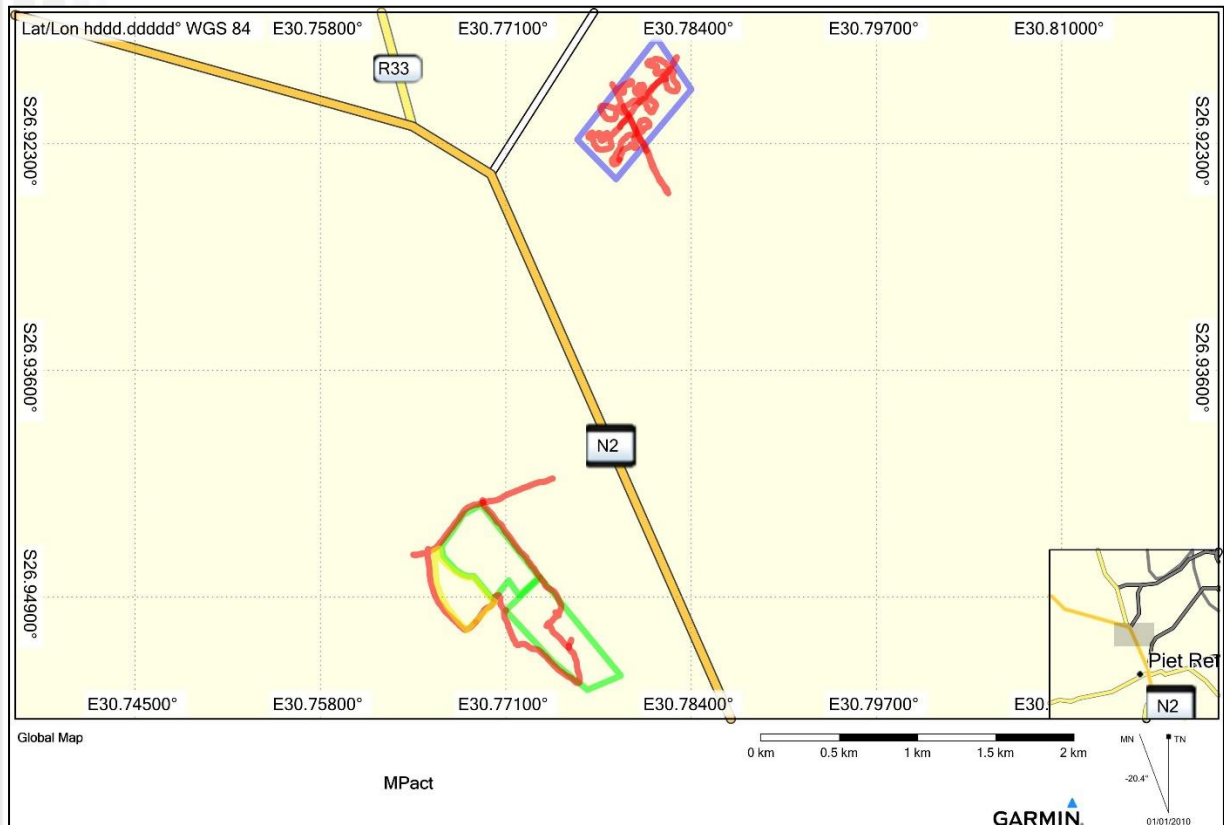


Figure 4-1: Map of the field survey indicating the GPS Track Log (red lines).

4.1.5 General Public Liaison

Consultation with an employee of MPact who is familiar with the area in question did not identify any heritage receptors in the project area.

4.2 Limitations

4.2.1 Access

The study area is accessed via a number of service road connecting to the N2 to Piet Retief / eMkhondo. Access control is applied to the survey areas but no restrictions were encountered as access arrangements were made with MPact and the author was accompanied by an employee of MPact.

4.2.2 Visibility

The surrounding vegetation in the project area mostly comprised out of timber plantations, grasslands and farmlands with pockets of pioneering species and natural vegetation. The general visibility at the time of the AIA survey (May 2022) ranged from high along the transformed areas to the west of the project area, to moderate in the more overgrown eastern areas. In single cases during the survey sub-surface inspection was possible. Where applied, this revealed no archaeological deposits.



Figure 4-2: View of open grassland and an irrigation dam at the site proposed for the cascading dams.



Figure 4-3: View of disused farmlands at the site proposed for the cascading dams.



Figure 4-4: View of the MPact plant (left) and the area proposed for the waste disposal site.



Figure 4-5: View of disused farmlands and deforested areas at the site proposed for the cascading dams.



Figure 4-6: View of the old slimes dams in the project area.



Figure 4-7: View of old cascading dams in the project area.



Figure 4-8: View of open grassland and an informal settlement near the new cascading dams site.

4.2.3 Summary: Limitations and Constraints

The site survey for the Mpact Piet Retief Waste License Project AIA proved to be constrained and the investigation primarily focused around areas tentatively identified as sensitive and of high heritage probability (i.e. those noted during the mapping and aerial survey) as well as areas of potential high human settlement catchment. In summary, the following constraints were encountered during the site survey:

- The general visibility at the time of the AIA survey (May 2022) ranged from high around the MPact plant areas to moderate low in overgrown areas. As such, visibility proved to be a constraint during the site survey.

Cognisant of the constraints noted above, it should be stated that the possibility exists that individual sites could be missed due to the localised nature of some heritage remains as well as the possible presence of sub-surface archaeology. Therefore, maintaining due cognisance of the integrity and accuracy of the archaeological survey, it should be stated that the heritage resources identified during the study do not necessarily represent all the heritage resources present in the project area. The subterranean nature of some archaeological sites, dense vegetation cover and visibility constraints sometimes distort heritage

representations and any additional heritage resources located during consequent development phases must be reported to the Heritage Resources Authority or an archaeological specialist.

5 ARCHAEO-HISTORICAL CONTEXT

5.1 The archaeology of Southern Africa

Archaeology in Southern Africa is typically divided into two main fields of study, the **Stone Age** and the **Iron Age** or **Farmer Period**. The following table provides a concise outline of the chronological sequence of periods, events, cultural groups and material expressions in Southern African pre-history and history.

Table 1 Chronological Periods across Southern Africa

Period	Epoch	Associated cultural groups	Typical Material Expressions
Early Stone Age 2.5m – 250 000 YCE	Pleistocene	Early Hominins: <i>Australopithecines</i> <i>Homo habilis</i> <i>Homo erectus</i>	Typically large stone tools such as hand axes, choppers and cleavers.
Middle Stone Age 250 000 – 25 000 YCE	Pleistocene	First <i>Homo sapiens</i> species	Typically smaller stone tools such as scrapers, blades and points.
Late Stone Age 20 000 BC – present	Pleistocene / Holocene	<i>Homo sapiens sapiens</i> including San people	Typically small to minute stone tools such as arrow heads, points and bladelets.
Early Iron Age / Early Farmer Period 300 – 900 AD (commonly restricted to the interior and north-east coastal areas of Southern Africa)	Holocene	First Bantu-speaking groups	Typically distinct ceramics, bead ware, iron objects, grinding stones.
Middle Iron Age (Mapungubwe / K2) / early Later Farmer Period 900 – 1350 AD (commonly restricted to the interior and north-east coastal areas of Southern Africa)	Holocene	Bantu-speaking groups, ancestors of present-day groups	Typically distinct ceramics, bead ware and iron / gold / copper objects, trade goods and grinding stones.
Late Iron Age / Later Farmer Period 1400 AD -1850 AD (commonly restricted to the interior and north-east coastal areas of Southern Africa)	Holocene	Various Bantu-speaking groups including Venda, Thonga, Sotho-Tswana and Zulu	Distinct ceramics, grinding stones, iron objects, trade objects, remains of iron smelting activities including iron smelting furnace, iron slag and residue as well as iron ore.
Historical / Colonial Period ±1850 AD – present	Holocene	Various Bantu-speaking groups as well as European farmers, settlers and explorers	Remains of historical structures e.g. homesteads, missionary schools etc. as well as, glass, porcelain, metal and ceramics.

