

# **PHASE 1 ARCHAEOLOGICAL IMPACT ASSESSMENT**

**For**

**The Proposed Trentra Coal  
Mining Development on a  
Portion Intersecting Portion  
21 of the Farm Vaalwater 173  
IS, District Carolina,  
Mpumalanga**

**Author ©:**

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**February 2022**

A Phase 1 Archaeological Impact Assessment for the Proposed Trentra Coal Mining Development on a Portion Intersecting Portion 21 of the Farm Vaalwater 173 IS, District Carolina, Mpumalanga

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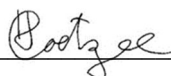
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I, Tobias Coetzee, declare that –

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



Date: 24 February 2022

## List of Abbreviations

**AIA** – Archaeological Impact Assessment

**CRM** – Cultural Resource Management

**EIA** – Environmental Impact Assessment

**ECO** – Environmental Control Officer

**ESA** – Early Stone Age

**GPS** – Global Positioning System

**ha** – Hectare

**HIA** – Heritage Impact Assessment

**km** – Kilometre

**LSA** – Later Stone Age

**m** – Metre

**MASL** – Metres Above Sea Level

**MEC** – Member of the Executive Council

**MP** – Mining Permit

**MSA** – Middle Stone Age

**NHRA** – National Heritage Resources Act

**SAHRA** – South African Heritage Resources Agency

**WMA** – Water Management Area

## Executive Summary

The author was appointed by Eco Elementum (Pty) Ltd to undertake a Phase 1 Archaeological Impact Assessment for the proposed Trentra Coal Mining Development on a portion intersecting Portion 21 of the Farm Vaalwater 173 IS within the Carolina District of the Mpumalanga Province. The proposed mining development is located approximately 24 km west-southwest of Carolina and falls within the Chief Albert Luthuli Local Municipality. The aim of the study is to determine the scope of archaeological resources that could be impacted by the proposed mining development.

The demarcated study area is characterised by open veldt that appears to be utilised for cattle grazing. According to historical aerial imagery and topographical maps, parts of the study area used to be cultivated as early as 1955. During later years, the entire area was cultivated, suggesting a lower significance and potential impact to cultural resources. No buildings or structures were noted on historical topographical maps and aerial imagery within the demarcated boundary. However, an angular structure (B02) and two historical built environment sites (B03 & B04), located on the outside of the demarcated study area, were noted on the 1955 aerial image. The 1966 topographical map also shows a cemetery (B01) to the east of the area demarcated for development. It should be noted that the identified sites are more likely to be impacted by the adjacent Vaalwater Coal Mining Permit Application (MP 30/5/1/1/3/12787 MP). Although a service level agreement is proposed between the Vaalwater Coal Mining Permit Application and the Trentra Mining Permit Application (MP 30/5/1/1/3/12786 MP), the impact of each Mining Permit (MP) area on the identified sites will differ. Therefore, the recommendations are based on each MP area's proximity to the identified sites.

Cemetery B01 consists of approximately 18 graves and is located roughly 140 m east of the proposed development. Although no dates were observed, the possibility exists that some of the graves exceed 60 years of age. The cemetery is therefore protected by 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 (NHRA) 25 of 1999. Because the cemetery appears not to be in use anymore, it is recommended that a 30 m fenced-off conservation buffer be erected around the cemetery in order to avoid accidental damage. Due to the type of the surface decorations and dilapidated state of the graves, it is unlikely that the proposed development will impact the graves. Access to the cemetery should also not be refused.

The foundation remains at site B02 is located 118 m east of the eastern corner of the demarcated study area and will not be impacted by the proposed development. The structure might have been a kraal, but was completely demolished as only the foundation mounds are visible. The site is therefore not considered to be significant from a heritage perspective.

Sites B03 and B04 consist of a combination of intact buildings and ruins dating to the Historic Period. Site B03 is located 242 m east-northeast of the proposed development, while site B04 is located 129 m to the northeast. These sites exceed 60 years of age and are therefore protected by the NHRA (25 of 1999). Due to the proximity of these sites to the proposed development, the sites could be impacted. Therefore, the sites should be monitored by the mine's Environmental Control Officer (ECO) on a quarterly basis, as well as before and after blasting. Should any damage be observed as a result of the proposed development, a qualified archaeologist must be contacted.

The proposed access road was not available at the time of the fieldwork and was therefore not inspected. However, historical aerial images and topographical maps indicate that the entire area used to be cultivated at some stage in the past and no buildings or structures were noted along the proposed road. The sensitivity of the associated area in terms of heritage resources can therefore be regarded as low. However, should any potential heritage sites be observed along the proposed road, a qualified archaeologist must be contacted prior to any development

Subject to adherence to the recommendations and approval by the South African Heritage Resources Agency (SAHRA), the proposed Trentra Coal Mining Development as per the indicated boundary may continue. Should skeletal remains be exposed during development and construction phases, all activities must be suspended and the relevant heritage resources authority contacted (See National Heritage and Resources Act, 25 of 1999 section 36 (6)). Also, should culturally significant material be discovered during the course of the said development, all activities must be suspended pending further investigation by a qualified archaeologist.

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# 1. Project Background

## 1.1 Introduction

Eco Elementum (Pty) Ltd appointed the author to undertake a Phase 1 Archaeological Impact Assessment for the proposed Trentra Coal Mining Development on a portion intersecting Portion 21 of the Farm Vaalwater 173 IS (**Table 1**) within the District of Carolina in the Mpumalanga Province (**Figures 1 – 3**). The proposed coal mining development falls within the Chief Albert Luthuli Local Municipality and is located approximately 24 km west-southwest of Carolina. The purpose of this study is to examine the demarcated study area in order to determine if any archaeological resources of heritage value will be impacted by the proposed mining development, as well as to archaeologically contextualise the general study area. The aim of this report is to provide the developer with information regarding the potential location of heritage resources within the demarcated study area.

In the following report, the implication for the proposed Trentra Coal Mining Development on the demarcated portion with regard to heritage resources is discussed: A Portion intersecting Portion 21 of the Farm Vaalwater 173 IS. The development will consist of an opencast pit and associated infrastructure. The legislation section included serves as a guide towards the effective identification and protection of heritage resources and will apply to any such material unearthed during development and construction phases within the demarcated study area.

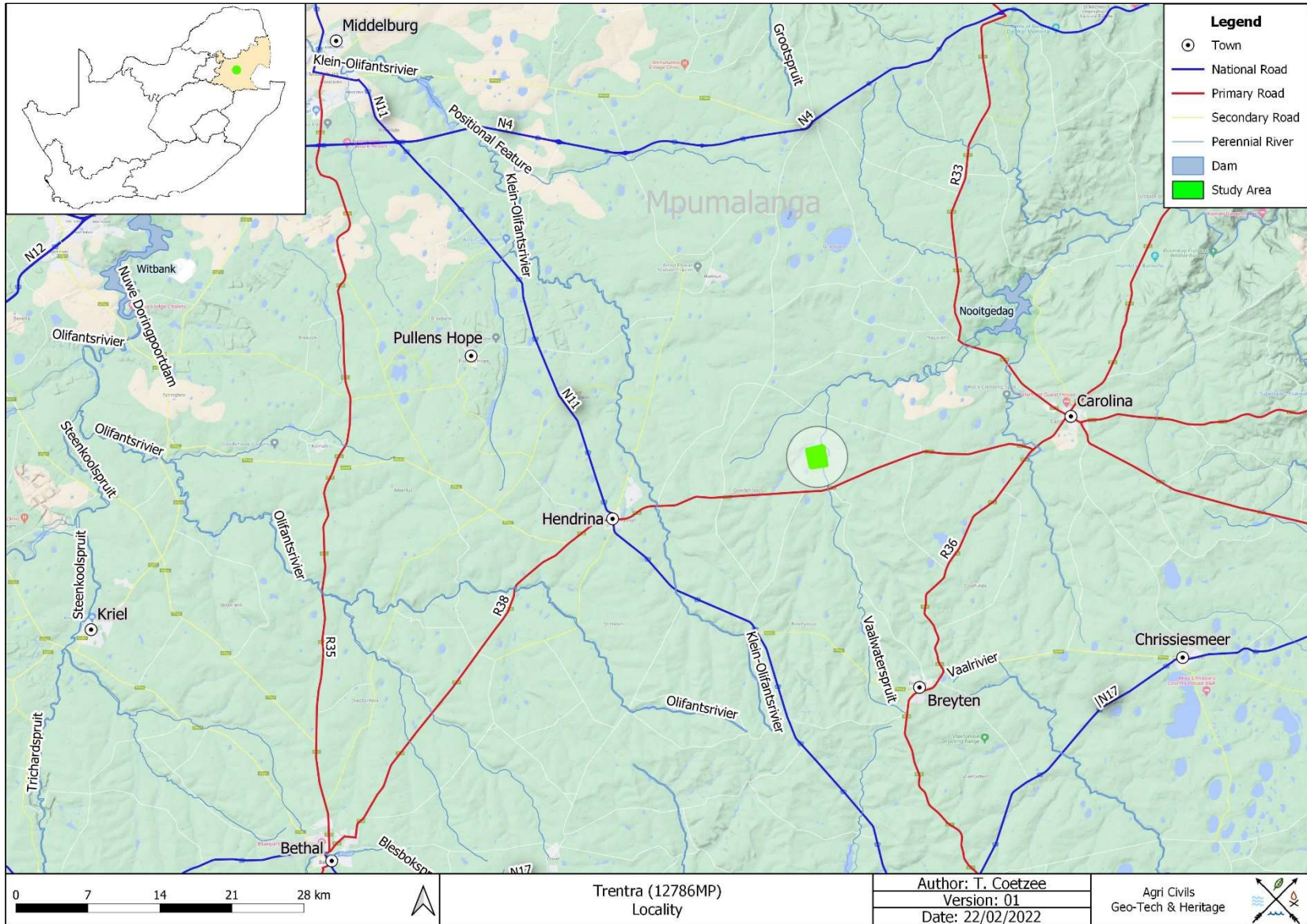


Figure 1: Regional and Provincial location of the study area.

