



# PHASE 1 ARCHAEOLOGICAL IMPACT ASSESSMENT

for the Proposed Optimum Colliery on Portion 8 of the Farm  
Boschmanspoort 159 IS, Hendrina, Mpumalanga

**For:**

Eco Elementum (Pty) Ltd

**Project Ref:**

22-1890-AUTH (Boschmanspoort EIA)

**Date:**

13/02/2023

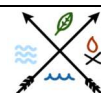
**Phase 1 Archaeological Impact Assessment for the Proposed Optimum Colliery on Portion 8 of the Farm  
Boschmanspoort 159 IS, Hendrina, Mpumalanga**

Project Ref: 22-1890-AUTH (Boschmanspoort EIA)  
 Report No: EE-16012023  
 Report Version: 3

I, Tobias Coetzee, declare that –

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

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## Executive Summary

The author was appointed by Eco Elementum (Pty) Ltd to undertake a Phase 1 Archaeological Impact Assessment for the proposed Boschmanspoort Optimum Colliery on Portion 8 of the Farm Boschmanspoort 159 IS near Hendrina in the Mpumalanga Province. The proposed mining development is located approximately 9 km north of Hendrina and falls within the Steve Tshwete Local Municipality. The aim of the study is to determine the scope of archaeological resources that could be impacted by the proposed mining development.

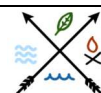
The areas demarcated for the proposed mining development largely consist of previously and currently cultivated land, as well as sections of mined areas and open veldt. The demarcated footprints are therefore not considered to be sensitive from a heritage perspective and cultural resources are unlikely to be impacted by the proposed development. Three areas associated with historical buildings exceeding 60 years of age were identified on historical aerial imagery (Sites B01 – B03), while one site associated with four graves (Site F01) and two contemporary sites (F02 & F03) were identified during the pedestrian survey. The identified sites, however, do not intersect the demarcated development footprints.

The buildings associated with Sites B01 & B02 have completely been demolished, fall within cultivated land, and since the sites do not intersect the demarcated development footprints, are not at risk of being impacted by the proposed mining project.

Site B03, associated with a building ruin, is located 108 m from the nearest development footprint (topsoil stockpile) and is therefore not at risk of being impacted by the proposed mining development.

Site F01 is located roughly 68 m from the nearest proposed development footprint (topsoil stockpile) and consists of four unfenced graves oriented in an east-west direction. Three of the graves consist of packed stones, while the fourth consists of a broken cement surface decoration. Due to the absence of headstones and inscriptions, the age of the graves could not be determined, but is likely to exceed 60 years of age. Although the graves are considered to be sensitive from a heritage perspective, the site is unlikely to be impacted by the proposed development. The graves are 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 (Act No. 25 of 1999). Since the site appears not to be in use anymore, it is recommended that a 50 m fenced-off conservation buffer be erected around the graves in order to avoid accidental damage. Access to the graves should also not be refused.

Subject to adherence to the recommendations and approval by the South African Heritage Resources Agency, the proposed Boschmanspoort Optimum Colliery as per the indicated boundaries 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.



## List of Abbreviations

**AIA** – Archaeological Impact Assessment

**CRM** – Cultural Resource Management

**DMR** – Department of Mineral Resources

**EIA** – Environmental Impact Assessment

**ESA** – Early Stone Age

**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

**PCD** – Pollution Control Dam

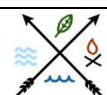
**SAHRA** – South African Heritage Resources Agency

**WMA** – Water Management Area



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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 (AIA) for the proposed Boschmanspoort Optimum Colliery on Portion 8 of the Farm Boschmanspoort 159 IS (**Table 1**) near Hendrina in the Mpumalanga Province (**Figures 1 – 3**). The proposed coal mining development falls within the Steve Tshwete Local Municipality and is located approximately 9 km north of Hendrina. 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 location of heritage resources within the demarcated study area.

In the following report, the implications for the proposed Boschmanspoort Optimum Colliery on the demarcated portion with regard to heritage resources are discussed: Portion 8 of the Farm Boschmanspoort 159 IS. The development will consist of an opencast pit, topsoil stockpile, hards stockpile, softs stockpile, and Pollution Control Dam (PCD). 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 of the project.





