

# **PHASE 1 ARCHAEOLOGICAL IMPACT ASSESSMENT**

**For**

**The Proposed Poultry Farm  
on Portion 3 of the Farm  
Kameel Zyn Kraal 547 JR,  
Bronkhorstspruit, Gauteng**

**Author ©:**

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**July 2021**

A Phase 1 Archaeological Impact Assessment for the Proposed Poultry Farm  
on Portion 3 of the Farm Kameel Zyn Kraal 547 JR, Bronkhorstspruit,  
Gauteng

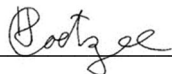
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I, Tobias Coetzee, declare that –

- I act as the independent specialist;
- I am conducting any work and activity relating to the proposed Eggspert Kameelzynkraal Poultry Farm 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: 15 July 2021

## List of Abbreviations

**AIA** – Archaeological Impact Assessment

**CRM** – Cultural Resource Management

**EIA** – Environmental Impact Assessment

**ESA** – Early Stone Age

**GPR** – Ground Penetrating Radar

**GPS** – Global Positioning System

**ha** – Hectare

**HIA** – Heritage Impact Assessment

**km** – Kilometre

**LIA** – Late Iron Age

**LSA** – Later Stone Age

**m** – Metre

**MASL** – Metres Above Sea Level

**MEC** – Member of the Executive Council

**MSA** – Middle Stone Age

**NHRA** – National Heritage Resources Act

**NEMA** - National Environmental Management Act

**SAHRA** – South African Heritage Resources Agency

## Executive Summary

The author was appointed by BECS Environmental (Pty) Ltd to undertake a Phase 1 Archaeological Impact Assessment (AIA) for the proposed construction of the Eggspert Kameelzynkraal Poultry Farm on a portion of Portion 3 of the Farm Kameel Zyn Kraal 547 JR near Bronkhorstspuit, Gauteng. The aim of the study is to determine the scope of archaeological resources that could be impacted by the proposed poultry farm.

A total of 17 sites were recorded during the pedestrian survey and inspection of historical aerial images and topographical maps: Two natural sites (K03 & K10), six contemporary sites (K04, K05, K07, K08, K11, K13), six sites dating to the historic period, two Late Iron Age Sites (K12 & K14), and one potential grave (K15).

One of the natural sites proved to be a rocky outcrop, while the other appears to be associated with the removal of rocks for the creation of a cultivated field. The sites are not significant from a heritage perspective and no further action is required.

The six contemporary sites do not exceed 60 years of age and appear not to be significant from a cultural perspective. No further action is required.

The six sites dating to the historic period consist of three intact sites, two demolished sites and one building ruin. Although modern in appearance, the intact sites, or parts thereof, might exceed 60 years of age and should therefore be avoided by the proposed development (K06, K16, K17). The demolished sites (K01 & K09) might be associated with subsurface culturally significant material and care should therefore be exercised when developing in the vicinity of these sites. The stone-walled ruin (K02) appears to have been associated with a building during historical times and should be avoided by the proposed development.

The Late Iron Age sites (K12 & K14), as well as the associated sensitive area, are considered culturally significant and should be avoided by the proposed development or any other activity since these sites can be linked via oral traditions to the Manala Ndebele groups of Kameel Zyn Kraal that date to between 1600 and 1800. Should impact not be avoidable, a Phase 2 AIA will be required. The area to the north of Site K14, however, may be accessed via the existing jeep track to the east of the site.

Subject to adherence of the recommendations and approval by SAHRA (South African Heritage Resources Agency), the proposed Eggspert Kameelzynkraal poultry farm may continue. Should skeletal remains be exposed during rehabilitation, 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.

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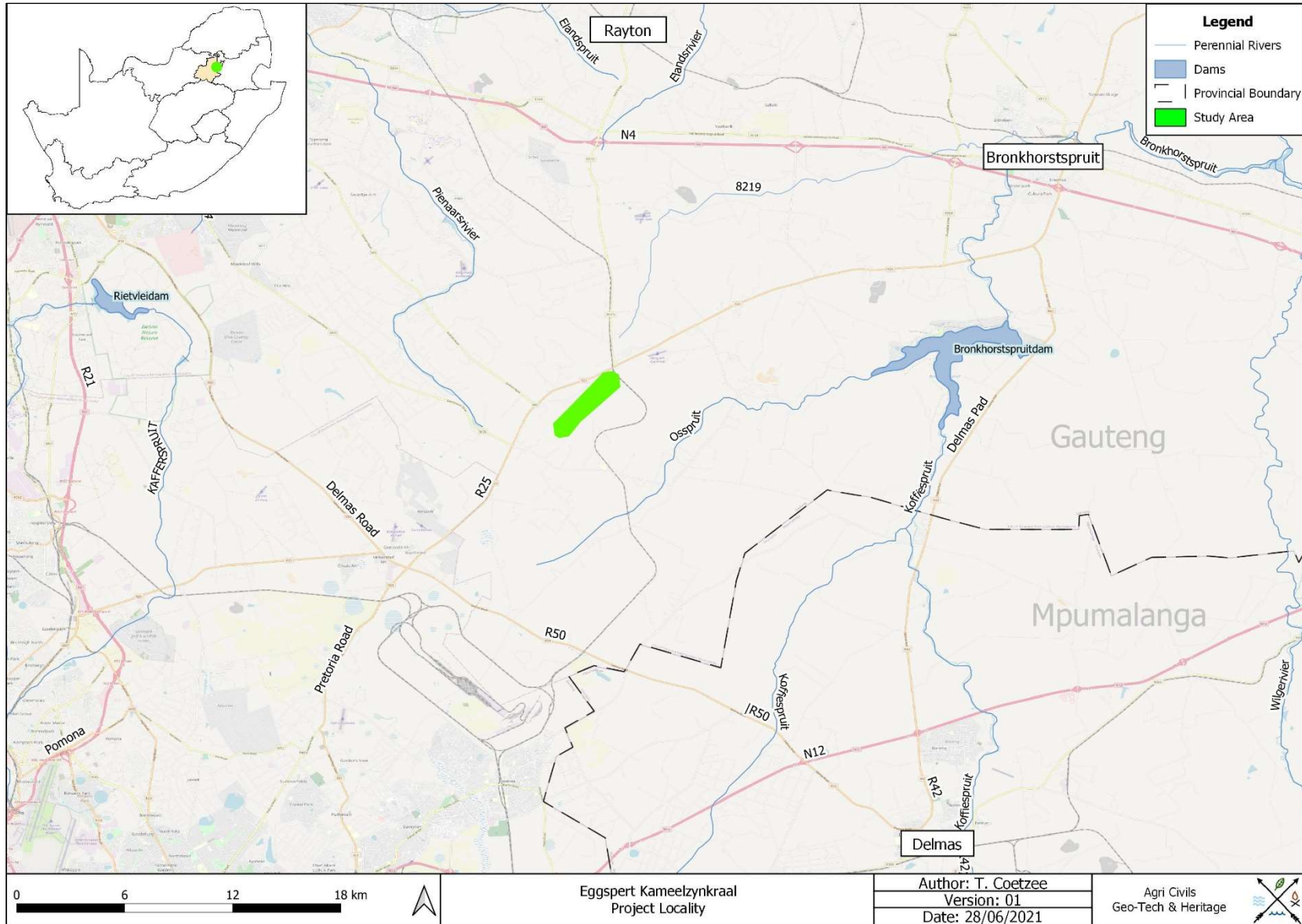
# 1. Project Background

## 1.1 Introduction

The author was appointed by BECS Environmental (Pty) Ltd to undertake a Phase 1 Archaeological Impact Assessment for the proposed Eggspert Kameelzynkraal Poultry Farm. The proposed study area is located on a portion of Portion 3 of the Farm Kameel Zyn Kraal 547 JR, approximately 27 km southwest of Bronkhorstspuit in the Gauteng Province (**Figures 1 & 2, Table 1**). Surrounding towns include Delmas 30 km to the southeast and Rayton 20 km to the north. The purpose of this study is to examine the demarcated portion in order to determine if any archaeological resources of heritage value will be impacted by the proposed poultry farm, 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 demarcated portion.

The following report discusses the implication for the development of the Eggspert Kameelzynkraal Poultry Farm and the associated activities on the demarcated portion of Portion 3 of the Farm Kameel Zyn Kraal 547 JR with regard to heritage resources. The demarcated portion is rectangular in shape, forms the north-eastern half of Portion 3 and is located roughly in the middle of the parent farm. 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 the project within the demarcated study area.





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

## 1.2 Legislation

The South African Heritage Resources Agency 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 (Environmental Impact Assessment) 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 (NHRA).

### 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)*

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 Member of Executive Council 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 proposed poultry farm is situated on a portion of the following property:

**Table 1:** Property name & coordinates

| Property                   | Portion | Map Reference<br>(1:50 000) | Lat        | Lon       | Parcel<br>Size (ha) | Proposed<br>development<br>(ha) |
|----------------------------|---------|-----------------------------|------------|-----------|---------------------|---------------------------------|
| Kameel Zyn Kraal<br>547 JR | 3       | 2528 DC                     | -25.926295 | 28.513800 | 107.9               | ±67                             |

Bronkhorstspuit is located about 27 km northeast of the proposed Eggspert Kameelzynkraal Poultry Farm, while Rayton is located 20 km to the north and Delmas 30 km to the southeast. The study area falls within the Tshwane Metropolitan Municipality in the Gauteng Province. The R25 primary road runs in a northeast – southwest direction approximately 500 m west of the study area, while several local roads are found in the general area (**Figure 1**). Access to the study area is via a local gravel road turning from the R25 primary road.

In terms of vegetation, the study area falls within the Grassland Biome and Mesic Highveld Grassland Bioregion. On a local scale, the proposed prospecting area is classified as Rand Highveld Grassland. According to Mucina & Rutherford (2006) Rand Highveld Grassland 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 conservation areas. Rand Highveld Grassland consists of the areas between rocky ridges from Pretoria to eMalahleni, extending onto ridges in the Stofberg and Roosenekal regions. Other localities include the area west of Krugersdorp, as well as the Potchefstroom and Derby surroundings. Almost 50% of this vegetation unit has been transformed by cultivation, plantations, urbanisation and the building of dams. Scattered alien invasive species are found in about 7% of the vegetation unit. Erosion in this area is moderate to high in only about 7% of the vegetation unit.

The average elevation for Rand Highveld Grassland varies between 1300 and 1635 MASL (Metres Above Sea Level) while the average elevation of the study area is 1560 MASL and slopes from the slightly more elevated north-eastern section to the lower south-western section.

The study area falls within the summer rainfall region and the average annual rainfall is roughly 677 mm per year. The average maximum temperature for the study area is recorded during January when an average of 21.3 °C is reached. The average minimum temperature is recorded during June when an average of 10 °C is reached (Climate-data.org 28/06/2021).

The study area falls within the B20C Quaternary Catchment within the Olifants Water Management Area. The closest perennial river to the study area is Osspruit and flows approximately 6 km to the east of the proposed poultry farm. A few non-perennial offshoots are found near the demarcated study area with one offshoot intersecting the southern section of Portion 3 that will not be developed.

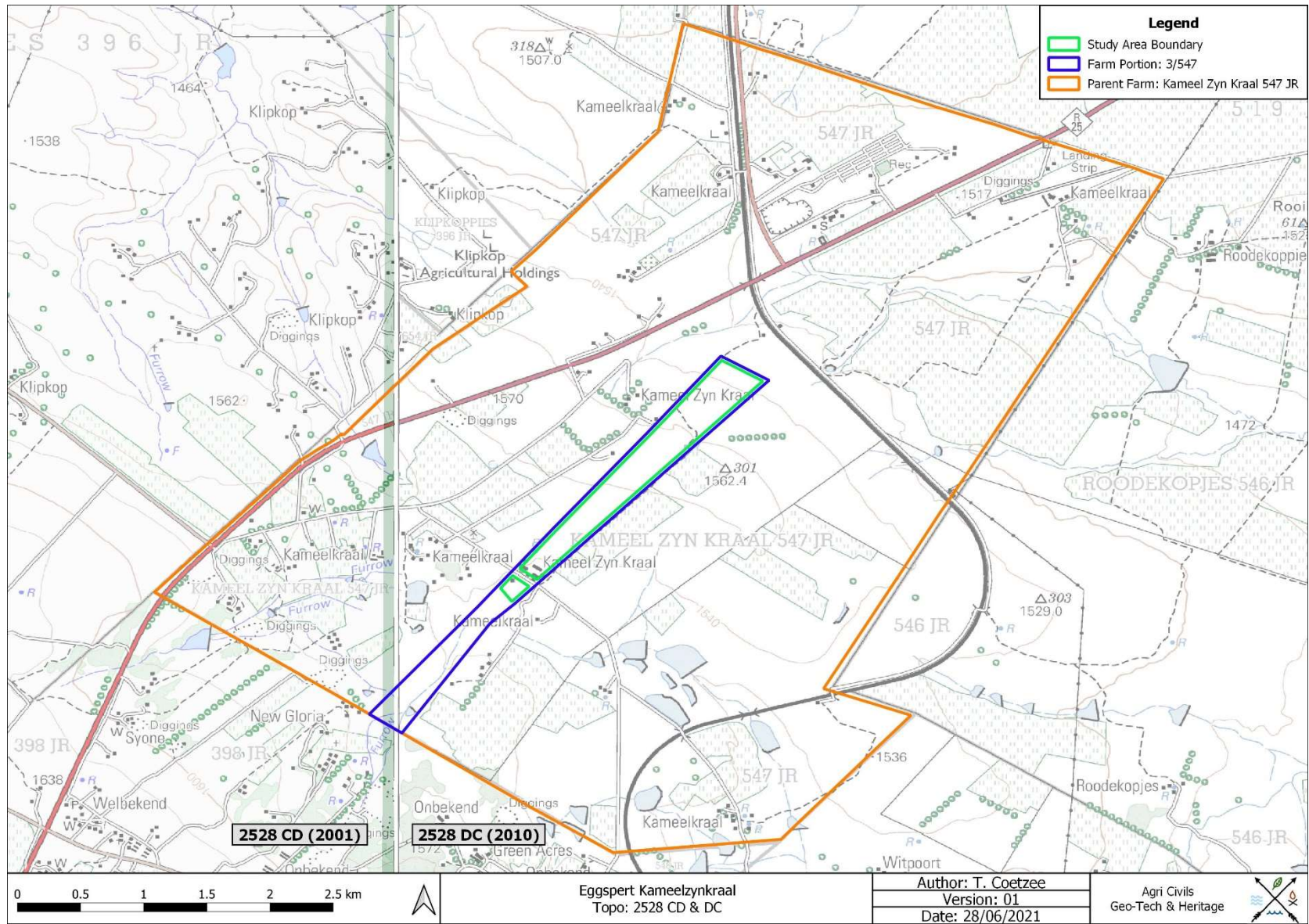
On a local scale, the study area is fenced-off and is split into a north-eastern and south-western section by a local gravel road. The north-eastern section is characterised by the main residence, stables and outbuildings, as well as cultivated fields, boma and an open area towards the north-eastern boundary. The south-western section is associated with a non-perennial stream, animal camps, open areas and cultivated fields. The greater area is generally associated with farming related activities. Historical aerial images (**Appendix A**) show sections of the study area to be cultivated since at least 1961 with the existing gravel road present since at least 1939.