5.2 The Mpumalanga and Piet-Retief Heritage Landscape: Specific Themes

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. This fertile landscape has provided resources for humans and their predecessors for more than 1,7million years. As such, the history of

Mpumalanga is reflected in a rich archaeological landscape. Sites, documenting Earlier, Middle and Later Stone Age habitation occur across the province, mostly in open air locales or in sediments alongside rivers or pans. In addition, a wealth of Later Stone Age rock art sites, most of which are in the form of rock engravings are to be found in the larger landscape. These sites occur on hilltops, slopes, rock outcrops and occasionally in river beds. Later, Bantu-speaking tribes moved into this area from the northern parts of Southern Africa and settled here. These were presumably Sotho-Tswana herder groups. Various historians and ethnographers describe that the Lowveld was frequented by Swazi and Sotho-Tswana groups during historic times i.e. Late Iron Age times during the period AD 1500-1800. Historical trade routes were well established before the period of Colonial expansion and these routes mainly existed as a direct consequence of metallurgy and mining for iron, tin, copper and some gold to make weapons, agricultural equipment and ornaments. During the nineteenth century the Lowveld area of Mpumalanga was extensively settled by both Bantu and European groups that migrated into this area.

5.2.1 Early History and the Stone Ages

According to archaeological research, the earliest ancestors of modern humans emerged some two to three million years ago. The remains of Australopithecine and *Homo habilis* have been found in dolomite caves and underground dwellings in the Bankeveld at places such as Sterkstroom and Swartkrans near Krugersdorp. *Homo habilis*, one of the Early Stone Age hominids, is associated with Oldowan artefacts, which include crude implements manufactured from large pebbles. The Acheulian industrial complex replaced the Oldowan industrial complex during the Early Stone Age. This phase of human existence was widely distributed across South Africa and is associated with *Homo erectus*, who manufactured hand axes and cleavers from as early as one and a half million years ago. Oldowan and Acheulian artefacts were also found four to five decades ago in some of the older gravels (ancient river beds and terraces) of the Vaal River and the Klip River in Vereeniging. The earliest ancestors of modern man may therefore have roamed the Vaal valley at the same time that their contemporaries occupied some of the dolomite caves near Krugersdorp. Middle Stone Age sites dating from as early as two hundred thousand years ago have been found all over South Africa. Middle Stone Age hunter-gatherer bands also lived and hunted in the Orange and Vaal River valleys. These people, who probably looked like modern humans, occupied campsites near water but also used caves as dwellings. They manufactured a wide range of stone tools, including blades and points that may have had long wooden sticks as hafts and were used as spears. The Late Stone Age commenced twenty thousand years ago or somewhat earlier. The various types of Later Stone Age industries scattered across the country are associated with the historical San and Khoi-Khoi people. The San were renowned as formidable hunter-gatherers, while the Khoi-Khoi herded cattle and small stock during the last two thousand years. Late Stone Age people manufactured tools that were small but highly effective, such as arrow heads and knives.

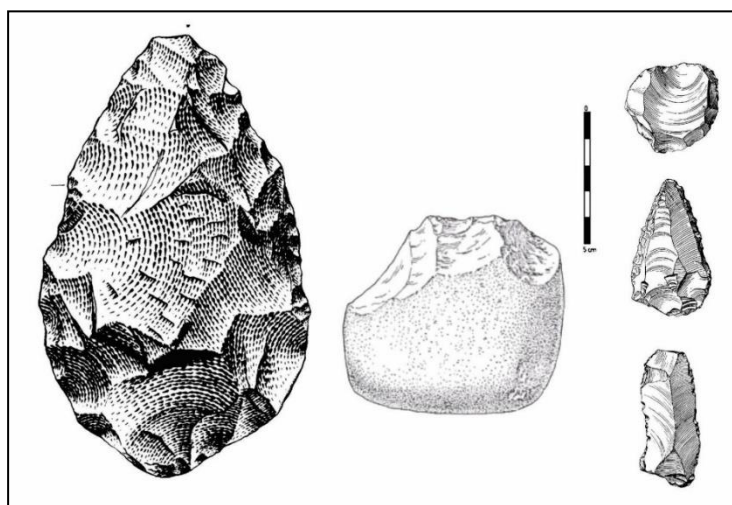


Figure 5-1: Typical ESA handaxe (left) and cleaver (center). To the right is a MSA scraper (right, top), point (right, middle) and blade (right, bottom).

In South Africa the Earlier Stone Age (ESA) dates from about 2 million to 250000 thousand years ago from the early to middle Pleistocene. An example in Mpumalanga is Maleoskop on the farm Rietkloof where ESA tools have been found. This is one of only a handful of known ESA sites in the Province. The Middle Stone Age (MSA) has not been extensively studied in Mpumalanga but evidence of this period has been excavated at Bushman Rock Shelter on the farm Klipfonteinhoek in the Ohrigstad district. No Earlier or Middle Stone Age sites are known to occur in the area of development, or close to Piet Retief (Bergh 1999).

5.2.2 The Later Stone Age and Rock Art

The Later Stone Age (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. Later Stone Age (LSA) sites occur both at the coast and inland as caves deposits, rock shelters, open sites and shell deposits. It appears that there is a gap of approximately 4000 years in the Mpumalanga LSA record between 9000 BP and 5000 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, 1999). 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 (Bergh, 1998). Nearby the sites, dated to between 4870 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). Some rock paintings are known to occur a few kilometres north of Piet Retief (Bergh 1999).

5.2.3 Iron Age / Farmer Period

The beginnings of the Iron Age (Farmer Period) in southern Africa are associated with the arrival of a new Bantu speaking population group at around the third century AD. These newcomers introduced a new way of life into areas that were occupied by Later Stone Age hunter-gatherers and Khoekhoe herders. Distinctive features of the Iron Age are a settled village life, food production (agriculture and animal husbandry), metallurgy (the mining, smelting and working of iron, copper and gold) and the manufacture of pottery. The period referred to as the Early Iron Age (AD 200-1500 approx.) was initiated with the arrival of presumably Karanga (north-east African) herder groups, who may have been the makers of the famous Lydenburg Heads. These artefacts from the Lydenburg area date to approximately 600AD. These people were Bantu herders and agriculturists and probably populated Southern Africa from areas north-east of the Limpopo River. Some archaeological research was done during the 1970's at sites belonging to the EIA (Early Iron Age), location Plaston, a settlement close to White River (Evers, 1977). Early Iron Age pottery was also excavated by Huffman during 1997 on location where the Riverside Government complex is currently situated (Huffman 1998). This site known as the Riverside site is situated a few kilometres north of Nelspruit next to the confluence of the Nelspruit and Crocodile River. During the early 1970's Evers conducted fieldwork and excavations in the Eastern Transvaal. Two areas were studied, 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. The later phases of the Iron Age (AD 1600-1800's) is represented by various tribes including Ndebele, Swazi, BaKoni and Pedi which is characterized by extensive stonewalled settlements found throughout the escarpment and particularly around Lydenburg, Badfontein, Sekhukuneland, Roosenekal and Steelpoort. The Swazi was particularly active in the Lowveld during the difaqane period (1820's) and it is well-known that they frequently attacked and ousted smaller herder groups like the Pai and Pulana, especially in the area today known as Low's Creek. They were however prevented from settling in the low-lying areas due to the presence of the tsetse fly and malaria. Small, isolated dry-packed stone-walled enclosures found near

Nelspruit and surrounding areas may be attributed to these smaller groups who hid away from the Swazi onslaught. The sites were probably not used for extended periods as they were frequently on the move as a result of the onslaught and therefore small, indistinct and with little associated cultural material. No significant Iron Age sites are known to occur directly around Piet Retief (Bergh 1999). However, it is possible that sites dating to the Mzonjani facies of the Urewe Tradition (AD450-750), and the Maguga facies of the Kalundu Tradition (AD1200-1450) could be found in the area (Huffman 2007).

