

# **PHASE 1 ARCHAEOLOGICAL IMPACT ASSESSMENT**

**For**

**The Proposed Mnambithi  
Straffontein Mining Project on  
Portion 4 of the Farm  
Straffontein 252 IR, Delmas,  
Mpumalanga**

**Author ©:**

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

**July 2021**

A Phase 1 Archaeological Impact Assessment for the Proposed Mnambithi  
Straffontein Mining Project on Portion 4 of the Farm Straffontein 252 IR,  
Delmas, Mpumalanga

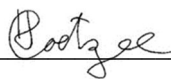
For: Eco Elementum (Pty) Ltd  
361 Oberon Ave  
Glenfield Office Park  
Nika Building  
Faerie Glen  
Pretoria  
0081

Report No: 21-1372-AUTH (Mnambithi MR + IWUL)  
Version: 1

Email: tobias.coetzee@gmail.com

I, Tobias Coetzee, declare that –

- I act as the independent specialist;
- I am conducting any work and activity relating to the proposed Mnambithi Straffontein Mining Project in an objective manner, even if this results in views and findings that are not favourable to the client;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have the required expertise in conducting the specialist report and I will comply with legislation, regulations and any guidelines that have relevance to the proposed activity;
- I have not, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- All the particulars furnished by me in this declaration are true and correct.



\_\_\_\_\_  
Date: 28 July 2021

## List of Abbreviations

**AIA** – Archaeological Impact Assessment

**CRM** – Cultural Resource Management

**EIA** – Environmental Impact Assessment

**ESA** – Early Stone Age

**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

**SAHRA** – South African Heritage Resources Agency

## Executive Summary

The author was appointed by Eco Elementum (Pty) Ltd to undertake a Phase 1 Archaeological Impact Assessment (AIA) for the proposed Mnambithi Straffontein mining project on Portion 4 of the Farm Straffontein 252 IR near Delmas, Mpumalanga. The aim of the study is to determine the scope of archaeological resources that could be impacted by the proposed mining development.

Three sites forming part of a contemporary irrigation system were observed in the cultivated section of the proposed study area (Sites K01 – K03). These sites are of modern origin, do not exceed 60 years of age and are not considered significant from a heritage perspective. No further action is required.

Subject to adherence of the recommendations and approval by SAHRA (South African Heritage Resources Agency), the proposed Mnambithi Straffontein mining project 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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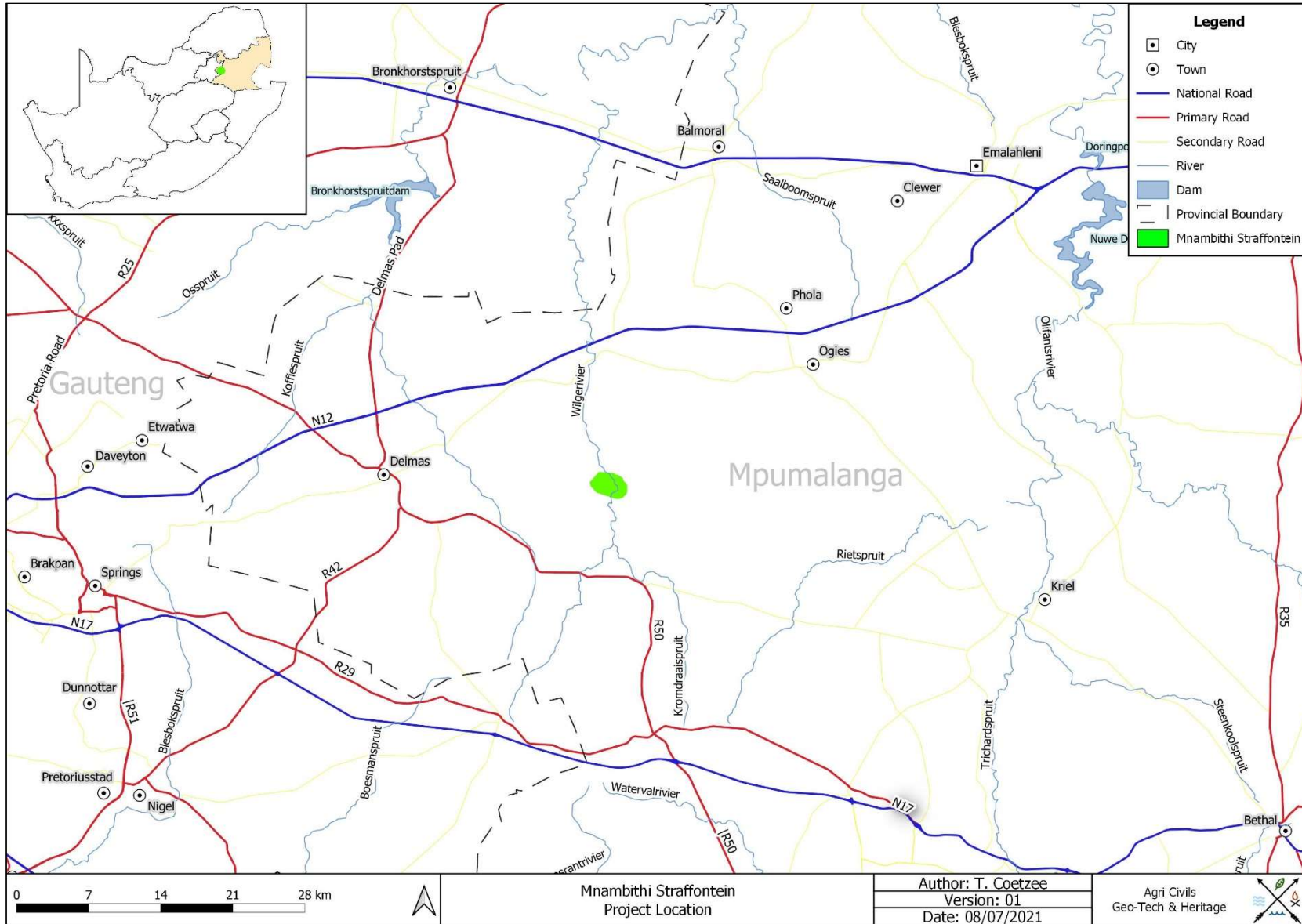
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# 1. Project Background

## 1.1 Introduction

The author was appointed by Eco Elementum (Pty) Ltd to undertake a Phase 1 Archaeological Impact Assessment for the proposed coal mining expansion at the Mnambithi Straffontein mine. The proposed study area is located on Portion 4 of the Farm Straffontein 252 IR, approximately 20 km east of Delmas in the Mpumalanga Province (**Figures 1 & 2, Table 1**). 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 mining project, 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 expansion of coal mining and the associated activities on Portion 4 of the Farm Straffontein 252 IR with regard to heritage resources. The demarcated portion is rectangular in shape, consists of the majority of Portion 4 and is located in the north-western corner 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.

