

# **PHASE 1 ARCHAEOLOGICAL IMPACT ASSESSMENT**

**for**

**the Emfuleni Local Municipality landfill  
development on a Portion of Portion 178  
of the Farm Vlaktefontein 546 IQ,  
Vereeniging, Gauteng**

**Author ©:**

**Tobias Coetzee, MA (Archaeology) (UP)**

**December 2017**

A Phase 1 Archaeological Impact Assessment for the Emfuleni Local Municipality landfill development on a Portion of Portion 178 of the Farm Vlakfontein 546 IQ, Vereeniging, Gauteng

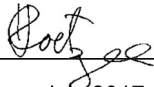
For: I-Cat Environmental Solutions (Pty) Ltd  
N4 Gateway Office Park  
Erf 516, 38 Amatole Street  
Willow Park Manor X65 Pretoria East

Report No: ELM Landfill: AIA-2411171

Email: tobias.coetzee@gmail.com

I, Tobias Coetzee, declare that –

- I act as the independent specialist;
- I am conducting any work and activity relating to the proposed landfill development 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.



\_\_\_\_\_  
Date: 6 December 2017

## Executive Summary

The author was appointed by I-CAT Environmental Solutions (Pty) Ltd to undertake a Phase 1 Archaeological study for the Emfuleni Local Municipality on a Portion of Portion 178 of the Farm Vlakfontein 546 IQ, Vereeniging. The study area is located about 12 kilometres north-northwest of Vereeniging and largely overlaps a disused clay quarry. The aim of the study is to determine the scope of archaeological resources that could be impacted on by the proposed landfill development.

Should the need exist to disturb the building ruins associated with the 'potentially sensitive area' towards the south of the study area as indicated on **Figure 4**, a qualified archaeologist should first inspect the ruins and provide recommendations. Special care should also be taken to preserve potential heritage remains that can include stone tool concentrations, building remains, historical features, stone cairns and graves. 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 and Resources Act, 25 of 1999 section 36 (6)). Also, should culturally significant material be discovered during the course of the said development, all activities must be suspended pending further investigation by a qualified archaeologist. Subject to adherence of the recommendations and approval by SAHRA the development of the proposed landfill development may continue.

# 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 .....	6
1.2.1 The EIA and AIA processes .....	6
1.2.2 Legislation regarding archaeology and heritage sites .....	7
<b>2. Study Area and Project Description</b> .....	<b>11</b>
2.1 Location & Physical environment.....	11
2.2 Project description.....	12
<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>19</b>
4.1 Sources of information .....	28
4.1.1 Previous research .....	28
4.2 Limitations .....	29
<b>5. Archaeological and Historical Remains</b> .....	<b>30</b>
5.1 Stone Age Remains .....	30
5.2 Iron Age Farmer Remains.....	31
5.3 Historical Remains .....	31
5.4 Recent remains .....	31
5.5 Graves.....	32
<b>6. Evaluation</b> .....	<b>32</b>
6.1 Field Rating.....	32
<b>7. Statement of Significance &amp; Recommendations</b> .....	<b>33</b>
7.1 Statement of significance .....	33
7.2 Recommendations .....	33
<b>8. Addendum: Terminology</b> .....	<b>35</b>
<b>9. References</b> .....	<b>36</b>

## List of Figures

Figure 1: Regional and Provincial location of the study area. ....	14
Figure 2: Segment of SA 1: 50 000 2627 DB indicating the study area. ....	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: Study area indicated on a 1938 aerial photograph. ....	21
Figure 6: Study area indicated on a 1952 aerial photograph. ....	22
Figure 7: Study area indicated on a 1969 aerial photograph. ....	23
Figure 8: Main pit area. ....	24
Figure 9: Northern section of study area. ....	24
Figure 10: General environment along the western border of the study area. ....	25
Figure 11: Informal settlements along the western border of the study area. ....	25
Figure 12: POI 1 – building ruin. ....	26
Figure 13: POI 4 – clearing. ....	26
Figure 14: POI 5 – clearing. ....	27
Figure 15: POI 6 – clearing. ....	27
Figure 16: POI 9 – building ruin. ....	28
Figure 17: Dense vegetation on the southern section of the study area. ....	30
Figure 18: ESA artefacts from Sterkfontein (Volman 1984). ....	31
Figure 19: MSA artefacts from Howiesons Poort (Volman 1984). ....	31
Figure 20: LSA scrapers (Klein 1984). ....	31

## List of Tables

Table 1: Property name & coordinates. ....	13
Table 2: Field Ratings. ....	32

# 1. Project Background

## 1.1 Introduction

I-CAT Environmental Solutions (Pty) Ltd appointed the author to undertake a Phase 1 Archaeological study for the Emfuleni Local Municipality on a Portion of Portion 178 of the Farm Vlakfontein 546 IQ, Vereeniging, Gauteng Province (**Figures 1 & 2**). The study area is located on the western section of Portion 178 and borders 1<sup>st</sup> avenue/Main Rd. The purpose of this study is to examine the demarcated study area in order to determine if any archaeological resources of heritage value will be impacted on by the proposed landfill development, 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 portion demarcated for development.

In the following report, I discuss the implication for the landfill development and its associated activities on the demarcated Portion of Portion 178 with regard to heritage resources. 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 on 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 Vereeniging, which is located 12 km south-southeast of the proposed landfill site. Sebokeng borders the study area to the west and Meyerton is located 13 km to the east. The study area falls within the Emfuleni Local Municipality and the Sedibeng District Municipality in the Gauteng Province. In terms of vegetation, the study area falls within the Grassland Biome, which is typically associated with summer rainfall regions. This Biome covers approximately 28% of South Africa. According to the vegetation classification by Mucina & Rutherford (2006) this area falls within the Soweto Highveld Grassland vegetation unit. Soweto Highveld Grassland is found in the Mpumalanga and Gauteng Provinces between Ermelo and Johannesburg in the north, Perdekop in the southeast and the Vaal River in the south. The western parts extend along the southern edge of the Johannesburg Dome as far as Randfontein and include Vanderbijlpark and Vereeniging in southern Gauteng, as well as Sasolburg in the northern Free State. This type of vegetation is considered to be endangered and has a conservation target of 24%. Only small patches are conserved and cultivation, urban sprawl, mining, dams and road infrastructure have transformed about half of the area. Erosion is generally very low (Mucina & Rutherford 2006).