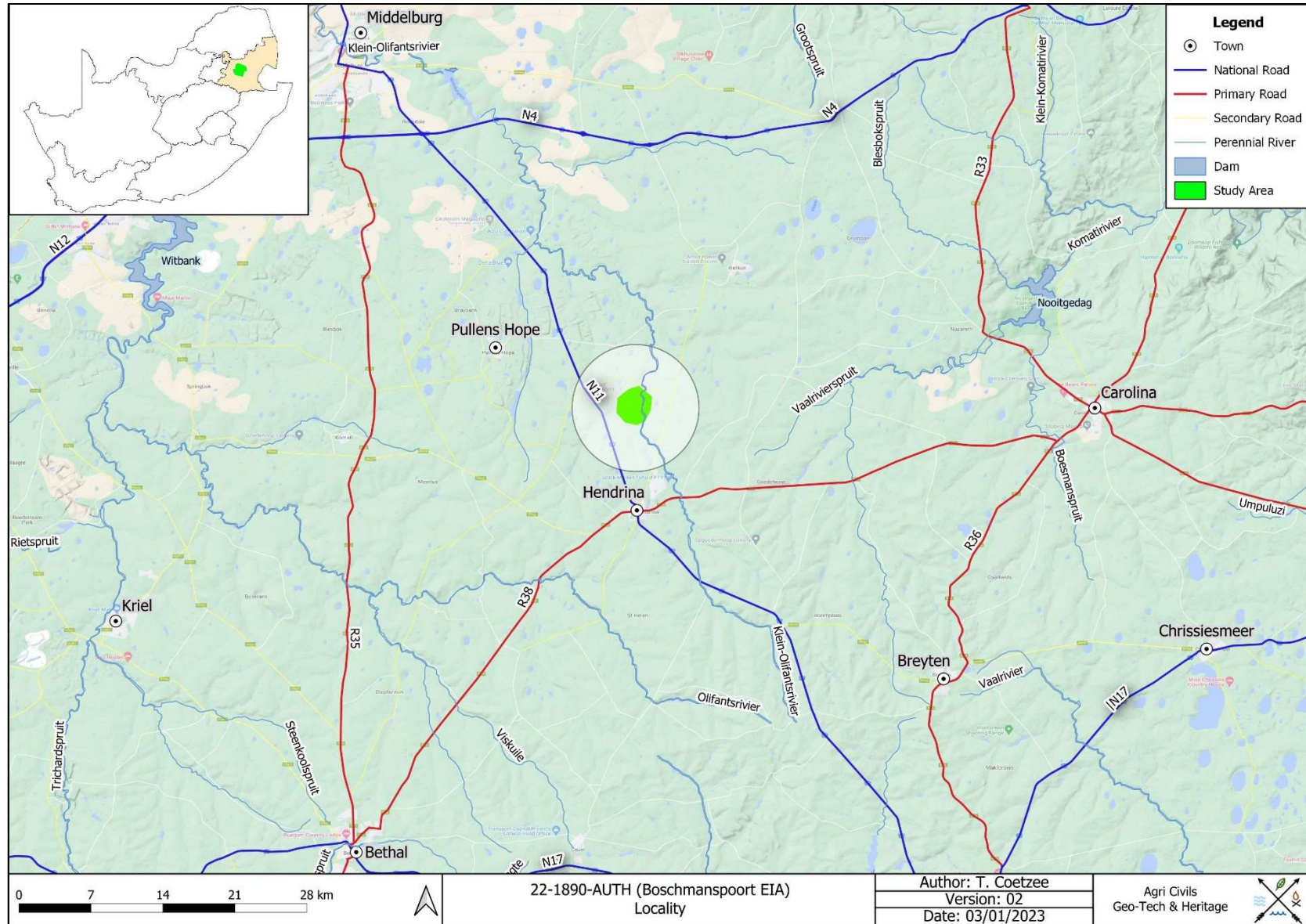


Figure 1: Regional and Provincial location of the study area.



## 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 if triggered.

Archaeological Impact Assessments (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 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 Boschmanspoort Optimum Colliery is situated to the north of Hendrina. The proposed development extents and intersecting farm portion are listed below (**Table 1**):

**Table 1:** Study area & coordinates.

Development area	Farm Name	Farm Portion	Map Reference (1:50 000)	Lat	Lon	Farm Portion Extent (ha)	Estimated Development Extent (ha)
Softs Stockpile	Boschmanspoort 159 IS	8	2629 BA	-26.073759	29.713396		5.8
Hards Stockpile	Boschmanspoort 159 IS	8	2629 BA	-26.062887	29.713622		6.9
Topsoil Stockpile	Boschmanspoort 159 IS	8	2629 BA	-26.068138	29.717027		4.4
Opencast Pit	Boschmanspoort 159 IS	8	2629 BA	-26.066919	29.709252		24.5
PCD	Boschmanspoort 159 IS	8	2629 BA	-26.060200	29.714914		1.1
<b>Total</b>						179.6	<b>42.7</b>

The study area is located 9 north of Hendrina, while Pullens Hope is located roughly 13 km to the northwest, Middelburg 44 km to the northwest and Carolina 42 km to the east (**Figure 1**). The study area falls within the Nkangala District Municipality and the Steve Tshwete 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 / eMakhazeni in the east and the eastern side of Johannesburg in the west and also extends towards Bethal, Ermelo and to the west of Piet Retief / eMkhondo. This vegetation type is associated with slightly to moderately undulating plains 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 to be 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 1620 MASL and is associated with an undulating landscape.

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 18.5 °C, and the average winter temperature 9 °C (Climate-data.org accessed 04/01/2023).