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## 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 mining development is situated on portion 4 only:

**Table 1:** Property name & coordinates

Property	Portion	Map Reference (1:50 000)	Lat	Lon	Parcel Size (ha)	Proposed development (ha)
Straffontein 252 IR	4	2628 BB	-26.153782	28.879409	94.3	±92

Delmas is located about 20 km west of the proposed mining development, while Ogies is located 22 km to the northeast and Kriel 44 km to the east-southeast. The study area falls within the Victor Khanye Local Municipality and the Nkangala District Municipality in the Mpumalanga Province. The R50 primary and R580 secondary roads run in an east – west direction approximately 8.5 km south of the study area, while the R555 secondary road runs in an east – west direction approximately 12 km to the north of the study area. Several local roads are also found in the general area (**Figures 1 – 3**). Access to the study area is via a local road turning from the R555 secondary 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 Stoffberg 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 1532 MASL and slopes from the slightly more elevated western section to the lower eastern section.

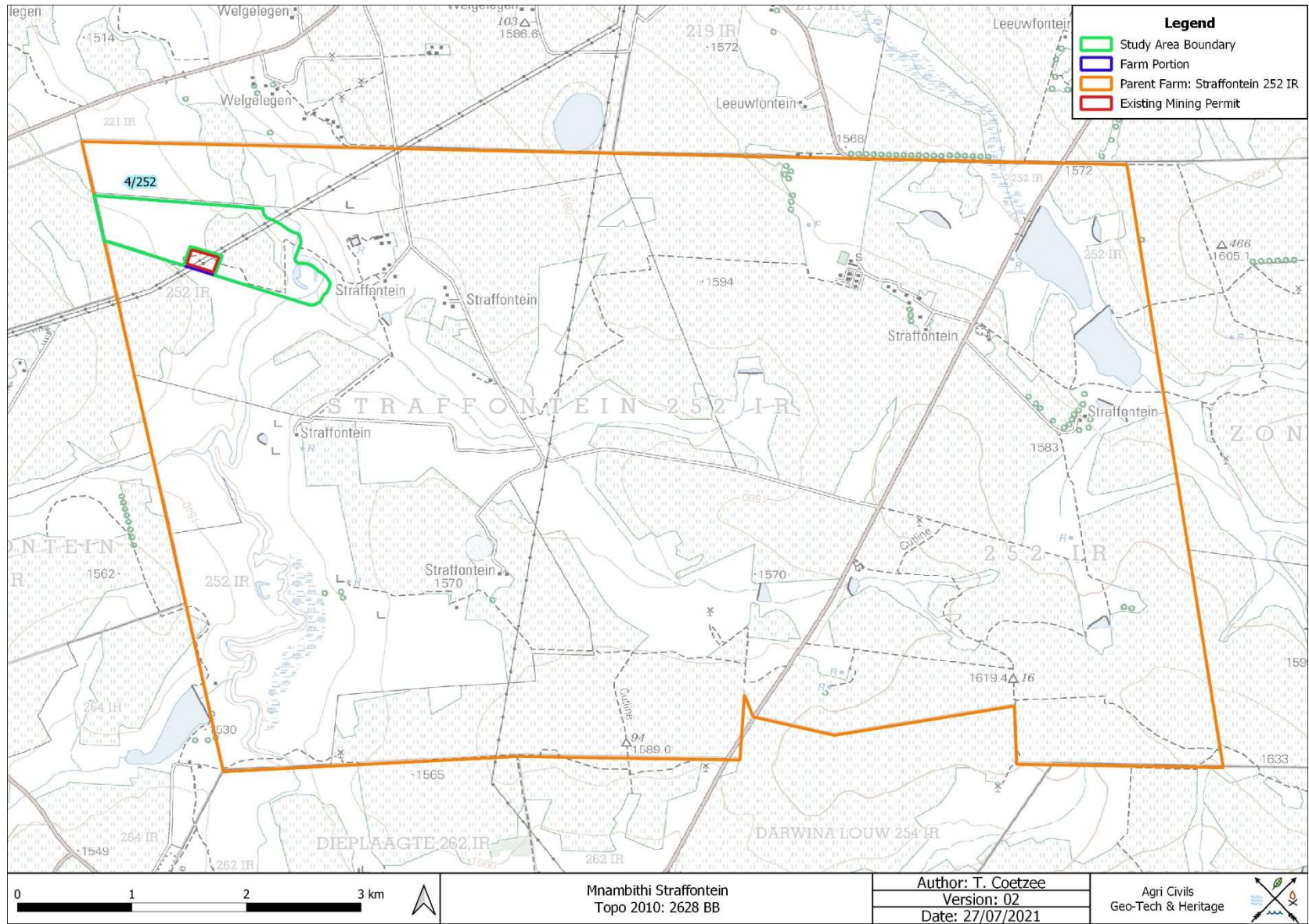
The study area falls within the summer rainfall region and the average annual rainfall is roughly 787 mm. The average maximum temperature for the study area is recorded during January when an average of 19.9 °C is reached. July is considered the coldest month (Climate-data.org 09/07/2021).

The study area falls within the B20E Quaternary Catchment within the Olifants Water Management Area. The closest perennial river to the study area is the Wilgerivier that forms the eastern boundary of Portion 4 of the Farm Straffontein 252 IR. A few non-perennial offshoots are found near the demarcated study area as well.

