

HERITAGE IMPACT ASSESSMENT REPORT:
PROPOSED STONE MINING AND
CRUSHERS ON PORTION 15 OF
RIETSPRUIT 437 IS,
ERMELO,
MPUMALANGA PROVINCE

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Prepared for: **MSOBO CRUSHERS (CLIENT)**

Date: 14 September 2020

DECLARATION

I, **Alexander Antonites**, declare that:

- I am conducting all work and activities relating to the proposed construction of a crushers and mining area on Portion 15 of Rietspruit 437 IS, 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 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;
- All the particulars furnished by me in this declaration are true and correct.



Signature of specialist
September 2020

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ABBREVIATIONS AND ACRONYMS

Abbreviation/Acronym	Description
ASAPA	Association for South African Professional Archaeologists
AIA	Archaeological Impact Assessment
BP	Before Present
BCE	Before Common Era
BGG	Burial Grounds and Graves
CSF	Correctional Services Facility
CRM	Culture Resources Management
DPW	Department of Public Works
DWS	Department of Water and Sanitation
ECO	Environmental Control Officer
EIA	Early Iron Age (also Early Farmer Period)
EIA	Environmental Impact Assessment
EFP	Early Farmer Period (also Early Iron Age)
ESA	Earlier Stone Age
GDS	Green Drop System
GIS	Geographic Information Systems
HIA	Heritage Impact Assessment
ICOMOS	International Council on Monuments and Sites
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)
MSA	Middle Stone Age
NHRA	National Heritage Resources Act No.25 of 1999, Section 35
PFS	Pre-Feasibility Study
PHRA	Provincial Heritage Resources Authority
SAHRA	South African Heritage Resources Association
YCE	Years before Common Era (Present)

EXECUTIVE SUMMARY

This report is the result of a Heritage Impact Assessment (HIA) conducted by Alexander Antonites for construction stone mining permit and mining rights application on Portion 15 of the farm Rietspruit 437 IS, Ermelo, Mpumalanga Province.

The project area is approximately 5km south west of the town Ermelo. The R39 road runs directly west of the project area. A single site visit was conducted on 28 August 2020.

Project Title	Proposed Stone Mining and Crushers on Portion 15 of Rietspruit 437 IS
Project Location:	S26.566289° / E29.933877° ; Portion 15 of Rietspruit 437 IS
1:50 000 Map Sheet	2629DB Ermelo
Farm Portion / Parcel	Portion 15 of Rietspruit 437 IS
Magisterial District / Municipal Area	Msukaligwa Municipality
Province	Mpumalanga Province

The larger landscape is a sensitive heritage zone and contains several Late Iron Age stone walled sites as well as buildings and locations of historical significance. As a result, a heritage assessment of the project area was conducted to identify any sensitive heritage sites/areas and to mitigate against future impacts on the heritage landscape.

The study revealed that the parts of the project area had previously been severely impacted by earthmoving, quarrying and agriculture. An isolated informal burial ground (UP-RTS-2629-01), approximately 25m outside the project area and on an adjacent property (portion 14 of Rietspruit 437 IS) was identified. The burial ground is likely still in use as attested by fresh soil on a recent unmarked burial. The graveyard was fenced off at one stage, but the fence lines are currently missing with only the fence poles left standing. Although it falls outside the project area, a 50m conservation buffer around the graves extending into the project areas must be implemented. In addition, all activities in this area must be monitored and to avoid impact of the burial ground.

Monitoring of the development progress by an ECO is recommended during the planning and construction phases 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.

HERITAGE SITE LOCATIONS

Table 1: Summary of Heritage sites

Site Code	Coordinates	Short Description	Mitigation Action
UP-RTS-2629-01	S26.572555° E29.931190°	Burial ground	Conservation buffer of 50m around burial ground; Fence erected and access control implemented. Monitor activities in general vicinity.

A copy of the report will be supplied to the Gauteng Provincial Heritage Resources Authority (Gauteng-PHRA) and recommendations contained in this document will be reviewed.

Heritage Impact Assessment Report: Proposed Stone Mining And Crushers On Portion 15 Of Rietspruit 437 Is, Ermelo, Mpumalanga Province

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1 PROJECT BACKGROUND

Msobo Crushers appointed Alexander Antonites to undertake a heritage assessment on Portion 15 of Rietspruit 437 IS. The proposed development is for a and mining licence application (85ha) which includes an area under mining permit (5ha). The project area located southwest of Ermelo, south of the R39 (Morgenzon Road).

The size of the area under consideration (85ha) necessitates a heritage impact assessment (HIA) in terms of section 38(1) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA). A heritage assessment of the entire extent of the project area (85ha) was conducted to identify sensitive heritage areas and to mitigate against future impacts on the heritage landscape.

Table 2: The affected properties and details of the property owners

Farm Name	Portion Number	21-SG Code	Property Owner
Rietspruit 437 IS	15	T0IS00000000043700000	N/A