5.2.4 Pastoralism and the last 2000 years

Until 2000 years ago, hunter-gatherer communities traded, exchanged goods, encountered and interacted with other hunter-gatherer communities. From about 2000 years ago the social dynamics of the Southern African landscape started changing with the immigration of two 'other' groups of people, different in physique, political, economic and social systems, beliefs and rituals. One of these groups, the Khoekhoe pastoralists or herders entered Southern Africa with domestic animals, namely fat-tailed sheep and goats, travelling through the south towards the coast. They also introduced thin-walled pottery common in the interior and along the coastal regions of Southern Africa. Their economic systems were directed by the accumulation of wealth in domestic stock numbers and their political make-up was more hierarchical than that of the hunter-gatherers.

5.2.5 Later History: Reorganization, Colonial Contact and living heritage.

The Historical period in Southern Africa encompass the course of Europe's discovery of South Africa and the spreading of European settlements along the East Coast and subsequently into the interior. In addition, the formation stages of this period are marked by the large scale movements of various Bantu-speaking groups in the interior of South Africa, which profoundly influenced the course of European settlement. Finally, the final retreat of the San and Khoekhoen groups into their present-day living areas also occurred in the Historical period in Southern Africa.

During the nineteenth century the Lowveld area of Mpumalanga was extensively settled by both Bantu and European groups that migrated into this area. Bantu migration was mainly as a result of political upheaval during the mfecane ("the crushing" in Nguni). This was a period of bloody tribal and faction struggles in present-day KwaZulu Natal and on the Highveld area, which occurred around the early 1820's until the late 1830's (Bergh, 1998). 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 this period, a movement of Swazi people took place to the areas north and northwest of Swaziland. As a result reports indicate that the Swazi were living in the Lowveld area by the 1840's (Bergh, 1998). The conflict during the mfecane, when the Swazi under Mswati II raided these smaller groups, resulted in scattered settlement of those who managed to escape the Swazi onslaught. Evidence of these scattered settlements are sometimes found in the form of small stone walled enclosures in and around Barberton, Nelspruit and onwards to the Schoemanskloof.

The Voortrekker Groot Trek or ("Great Trek") commenced with the Tregardt-van Rensburg trek in 1835. Permanent European (Voortrekker) settlement of the eastern areas of Mpumalanga can first 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 migrated into the area in 1845. 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 Bronkhortspruit

in the west to the Swazi border and the Lebombo mountains east.

The town of Piet Retief was proclaimed on 20 November 1882, on land obtained from a local Swazi chief on the farms Osloop and Geluk. The surveying of the erven however only started in 1884 (Bergh, 1999). The town was named after a Voortrekker Leader, Piet Retief (1780-1838) who was murdered by Dingane, the half-brother of Shaka, King of the Zulu nation. He was born in the Wagenmakersvallei (Wellington) in the Western Cape. He later became a activist for freedom of the Voortrekkers and led a group of them northwards during the Great Trek during 1837/38. Retief and his following left the Tugela region on 28 January 1838 to negotiate with Dingane for permanent boundaries in Natal for their settlement. The deed of cession of the Tugela Umzimvubu region was signed by Dingane on 6 February 1838 after which Dingane invited Retief and his party of around 100 people for the viewing of a special ceremony. They were taken to a hill known as kwaMatiwane where they were all executed. The first missionaries from Sweden erected a missionary in Piet Retief in 1905, today known as the Mission House. In the 19th century Piet Retief acted as a buffer between groups where constant infringements and hostilities occurred between Zulu and Swazi Impies. In addition, Boers groups were looking to extend their farming interests to the north and to the south. Finally, the British were looking to extend the Empire in all areas. During the Anglo -Zulu War of 1879 a number of historic events also took place in the area. The area known as the 'disputed territory' was the site of several skirmishes during the war. The most important incident was the Battle of Entombe Drift which took place at dawn on 12 March 1879. Although no battles or skirmishes took place in this area during the Anglo- Boer War (1899-1902), both Boer and German settlers were involved, with many of the women and children being interned in concentration camps in Volksrust. The men took part in action further south.

On 2 February 2010, South African Arts and Culture minister Lulu Xingwana approved a state decision for Piet Retief to be renamed to eMkhondo.

6 RESULTS: ARCHAEOLOGICAL SURVEY

6.1 The Off-Site Desktop Survey

In terms of heritage resources, the landscape around Piet Retief / eMkhondo is primarily well known for the occurrence of Iron Age Farmer and Colonial Period resources, primarily clustered in the vicinity of historical farms and settlements. However, the general landscape area has seen intensive timber-growing, agriculture development and industrialization over the past century where portions of pristine areas have been altered largely sterilizing the area of heritage remains. An analysis of historical aerial imagery and archive maps reveals the following (see Figure 6-1 to Figure 6-5):

- The farm Vroegeveld was proclaimed in 1881 according to the title deed.
- A topographic map dating to 1971 indicates afforestation across much of the project areas with a dam occurring at the site of the waste disposal site extension during that time. An old railway line is indicated on the map routing along the south-western periphery of the project area. "Compounds" and a sawmill are indicated on the map.
- A topographic map dating to 1985 indicates afforestation across the site demarcated for the cascading dams whereas slimes dams occur at the site of the waste disposal site extension during that time. An "Old Rail Route" is yet again indicated on the map routing along the south-western periphery of the project area. Industrial buildings are indicated on the map.
- A more recent topographic map dating to 2009 indicates agricultural fields and furrows across the site demarcated for the cascading dams whereas "slimes dams" occur at the site of the waste disposal site extension during that time. The "Old Rail Route" is yet again indicated on the map along the south-western periphery of the project area. Industrial buildings and a "Sawmill" are

indicated on the map.

- Apparent dense afforestation is legible across much of the project areas on a historical aerial image dating to 1955, with a dam occurring at the site of the waste disposal site extension during that time. The old railway line is visible along the south-western periphery of the project area on the image.
- Afforestation and crop fields are legible across the site demarcated for the cascading dams on a historical aerial image dating to 1977 whereas slimes dams occur at the site of the waste disposal site extension during that time. The old railway line is again visible along the south-western periphery of the project area on the image with the new railway line also noticeable. Industrial buildings can be seen across the project area at this time.
- In his "Preliminary Survey of Bantu Tribes of South Africa", Van Warmelo (1935) indicates that the project area was densely populated by Mxumalo, Sidwi, Yende, Vilakazi, Mbokazi and Dlamini groups during the first part of the 20th century. Some of the settlement of these groups in the area might represent plantation workers or farm workers resident on local farms.

6.2 The Archaeological Site Survey

The analysis of historical aerial imagery and archive maps above, of areas subject to this assessment suggests a landscape which has been subjected to timber-growing, afforestation, historical farming activities and industrialization possibly sterilizing the area of heritage remains. **This inference was confirmed during an archaeological site assessment during which no *in situ* archaeological or heritage remains were encountered.**

As noted in the previous section, an old regional railway line is visible on historical aerial photos and archive maps, routing along the south-western periphery of the study area. However, a site inspection could not locate any remains of the railway and it is assumed that the line was dismantled in past years.



Figure 6-1: The location of the old rail route (left) and the current railway line near the project area (right).



Figure 6-3: Historical aerial image dating to 1955 indicating the project locations (yellow outlines) within the historical landscape. Green arrows indicate afforestation, the blue arrow indicate a dam and the old railway line is indicated by orange arrows.