The study area falls within the summer rainfall region and experiences very dry winters. The average annual rainfall is about 559 mm. The average maximum temperature for the study area ranges from 17 °C in June to 27.6 °C in January. The lowest temperatures occur during June when the mercury drops to an average of 0 °C during the night (SA Explorer accessed 28/11/2017).

In terms of topography, the general area consists of sloping plains and a series of ridges with undulating surrounding plains. Altitudes may vary between 1420 and 1760 MASL (metres above sea level). The average elevation of the project area is 1570 MASL and slopes from the elevated southern side to the lower northern side.

The study area falls on the intersection of the C22E (Klip River Catchment), C22F and C22H Quaternary catchments. The closest perennial river to the study area is the Rietspruit River, a perennial river located 2.5 km to the north. Several non-perennial rivers, however, are located as close as 75 m from the proposed development.

Two sections of the area demarcated for development (indicated as 'disturbed area' on **Figure 4**) consist of a discontinued clay quarry and its associated factory. These areas have completely been cleared of vegetation in the past and several roads exist on the demarcated area. Agricultural holdings are found to the east and west of the study area, while the areas to the north and south are open veld.

## 2.2 Project description

The property on which the proposed landfill site will be developed is about 115 Ha in size (**Table 1 & Figure 2**). However, it should be noted that the exact extent of the project has not yet been confirmed. The site will be classified as a Class B Landfill with ancillary infrastructure and will only accept general waste. The following activities / infrastructure will be associated with the planned development: Internal roads, 3 x office buildings, weighbridge works with a double lane, lab, recycling facility/area, transfer station facility, workshop and sheds, composting area, ablution, security office, office, wash bay and access to the working faces of the landfill areas (Le Roux 2017).

Equipment required for daily operations include the following:

- 1 x Landfill Compactor (achieving 1000kg/m<sup>3</sup> compaction density)
- 1 x Excavator/Front Loader
- 2 x Articulated Dump Trucks
- 1 x Water Cart.

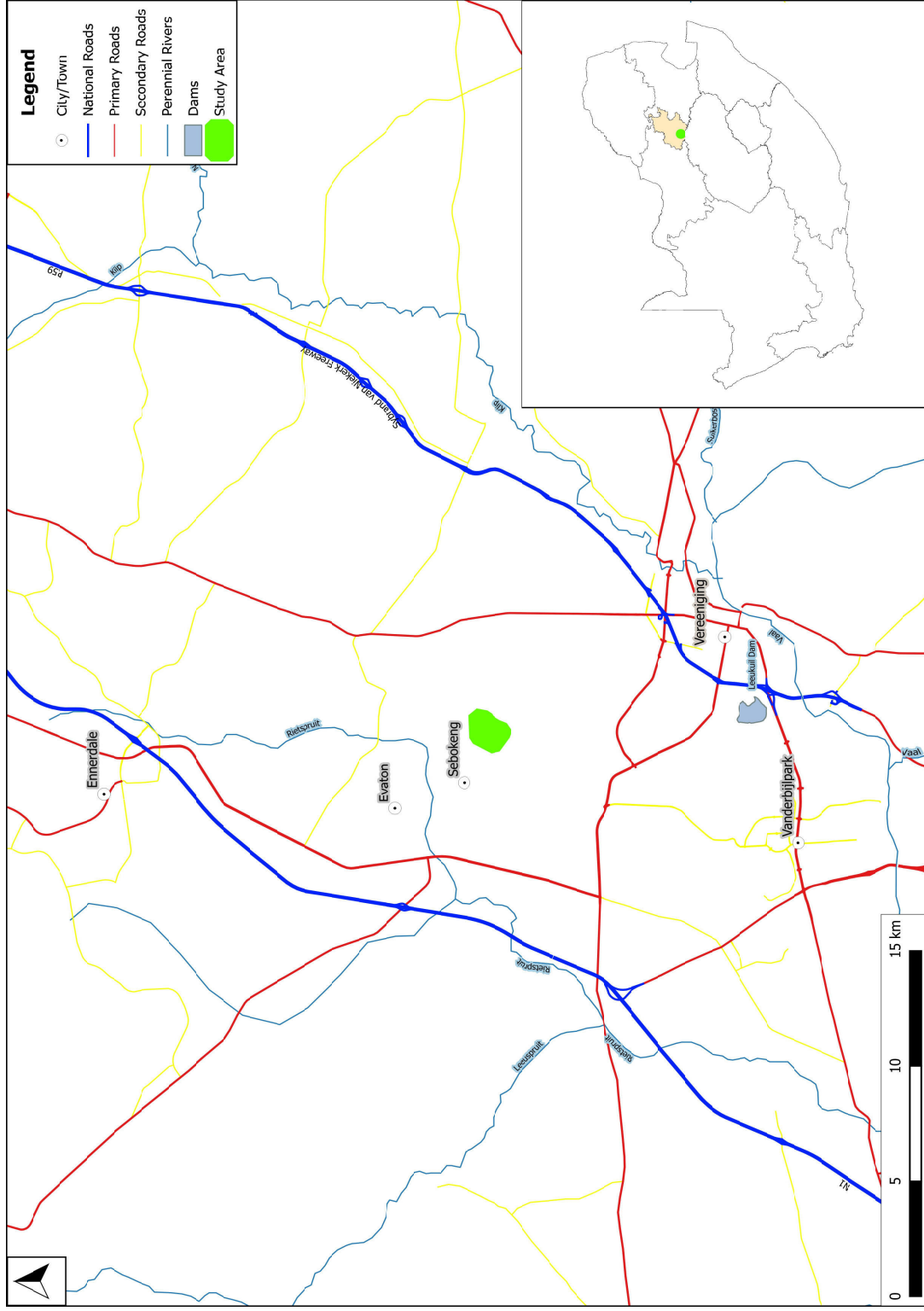
At this stage, phase 1 will involve filling the burrow pits to 2 m above ground level (AGL) to allow for settlement. This phase's total volume will be 3 400 000 m<sup>3</sup> with a 22 years life at 11 000 m<sup>3</sup> of waste disposed per month. The final airspace will include raising the landfill to 30 m AGL reaching a total volume of 14 200 000 m<sup>3</sup>. At this volume the landfill will be able to obtain a 90 years life at 11 000 m<sup>2</sup> of waste disposed per month (Le Roux 2017).