## 1.2 Legislation

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

### 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 MEC (Member of the Executive Council) as well as the relevant Local Authorities. Graves 60 years or older fall under the jurisdiction of the National Heritage Resources Act (NHRA) as well as the Human Tissues Act, 1983.

## 2. Study Area and Project Description

### 2.1 Location & Physical Environment

The proposed Trentra Coal Mining Development is situated to the west-southwest of Carolina. The intersecting farm portions and proposed development are listed in **Table 1**:

**Table 1:** Development location.

Development	Farm Name	Portion	Map Reference (1:50 000)	Lat	Lon	Proposed development (ha)
Surface Infrastructure & Opencast pit	Vaalwater 173 IS	21	2629 BB	-26.104264	29.894758	± 6.1
Access Road	Vaalwater 173 IS	21	2629 BB	-26.106414	29.893784	± 1
<b>Total</b>						<b>± 7.1</b>

The study area is located 24 km west-southwest of Carolina, while Hendrina is located roughly 21 km to the west-southwest and Breyten 23 km to the south-southeast (**Figures 1 – 3**). The study area falls within the Gert Sibande District Municipality and the Chief Albert Luthuli Local Municipality in the Mpumalanga Province. In terms of vegetation, the study area falls within the Grassland Biome, which is typically associated with summer rainfall regions. This Biome covers approximately 28% of South Africa. According to the vegetation classification by Mucina & Rutherford (2006) the study area falls within the Eastern Highveld Grassland vegetation unit.

Eastern Highveld Grassland's conservation status is considered to be endangered with a conservation target of 24%. Only a small portion is conserved in statutory and private reserves. This vegetation unit consists of the plains between Belfast in the east and the eastern side of Johannesburg in the west and also extends towards Bethal, Ermelo and to the west of eMkhondo (Piet Retief). This vegetation type is associated with slightly to moderately undulating planes and includes low hills and pan depressions. The general vegetation is short dense grassland with small, scattered rocky outcrops and some woody species. About 44% of this vegetation unit has

been transformed by cultivation, plantations, mines, urbanisation and the building of dams. Although no serious alien invasions are reported, *Acacia mearnsii* may become dominant in disturbed areas. Erosion associated with this vegetation unit is considered low (Mucina & Rutherford 2006).

The average elevation for Eastern Highveld Grassland varies between 1520 and 1780 MASL (metres above sea level). The average elevation of the project area is 1631 MASL and slopes from the slightly more elevated western section to the lower eastern area.

The study area falls within the summer rainfall region and the average annual rainfall is roughly 794 mm. The average annual temperature is 15.1 °C. The average summer temperature is 18.5 °C, while the winter temperature averages 9 °C (Climate-data.org accessed 31/01/2022).

The study area falls within the X11A Quaternary Catchment that forms part of the Inkomati-Usuthu Water Management Area (WMA). The closest perennial river to the study area is the Vaalwaterspruit that flows 144 m to the east. Several dams, perennial pans, non-perennial pans and marshes are also located in the general vicinity of the study area.

When the surrounding environment is considered, the region is associated with crop cultivation and grazing veldt. Access to the study area is via a local road turning from the R38 primary road to the south of the study area, as well as via a local road turning from the tertiary road to the north of the study area (**Figures 2 & 3**). On a local scale, the study area is associated with open grassland utilised for cattle grazing. The entire demarcated area, however, used to be cultivated.



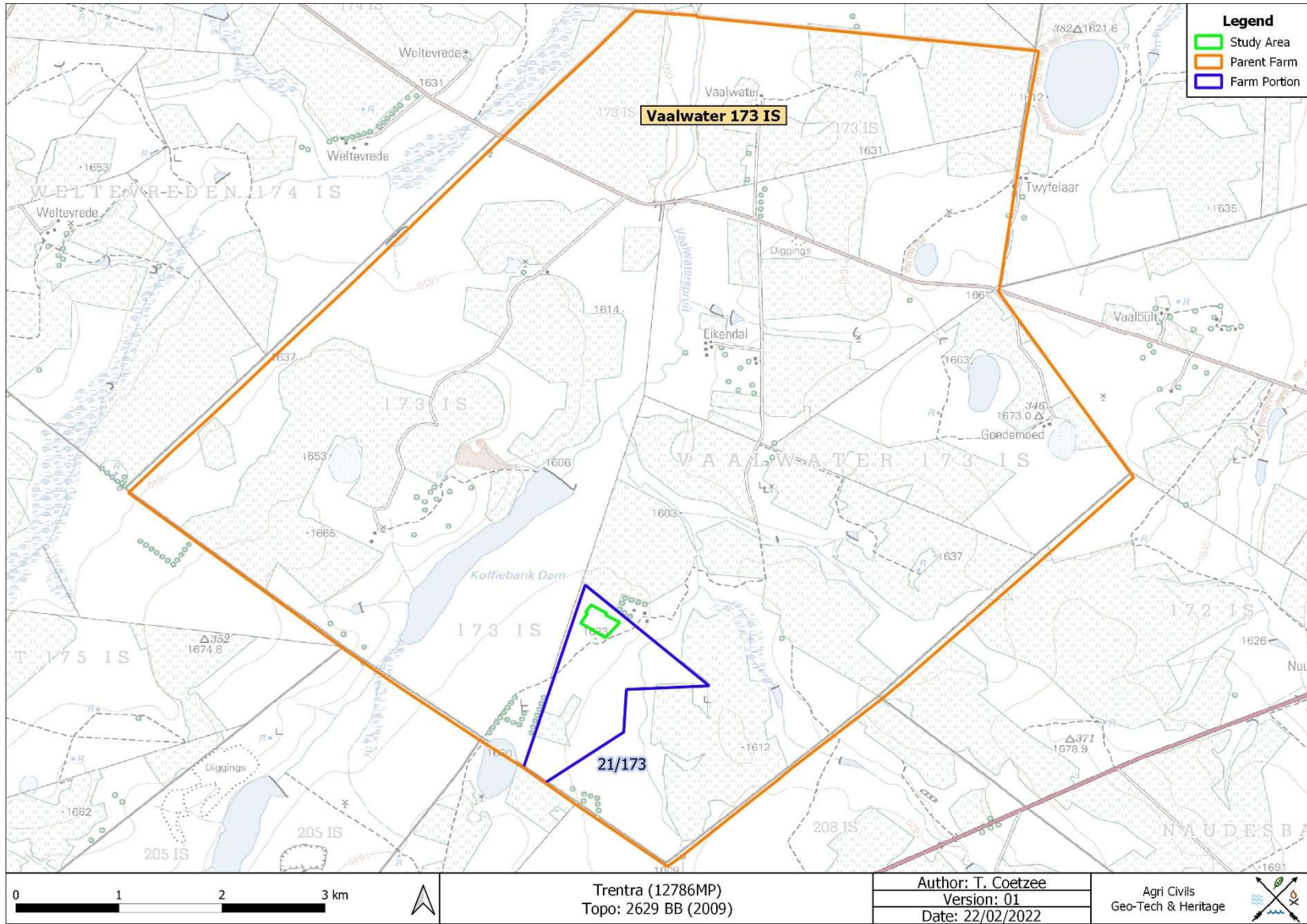
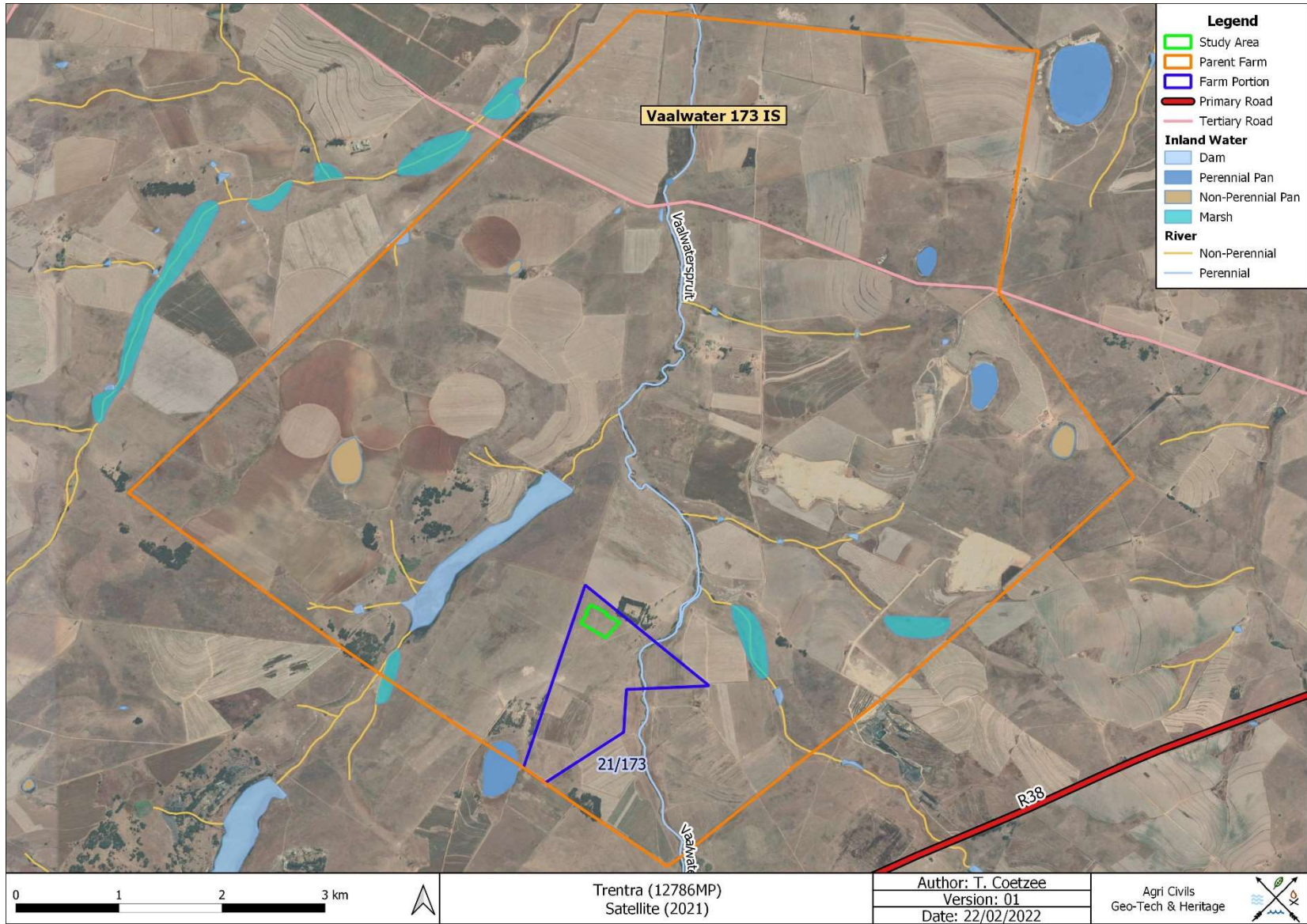


Figure 2: Segment of SA 1: 50 000 2629 BB indicating the study area.