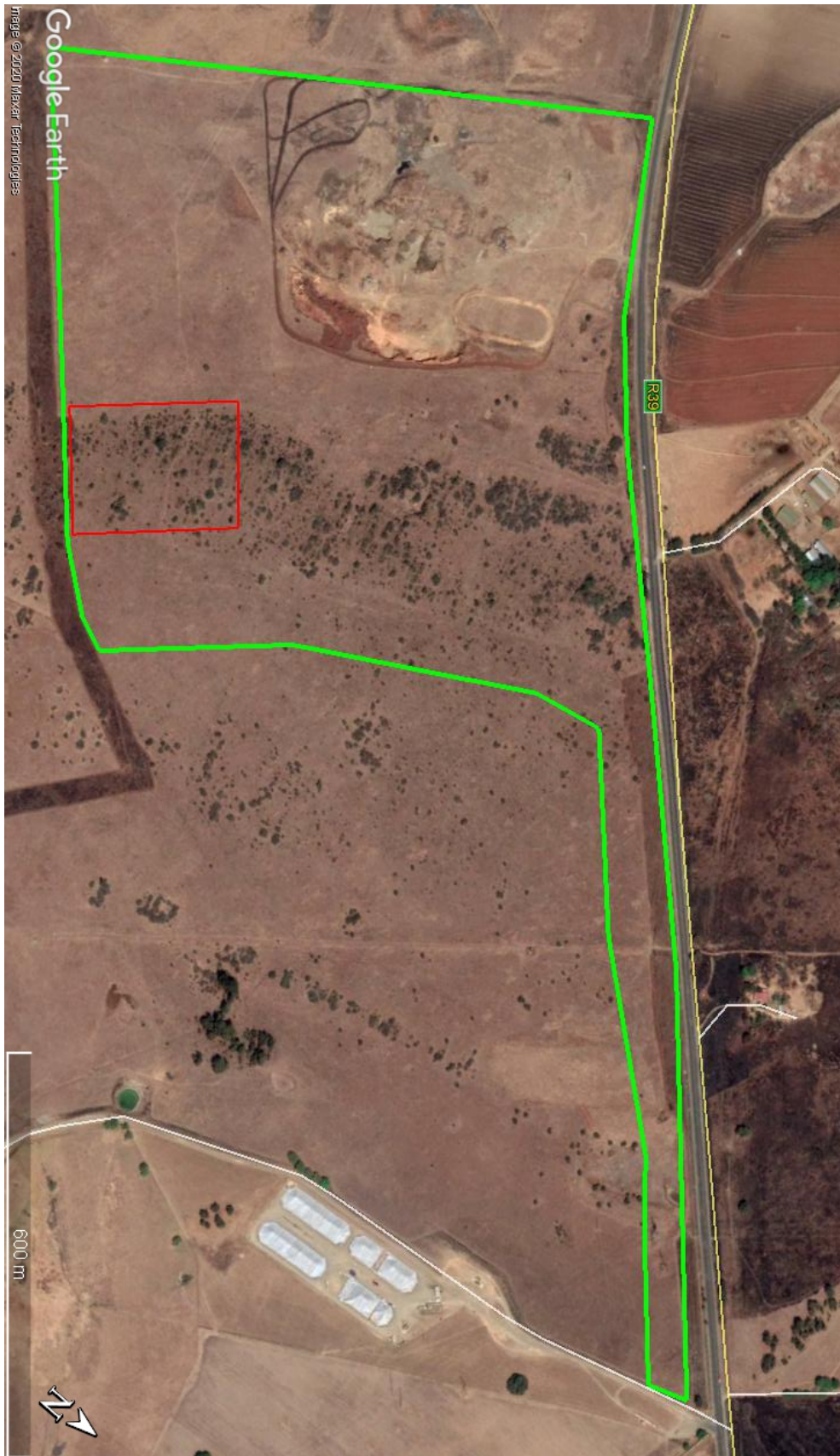


Figure 2: Project Area – Mining rights application in green (85ha); Extant mining permit in red (5ha) on Google Earth imagery dated to 2019.