## 2.2 Project description

The area identified for the construction of the Eggspert Kameelzynkraal Poultry Farm is approximately 67 ha. The entire portion north of the gravel road (63.6 ha) will be considered in the planning of the proposed poultry farm, while only small section to the south of the gravel road (3.34 ha) will be considered (**Figures 2 & 3**).

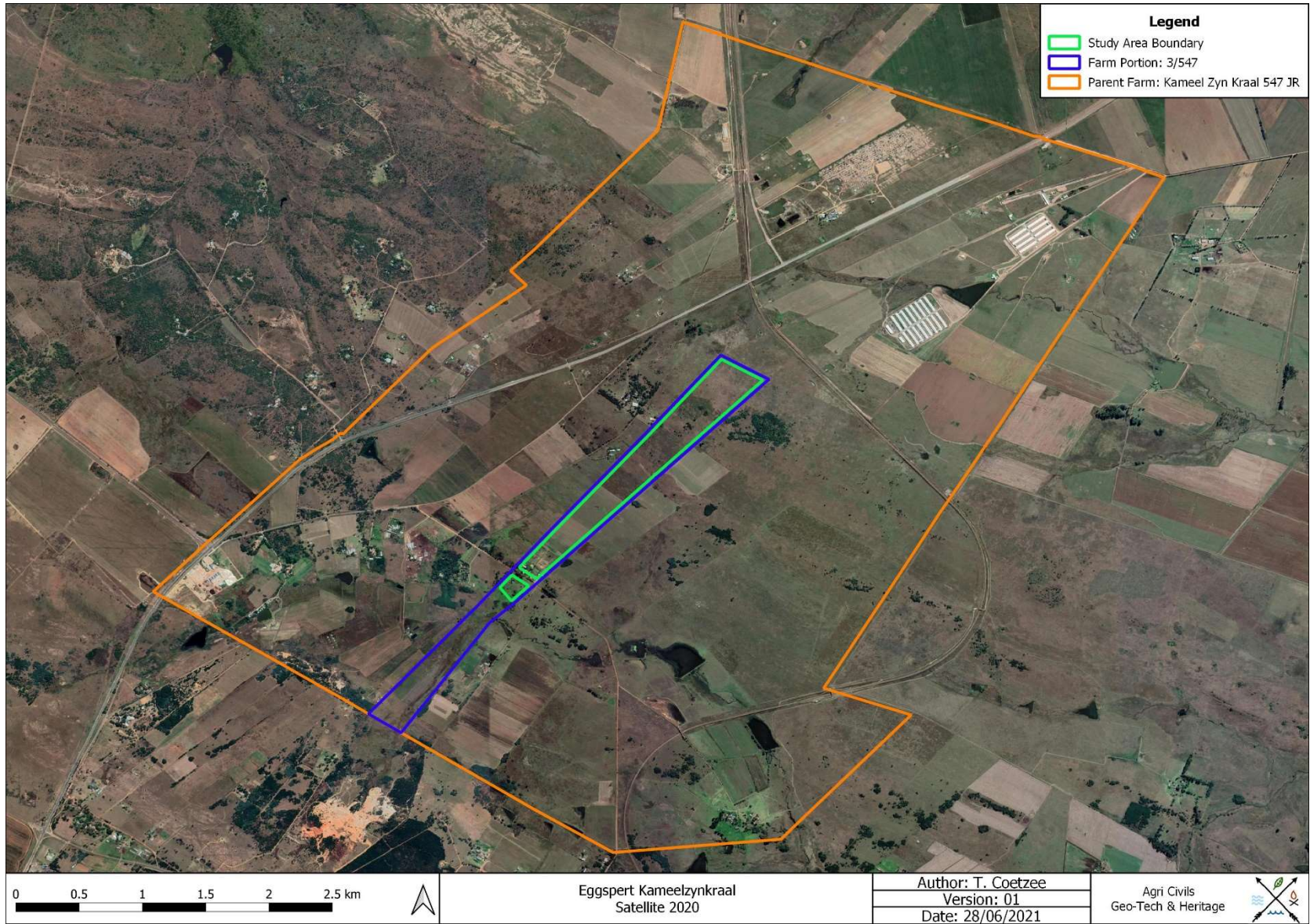
The project aims at constructing seven chicken rearing houses and the associated infrastructure. Each chicken house will measure approximately 1000 m<sup>2</sup> and each coop will house roughly 32 500 day-old chicks. Roads with an estimated width of four metres will be constructed on the site and vegetation clearing of between 1 ha and 20 ha will be required. Approximately 360 m<sup>3</sup> of water, that will be abstracted from boreholes, will be stored in a water reservoir. The annual groundwater abstraction will be roughly 20 000 m<sup>3</sup>.





**Figure 2:** Segments of SA 1: 50 000 2528 CD & DC indicating the study area.





**Figure 3:** Study area indicated on a 2020 satellite image.

### 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 Ages

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 (Early Stone Age) 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 (MSA) 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 (LSA) 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). These artefacts are often associated with rocky outcrops or water sources. The LSA site, Fort Troje, is located just north of Cullinan and approximately 36 km north of the proposed Eggspert Kameelzynkraal poultry farm (Korsman et al. 1998: 95).

## 3.2 The Iron Age & Later History

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 (LIA) 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.

In terms of general project area, the region is well known for LIA sites. The area west of Wonderboompoort is associated with one of the earliest LIA sites. Further to the west a high concentration of sites is also found that stretches to Olifantspoort in the Magaliesberg. These sites date to the Moloko period that roughly stretched from AD 1100 – 1500 (Van Vollenhoven 2006).

Oral traditions of Nguni-speaking Ndebele groups indicate their sites in the area to the east of Pretoria, while heritage reports conducted on the stone-walled sites of this area suggest that Ndebele-speaking people inhabited this area between the late 1600s and mid-1800s (Antonites 2020).

According to Van Vuuren (2006), Ndebele oral traditions state that they first settled at Emhlangeni, translating to “At the reeds”, near Randfontein in the Gauteng Province. Accordingly, they entered the Pretoria region during the early to mid- 1600s and settled at KwaMnyamana, which translates to “Place of the Black Hills”. KwaMnyamana is located close to the Hippo Quarries crusher site on the farms De Onderstepoort (300JR) and Doornpoort (295JR). The first chief to settle at this site was called Musi. A split between his sons caused the Ndebele to divide into several tribal entities. The descendants of the youngest son, Ndzungza, moved further to the east, while the descendants of the eldest son, Manala, stayed behind.

The first composite pre-colonial Manala settlement was known as *Ezotshaneni* and is roughly situated on both sides of the current Cullinan-Bapsfontein roads (R515 and R25) and with one section located south of the N4 national road between the Donkerhoek and Cullinan off-ramps. The eastern section of the site includes the Osspruit. The following farms are associated with *Ezotshaneni*: Kleinsonderhout (519JR), Rhenosterfontein (514JR), Rietvlei (513JR), Witfontein (521JR), Puntlyf (520JR), Boschkop (543JR), Roodekopies (546JR), Kameel-zijn-kraal (547JR), Onbekend (398JR), Witpoort (551JR), Knoppiesfontein (549JR), Vlakfontein (548JR), Boscchkop (369JR). Of importance to the proposed poultry farm, is the reference to Kameel-zijn-kraal. Accordingly, this was known as *KwaMangungu* (“Place of the drums”) and refers to the drums used during the girls’ initiation rituals (Van Vuuren 2006).

A later Ndebele invasion that was led by Mzilikaze in 1827, settled at Kungwini, present day Wonderboom in Pretoria North. In 1832, the Zulu king Dingane attacked Mzilikaze at Kungwini. According to Van Vollenhoven (2006), the Sotho-Tswana groups are the largest Bantu language speaking people who are formed by the Northern and Southern Sotho, as well as the Tswana. These groups are responsible for large stone-walled towns and according to oral histories, these groups re-established themselves after the 1827 arrival of Mzilikaze during the Mfecane/Difaquane.

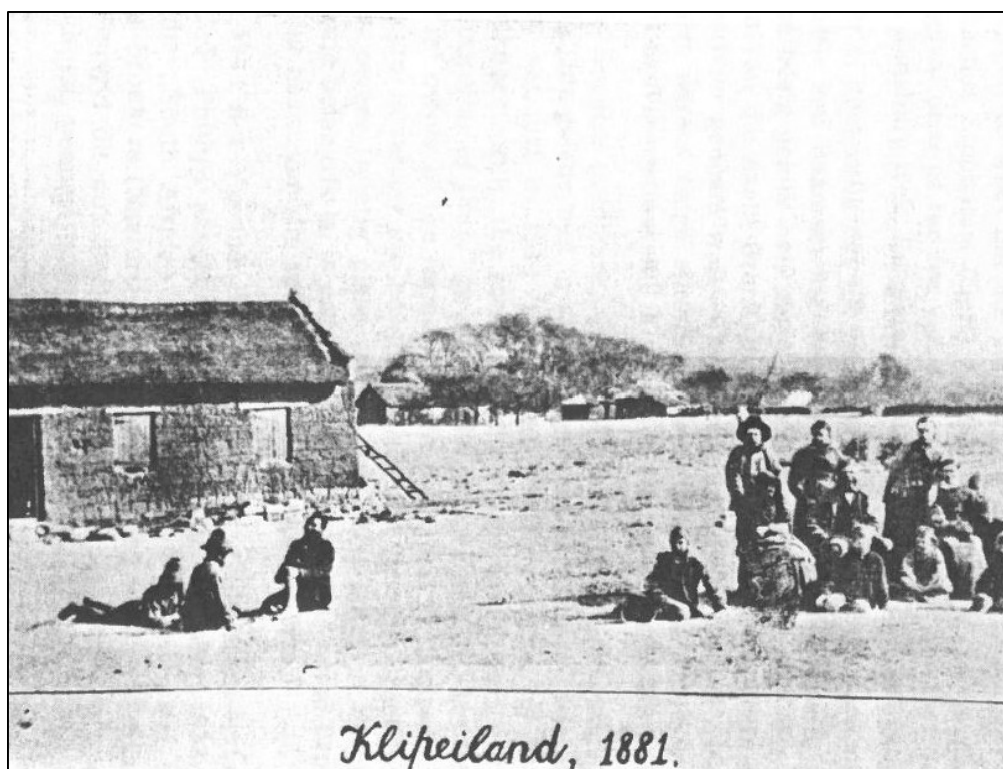
According to Huffman (2007), the pottery associated with the general area surrounding Pretoria belongs to the Buispoort facies of the Moloko Branch of the Urewe Tradition. A likely date range of AD 1700 – 1840 is suggested.

### 3.2.1 The 1st Anglo-Boer War - The Battle of Bronkhorstspuit

In 1874 Lord Carnarvon, the Colonial State Secretary, wished to unite British territory and the two Republics under the British flag. Because none of these states were in favour of uniting, Carnarvon reasoned that through uniting with the Transvaal, the others would follow. Due to poor relations, the only option left was annexation. In 1877 Shepstone was sent from Natal to Pretoria with a police force of 25 with the goal to annex the Transvaal. On 12 April 1877, Shepstone raised the British flag and the Transvaal was annexed without firing a single shot. Several deputations were sent to England to regain independence, but both failed. Consequently S. P. J. Kruger, P. Joubert and M. W. Pretorius decided to gather the nation at Paardekraal to discuss the future of the Transvaal. During the meeting, which lasted from 12 to 16 December 1880, it was decided that Heidelberg would serve as the seat of the government. British forces were stationed in most of the towns, but were too weak to launch attacks on the Boer forces. British forces were therefore ordered from Lydenburg to support forces in Pretoria. Upon receiving this news, Frans Joubert was sent from Heidelberg to Pretoria with a force consisting of between 200 and 300 men to intercept and stop these reinforcements. According to the historian, Theal, the British forces under Col. Anstruther consisted of 257 men and 34 wagons. On 20 December 1880 they arrived at the place known today as Bronkhorstspuit. A brief exchange of words in which Joubert requested Anstruther to discontinue his mission resulted in a 10 to 20-minute battle over open field. After a significant number of casualties on the British side, Col. Anstruther, who was mortally wounded, requested that the white flag be raised. According to Theal, 66 on the British side were killed and 72 wounded. Later, 10 of the wounded died as well. On the Boers' side, one commando member was killed in action and another five wounded. Later, another succumbed to his wounds. The captives were transported to Heidelberg and from there to the Vaal River. From there they were allowed to go to the Free State. This was the first open battle of the First Boer War (Roodt 1949: 7-9).

The photo below (**Figure 4**) depicts the settlement of Paul Grobler on the farm Klippeiland, where the Battle of Bronkhorstspuit took place. Grobler bought the farm from Salomon Prinsloo in the 1850's and renamed it from Kalkoenkrans to Klippeiland. One of the wounded commando members was treated in this homestead. In the background the homesteads of Marthinus Johannes Grobler can be observed (Rex 1969: 14). The Farm Klippeiland is located approximately 22 km to the northeast of the proposed poultry farm.