**Figure 3:** Study area portrayed on a 2021 satellite image.

## 2.2 Project description

The proposed development (MP 30/5/1/1/3/12786 MP) consists of approximately 7.1 ha demarcated for the mining of coal on a portion intersecting Portion 21 of the Farm Vaalwater 173 IS (**Figure 4**). The proposed development will include:

- Opencast pit
- Access road
- Clean water discharge structure
- Clean water discharge channel
- Dirty water channels
- Clean water channels soft stockpiles
- Berms
- Culvert crossing
- Silt retention structure
- Overburden
- Production platform
- Entrance
- Weighbridge
- PCD
- Offices and hardpark
- Topsoil

It should be noted that a Mining Permit for the adjacent area to the east will be applied for by Vaalwater Coal (MP 30/5/1/1/3/12787 MP) and that they wish to enter into a service level agreement with the holder of the Trentra Mining Permit (MP 30/5/1/1/3/12787 MP). The majority of the surface infrastructure will be located on the Trentra (Pty) Ltd study area.

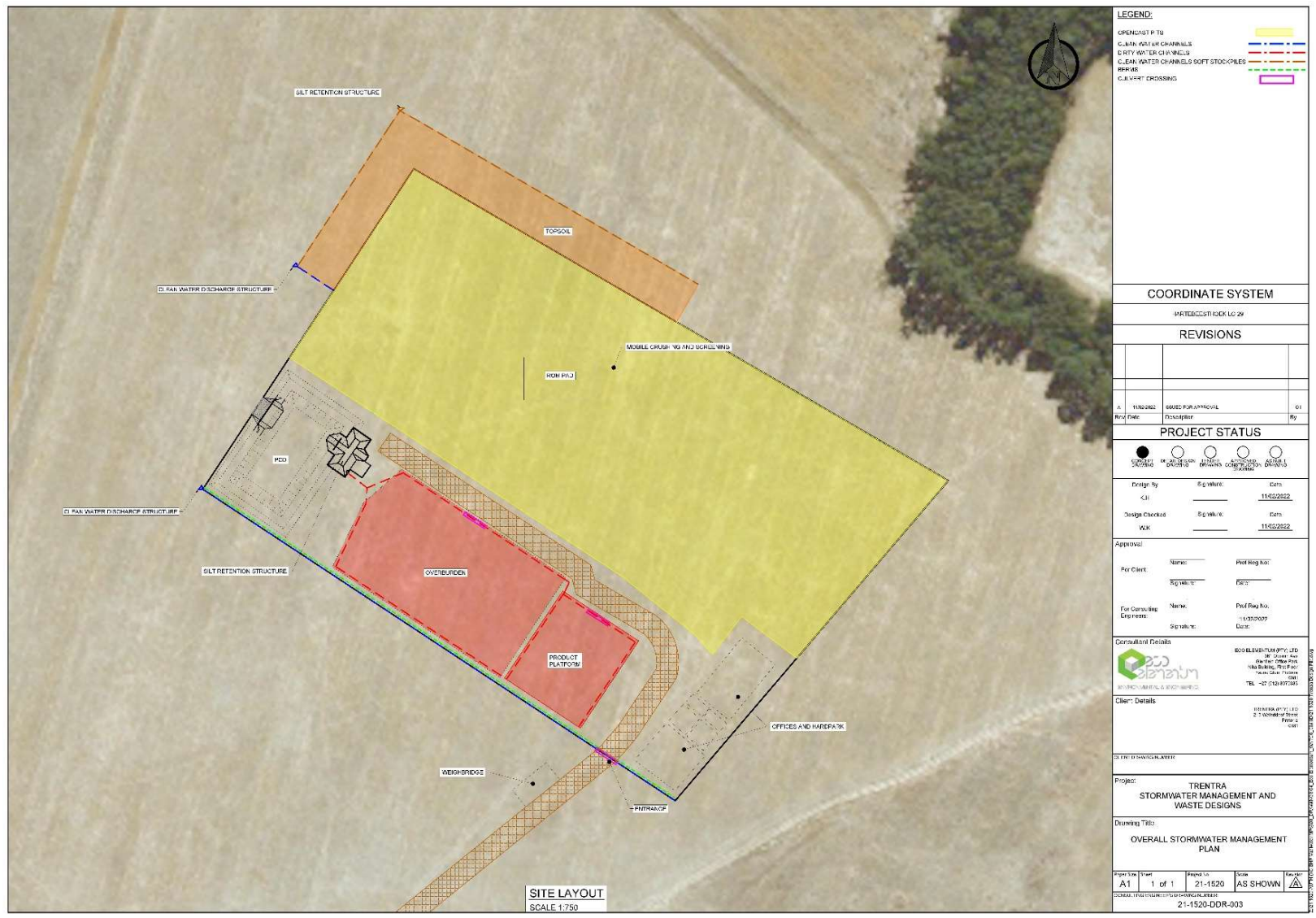


Figure 4: Proposed layout for the Trentra Coal Mining Development.

### 3. Methodology

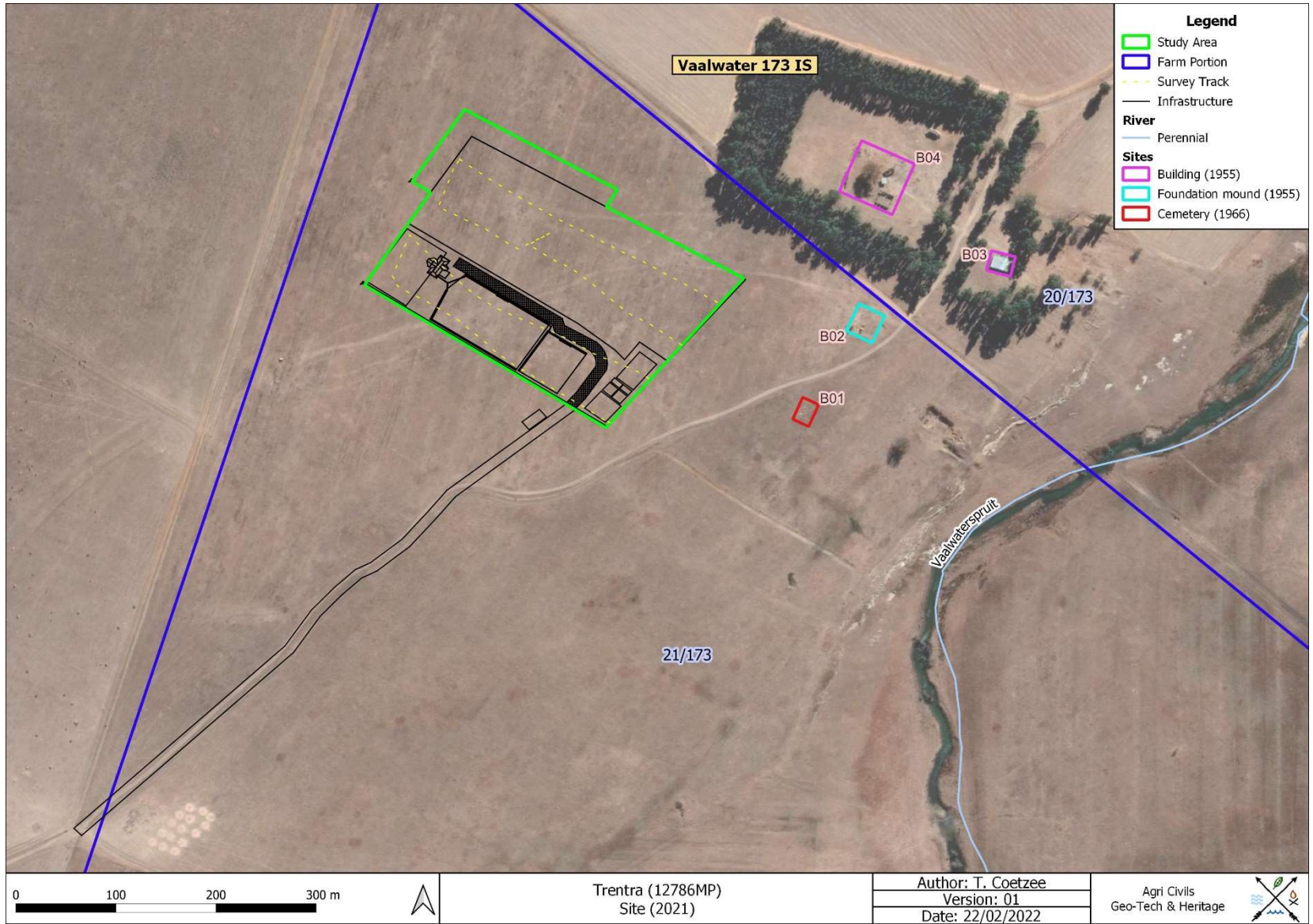
Archaeological reconnaissance of the study area was conducted during January 2022 through a systematic pedestrian survey (**Figure 5**). The transects were spaced roughly 50 m apart. General site conditions were recorded via photographic record (**Figures 6 – 9**). Also, the project area was inspected beforehand on Google Earth, historical topographical maps and aerial imagery in order to identify potential heritage remains (**Appendix A**). Four potential sites (B01 – B04) were observed outside of the demarcated boundary (**Table 2 & Figure 5**). These sites were inspected during the site visit. It should be noted that the prefix '2629BB' is not used as a site reference due to the length of the name, but is recorded as such in **Tables 2 & 5**. The historical topographical datasets dating to 1966, 1984, 1996 and 2009, as well as the historical aerial images dating to 1955, 1967, 1975, 1984 and 1991, proved useful in terms of providing an indication of potential heritage sites and past land uses associated with the study area. The total area inspected was 6.1 ha. Because heritage resources are often associated with perennial and non-perennial rivers, the rivers and streams located within close proximity of the study area were buffered by a distance of 500 m, indicating a potentially sensitive area.