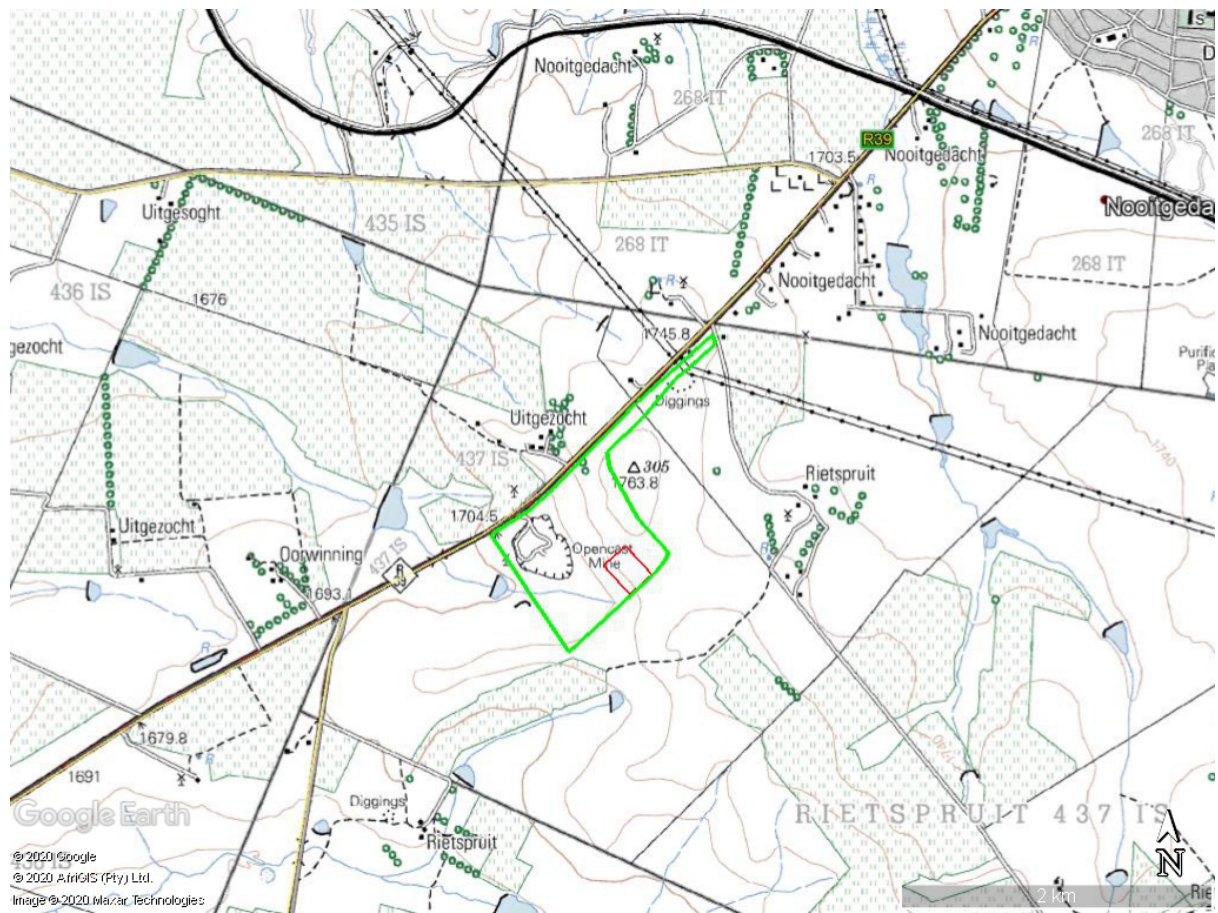


Figure 3: Project alignment indicated on 1:50000 map (2629DB Ermelo, 2009).

2 TERMS OF REFERENCE

The heritage component of the EIA is set out in the National Environmental Management Act (Act 107 of 1998) and section 38 of the National Heritage Resources Act (NHRA; Act 25 of 1999).

The NHRA protects all structures and features older than 60 years, archaeological sites and material and graves as well as burial sites. This legislation ensures that developers implement measures to limit the potentially negative effects that the development could have on heritage resources.

Legislation determines defines the terms of reference for heritage specialists as the following:

- To provide a detailed description of all archaeological artefacts, structures (including graves) and settlements that 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, which may emanate from the proposed development activities.
- Propose possible heritage management measures if such action is necessitated by the development.
- Liaise and consult with the South African Heritage Resources Agency (SAHRA and/or PHRA)

2.1 HERITAGE LEGISLATION, CONSERVATION AND MANAGEMENT

Heritage Resources are any physical and spiritual property associated with past and present human use or occupation of the environment, cultural activities, and history. It 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 *Heritage Bodies*

The South African Heritage Resources Agency (SAHRA) is an agency within the Department of Sport, Arts and Culture tasked with an overall legislative mandate to identify, assess, manage, protect, and promote heritage resources in South Africa. SAHRA is mandated to coordinate the identification and management of the national estate. The aims are to introduce an integrated system for the identification, assessment, and management of the heritage resources and to enable provincial and local authorities to adopt powers to protect and manage them.

2.1.2 *Legislation regarding archaeology and heritage sites*

The following Acts has direct bearing on Heritage resource protection and management process:

National Heritage Resources Act No 25 of 1999, section 35

The National Heritage Resources Act No 25 of 1999 (section 35) defines protected cultural heritage resources as:

- Archaeological artifacts, structures and sites older than 100 years

- Ethnographic art objects (e.g. prehistoric rock art) and ethnography
- Objects of decorative and visual arts
- Military objects, structures and sites older than 75 years
- Historical objects, structures and sites older than 60 years
- Proclaimed heritage sites
- Graveyards and graves older than 60 years
- Meteorites and fossils
- Objects, structures and sites of scientific or technological value.

The national estate includes the following:

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

In terms of activities carried out on archaeological and heritage sites the 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."

(NHRA 1999:58)

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)."

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)."

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. Approval for the exhumation and re-burial must be obtained from the relevant Provincial MEC as well as the relevant local authorities.

National Environmental Management Act No 107 of 1998

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.

2.2 RATING OF SIGNIFICANCE

The National Heritage Resources Act (Act 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
- Amount of deposit, range of features (e.g., stonewalling, stone tools and enclosures)
- Density of scatter (dispersed scatter)
- Social value
- Uniqueness
- 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. It is summarised in Table 3.

Table 3: Field rating of significance

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; mitigation and or exhumation and reinternment [including 2a, 2b & 3]

3 STATEMENT OF SIGNIFICANCE AND IMPACT RATING

This section outlines the potential impact of risk situations and scenarios commonly associated with heritage resources management. Refer to Appendix 1: for guideline of the rating of impacts and recommendation of management actions for areas of heritage potential within the study area.

3.1 DIRECT, INDIRECT AND CUMULATIVE EFFECTS

Beyond the initial direct or primary impact, the HIA should also consider the potential indirect and cumulative impacts. Winter and Baumann (2005) define **direct or primary impacts** as those that occur at the same time and in the same space as the proposed activity. **Indirect effects** occur at a later stage or at a different place from the causal activity or may be impacts that occur as through a "complex pathway" (Winter and Baumann 2005, 24). **Cumulative effects** are a constellation of processes that are seemingly insignificant in isolation but have a significant cumulative effect on heritage resources (ibid.).

3.1.1 Direct Impact Rating Criteria

The criteria used for assessment of impacts is based on the guidelines set out by Winter and Baumann (2005) and Department of Environmental Affairs and Tourism (1998):

Extent

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

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

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

Probability

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.

