

# **PHASE 1 ARCHAEOLOGICAL IMPACT ASSESSMENT**

**For**

**The Proposed Diep Vaalbank  
Coal Project Between  
Hendrina and Bethal,  
Mpumalanga**

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**February 2018**

A Phase 1 Archaeological Impact Assessment for the Proposed Diep  
Vaalbank Coal Project Between Hendrina and Bethal, Mpumalanga

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I, Tobias Coetzee, declare that –

- I act as the independent specialist;
- I am conducting any work and activity relating to the proposed Diep Vaalbank Coal 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, 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.

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Date: 28 February 2018

## Executive Summary

The author was appointed by Eco Elementum (Pty) Ltd to undertake a Phase 1 Archaeological Impact Assessment for Diepsoils Investments (Pty) Ltd on a portion of Portion 10 of the Farm Rietkuil 224 IS and two portions of Portion 5 of the Farm Kalabasfontein 232 IS, Bethal, Mpumalanga Province. The study areas are located between Bethal and Hendrina. The aim of the study is to determine the scope of archaeological resources that could be impacted on by the proposed Diep Vaalbank Coal Project.

The identified graveyards near the Preferred and Alternative 2 Sites fall outside of the areas demarcated for development. However, due to the nature of the development, the graveyard near the Alternative 2 Site might be negatively affected. Although this graveyard is no longer in use, it is recommended that should the Alternative 2 Site be selected for the proposed development, a fenced-off conservation buffer of 30m be established around the graveyard and that the mine's ECO inspect the graves before and after blasting activities. The graveyard must also be kept tidy, the fence regularly inspected and access should not be refused. Should any damage be observed as a result of mining activities a qualified archaeologist must be contacted to assess the situation to provide further recommendations.

The sensitive area associated with the Alternative 2 Site, as indicated on **Figure 4**, appears to contain settlement foundations that might be associated with the nearby graveyard. Therefore, the indicated sensitive area should be fenced-off and avoided by the proposed development.

The general area in the vicinity of the Preferred and Alternative 1 Sites were investigated, but a development layout specific investigation will be required before final recommendations can be provided for this portion.

## Table of Contents

<b>Executive Summary</b> .....	<b>3</b>
<b>1. Project Background</b> .....	<b>6</b>
1.1 Introduction.....	6
1.2 Legislation.....	7
1.2.1 The EIA and AIA processes.....	7
1.2.2 Legislation regarding archaeology and heritage sites .....	8
<b>2. Study Area and Project Description</b> .....	<b>11</b>
<b>2.1 Location &amp; Physical Environment</b> .....	<b>11</b>
<b>2.2 Project description</b> .....	<b>12</b>
<b>3. Archaeological Background</b> .....	<b>16</b>
3.1 The Stone Age.....	16
3.2 The Iron Age & Historical Period .....	17
<b>4. Methodology</b> .....	<b>18</b>
4.1 Sources of information .....	24
4.1.1 Previous research .....	25
4.2 Limitations .....	25
<b>5. Archaeological and Historical Remains</b> .....	<b>26</b>
5.1 Stone Age Remains.....	26
5.2 Iron Age Farmer Remains .....	27
5.3 Historical & Recent Remains .....	28
5.4 Graves.....	29
<b>6. Evaluation</b> .....	<b>32</b>
6.1 Field Ratings.....	33
<b>7. Statement of Significance &amp; Recommendations</b> .....	<b>33</b>
7.1 Statement of significance .....	33
7.2 Recommendations.....	34
<b>8. Addendum: Terminology</b> .....	<b>35</b>
<b>9. References</b> .....	<b>37</b>

## List of Figures

Figure 1: Regional and Provincial location of the study area. ....	14
Figure 2: Segment of SA 1: 50 000 2629 BC indicating the study areas. ....	15
Figure 3: Rough indication of the study area on a map compiled by Merensky (Extract from: Merensky 1875). ....	18
Figure 4: Study area with survey tracks. ....	20
Figure 5: Small undisturbed area of the northern section of the Preferred Site. ....	21
Figure 6: Cultivated land making up the majority of the western half of the Preferred Site. ....	22
Figure 7: South-western section of the Preferred Site used for grazing. ....	22
Figure 8: Cultivated land making up the majority of the eastern half of the Preferred Site. ....	23
Figure 9: Cultivated land making up the majority of the Alternative Site. ....	23
Figure 10: Previously cultivated land along the northern border of the Alternative Site. ....	24
Figure 11: Dense vegetation next to the Alternative Site. ....	26
Figure 12: ESA artefacts from Sterkfontein (Volman 1984) ....	27
Figure 13: MSA artefacts from Howiesons Poort (Volman 1984). ....	27
Figure 14: LSA scrapers (Klein 1984) ....	27
Figure 15: Sensitive area next to the Alternative Site. ....	28
Figure 16: Graveyard Pref1. ....	30
Figure 17: Grave constructed of cement and bricks in Graveyard Pref1. ....	30
Figure 18: Grave consisting of stacked stones in Graveyard Pref1. ....	31
Figure 19: Graveyard Alt1 next to the Alternative Site. ....	31
Figure 20: Grave consisting of stacked stone in graveyard Alt1. ....	32

## List of Tables

Table 1: Property name & coordinates. ....	13
Table 2: Site coordinates. ....	21
Table 3: Field Ratings. ....	33
Table 4: Individual site ratings. ....	33

# 1. Project Background

## 1.1 Introduction

Eco Elementum (Pty) Ltd appointed the author to undertake a Phase 1 Archaeological Impact Assessment for Diepsoils Investments (Pty) Ltd on a portion of Portion 10 of the Farm Rietkuil 224 IS and two portions of Portion 5 of the Farm Kalabasfontein 232 IS, Bethal, Mpumalanga Province (**Figures 1 & 2**). Hendrina is located 22km to the northeast and Bethal 20km to the southwest. The study comprises a Phase 1 AIA on three possible locations consisting of a Preferred and two Alternative Sites (**Figure 2**). The purpose of this study is to examine the demarcated portions in order to determine if any archaeological resources of heritage value will be impacted on by the proposed coal mining activities on the demarcated portions, as well as to archaeologically contextualise the general study area. The aim of this report is to provide the developer with information regarding the location of heritage resources on the two demarcated portions.