**Figure 4:** Grobler residence on Klikeiland (adapted from Rex 1969).

## 4. Methodology

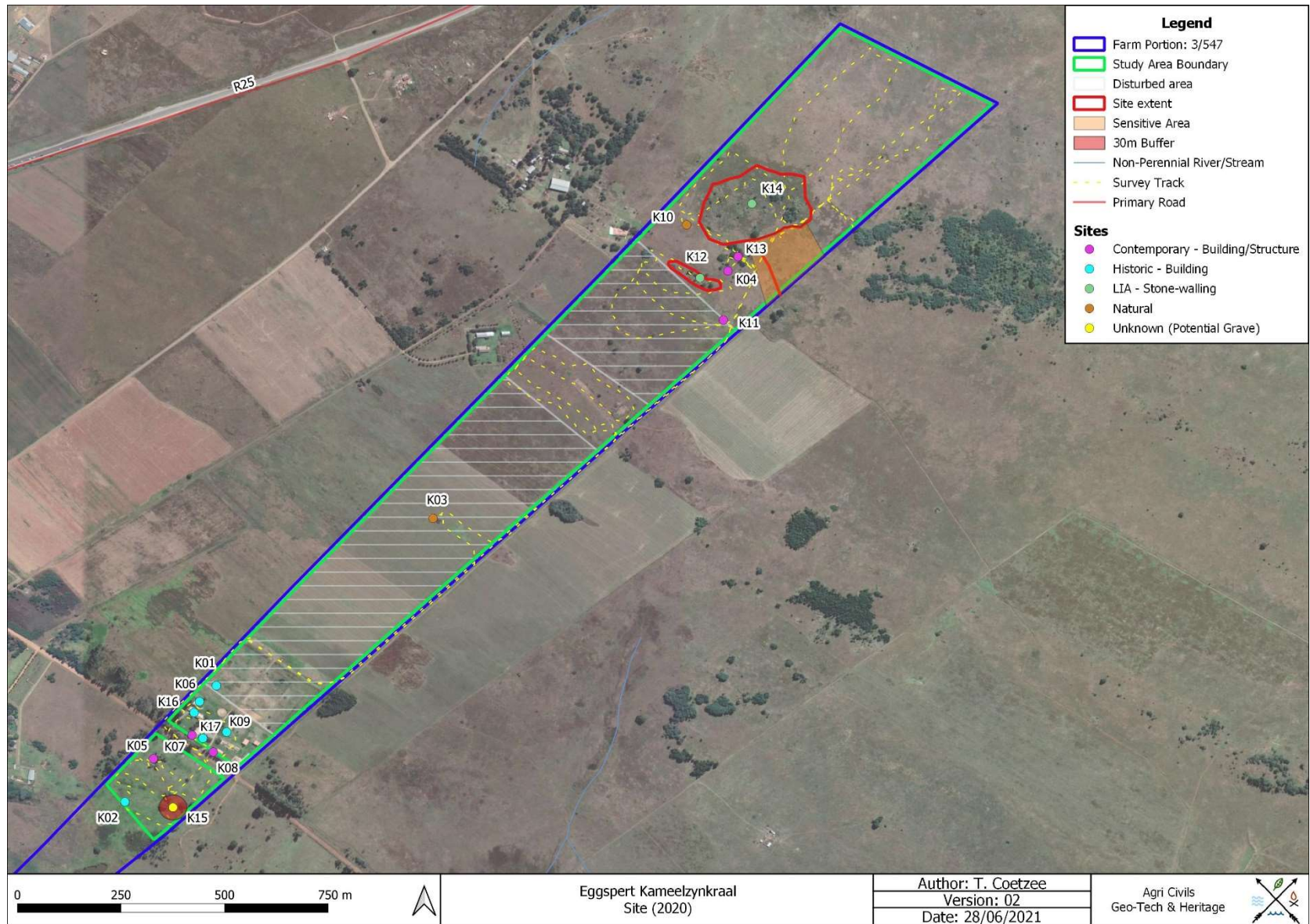
Archaeological reconnaissance of the study area was conducted during June 2021 (Winter) through a combination of systematic and unsystematic pedestrian site surveys that lasted one day (**Figure 5**). The inspection consisted of a systematic pedestrian survey of the undisturbed sections associated with the study area. The transects were spaces roughly 60 m apart where movement was not hampered by dense vegetation. General site conditions were recorded via photographic record (**Figures 6 – 12**). Also, the site was inspected beforehand on Google Earth, historical aerial imagery and topographical maps in order to identify possible heritage remains (**Appendix A**). Fifteen potential sites (K01-K11; K13-K14; K16-K17) were identified on historical topographical maps or aerial images to be visited during the survey (**Table 2 & Figure 5**). Two additional sites (K12 & K15) were identified during the survey (**Table 2 & Figure 5**). It should be noted that the prefix '2528DC' is not used as a site reference due to the length of the name, but is recorded as such in **Tables 2 & 8**. The topographical datasets dating to 1944, 1984, 1995, 2003 and 2010, as well as the historical aerial photographs dating to 1939, 1961, 1965 and 1976 proved useful in terms of providing an indication of the location and age of some of the structures and features associated with the study area, as well as to determine past land uses of the area. The total area surveyed was approximately 67 ha.

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 (Global Positioning System) during the site visit.

**Table 2:** Site coordinates & description

| Name | Off. Name  | Latitude   | Longitude | Description     | Age                       | Current Status | ID Source   |
|------|------------|------------|-----------|-----------------|---------------------------|----------------|-------------|
| K01  | 2528DC-K01 | -25.929303 | 28.509427 | Building        | Historic                  | Demolished     | Topo 1944   |
| K02  | 2528DC-K02 | -25.931823 | 28.507442 | Building        | Historic                  | Ruin           | Aerial 1939 |
| K03  | 2528DC-K03 | -25.925674 | 28.514125 | Natural         | Natural                   | Intact         | Aerial 2020 |
| K04  | 2528DC-K04 | -25.920309 | 28.520520 | Building        | Contemporary              | Demolished     | Aerial 2005 |
| K05  | 2528DC-K05 | -25.930888 | 28.508058 | Building        | Contemporary              | Ruin           | Topo 1995   |
| K06  | 2528DC-K06 | -25.929648 | 28.509061 | Building        | Historic                  | Intact         | Aerial 1961 |
| K07  | 2528DC-K07 | -25.930378 | 28.508899 | Building        | Contemporary              | Intact         | Topo 1984   |
| K08  | 2528DC-K08 | -25.930741 | 28.509357 | Building        | Contemporary              | Intact         | Topo 1984   |
| K09  | 2528DC-K09 | -25.930308 | 28.509648 | Building        | Historic                  | Demolished     | Aerial 1961 |
| K10  | 2528DC-K10 | -25.919308 | 28.519625 | Natural         | Natural                   | Intact         | Aerial 2020 |
| K11  | 2528DC-K11 | -25.921373 | 28.520423 | Structure       | Contemporary              | Intact         | Topo 2003   |
| K12  | 2528DC-K12 | -25.920459 | 28.519916 | Stone-walling   | LIA                       | Intact         | Survey      |
| K13  | 2528DC-K13 | -25.919998 | 28.520742 | Structure       | Contemporary              | Intact         | Aerial 2008 |
| K14  | 2528DC-K14 | -25.918852 | 28.521042 | Stone-walling   | LIA                       | Intact         | Aerial 1939 |
| K15  | 2528DC-K15 | -25.931944 | 28.508485 | Potential Grave | Unknown (Potential Grave) | Unknown        | Survey      |
| K16  | 2528DC-K16 | -25.929886 | 28.508941 | Building        | Historic                  | Intact         | Aerial 1961 |
| K17  | 2528DC-K17 | -25.930444 | 28.509133 | Building        | Historic                  | Intact         | Aerial 1961 |



**Figure 5:** Study area with survey track indicated on a 2020 satellite image.





**Figure 6:** Cultivated fields.



**Figure 7:** Open veldt between two disturbed/cultivated sections.



**Figure 8:** Environment towards the northern boundary of the study area.



**Figure 9:** Southern section of the study area as seen from the gravel road.





**Figure 10:** Intact and demolished buildings associated with the area south of the gravel road.



**Figure 11:** Environment associated with the southern border of the study area.



**Figure 12:** Built environment directly north of the gravel road.

## 4.1 Sources of information

At all times during the survey, standard archaeological procedures for the observation of heritage resources were followed. As most archaeological material occur in single or multiple stratified layers beneath the soil surface, special attention was paid to disturbances; both man-made such as roads and clearings, and those made by natural agents such as burrowing animals and erosion. Locations of archaeological material remains were recorded by means of a Garmin Oregon 750 GPS. These sites, as well as the general conditions of the terrain, were photographed with a Sony Cyber-shot digital camera.

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

Personal communication with Mrs Alet Marais, who has been living in the main residence for eight years, provided useful information regarding the presence of a potential burial site (Alet Marias, pers. Comm. 2021).

### 4.1.1 Historical aerial and topographical maps

The historical aerial image dating to 1939 (**Appendix A: Figure 43**) shows the presence of the LIA archaeological site near the northern boundary of Portion 3, while several footpaths and a gravel roads intersect the study area. Buildings and structures are unclear, but some cultivated fields are visible to the south of the area demarcated for development. The 1944 topographical map (**Appendix A: Figure 44**) also reflects the cultivated fields observed

on the 1939 aerial image, while a building is shown to the north and south of the gravel road. A few additional buildings directly north of the gravel road are visible on the 1961 aerial image (**Appendix A: Figure 45**), while the 1965 and 1976 aerial images (**Appendix A: Figures 46 & 47**) indicate an increase in cultivated fields to the north of the gravel road. By 1984 the topographical map (**Appendix A: Figure 48**) indicates a few buildings to the north of the gravel road only. The 1995 topographical map, however, shows buildings to the south of the gravel road, as well as a landing strip to the north of the road (**Appendix A: Figure 49**). More buildings are shown to the north and south of the gravel road and fewer cultivated fields to the south of the road when the 2003 topographical map is inspected (**Appendix A: Figure 50**). The most recent topographical map dates to 2010 (**Appendix A: Figure 51**). This map shows a significant increase in buildings directly north of the gravel road, while only one building is shown to the south of the road. It should also be noted that no cultivated fields are shown on the demarcated study area during this time.

#### **4.1.2 Previous Heritage Studies**

##### **Pig Production Facility on Portion 23 of the Farm Kameel Zyn Kraal 547 JR**

A Heritage Impact Assessment (HIA) was conducted by Alexander Antonites (2020) for the development of a pig production facility on Portion 23 of the Farm Kameel Zyn Kraal 547 JR. The study area, located approximately 1 km northwest of the proposed poultry farm concerned in this report, reported a sensitive archaeological landscape associated with several heritage sites. Thirteen Late Iron Age stone-walled homesteads and associated features were recorded. Accordingly, these sites date to between 1600-1820 and oral traditions indicate the likely occupation by the Manala Ndebele groups. An informal cemetery was recorded as well.

##### **Clover Hill Development, Bronkhorstspuit Dam**

A phase 1 HIA was done for the Clover Hill Housing Estate, which is located about 17 km east-northeast of the proposed poultry farm. The Housing Estate is located on the banks of the Bronkhorstspuit Dam. The HIA revealed several stone-walled enclosures belonging to the Late Iron Age, as well as potsherds and middens. Several structures with a square layout were also located, but probably do not exceed 60 years of age (National Cultural History Museum 2003).

##### **Nooitgedacht 525JR**

The HIA survey done for the development of a housing estate on Portion 9 of the Farm Nooitgedacht 525 JR, located 26 km east-northeast of the proposed development, revealed two heritage sites. It is in the same area where the Battle of Bronkhorstspuit took place. These sites date to the Historic period (Van Schalkwyk 2007).

##### **Ekangala Borrow Pit Extension**

Van Schalkwyk (2013) conducted a Heritage Impact Assessment for the extension of the Ekangala Borrow Pit located approximately 27 km northeast of the proposed poultry farm. The HIA did not record any heritage sites



in close proximity of the borrow pit, but noted that the following sites occur in the general vicinity: farmsteads and cemeteries.

## 4.2 Limitations

Dense vegetation associated with the northern quarter of the study area (**Figure 13**) significantly hampered visibility and free movement at the time of surveying (June 2021). The extent of LIA Sites K12 & K14, consisting of stone-walling, could therefore not be determined during the survey (**Figure 14**). However, satellite imagery and historical aerial photographs proved useful in determining the extent of Site K14. Unfortunately, Site K12 is not visible on aerial data sources. No other access constraints were encountered.



**Figure 13:** Dense vegetation associated with the northern section of the study area.



**Figure 14:** Dense vegetation associated with Site K14.

## **5. Archaeological and Historical Remains**

### **5.1 Stone Age Remains**

No Stone Age archaeological remains were observed within the demarcated study area.

Stone Age artefacts are often associated with rocky outcrops or water sources. **Figures 15 – 17** 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 15: ESA artefacts from Sterkfontein (Volman 1984).

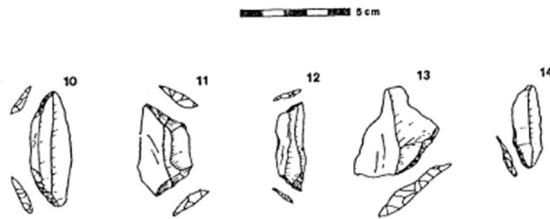


Figure 16: MSA artefacts from Howiesons Poort (Volman 1984).



Figure 17: LSA scrapers (Klein 1984).

## 5.2 Iron Age Farmer Remains

One stone-walled site and one potential stone-walled site were observed during the survey.

Site K12 is located directly north of the northern-most disturbed area along a small ridge (**Figure 42**). The site consists of linear free standing stone-walling of which the exact extent could not be determined due to dense vegetation, but appears to be approximately 90 m. The site could also not be identified on aerial or satellite imagery. A possibility also exists that the rocks were moved from the previously cultivated field located directly to the south. The feature in **Figure 18** appears more representative of such a situation. However, the stone-walling shown in **Figure 19** appears to be similar to typical LIA stone-walling. It might also be that a LIA stone-walled site did exist, but was impacted during the creation of the cultivated field. No material culture were observed at the site.

Site K14, first observed on satellite imagery, consists of several stone-walled enclosures (**Figure 20**). Historical aerial imagery dating to 1939, 1961, 1965 and 1976 (**Appendix A: Figures 43, 45 – 47**) also indicate the site.

The site is located approximately 60 m north of Site K12 and is associated with very dense vegetation that



significantly hampered free movement and visibility (**Figure 21**). The observed walls all are roughly packed and uncoursed. One undecorated potsherd was observed at the site (**Figure 22**). Several footpaths and a jeep track intersect the site as well. When the 1939 aerial image (**Appendix A: Figure 43**) is inspected, a linear feature stretching from the site towards another stone-walled enclosure approximately 180 m to the southeast is observed. This feature, likely to be an early road, is not visible on subsequent aerial imagery. The low visibility might be attributed to the likely possibility that feature is not as prominent as the enclosures. The estimated area of the site as calculated on Google Earth imagery, is approximately 3.3 ha.

Sites K12 & K13 are similar in appearance to the sites observed by Antonites (2020) that are located approximately 1 km to the northwest. It is therefore likely that that these sites form part of the same complex as historical Google Earth imagery shows a relatively dense concentration of stone-walled sites in the general area. The heritage study done by the National Cultural History Museum (2003) also recorded stone-walled enclosures belonging to the LIA in the vicinity of the Bronkhorstspuit Dam.