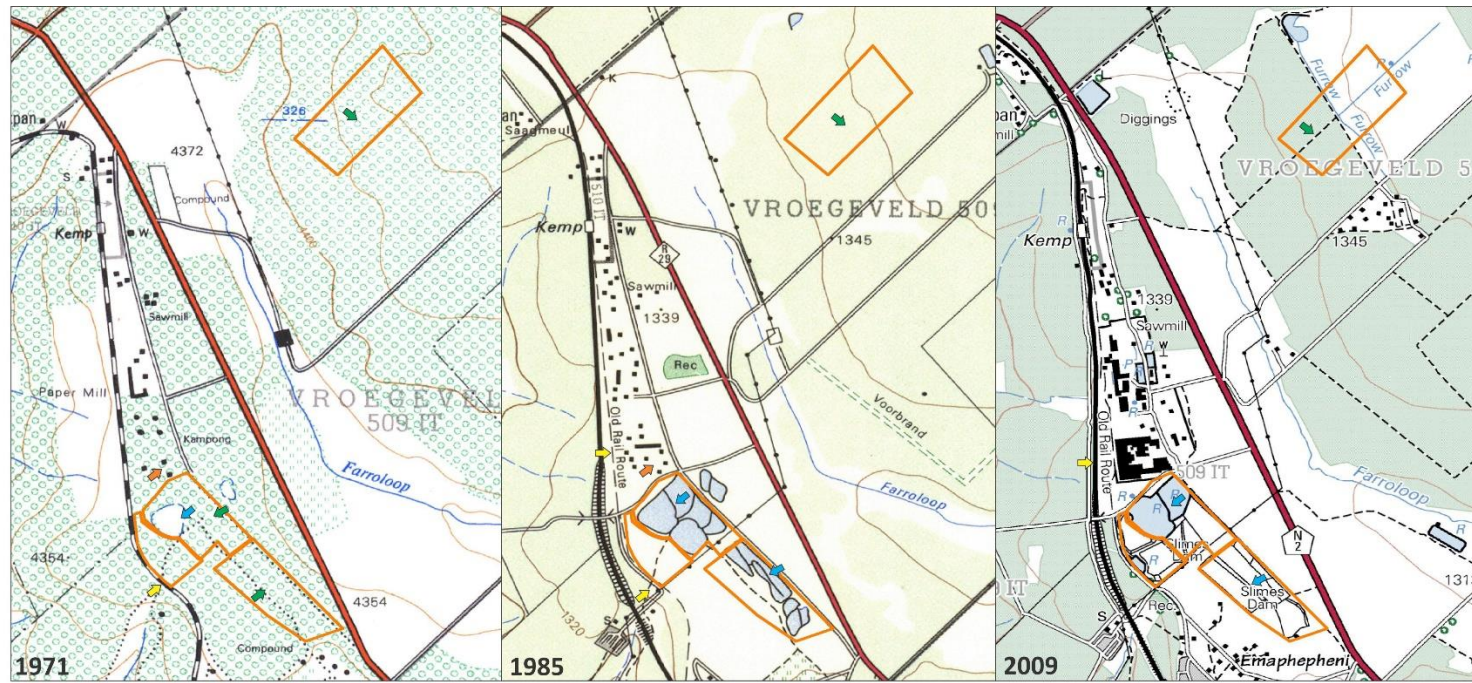
Figure 6-4: Historical aerial image dating to 1977 indicating the project locations (yellow outlines) within the historical landscape. Green arrows indicate afforestation, yellow arrows indicate crop fields, blue arrows indicate slimes dams and the old railway line is indicated by orange arrows.



Figure 6-5: Historical Great Britain War Office Map of the Transvaal dating to 1924 indicating the Piet Retief area.



Figure 6-6: An excerpt of Van Warmelo's Map of the project landscape dating to 1935. Each red dot represents "10 taxpayers". Note that the project area was densely populated by that the project area was densely populated by Mxumalo, Sidwi, Yende, Vilakazi, Mbokazi and Dlamini groups around Piet Retief at the time.



VERKLARING		REFERENCE		VERKLARING		REFERENCE		VERKLARING		REFERENCE	
Internasionale Grense.....	-----	International Boundaries	□	□	.....	Magnetic Stations and Ground Signs	Trig. Bakens (Nommer en grondhoogte)	△ / RE	.....	Trig. Beacons (Number and ground height)
Provisiale Grense.....	-----	Provincial Boundaries	▲	▲	.....	Hutte.....	□ 30	□	.....	Magnetic Stations and Ground Signs
Vetvoudige Spoorlyne.....	-----	Multiple Track Railways	▲	▲	.....	Monumente.....	■	■	.....	Monuments
Enkelspoorlyne.....	-----	Single Track Railways	▲	▲	.....	Dipbakke.....	■	■	.....	Dipping Tanks
Geëlektrifiseerde Spoorlyne.....	-----	Electrified Railways	▲	▲	.....	Windpompe.....	■	■	.....	Windmills
Smalspoorlyne.....	-----	Narrow Gauge Railways	▲	▲	.....	Mure.....	■	■	.....	Walls
Dienspoorlyne.....	-----	Service Railways	▲	▲	.....	Grondbewaringswalle.....	■	■	.....	Anti-erosion Walls
Nasionale Paai.....	-----	National Roads	▲	▲	.....	Uitgrawings.....	■	■	.....	Excavations
Hoofpaai.....	-----	Main Roads	▲	▲	.....	Standhoudende Water.....	■	■	.....	Perennial Water
Sekondêre Paai.....	-----	Secondary Roads	▲	▲	.....	Nie-standhoudende Water.....	■	■	.....	Non-perennial Water
Ander Paai.....	-----	Other Roads	▲	▲	.....	Droe Panne.....	■	■	.....	Dry Pans
Dowwe Paai en Voetpaai.....	-----	Tracks and Footpaths	▲	▲	.....	Fonteine, Watergate en Putte.....	■	■	.....	Fountains, Springs, Waterholes and Wells
Kraglyne.....	-----	Power Lines	▲	▲	.....	Moerasse en Vieie.....	■	■	.....	Marshes, Swamps and Vleis
Telefoon- en Telegraaflyne.....	-----	Telephone and Telegraph Lines	▲	▲	.....	Pyplyne.....	■	■	.....	Pipelines
Pos- en Telegraafkantore, Polisie-stasies en -poste, Winkels, Hotelle, Skole en Plekke van Aanbidding.....	-----	Post and Telegraph Offices, Police Stations and Posts, Stores, Hotels, Schools and Places of Worship	▲	▲	.....	Fotomiddel-punte.....	■	■	.....	Photo Centres
Vuurtorings en Seevaartligte.....	-----	Lighthouses and Marine Lights	▲	▲	.....	Uitstaande Klipbanke.....	■	■	.....	Prominent Rock Outcrops
Seevaartbakens (Nommer regs en hoogte onder)	-----	Marine Beacons	▲	▲	.....	Terrasse.....	■	■	.....	Terraces
	-----	Trig. Beacons (Number to right and height below)	▲	▲	.....	Bewerkte Lande.....	■	■	.....	Cultivated Lands
	-----		▲	▲	Boorde en Wingerde.....	■	■	.....	Orchards and Vineyards
	-----		▲	▲	Bome en Bos.....	■	■	.....	Trees and Bush

Figure 6-7: Historical topographic maps of the project areas (orange outlines) in the past decades. Green arrows indicate afforestation, blue arrows indicate dams / slimes dams, the old railway line is indicated by yellow arrows and industrial buildings and compounds are indicated by orange arrows.

7 STATEMENT OF SIGNIFICANCE AND IMPACT RATING

The following section provides a background to the identification and assessment of possible impacts and alternatives, as well as a range of risk situations and scenarios commonly associated with heritage resources management. A guideline for the rating of impacts and recommendation of management actions for areas of heritage potential within the study area is supplied in Section 10.2 of Addendum 3.

7.1 General assessment of impacts on resources¹

Generally, the value and significance of archaeological and other heritage sites might be impacted on by any activity that would result immediately or in the future in the destruction, damage, excavation, alteration, removal or collection from its original position, of any archaeological material or object (as indicated in the National Heritage Resources Act (No 25 of 1999)). Thus, the destructive impacts that are possible in terms of heritage resources would tend to be direct, once-off events occurring during the initial construction period. However, in the long run, the proximity of operations in any given area could result in secondary indirect impacts. The EIA process therefore specifies impact assessment criteria which can be utilised from the perspective of a heritage specialist study which elucidates the overall extent of impacts.

7.1.1 Direct, indirect and cumulative effects

Direct or primary effects on heritage resources occur at the same time and in the same space as the activity, e.g. loss of historical fabric through demolition work. **Indirect effects or secondary effects** on heritage resources occur later in time or at a different place from the causal activity, or as a result of a complex pathway, e.g. restriction of access to a heritage resource resulting in the gradual erosion of its significance, which is dependent on ritual patterns of access (refer to Section 10.3 in the Addendum for an outline of the relationship between the significance of a heritage context, the intensity of development and the significance of heritage impacts to be expected).