The proposed landfill is based on the excavation and preparation of a series of waste cells in phases to generate cover material and the subsequent disposal of waste. These cells should adhere to prescribed design standards that should have the least impact on the environment. Waste will be disposed of in the waste disposal cells that are excavated into in-situ soil. Later phases will see waste disposal above natural ground level, in which case starter berms will form the side of the cells and will be a minimum of 1.5 m high. These berms may be constructed using on-site material, other material or building rubble. Towards the end of the cell's lifespan, the berms will be flattened to provide the required 1:3 gradient for the application of the capping layer (Le Roux 2017).

As a minimum requirement of the rehabilitation of the landfill site, self-sustaining vegetation must be established. This requirement is valid for all areas where no further waste deposition will take place. The final capping design will include the following: 150 mm gas and foundation drainage layer overlain by a geotextile liner, three 150 mm clay liners and finally 200 mm topsoil. The topsoil excavated and stockpiled during the initial phases of the cell development will be used in the final closure. Also, the final cover of an area or phase will be applied upon completion, followed by rehabilitation (Le Roux 2017).

**Table 1:** Property name & coordinates

<b>Property</b>	<b>Portion</b>	<b>Map Reference (1:50 000)</b>	<b>Coordinates</b>
Vlakfontein 546 IQ	Portion of Portion 178	2627 DB	S: -26.570705 E: 27.883663



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

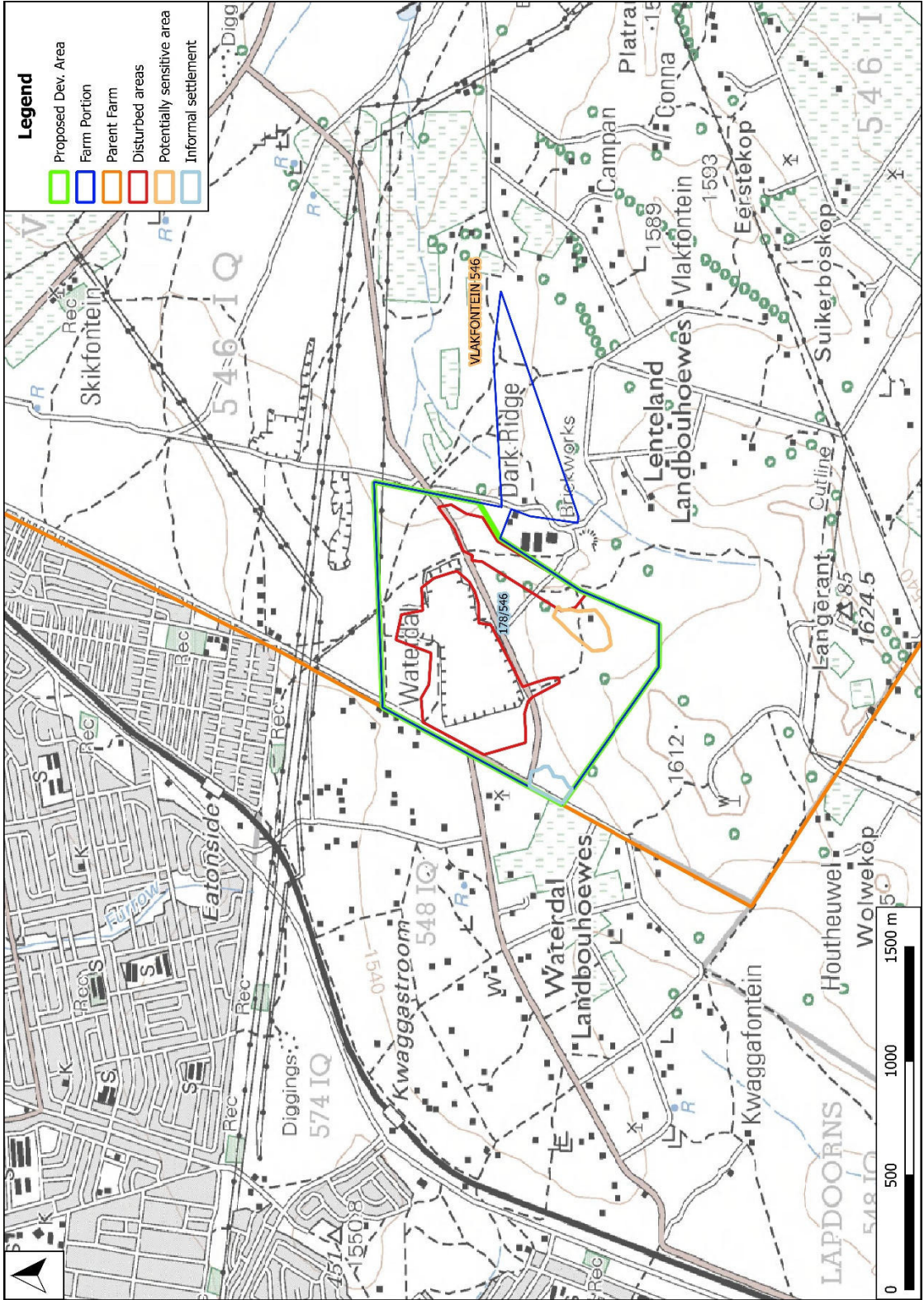


Figure 2: Segment of SA 1: 50 000 2627 DB indicating the study area.



### 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 also 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 Acheulian 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.