**Table 3:** Iron Age Remains.

| Name | Type          | Source | Year | Status | Age | Estimated extent (ha) |
|------|---------------|--------|------|--------|-----|-----------------------|
| K12  | Stone-walling | Field  | N/A  | Intact | LIA | 0.3                   |
| K14  | Stone-walling | Aerial | 2008 | Intact | LIA | 3.3                   |



**Figure 18:** Linear stone feature at Site K12.



**Figure 19:** Stone-walling at Site K12.



**Figure 20:** 2015 Google Earth image of Site K14.





**Figure 21:** Stone-walling at Site K14.



**Figure 22:** Potsherd observed at site K14.

### 5.3 Historical

Six sites (**Table 4**) potentially dating to the historic period were identified on using a combination of historical topographical maps and aerial imagery.

Site K01 was identified on the 1944 topographical map as a building located along the western boundary of the study area and just north of the current werf (**Appendix A: Figure 44**). No building, however, is visible on any of the aerial images and topographical maps. A cultivated field is visible on the 1961 aerial image (**Appendix A: Figure 45**) and no evidence of a building was observed during the site visit. The area is presently utilised as an equestrian grazing camp (**Figure 23**).

Site K02 is located along the southern boundary of the study area and was identified on the 1939 aerial image as a structure (**Appendix A: Figure 43**). The 1944 topographical map (**Appendix A: Figure 44**), however, indicates the presence of a building, while no building or feature is indicated on any of the remaining aerial images or topographical maps. The site visit revealed a small stone-walled enclosure angular in shape (**Figure 24**). It is therefore likely that this structure is at least 77 years of age. The use of this structure is unknown.

Sites K06, K16 and K17 consist of intact buildings on the werf. These sites were identified on the 1961 aerial image (**Appendix A: Figure 45**) and are present on subsequent aerial images as well. However, it should be noted that the extents are not clear on the historical images. Several buildings are also visible on the topographical maps. Because it is unclear whether Sites K06 and K16 formed part of the original structures observed on the 1961 aerial image, the possibility exists that these sites or parts thereof date to historical times (**Figures 25 & 27**). According to historical Google Earth imagery, Site K17 (**Figure 28**) used to be part of a larger structure, but was altered between 2005 and 2008. If the remaining section of the building forms part of the building observed on the 1961 aerial image, the building would be 60 years of age. These buildings appear to be modern and might have been renovated in recent years.

Site K09, also a building identified on the 1961 aerial image, is located to the northeast of Site K17 (**Appendix A: Figure 45**). The building appears to have been demolished between 1965 and 1976 (**Appendix A: Figures 46 & 47**). The site visit confirmed an open section on the werf (**Figure 26**).

**Table 4:** Historic Sites.

| Name | Type     | Source | Year | Status     | Age      |
|------|----------|--------|------|------------|----------|
| K01  | Building | Topo   | 1944 | Demolished | Historic |
| K02  | Building | Aerial | 1939 | Ruin       | Historic |
| K06  | Building | Aerial | 1961 | Intact     | Historic |
| K09  | Building | Aerial | 1961 | Demolished | Historic |
| K16  | Building | Aerial | 1961 | Intact     | Historic |
| K17  | Building | Aerial | 1961 | Intact     | Historic |



The Heritage study conducted on the Farm Nooitgedacht 525 JR (Van Schalkwyk 2007) recorded two heritage sites that might date to the Historic Period.



**Figure 23:** Demolished Site K01.



**Figure 24:** Ruin at Site K02.



**Figure 25:** Building associated with Site K06.



**Figure 26:** Demolished Site K09.





**Figure 27:** Residence associated with Site K16.



**Figure 28:** Building at Site K17.

## 5.4 Contemporary Remains / Natural Sites

Two sites (K03 & K10) were identified on contemporary satellite imagery as disturbances (**Table 5**). The site visit confirmed that Site K03 consists of rocks in the middle of a cultivated field. It is likely that these rocks were removed from the surrounding areas during the creation of the cultivated field (**Figure 29**). Site K10 was confirmed to be a natural rock outcrop (**Figure 37**).

Six contemporary sites (**Table 5**) were identified on aerial images and topographical maps. Four of these sites (K07, K08, K11, K13) are associated with intact buildings, one with a building ruin (K05) and one with a demolished site (K04). These sites do not exceed 60 years of age.

Site K04 is located just south of the boma on the northern section of the study area. The site was first identified on 2005 Google Earth satellite imagery. No building is visible on any of the historical aerial images and no building or structure is indicated on any of the topographical maps. Upon visiting the site, a building foundation measuring roughly 6 X 6 m were observed (**Figure 30**). The use of the building is unknown.

Site K05 is associated with two buildings, one stone building with no roof (**Figure 31**) and one brick building with no roof (**Figure 32**). Both buildings are in a dilapidated state. Several modern cement slabs were also observed. The first buildings in this vicinity are indicated on the 1995 topographical map (**Appendix A: Figure 49**) and shows the presence of the stone building, as well as another building further to the southeast. The 2003 topographical map indicates an additional building between the previously identified buildings (**Appendix A: Figure 50**), while the 2010 topographical map (**Appendix A: Figure 51**) again only shows the one building to the northwest. Historical Google Earth imagery also show several buildings/structures in 2005, but by 2008 the majority of the buildings/structures have been demolished. The remains of these demolished sites were noted during the site visit (**Figure 33**).

Site K07, currently stables, was first observed as a building on the 1984 topographical map (**Appendix A: Figure 48**). The building is rectangular in shape, constructed from bricks, and is oriented in a NE-SW direction. The building is also indicated on the 1995 topographical map (**Appendix A: Figure 49**), but it is only on the 2003 topographical map that the same rectangular shape is observed (**Appendix A: Figure 50**). This suggests that the original building might have been altered or was completely demolished and replaced by the current stables (**Figure 34**). A few modern stores were also observed to the northeast of Site K08 (**Figure 35**).

Site K08 is a building located directly north of the gravel road (**Figure 36**). A building is first indicated on the 1984 topographical map (**Appendix A: Figure 48**). By 1995 (**Appendix A: Figure 49**) a rectangular building of completely different dimensions is indicated, while the 2003 topographical again shows a small building (**Appendix A: Figure 50**). However, no buildings or structures are shown on any of the historical aerial images, suggesting the building is of contemporary construction.



Site K11 was identified as a circular cement water reservoir on the 2003 topographical map (**Figure 38 & Appendix A: Figure 50**). The site is also indicated on the 2010 topographical map (**Appendix A: Figure 51**) and is visible on contemporary satellite imagery. No indications were observed on any of the remaining aerial images or topographical maps.

Site K13 consists of a modern boma and associated brick building and is located between LIA sites K12 and K14. The site is not indicated on any of the historical topographical maps or aerial images, but was identified on the 2008 Google Earth satellite image. The boma is constructed from stone (**Figure 39**), while the toilet building is constructed from bricks (**Figure 40**). The toilet building, however, is in a dilapidated state.

**Table 5:** Contemporary Sites.

| <b>Name</b> | <b>Type</b> | <b>Source</b> | <b>Year</b> | <b>Status</b> | <b>Age</b>   |
|-------------|-------------|---------------|-------------|---------------|--------------|
| K03         | Natural     | Aerial        | 2020        | Intact        | Contemporary |
| K04         | Building    | Aerial        | 2005        | Demolished    | Contemporary |
| K05         | Building    | Topo          | 1995        | Ruin          | Contemporary |
| K07         | Building    | Topo          | 1984        | Intact        | Contemporary |
| K08         | Building    | Topo          | 1984        | Intact        | Contemporary |
| K10         | Natural     | Aerial        | 2020        | Intact        | Contemporary |
| K11         | Structure   | Topo          | 2003        | Intact        | Contemporary |
| K13         | Structure   | Aerial        | 2008        | Intact        | Contemporary |

The HIA done by the National Cultural History Museum (2003) mentions square structures that might date to contemporary times



**Figure 29:** Natural Site K03.



**Figure 30:** Contemporary remains at site K04.





**Figure 31:** Building ruin at Site K05.



**Figure 32:** Modern infrastructure at Site K05.





**Figure 33:** Demolished buildings at Site K05.



**Figure 34:** Stables at Site K07.



**Figure 35:** Modern Stores near site K07.



**Figure 36:** Building associated with Site K08.





**Figure 37:** Natural Site K10.



**Figure 38:** Water reservoir at Site K11.





**Figure 39:** Boma at Site K13.



**Figure 40:** Dilapidated toilet building at Site K13.

## 5.5 Graves

According to Mrs Marais (Alet Marais, pers. Comm. 2021), the previous owner informed her of a potential grave to the south of the gravel road and near the border of the study area. Accordingly, the grave is located under a heap of rocks, but it was never confirmed (**Figure 41**).

**Table 6:** Graves.

| Name | Type            | Source | Year    | Status  | Age                       |
|------|-----------------|--------|---------|---------|---------------------------|
| K15  | Potential Grave | Field  | Unknown | Unknown | Unknown (Potential Grave) |

The heritage studies done by Van Schalkwyk (2013), as well as Antonites (2020), recorded cemeteries in the general study area.



**Figure 41:** Potential Grave at Site K15.





Figure 42: Heritage sites indicated on a 2020 satellite image.

## 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 7:** Field Ratings.

| <b>Rating</b>        | <b>Field Rating/Grade</b> | <b>Significance</b> | <b>Recommendation</b>           |
|----------------------|---------------------------|---------------------|---------------------------------|
| 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 8:** Individual site ratings.

| Site / Survey Point Name | Type                | Rating               | Field Rating/Grade | Significance | Recommendation         |
|--------------------------|---------------------|----------------------|--------------------|--------------|------------------------|
| 2528DC-K01               | Building-Demolished | General Protection C | 4 C                | Low          | No recording necessary |
| 2528DC-K02               | Building-Ruin       | General Protection B | 4 B                | Medium       | Record site            |
| 2528DC-K03               | Natural             | General Protection C | 4 C                | Low          | No recording necessary |
| 2528DC-K04               | Building-Demolished | General Protection C | 4 C                | Low          | No recording necessary |
| 2528DC-K05               | Building-Ruin       | General Protection C | 4 C                | Low          | No recording necessary |
| 2528DC-K06               | Building            | General Protection B | 4 B                | Medium       | Record site            |
| 2528DC-K07               | Building            | General Protection C | 4 C                | Low          | No recording necessary |
| 2528DC-K08               | Building            | General Protection C | 4 C                | Low          | No recording necessary |
| 2528DC-K09               | Building-Demolished | General Protection C | 4 C                | Low          | No recording necessary |
| 2528DC-K10               | Natural             | General Protection C | 4 C                | Low          | No recording necessary |
| 2528DC-K11               | Structure           | General Protection C | 4 C                | Low          | No recording necessary |
| 2528DC-K12               | Stone-walling       | Local                | Grade 3 A          | High         | Mitigation not advised |
| 2528DC-K13               | Structure           | General Protection C | 4 C                | Low          | No recording necessary |
| 2528DC-K14               | Stone-walling       | Local                | Grade 3 A          | High         | Mitigation not advised |
| 2528DC-K15               | Potential Grave     | Local                | Grade 3 A          | High         | Mitigation not advised |
| 2528DC-K16               | Building            | General Protection B | 4 B                | Medium       | Record site            |
| 2528DC-K17               | Building            | General Protection B | 4 B                | Medium       | Record site            |

## 7. Statement of Significance & Recommendations

### 7.1 Statement of significance

#### **The study area: A Portion of Portion 3 of the Farm Kameel Zyn Kraal 547 JR**

As can be seen from heritage studies done in the surrounding areas, as well as the findings made in this study, the greater study area is considered to be significant from a heritage perspective. Locally, historical buildings and structures are limited to the southern section of the study area. Two of these sites (K01 & K09) have been demolished and are not considered to be significant from a heritage perspective. Site K02 consists of an angular stone-walled enclosure in a dilapidated state. A possibility exists that this structure exceeds 60 years of age and might therefore be significant from a heritage perspective. The remaining historical sites (K06, K16, K17) are associated with intact buildings. It is unclear whether these buildings have been demolished and rebuilt or form part of the original buildings. Should these buildings, or any parts thereof, consist of the original buildings, it will be protected under the NHRA (25 of 1999).

The two identified natural sites are not significant from a heritage perspective (K03 & K10). These sites were identified on contemporary satellite imagery as disturbances. The site visit confirmed that one site consists of rocks that appear to have been removed during the creation of a cultivated field (K03), while the other is a natural rock outcrop (K10).

Three of the contemporary sites are located in the northern quarter of the study area (K04, K11, K13) and three in the southern quarter (K05, K07, K08). These sites consist of brick or stone buildings and it has been established that these sites do not exceed 60 years of age and are not considered significant from a heritage perspective. Four of the contemporary sites are intact (K07, K08, K11, K13), one consists of a building ruin (K05) and one has been demolished (K04).

Research has shown that two of the sites (K12 & K14) form part of a culturally significant Late Iron Age landscape. Several Late Iron Age stone-walled sites are associated with the greater study area, but are increasingly threatened by agricultural activities and development. Since Kameel Zyn Kraal is specifically mentioned in Manala Ndebele oral traditions (Van Vuuren 2006), the sites are significant in the local cultural landscape. These sites are protected by the NHRA (25 of 1999).

Although the existence of the grave (K15) near the south-eastern corner of the study area could not be verified, the area surrounding this site should be regarded as sensitive. Graves are significant from a heritage perspective as the Human Tissues Act (65 of 1983) and Ordinance on the Removal of Graves and Dead Bodies (Ordinance 7 of 1925), as well as the National Heritage Resources Act 25 of 1999 apply.

## 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:

- Sites K03 & K10 are natural features and not significant from a heritage perspective. No further action is required.
- Contemporary sites K04, K05, K07, K08, K11 and K13 do not exceed 60 years of age and are not considered significant from a heritage perspective. No further action is required.
- Historical Sites K01 & K09 used to be associated with buildings exceeding 60 years of age, but have been demolished. Even though surface structures are no longer present, subsurface cultural material might exist and care should therefore be exercised during the proposed development. Should culturally significant material be unearthed during these processes, it is advised that a qualified archaeologist be contacted.
- Site K02, a stone-walled enclosure that appears to have been associated with a building, is likely to exceed 60 years of age. It is therefore recommended that this site be avoided by the proposed development. Should this not be possible, a destruction permit from the local heritage authority will be required.
- Sites K06, K16 and K17 are intact buildings that are modern in appearance, but are located on the same premises as historically identified buildings. The possibility therefore exists that these buildings, or part thereof, might exceed 60 years age and should therefore be avoided by the proposed development. Should this not be possible, a destruction permit from the local heritage authority will be required.
- Site K14 is a culturally significant LIA site associated with oral traditions of the Manala Ndebele groups. These groups are placed in the area between 1600 and 1800. It is recommended that the indicated site boundary and associated road be avoided by all activities. The areas between stone-walled homesteads are also considered to be significant as these areas are often associated with surface/subsurface archaeological sites. This area should be avoided as well. However, the existing jeep track to the east of the site (Track A) may be used to access the area to the north of Site K14 where no archaeological sites were observed. Jeep track B intersects Site K14 and should no longer be used. Should impact be unavoidable, a Phase 2 AIA will be required. This process will require obtaining the required permit from SAHRA, the excavation, recording and mapping of the sites, as well as a destruction permit upon completion of the project.