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

3.1.2 Direct Impact 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	3
	Highly Probable	4
	Definite	5
Impact Rating	Sum (Duration, Scale, Magnitude) x Probability	
Negligible	<10	
Low	<40	
Moderate	<60	
High	>60	

4 ARCHAEOLOGICAL AND HISTORICAL CONTEXT

4.1 OVERVIEW OF THE SOUTH AFRICAN ARCHAEOLOGICAL AND HISTORICAL CONTEXT

4.1.1 Stone Age

In Southern Africa, the Stone Age is defined by the use of stone cobbles and flakes that have been modified into tools such as scrapers, points and hand axes. Our early ancestors such as *Homo ergaster* and early *Homo sapiens* first used these tools as much as 1.4 million years ago (Mitchell 2002:59). Stone technology would persist throughout the human species development right up to the arrival of iron using farming people in southern Africa some 2000 years ago. Changes in the stone tool technology over time allows different stone tool industries to be chronologically separated based on trends in tool design. This provides the useful partitioning of the entire Stone Age sequence into three broad phases outlined by Lombard et. al. (Lombard et al. 2012) below:

Early Stone Age: 2 Million – 200 000 years ago
Middle Stone Age: 300 000 – 20 000 years ago
Later Stone Age: 40 000 – <2 000 years ago

4.1.2 Iron Age

The advent of the Iron Age in southern Africa sees the widespread adoption of metallurgy, ceramics and agriculture. The period is associated with farming communities who spoke Bantu languages and dates from around AD 350 up to the 1800s (Huffman 2007). The Iron Age has been divided into distinct periods. These periods, however, do not mark changes in technology (as is the case with the Stone Age) but rather signify changes in the social and political organisation of the Iron Age farmers. The three periods of the Iron Age are presented by Huffman (2007) as follows:

Early Iron Age: AD 200 – 900
Middle Iron Age: AD 900 – 1300
Late Iron Age: AD 1300 – 1840

The Iron Age is thus considered the period, which covers the unwritten history of precolonial farming communities and, as a chronological unit, ends with the contact between the Bantu farmers and European settlers.

4.1.3 Historical Period

The historical period is best regarded as a phase where historical sources can be reliably used to reconstruct past events. The earliest sources of historical data found in southern Africa take the form of oral accounts that were recorded by travellers and missionaries as they explored the interior of the country while later sources tend to be more formally constructed as literacy rates increased with more European settlers entering the region (Vollenhoven 2006:189).

4.2 ARCHAEOLOGICAL AND HISTORICAL CONTEXT OF THE PROJECT AREA

4.2.1 Stone Age

The Earlier and Middle Stone Ages are poorly represented on the Mpumalanga Highveld region. From around 20kya, there is evidence of microlithic assemblages in the region associated with the Later Stone Age (LSA). Prominent LSA sites are located near Badplaas where stone age tools have been found in association with Rock Art panels (Korsman and Plug 1994) and from here there is evidence that LSA hunter gatherers occupied the Highveld region well into the 18th century. Similar evidence from Welgelefen Shelter, close to Ermelo on the banks of the Vaal river (Schoonraad and Beaumont 1971). Recent excavations on Iron Pig shelter in the Doornkop Nature Reserve north of Carolina indicates that the site was occupied from 16000 BP to 9000 BP with stone tool technology lined to the Robberg techno-complex (Bader, Linstädter, and Schoeman 2020).

4.2.2 Iron Age

Sites related to the Late Iron Age (LIA) have been documented in the region around Ermelo. These sites mostly relate to the ancestors of the historical, Sotho, Swazi and Ndebele-speaking communities of the region. The sites are characterised by stone walled architecture and typically clearly discernible from areal imagery. Architecture typically consist of stone wall feature, trackways, terraces, and enclosures. Several of these LIA stone walled sites of the eastern Highveld have been documented and researched (Collett 1979, 1982; Delius, Maggs, and Schoeman 2012; Evers 1973, 1975; Maggs 1995; Mason 1962; Schoeman 1998; Van Hoepen 1939).

The early to mid-19th century was a period of great turmoil and violence, commonly referred to as the Mfecane/Difaqane – was caused by colonial expansion and the growth and Nguni African kingdoms. As some chiefdoms and kingdoms grew stronger, others were shattered and absorbed by the victors (Delius and Hay 2009).

4.2.3 Historical period

White farmers moved into the eastern Highveld after 1853 when the government of the South African Republic (ZAR or Transvaal) traded the land from the Swazi. The town of Ermelo was established in 1880 and the Ermelo district was proclaimed in 1882 (Bergh 1999). Pistorius (Pistorius 2007) notes that even before the town's establishment, Ermelo was a outspan for travelers and traders moving between Lydenburg and Natal (Lombard 1980).

During the South African War (1899-1902) the larger Ermelo region saw various skirmishes (Bergh 1999: 51, 54). These include skirmishes on the farms Oshoek (4 December 1901), Trigaardsfontein (10 December 1901), Witbank (11 January 1902) and Nelspan (26 January 1902). During the War, Ermelo was completely destroyed by the British and rebuilt after 1903 (Pistorius 2007). Heritage sites in Ermelo include: a memorial in honour of the men from the town and district who fought and died in the Anglo Boer War and the Paul Kruger Bridge across the Vaal River which was built in 1897 by architect, Sytze Wierda (Pistorius 2007).

Stone-built farmsteads and dwellings from the Eastern Highveld that date from the second half of the 19th century into the 20th century present a unique regional architectural tradition within the Southern African context (Naude 2000). Structures in urban and in rural areas used

a variety of stone which included sandstone, ferricrete, dolerite, granite, shale and slate. These vernacular structures were seldomly built from formally draughted plans and were usually erected as an initial core structure after which additional rooms were added as the family expanded or needs changed (Naude 2000). These buildings are fast disappearing and little systematic study has been done on them.

5 PROJECT AREA

The total area applied mining rights has a footprint of 85ha and contains the mining permit area with a surface footprint of 5ha. A narrow band which runs parallel to the R39 for approximately 970m, will serve as an access road. This currently runs on a servitude and existing dirt road.