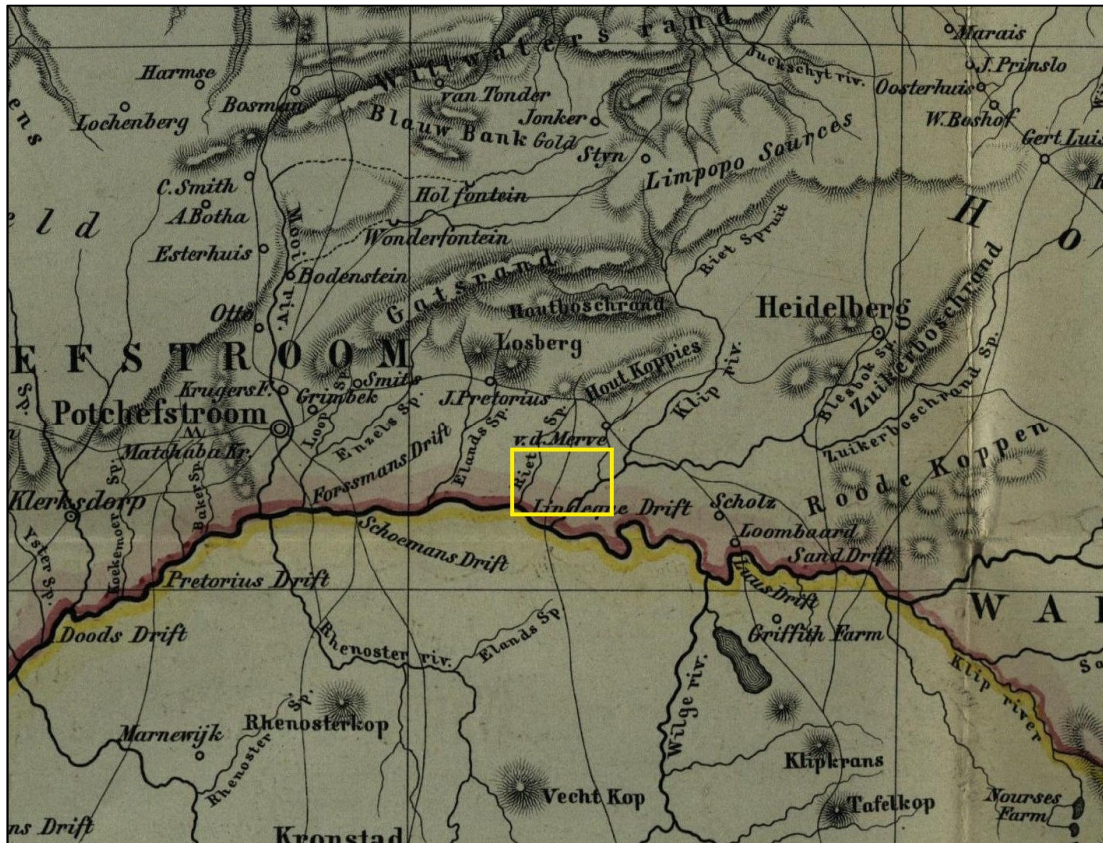


Figure 3: Rough indication of the study area on a map compiled by Merensky (Extract from: Merensky 1875).

### Vereeniging – Archaeo History

George W. Stow discovered coal fields in 1879 on the farm Leeukuill north of the Vaal River. The discovery of coalfields in this area led to the establishment of the *Zuid-Afrikaansche en Oranje Vrystaatsche Steenkool en Mineralen Mijn Vereeniging*. Samuel Marks and Isaac Lewis, the owners of the company, commissioned Stow to purchase and develop the farms with coal deposits in the area. Coal mining began in 1879 and in 1882 the town of Vereeniging was founded on the farm Leeukuil. The name of the town is derived from the name of the coal company. The general Vereeniging area is considered rich in terms of archaeological resources. The Redan rock engravings, for instance, consists of 244 rock engravings on a rock outcrop and was declared a national monument. Initial coal mining revealed plant fossils as well as several Stone Age sites. These sites include Klipplaatdrift, Klip River Quarry site and the Van Riet Louw Archaeological Reserve. Other heritage sites of prominence include bridge pillars from the first railway line over the Vaal, a sawn-off tree trunk marking the location where peace negotiations took place at the end of the Anglo Boer War, the Peace of Vereeniging Monument, a British blockhouse, the Vereeniging concentration camp cemetery, a garden of remembrance, a small Voortrekker monument, a memorial for five miners who died in South Africa's first mining disaster, a bronze plaque commemorating the 100 year anniversary of the discovery of coal at Dickenson Park and one of the first apple processing plants at Makauvei (Pistorius 2007).