- Due to dense vegetation and poor representation on aerial imagery, the layout of the stone-walling associated with Site K12 could not be determined. It is, however, likely that Site K12 is associated with Site K14. The demarcated area should therefore be avoided by the proposed development. Should impact be unavoidable, it is recommended that the vegetation surrounding this site be cleared in a manner that won't impact potential surface or subsurface features and that a qualified archaeologist inspect the site and provide follow-up recommendations.
- Due to the uncertainty regarding the existence of the potential grave at Site K15, it is recommended that an area of 30 m surrounding this site be avoided by the proposed development. Should this not be possible, a grave relocation process may be initiated. Alternatively, the site may be inspected by GPR (ground penetrating radar) operated by a suitably qualified heritage specialist in order to attempt to determine the presence of human remains.
- Because archaeological artefacts generally occur below surface, the possibility exists that culturally significant material may be exposed during the construction phase, in which case all activities must be suspended pending further archaeological investigations by a qualified archaeologist. Also, should skeletal remains be exposed during the course of the project, 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 proposed project beyond the surveyed area outlined in this study, the following applies: A qualified archaeologist must conduct a full Phase 1 Archaeological Impact Assessment on the sections beyond the demarcated area that will be affected by the development, 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, the development of the proposed poultry farm may proceed, 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.

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*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*

# Appendix A: Historical Aerial Photographs and Topographical Maps

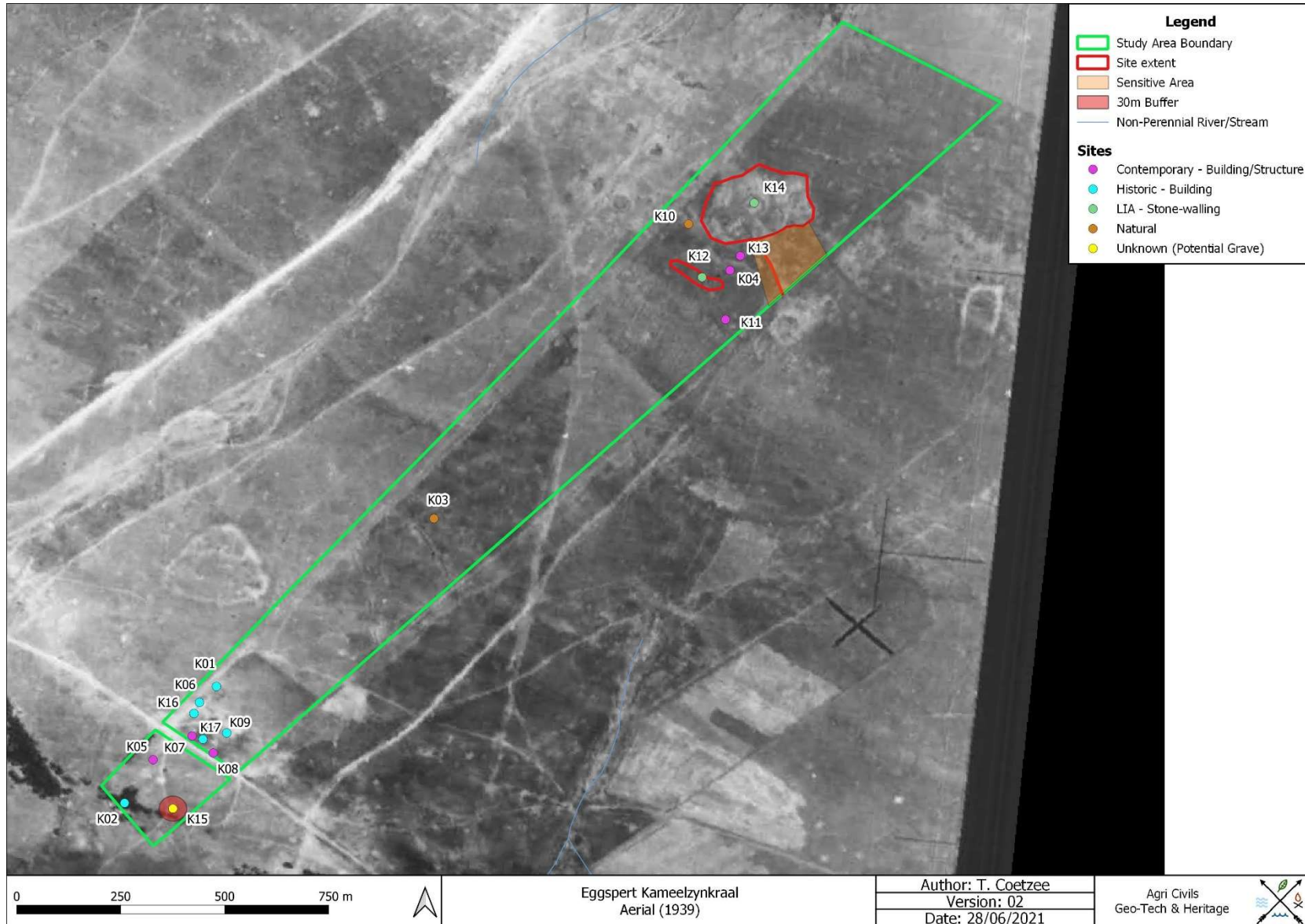
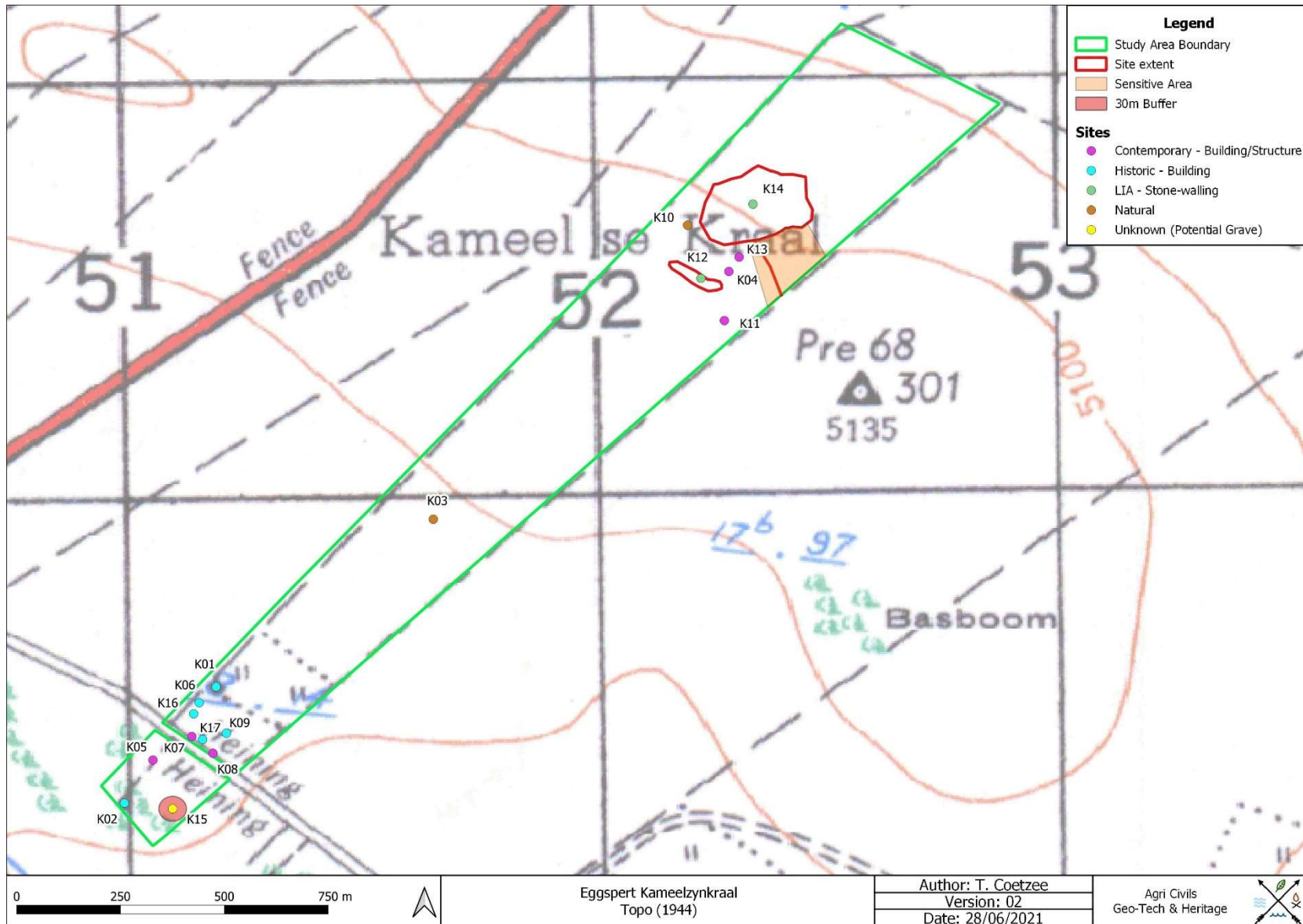
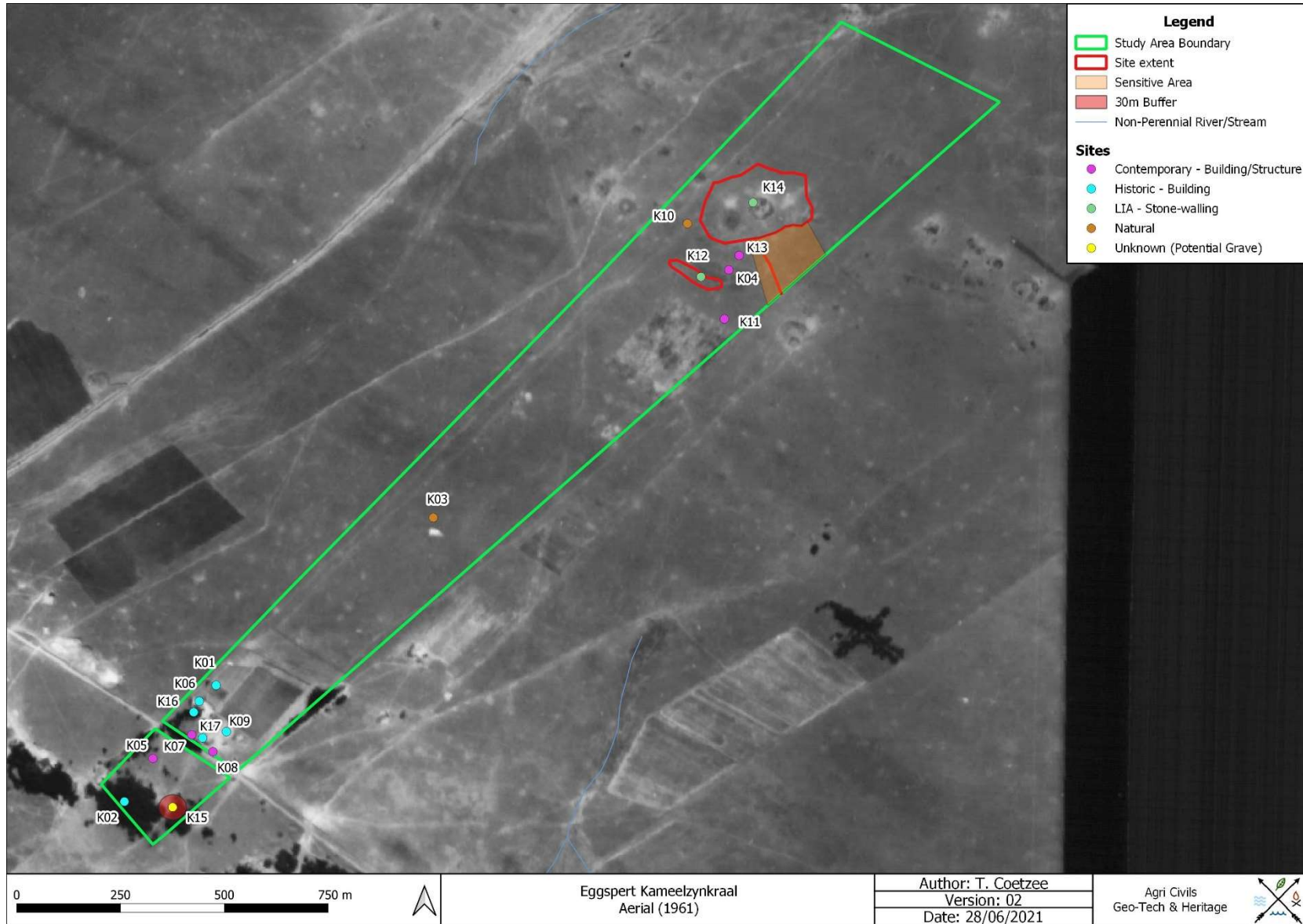


Figure 43: The study area superimposed on a 1939 aerial image.