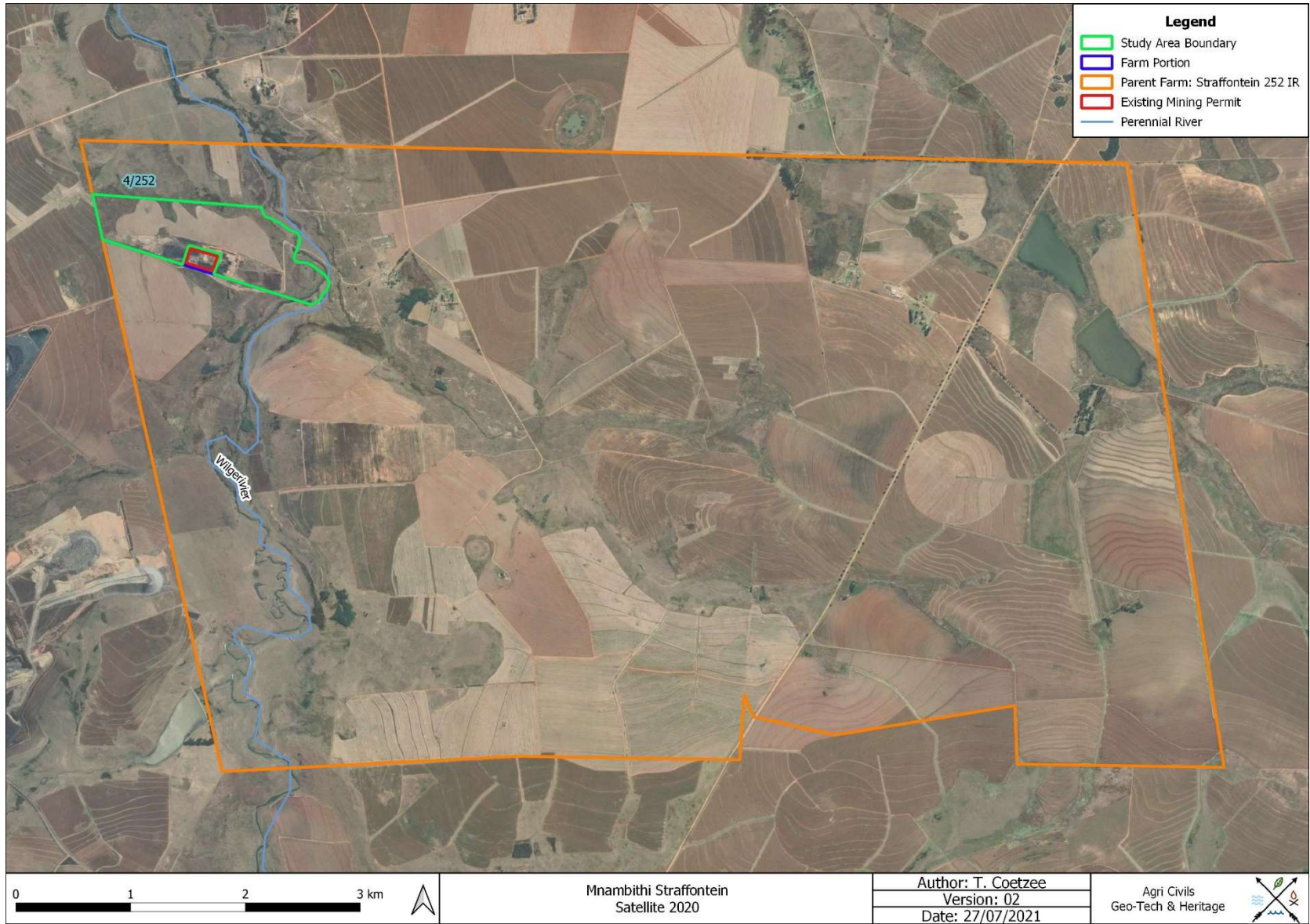
On a local scale, the south-western quadrant of the study area is associated with current mining activities, while the majority of the northern half consists of cultivated land. The greater area is generally associated with farming related activities and mining development. Historical topographical maps (**Appendix A**) indicate the presence of huts and buildings on the area associated with current mining activities, while the surrounding area was cultivated since at least 1965.

## 2.2 Project description

A Mining Permit for coal exists for a small section along the southern boundary of Portion 4/252. The proposed mining project aims at expanding the current coal mining activities to include approximately 92 ha to the west, north and east of the area associated with the existing Mining Permit (**Figures 2 & 3**).



**Figure 2:** Segments of SA 1: 50 000 2628 BB 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.

## 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.

The Historical period mainly deals with Europe’s discovery, settlement and impact on southern Africa. Some topics covered by the Historical period include Dutch settlement in the Western Cape, early mission stations, Voortrekker routes and the Anglo Boer War. This time period also saw the compilation of early maps by missionaries, explorers, military personnel, etc. Two Anglo Boer War sites worth mentioning are the Battle of Bronkhorstspuit and the Battle of Bakenlaagte. The Battle of Bronkhorstspuit took place on 20 December 1880 and is considered to be the first open battle of the 1<sup>st</sup> Boer War. The battlefield is located approximately 36 km northwest of the proposed Mnambithi Straffontein mining project on the farm Klippeiland. The Battle of Bakenlaagte

took place on 30 October 1901 during the 2<sup>nd</sup> Boer War. The battlefield is located approximately 30 km southeast of the proposed Mnambithi Straffontein mining project.

### 3.2.1 Coal mining general history on the Highveld

eMalahleni, previously known as Witbank, has a rich history in terms of development and mineral exploitation. Mpumalanga, especially the area between eMalahleni, Middelburg, Bethal, Hendrina, Ermelo and Carolina, is associated with vast coal fields. These coal fields formed between 200 and 300 million years ago from rotten forests in swamps. During this period, Africa was still attached to South America, India and Antarctica as part of the Gondwana supercontinent. By 250 million years ago, the climate changed to dry warm conditions and the swamps in Mpumalanga were replaced by desert-like conditions around 200 million years ago. By 180 million years ago, when the Gondwana supercontinent started to split up, volcanic lava fields covered areas in Mpumalanga (De Wit 2007: 37).

With the rich coal deposits in Mpumalanga, it was only a matter of time before its value was realised and the coal extracted. Coal mining is Mpumalanga's most important industrial activity and produces about 80% of South Africa's coal. The earliest coal mining in the area dates to 1868 when farmers extracted coal for personal use in the Middelburg district. Large-scale coal mining around eMalahleni, however, only started after the discovery of gold on the Witwatersrand in 1886. Due to the discovery of coal in the Brakpan and Springs surroundings in 1887 and no railway linking eMalahleni with the Rand, these early eMalahleni coal mines closed down. It was more cost effective to exploit the closer Brakpan and Springs coal deposits than the coal found at eMalahleni (Schirmer 2007: 316).

After the construction of the railway line between the Rand and eMalahleni the deposits were exploited on large scale again. The coal fields, which are about 40 km wide, are concentrated around eMalahleni and run towards Belfast in the east. The first collieries around eMalahleni were Douglas, Transvaal and Delagoa Bay, Witbank and Landau and are of a higher quality compared to the coal found at Brakpan and Springs. During the 1890s some of the coal was exported via Delagoa Bay. In addition, the coal was readily accessible as the deposits occurred at a depth of 100 m or less (Schirmer 2007: 316-317). It should also be noted that the railway line between Pretoria and Lorenzo Marques (Maputo) was completed on 2 November 1894 and the connection between eMalahleni and Johannesburg during the 1910s (Heydenrych 1999).

Between 1900 and 1920 many new collieries were established and the coal price dropped. This led to the establishment of the Transvaal Coal Owners' Association with the main aim to regulate output coal prices. This also acted to counter possible competition. It should also be noted that not all collieries joined this association. The establishment of the Transvaal Coal Owners' Association had positive as well as negative influences. On the one hand eliminating the competition might have impacted negatively on efficiency and the workers. On the other hand, it is possible that the capacity of coal mines was enhanced and facilitated further development in the

industry. One positive point was that the association eased interaction with international buyers. During the 1930s, however, the coal price continued to drop and resulted in mechanisation. This introduced electric coal cutters and eliminated the need for high number of unskilled workers. By 1946 eMalahleni and Middelburg saw the emergence of a modern coal industry. The Transvaal had 34 large collieries that were responsible for 99.7% of the province's coal (Schirmer 2007: 317-319).