The study area falls within the B12A Quaternary Catchment of the Olifants Water Management Area (WMA). The closest perennial river to the study area is the Klein-Olifants River that forms the eastern boundary of the demarcated farm portion, while non-perennial rivers are found near the western corner of the study area. Several perennial and non-perennial pans are also found in the general area.

When the surrounding environment is considered, the region is associated with extensive crop cultivation and mining activity. Access to the demarcated portion is via a local road turning from a secondary road to the north of the study area (**Figures 2 & 3**). On a local scale, the proposed softs and topsoil stockpile areas are located within cultivated fields, and the proposed hards stockpile and PCD on previously mined land. The proposed opencast pit intersects sections of previously cultivated land, previously mined areas, as well as open veldt.



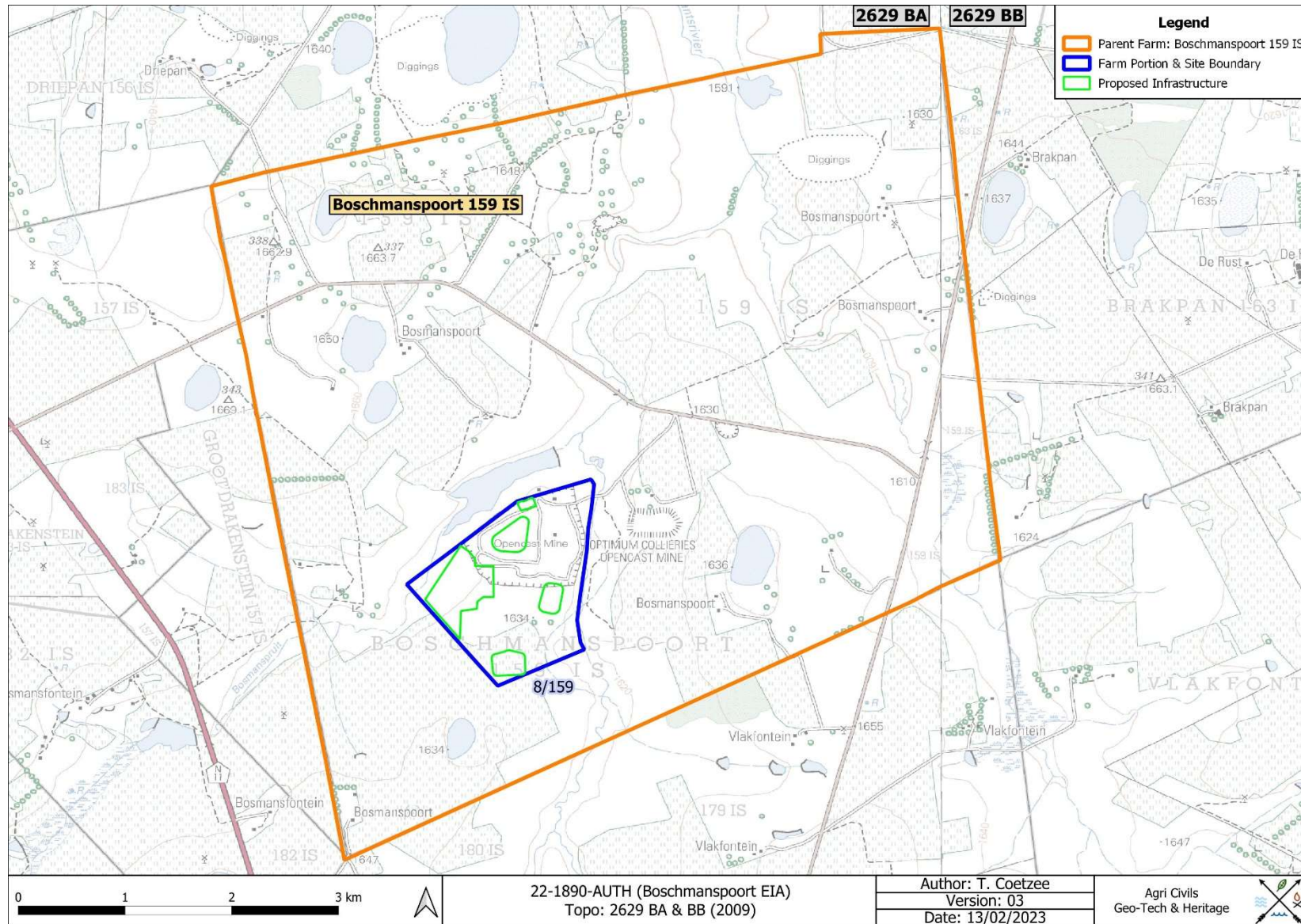


Figure 2: Segment of SA 1: 50 000 2629 BA & BB indicating the study area.