In the following report, I discuss the implication for the construction of coal mining infrastructure on three demarcated portions with regard to heritage resources: The Preferred and Alternative 1 Sites are located on Portion 5 of the Farm Kalabasfontein 232 IS, while Alternative Site 2 is located on Portion 10 of the Farm Rietkuil 224 IS. The legislation section included serves as a guide towards the effective identification and protection of heritage resources and will apply to any such material unearthed during development and construction phases within the demarcated study area.

## 1.2 Legislation

The South African Heritage Resources Agency (SAHRA) aims to conserve and control the management, research, alteration and destruction of cultural resources of South Africa and to prosecute if necessary. It is therefore crucially important to adhere to heritage resource legislation contained in the Government Gazette of the Republic of South Africa (Act No.25 of 1999), as many heritage sites are threatened daily by development. Conservation legislation requires an impact assessment report to be submitted for development authorisation that must include an AIA if triggered.

AIAs should be done by qualified professionals with adequate knowledge to (a) identify all heritage resources that might occur in areas of development and (b) make recommendations for protection or mitigation of the impact of the sites.

### 1.2.1 The EIA and AIA processes

Phase 1 Archaeological Impact Assessments generally involve the identification of sites during a field survey with assessment of their significance, the possible impact that the development might have, and relevant recommendations.

All Archaeological Impact Assessment reports should include:

- a. Location of the sites that are found;
- b. Short descriptions of the characteristics of each site;
- c. Short assessments of how important each site is, indicating which should be conserved and which mitigated;
- d. Assessments of the potential impact of the development on the site(s);
- e. In some cases a shovel test, to establish the extent of a site, or collection of material, to identify the associations of the site, may be necessary (a pre-arranged SAHRA permit is required); and
- f. Recommendations for conservation or mitigation.

This AIA report is intended to inform the client about the legislative protection of heritage resources and their significance and make appropriate recommendations. It is essential to also provide the heritage authority with sufficient information about the sites to enable the authority to assess with confidence:

- a. Whether or not it has objections to a development;

- b. What the conditions are upon which such development might proceed;
- c. Which sites require permits for mitigation or destruction;
- d. Which sites require mitigation and what this should comprise;
- e. Whether sites must be conserved and what alternatives can be proposed to relocate the development in such a way as to conserve other sites; and
- f. What measures should or could be put in place to protect the sites which should be conserved.

When a Phase 1 AIA is part of an EIA, wider issues such as public consultation and assessment of the spatial and visual impacts of the development may be undertaken as part of the general study and may not be required from the archaeologist. If, however, the Phase 1 project forms a major component of an AIA it will be necessary to ensure that the study addresses such issues and complies with Section 38 of the National Heritage Resources Act.

### **1.2.2 Legislation regarding archaeology and heritage sites**

*National Heritage Resource Act No.25 of April 1999*

Buildings are among 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 Farming Community settlements. 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;
- books, records, documents, photographic positives and negatives, graphic material, film or video or sound recordings, excluding those that are public records as defined in section 1(xiv) of the National



Archives of South Africa Act, 1996 (Act No. 43 of 1996), or in a provincial law pertaining to records or archives;

- 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 issued 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 authority:*

- (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)*

On the development of any area the gazette states that:

*“...any person who intends to undertake a development categorised as:*

- (a) the construction of a road, wall, power line, 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 5000m<sup>2</sup> 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 10000m<sup>2</sup> 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.” (38. [1] 1999:62-64)*

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:*

- (a) The identification and mapping of all heritage resources in the area affected;*
- (b) an assessment of the significance of such resources in terms of the heritage assessment criteria set out in section 6(2) or prescribed under section 7;*
- (c) an assessment of the impact of the development on such heritage resources;*
- (d) an evaluation of the impact of the development on heritage resources relative to the sustainable social and economic benefits to be derived from the development;*

- (e) *the results of consultation with communities affected by the proposed development and other interested parties regarding the impact of the development on heritage resources;*
- (f) *if heritage resources will be adversely affected by the proposed development, the consideration of alternatives; and*
- (g) *plans for mitigation of any adverse effects during and after the completion of the proposed development.”*  
(38. [3] 1999:64)

#### *Human Tissue Act and Ordinance 7 of 1925*

The Human Tissues Act (65 of 1983) and Ordinance on the Removal of Graves and Dead Bodies (Ordinance 7 of 1925) protects graves younger than 60 years. These 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. Graves 60 years or older fall under the jurisdiction of the National Heritage Resources Act as well as the Human Tissues Act, 1983.

## **2. Study Area and Project Description**

### **2.1 Location & Physical Environment**

The closest town to the study area is Bethal, which is located about 20km southwest of the area demarcated for mining. Hendrina is located roughly 22km to the northeast of the study area and Ermelo 42km to the southeast (**Figure 1**). The study area falls within the Gert Sibande District Municipality and the Msukaligwa Local Municipality in the Mpumalanga Province. In terms of vegetation, the study area falls within the Grassland Biome, Mesic Highveld Grassland Bioregion and Eastern Highveld Grassland vegetation unit. The Grassland Biome covers approximately 28% of South Africa (Mucina & Rutherford 2006). According to Mucina & Rutherford (2006) this vegetation unit has a conservation status of endangered. The conservation target for this area is 24% and only a small portion is conserved in statutory and private reserves. Eastern Highveld Grassland consists of the plains between Belfast in the east and the eastern side of Johannesburg in the west and also extends towards Bethal, Ermelo and the west of Piet Retief. This vegetation type is associated with slightly to moderately undulating planes and includes low hills and pan depressions. The general vegetation is short dense grassland with small scattered rocky outcrops and some woody species. About 44% of this vegetation unit has been transformed by cultivation, plantations, mines, urbanisation and the building of dams. Although no serious alien invasions are reported, *Acacia mearnsii* may become dominant in disturbed areas. Erosion in this areas is low (Mucina & Rutherford 2006).