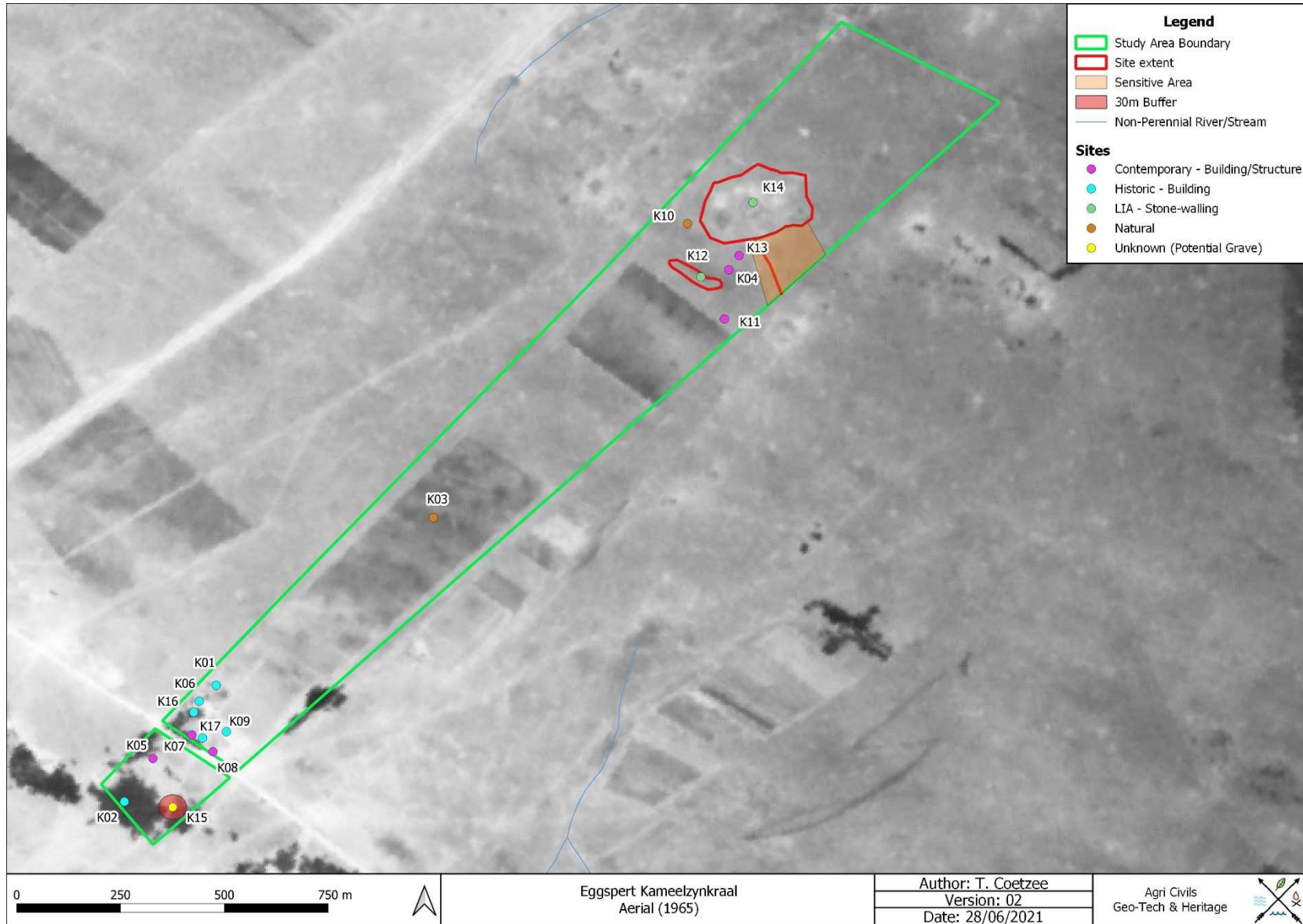


**Figure 44:** The study area superimposed on 1: 50 000 2528 DC 1944 topographical map.





**Figure 45:** The study area superimposed on a 1961 aerial image.

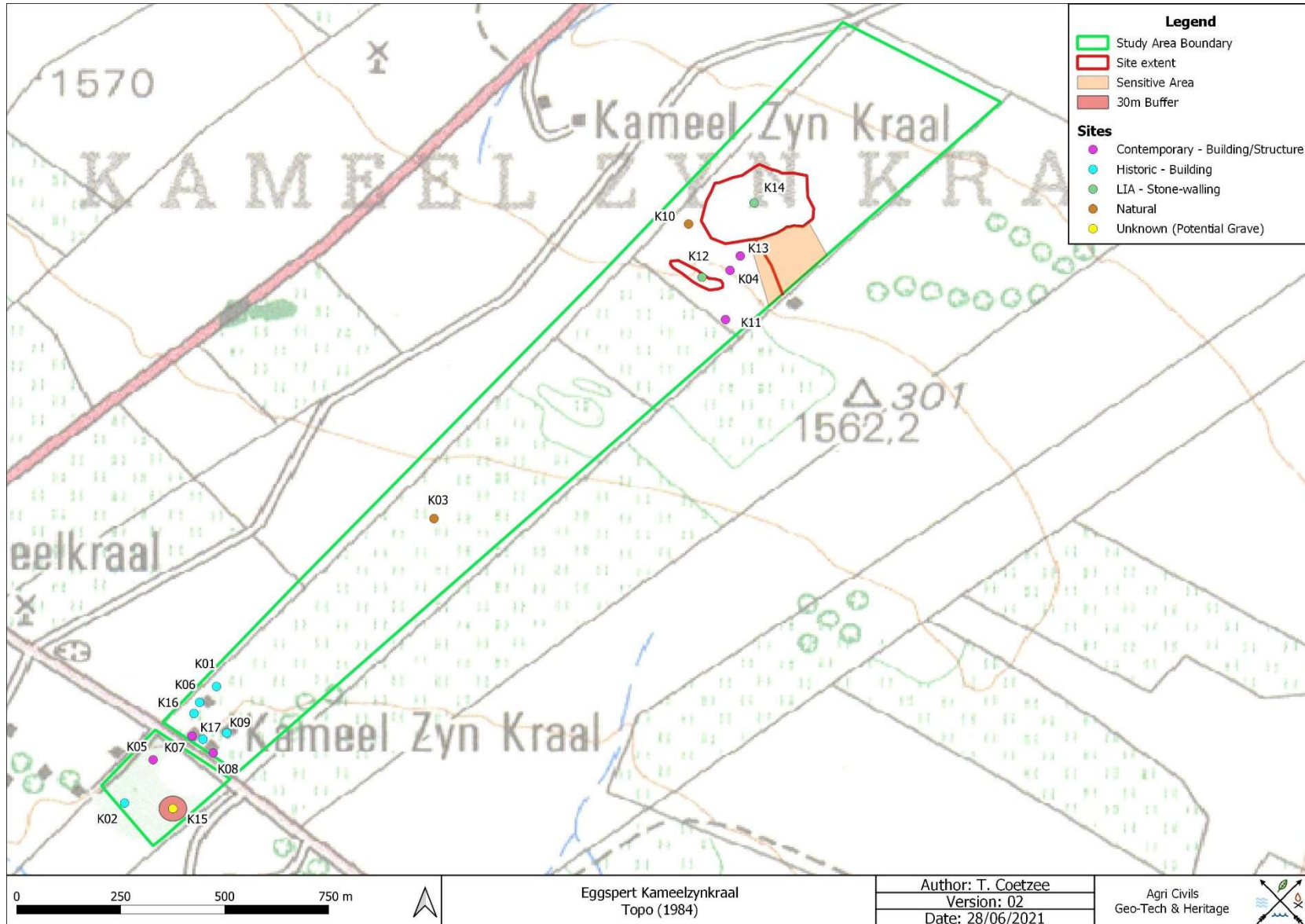


**Figure 46:** The study area superimposed on a 1965 topographical map.



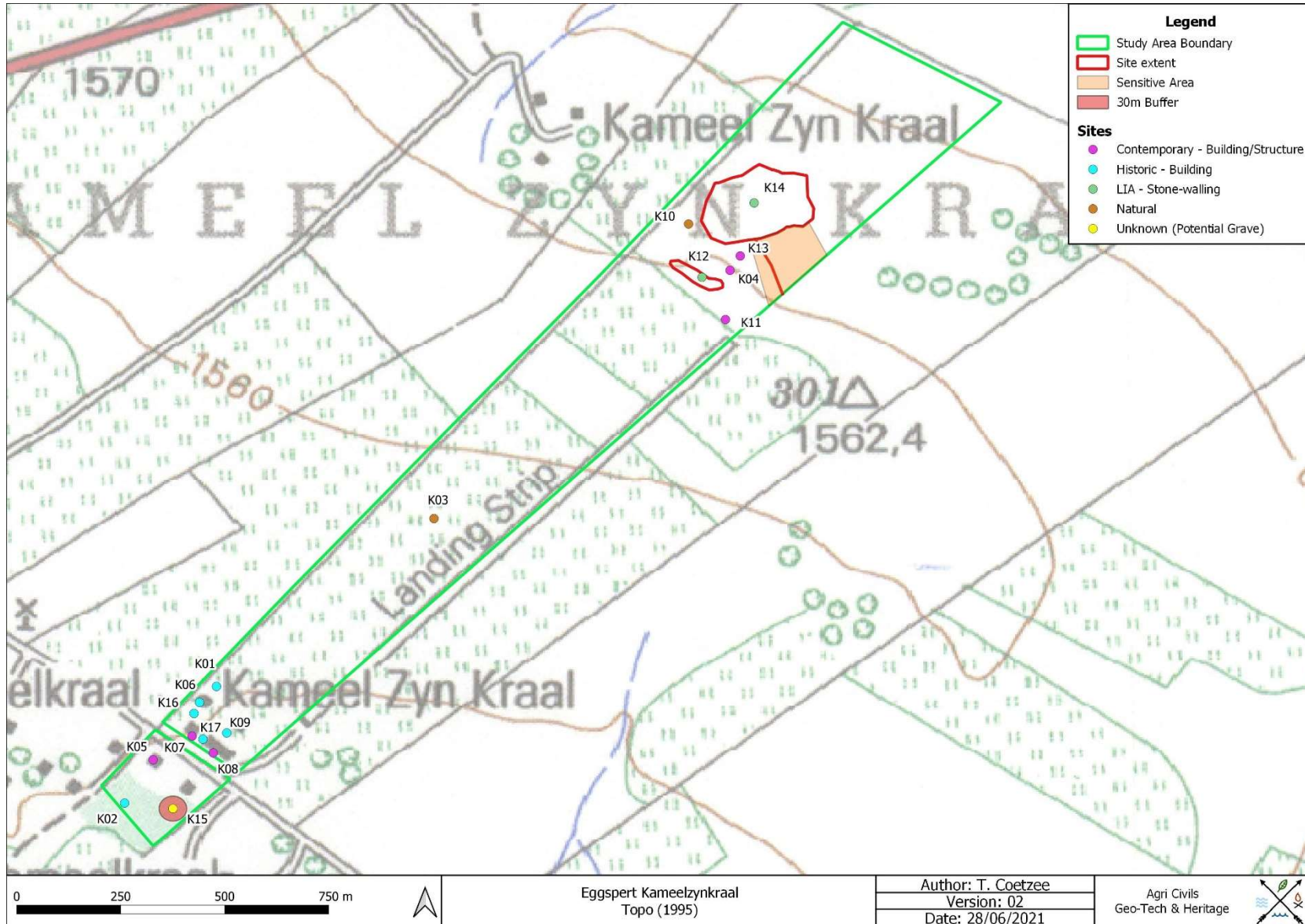
Figure 47: The study area superimposed on a 1976 topographical map.