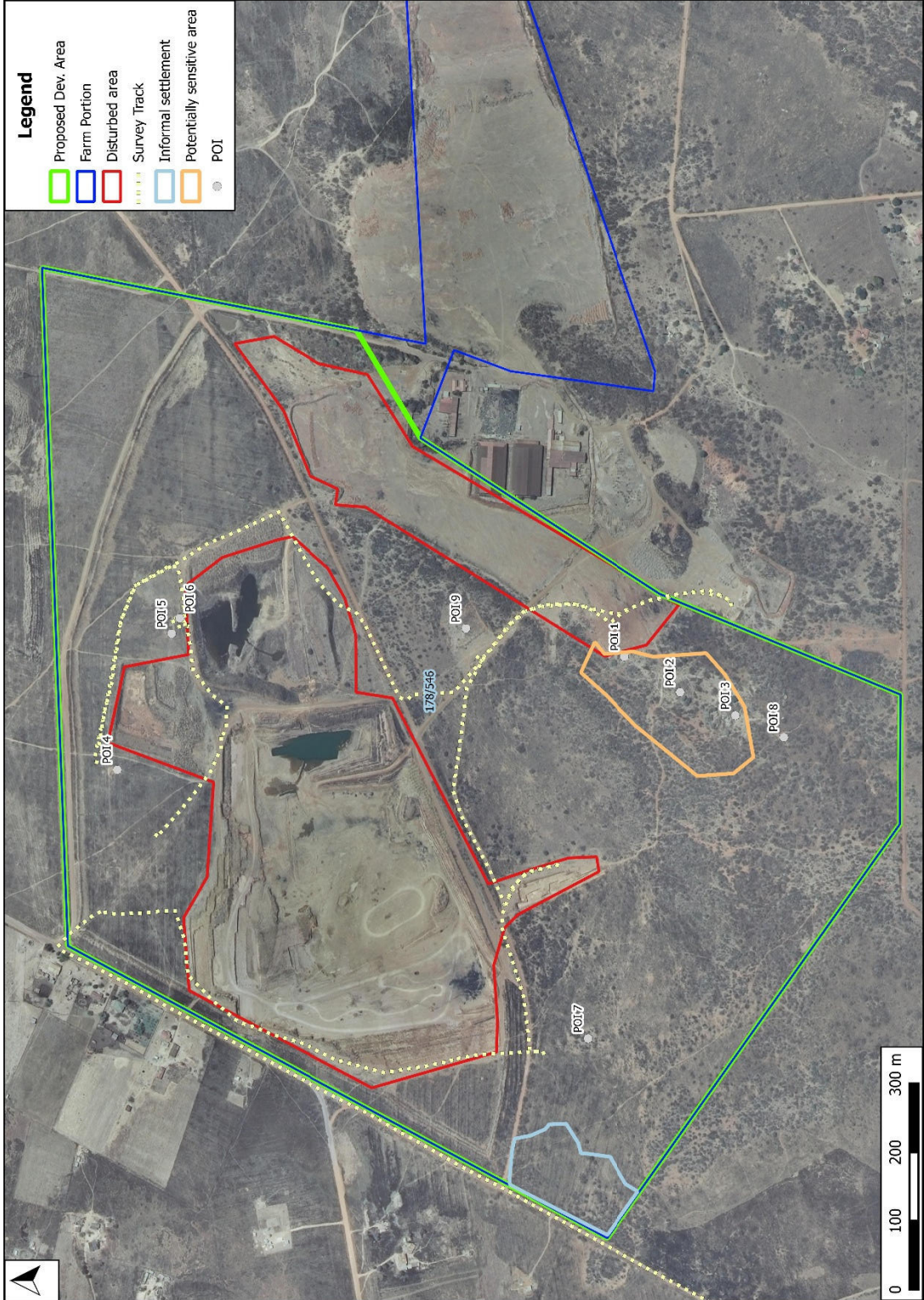
## 4. Methodology

I conducted archaeological reconnaissance of the study area through an unsystematic pedestrian site survey recorded via GPS (Global Positioning System) (**Figure 4**). General site conditions were recorded via photographic record (**Figures 8 – 11**). Also, the site was inspected beforehand on Google as well as historical aerial imagery dating to 1938 (**Figure 5**), 1952 (**Figure 6**) and 1969 (**Figure 7**) in order to identify possible heritage remains. Because safety proved to be a concern, several Points of Interest (POIs 1 - 9) were identified and aerial images and visited during the survey (**Figures 12 – 16**). The POI sites generally appear on aerial images as areas cleared of vegetation or buildings.

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

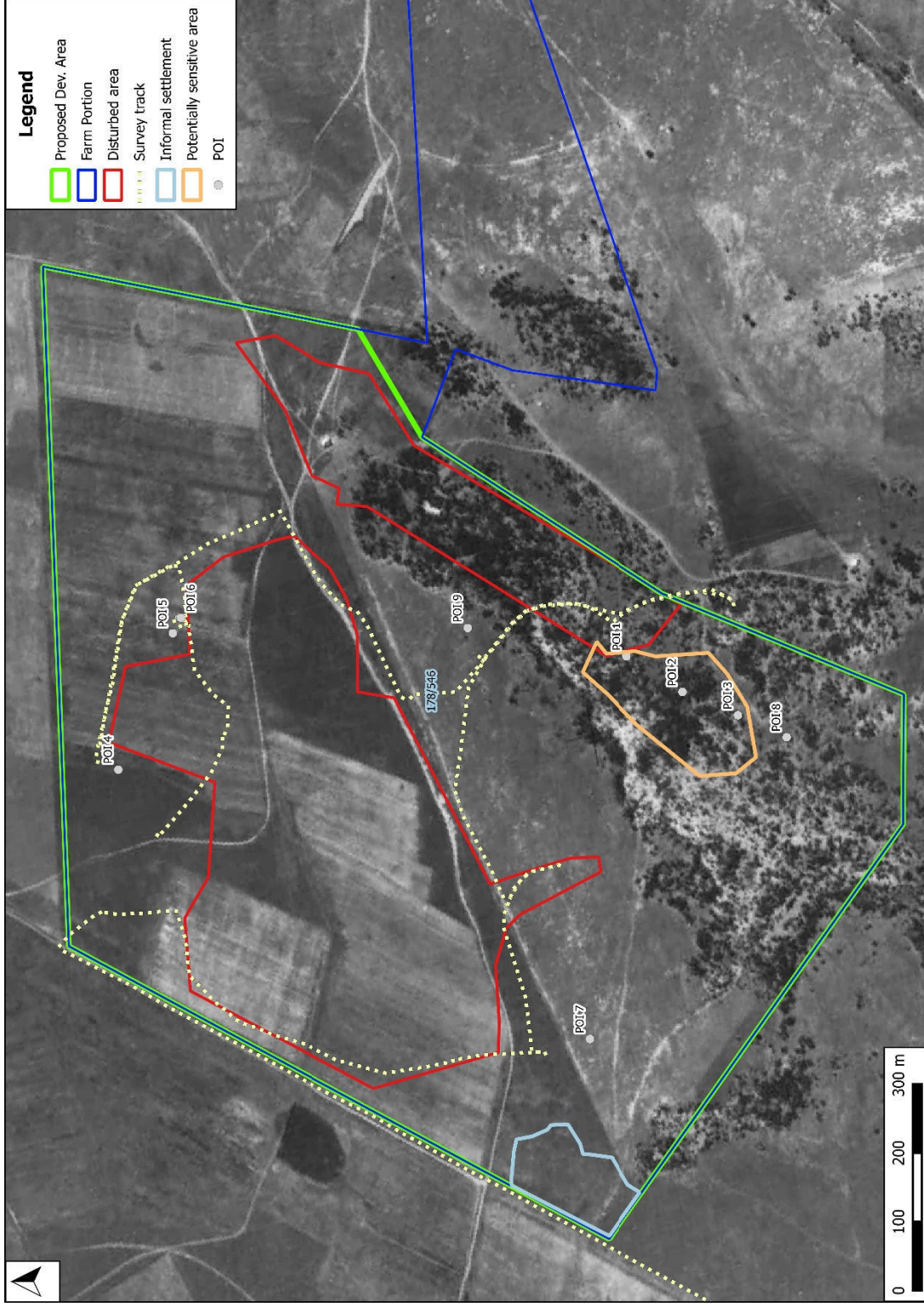
- To obtain an indication of heritage material found in the general area as well as to identify or locate archaeological sites on the area demarcated for development. This was done in order to establish a heritage context and to supplement background information that would benefit developers through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