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, as well as by plotting the boundaries from aerial imagery and topographical maps.

**Table 2:** Site coordinates & description.

Name	Off. Name	Latitude	Longitude	Description	Age	Current Status	Estimated Extent (m <sup>2</sup> )	ID Source
B01	2629BA-B01	-26.105493	29.897172	Cemetery	Unknown	Intact	375.5	Topo 1966
B02	2629BB-B02	-26.104697	29.897702	Foundation Mound	Historic	Demolished	759.7	Aerial 1955
B03	2629BB-B03	-26.104148	29.898918	Building	Historic	Intact	451.4	Aerial 1955
B04	2629BB-B04	-26.103383	29.897832	Building	Historic	Ruin	2867.7	Aerial 1955



**Figure 5:** Study area and identified sites portrayed on a 2021 satellite image.



**Figure 6:** Study area viewed from the east.



**Figure 7:** Study area viewed from the south.



**Figure 8:** Study area viewed from the west.



**Figure 9:** Study area viewed from the north.

### **3.1 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 associated with archaeological material remains were recorded by means of a Garmin Oregon 750 GPS and were photographed with a Samsung S7 mobile phone. 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.

#### **3.1.1 Previous Heritage Studies**

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

An archaeological survey was done for a coal mine on the Farms Weltevreden 193 IS and Halfgewonnen 190 IS. The demarcated impact area was 600 X 600 m and is located roughly 11 km west of the proposed Vaalwater Coal Project. Archaeological Resources Management (ARM) surveyed the study area and the remains of two circular homesteads that possibly date to the Late Iron Age were observed. Both homesteads consist of between 3 and 6 structures and are located close to a stream. More recent angular settlement remains, as well as 2 graveyards associated with the settlements were observed. The graves consisted of mounds made with ferricrete. One of the graveyards consisted of 8 graves, and the other of 5 graves (Huffman & Steel 1995).

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

An Archaeological and Cultural Historical survey and impact assessment was conducted by the National Cultural History Museum (2003) for the development of the Goedehoop opencast coal mine near Hendrina in the Mpumalanga Province. The Goedehoop site is located roughly 45 km southwest of the proposed Vaalwater Coal Project. Opencast areas that were surveyed included portions of the Farms Schurvekop 227 IS, Vlakkuijen 76



IS, Middelkraal 50 IS, and Halfgewonnen 190 IS. It was noted that a few graveyards located outside of the impacted areas were observed and would therefore not be impacted.

### **Halfgewonnen Colliery, Mpumalanga**

Van Vollenhoven (2013) conducted a Cultural Heritage Impact Assessment for a mining right application at the Halfgewonnen Colliery between Hendrina and Bethal. The Halfgewonnen Colliery is located on the Farm Halfgewonnen 190 IS about 41 km west-southwest of the proposed Vaalwater Coal Project. The project entailed the extraction of pillars from the underground mining area that was previously mined through bord-and-pillar methods. Van Vollenhoven (2013) located no sites of cultural heritage significance during the survey.

#### **3.1.2 Historical topographical maps & aerial images**

The historical aerial images dating to 1955, 1967, 1975, 1984 and 1991 (**Appendix A: Figures 29, 31 – 33, 35**) appear to indicate that the demarcated study area was cultivated and that no structures existed within the demarcated boundary. A structure, however, is visible to the east of the study area, as well as two areas associated with buildings further to the northeast. The southern access road, as well as a few footpaths, are visible on the 1955 aerial image. The subsequent aerial images indicate the access road as well, while the footpaths are no longer visible.

When the historical topographical maps are inspected, the 1966 topographical map (**Appendix A: Figure 30**) indicates the access road, a grave to the east thereof, as well as buildings further to the northeast of the demarcated area. The 1984 topographical map (**Appendix A: Figure 34**) indicates the grave as well, while several additional buildings are noted to the northeast of the study area. The 1996 topographical map, however, shows the buildings to the northeast of the study area to be ruins and the grave to be absent (**Appendix A: Figure 36**). By 2009 (**Appendix A: Figure 37**) the grave is omitted as well, while the buildings to the northeast of the study area are again shown. According to the 1966 topographical map, as well as the 1984 and 1996 topographical maps, the demarcated study area was cultivated, while the 2009 topographical map shows the area to be no longer cultivated.

## **3.2 Limitations**

The pedestrian survey (January 2022) confirmed the study area to be open grassland utilised for cattle grazing. Movement was not restricted and despite the slightly high grass cover, visibility at this time was considered to be good. No other access constraints were encountered. It should be noted that the proposed access road boundary was not available at the time of the fieldwork and was therefore not inspected.

## 4. 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.

### 4.1 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.

## 4.2 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 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.

#### 4.2.1 The South African War

Several small skirmishes took place in the general area. One of the more important and well-known South African War sites in the vicinity of the study area is the Battle of Bergendal, located approximately 29 km east of the study area. The battle took place on 27 August 1900 between the forces of General Louis Botha and Lord Roberts. Lord Robert's plan was to use his 20 000 troops for a decisive action against the Boer commandos to the east of Pretoria, while the Boers intended to use strong positions north and south of the railway line near Belfast to stop the British advance to Machadodorp (eNtokozweni). During this time President Paul Kruger was in Machadodorp, the new seat of the Boer government (Von der Heyde 2013: 205-207).

Lord Robert's force was mobilising from Middleburg and General Sir Redvers Buller was on his way from Natal to trap the Boers in a pincer movement between Machadodorp and Belfast. Buller, however, decided to move his force to the north instead of Machadodorp, a decision based on the fact that a large force would be travelling slowly and through swampy areas. The Boers under General Louis Botha positioned 5000 men in a defensive line over 80 km long to the north and south of the railway line with the centre near Belfast. Botha strengthened his flanks as he expected the British to attack his flanks with cavalry, as they had done so on previous occasions. The attack, however, was aimed at Bergendal Koppie near the middle of Botha's defensive line, taking him by surprise. Seventy-four members of the Zuid-Afrikaansche Republiek Politie under Commandant Sarel Oosthuizen held the hill for three hours until the British infantry reached the foot of the hill. As the British fixed their bayonets for the charge the Boers withdrew. Upon realising that the line had been breached, the rest of the Boers withdrew as well. Between 21 and 27 August 1900 the British suffered 300 casualties and the Boers 14. Nineteen were taken prisoner. This led to the British occupying Waterval Boven, the Boer government releasing 2000 British prisoners from the camp near Barberton and moving their railway carriage to Nelspruit (Mbombela). The Battle of Bergendal is considered to be the last pitched battle of the Anglo-Boer War as the guerrilla phase started thereafter (Von der Heyde 2013: 205-207).

#### 4.2.2 Coal mining general history near eMalahleni, Middelburg, Bethal, Hendrina, Ermelo and Carolina

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 Lorenço 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).

## 5. Archaeological and Historical Remains

### 5.1 Stone Age Remains

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

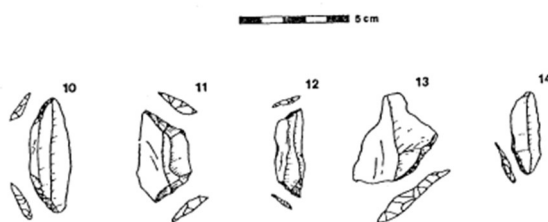
Although no Stone Age archaeological remains were located, such artefacts may occur in the area. These artefacts are often associated with rocky outcrops or water sources. **Figures 10 – 12** below are examples of stone tools often associated with the Early, Middle and Later Stone Age of southern Africa.

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

According to Bergh (1999: 5), the Groenvlei LSA site is located near Carolina and approximately 20 km east of the proposed mining development. Rock art is also found in the same vicinity (Bergh 1999: 6).



**Figure 10:** ESA artefacts from Sterkfontein (Volman 1984).



**Figure 11:** MSA artefacts from Howiesons Poort (Volman 1984).



**Figure 12:** LSA scrapers (Klein 1984).

## 5.2 Iron Age Farmer Remains

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

The heritage study conducted for Forzando Coal Holdings on the Farms Weltevreden 193 IS and Halfgewonnen 190 IS located two circular homesteads that possibly date to the LIA (Huffman & Steel 1995).

## 5.3 Historical

Three sites (B02, B03 & B04) dating to the Historic Period were located outside of the demarcated study area.

Site B02 was identified on the historical aerial image dating to 1955 (**Appendix A: Figure 29**) as a potential rectangular structure located approximately 118 m east of the eastern corner of the demarcated study area. The site visit confirmed that a structure once existed, but that only the foundation mound measuring 27 X 20 m remains (**Figure 13**). In terms of material culture, only one instance of building material were observed (**Figure 14**). The structure is not visible on any of the remaining aerial photographs and is not indicated on any of the topographical maps. The use of the structure is unknown, but it is likely that it used to be a kraal. Due to the absence of the structure on aerial and topographical data sources, and the potential state of ruin in 1955, it is likely that the structure was mainly used before the area was cultivated.