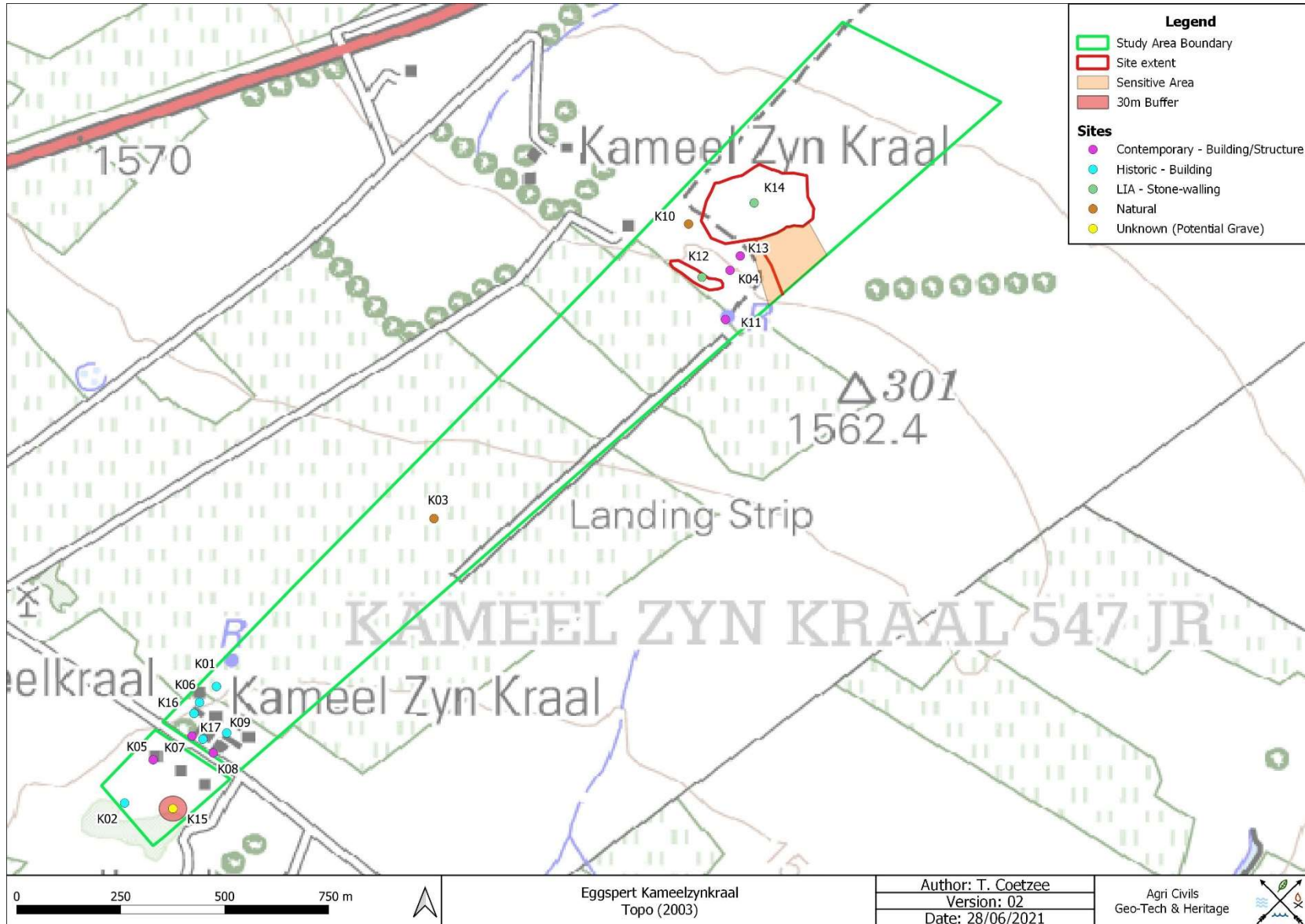


**Figure 48:** The study area superimposed on 1: 50 000 2528 DC 1984 topographical map

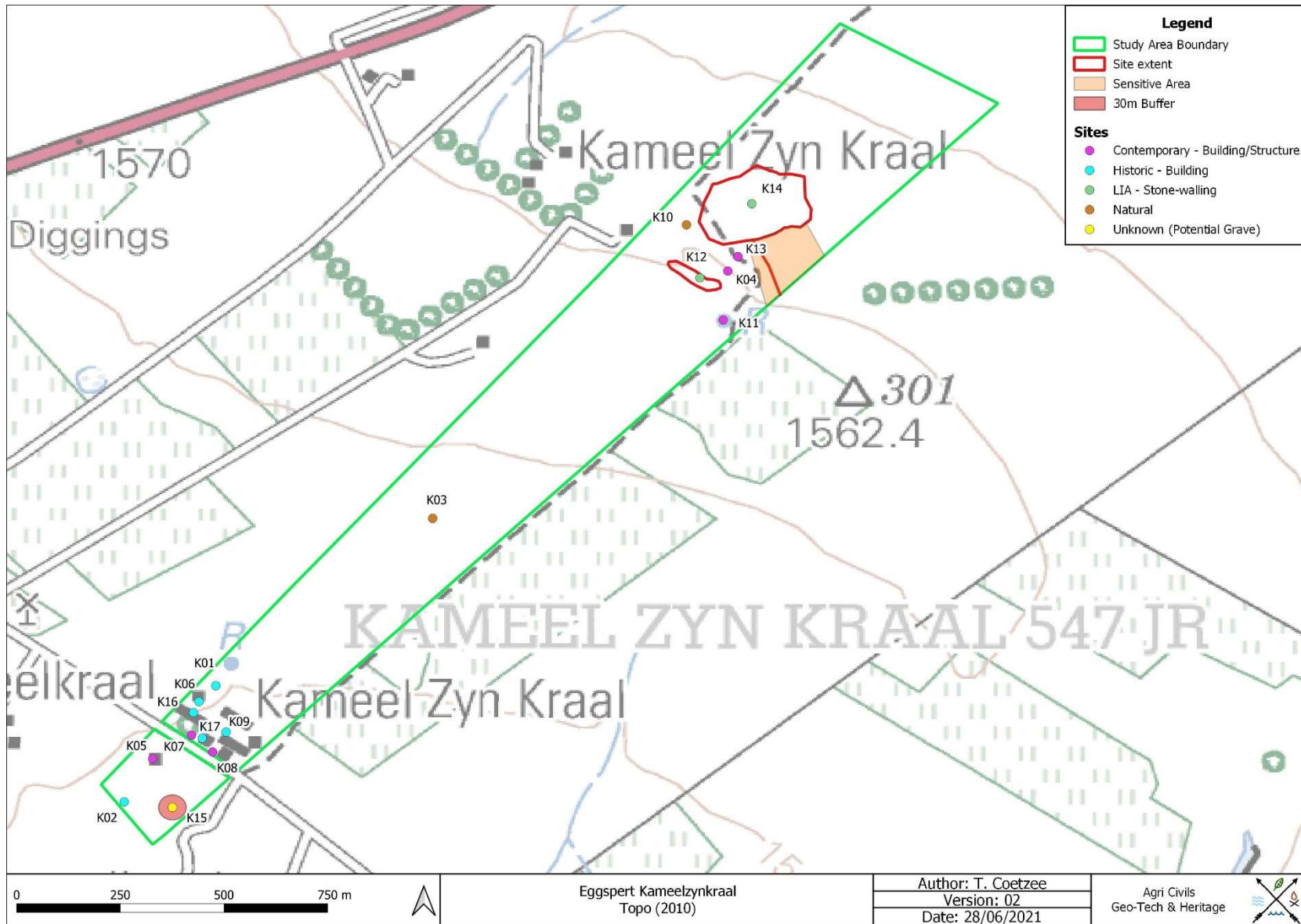




**Figure 49:** The study area superimposed on 1: 50 000 2528 DC 1955 topographical map



**Figure 50:** The study area superimposed on 1: 50 000 2528 DC 2003 topographical map



**Figure 51:** The study area superimposed on 1: 50 000 2528 DC 2010 topographical map

## Appendix B: Impact Table

### v) Impacts and risks identified including the nature, significance, consequence, extent, duration, and probability of the impacts, including the degree to which these impacts

This section includes the impact management for the proposed poultry farm.

#### 1 Surface and subsurface impact on heritage resources due to rehabilitation

##### Activity, nature, and consequence of impact:

During the proposed construction and operational phases, surface and subsurface impacts may take place. These activities can lead to irreparable damage or complete destruction of heritage resources if not correctly managed.

##### Cumulative impacts:

If mitigation measures are adhered to, none are foreseen

##### Assumptions, uncertainties, and gaps in knowledge:

Dense vegetation hampered the visibility of archaeological material towards the northern boundary of the study area. Because archaeological artefacts generally occur below surface, the possibility exists that culturally significant material may be exposed during the construction phase.



**Pre- and post-mitigation impacts per site (table1/2)**

| Line No | Site No    | Site Type           | Impact Rating without Mitigation |                         |          |                         |             |              | Impact Rating with Mitigation |                         |          |                         |             |              |
|---------|------------|---------------------|----------------------------------|-------------------------|----------|-------------------------|-------------|--------------|-------------------------------|-------------------------|----------|-------------------------|-------------|--------------|
|         |            |                     | Intensity and Magnitude          | Resource replaceability | Duration | Extent or Spatial Scale | Probability | Significance | Intensity and Magnitude       | Resource replaceability | Duration | Extent or Spatial Scale | Probability | Significance |
| 1       | 2528DC-K01 | Building-Demolished | 3                                | 3                       | 3        | 1                       | 2           | 12 High      | 1                             | 1                       | 1        | 1                       | 1           | 5 Low        |
| 2       | 2528DC-K02 | Building-Ruin       | 3                                | 3                       | 3        | 1                       | 2           | 12 High      | 1                             | 1                       | 1        | 1                       | 1           | 5 Low        |
| 3       | 2528DC-K03 | Natural             | 1                                | 1                       | 1        | 1                       | 1           | None         | 1                             | 1                       | 1        | 1                       | 1           | 5 Low        |
| 4       | 2528DC-K04 | Building-Demolished | 1                                | 1                       | 1        | 1                       | 1           | 5 Low        | 1                             | 1                       | 1        | 1                       | 1           | 5 Low        |
| 5       | 2528DC-K05 | Building-Ruin       | 1                                | 1                       | 1        | 1                       | 1           | 5 Low        | 1                             | 1                       | 1        | 1                       | 1           | 5 Low        |
| 6       | 2528DC-K06 | Building            | 3                                | 3                       | 3        | 1                       | 2           | 12 High      | 1                             | 1                       | 1        | 1                       | 1           | 5 Low        |
| 7       | 2528DC-K07 | Building            | 1                                | 1                       | 1        | 1                       | 1           | 5 Low        | 1                             | 1                       | 1        | 1                       | 1           | 5 Low        |
| 8       | 2528DC-K08 | Building            | 1                                | 1                       | 1        | 1                       | 1           | 5 Low        | 1                             | 1                       | 1        | 1                       | 1           | 5 Low        |
| 9       | 2528DC-K09 | Building-Demolished | 3                                | 3                       | 3        | 1                       | 2           | 12 High      | 1                             | 1                       | 1        | 1                       | 1           | 5 Low        |
| 10      | 2528DC-K10 | Natural             | 1                                | 1                       | 1        | 1                       | 1           | None         | 1                             | 1                       | 1        | 1                       | 1           | 5 Low        |
| 11      | 2528DC-K11 | Structure           | 1                                | 1                       | 1        | 1                       | 1           | 5 Low        | 1                             | 1                       | 1        | 1                       | 1           | 5 Low        |
| 12      | 2528DC-K12 | Stone-walling       | 3                                | 3                       | 3        | 2                       | 2           | 13 High      | 1                             | 1                       | 1        | 1                       | 1           | 5 Low        |
| 13      | 2528DC-K13 | Structure           | 1                                | 1                       | 1        | 1                       | 1           | 5 Low        | 1                             | 1                       | 1        | 1                       | 1           | 5 Low        |
| 14      | 2528DC-K14 | Stone-walling       | 3                                | 3                       | 3        | 2                       | 2           | 13 High      | 1                             | 1                       | 1        | 1                       | 1           | 5 Low        |
| 15      | 2528DC-K15 | Potential Grave     | 3                                | 3                       | 3        | 1                       | 1           | 11 Medium    | 1                             | 1                       | 1        | 1                       | 1           | 5 Low        |
| 16      | 2528DC-K16 | Building            | 3                                | 3                       | 3        | 1                       | 2           | 12 High      | 1                             | 1                       | 1        | 1                       | 1           | 5 Low        |
| 17      | 2528DC-K17 | Building            | 3                                | 3                       | 3        | 1                       | 2           | 12 High      | 1                             | 1                       | 1        | 1                       | 1           | 5 Low        |

**Pre- and post-mitigation impacts per site (table2/2)**

| Line No | Site No    | Environmental Objective                         | Management measures to be applied                         | Phase applicable to management measure | Management Tools  | Monitoring programmes | Management timeframe and schedule                | Responsibilities for implementation and long-term maintenance | Financial provision for long-term maintenance and/or environmental costs | Mitigation Hierarchy |
|---------|------------|---|---|--|-------------------|-----------------------|--|---|--|----------------------|
| 1       | 2528DC-K01 | Ensure that heritage resources are not impacted | Care should be exercised when developing in this vicinity | Construction                           | General awareness | Site inspections      | Inspections during construction                  | ECO/Heritage specialist                                       | Only necessary if resources are found                                    | Prevent              |
| 2       | 2528DC-K02 | Ensure that heritage resources are not impacted | Avoid site  | Construction & development             | General awareness | Site inspections      | Inspections during construction and development  | ECO/Heritage specialist                                       | None   | Prevent              |
| 3       | 2528DC-K03 | N/A   | None  | None                                   | None              | None                  | None   | N/A   | None   | N/A                  |
| 4       | 2528DC-K04 | N/A   | None  | None                                   | None              | None                  | None   | N/A   | None   | N/A                  |
| 5       | 2528DC-K05 | N/A   | None  | None                                   | None              | None                  | None   | N/A   | None   | N/A                  |
| 6       | 2528DC-K06 | Ensure that heritage resources are not impacted | Avoid site  | Construction & development             | General awareness | Site inspections      | Inspections during construction and development  | ECO/Heritage specialist                                       | None   | Prevent              |
| 7       | 2528DC-K07 | N/A   | None  | None                                   | None              | None                  | None   | N/A   | None   | N/A                  |
| 8       | 2528DC-K08 | N/A   | None  | None                                   | None              | None                  | None   | N/A   | None   | N/A                  |
| 9       | 2528DC-K09 | Ensure that heritage resources are not impacted | Care should be exercised when developing in this vicinity | Construction                           | General awareness | Site inspections      | Inspections during construction                  | ECO/Heritage specialist                                       | Only necessary if resources are found                                    | Prevent              |
| 10      | 2528DC-K10 | N/A   | None  | None                                   | None              | None                  | None   | N/A   | None   | N/A                  |
| 11      | 2528DC-K11 | N/A   | None  | None                                   | None              | None                  | None   | N/A   | None   | N/A                  |
| 12      | 2528DC-K12 | Ensure that heritage resources are not impacted | Avoid site  | Construction & development             | General awareness | Site inspections      | Inspections during construction, development and | ECO/Heritage specialist                                       | Only if vegetation clearing is considered                                | Prevent              |

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| Line No | Site No    | Environmental Objective                         | Management measures to be applied                     | Phase applicable to management measure | Management Tools  | Monitoring programmes | Management timeframe and schedule                                   | Responsibilities for implementation and long-term maintenance | Financial provision for long-term maintenance and/or environmental costs | Mitigation Hierarchy |
|---------|------------|---|---|--|-------------------|-----------------------|---|---|--|----------------------|
|         |            |   |   |  |                   |                       | operational phases  |   |  |                      |
| 13      | 2528DC-K13 | N/A   | None  | None                                   | None              | None                  | None  | N/A   | None   | N/A                  |
| 14      | 2528DC-K14 | Ensure that heritage resources are not impacted | Avoid site  | Construction & development             | General awareness | Site inspections      | Inspections during construction, development and operational phases | ECO/Heritage specialist                                       | Only if Phase 2 AIA is considered  | Prevent              |
| 15      | 2528DC-K15 | Ensure that heritage resources are not impacted | Establish conservation buffer of 30 m around the site | Construction & development             | General awareness | Site inspections      | Inspections during construction and development                     | ECO   | Only necessary if relocation is considered                               | Prevent              |
| 16      | 2528DC-K16 | Ensure that heritage resources are not impacted | Avoid site  | Construction & development             | General awareness | Site inspections      | Inspections during construction and development                     | ECO/Heritage specialist                                       | None   | Prevent              |
| 17      | 2528DC-K17 | Ensure that heritage resources are not impacted | Avoid site  | Construction & development             | General awareness | Site inspections      | Inspections during construction and development                     | ECO/Heritage specialist                                       | None   | Prevent              |

**Stakeholder expectations and / or comments**

None received.

**Residual and latent risks**

If effective management takes place, there should not be residual impacts. No latent impacts foreseen.

**vi) Methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks**

**Impact assessment**

The methodology used to assess the significance of an impact is based on the requirements as set out in EIA Regulations, (GN 982) of 2014 i.t.o. the NEMA as well as the Proposed National Guideline on Minimum Information Requirements for Preparing EIA for Mining Activities that Require EA, of 2018, GN 86 in terms of NEMA. The impact significance methodology described below also complies to Appendix B of the Operational Guideline to Integrated Water and Waste Management of 2010 in terms of the NWA. In the event of any Section 21c&i water uses in terms of the NWA being assessed, Appendix A of the General Authorisations of 2016, GN 509 in terms of the NWA will be used to construct a risk matrix. Regulation 3(b) of the General Authorisations of 2016, GN 509 in terms of the NWA states that a suitably qualified SACNASP professional member must determine risks associated with this risk matrix.

Impact identification and prediction means forecasting the change of environmental parameters due to developmental patterns. These parameters may also be changing due to climate change and should be included.

Method of assessment: Impact identification and prediction is a stepwise procedure to identify the direct, indirect and cumulative impacts (relating to both positive and negative impacts) for which a proposed activity and its alternatives will have on the environment as well as the community. This should be undertaken by determining the geographical, physical, biological, social, economic, heritage and cultural sensitivity aspects of sites and locations as well as the risk of impact of the proposed activity. Refer to part A(h)(iv) for a complete description of these environmental attributes. Sources of data to be used for gathering data on the environmental attributes as well as the impacts include; monitoring / sampling data collected and stored, assumptions and actual measurements, published data available from the departments or other stakeholders in the area as well as specialist studies. Likely impacts should be described qualitatively and then studied separately in detail. This provides consistent and systematic basis for the comparison and application of judgements.