Between 1940 and 1960 coal output in the Eastern Transvaal increased from 13 million to 25 million tons. Although industrialisation expanded throughout this time in South Africa and a demand existed for coal both locally and internationally, a steady shift to oil as the dominant form of energy was noted. In light of these developments Anglo American Corporation launched three research programmes in the 1960s. As a result of these programmes the region's coal mines became export orientated. This trend continued throughout the 1980s. During these times a series of coal-burning power stations around the eastern Highveld coal deposits were constructed (Schirmer 2007: 321).

## 4. Methodology

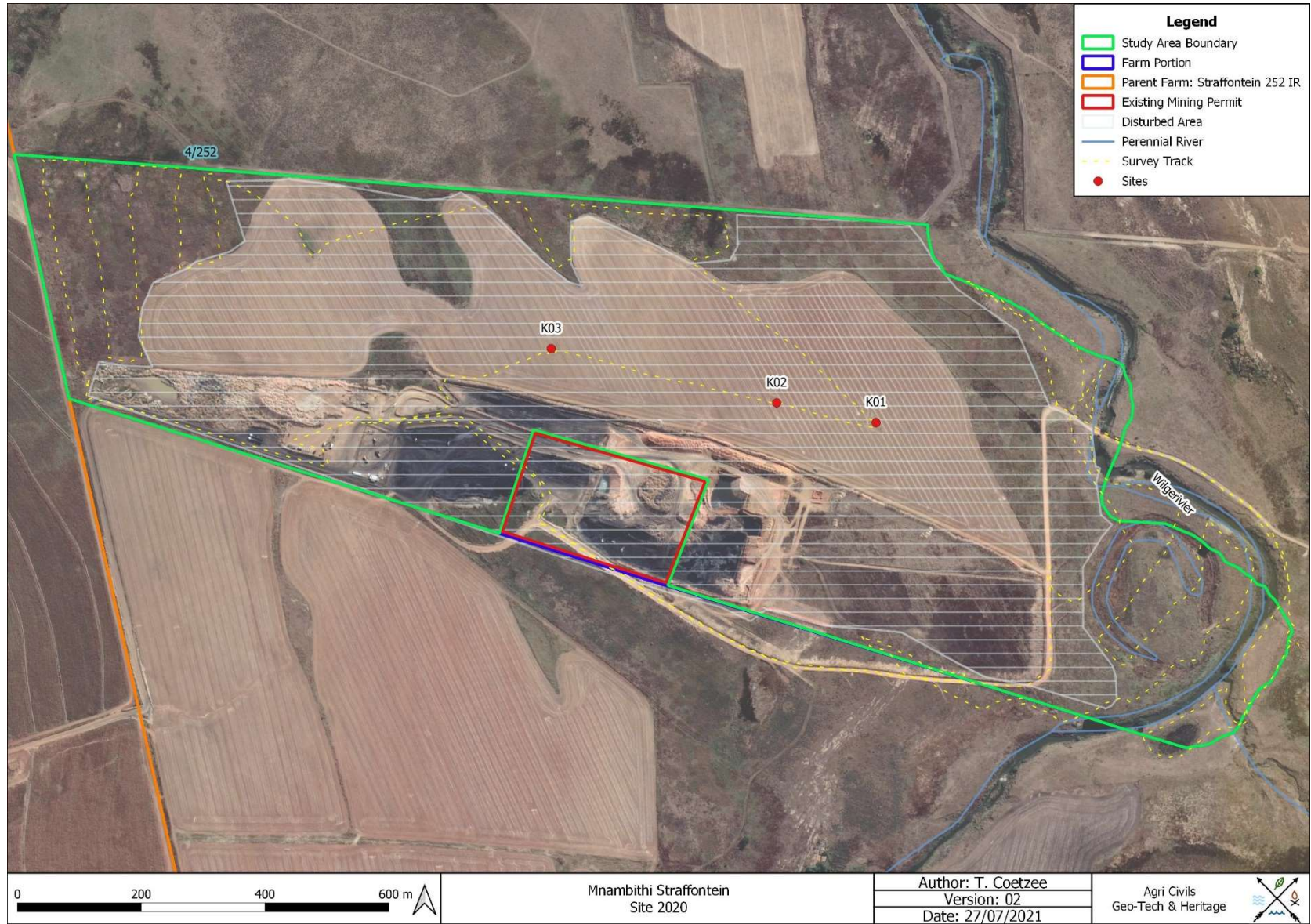
Archaeological reconnaissance of the study area was conducted during June 2021 (Winter) through a combination of systematic and unsystematic pedestrian site surveys that lasted one day (**Figure 4**). The inspection consisted of a systematic pedestrian survey of the undisturbed sections associated with the study area. The transects were spaced roughly 60 m apart where movement was not hampered by dense vegetation. General site conditions were recorded via photographic record (**Figures 5 – 12**). Also, the site was inspected beforehand on Google Earth and historical topographical maps and aerial images in order to identify potential heritage remains (**Appendix A**). Three potential sites (K01 – K03) were identified as disturbances on contemporary satellite imagery and were visited during the survey (**Table 2 & Figure 4**). It should be noted that the prefix '2628BB' is not used as a site reference due to the length of the name, but is recorded as such in **Tables 2 & 5**. The topographical datasets dating to 1965, 1984, 1995 and 2010, as well as the historical aerial images dating to 1953 and 1958 proved useful in terms of providing an indication of potential structures and buildings associated with the study area, as well as to determine past land uses. The total area surveyed was approximately 92 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

<b>Name</b>	<b>Off. Name</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Description</b>	<b>Age</b>	<b>Current Status</b>	<b>ID Source</b>
K01	2628BB-K01	28.883254	-26.154909	Irrigation	Contemporary	Intact	Satellite 2020
K02	2628BB -K02	28.881813	-26.154624	Irrigation	Contemporary	Intact	Satellite 2020
K03	2628BB -K03	28.878539	-26.153837	Irrigation	Contemporary	Intact	Satellite 2020



**Figure 4:** Study area with survey track indicated on a 2020 satellite image.



**Figure 5:** Open veldt in the north-western corner of the study area.



**Figure 6:** Open veldt in the south-western corner of the study area.



**Figure 7:** Environment in the south-eastern corner of the study area.



**Figure 8:** Environment in the north-eastern corner of the study area.



**Figure 9:** Previously cultivated section along the southern boundary.



**Figure 10:** Cultivated area.





**Figure 11:** Natural disturbance identified on contemporary satellite imagery.



**Figure 12:** Current mining development.

#### **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 Mr Carlos Masinga, a local farm worker who has been working on the farm for the past year, provided useful information regarding the presence of cemeteries in the general area (Carlos Masinga, pers. Comm. 2021).