Sites B03 and B04 were also identified on the historical aerial image dating to 1955 (**Appendix A: Figure 29**) as buildings falling outside of the proposed mining development boundary. Both sites are visible on the remaining historical aerial images, except for the 1991 aerial image (**Appendix A: Figure 35**), but this might be ascribed to poor image resolution. The 1966 topographical map (**Appendix A: Figure 30**) indicates one building at each of the sites, while the 1984 topographical map shows two buildings in the vicinity of each site, as well as two buildings further to the north (**Appendix A: Figure 34**). The 1996 topographical map, however, only indicates a ruin at each site (**Appendix A: Figure 36**), while the 2009 topographical map again shows the presence of a building at each site, with an additional building further to the north (**Appendix A: Figure 37**).

Site B03 is located approximately 242 m east-northeast of the eastern corner of the demarcated study area and consists of a building constructed from stone that measures approximately 20 m X 14 m and has a corrugated iron roof. Some wall sections appear to have been repaired and an additional room constructed from corrugated iron has been constructed on what appears to be a demolished section of the original building (**Figures 15 & 16**). Presently, the building, or a part thereof, seems to be utilised as a residence.

Site B04 is located approximately 129 m northeast of the eastern corner of the demarcated study area and consists of two building ruins and a dilapidated circular building. All three buildings are constructed from stone and only the circular building has a roof that is constructed from corrugated iron. The one building ruin appears

to have been a residence and measures approximately 12 m X 14 m, while the other building ruin, potentially an outbuilding, measures approximately 10 m X 4 m. The circular building has a radius of approximately 3.5 m (Figures 17 – 19) . The entire yard is demarcated by trees.

The heritage study conducted by Huffman & Steel (1995) recorded angular settlement remains that might date to the Historic Period.

**Table 3:** Historic sites.

Name	Type	Source	Year	Status
B02	Foundation Mound	Aerial	1955	Demolished
B03	Building	Aerial	1955	Intact
B04	Building	Aerial	1955	Ruin

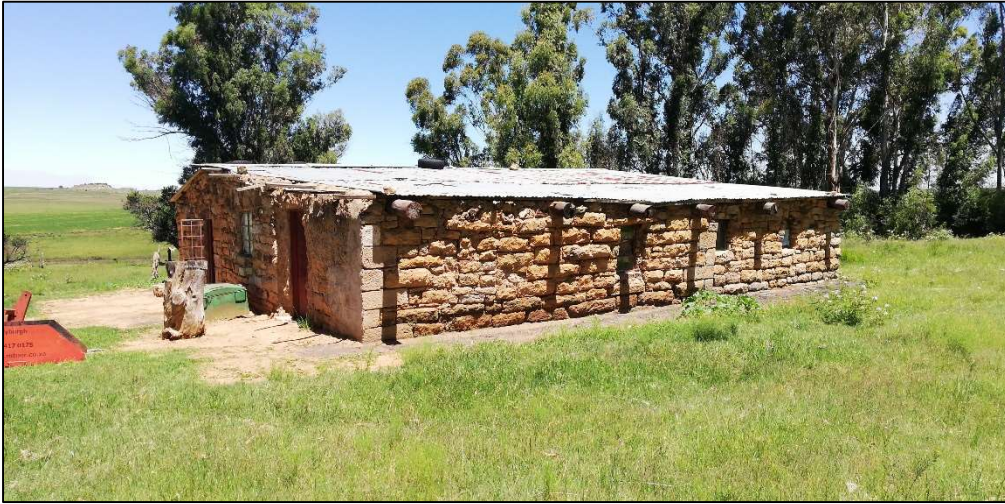


**Figure 13:** Foundation mound at site B02.



**Figure 14:** Building material remains at site B02.





**Figure 15:** North-western view of site B03.



**Figure 16:** South-eastern view of site B03.



**Figure 17:** Building ruin at site B04.



**Figure 18:** Interior of building ruin at site B04.



**Figure 19:** Building ruin and partially intact rondavel at site B04.

## 5.4 Contemporary Remains/Natural

No sites of contemporary origin were observed within the demarcated study area.

Heritage studies conducted in the surrounding areas did not mention any significant contemporary remains. See National Cultural History Museum (2003), Huffman & Steel (1995) and Van Vollenhoven (2013).

## 5.5 Graves

One cemetery (B01) was recorded approximately 140 east of the demarcated study area. The cemetery is unfenced, rectangular in shape and measures approximately 18 X 24 m. The cemetery is demarcated by four stone corner posts. One corner post, however, has fallen over.

The cemetery consists of approximately 18 graves that are associated with a combination of formal and informal surface decorations (**Figures 20 – 27**). Some of the surface decorations are not clearly identifiable due to the presence of only a few stones serving as indication. The possibility therefore exists that additional graves may be located in the cemetery. No dates were observed at any of the graves. Three graves are outlined with modern bricks with no inscriptions. Two of these graves, however, are oriented in a north-south direction (**Figure 25**). The reason for this style in this particular case is unknown. A further two graves are associated with formal surface decorations, but are in a dilapidated state since the headstones have fallen over (**Figure 23**). The only identifiable name observed was ‘Sibanyoni’. The remaining graves consist of elongated stone cairns, some of which are associated with an upright stone serving as a headstone (**Figure 24**). These graves are also not associated with any inscriptions. In terms of grave goods, one ceramic pot was observed on the brick-lined grave that is oriented in an east-west direction (**Figure 26**), while a broken tin bowl was noted next to the cemetery (**Figure 27**). Due to the dilapidated state of the cemetery and the boundary not being exceeded, it is assumed that the cemetery is no longer in use, but might still be visited.

The heritage studies conducted by Huffman & Steel (1995) and the National Cultural History Museum (2003), recorded the presence of several graves and cemeteries.

**Table 4:** Burial sites.

Name	Type	Source	Year	Status	Age
B01	Cemetery	Topo	1966	Intact	Potentially exceeding 60 years



**Figure 20:** Cemetery B01 seen from the south-western corner.



**Figure 21:** Cemetery B01 seen from the north-western corner.



**Figure 22:** Cemetery B01 seen from the south-eastern corner.



**Figure 23:** Two formally decorated graves with broken headstones at cemetery site B01.



**Figure 24:** Informally decorated graves at cemetery site B01.



**Figure 25:** Two north-south oriented graves at cemetery site B01.



**Figure 26:** Grave goods at one grave demarcated by bricks at cemetery site B01.



**Figure 27:** Grave goods in the form of a broken bowl located just outside of cemetery B01.

## 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 5:** Prescribed 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

Rating	Field Rating/Grade	Significance	Recommendation
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 6:** Individual site ratings.

Site / Survey Point Name	Type	Rating	Field Rating/Grade	Significance	Recommendation
2629BB-B01	Cemetery	Local	Grade 3 A	High	Mitigation not advised
2629BB-B02	Foundation Mound	General Protection B	4 B	Medium	Record site
2629BB-B03	Intact Building	General Protection B	4 B	Medium	Record site
2629BB-B04	Building Ruin	General Protection B	4 B	Medium	Record site

\* Ratings are dependent on specific project boundaries and activities.

## 7. Statement of Significance & Recommendations

### 7.1 Statement of significance

#### The study area: The Proposed Trentra Coal Mining Development

Four sites of heritage significance were noted outside of the demarcated development boundary. The eastern half of the demarcated study area also falls within 500 m of a river, an area generally considered to be sensitive from a heritage perspective (**Figure 28**). However, according to historical aerial imagery and topographical maps, the demarcated study area used to be cultivated, thereby significantly lowering the sensitivity in terms of heritage resources. Heritage studies conducted in the surrounding areas noted the presence of historical and LIA sites, as well as the presence of burial sites.

#### - Sites located within the demarcated development footprint

No sites were located within the demarcated development footprint.