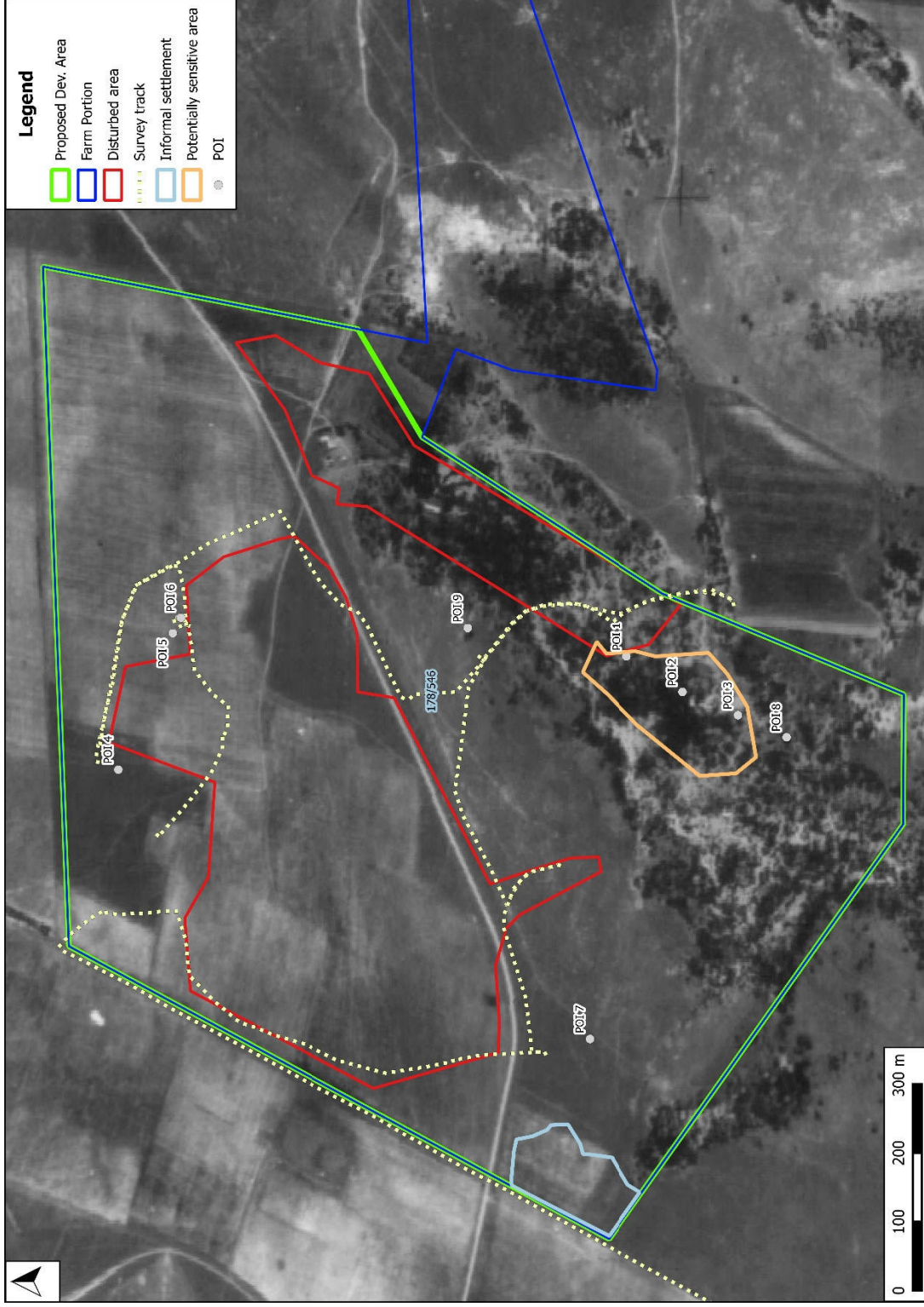


**Figure 4:** Study area with survey tracks.



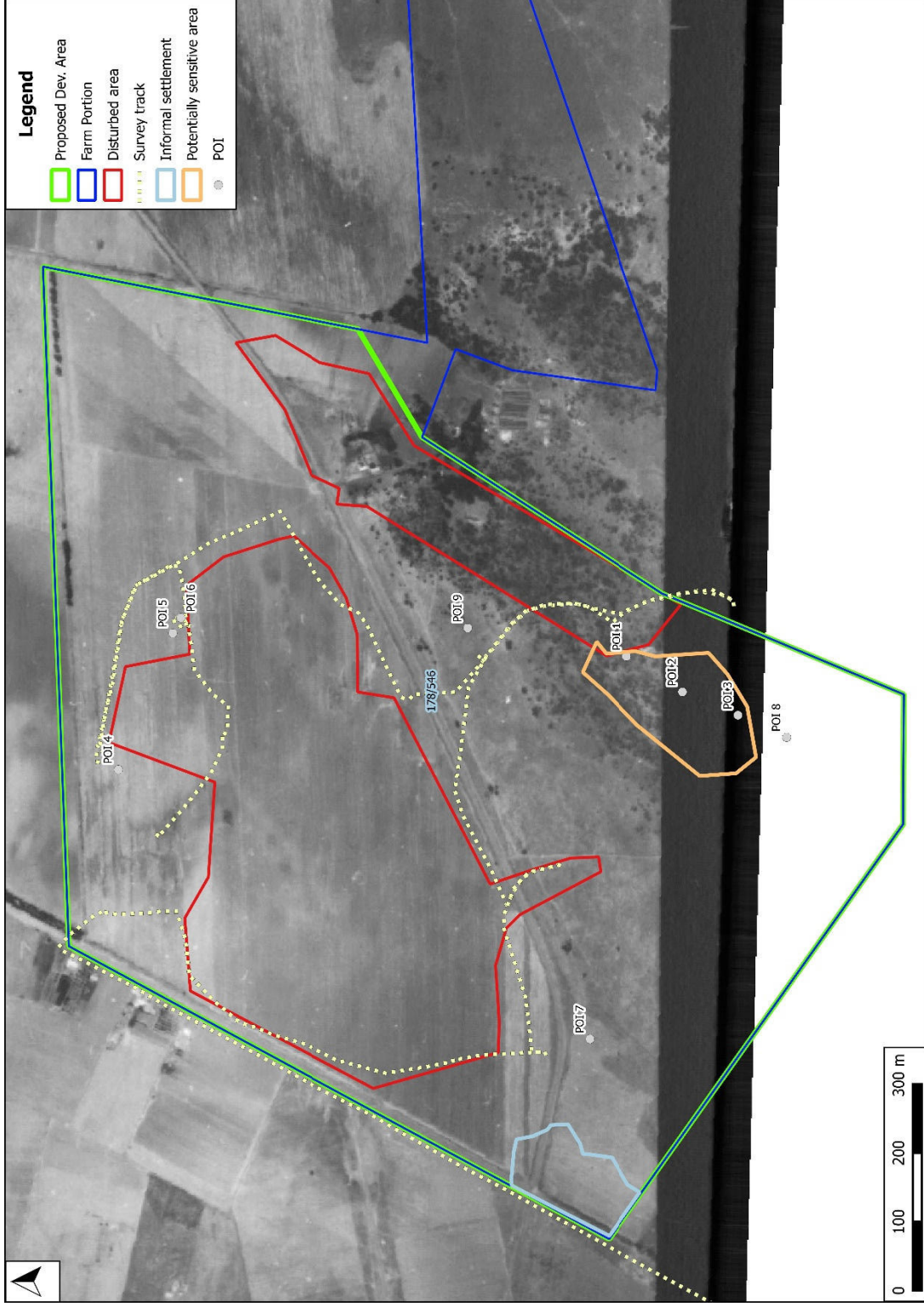


**Figure 5:** Study area indicated on a 1938 aerial photograph.



**Figure 6:** Study area indicated on a 1952 aerial photograph.





**Figure 7:** Study area indicated on a 1969 aerial photograph.



**Figure 8:** Main pit area.



**Figure 9:** Northern section of study area.





**Figure 10:** General environment along the western border of the study area.



**Figure 11:** Informal settlements along the western border of the study area.



**Figure 12:** POI 1 – building ruin.



**Figure 13:** POI 4 – clearing.





**Figure 14:** POI 5 – clearing.



**Figure 15:** POI 6 – clearing.



**Figure 16:** POI 9 – building ruin.

## **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.

### **4.1.1 Previous research**

#### **Pipeline development between Vanderbijlpark and Vereeniging**

A phase 1 HIA was done for the construction of a pipeline between Vanderbijlpark and Vereeniging. Sections of the pipeline are located in the general proximity of the study area. The HIA revealed two historical graveyards, historical houses, as well as stone structures of historical significance. One of the graveyards contain about 70 graves and the other about 50. Both graveyards have graves dating to the 1800s. The historical houses most likely date to the 1940s and may be associated with the railway line between Pretoria and the former Iscor.

Some of the historical houses near a different section of the pipeline date to the late 19<sup>th</sup> century. The stone structures are angular in layout and therefore point to historical times (Pistorius 2007).