7.2 Direct Impact Rating Criteria

7.2.1 Extent

Local	extend only as far as the footprint of the proposed activity/development
Site	Impact extends beyond the site footprint to immediate surrounds
Regional	within which development takes place, i.e. farm, suburb, town, community
National	Impact is on a national level

7.2.2 Duration

Short term	The impact will disappear with through mitigation or through natural processes
Medium term	The impact will last up to the end of the phases, where after it will be negated
Long term	impact will persist indefinitely, possibly beyond the operational life of the activity, either because of natural processes or by human intervention
Permanent	Permanent where mitigation either by natural process or by human intervention will not occur in such a way or in such a time span that the impact can be considered transient

7.2.3 Magnitude severity

Low	where the impact affects the resource in such a way that its heritage value is not affected
Medium	where the affected resource is altered but its heritage value continues to exist albeit in a modified way
High	where heritage value is altered to the extent that it will temporarily or permanently be damaged or destroyed

7.2.4 Probability

Improbable	where the possibility of the impact to materialize is very low either because of design or historic experience;
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¹ Based on: Winter, S. & Baumann, N. 2005. *Guideline for involving heritage specialists in EIA processes: Edition 1.*

Probable	where there is a distinct possibility that the impact will occur
Highly	probable, where it is most likely that the impact will occur; or
Definite	where the impact will definitely occur regardless of any mitigation measures.

7.2.5 Impact Significance

Low	negligible effect on heritage – no effect on decision
Medium	where it would have a moderate effect on heritage and – influences the decision
High	high risk of, a big effect on heritage. Impacts of high significance should have a major influence on the decision
Very high	high risk of, an irreversible and possibly irreplaceable impact on heritage – central factor in decision-making

7.3 Weighting matrix

Aspect	Description	Weight
Extent		
	Local	1
	Site	2
	Regional	3
Duration		
	Short term	1
	Medium term	3
	Long term	4
	Permanent	5
Magnitude/Severity		
	Low	2
	Medium	6
	High	8
Probability		
	Improbable	1
	Probable	2
	Highly Probable	4
	Definite	5
Significance	Sum (Duration, Scale, Magnitude) x Probability	
Negligible	<20	
Low	<40	
Moderate	<60	
High	>60	

The following table summarizes impacts to the general heritage landscape of the project area:

Impact	Without or With Mitigation	Nature (Negative or Positive Impact)	Probability		Duration		Scale		Magnitude/Severity		Significance		Mitigation Measures	Mitigation Effect	Residual Impact
			Magnitude	Score	Magnitude	Score	Magnitude	Score	Magnitude	Score	Score	Magnitude			
Heritage Impact Assessment															
Planning Phase															
The Local Heritage Landscape	WOM	Negative	Improbable	1	Short term	1	Local	1	Low	2	4	Negligible	No mitigation.	N/A	No
	WM	Negative	Improbable	1	Short term	1	Local	1	Low	2	4	Negligible			No
Construction Phase															
The Local Heritage Landscape	WOM	Negative	Improbable	1	Short term	1	Site	2	Low	2	5	Negligible	No mitigation. General site monitoring by informed ECO.	N/A	No
	WM	Negative	Improbable	1	Short term	1	Site	2	Low	2	5	Negligible			No
Operational Phase															
The Local Heritage Landscape	WOM	Negative	Improbable	1	Long term	4	Site	2	Low	2	8	Negligible	No mitigation. General site monitoring by informed ECO.	N/A	No
	WM	Negative	Improbable	1	Long term	4	Site	2	Low	2	8	Negligible			No
Decommissioning / Rehabilitation Phase															
The Local Heritage Landscape	WOM	Negative	Improbable	1	Short term	1	Site	2	Low	2	5	Negligible	No mitigation. General site monitoring by informed ECO.	N/A	No
	WM	Negative	Improbable	1	Short term	1	Site	2	Low	2	5	Negligible			No

7.4 Evaluation of Impact: The Project

7.4.1 Archaeology

No archeological sites, features or artefacts were noted in the project area which has seen vast historical transformation and no impact on archeological resources is anticipated.

7.4.2 Built Environment

The study has not identified any buildings or structures which will be impacted by the proposed project. This is confirmed by an examination of aerial photographs of the area. In addition, a site inspection could not locate any remains of an old railway line indicated on historical maps. No impact on built environment sites is therefore anticipated. For the rest of the project area, the general landscape holds varied significance in terms of the built environment as the area comprises historical farming remnants and relatively newly established settlement areas.

7.4.3 Cultural Landscape

Generally, the proposed project area and its surrounds are characterized by timber plantations, rural farmlands and industrial areas. Further away from the project area, the landscape displays forested undulating hills with flatter plains in-between. This landscape stretches over many kilometres and the proposed project is unlikely to result in a significant impact on the or the landscape sense of place.

7.4.4 Graves / Human Burials Sites

No human burials were documented in the project area. In the rural areas of the Mpumalanga Province, graves and cemeteries often occur around farmsteads in family burial grounds but they are also randomly scattered around archaeological and historical settlements. The probability of informal human burials encountered during development should thus not be excluded. In addition, human remains and burials are commonly found close to archaeological sites; they may be found in "lost" graveyards, or occur sporadically anywhere as a result of prehistoric activity, victims of conflict or crime. It is often difficult to detect the presence of archaeological human remains on the landscape as these burials, in most cases, are not marked at the surface. Human remains are usually observed when they are exposed through erosion. In some instances packed stones or rocks may indicate the presence of informal pre-colonial burials. If any human bones are found during the course of construction work then they should be reported to an archaeologist and work in the immediate vicinity should cease until the appropriate actions have been carried out by the archaeologist. Where human remains are part of a burial they would need to be exhumed under a permit from either SAHRA (for pre-colonial burials as well as burials later than about AD 1500). Should any unmarked human burials/remains be found during the course of construction, work in the immediate vicinity should cease and the find must immediately be reported to the archaeologist, or the South African Heritage Resources Agency (SAHRA). Under no circumstances may burials be disturbed or removed until such time as necessary statutory procedures required for grave relocation have been met.

In summary, no sensitive heritage receptors were found in the project area and no potential impact to heritage resources is foreseen.

7.5 Management actions

Recommendations for relevant heritage resource management actions are vital to the conservation of heritage resources. The AIA did not identify heritage resources within of in close proximity to the proposed Mpac Piet Retief Waste License alignment and no direct or peripheral impacts are envisaged on heritage resources. Therefore, it is the opinion of this author that the Mpac Piet Retief Waste License Project may proceed from a culture resources management perspective on the condition that mitigation measures are implemented where

applicable, and provided that no subsurface heritage remains are encountered during construction. The following management measures should be considered during implementation of the proposed Mpac Piet Retief Waste License Project. A general guideline for recommended management actions is included in Section 10.4 of Addendum 3.

PROJECT COMPONENT/S	All phases of construction and operation.		
POTENTIAL IMPACT	Damage/destruction of sites.		
ACTIVITY RISK/SOURCE	Digging foundations and trenches into sensitive deposits that are not visible at the surface.		
MITIGATION: TARGET/OBJECTIVE	To locate previously undetected heritage remains / graves as soon as possible after disturbance so as to maximize the chances of successful rescue/mitigation work.		
MITIGATION: ACTION/CONTROL	RESPONSIBILITY	TIMEFRAME	
Fixed Mitigation Procedure (required)			
Site Monitoring: Regular examination of trenches and excavations.	ECO	Monitor	as frequently as practically possible.
PERFORMANCE INDICATOR	Archaeological sites are discovered and mitigated with the minimum amount of unnecessary disturbance.		
MONITORING	Successful location of sites by person/s monitoring.		