The project predominantly falls on Amersfoort Highveld Clay Grassland with the northern extreme on Soweto Highveld Grassland (Mucina, Rutherford, and Powrie 2018). The project area for the most part is set against the slope of a north-south running ridge. The ridge top is relatively flat, with shallow topsoil. The western slope is steep and rocky and in places have been quarried extensively and affected by earthmoving leaving behind substantial pits in excess of 6m, and in places filled with water. To the west of the ridge, the landscape slopes down gently to the west into open grassland bisected by a drainage line. A catchment dam is built in the drainage line. Several dirt roads cut through the area.

6 HERITAGE IMPACT ASSESSMENT

Desktop and field-based research were conducted to ensure a high probability of recording heritage sites in the project area.

6.1 DESKTOP STUDY

The desktop study focussed on the relevant previous research conducted in the area based on previous reports, published material, aerial photographs, remote sensing data that has bearing on the immediate project area.

6.1.1 *Heritage Reports*

Heritage reports on the SAHRIS database was consulted for other archaeological finds.

6.1.2 *Map data*

Historical and current topographical maps were consulted as sources of information on potential areas of significance. These were georeferenced in ArcGIS and Google earth with the project area superimposed.

6.1.3 *Remote Sensing Data*

Historical and modern aerial and satellite imagery of the project area was studied to identify any heritage sites. Historical aerial imagery from the National Geo-spatial Information database from 1955, 1961, 1963, 1979 and 1998 and Google Earth imagery from 2003-2020 were inspected. The remote sensing data was used to date earthmoving activities on the site as well as building ruins (refer to results below).

6.1.4 *Published Research*

Publication repositories were consulted for any published research that pertains to the project.

6.2 FIELD SURVEY

An archaeological foot survey of Portion 15 of Rietspruit 437 IS was conducted on 28 August 2020. The survey was conducted following standard archaeological practice of walking transects, spaced roughly 20m apart. The survey team used real time positioning in relation to the project by means of a mobile GIS application. Sites of interest and of the project area were photographed and recorded with a handheld GPS (Garmin e-Trex) recorded using Datum WGS 84.

6.2.1 *Limitations*

Access

The project was accessed from the R39. No access restrictions were encountered.

Visibility

Generally, the visibility at the time of the HIA site inspection (28 August 2020) was high due to low grass cover and sparse tree cover.

Previous Impact

From aerial imagery and ground survey it is clear that several areas of the property has been subjected to severe earth moving and mining activities. This is most notable on the southern boundary where an approximately 20ha area had previously been mined. Several areas of the western ridge slope have also been quarried. A roughly 35m strip leading to the R39 had been cleared and levelled. All these impacts places severe limitations on finding any intact heritage remains for approximately 30% of the project area. From the historical imagery it also clear that the mining, quarrying and earth moving activities in the project area started around 1979 and gradually expanded over the years to its present state.

During the desktop research historical areal imagery of the entire project area was inspected in detail. This did not identify any heritage sites that were destroyed by these activities.



Figure 4 a, b: Views from top of ridge looking south



Figure 5a,b: General views of northern parts of project area



Figure 6a, b: General views of south eastern parts of project area



Figure 7: Aerial imagery from 1955. Relatively pristine landscape with no visible archaeological features



Figure 8: Aerial imagery from 1963. Relatively pristine landscape with no visible archaeological features



Figure 9: Aerial imagery from 1979. Initial ground clearing in eastern corner and northern extent.



Figure 10a,b: Pits left by excavation in western portion of project area.



Figure 11 a,b: stone mining on eastern slope of ridge.



Figure 10a, dam in northern extent (corridor area); b, exposure from earth moving in eastern corner of project area.



Figure 12: View of Project area looking west. Ridge visible in background with large scale quarrying on middle ground.



Figure 13: Google Earth image (2019) showing the extensive burrowing and earthmoving in western portion of project area.

6.3 RESULTS OF THE HERITAGE ASSESSMENT

Regionally, heritage assessments have identified isolated graves and informal graveyards (Archaetos 2012, 2016; National Culture History Museum 2003; Pistorius 2007; Vhubvo Archaeo-Heritage Consultants 2013), historical farmsteads and associated outbuildings (Archaetos 2012, 2016; Pistorius 2007), and stone walled Iron Age sites (Pistorius 2007).

LIA settlements and historical buildings are typically clearly discernible in remote sensed imagery, but close inspection of imagery from 1955 onwards failed to identify any visible trace of heritage sites in the project area. Therefore, despite the scale and severity of surface and subsurface impacts in the project area, the desktop survey would suggest that no visible heritage sites that were destroyed by these activities.

The remote sensed data did flag a rectangular structure at S26.564545°/ E29.930872°. Ground inspection revealed this to be ruins of a brick structure. From historical imagery it seems that the structure was built before 1979 but not earlier than 1963. Therefore, it is not older than 60 years and does not warrant any mitigation.



Figure 14: Square structure visible on 2019 Google Earth imagery.



Figure 15: Square structure absent in 1963 imagery.