#### 4.1.1 Historical topographical maps

The historical aerial image dating to 1953 (**Appendix A: Figure 20**) indicates a triangular area along the southern boundary of Portion 4/252 associated with two buildings, while the rest of the proposed study area appears to be cultivated. The same observations are made on the 1958 aerial image and the historical topographical map dating to 1965 (**Appendix A: Figures 21 & 22**), with the addition of one building within the triangular area. It should be noted that the 1965 topographical map indicates the buildings as huts. By 1984, the same area was cultivated, while the hut symbols were replaced by buildings (**Appendix A: Figure 23**). One additional building and several footpaths are also indicated within the triangular area, as well as excavations to the east of the river in the south-eastern corner of the proposed study area. The 1995 topographical map (**Appendix A: Figure 24**) indicates only one remaining building along the southern boundary of Portion 4/252 and one footpath, while the 2010 topographical map (**Appendix A: Figure 25**) shows only a small section of cultivated land, a powerline and no buildings. **Figure 4** shows that the triangular area that used to be associated with buildings have completely been disturbed by mining activities.

#### 4.1.2 Previous Heritage Studies

##### **Khutala Colliery, Nkangala District**

Matakoma Heritage Consultants (2007) conducted a Heritage Impact Assessment for the BHP Billiton Khutala Colliery on certain portions of the farms Zondagsvlei, Schoongezicht, Leeuwfontein, Klippoortje, Springboklaagte, Cologne, Bombardie and Smithfield in the Nkangala district. The HIA recorded 24 cemeteries consisting of approximately 735 graves, as well as 15 historical structures. This development is located roughly 9 km northeast of the proposed Mnambithi Straffontein mining project area concerned in this report.

##### **Klipspruit Extension: Weltevreden**

The HIA survey for the Klipspruit Extension: Weltevreden project was done by Du Piesanie (2014). The project entailed an assessment of the built environment that included a field reconnaissance survey that identified, recorded, and documented all structures and burials in the project area, in addition to the sites identified by Cultmatrix cc (De Jong 2009). The HIA recorded 57 heritage sites within the project area: 20 burial grounds, 34 built structures and 1 palaeontology and meteorites sites. The Klipspruit Extension Project is approximately 24 km northeast of the study area concerned in this report.

## Nooitgedacht 525JR

The HIA survey conducted for the development of a housing estate on Portion 9 of the Farm Nooitgedacht 525 JR, located 34 km northwest of the proposed mining 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).

## 4.2 Limitations

Dense vegetation associated with the western section of the study area (**Figure 13**) significantly hampered visibility and free movement at the time of surveying (June 2021). However, historical topographical maps indicate that this area used to be cultivated land as well. No other access constraints were encountered.



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

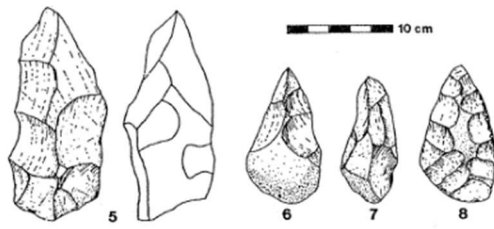
## 5. Archaeological and Historical Remains

### 5.1 Stone Age Remains

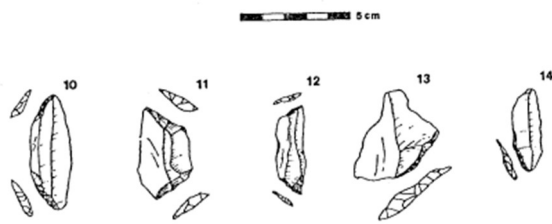
No Stone Age archaeological remains were observed within the demarcated study area.

Stone Age artefacts are often associated with rocky outcrops or water sources. **Figures 14 – 16** are examples of stone tools often associated with the Early, Middle and Later Stone Age of southern Africa.

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



**Figure 14:** ESA artefacts from Sterkfontein (Volman 1984).



**Figure 15:** MSA artefacts from Howiesons Poort (Volman 1984).



**Figure 16:** LSA scrapers (Klein 1984).

## 5.2 Iron Age Farmer Remains

No Iron Age Farmer remains were observed within the demarcated study area.

Archaeological studies done in the surrounding areas also did not locate material pertaining to the Iron Age.

## 5.3 Historical

No historical remains were observed within the demarcated study area.

The Heritage studies conducted by Van Schalkwyk (2007), Matakoma Heritage Consultants (2007) and Du Piesanie (2014) recorded several heritage sites consisting of buildings and structures that date to the Historic Period.

## 5.4 Contemporary Remains / Natural Sites

Three sites (K01 – K03) were identified on contemporary satellite imagery as disturbances within cultivated land (Table 3). The site visit confirmed that these sites form part of a contemporary irrigation system. It is unknown whether the system is still operational (Figures 17 – 19). These sites do not exceed 60 years of age.

**Table 3:** Contemporary Sites.

Name	Type	Source	Year	Status	Age
K01	Irrigation	Aerial	2020	Intact	Contemporary
K02	Irrigation	Aerial	2005	Intact	Contemporary
K03	Irrigation	Aerial	2020	Intact	Contemporary

The heritage studies done by Van Schalkwyk (2007), Matakoma Heritage Consultants (2007) and Du Piesanie (2014) did not record contemporary remains.



**Figure 17:** Irrigation system at Site K01.



**Figure 18:** Irrigation system at Site K02.



**Figure 19:** Irrigation system at Site K03.

## 5.5 Graves

No graves or burial sites were observed within the demarcated study area. According to Mr Masinga (Carlos Masinga, pers. Comm. 2021), no grave or cemetery is located within close proximity of the area demarcated for mining development.

The heritage studies done by Matakoma Heritage Consultants (2007) and Du Piesanie (2014) recorded several burial sites.

## 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 4:** Field Ratings.

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

**Table 5:** Individual site ratings.

Site / Survey Point Name	Type	Rating	Field Rating/Grade	Significance	Recommendation
2628BB-K01	Contemporary - Irrigation	General Protection C	4 C	Low	No recording necessary
2628BB-K02	Contemporary - Irrigation	General Protection C	4 C	Low	No recording necessary
2628BB-K03	Contemporary - Irrigation	General Protection C	4 C	Low	No recording necessary

## 7. Statement of Significance & Recommendations

### 7.1 Statement of significance

#### **The study area: Portion 4 of the Farm Straffontein 252 IR**

As can be seen from heritage studies done in the surrounding areas, the greater study area is considered to be significant from a heritage perspective. The three identified sites (K01 – K03) form part of an irrigation system that date to contemporary times, do not exceed 60 years of age and are not considered significant from a heritage perspective. The sites are consequently not protected by the NHRA (25 of 1999). Also, the entire demarcated study area appears to have been disturbed by a combination of mining activities and crop cultivation. In terms of heritage resources, the sensitivity of the demarcated study area is therefore considered to be low.