Significance rating: Ratings should then be assigned to each criterion. Significance of impacts should be determined for each phase of the mining lifecycle this includes; preconstruction, construction, operational, closure (including decommissioning) and post closure phases. The significance of impacts should further be assessed both with and without mitigation action. The description of significance is largely judgemental, subjective and variable. However, generic criteria can be used systematically to identify, predict, evaluate and determine the significance of impacts resulting from project construction, operation and decommissioning. The process of determining impact magnitude and significance should never become mechanistic. Impact magnitude is determined by empirical prediction, while impact significance should ideally involve a process of determining the acceptability of a predicted impact to society. Making the process of determining the significance of impacts more explicit, open to comment and public input would be an improvement of environmental assessment practice. Impact magnitude and significance should as far as possible be determined by reference to either legal requirements (accepted scientific standards) or social acceptability. If no legislation or scientific

standards are available, the EAP can evaluate impact magnitude based on clearly described criteria. A matrix selection process is the most common methodology used in determining and ranking the site sensitivities:

- The consequence: includes the nature / intensity / severity of the impact, spatial extent of the impact, and duration of the impact.
  - The nature / intensity / severity of the impact: An evaluation of the effect of the impact related to the proposed development on the receiving environment. The impact can be either positive or negative. A description should be provided as to whether the intensity of the impact is high, medium, or low or has no impact in terms of its potential for causing negative or positive effects. Cognisance should be given to climate change which may intensify impacts.
  - The spatial extent of the impact: Indication of the zone of influence of the impact: A description should be provided as to whether impacts are either limited in extent or affect a wide area or group of people. Cumulative impacts must also be considered as the extent of the impact as may increase over time.
  - The duration of the impact: It should be determined whether the duration of an impact will be short-term, medium term, long term or permanent. Cumulative impacts must also be considered as the duration of the impact as it may increase over time.
- The likelihood: includes the probability of the potential occurrence of the impact, and frequency of the potential occurrence of the impact
  - The probability of the impact: The probability is the quality or condition of being probable or likely. The probability must include the degree to which these impacts can be reversed; may cause irreplaceable loss of resources; and can be avoided, managed or mitigated
  - The frequency of the potential occurrence of the impact.
- The significance: This is worst case scenario without any management measures. See below how significance is determined: Impact that may have a notable effect on one or more aspects of the environment or may result in noncompliance with accepted environmental quality standards, thresholds or targets and is determined through rating the positive and negative effects of an impact on the environment based on criteria such as duration, magnitude, intensity and probability of occurrence. Mitigation measures should be provided with evidence or motivation of its effectiveness



Example of significance rating:

Prior to mitigation

|                         |   |   |  |
|-------------------------|---|---|--|
| Intensity and magnitude | 1<br>Natural processes or functions are not affected and will adequately return to its natural state. The impact will be completely reversed with correct management, and can be completely avoided, managed, or mitigated. | 2<br>Natural processes or functions are affected, and natural processes or functions will continue in a modified manner. The impact will be reversed to some degree with correct management, and can be somewhat avoided, managed, or mitigated | 3<br>Natural processes or functions are to the extent where it temporarily or permanently ceases. The impact cannot be reversed even with correct management, and cannot be avoided, managed, or mitigated |
| Resource replaceability | 1<br>Loss of resource can be completely replaced.   | 2<br>Loss of resource can somewhat be replaced.   | 3<br>Resources will be completely lost.  |
| Duration                | 1<br>The impact will be short-lived.  | 2<br>The impact will last for the entire operational life of the activity but will be mitigated thereafter.   | 3<br>The impact will not cease after the operational life of the activity ceases but will be permanent.  |
| Extent or spatial scale | 1<br>The impact will be site specific.  | 2<br>The impact will affect the local area.   | 3<br>The impact will affect an area larger than just the local area.   |
| Probability             | 1<br>It is unlikely that the impact will occur.   | 2<br>There is a probability for the impact to occur.  | 3<br>The impact will definitely occur.   |
| Significance            | None or low<br>If the sum of the above ranking is equal or more than 5 and 7, and no ranking equals 3.  | Medium<br>If the sum of the above ranking is equal or more than 8 to 11.  | High<br>If the sum of the above ranking is 12 or more.   |

Post to mitigation

|                         |   |   |  |
|-------------------------|---|---|--|
| Intensity and magnitude | 1<br>Natural processes or functions are not affected and will adequately return to its natural state. The impact will be completely reversed with correct management, and can be completely avoided, managed, or mitigated. | 2<br>Natural processes or functions are affected, and natural processes or functions will continue in a modified manner. The impact will be reversed to some degree with correct management, and can be somewhat avoided, managed, or mitigated | 3<br>Natural processes or functions are to the extent where it temporarily or permanently ceases. The impact cannot be reversed even with correct management, and cannot be avoided, managed, or mitigated |
| Resource replaceability | 1<br>Loss of resource can be completely replaced.   | 2<br>Loss of resource can somewhat be replaced.   | 3<br>Resources will be completely lost.  |
| Duration                | 1<br>The impact will be short-lived.  | 2<br>The impact will last for the entire operational life of the activity but will be mitigated thereafter.   | 3<br>The impact will not cease after the operational life of the activity ceases but will be permanent.  |
| Extent or spatial scale | 1<br>The impact will be site specific.  | 2<br>The impact will affect the local area.   | 3<br>The impact will affect an area larger than just the local area.   |
| Probability             | 1<br>It is unlikely that the impact will occur.   | 2<br>It is likely for the impact to occur.  | 3<br>The impact will definitely occur.   |
| Significance            | None or low<br>If the sum of the above ranking is equal or more than 5 and 7, and no ranking equals 3.  | Medium<br>If the sum of the above ranking is equal or more than 8 to 11.  | High<br>If the sum of the above ranking is 12 or more.   |

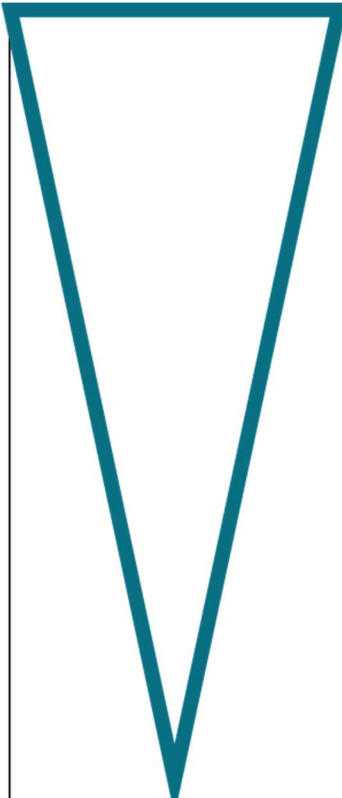
## Mitigation and management

Management methodology is based on the requirements as set out in EIA Regulations, (GN 982) of 2014 i.t.o. the NEMA as well as the Proposed National Guideline on Minimum Information Requirements for Preparing EIA for Mining Activities that Require EA, of 2018, GN 86 in terms of NEMA; and the Mining and Biodiversity Guideline (Mainstreaming Biodiversity into the Mining Sector) IDB of 2013 in terms of the MPRDA.

Management statements detail the processes, procedures and practices required to achieve an impact management outcome. A hierarchy of management tools used can also be used as seen below.



Mitigation should include measures in the following order of priority. The aim is to prevent adverse impacts from happening or, where this is unavoidable, to limit their significance to an acceptable level.

|   |   |
|---|---|
|  | <p><b>Avoid or prevent</b></p> <p>Refers to considering options in project location, siting, scale, layout, technology and phasing to <b>avoid impacts</b> on biodiversity, associated ecosystem services, and people. This is the best option, but is not always possible. Where environmental and social factors give rise to unacceptable negative impacts mining should not take place. In such cases it is unlikely to be possible or appropriate to rely on the latter steps in the mitigation.</p>   |
|   | <p><b>Minimise (Modification or control measures)</b></p> <p>Refers to considering alternatives in the project location, siting, scale, layout, technology and phasing that would minimise impacts on biodiversity and ecosystem services. In cases where there are environmental and social constraints every effort should be made to minimise impacts. Can also include changes to process and/or practices to reduce risk; or control, either through physical control or operational practices to ensure acceptable performance is maintained.</p> |
|   | <p><b>Rehabilitate</b></p> <p>Refers to rehabilitation and pollution clean-up of areas where impacts are unavoidable and measures are provided to return impacted areas to near-natural state or an agreed land use after mine closure. Although rehabilitation may fall short of replicating the diversity and complexity of a natural system.</p>   |
|   | <p><b>Offset</b></p> <p>Refers to measures over and above rehabilitation to compensate for the residual negative effects on biodiversity, after every effort has been made to minimise and then rehabilitate impacts. Biodiversity offsets can provide a mechanism to compensate for significant residual impacts on biodiversity.</p>  |

### Avoiding or preventing impacts

If the biodiversity (an ecosystem, habitat for threatened species, ecological corridor or area that provides essential ecosystem services) is of conservation value or importance, it is best to plan to avoid or prevent impacts altogether by changing the location, siting, method or processes of the mining activities and related infrastructure.

### Minimising impacts

Minimising impacts of mining is a mitigation measure that deals with the environment in general. In areas where the biodiversity is to be affected is of conservational value or importance, then every effort should be made to minimise those impacts that cannot be avoided or prevented. Mining companies should strive to minimise impacts on biodiversity to ensure environmental protection. Section 2 of NEMA contains environmental management principles that resonates with minimising the impact rather than stopping at mitigation, this is imperative in the mining sector.

### Rehabilitating impacted areas

Rehabilitation is the measures that are undertaken to “as far as it is reasonably practicable, rehabilitate the environment affected by the prospecting or mining operations to its natural or predetermined state or to a land use which aligns to the generally accepted principle of sustainable development. A closure plan is an essential part of rehabilitation and must be developed based on the establishment of the closure objectives and criteria.

## Biodiversity offsets

Biodiversity offsets are measurable conservation gains that help to balance any significant biodiversity losses that remain after actions to avoid, minimise and restore negative impacts have been taken. They are the last stage of mitigation and should be considered after appropriate avoidance, minimisation, and rehabilitation/restoration measures have been applied already.

When dealing with management, impact management outcomes must:

- be set for the expected activity-based impacts;
- describe the desired outcome of the management measure/s prescribed or the standard to be achieved (environmental objective);
- be clearly documented and identified per project phase as in the impact identification and significance rating process (this must be aligned to the mines closure objectives, and must therefore include predicted long-term result of the applied management measures);
- be measurable to determine compliance, which includes time frames and schedule for the implementation of the management measures; responsibilities for implementation and long-term maintenance of the management measures; financial provision for long-term maintenance; and monitoring programmes to be implemented;
- be informed by stakeholder expectations; and
- ensure legal compliance;

Finally, the impact assessment must refer to the residual and latent impact after successful implementation of the management measures.

## Appendix C: Curriculum Vitae



# Curriculum vitae

## Tobias Coetzee

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Registered Professional Archaeologist, Association of Southern African Professional Archaeologists (ASAPA), CRM accredited, membership no: 289

**Full names:** Tobias Johannes Coetzee  
**Date of birth:** 19 May 1986  
**Qualifications:** MA (Archaeology)

### Education:

2017 MA (Archaeology)  
University of Pretoria  
Dissertation: *Mapping Bokoni: Exploring Bokoni settlement choices and changes in Mpumalanga and Limpopo, South Africa using GIS site distribution analysis techniques*

2008 BA (Hons) (Archaeology)  
University of Pretoria  
Dissertation: *Mapping Bokoni towns & trade: Applying Geographic Information Systems to the articulation of Mpumalanga stonewalled sites with pre-colonial trade routes*

2006 – 2008 BA (Archaeology & Geography)  
University of Pretoria  
Subjects: Zulu, Afrikaans, Cartography, GIS and ArcGIS applications, Meteorology, Anthropology, Ancient History, Isotope Ecology and Dating, Computer and Information Literacy, Academic Skills and Introduction to research

### Employment:

2020 – present Heritage Practitioner  
Agri Civils Geo-Tech & Heritage

2013 – 2019 GIS Practitioner  
Bigen Group (Pty) Ltd

2013 Specialist consultant: Heritage  
Environmental Assurance (Pty) Ltd

2011 Junior lecturer in Archaeology at the University of South Africa (UNISA) at the department of Anthropology & Archaeology  
Primary lecturer for: The Prehistory of South Africa  
Assistant lecturer for: Applied Archaeology - Heritage Conservation

2009 Tutor  
Department of Anthropology & Archaeology, University of Pretoria

## **Conference papers, publications & Cultural Resources Management Reports:**

Coetzee, T. 2020. *Conservation Management Plan for Cemetery 1 at the Kwagga North Mine, Middelburg, Mpumalanga*. Lydenburg: Agri Civils Geo-Tech & Heritage

Coetzee, T. 2020. *Conservation Management Plan for Cemetery 4 at the Kwagga North Mine, Middelburg, Mpumalanga*. Lydenburg: Agri Civils Geo-Tech & Heritage

Coetzee, T. 2020. *A Phase 1 Archaeological Impact Assessment for the Proposed Trentra Mining Development near Kriel, Mpumalanga*. Lydenburg: Agri Civils Geo-Tech & Heritage

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Coetzee, T. 2020. *A Phase 1 Archaeological Impact Assessment for the proposed Blesboklaagte Colliery near eMalahleni, Mpumalanga*. Lydenburg: Agri Civils Geo-Tech & Heritage

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Coetzee, T. 2019. *Phase 1 Archaeological Impact Assessment for the Refurbishment of the Reception and Construction of a New Double Storey Office Extension at Sender Technology Park, Roodepoort, Gauteng*. Pretoria

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Coetzee, T. 2018. *A Phase 1 Archaeological Impact Assessment for the Expansion of the Kleinfontein Colliery Between Hendrina and Bethal, Mpumalanga*. Pretoria

Coetzee, T. 2018. *Grave Relocation Report for the Jeremiah Nyathi Grave from Portion 7 of the Farm Enkeldedooms 35 JT, Lydenburg, Mpumalanga*. Pretoria

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Coetzee, T. 2017. *A Phase 1 Archaeological Impact Assessment for the Proposed Witbank Siding on erf 5197 and portions of portion 2, 144, 150, 219 and 244 of the Farm Blesboklaagte 296 JS, Emalahleni, Mpumalanga*. Pretoria

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