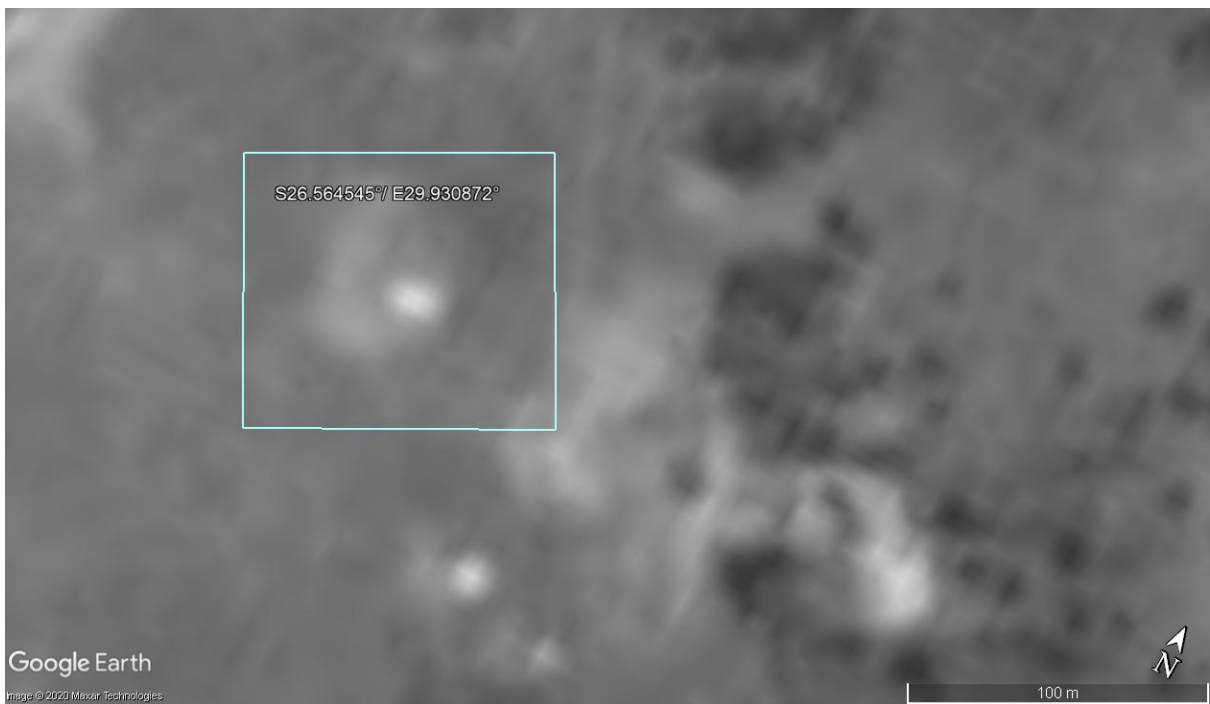


Figure 16: Square structure visible in 1979 imagery.



Figure 17a,b,c: Ruins of square structure post-dating 1963, located at S26.564545°/ E29.930872°.

6.3.1 Stone Age

No Stone Age material was found in the project area.

6.3.2 Iron Age

No Iron Age material was found in the project area.

6.3.3 Historical Sites

No historical sites were found in the project area.

6.3.4 Graves and Burial Grounds

An informal burial ground was found 25m from the southern corner of the area under future consideration for mining rights. Although the burial ground falls outside the project area (on Portion 4 of Rietspruit 437 IT) mitigation measures should be implemented as spill-over effects could impact on this site.

Site: UP-RTS-2629-01

Coordinates: S26.572591°/ E29.931175°

Farm: Portion 4 of Rietspruit 437 IT

50K Map Series:

Type: Burial Ground

Rating: High Significance (4b)

Twenty-eight (28) graves were identified immediately south of southern corner of project area. This number could be higher since some of the mounds were spaced close to one another and difficult to distinguish. Four graves had headstones with names. The earliest date is 1968 and the most recent 2016. All the graves were orientated in an east-west direction with headstones in the west. Some of the unmarked graves had natural stone slabs employed as informal headstones.



Figure 18: View of Graveyard UP-RTS-2629-01







Figure 19: Location of burial ground UP-RTS-2629-01 at S26.572591°/ E29.931175° (Google Earth imagery dated 2019).



Figure 20: Grave with fresh soil at UP-RTS-2629-01.

Table 4: Descriptions of Marked graves at UP-RTS-2629-01

Grave	Inscription	Description	Image
Grave 1:	Bafana Alfred Mlotshwa *1977/09/15 +2016/10/12	Text printed in metal plate mounted on iron frame and stake. Text facing west. Undertaker listed on grave as Lala Ngoxolo, Ermelo, with telephone number provided. Text facing west.	
Grave 2	GENCE EMELINA KHUMALO 1912-15. 5. 1973	Granite headstone and base. Rectangular, c. 40cm high. Engraved leaf pattern on base. Text facing west.	
Grave 3	J(?)M H(?)VA R.I. _1968	Hand carved sandstone headstone, c. 25cm high. Text hand chiselled. Severely eroded and mostly illegible. Text facing west.	
Grave 4	IN LOVING MEMORY OF SESI SPHELELE *1989-07-19 +1989-10-21 REST IN PEACE SIYOHLALA SIKUKHUMBULA SESI	Dark grey, polished granite headstone that had come loose from base and stand. Loose headstone is placed flat on grave surface. Granite kerbs filled with granite chips. Burial plinth constructed from red brick.	