The average elevation for this vegetation unit varies between 1520 and 1780 MASL. The average elevation of the project area is 1680 MASL.

The study area falls within the summer rainfall region and the average annual rainfall is roughly 564 mm per year. The average maximum day temperatures for the study area range from 16 °C in June to 25 °C in January. The lowest temperatures occur during July when an average of 0.1 °C is reached during the night (SA Explorer accessed 19/02/2018).

The study area falls within the B11A Quaternary Catchment and forms part of the Upper Olifants River Catchment. The closest perennial river to the study area is the Viskuille River. This river crosses Portion 5 of the Farm Kalabasfontein 232 IS and is located about 1.6 km southwest of the proposed Preferred Site on this portion. The Viskuille River is located about 3.7 km from the proposed Alternative Site on Portion 10 of the Farm Rietkuil 224 IS. Several smaller rivers and dams, however, are found on other farm parcels demarcated for underground mining.

The majority of the Preferred and Alternative 1 Sites are located on cultivated land. However, a small section of the Preferred Site is located close to a settlement while the southern section of the Alternative 1 Site is located on an area used for grazing. The majority of the Alternative 2 Site is cultivated and the small section along the northern boundary used to be cultivated land in previous years.

## 2.2 Project description

Diepsoils Investments (Pty) Ltd plans to mine for coal on the Farms Rietkuil 224 IS, Vaalbank 233 IS and Kalabasfontein 232 IS. Mining will consist of 90% underground mining and the remaining 10% of opencast and operational infrastructure. Three possible locations have been identified for the opencast and operational areas, which will roughly be 50 ha in size. The Preferred and Alternative 1 Sites is located on Portion 5 of the Farm Kalabasfontein 232 IS and the Alternative 2 Site on Portion 10 of the Farm Rietkuil 224 IS (**Table 1, Figures 2 & 4**). Typical infrastructure associated with the proposed mining activities will include the operational plant, crushing and screening, stockpiles, overburden, etc. No wash plant, however, will be located on-site and material will be transported to the Exxaro Forzando Mine. It should be noted that the exact mine layout is not yet available.

**Table 1:** Property name & coordinates

<b>Property</b>	<b>Site &amp; Portion</b>	<b>Map Reference (1:50 000)</b>	<b>Coordinates</b>
Kalabasfontein 232 IS	Portion 5	2629 BC	S: -26.339137 E: 29.600268
Rietkuil 224 IS	Portion 10	2629 BC	S: -26.330342 E: 29.618053
Vaalbank 233 IS	Portion 0	2629 BC	S: -26.353280 E: 29.607990

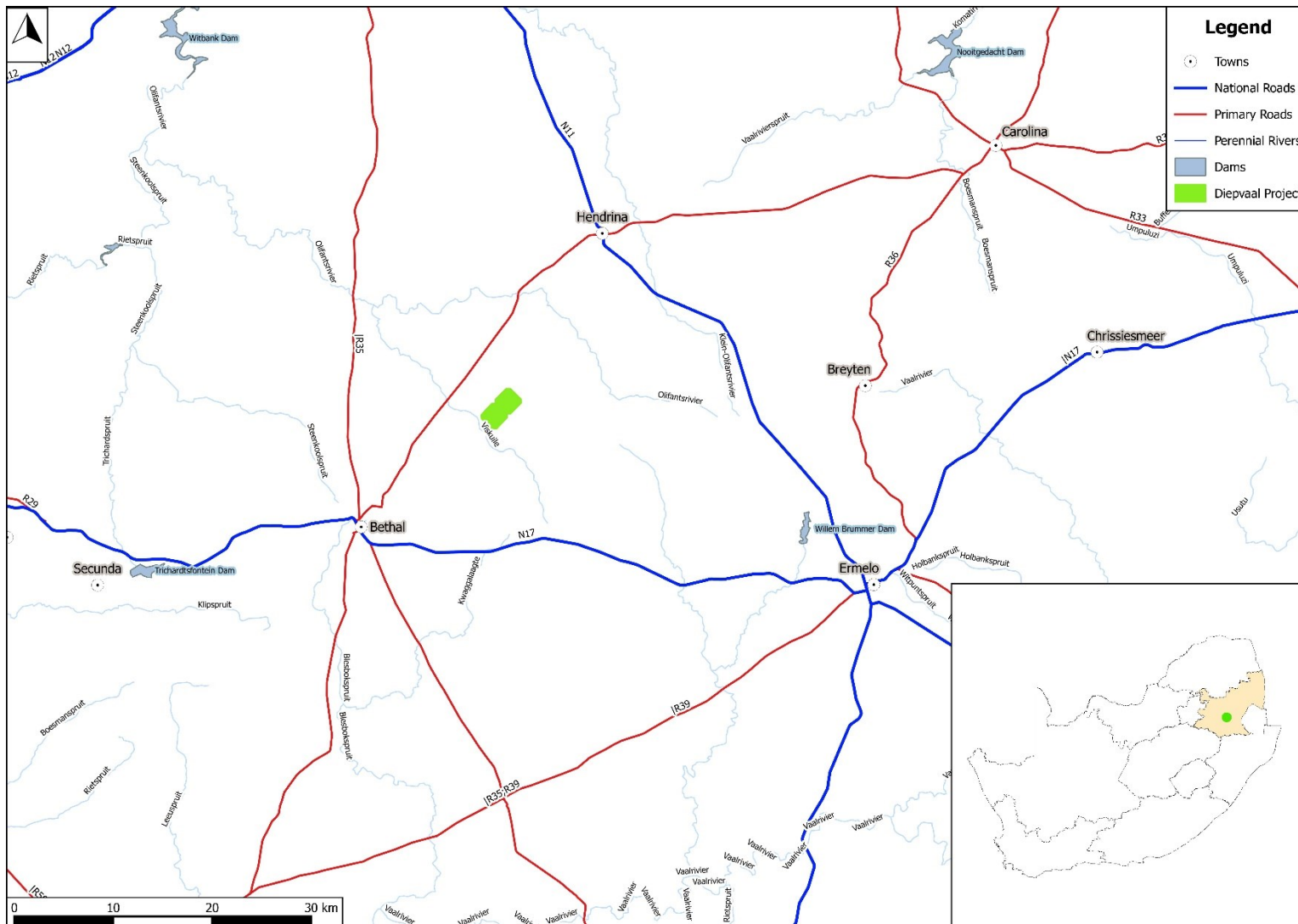


Figure 1: Regional and Provincial location of the study area.