8 RECOMMENDATIONS

The larger landscape around the project area indicates a rich heritage horizon where Iron Age Farmer and Colonial Period resources are known to be ample, primarily clustered in the vicinity of old farmstead and settlements. Locally, the project area has seen transformation by timber-growing, afforestation, historical farming activities and industrialization potentially sterilizing surface and subsurface of heritage remains, especially those dating to pre-colonial and prehistorical times. Cognisance should nonetheless be taken of archaeological material that might be present in surface and sub-surface deposits along drainage lines and in pristine areas. The following recommendations are made based on general observations in the proposed Mpac Piet Retief Waste License Project area:

- An old regional railway line was noted to occur on historical aerial photos and archive maps, routing along the south-western periphery of the study area. However, a site inspection could not locate any remains of the railway and it is assumed that the line was dismantled in past years. It is recommended that all development activities in this area be closely monitored in order to avoid the potential destruction of previously undetected heritage remains pertaining to the railway line.
- It should be stated that it is likely that further undetected archaeological remains might occur elsewhere in the project area along water sources and drainage lines, fountains and pans would often have attracted human activity in the past. Burials and historically significant structures dating to the Colonial Period occur on farms in the area and these resources should be avoided during all phases of construction and development, including the operational phases of the development. Generally, the frequent monitoring of the development progress by an ECO or by the heritage specialist is recommended for all stages of the project. Should any subsurface palaeontological, archaeological or historical material, or burials be exposed during construction activities, all activities should be suspended and the archaeological specialist should be notified immediately.

9 GENERAL COMMENTS AND CONDITIONS

This AIA report serves to confirm the extent and significance of the heritage landscape of the proposed Mpac Piet Retief Waste License Project area. The larger heritage horizon encompasses rich and diverse archaeological landscapes and cognisance should be taken of heritage resources and archaeological material that might be present in surface and sub-surface deposits. If, during construction, any possible archaeological material culture discoveries are made, the operations must be stopped and a qualified archaeologist be contacted for an assessment of the find. Such material culture might include:

- Formal Earlier Stone Age stone tools.
- Formal MSA stone tools.
- Formal LSA stone tools.
- Potsherds
- Iron objects.
- Beads made from ostrich eggshell and glass.
- Ash middens and cattle dung deposits and accumulations.
- Faunal remains.
- Human remains/graves.
- Stone walling or any sub-surface structures.
- Historical glass, tin or ceramics.
- Fossils.

If such sites were to be encountered or impacted by any proposed developments, recommendations contained in this report, as well as endorsement of mitigation measures as set out by AMAFA, SAHRA, the National Resources Act and the CRM section of ASAPA will be required. It must be emphasised that the conclusions and recommendations expressed in this archaeological heritage sensitivity investigation are based on the visibility of archaeological sites/features and may not therefore, represent the area's complete archaeological legacy. Many sites/features may be covered by soil and vegetation and might only be located during sub-surface investigations. If subsurface archaeological deposits, artefacts or skeletal material were to be recovered in the area during construction activities, all activities should be suspended and the archaeological specialist should be notified immediately (**cf. NHRA (Act No. 25 of 1999)**, Section 36 (6)). It must also be clear that Archaeological Specialist Reports will be assessed by the relevant heritage resources authority (SAHRA).

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Great Britain War Office Map of the Transvaal 1924.

11 ADDENDUM 1: HERITAGE LEGISLATION BACKGROUND

11.1 CRM: Legislation, Conservation and Heritage Management

The broad generic term Cultural Heritage Resources refers to any physical and spiritual property associated with past and present human use or occupation of the environment, cultural activities and history. The term includes sites, structures, places, natural features and material of palaeontological, archaeological, historical, aesthetic, scientific, architectural, religious, symbolic or traditional importance to specific individuals or groups, traditional systems of cultural practice, belief or social interaction.

11.1.1 Legislation regarding archaeology and heritage sites

The South African Heritage Resources Agency (SAHRA) and their provincial offices aim to conserve and control the management, research, alteration and destruction of cultural resources of South Africa. It is therefore vitally important to adhere to heritage resource legislation at all times.

a. National Heritage Resources Act No 25 of 1999, section 35

According to the National Heritage Resources Act of 1999 a historical site is any identifiable building or part thereof, marker, milestone, gravestone, landmark or tell older than 60 years. This clause is commonly known as the "60-years clause". Buildings are amongst the most enduring features of human occupation, and this definition therefore includes all buildings older than 60 years, modern architecture as well as ruins, fortifications and Iron Age settlements. "Tell" refers to the evidence of human existence which is no longer above ground level, such as building foundations and buried remains of settlements (including artefacts).

The Act identifies heritage objects as:

- objects recovered from the soil or waters of South Africa including archaeological and palaeontological objects, meteorites and rare geological specimens
- visual art objects
- military objects
- numismatic objects
- objects of cultural and historical significance
- objects to which oral traditions are attached and which are associated with living heritage
- objects of scientific or technological interest
- any other prescribed category

With regards to activities and work on archaeological and heritage sites this Act states that:

"No person may alter or demolish any structure or part of a structure which is older than 60 years without a permit by the relevant provincial heritage resources authority." (34. [1] 1999:58)

and

"No person may, without a permit issued by the responsible heritage resources authority-

- (d) destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or palaeontological site or any meteorite;*
- (e) destroy, damage, excavate, remove from its original position, collect or own any archaeological or palaeontological material or object or any meteorite;*
- (f) trade in, sell for private gain, export or attempt to export from the Republic any category of archaeological or palaeontological material or object, or any meteorite; or*

- (g) *bring onto or use at an archaeological or palaeontological site any excavation equipment or any equipment which assist in the detection or recovery of metals or archaeological and palaeontological material or objects, or use such equipment for the recovery of meteorites. (35. [4] 1999:58)."*

and

"No person may, without a permit issued by SAHRA or a provincial heritage resources agency-

- (h) *destroy, damage, alter, exhume or remove from its original position or otherwise disturb the grave of a victim of conflict, or any burial ground or part thereof which contains such graves;*
- (i) *destroy, damage, alter, exhume, remove from its original position or otherwise disturb any grave or burial ground older than 60 years which is situated outside a formal cemetery administered by a local authority;*
- (j) *bring onto or use at a burial ground or grave referred to in paragraph (a) or (b) and excavation equipment, or any equipment which assists in the detection or recovery of metals (36. [3] 1999:60)."*

b. Human Tissue Act of 1983 and Ordinance on the Removal of Graves and Dead Bodies of 1925

Graves 60 years or older are heritage resources and fall under the jurisdiction of both the National Heritage Resources Act and the Human Tissues Act of 1983. However, graves younger than 60 years are specifically protected by the Human Tissues Act (Act 65 of 1983) and the Ordinance on the Removal of Graves and Dead Bodies (Ordinance 7 of 1925) as well as any local and regional provisions, laws and by-laws. Such burial places also fall under the jurisdiction of the National Department of Health and the Provincial Health Departments. Approval for the exhumation and re-burial must be obtained from the relevant Provincial MEC as well as the relevant Local Authorities.

11.1.2 Background to HIA and AIA Studies

South Africa's unique and non-renewable archaeological and palaeontological heritage sites are 'generally' protected in terms of the National Heritage Resources Act (Act No 25 of 1999, section 35) and may not be disturbed at all without a permit from the relevant heritage resources authority. Heritage sites are frequently threatened by development projects and both the environmental and heritage legislation require impact assessments (HIAs & AIAs) that identify all heritage resources in areas to be developed. Particularly, these assessments are required to make recommendations for protection or mitigation of the impact of the sites. HIAs and AIAs should be done by qualified professionals with adequate knowledge to (a) identify all heritage resources including archaeological and palaeontological sites that might occur in areas of developed and (b) make recommendations for protection or mitigation of the impact on the sites.

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

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

- (a) *the construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;*
- (b) *the construction of a bridge or similar structure exceeding 50m in length;*
- (c) *any development or other activity which will change the character of a site:*

- (i) exceeding 5 000 m² in extent; or*
- (ii) involving three or more existing erven or subdivisions thereof; or*
- (iii) involving three or more erven or divisions thereof which have been consolidated within the past five years; or*
- (iv) the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority;*
- (d) the re-zoning of a site exceeding 10 000 m² in extent; or*
- (e) any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority,*

must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development.”