### 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 K01 – K03 are of recent origin and not considered significant from a heritage perspective. No further action is required.
- Because archaeological artefacts generally occur below surface, the possibility exists that culturally significant material may be exposed during the construction and development phases, 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 proposed Mnambithi Straffontein mining project 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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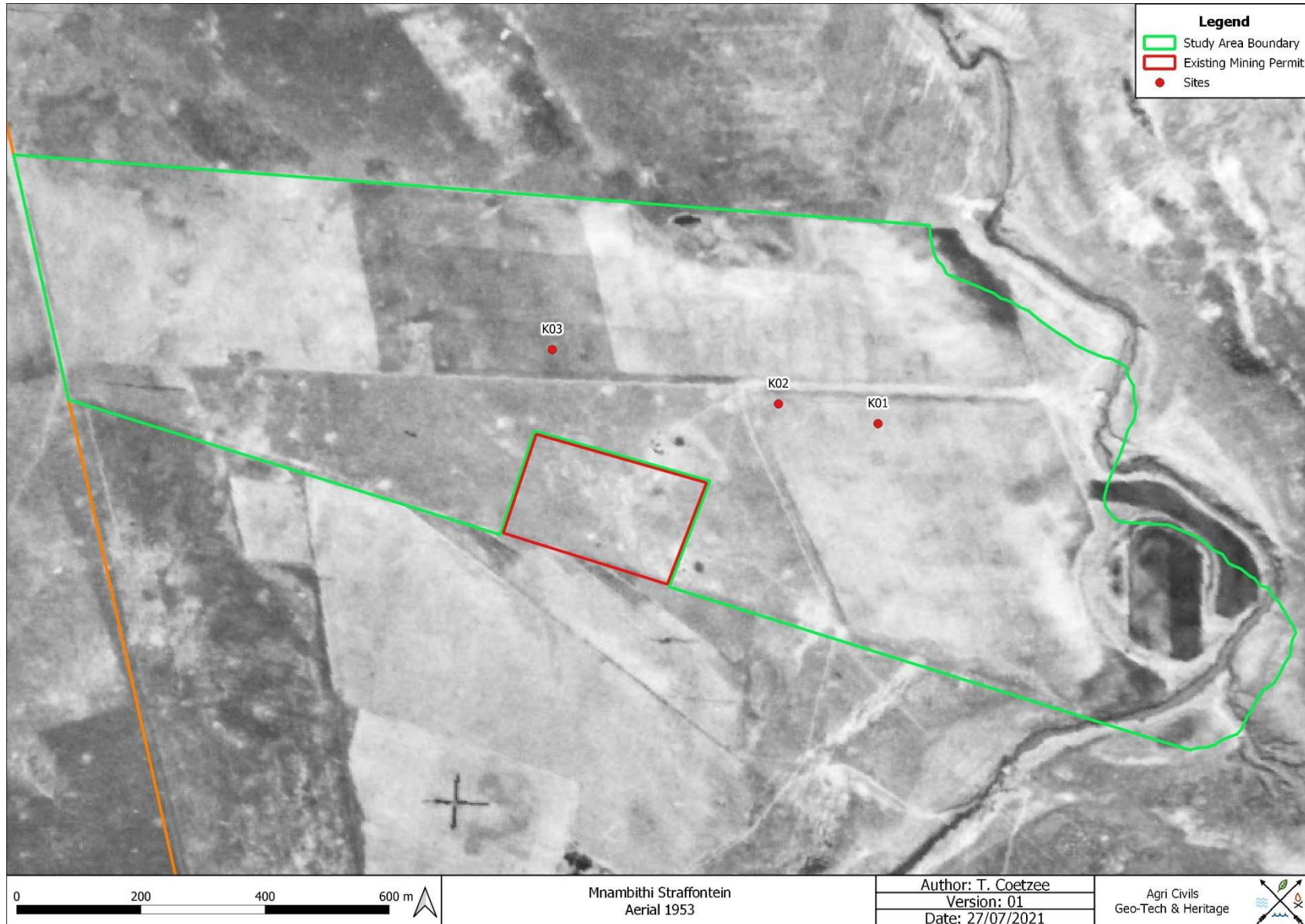
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*National Heritage Resource Act No.25 of 1999, Government Gazette, Cape Town*