#### - Sites located outside of the demarcated development footprint

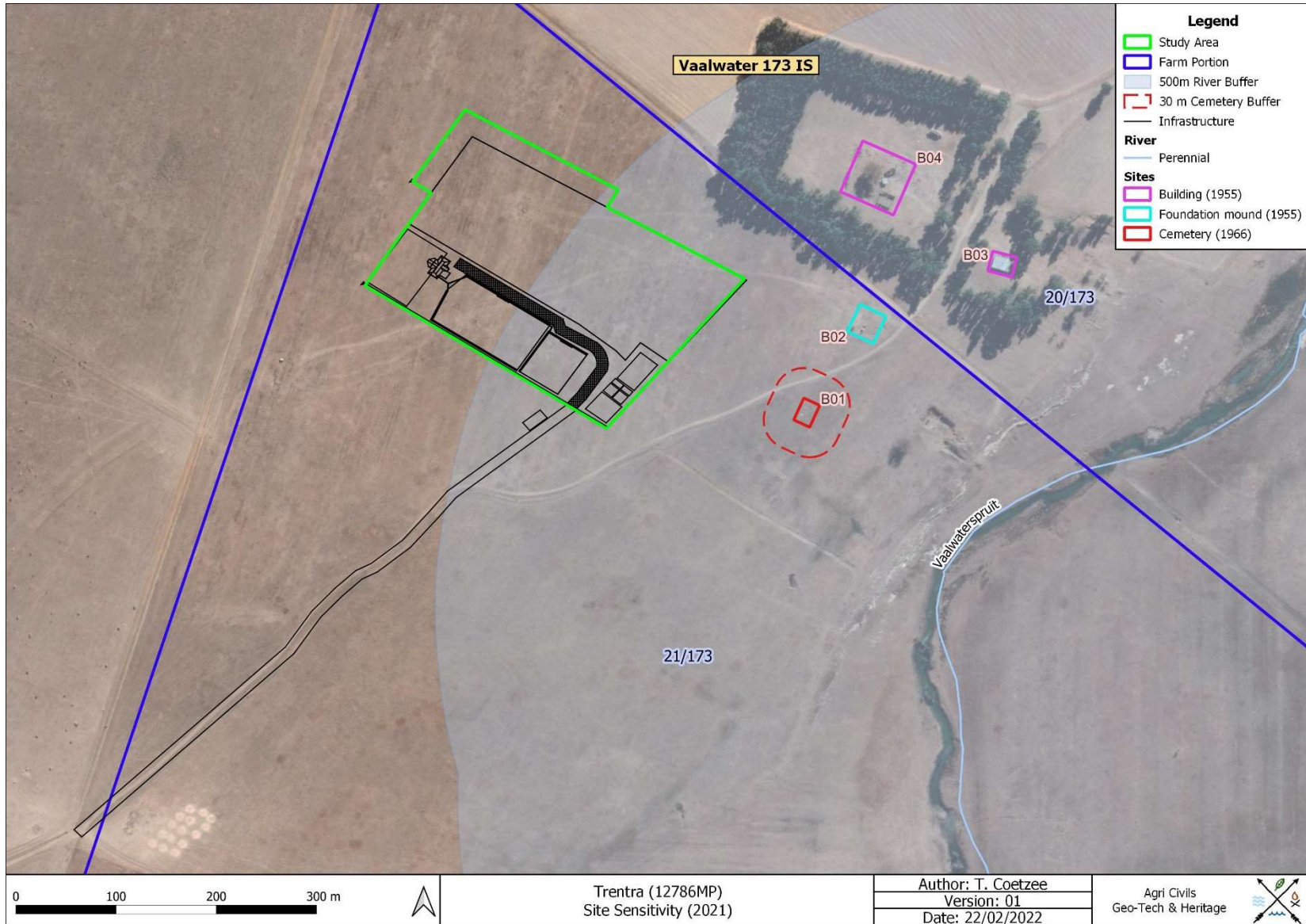
Site (B01) was identified as a cemetery to the east of the demarcated project area. It is likely that cemetery BA01 contains graves older, as well as younger than 60 years and are significant from a heritage perspective as the

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. Due to the type of surface features and dilapidated state of the graves, it is unlikely that this site will be impacted by the proposed development as it is located a significant distance from the proposed development.

Site B02 was identified on the 1955 aerial image as a structure approximately 118 m east of the area demarcated for development. The structure has since been demolished and the area was cultivated. Very few surface indications remain and the possibility exists that the structure was used as a kraal. The site is therefore not at risk of being impacted by the proposed development.

Sites B03 & B04 are located to the north of the demarcated development footprint and were identified on the 1955 aerial image. Site B03 consists of an intact building constructed from stone, is partially dilapidated and has partially been repaired. Site B04 consists of three buildings constructed from stone: two angular buildings in a state of ruin and one circular building with a corrugated iron roof that is partially dilapidated. The identified sites exceed 60 years of age and are therefore protected under the NHRA 25 of 1999. Although the sites are located outside of the demarcated footprint, the proposed mining activity might impact the sites negatively and will therefore require monitoring.





**Figure 28: Site Sensitivity.**

## 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:

- Site B01, a cemetery consisting of 18 graves, is located approximately 140 m east of the proposed development. Although no dates were observed on the surface features, the possibility exists that some of the graves exceed 60 years of age. Therefore 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. Due to the type and dilapidated state of the surface features, it is unlikely that the site will be impacted by the proposed development. However, the cemetery appears not to be in use anymore and in order to prevent accidental damage to the graves, a fenced-off conservation buffer of 30 m is recommended. Access to the cemetery should also not be refused.
- Site B02 consists of a foundation mound that might have been a kraal. The structure, however, has completely been demolished and is not regarded to be significant from a heritage perspective. The site is located approximately 118 m east of the proposed development footprint and is therefore not at risk of being impacted by the proposed development.
- Sites B03 and B04, consisting of a combination of intact historical buildings and ruins, are located to the northeast of the demarcated study area, but might be impacted by the proposed development. Since these buildings and structures exceed 60 years of age, they are protected under the NHRA 25 of 1999. It is therefore recommended that these sites be monitored on a quarterly basis by the ECO, as well as before and after blasting. Should any damage be observed as a result of the proposed development, a qualified archaeologist must be contacted.
- The proposed access road was not available at the time of the fieldwork and was therefore not inspected. However, except for approximately 126 m, the proposed road follows an existing road. Also, based on historical aerial imagery and topographical maps, the entire area associated with the proposed road appears to have been cultivated in the past. The associated area, therefore, is not considered to be sensitive from a heritage perspective. Should any potential heritage sites be observed along the proposed road, a qualified archaeologist must be contacted prior to any development.

### General Recommendations

- The above recommendations are based on the specific project activities and extents as indicated in the figures of this report. Should the proposed surface impact areas be changed, a qualified archaeologist must conduct a pedestrian survey on the new area and amend the report accordingly.

- Because archaeological artefacts generally occur below surface, the possibility exists that culturally significant material may be exposed during the construction and operational phases, in which case all activities must be suspended pending further archaeological investigations by a qualified archaeologist. Also, should skeletal remains be exposed during development and construction phases, all activities must be suspended and the relevant heritage resources authority contacted (See National Heritage Resources Act, 25 of 1999 section 36 (6)).
- From a heritage point of view, development may proceed on the demarcated area, subject to the abovementioned conditions, recommendations and approval by the South African Heritage Resources Agency.

## 8. Conclusion

The proposed Trentra Coal Mining Development consists of surface infrastructure and mining activities impacting approximately 7.1 ha. The Archaeological Impact Assessment examined the area and determined that the study area has been disturbed by past cultivation. A cemetery, a foundation mound, as well as two historical building sites were identified on the outside of the demarcated project boundary. The cemetery and two building sites are considered to be significant from a heritage perspective. Therefore it is recommended that the cemetery be avoided by the proposed development and that the building sites be monitored for damage caused by the proposed development.

Should the recommendations made in this study be adhered to and with the approval of the South African Heritage Resources Agency, the proposed Trentra Coal Mining Development may proceed.

## 9. 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.

## 10. References

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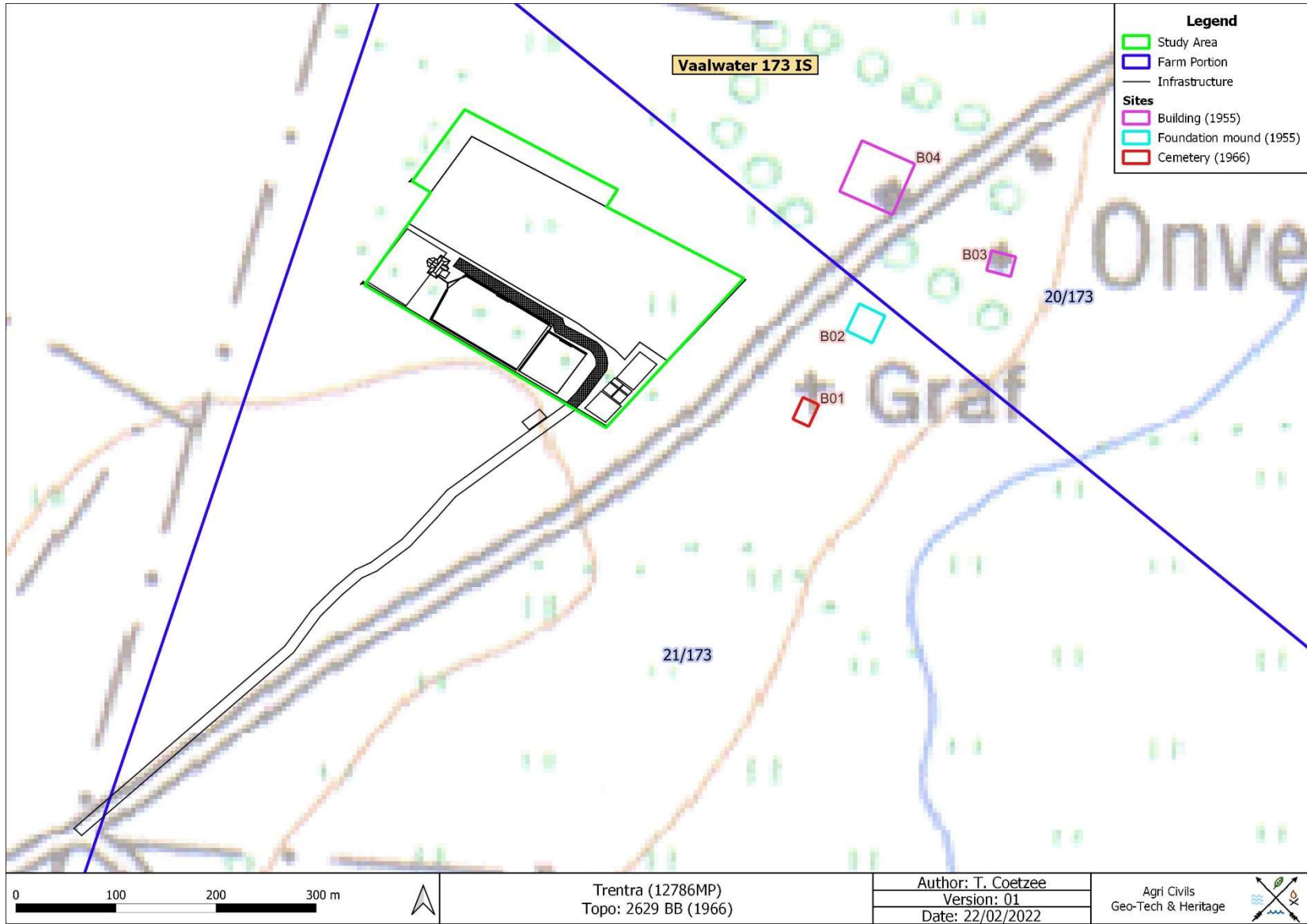
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## Appendix A: Historical Topographical Maps & Aerial Images