#### **Power lines connecting Kookfontein and Jaguar**

The HIA survey done for the construction of five alternative routes for an 88 kV power line connecting Kookfontein and Jaguar substations, located in the vicinity of the proposed development, revealed eight heritage sites. These sites consist of two Stone Age sites and six historical sites. The Stone Age sites include rock engravings and stone tools, while the historical sites include a culvert, a farmstead, contemporary people's park and formal and informal cemeteries. According to the author, it was possible to avoid all the heritage sites during the construction of the power line (Van Schalkwyk 2013).

#### **Meteor Substation and Associated power lines in Sebokeng Township**

An AIA survey was done for the construction of the Meteor substation and associated 88 kV power line, located to the west of the proposed landfill site. The study located nine sites of heritage importance. These sites consist of three burial sites, structures with stone dressing, several other structures, two churches and a cross (Magoma 2014).

## **4.2 Limitations**

The northern half of the study area consists mainly of the disused clay quarry and short grassland, which offered good visibility during the time of surveying (December 2017). The southern section consists of a combination of a disturbed area, informal settlements, a potentially sensitive area and very dense vegetation that hampered movement (**Figure 17**). The potentially sensitive area could not be accessed, but building ruins appear on aerial imagery from 2004. General site conditions proved to be unsafe due to the combination of remoteness and illegal occupants on the site. Therefore, a systematic pedestrian survey could not be done and POI 2, 3, 7 and 8 could not be reached. POI 2 & 3 appear to be building ruins, while POI 7 & 8 are clearings in the vegetation. Historical aerial imagery, however, did prove useful in establishing the age of the structures and the clay quarry.





**Figure 17:** Dense vegetation on the southern section of the study area.

## **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 18 - 20** below are examples of stone tools often associated with the Early, Middle and Later Stone Age of southern Africa.