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

## Appendix A: Historical Aerial Photographs and Topographical Maps



**Figure 20:** The study area superimposed on a 1953 aerial image.



**Figure 21:** The study area superimposed on a 1958 aerial image.

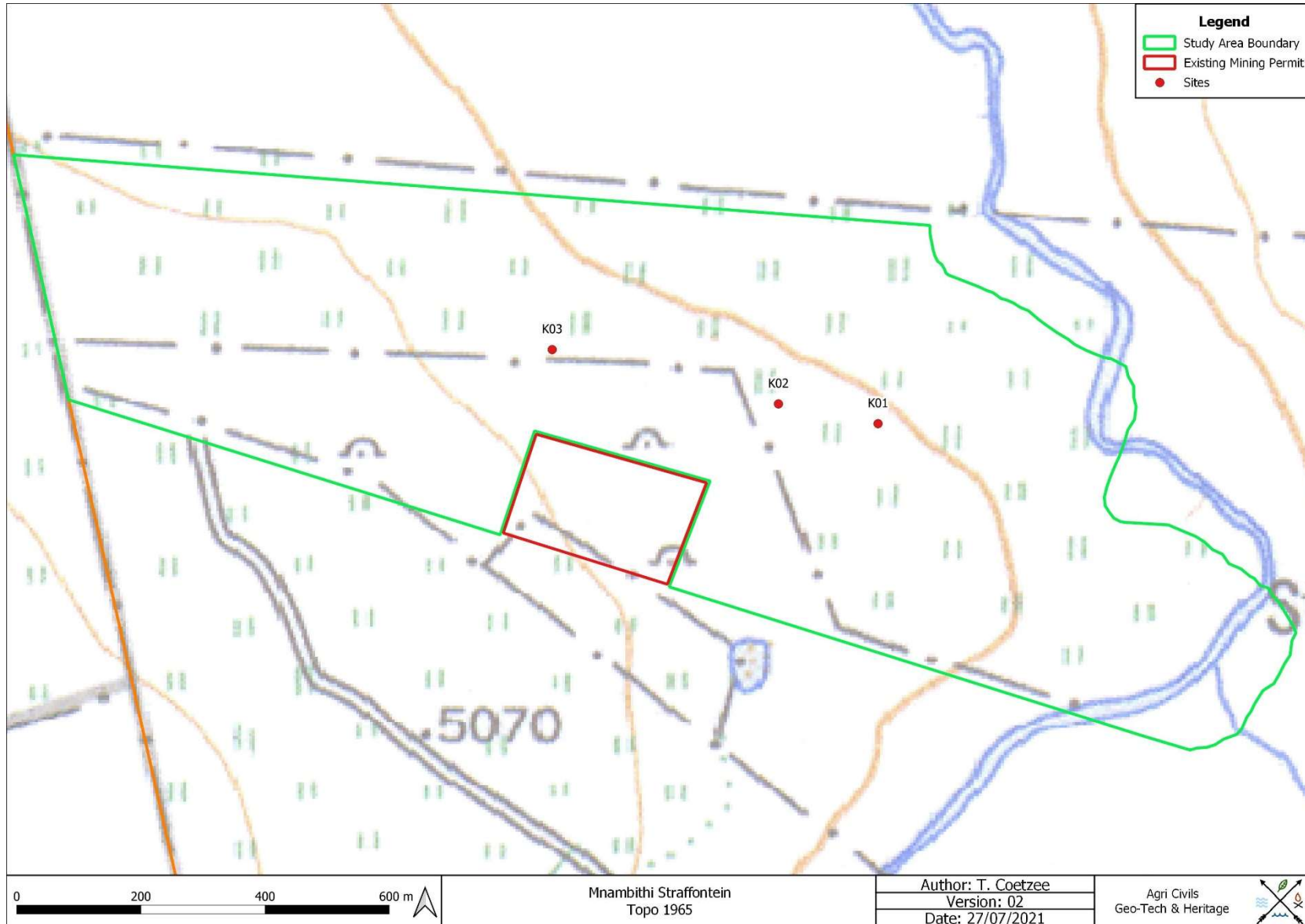
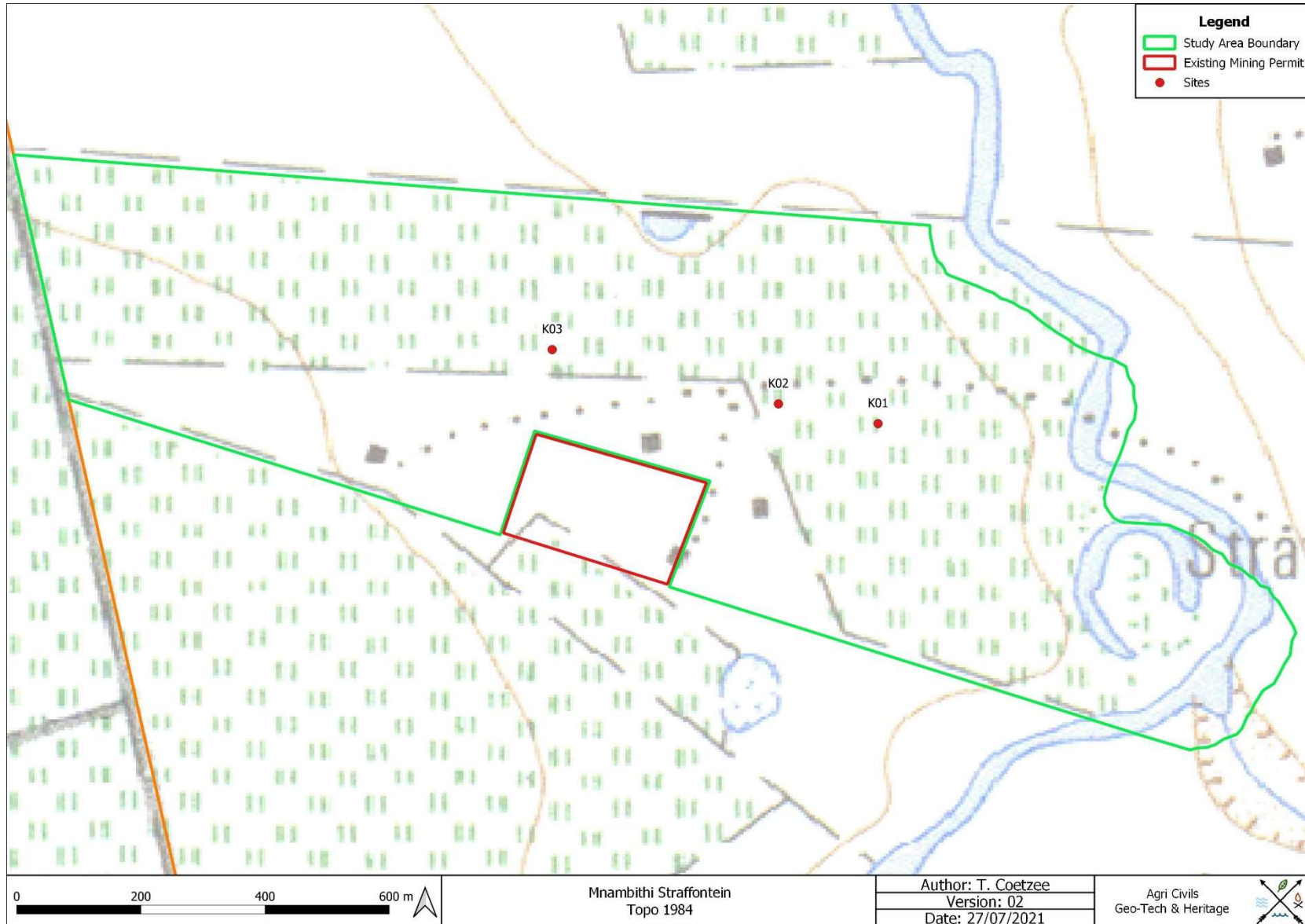
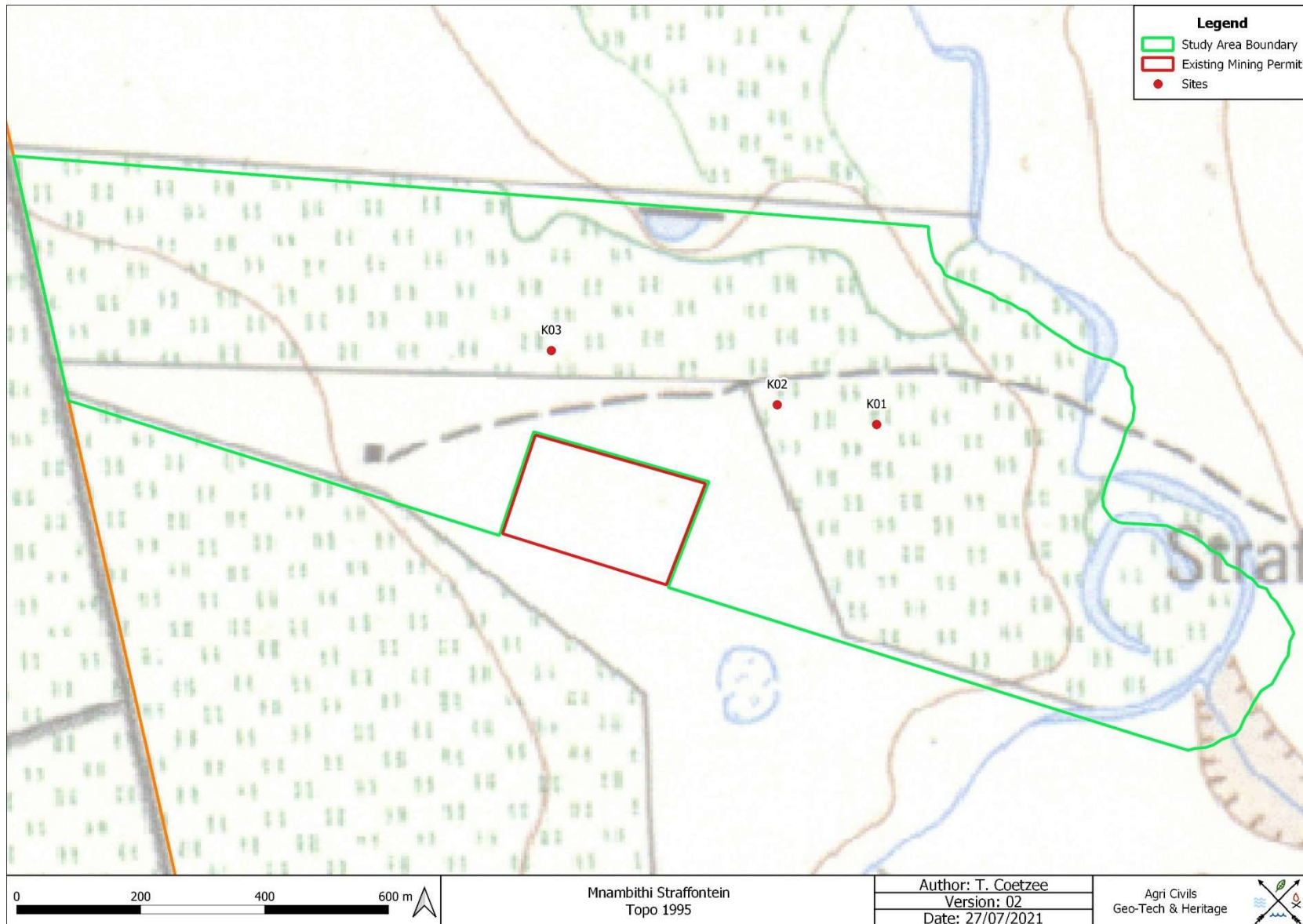