**Figure 29:** Study area superimposed on a 1955 aerial image.

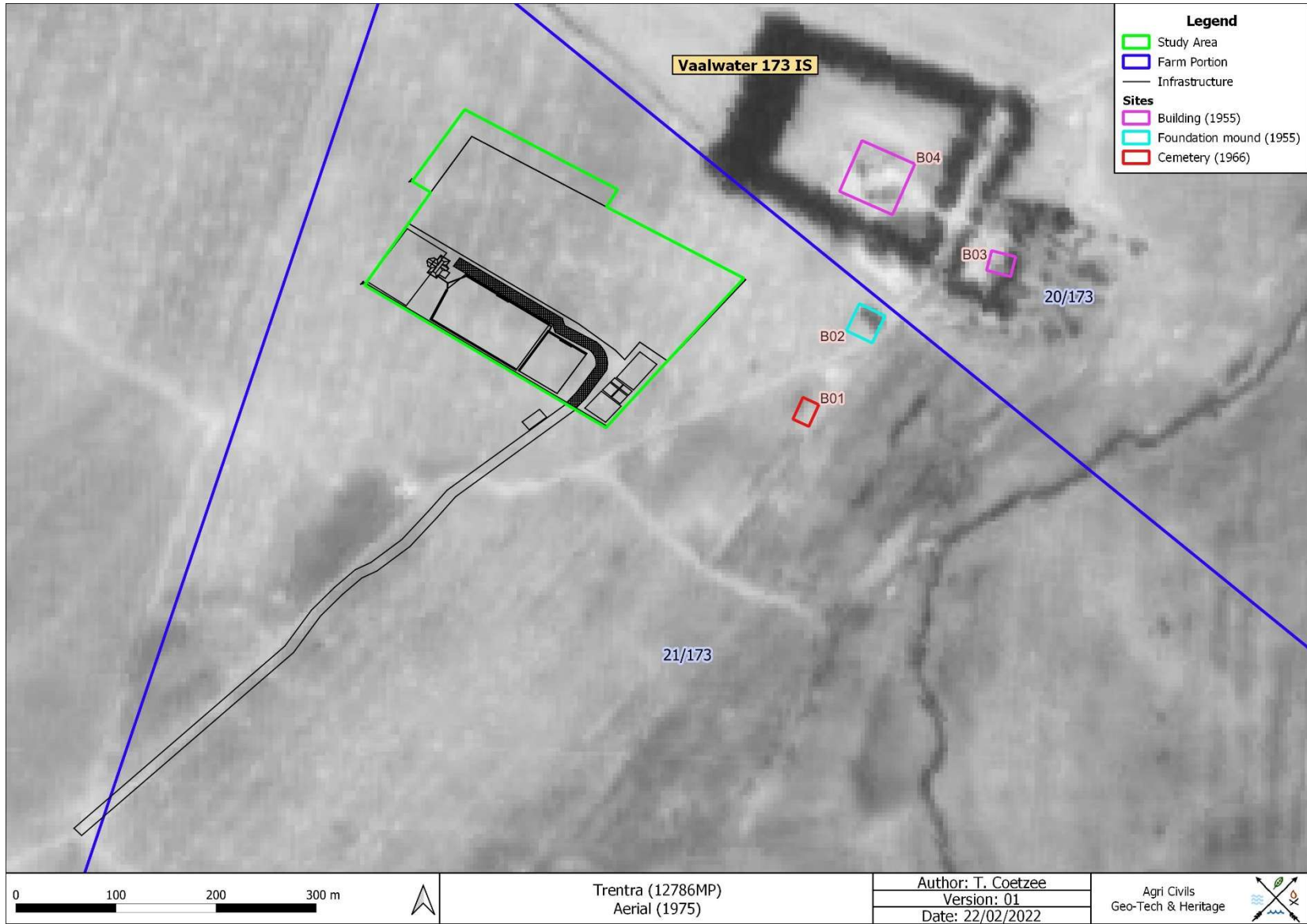




**Figure 30:** Study area superimposed on a 1966 topographical map.



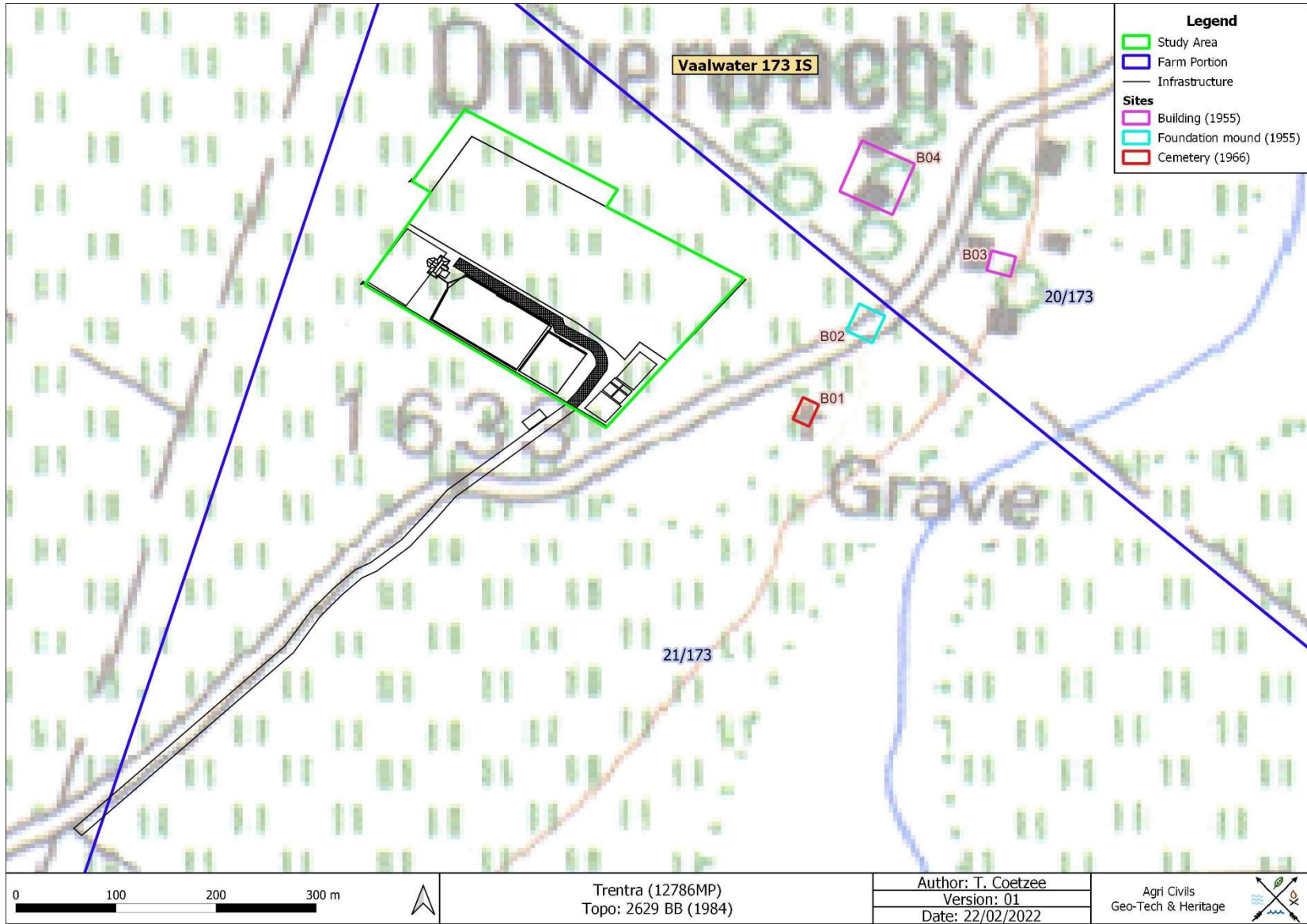
**Figure 31:** Study area superimposed on a 1967 aerial image.



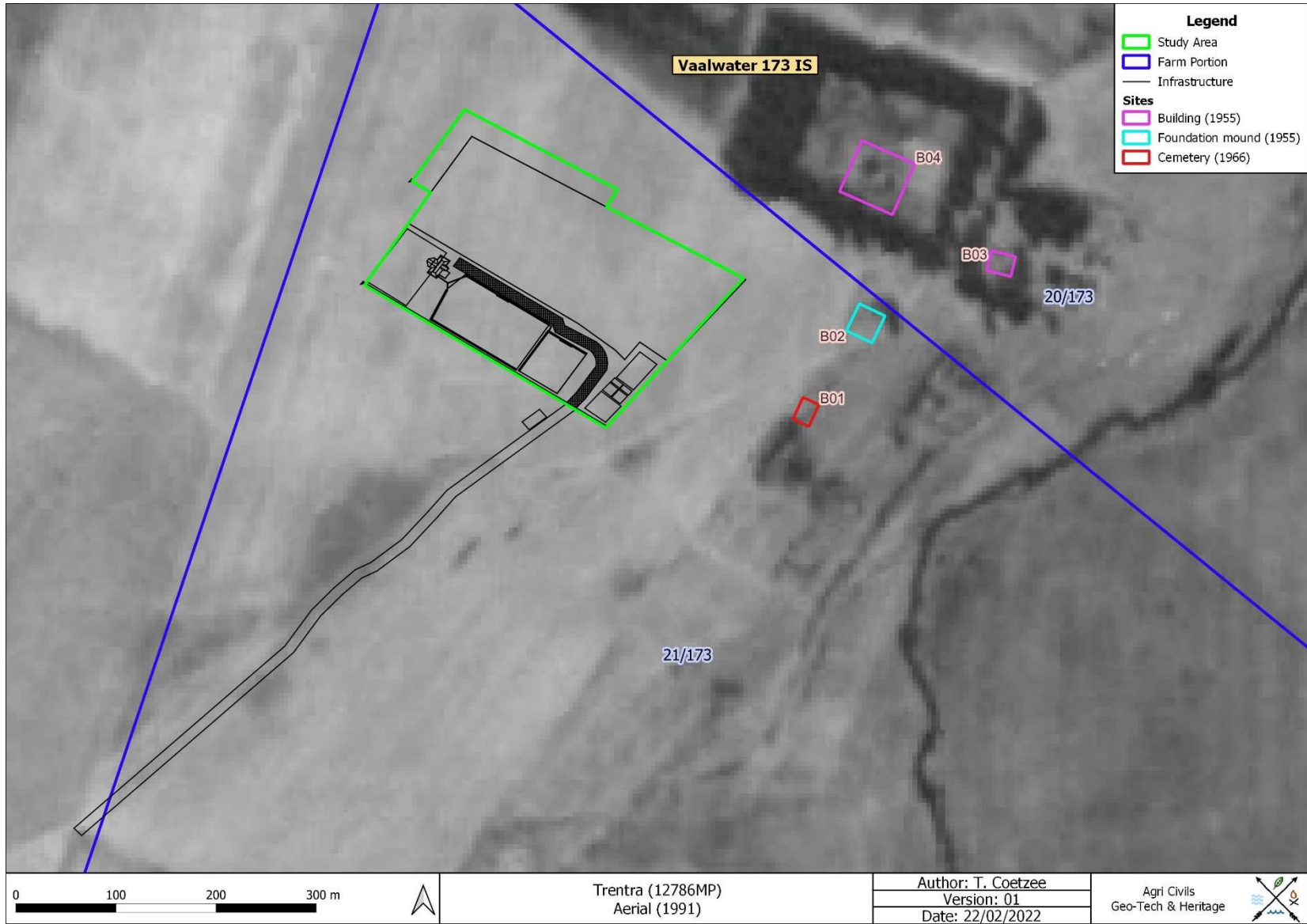
**Figure 32:** Study area superimposed on a 1975 aerial image.