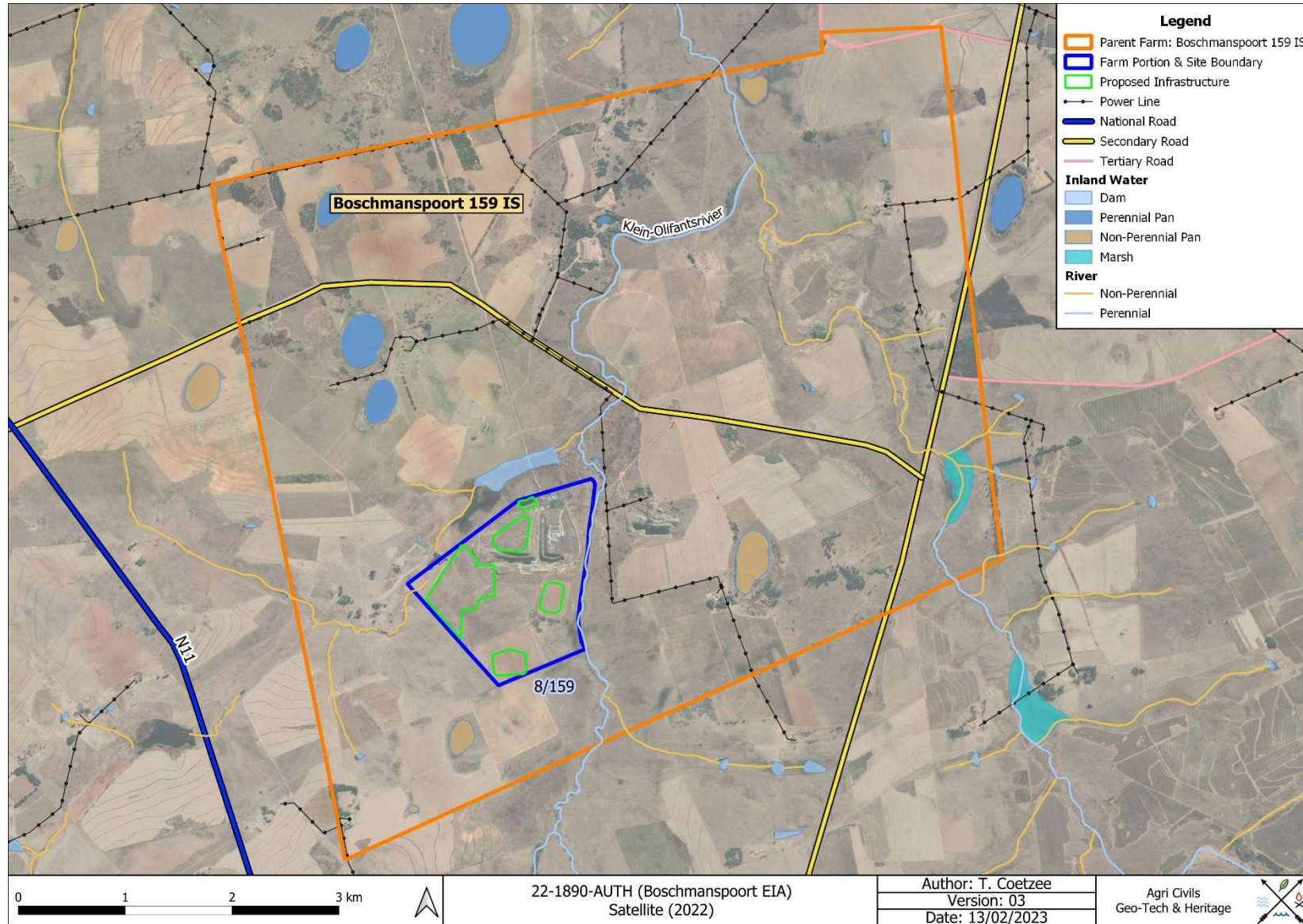


Figure 3: Study area portrayed on a 2022 satellite image



## 2.2 Project Description

The farm portion measures 179.6 ha, while the proposed infrastructure for the mining of coal measures approximately 42.7 ha (**Figure 4**). The proposed infrastructure and activities include:

- Hards Stockpile
- Softs Stockpile
- Topsoil Stockpile
- Opencast Mining Area
- PCD to be rebuilt





Figure 4: Proposed Boschmanspoort Optimum Colliery layout (Supplied by Eco Elementum 2023).



### 3. Methodology

Archaeological reconnaissance of the study area was conducted during December 2022 and February 2023 through a combination of systematic and unsystematic pedestrian surveys of the proposed study areas. Following the initial site visit, a follow-up inspection was conducted since a PCD dam was added to the design and the location of the proposed hards, softs and topsoil stockpiles were altered (**Figure 5**). The transects were spaced between 50 and 60 m apart and general site conditions were recorded via photographic record (**Figures 6 – 17**). 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**). The historical topographical datasets dating to 1965, 1984, 1996 and 2009, as well as the historical aerial images dating to 1956, 1968, 1975, 1978, 1984, 1991, and 2005, proved useful in terms of providing an indication of potential heritage sites and past land uses associated with the study area. Three potential sites associated with buildings were identified on the 1956 aerial image (Sites B01 – B03), while one site consisting of graves (Site F01) and two contemporary sites consisting of mining infrastructure and a corrugated iron building (Sites F02 & F03) were identified during the pedestrian survey (**Table 2**). The total area inspected was 179.6 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. Areas previously/currently associated with cultivated land and mining development that intersect the study area were traced and plotted as shown on topographical maps and aerial imagery, indicating disturbed areas that are less sensitive from a heritage perspective (**Figure 5**).