_ = illegible; (?) = character uncertain

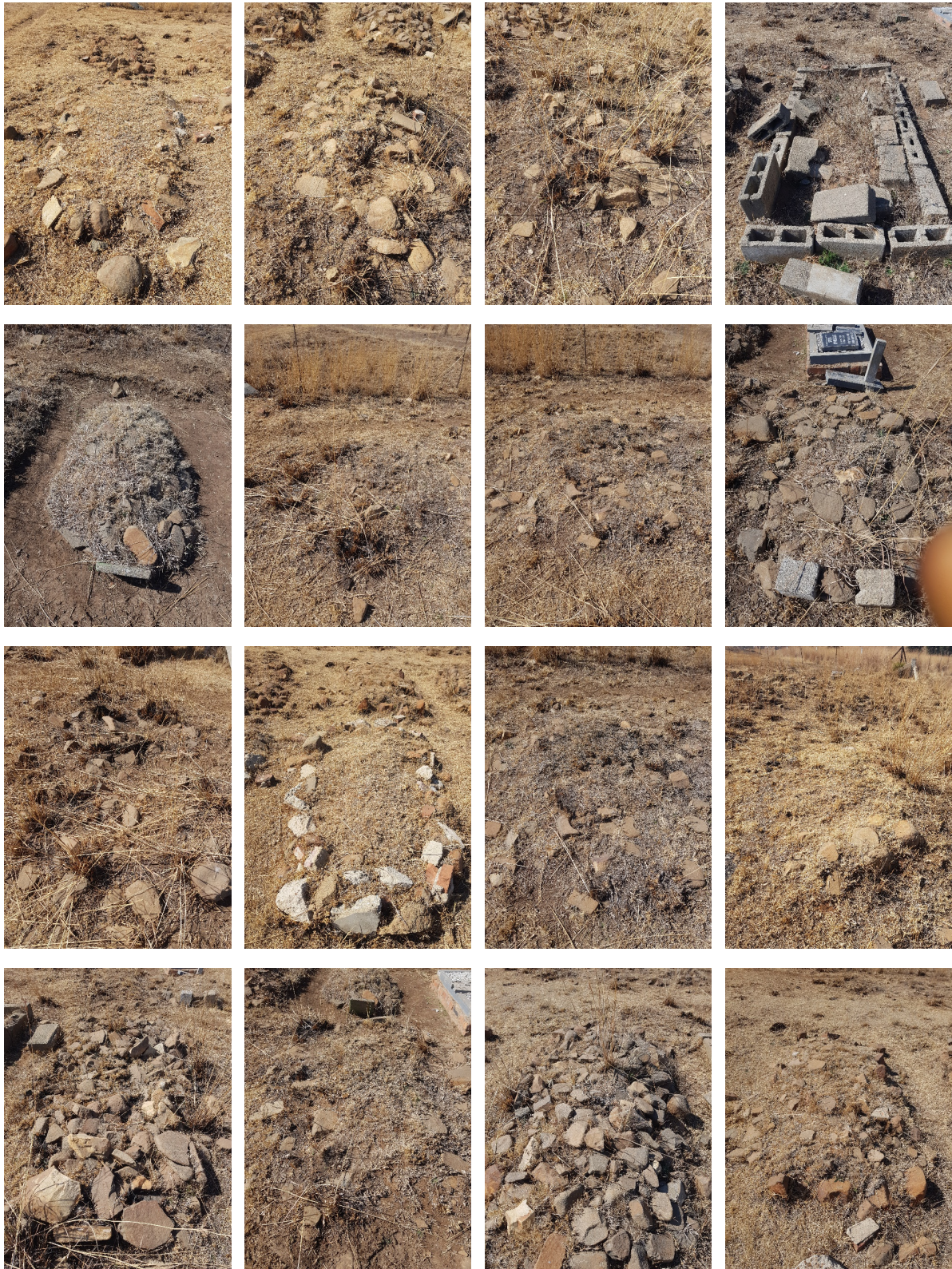


Figure 21: Examples of unmarked graves at UP-RTS-2629-01.

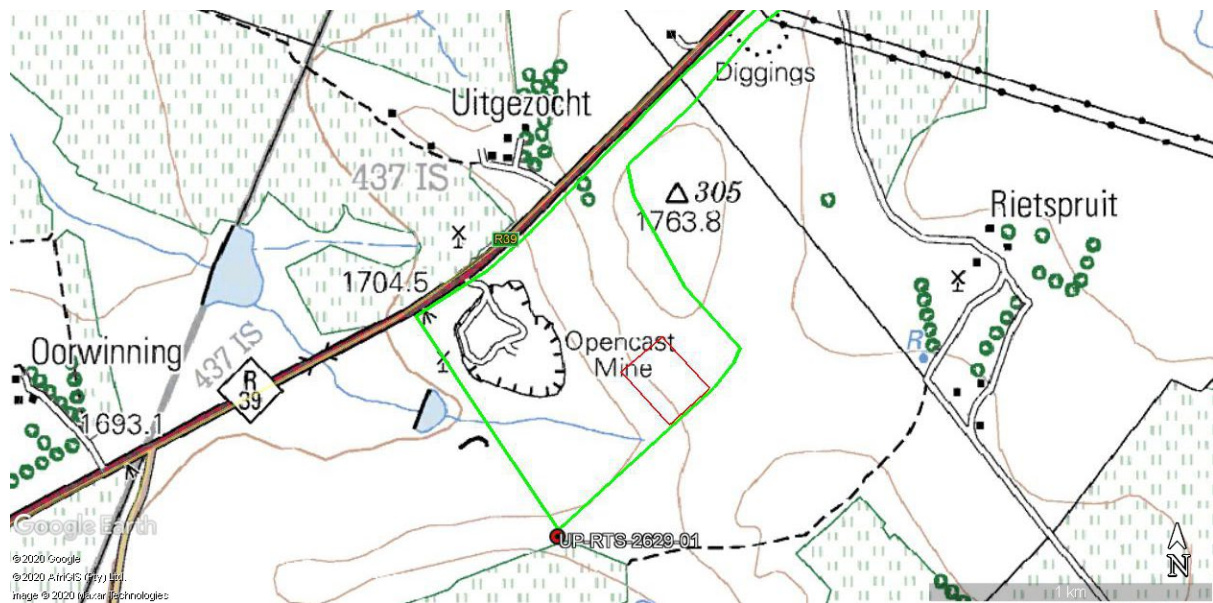


Figure 22: Location of UP-RTS-2629-01 in relation to project alignment.