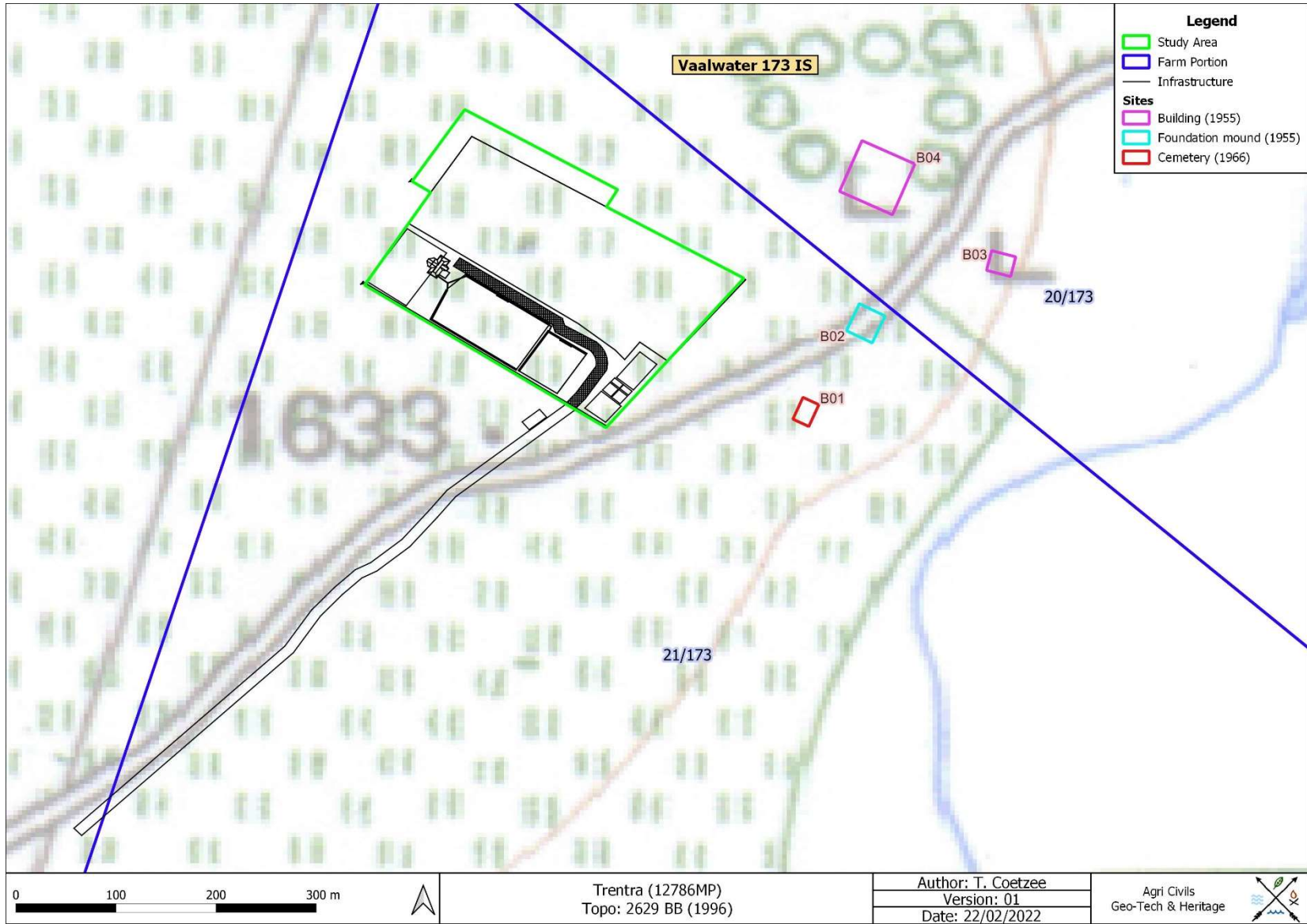
**Figure 33:** Study area superimposed on a 1984 aerial image.



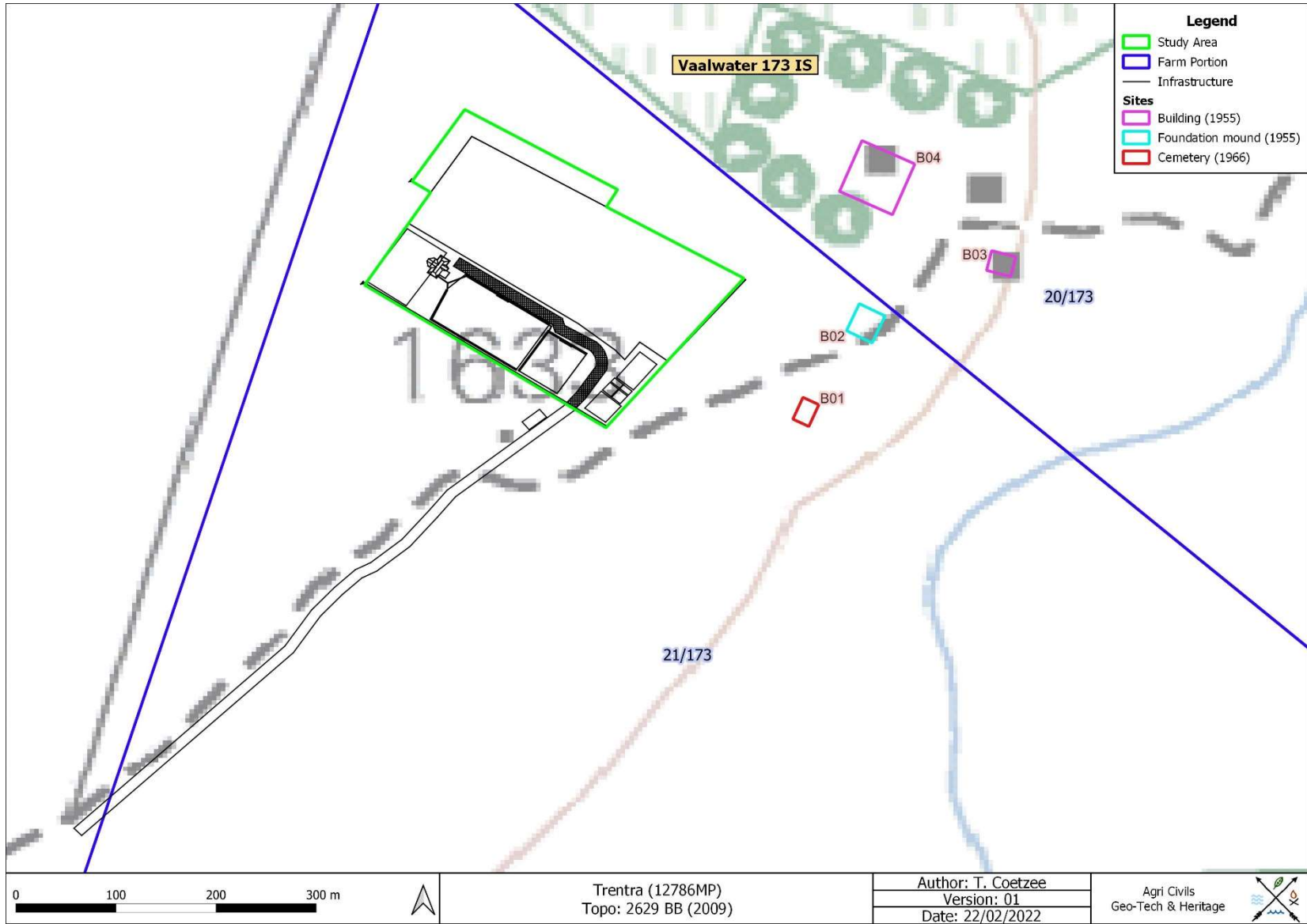
**Figure 34:** Study area superimposed on a 1984 topographical map.



**Figure 35:** Study area superimposed on a 1991 aerial image.



**Figure 36:** Study area superimposed on a 1996 topographical map.



**Figure 37:** Study area superimposed on a 2009 topographical map