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 Global Positioning System (GPS) 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	ID Source	Farm Portion	Intersecting Development
B01	2629BA-B01	-26.072415	29.712502	Building	Historical	Demolished – No surface remains	1.1 ha	Aerial 1956	8	No
B02	2629BA-B02	-26.073785	29.715932	Building	Historical	Demolished – No surface remains	0.9 ha	Aerial 1956	8	No
B03	2629BA-B03	-26.070424	29.716243	Building	Historical	Ruin	1.2 ha	Aerial 1956	8	No
F01	2629BA-F01	-26.069965	29.716446	Graves	Unknown	Dilapidated	25 m <sup>2</sup>	Field	8	No
F02	2629BA-F02	-26.071215	29.716125	Mining infrastructure	Contemporary	Intact	25 m <sup>2</sup>	Field	8	No
F03	2629BA-F03	-26.071661	29.715722	Corrugated iron building	Contemporary	Intact	30 m <sup>2</sup>	Field	8	No



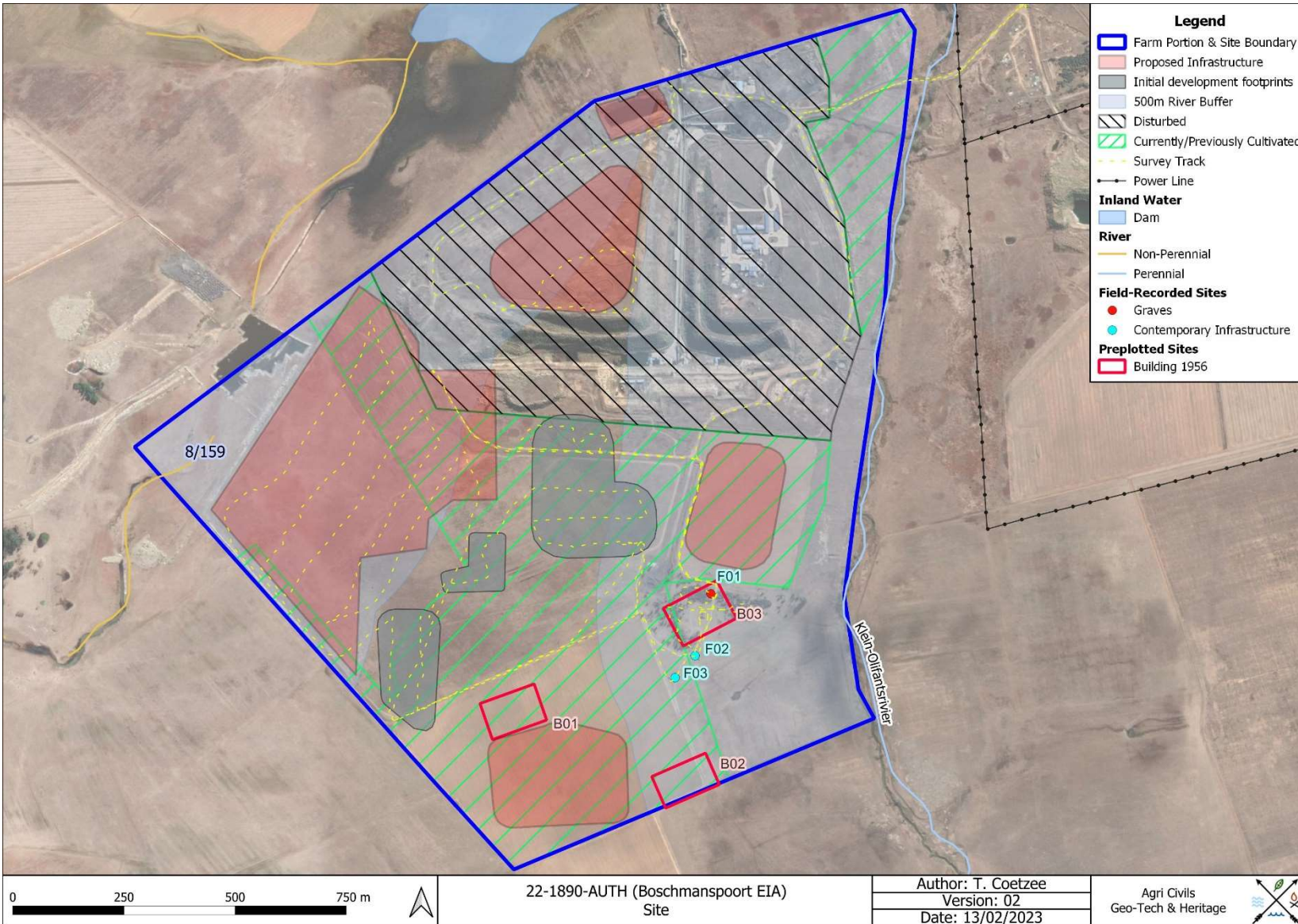


Figure 5: Study area with survey track and river buffer zone portrayed on a 2022 satellite image.