Figure 22: The study area superimposed on a 1965 topographical map.



**Figure 23:** The study area superimposed on a 1984 topographical map.





**Figure 24:** The study area superimposed on a 1995 topographical map.

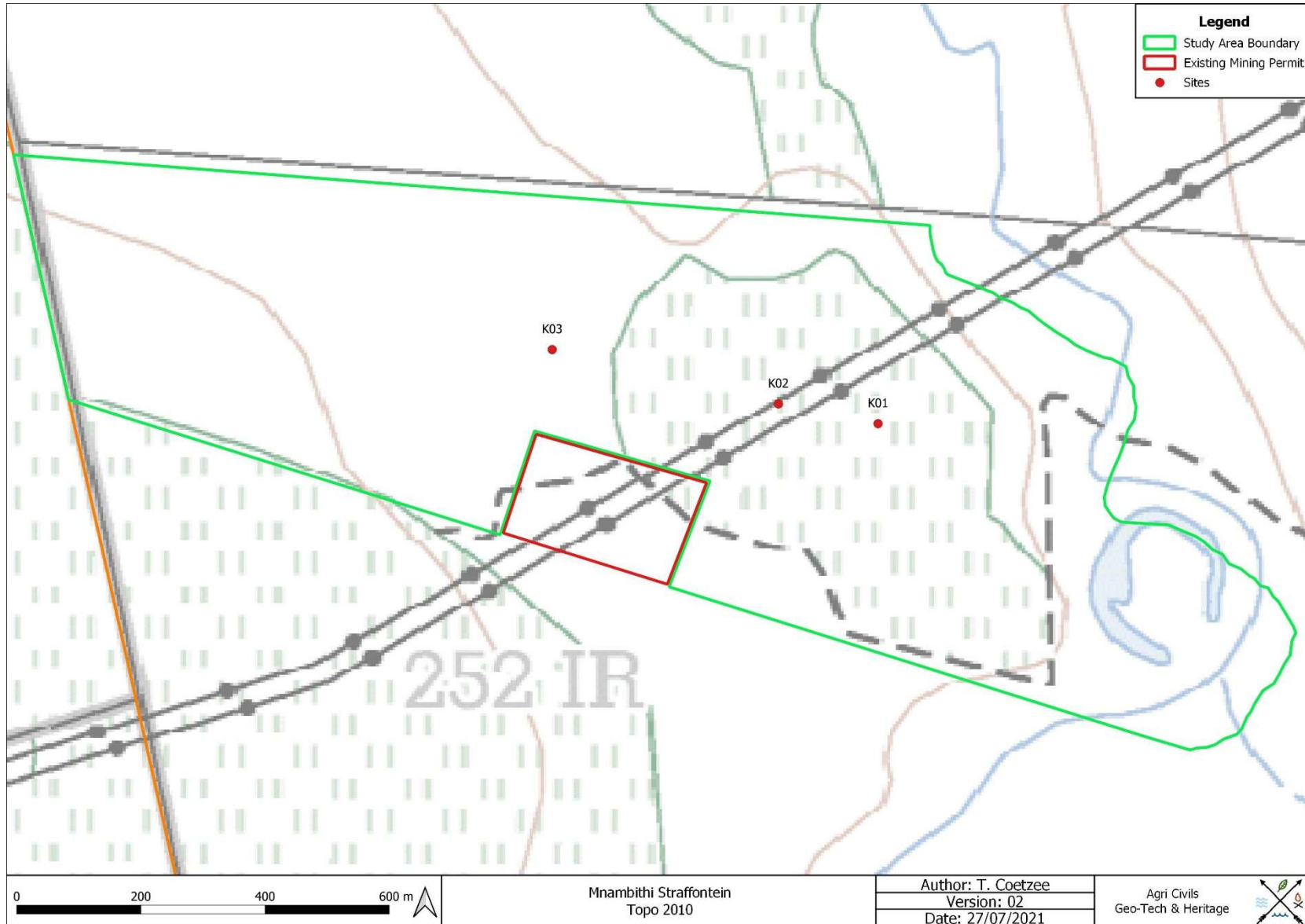


Figure 25: The study area superimposed on a 2010 topographical map.