And:

“The responsible heritage resources authority must specify the information to be provided in a report required in terms of subsection (2)(a): Provided that the following must be included:

- (k) The identification and mapping of all heritage resources in the area affected;*
- (l) an assessment of the significance of such resources in terms of the heritage assessment criteria set out in section 6(2) or prescribed under section 7;*
- (m) an assessment of the impact of the development on such heritage resources;*
- (n) an evaluation of the impact of the development on heritage resources relative to the sustainable social and economic benefits to be derived from the development;*
- (o) the results of consultation with communities affected by the proposed development and other interested parties regarding the impact of the development on heritage resources;*
- (p) if heritage resources will be adversely affected by the proposed development, the consideration of alternatives; and*
- (q) plans for mitigation of any adverse effects during and after the completion of the proposed development (38. [3] 1999:64).”*

Consequently, section 35 of the Act requires Heritage Impact Assessments (HIAs) or Archaeological Impact Assessments (AIAs) to be done for such developments in order for all heritage resources, that is, all places or objects of aesthetics, architectural, historic, scientific, social, spiritual, linguistic or technological value or significance to be protected. Thus any assessment should make provision for the protection of all these heritage components, including archaeology, shipwrecks, battlefields, graves, and structures older than 60 years, living heritage, historical settlements, landscapes, geological sites, palaeontological sites and objects. Heritage resources management and conservation.

11.2 Assessing the Significance of Heritage Resources

Archaeological sites, as previously defined in the National Heritage Resources Act (Act 25 of 1999) are places in the landscape where people have lived in the past – generally more than 60 years ago – and have left traces of their presence behind. In South Africa, archaeological sites include hominid fossil sites, places where people

of the Earlier, Middle and Later Stone Age lived in open sites, river gravels, rock shelters and caves, Iron Age sites, graves, and a variety of historical sites and structures in rural areas, towns and cities. Palaeontological sites are those with fossil remains of plants and animals where people were not involved in the accumulation of the deposits. The basic principle of cultural heritage conservation is that archaeological and other heritage sites are valuable, scarce and *non-renewable*. Many such sites are unfortunately lost on a daily basis through development for housing, roads and infrastructure and once archaeological sites are damaged, they cannot be re-created as site integrity and authenticity is permanently lost. Archaeological sites have the potential to contribute to our understanding of the history of the region and of our country and continent. By preserving links with our past, we may not be able to revive lost cultural traditions, but it enables us to appreciate the role they have played in the history of our country.

- Categories of significance

Rating the significance of archaeological sites, and consequently grading the potential impact on the resources is linked to the significance of the site itself. The significance of an archaeological site is based on the amount of deposit, the integrity of the context, the kind of deposit and the potential to help answer present research questions. Historical structures are defined by Section 34 of the National Heritage Resources Act, 1999, while other historical and cultural significant sites, places and features, are generally determined by community preferences. The guidelines as provided by the NHRA (Act No. 25 of 1999) in Section 3, with special reference to subsection 3 are used when determining the cultural significance or other special value of archaeological or historical sites. In addition, ICOMOS (the Australian Committee of the International Council on Monuments and Sites) highlights four cultural attributes, which are valuable to any given culture:

- Aesthetic value:

Aesthetic value includes aspects of sensory perception for which criteria can and should be stated. Such criteria include consideration of the form, scale, colour, texture and material of the fabric, the general atmosphere associated with the place and its uses and also the aesthetic values commonly assessed in the analysis of landscapes and townscape.

- Historic value:

Historic value encompasses the history of aesthetics, science and society and therefore to a large extent underlies all of the attributes discussed here. Usually a place has historical value because of some kind of influence by an event, person, phase or activity.

- Scientific value:

The scientific or research value of a place will depend upon the importance of the data involved, on its rarity, quality and on the degree to which the place may contribute further substantial information.

- Social value:

Social value includes the qualities for which a place has become a focus of spiritual, political, national or other cultural sentiment to a certain group.

It is important for heritage specialist input in the EIA process to take into account the heritage management structure set up by the NHR Act. It makes provision for a 3-tier system of management including the South Africa Heritage Resources Agency (SAHRA) at a national level, Provincial Heritage Resources Authorities (PHRAs) at a provincial and the local authority. The Act makes provision for two types or forms of protection of heritage resources; i.e. formally protected and generally protected sites:

Formally protected sites:

- Grade 1 or national heritage sites, which are managed by SAHRA
- Grade 2 or provincial heritage sites, which are managed by the provincial HRA (MP-PHRA).
- Grade 3 or local heritage sites.

Generally protected sites:

- Human burials older than 60 years.
- Archaeological and palaeontological sites.
- Shipwrecks and associated remains older than 60 years.
- Structures older than 60 years.

With reference to the evaluation of sites, the certainty of prediction is definite, unless stated otherwise and if the significance of the site is rated high, the significance of the impact will also result in a high rating. The same rule applies if the significance rating of the site is low. The significance of archaeological sites is generally ranked into the following categories.

Significance	Rating Action
No significance: sites that do not require mitigation.	None
Low significance: sites, which may require mitigation.	2a. Recording and documentation (Phase 1) of site; no further action required 2b. Controlled sampling (shovel test pits, auguring), mapping and documentation (Phase 2 investigation); permit required for sampling and destruction
Medium significance: sites, which require mitigation.	3. Excavation of representative sample, C14 dating, mapping and documentation (Phase 2 investigation); permit required for sampling and destruction [including 2a & 2b]
High significance: sites, where disturbance should be avoided.	4a. Nomination for listing on Heritage Register (National, Provincial or Local) (Phase 2 & 3 investigation); site management plan; permit required if utilised for education or tourism
High significance: Graves and burial places	4b. Locate demonstrable descendants through social consulting; obtain permits from applicable legislation, ordinances and regional by-laws; exhumation and reinterment [including 2a, 2b & 3]

Furthermore, the significance of archaeological sites was based on six main criteria:

- Site integrity (i.e. primary vs. secondary context),
- Amount of deposit, range of features (e.g., stonewalling, stone tools and enclosures),
- Density of scatter (dispersed scatter),
- Social value,
- Uniqueness, and
- Potential to answer current and future research questions.

12 ADDENDUM 2: CONVENTIONS USED TO ASSESS THE SIGNIFICANCE OF HERITAGE

12.1 Site Significance Matrix

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

2. SITE EVALUATION			
2.1 Heritage Value (NHRA, section 2 [3])	High	Medium	Low
It has importance to the community or pattern of South Africa's history or pre-colonial history.			
It possesses unique, uncommon, rare or endangered aspects of South Africa's natural or cultural heritage.			
It has potential to yield information that will contribute to an understanding of South Africa's natural and cultural heritage.			
It is of importance in demonstrating the principle characteristics of a particular class of South Africa's natural or cultural places or objects.			
It has importance in exhibiting particular aesthetic characteristics valued by a particular community or cultural group.			
It has importance in demonstrating a high degree of creative or technical achievement at a particular period.			
It has marked or special association with a particular community or cultural group for social, cultural or spiritual reasons (sense of place).			
It has strong or special association with the life or work of a person, group or organisation of importance in the history of South Africa.			
It has significance through contributing towards the promotion of a local sociocultural identity and can be developed as a tourist destination.			
It has significance relating to the history of slavery in South Africa.			
It has importance to the wider understanding of temporal changes within cultural landscapes, settlement patterns and human occupation.			
2.2 Field Register Rating			
National/Grade 1 [should be registered, retained]			
Provincial/Grade 2 [should be registered, retained]			
Local/Grade 3A [should be registered, mitigation not advised]			
Local/Grade 3B [High significance; mitigation, partly retained]			
Generally Protected A [High/Medium significance, mitigation]			
Generally protected B [Medium significance, to be recorded]			
Generally Protected C [Low significance, no further action]			
2.3 Sphere of Significance	High	Medium	Low
International			
National			
Provincial			
Local			
Specific community			

12.2 Impact Assessment Criteria

The following table provides a guideline for the rating of impacts and recommendation of management actions for sites of heritage potential.