**Figure 6:** Northern section of the proposed opencast area.



**Figure 7:** Eastern section of the proposed opencast area.



**Figure 8:** Southern section of the proposed opencast area.





**Figure 9:** Western section of the proposed opencast area.



**Figure 10:** South-western view of the proposed hards stockpile.



**Figure 11:** South-eastern view of the proposed hards stockpile.







**Figure 12:** General environment associated with the proposed hards stockpile.



**Figure 13:** South-western view of the proposed PCD.



**Figure 14:** South-eastern view of the proposed PCD.





**Figure 15:** North-eastern view of the proposed PCD.



**Figure 16:** General area associated with the initial hards, softs and topsoil stockpiles.



**Figure 17:** Cultivated land associated with the proposed softs and topsoil stockpiles.



## 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, as well as general environmental conditions, were recorded by means of a Garmin Oregon 750 GPS and were photographed with a Samsung A71 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 conducted 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 18 km southwest of the proposed Boschmanspoort Optimum Colliery. 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 29 km southwest of the proposed Boschmanspoort Optimum Colliery. Opencast areas that were surveyed included portions of the Farms Schurvekop 227 IS, Vlakkuielen 76 IS, Middelkraal 50 IS, and Halfgewonnen 190 IS. It was noted that a few graveyards located outside of the study 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 22 km southwest of the proposed Boschmanspoort Optimum Colliery. 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 image dating to 1956 (**Appendix A: Figure 33**), as well as the 1965 topographical map (**Appendix A: Figure 34**) show the presence of buildings and huts near the south-eastern corner of Portion 8 of the Farm Boschmanspoort 159 IS (Sites B01 – B03), while the majority of demarcated land parcel appears to be cultivated. The same detail, except for Sites B01 and B02, is evident on the 1968 aerial image (**Appendix A: Figure 35**). The aerial images dating to 1975, 1978, 1984, 1991, as well as the 1984 topographical map, (**Appendix A: Figures 36 – 40**) indicate an increase in cultivated land. When the 1996 topographical map is inspected (**Appendix A: Figure 41**), a reduction in cultivated land is noted, while the 2005 aerial image and 2009 topographical map (**Appendix A: Figures 42 & 43**) show the presence of an opencast mine on the northern section of the study area. It should also be noted that the building at Site B03 is omitted from the 2009 topographical map (**Appendix A: Figure 43**), but a structure, possibly a ruin, is still evident on the 2005 aerial image (**Appendix A: Figure 42**).

## 3.2 Limitations

The pedestrian surveys (December 2022 & February 2023) confirmed that the study area consists of a combination of open grassland, mined areas and cultivated land. Movement was hampered in a few places by wet and marshy conditions (**Figure 22**) and visibility within the cultivated fields were poor (**Figure 17**). The general visibility of the remaining areas, however, was considered to be good.



**Figure 18:** Wet and marshy conditions associated with some areas.

## 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.



## 4.1 The Stone Age

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

The Acheulean industry completely replaced the Oldowan industry. The Acheulian industry was first developed by *Homo ergaster* between 1.8 to 1.65 million years ago and lasted until around 300 000 years ago. Archaeological evidence from this period is also found at Swartkrans, Kromdraai and Sterkfontein. The most typical tools of the ESA (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 & Historical Period

The Early Iron Age marks the movement of farming communities into South Africa in the first millennium AD, or around 2500 years ago (Mitchell 2002:259, 260). These groups were agro-pastoralist communities that settled in the vicinity of water in order to provide subsistence for their cattle and crops. Archaeological evidence from Early Iron Age sites is mostly artefacts in the form of ceramic assemblages. The origins and archaeological identities of this period are largely based upon ceramic typologies. Some scholars classify Early Iron Age ceramic traditions into different “streams” or “trends” in pot types and decoration, which emerged over time in southern Africa. These



“streams” are identified as the Kwale Branch (east), the Nkope Branch (central) and the Kalundu Branch (west). Early Iron Age ceramics typically display features such as large and prominent inverted rims, large neck areas and fine elaborate decorations. This period continued until the end of the first millennium AD (Mitchell 2002; Huffman 2007). Some well-known Early Iron Age sites include the Lydenburg Heads in Mpumalanga, Happy Rest in the Limpopo Province and Mzonjani in Kwa-Zulu Natal.

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

The Late Iron Age (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.

#### 4.2.1 The South African War

Several small skirmishes took place in the general area. However, no artefacts or features relating to the South African War were found during the survey. The phase in the South African War that is significant in terms of the study area relates to the period after the British occupied Pretoria on 5 June 1900. During this time the republican forces retreated towards the eastern boundary of the *Zuid-Afrikaansche Republiek* under General Louis Botha and started employing guerrilla tactics (Matakoma Heritage Consultants 2007).