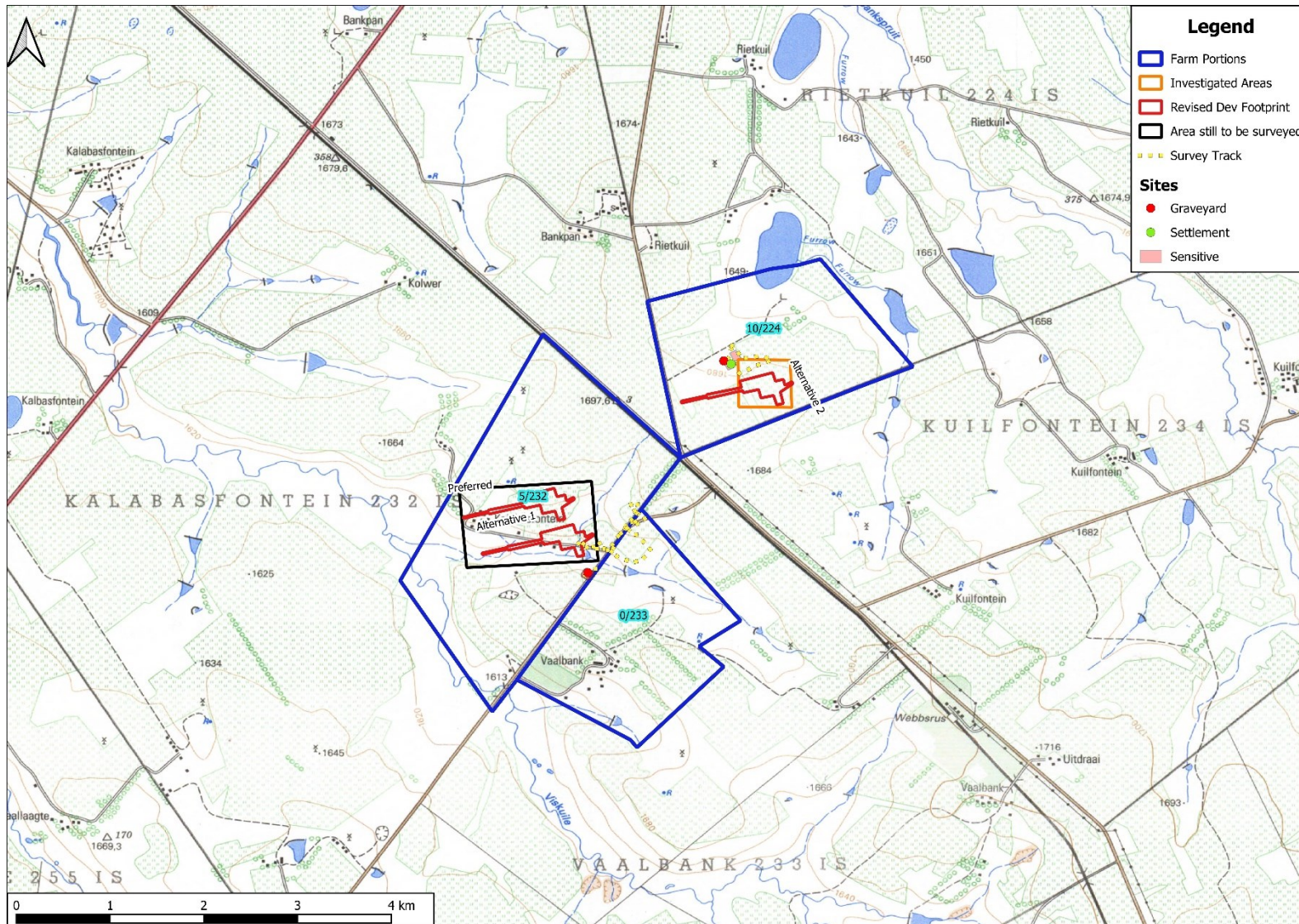


Figure 2: Segment of SA 1: 50 000 2629 BC indicating the study areas.

### 3. Archaeological Background

Southern African archaeology is broadly divided into the Early, Middle and Later Stone Ages; Early, Middle and Later Iron Ages; and Historical or Colonial Periods. This section of the report provides a general background to archaeology in South Africa and focuses on more site-specific elements where relevant.

#### 3.1 The Stone Age

The earliest stone tool industry, the Oldowan, was developed by early human ancestors which were the earliest members of the genus *Homo*, such as *Homo habilis*, around 2.6 million years ago. It comprises tools such as cobble cores and pebble choppers (Toth & Schick 2007). Archaeologists suggest these stone tools are the earliest direct evidence for culture in southern Africa (Clarke & Kuman 2000). The advent of culture indicates the advent of more cognitively modern hominins (Mitchell 2002: 56, 57)

The Acheulean industry completely replaced the Oldowan industry. The Acheulean industry was first developed by *Homo ergaster* between 1.8 to 1.65 million years ago and lasted until around 300 000 years ago. Archaeological evidence from this period is also found at Swartkrans, Kromdraai and Sterkfontein. The most typical tools of the ESA are handaxes, cleavers, choppers and spheroids. Although hominins seemingly used handaxes often, scholars disagree about their use. There are no indications of hafting, and some artefacts are far too large for it. Hominins likely used choppers and scrapers for skinning and butchering scavenged animals and often obtained sharp ended sticks for digging up edible roots. Presumably, early humans used wooden spears as early as 5 million years ago to hunt small animals.