Significance of the heritage resource

This is a statement of the nature and degree of significance of the heritage resource being affected by the activity. From a heritage management perspective, it is useful to distinguish between whether the significance is embedded in the physical fabric or in associations with events or persons or in the experience of a place; i.e. its visual and non-visual qualities. This statement is a primary informant to the nature and degree of significance of an impact and thus needs to be thoroughly considered. Consideration needs to be given to the significance of a heritage resource at different scales (i.e. site-specific, local, regional, national or international) and the relationship between the heritage resource, its setting and its associations.

Nature of the impact

This is an assessment of the nature of the impact of the activity on a heritage resource, with some indication of its positive and/or negative effect/s. It is strongly informed by the statement of resource significance. In other words, the nature of the impact may be historical, aesthetic, social, scientific, linguistic or architectural, intrinsic, associational or contextual (visual or non-visual). In many cases, the nature of the impact will include more than one value.

Extent

Here it should be indicated whether the impact will be experienced:

- On a site scale, i.e. extend only as far as the activity;
- Within the immediate context of a heritage resource;
- On a local scale, e.g. town or suburb
- On a metropolitan or regional scale; or
- On a national/international scale.

Duration

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

- Short term, (needs to be defined in context)
- Medium term, (needs to be defined in context)
- Long term where the impact will persist indefinitely, possibly beyond the operational life of the activity, either because of natural processes or
by human intervention; or
- Permanent where mitigation either by natural process or by human intervention will not occur in such a way or in such a time span that the
impact can be considered transient.

Of relevance to the duration of an impact are the following considerations:

- Reversibility of the impact; and
- Renewability of the heritage resource.

Intensity

Here it should be established whether the impact should be indicated as:

- Low, where the impact affects the resource in such a way that its heritage value is not affected;
- Medium, where the affected resource is altered but its heritage value continues to exist albeit in a modified way; and
- High, where heritage value is altered to the extent that it will temporarily or permanently be damaged or destroyed.

Probability

This should describe the likelihood of the impact actually occurring indicated as:

- Improbable, where the possibility of the impact to materialize is very low either because of design or historic experience;
- Probable, where there is a distinct possibility that the impact will occur;
- Highly probable, where it is most likely that the impact will occur; or
- Definite, where the impact will definitely occur regardless of any mitigation measures

Confidence

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

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

Impact Significance

The significance of impacts can be determined through a synthesis of the aspects produced in terms of the nature and degree of heritage significance and the nature, duration, intensity, extent, probability and confidence of impacts and can be described as:

- Low; where it would have a negligible effect on heritage and on the decision
- Medium, where it would have a moderate effect on heritage and should influence the decision.
- High, where it would have, or there would be a high risk of, a big effect on heritage. Impacts of high significance should have a major

major

influence on the decision;

- Very high, where it would have, or there would be high risk of, an irreversible and possibly irreplaceable negative impact on heritage. Impacts

of very high significance should be a central factor in decision-making.

12.3 Direct Impact Assessment Criteria

The following table provides an outline of the relationship between the significance of a heritage context, the intensity of development and the significance of heritage impacts to be expected

HERITAGE CONTEXT	TYPE OF DEVELOPMENT			
	CATEGORY A	CATEGORY B	CATEGORY C	CATEGORY D
CONTEXT 1 High heritage Value	Moderate heritage impact expected	High heritage impact expected	Very high heritage impact expected	Very high heritage impact expected
CONTEXT 2 Medium to high heritage value	Minimal heritage impact expected	Moderate heritage impact expected	High heritage impact expected	Very high heritage impact expected
CONTEXT 3 Medium to low heritage value	Little or no heritage impact expected	Minimal heritage impact expected	Moderate heritage impact expected	High heritage impact expected
CONTEXT 4 Low to no heritage value	Little or no heritage impact expected	Little or no heritage impact expected	Minimal heritage value expected	Moderate heritage impact expected

NOTE: A DEFAULT "LITTLE OR NO HERITAGE IMPACT EXPECTED" VALUE APPLIES WHERE A HERITAGE RESOURCE OCCURS OUTSIDE THE IMPACT ZONE OF THE DEVELOPMENT.

HERITAGE CONTEXTS	CATEGORIES OF DEVELOPMENT
<p>Context 1: Of high intrinsic, associational and contextual heritage value within a national, provincial and local context, i.e. formally declared or potential Grade 1, 2 or 3A heritage resources</p> <p>Context 2: Of moderate to high intrinsic, associational and contextual value within a local context, i.e. potential Grade 3B heritage resources.</p> <p>Context 3: Of medium to low intrinsic, associational or contextual heritage value within a national, provincial and local context, i.e. potential Grade 3C heritage resources</p> <p>Context 4: Of little or no intrinsic, associational or contextual heritage value due to disturbed, degraded conditions or extent of irreversible damage.</p>	<p>Category A: Minimal intensity development</p> <ul style="list-style-type: none"> - No rezoning involved; within existing use rights. - No subdivision involved. - Upgrading of existing infrastructure within existing envelopes - Minor internal changes to existing structures - New building footprints limited to less than 1000m2. <p>Category B: Low-key intensity development</p> <ul style="list-style-type: none"> - Spot rezoning with no change to overall zoning of a site. - Linear development less than 100m - Building footprints between 1000m2-2000m2 - Minor changes to external envelop of existing structures (less than 25%) - Minor changes in relation to bulk and height of immediately adjacent structures (less than 25%). <p>Category C: Moderate intensity development</p> <ul style="list-style-type: none"> - Rezoning of a site between 5000m2-10 000m2. - Linear development between 100m and 300m. - Building footprints between 2000m2 and 5000m2 - Substantial changes to external envelop of existing structures (more than 50%) - Substantial increase in bulk and height in relation to immediately adjacent buildings (more than 50%) <p>Category D: High intensity development</p> <ul style="list-style-type: none"> - Rezoning of a site in excess of 10 000m2

	<ul style="list-style-type: none"> - Linear development in excess of 300m. - Any development changing the character of a site exceeding 5000m² or involving the subdivision of a site into three or more erven. - Substantial increase in bulk and height in relation to immediately adjacent buildings (more than 100%)
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12.4 Management and Mitigation Actions

The following table provides a guideline of relevant heritage resources management actions is vital to the conservation of heritage resources.

<p>No further action / Monitoring</p> <p>Where no heritage resources have been documented, heritage resources occur well outside the impact zone of any development or the primary context of the surroundings at a development footprint has been largely destroyed or altered, no further immediate action is required. Site monitoring during development, by an ECO or the heritage specialist are often added to this recommendation in order to ensure that no undetected heritage\ remains are destroyed.</p> <p>Avoidance</p> <p>This is appropriate where any type of development occurs within a formally protected or significant or sensitive heritage context and is likely to have a high negative impact. Mitigation is not acceptable or not possible. This measure often includes the change / alteration of development planning and therefore impact zones in order not to impact on resources.</p> <p>Mitigation</p> <p>This is appropriate where development occurs in a context of heritage significance and where the impact is such that it can be mitigated to a degree of medium to low significance, e.g. the high to medium impact of a development on an archaeological site could be mitigated through sampling/excavation of the remains. Not all negative impacts can be mitigated.</p> <p>Compensation</p> <p>Compensation is generally not an appropriate heritage management action. The main function of management actions should be to conserve the resource for the benefit of future generations. Once lost it cannot be renewed. The circumstances around the potential public or heritage benefits would need to be exceptional to warrant this type of action, especially in the case of where the impact was high.</p> <p>Rehabilitation</p> <p>Rehabilitation is considered in heritage management terms as a intervention typically involving the adding of a new heritage layer to enable a new sustainable use. It is not appropriate when the process necessitates the removal of previous historical layers, i.e. restoration of a building or place to the previous state/period. It is an appropriate heritage management action in the following cases:</p> <ul style="list-style-type: none"> - The heritage resource is degraded or in the process of degradation and would benefit from rehabilitation. - Where rehabilitation implies appropriate conservation interventions, i.e. adaptive reuse, repair and maintenance, consolidation and minimal loss of historical fabric. - Where the rehabilitation process will not result in a negative impact on the intrinsic value of the resource