6.4 PALEONTOLOGICAL SENSITIVITY

The project area falls outside any paleontologically sensitive areas as indicated on the SAHRIS Paleontological Sensitivity Map. According to this, a desktop or field assessment report will not be required. This is ultimately subject to review and recommendations by the relevant heritage authorities.



Figure 23: Paleontological sensitivity map.

6.5 EVALUATION OF IMPACT

Archaeology

The study failed to identify any archaeological sites or sites of cultural significance.

Cultural Landscape

The eastern Highveld is an important cultural landscape with a rich Late Iron Age and Historical Period cultural landscape. Although stone walled sites are relatively ubiquitous regionally, none were found on the property. Similarly, no buildings constructed in the local stone-built vernacular-style were found. Both types of sites are under immense pressure from mining and mega-agriculture, but their absence means that the impact of the mining activities will have a minimal impact on such sites.

Graves / Human Burials Sites

An informal historical graveyard was located with approximately twenty-eight graves. Although, these fall outside the project area by around 25m, spill over effects may impact the site. Although strict adherence to the project boundary will minimise direct impact on the graves, a 50m buffer area around the graves should be implemented to minimise risks. Regular monitoring is advised.

Table 5: Summary direct impact on heritage finds

Site	Impact	Mitigation	Extent		Duration		Magnitude		Probability		Impact		Mitigation Measures to be Implemented
			Scale	Score	Scale	Score	Scale	Score	Scale	Score	Scale	Score	
UP-RTS-2629-01	Damage to graves	Mitigated	Site	2	Long term	4	High	8	Improbable	1	Low	14	50m conservation buffer. Fence and access control.
		No Mitigation	Site	2	Long term	4	High	8	Highly Probable	4	Moderate	56	

7 MANAGEMENT ACTIONS

It is the opinion of this author that the no mitigation is needed for the area under the existing mining permit (5ha). For the area under consideration for mining rights (82ha), mitigation is needed for site UP-RTS-2629-01.

The following management measures should be considered during mining rights application on Portion 15 of Rietspruit 437 IS.

SITES	UP-RTS-2629-01	
PROJECT COMPONENT/S	Unspecified	
POTENTIAL IMPACT	Destruction and/or damage to graves	
ACTIVITY RISK/SOURCE	Earth moving, excavation, road construction	
MITIGATION: TARGET/OBJECTIVE	To preserve historical graves and create an adequate conservation buffer.	
MITIGATION: ACTION/CONTROL	RESPONSIBILITY	TIMEFRAME
Fixed Mitigation Procedure (required)		
Site Monitoring	ECO	Monitor as frequently as practically possible.
Preferred Mitigation		
Avoidance: Implement a heritage conservation buffer of at least 50m around the graveyard.	DEVELOPER	Prior to the commencement of mining, construction and/or earth-moving activities.
Alternative Mitigation (if preferred mitigation not feasible)		
Phase 2 Specialist Mitigation: Exhumation and repatriation of graves to formal graveyard	HERITAGE PRACTITIONER	Prior to the commencement of mining, construction and/or earth-moving activities.
PERFORMANCE INDICATOR	Successful protection of graveyard	

8 RECOMMENDATION

The following general recommendations are made based the impact assessment process:

1. **UP-RTS-2629-01** is an informal burial ground. It has a heritage significance rating of **High (4b)**. Burial grounds and graves are protected by the National Heritage Resources Act No 25 Of 1999, Section 36 and the Human Tissue Act of 1983. There is clear evidence that the graves are actively visited and used in the present. Avoidance measures should ensure their future protection. A conservation buffer of at least 50m should be implemented around the burial ground to ensure the necessary protection of the site. In addition, the entire cemetery should be fenced off and access control should be applied. The fence should be positioned no closer than 5m from the nearest grave along the outer periphery of the site. If direct impact in future is unavoidable, the burials should be exhumed and interred in a formal graveyard by a qualified Heritage Practitioner. An exhumation permit from SAHRA will be required for this.

9 CONCLUSION

Investigation of the heritage resources on Portion 15 of Rietspruit 437 IS revealed single burial ground located 25m outside the area considered for mining rights application. Mitigation measures must b put in place to preserve and conserve the integrity of this site before any construction or activities in the area under mining application can take place. No sites of heritage significance were identified in or around the 5ha mining permit area.

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Appendix 1: HERITAGE LEGISLATION BACKGROUND

A1.1 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.

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 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)

"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)."

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

- 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) bdestroy, 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)."

A1.2 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.

Appendix 2: MANAGEMENT AND MITIGATION ACTIONS

A2.1 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:

A2.1.1 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.

A2.1.2 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 association with an event, person, phase or activity.

A2.1.3 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.

A2.1.4 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.

A2.2 MITIGATION CATEGORIES

The following provides a guideline of relevant heritage resources management actions in the conservation of heritage resources:

A2.2.1 No further action / Monitoring

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.

A2.2.2 Avoidance

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.

A2.2.3 Mitigation

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.

A2.2.4 Compensation

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.

A2.2.5 Rehabilitation

Rehabilitation is considered in heritage management terms as an intervention typically involving the adding of a new heritage layer to enable a new sustainable use. 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:

- 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.

A2.2.6 Enhancement

Enhancement is appropriate where the overall heritage significance and its public appreciation value are improved. It does not imply creation of a condition that might never have occurred during the evolution of a place, e.g. the tendency to sanitize the past. This management action might result from the removal of previous layers where these layers are culturally of low significance and detract from the significance of the resource. It would be appropriate in a range of heritage contexts and applicable to a range of resources. In the case of formally protected or significant resources, appropriate enhancement action should be encouraged. Care should, however, be taken to ensure that the process does not have a negative impact on the character and context of the resource. It would thus have to be carefully monitored.