Middle Stone Age artefacts started appearing about 250 000 years ago and replaced the larger Early Stone Age bifaces, handaxes and cleavers with smaller flake industries consisting of scrapers, points and blades. These artefacts roughly fall in the 40-100 mm size range and were, in some cases, attached to handles, indicating a significant technical advance. The first *Homo sapiens* species also emerged during this period. Associated sites are Klasies River Mouth, Blombos Cave and Border Cave (Deacon & Deacon 1999).

Although the transition from the Middle Stone Age to the Later Stone Age did not occur simultaneously across the whole of southern Africa, the Later Stone Age ranges from about 20 000 to 2000 years ago. Stone tools from this period are generally smaller, but were used to do the same job as those from previous periods; only in a different, more efficient way. The Later Stone Age is associated with: rock art, smaller stone tools (microliths), bows and arrows, bored stones, grooved stones, polished bone tools, earthenware pottery and beads. Examples of Later Stone Age sites are Nelson Bay Cave, Rose Cottage Cave and Boomplaas Cave (Deacon & Deacon 1999).



## 3.2 The Iron Age & Historical Period

The Early Iron Age marks the movement of farming communities into South Africa in the first millennium AD, or around 2500 years ago (Mitchell 2002:259, 260). These groups were agro-pastoralist communities that settled in the vicinity of water in order to provide subsistence for their cattle and crops. Archaeological evidence from Early Iron Age sites is mostly artefacts in the form of ceramic assemblages. The origins and archaeological identities of this period are largely based upon ceramic typologies. Some scholars classify Early Iron Age ceramic traditions into different “streams” or “trends” in pot types and decoration, which emerged over time in southern Africa. These “streams” are identified as the Kwale Branch (east), the Nkope Branch (central) and the Kalundu Branch (west). Early Iron Age ceramics typically display features such as large and prominent inverted rims, large neck areas and fine elaborate decorations. This period continued until the end of the first millennium AD (Mitchell 2002; Huffman 2007). Some well-known Early Iron Age sites include the Lydenburg Heads in Mpumalanga, Happy Rest in the Limpopo Province and Mzonjani in Kwa-Zulu Natal.

The Middle Iron Age roughly stretches from AD 900 to 1300 and marks the origins of the Zimbabwe culture. During this period cattle herding appeared to play an increasingly important role in society. However, it was proved that cattle remained an important source of wealth throughout the Iron Age. An important shift in the Iron Age of southern Africa took place in the Shashe-Limpopo basin during this period, namely the development of class distinction and sacred leadership. The Zimbabwe culture can be divided into three periods based on certain capitals. Mapungubwe, the first period, dates from AD 1220 to 1300, Great Zimbabwe from AD 1300 to 1450, and Khami from AD 1450 to 1820 (Huffman 2007: 361, 362).

The Late Iron Age roughly dates from AD 1300 to 1840. It is generally accepted that Great Zimbabwe replaced Mapungubwe. Some characteristics include a greater focus on economic growth and the increased importance of trade. Specialisation in terms of natural resources also started to play a role, as can be seen from the distribution of iron slag which tend to occur only in certain localities compared to a wide distribution during earlier times. It was also during the Late Iron Age that different areas of South Africa were populated, such as the interior of KwaZulu Natal, the Free State, the Gauteng Highveld and the Transkei. Another characteristic is the increased use of stone as building material. Some artefacts associated with this period are knife-blades, hoes, adzes, awls, other metal objects as well as bone tools and grinding stones.

The Historical period mainly deals with Europe’s discovery, settlement and impact on southern Africa. Some topics covered by the Historical period include Dutch settlement in the Western Cape, early mission stations, Voortrekker routes and the Anglo Boer War. This time period also saw the compilation of early maps by missionaries, explorers, military personnel, etc. **Figure 3** indicates the rough location of the study area on a map compiled by Merensky in 1875.



**Figure 3:** Rough indication of the study area on a map compiled by Merensky (Extract from: Merensky 1875).

## 4. Methodology

Because the mine operational infrastructure layout plans for the Preferred and Alternative Sites were not available at the time of surveying, a location pin for each site was provided and the general area in the vicinity of the locations investigated. It should be noted that the layout plans for the proposed Preferred and Alternative Sites have since become available. The specific locations will be verified through a layout specific survey.

I conducted archaeological reconnaissance of the study area through an unsystematic pedestrian site survey (**Figure 4**). This was done because the majority of the demarcated study areas consist of cultivated land. Consequently, only undisturbed areas were visited where possible and sites were recorded via GPS (Global Positioning System) (**Table 2**). General site conditions were recorded via photographic record (**Figures 5 – 10**). Also, the site was inspected beforehand on Google Earth as well as black and white aerial imagery in order to identify possible heritage remains. No remains, however, could be observed on aerial imagery. The total area inspected was 50 ha per site.

The reconnaissance of the area under investigation served a twofold purpose:

- To obtain an indication of heritage material found in the general area as well as to identify or locate archaeological sites on the area demarcated for development. This was done in order to establish a heritage context and to supplement background information that would benefit developers through identifying areas that are sensitive from a heritage perspective.

- All archaeological and historical events have spatial definitions in addition to their cultural and chronological context. Where applicable, spatial recording of these definitions were done by means of a handheld GPS during the site visit.