One of the more important and well-known South African War sites in the vicinity of the study area is the Battle of Bergendal that took place approximately 29 km northeast 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).

Another battle, known as the Battle of Bakenlaagte, took place approximately 35 km southwest of the study area. The battle took place on 30 October 1901 between Lieutenant Colonel George Benson's Flying Column and the joint forces of General Louis Botha and General Sarel Grobler. Benson's Flying Column continuously threatened Boer commandos that caused the commandos to move camp every two days. Grobler had been following Benson's trail and harassed his rearguard, but it was only after Botha and his commando joined Grobler's commando that an attack could be launched. Benson's column was enroute from Syferfontein to Balmoral to resupply his men and horses. The column, consisting of more than 300 wagons, 800 horses and 600 infantry, aimed to camp at Bakenlaagte farmstead (Von der Heyde 2013: 208-209).

During the march, the column stretched out over a distance of approximately 2 km. The advance guard reached the Bakenlaagte farmstead at 09:00, but one of the rearguard wagons got stuck in mud when crossing a drift. Because the Boers were close by and visibility was poor, Benson rode back towards the rearguard and ordered two field guns be placed on a stony ridge between the camp and the rearguard. Benson was on his way to rescue



the wagon when Botha with 800 men launched his attack. Upon seeing the attack, Benson ordered a retreat to Gun Hill, where the field guns were positioned. Two companies were also on their way from the camp to Gun Hill. At this stage Benson ordered some of the rearguard toward the northeast to protect the camp, creating a gap through which the Boers attacked. The position was overrun and of the 280 soldiers, the British suffered 231 casualties. Before Benson succumbed to his wounds, he ordered the camp to fire their guns at the hill, despite the danger to him and his men. The shelling drove the Boers back, but ambulance wagons provided cover and they managed to capture the two field guns. The Boers lost almost 100 men and decided not to follow up with an attack. The 73 British soldiers, including Benson, who were killed in the Battle were buried on Gun Hill, but were later exhumed and reburied in Germiston's Primrose Cemetery (Von der Heyde 2013: 208-209)

#### **4.2.2 Hendrina General History**

The town of Hendrina became a village in 1923 and was named after Hendrina Beukes, the wife of the owner of the farm on which it was established. The area is associated with maize production and coal mining, as well as Arnot and Hendrina power stations (Bulpin 1986: 637).

#### **4.2.3 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 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).

## 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 general area. These artefacts are often associated with rocky outcrops or water sources. **Figures 19 – 21** 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 Stone Age artefacts.



According to Bergh (1999: 5), no major Stone Age archaeological sites are located in the direct vicinity of Hendrina, but the Groenvlei MSA site as well as rock engravings are located to the south of Carolina (Bergh 1999: 4 & 5).



Figure 19: ESA artefacts from Sterkfontein (Volman 1984).

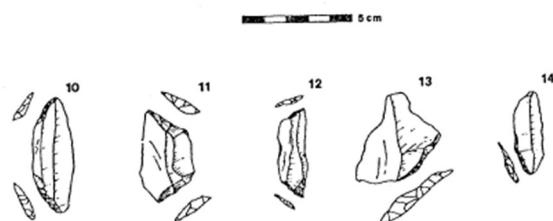


Figure 20: MSA artefacts from Howiesons Poort (Volman 1984).



Figure 21: 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), while Bergh (1999: 7) indicated the presence of LIA sites to the east-northeast of Bethal.

## 5.3 Historical Remains

Three potential sites (B01 – B03) consisting of buildings were observed on the 1956 aerial image (**Table 3, Appendix A: Figure 33**) near the south-eastern corner of the study area and outside of the demarcated impact areas. Sites B01 and B02 are also shown as huts on the 1965 topographical map (**Appendix A: Figure 34**), but are no longer visible on the 1968 aerial image (**Appendix A: Figure 35**). Sites B01 and B02 were therefore demolished between 1965 and 1968. Site B03 is still indicated as a building on the 1996 Topographical map (**Appendix A: Figure 41**), but was omitted from the 2009 topographical map (**Appendix A: Figure 43**), which suggests that the building was demolished between 1996 and 2009. The site visit confirmed that the areas



associated with Sites B01 and B02 are now part of a cultivated field (**Figure 22**), while Site B03 is characterised by a building ruin consisting of bricks and stone measuring roughly 15 m X 10 m (**Figures 23 – 25**). The associated area surrounding the site, however, measures approximately 1.2 ha.

The heritage study conducted by Huffman & Steel (1995) recorded a few angular structures that might date to historical times.