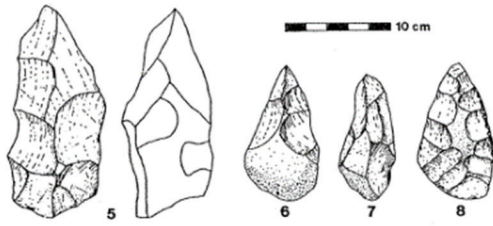


Figure 18: ESA artefacts from Sterkfontein (Volman 1984).

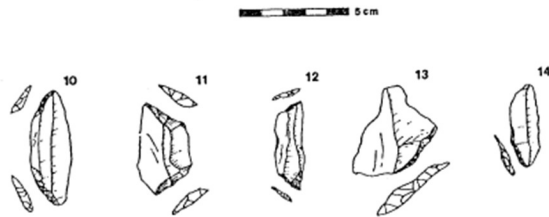


Figure 19: MSA artefacts from Howiesons Poort (Volman 1984).



Figure 20: LSA scrapers (Klein 1984).

## 5.2 Iron Age Farmer Remains

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

## 5.3 Historical Remains

I found no Historical remains within the demarcated study area.

## 5.4 Recent remains

The historical aerial images from 1952 show no indication of the clay quarry and structures associated with the 'potentially sensitive area' as indicated on **Figure 4**, proving that the quarry and structures are not older than 60 years. According to historical imagery, these structures were demolished around 2004, while the structures on

the eastern 'disturbed' area were demolished between 2010 and 2011. Apart from these remains, some dumping is present on the site, as well as informal settlements.

## 5.5 Graves

No graves were observed during the survey of the area demarcated for development.

## 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 Rating

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 2:** 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

\*No sites of heritage importance were observed on the area demarcated for development. Although the building ruins in the 'potentially sensitive area' do not exceed 60 years of age, this area could not be accessed and the sensitivity verified. Therefore, no rating was assigned.



## 7. Statement of Significance & Recommendations

### 7.1 Statement of significance

#### **The study area: A Portion of Portion 178 of the Farm Vlakfontein 546 IQ**

The study area is disturbed as a large section consists of an abandoned clay quarry, several informal settlements, roads and dumping. Towards the southern border, several structures appear on aerial photographs from 2004, but in later images only ruins are visible. Historical aerial photographs also proved that the quarry and the ruins to the south do not exceed 60 years. Although the ruins do not exceed 60 years, it might still be sensitive from a heritage perspective and should be avoided until an archaeologist can gain access to the sites to verify the situation. It should also be noted that some parts of the study area were previously exposed to agricultural activities resulting in further disturbances. Although the site is disturbed, previous studies done in the vicinity prove that the general area is rich in heritage resources and include Stone Age and historical remains.

### 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 in the area demarcated for development:

- Although the building ruins associated with the 'potentially sensitive area' appear not to exceed 60 years of age, it is recommended that this area be avoided during development and construction phases. Should the need exist to develop this area, a qualified archaeologist should first conduct a site inspection and provide recommendations.
- Because a total coverage pedestrian survey was not possible, it is recommended that special care be taken not to accidentally destroy heritage remains. A qualified archaeologist should be contacted if features/artefacts such as building ruins, stone cairns, graves, or stone tool concentrations are observed.
- 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 area 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 which 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.
- From a heritage point of view, development may proceed on the demarcated portion, subject to the abovementioned conditions, recommendations and approval by the South African Heritage Resources Agency.

## 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

- Clarke, R.J. & Kuman, K. 2000. *The Sterkfontein Caves Palaeontological and Archaeological Sites*. Johannesburg: University of the Witwatersrand.
- Deacon, H. & Deacon, J. 1999. *Human beginnings in South Africa*. Cape Town: David Philip.
- Huffman, T.N. 2007. *Handbook to the Iron Age*. Pietermaritzburg: UKZN Press.
- Klein, R. G. (ed.) 1984. *South African prehistory and paleoenvironments*. Rotterdam: Balkema.
- Le Roux, G. 2017. 1026\_Operational Plan Information for Proposed Yakani landfill (glr). Pretoria: iX Engineers.
- Magoma, M. 2014. Phase 1 Archaeological Impact Assessment Specialist Study Report for the Proposed new Meteor Substation and Associated 88kV Powerlines in Seboken Township of Emfuleni Local Municipality within Sedibeng District Municipality. Gauteng Province. Pretoria: Vhubvo Archaeo-Heritage Consultants.

Mitchell, P. 2002. *The archaeology of southern Africa*. Cambridge: Cambridge University Press.

Mucina, L. & Rutherford, M. C. 2006. *The Vegetation of South Africa, Lesotho and Swaziland*. Strelitzia 19. South African National Biodiversity Institute, Pretoria.

Pistorius, J. 2007. A Phase 1 Heritage Impact Assessment Study for Water and Sewage Pipeline Corridors near Vanderbijlpark in the Gauteng Province of South Africa. Pretoria.

Sa Explorer. Vereeniging Climate. [http://www.saexplorer.co.za/south-africa/climate/vereeniging\\_climate.asp](http://www.saexplorer.co.za/south-africa/climate/vereeniging_climate.asp). Accessed 28-11-2017.

Toth, N. & Schick, K. 2007. *Handbook of paleoanthropology*. Berlin: Springer.

Van Schalkwyk, J. 2013. Heritage Impact Assessment for the proposed construction of Eskom five (5) 88kV powerlines connecting Kookfontein and Jaguar substations, Midvaal and Emfuleni Municipalities, Gauteng Province. Pretoria: J van Schalkwyk.

Volman, T.P. 1984. Early Prehistory of southern Africa. In: Klein, R. G. (ed.) *Southern African prehistory and paleoenvironments*. Rotterdam: Balkema.

*Human Tissue Act No. 65 of 1983, Government Gazette, Cape Town*

*National Heritage Resource Act No.25 of 1999, Government Gazette, Cape Town*

*Removal of Graves and Dead Bodies Ordinance No. 7 of 1925, Government Gazette, Cape Town*

## **Maps**

Merensky, A. 1875. Original Map of the Transvaal or South-African Republic including the Gold and Diamondfields. Berlin & Botsabelo.