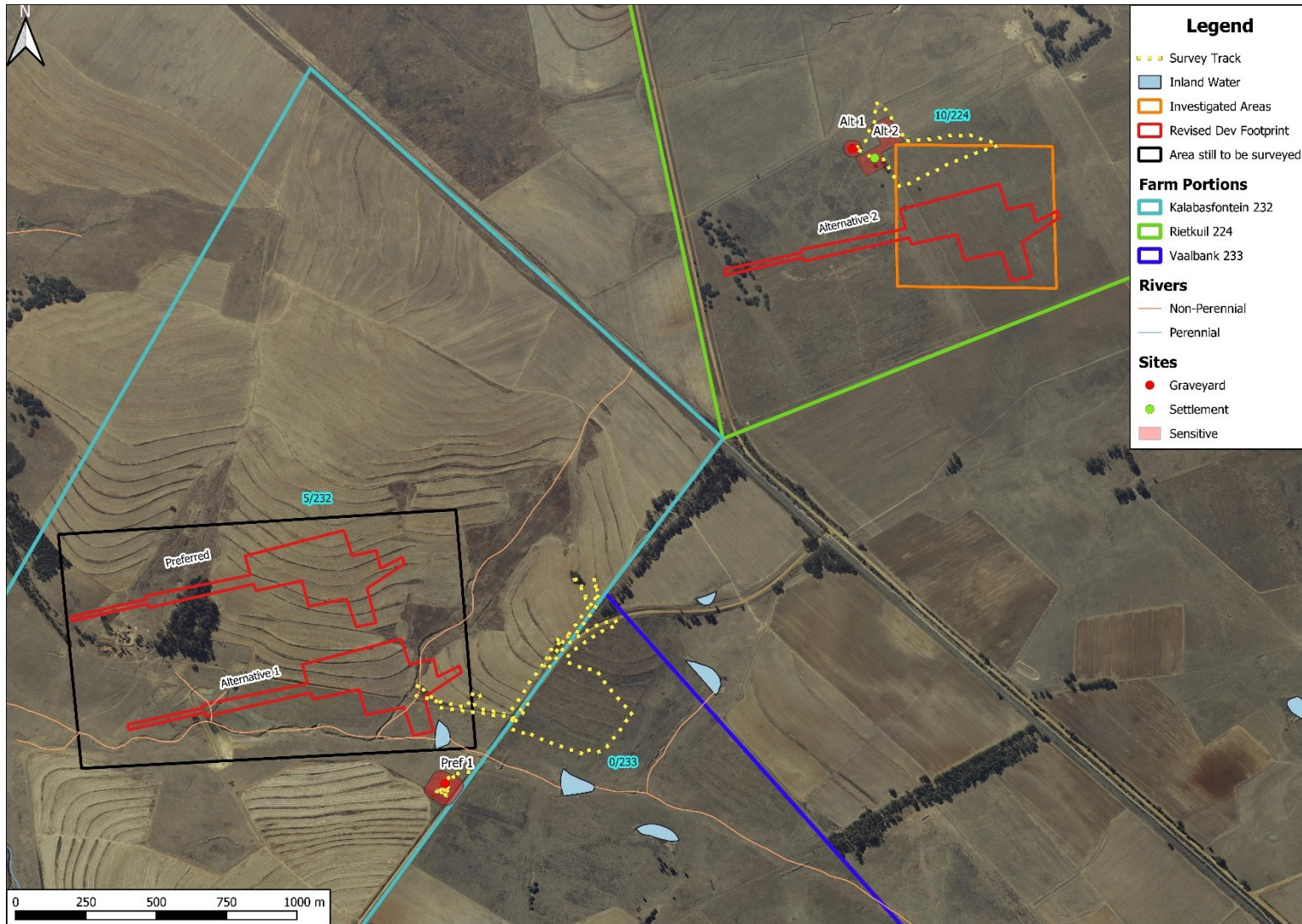


Figure 4: Study area with survey tracks.

**Table 2:** Site coordinates

<b>Site / Survey Point Name</b>	<b>Longitude</b>	<b>Latitude</b>
Pref1	29.60347	-26.34726
Alt1	29.61649	-26.32697
Alt2	29.61719	-26.32727



**Figure 5:** Small undisturbed area of the northern section of the Preferred Site.



**Figure 6:** Cultivated land making up the majority of the western half of the Preferred Site.



**Figure 7:** South-western section of the Preferred Site used for grazing.



**Figure 8:** Cultivated land making up the majority of the eastern half of the Preferred Site.



**Figure 9:** Cultivated land making up the majority of the Alternative Site.



**Figure 10:** Previously cultivated land along the northern border of the Alternative Site.

#### **4.1 Sources of information**

At all times during the survey, I followed standard archaeological procedures for the observation of heritage resources. As most archaeological material occurs in single or multiple stratified layers beneath the soil surface, I paid special attention to disturbances; both man-made such as roads and clearings, and those made by natural agents such as burrowing animals and erosion. I recorded locations of archaeological material remains by means of a Garmin Oregon 550 GPS and photographed these sites as well as general conditions on the terrain with a Sony Cyber-shot camera.

I conducted a literature study, which incorporated previous work done in the region, in order to place the study area into context from a heritage perspective.

Personal communication with Mr. Johan Pasi, who has been working on the Farm Rietkuil 224 IS for 11 years, proved invaluable in locating a graveyard and settlement remains in areas associated with very dense vegetation near the proposed Alternative Site (Johan Pasi, pers. Comm. 2018).



#### 4.1.1 Previous research

##### **Forzando Coal Holdings on the Farms Weltevreden 193 IS and Halfgewonnen 190 IS**

An archaeological survey was done for a coal mine on the Farms Weltevreden 193 IS and Halfgewonnen 190 IS. The demarcated impact area was 600 X 600m and is located roughly 9 km north-northwest of the Diep Vaalbank Coal Project study area concerned in this report. Archaeological Resources Management (ARM) surveyed the study area and the remains of two circular homesteads that possibly date to the Late Iron Age were observed. Both homesteads consist of between 3 and 6 structures and are located close to a stream. More recent angular settlement remains, as well as 2 graveyards associated with the settlements were observed. The graves consisted of mounds made with ferricrete. One of the graveyards consisted of 8 graves, and the other of 5 graves (Huffman & Steel 1995).

##### **Goedehoop Coal Mine, Mpumalanga**

An Archaeological and Cultural Historical survey and impact assessment was conducted by the National Cultural History Museum (2003) for the development of the Goedehoop opencast coal mine near Hendrina in the Mpumalanga Province. The Goedehoop site is located roughly 13 km northwest of the Diep Vaalbank Coal Project study area concerned in this report. Opencast areas that were surveyed included portions of the Farms Schurvekop 227 IS, Vlakkuielen 76 IS, Middelkraal 50 IS, and Halfgewonnen 190 IS. It was noted that a few graveyards located outside of the impacted areas were observed and would therefore not be impacted.

##### **Halfgewonnen Colliery, Mpumalanga**

Van Vollenhoven (2013) conducted a Cultural Heritage Impact Assessment for a mining right application at the Halfgewonnen Colliery between Hendrina and Bethal. The Halfgewonnen Colliery is located on the Farm Halfgewonnen 190 IS and is located about 7 km northwest of the Diep Vaalbank Coal Project study area concerned in this report. The project entailed the extraction of pillars from the underground mining area that was previously mined through bord-and-pillar methods. Van Vollenhoven (2013) located no sites of cultural heritage significance during the survey.

## 4.2 Limitations

The vegetation directly northwest of the Alternative 2 Site consists of dense grassland, which significantly hampered visibility during the time of surveying (February 2018) (**Figure 11**). Although this area falls outside of the proposed demarcated section, graves and settlement remains are associated with this area.

It should be noted that only the general area of the Preferred and Alternative 1 Sites were investigated. The area that still needs to be investigated is indicated on **Figure 4**. Although topographical maps and aerial images indicate that the majority of this area falls on cultivated land, a site investigation will still be necessary as it is expected that settlement structures and possibly burial sites might be located.

The actual area proposed for mining development at the Alternative 2 Site slightly exceeds the surveyed boundary, but aerial imagery and topographical maps confirmed that the exceeded area used to be cultivated land (Figure 4).



Figure 11: Dense vegetation next to the Alternative Site.

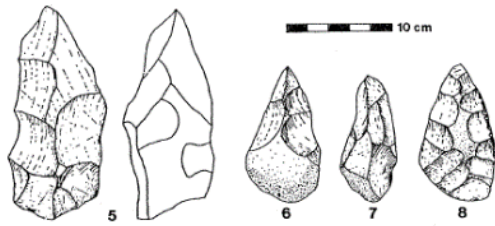
## 5. Archaeological and Historical Remains

### 5.1 Stone Age Remains

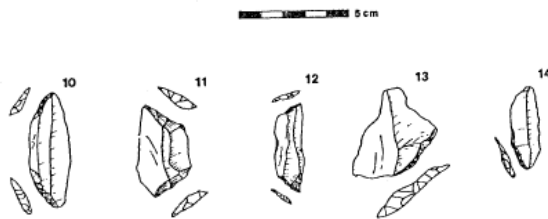
I found no Stone Age archaeological remains within the demarcated study area.

Although I located no Stone Age archaeological remains, such artefacts may occur in the area. These artefacts are often associated with rocky outcrops or water sources. **Figures 12 - 14** below are examples of stone tools often associated with the Early, Middle and Later Stone Age of southern Africa.

Archaeological studies done on the surrounding areas also did not locate material pertaining to the Stone Age.



**Figure 12:** ESA artefacts from Sterkfontein (Volman 1984)



**Figure 13:** MSA artefacts from Howiesons Poort (Volman 1984)



**Figure 14:** LSA scrapers (Klein 1984)

## 5.2 Iron Age Farmer Remains

I found no Iron Age Farmer remains within the demarcated study area.

The Forzando Coal Holdings project identified two circular homesteads that possibly date the LIA (Huffman & Steel 1995).

### 5.3 Historical

I found no Historical remains within the demarcated study area. However, the area directly northwest of the Alternative 2 Site, indicated as 'Sensitive' and 'Alt2' on **Figure 4**, might be important from a heritage perspective. According to Mr. Johan Pasi, settlement foundations can be seen in this area when vegetation cover allows for better visibility (**Figure 15**) (Johan Pasi, pers. Comm. 2018). The sensitive area borders previously cultivated land, which might suggest the settlements served as a boundary when the bordering croplands were made. The graves located within the sensitive area might also be associated with the settlement remains.

Studies done in the surrounding areas did not locate any historical remains.



**Figure 15:** Sensitive area next to the Alternative Site.

### 5.4 Recent Remains

I found no recent remains within the demarcated study area.

During the survey for the Forzando Coal Holdings project, some angular settlement remains were identified (Huffman & Steel 1995).

## 5.5 Graves

I observed one graveyard (Pref1) on Portion 5 of the Farm Kalabasfontein 232 IS and one graveyard (Alt1) near the Alternative 2 Site. Graveyard Pref1 is located about 180m south-southeast of the Alternative 1 Site location and consists of approximately 100 graves oriented in an east-west direction (**Figures 16 – 18**). The exact amount, however, could not be determined due dense vegetation cover in some areas. The graveyard is still in use and is not fenced-off. Burial dates are not visible on the majority of the graves and construction material include cement, bricks and stacked stones with no visible grave goods. Only a few headstone were observed during the survey.

Graveyard Alt1 is located about 260m north-northeast from the Alternative 2 Site location and consists of approximately 7 graves (**Figures 19 – 20**). The exact amount, however, could not be determined due to dense vegetation cover. The east-west oriented graves consist of stacked stones with no headstones or dates. The graveyard is not fenced-off and is no longer in use. However, according to Mr. Johan Pasi one of the community elders still visits the graves from time to time (Johan Pasi, pers. Comm. 2018). Although the exact age of the graves are not known, a good chance exists that they exceed 60 years of age.

The studies conducted for the Forzando Coal Holdings project (Huffman & Steel 1995) and the Goedehoop Coal Mine project (National Cultural History Museum 2003) made reference to graveyards found in the vicinity of the respective projects.



**Figure 16:** Graveyard Pref1.



**Figure 17:** Grave constructed of cement and bricks in Graveyard Pref1.



**Figure 18:** Grave consisting of stacked stones in Graveyard Pref1.



**Figure 19:** Graveyard Alt1 next to the Alternative Site.



**Figure 20:** Grave consisting of stacked stone in graveyard Alt1.

## 6. Evaluation

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.

A fundamental aspect in the conservation of a heritage resource relates to whether the sustainable social and economic benefits of a proposed development outweigh the conservation issues at stake. There are many aspects that must be taken into consideration when determining significance, such as rarity, national significance, scientific importance, cultural and religious significance, and not least, community preferences. When, for whatever reason the protection of a heritage site is not deemed necessary or practical, its research potential must be assessed and if appropriate mitigated in order to gain data / information which would otherwise be lost. Such sites must be adequately recorded and sampled before being destroyed.



## 6.1 Field Ratings

All sites should include a field rating in order to comply with section 38 of the National Heritage Resources Act (Act No. 25 of 1999). The field rating and classification in this report are prescribed by SAHRA.

**Table 3:** Field Ratings

Rating	Field Rating/Grade	Significance	Recommendation
National	Grade 1		National site
Provincial	Grade 2		Provincial site
Local	Grade 3 A	High	Mitigation not advised
Local	Grade 3 B	High	Part of site should be retained
General protection A	4 A	High/Medium	Mitigate site
General Protection B	4 B	Medium	Record site
General Protection C	4 C	Low	No recording necessary

**Table 4:** Individual site ratings

Site / Survey Point Name	Type	Rating	Field Rating/Grade	Significance	Recommendation
Pref1	Graveyard	Local	3 A	High	Mitigation not advised
Alt1	Graveyard	Local	3 A	High	Mitigation not advised
Alt2	Foundation remains	Local	3 A	High	Mitigation not advised
Sensitive	Foundation remains	Local	3 A	High	Mitigation not advised

## 7. Statement of Significance & Recommendations

### 7.1 Statement of significance

#### The study area: The proposed Diep Vaalbank Coal Project

I observed two graveyards and an archaeologically sensitive area that might contain settlement foundations associated with one of the graveyards. All three areas fall outside of the demarcated study areas, and some distance from the proposed boundaries. Due to the poor visibility of the settlement remains and graves associated with the sensitive area near the proposed Alternative 2 Site, the sensitive area might be at risk of suffering damage by the proposed development. It is also likely that these sites and the graveyard exceed 60 years of age and are therefore protected by the National Heritage Resources Act (25 of 1999). The graveyard located on Portion 5 of the Farm Kalabasfontein 232 IS is still in use and is more recent than the graveyard associated with the Alternative 2 Site.

## 7.2 Recommendations

The following recommendations are made in terms with the National Heritage Resources Act (25 of 1999) in order to avoid the destruction of heritage remains associated with the area demarcated for development:

- Although the general area in the vicinity of the Preferred and Alternative 1 Sites were investigated, a development layout specific investigation will be required before final recommendations can be provided.
- Because Graveyard Pref1 is located a significant distance from the proposed development, the graveyard will not be impacted.
- Should the Alternative 2 Site be developed, it is recommended that a fenced-off conservation buffer of 30m be established around the graveyard and that the graveyard kept tidy. The mine ECO should regularly inspect the fence, as well as the graves before and after blasting. Should any damage be observed as a result of mining activities a qualified archaeologist must be contacted to assess the situation to provide further recommendations.
- Because the settlement remains falling within the area marked as 'Sensitive' on **Figure 4** are most likely associated with Graveyard Alt1, it is recommended that this area be fenced-off and avoided. Should this not be possible a qualified archaeologist will have to provide updated recommendations after investigating the area during a time when site visibility is not hampered by dense vegetation cover.
- Because archaeological artefacts generally occur below surface, the possibility exists that culturally significant material may be exposed during the development and construction phases, in which case all activities must be suspended pending further archaeological investigations by a qualified archaeologist. Also, should skeletal remains be exposed during development and construction phases, all activities must be suspended and the relevant heritage resources authority contacted (See National Heritage Resources Act, 25 of 1999 section 36 (6)).
- Should the need arise to expand the development beyond the surveyed areas mentioned in this study, the following applies: A qualified archaeologist must conduct a full Phase 1 Archaeological Impact Assessment (AIA) on the sections beyond the demarcated areas that will be affected by the expansion, in order to determine the occurrence and extent of any archaeological sites and the impact development might have on these sites.

## 8. Addendum: Terminology

### **Archaeology:**

The study of the human past through its material remains.

### **Artefact:**

Any portable object used, modified, or made by humans; e.g. pottery and metal objects.

### **Assemblage:**

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

### **Context:**

An artefact's context usually consist of its immediate *matrix* (the material surrounding it e.g. gravel, clay or sand), its *provenience* (horizontal and vertical position within the matrix), and its *association* with other artefacts (occurrence together with other archaeological remains, usually in the same matrix).

### **Cultural Resource Management (CRM):**

The safeguarding of the archaeological heritage through the protection of sites and through salvage archaeology (rescue archaeology), generally within the framework of legislation designed to safeguard the past.

### **Excavation:**

The principal method of data acquisition in archaeology, involving the systematic uncovering of archaeological remains through the removal of the deposits of soil and other material covering and accompanying it.

### **Feature:**

An irremovable artefact; e.g. hearths or architectural elements.

### **Ground Reconnaissance:**

A collective name for a wide variety of methods for identifying individual archaeological sites, including consultation of documentary sources, place-name evidence, local folklore, and legend, but primarily actual fieldwork.

### **Matrix:**

The physical material within which artefacts is embedded or supported, i.e. the material surrounding it e.g. gravel, clay or sand.

### **Phase 1 Assessments:**

Scoping surveys to establish the presence of and to evaluate heritage resources in a given area.

**Phase 2 Assessments:**

In-depth culture resources management 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.

**Sensitive:**

Often refers to graves and burial sites although not necessarily a heritage place, as well as ideologically significant sites such as ritual / religious places. *Sensitive* may also refer to an entire landscape / area known for its significant heritage remains.

**Site:**

A distinct spatial clustering of artefacts, features, structures, and organic and environmental remains, as the residue of human activity.

**Surface survey:**

There are two kinds: (1) unsystematic and (2) systematic. The former involves field walking, i.e. scanning the ground along one's path and recording the location of artefacts and surface features. Systematic survey by comparison is less subjective and involves a grid system, such that the survey area is divided into sectors and these are walked ally, thus making the recording of finds more accurate.

## 9. References

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## Maps

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