**Table 3:** Historical Sites.

<b>Name</b>	<b>Type</b>	<b>Source</b>	<b>Year</b>	<b>Current Status</b>	<b>Surface Indications</b>
B01	Building	Aerial	1956	Demolished	None
B02	Building	Aerial	1956	Demolished	None
B03	Building	Aerial	1956	Ruin	Brick & Stone



**Figure 22:** Environment associated with Sites B01 & B02.





**Figure 23:** Site B03 seen from the southeast.



**Figure 24:** Site B03 seen from the east.



**Figure 25:** Site B03 seen from the northwest.



## 5.4 Contemporary/Natural Remains

Two contemporary sites were located within the demarcated study area, but outside of the proposed impact areas (**Table 4**). Both sites (F02 & F03) are located near the south-eastern corner of the study area. Site F02 consists of a steel palisade, metal cover and a sign with the following writing (**Figure 26**):

“GLENCORE Optimum Complex  
REFUGE CHAMBER  
Boschmanspoort Mine  
No. 1  
Surface Borehole”

The site measures approximately 25 m<sup>2</sup> and according to Google Earth imagery, the structure was erected between 2012 and 2017.

Site F03 consists of a corrugated iron building measuring approximately 30 m<sup>2</sup>. Based on Google Earth imagery, the building was constructed between 2020 and 2021.

The heritage study conducted by Huffman & Steel (1995) recorded a few angular structures that might date to contemporary times. No significant sites, however, were recorded.

**Table 4:** Contemporary Sites

Name	Type	Source	Year	Current Status	Surface Indications
F02	Mining Infrastructure	Field	2012-2017	Intact	Steel palisade & structure
F03	Corrugated iron building	Field	2020-2021	Intact	Corrugated iron





Figure 26: Mining infrastructure at Site F02.

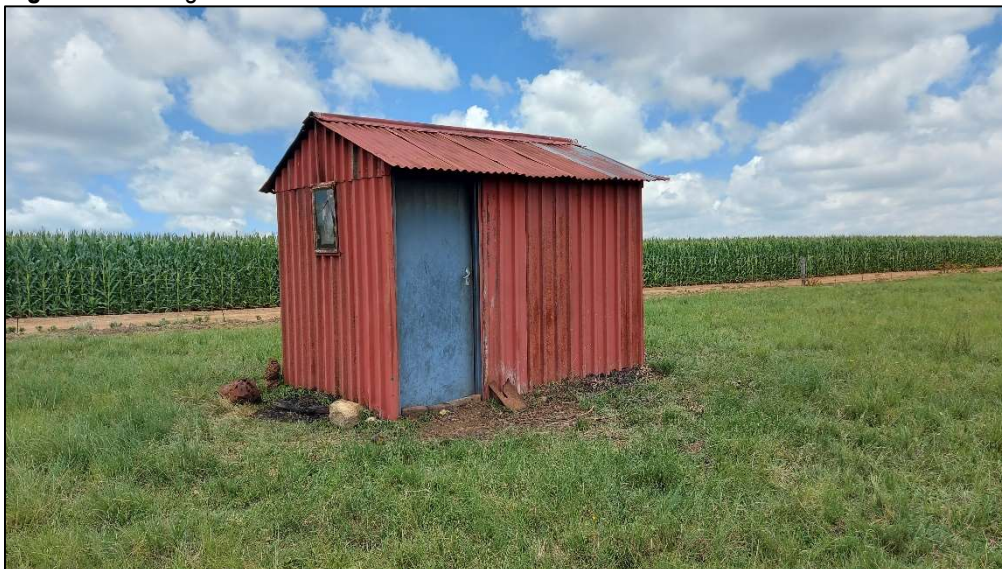


Figure 27: Corrugated iron building at Site F03.

## 5.5 Graves/Burial Sites

Four unfenced graves were recorded during the site inspection (Site F01). The site is located near the building ruin at Site B03 and approximately 68 m from the nearest demarcated impact area (topsoil stockpile). Site F01 consists of one formal and 3 informal surface decorations (**Figures 28 – 31**), and is in a dilapidated state since the formal surface decoration is broken. The formal surface decoration consists of a cement feature, while the informal graves are all associated with packed stones. No headstones, inscriptions or grave goods were observed. All the graves are placed in an approximate east-west orientation, known as the Christian Western style. Due to the dilapidated state of the graves, absence of grave goods and the lack of recent burials, it is assumed that the site is no longer in use.

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



**Table 5:** Burial Sites.

Name	Type	Source	Number of graves	Status	Age
F01	Graves	Field	4	Dilapidated	Unknown



**Figure 28:** Graves at Site F01 seen from the northeast.



**Figure 29:** Graves at Site F01 seen from the south.





**Figure 30:** Grave with cement surface decoration.



**Figure 31:** Grave with packed stones.





## 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 (Act No. 25 of 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 6:** 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
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 7:** Individual site ratings.

Site / Survey Point Name	Type	Rating	Field Rating/Grade	Significance	Recommendation
2629BA-B01	Demolished Building	General Protection C	4 C	Low	No recording necessary
2629BA-B02	Demolished Building	General Protection C	4 C	Low	No recording necessary
2629BA-B03	Building ruin	General Protection B	4 B	Medium	Record site



Site / Survey Point Name	Type	Rating	Field Rating/Grade	Significance	Recommendation
2629BA-F01	Graves	Local	Grade 3 A	High	Mitigation not advised
2629BA-F02	Mining infrastructure	General Protection C	4 C	Low	No recording necessary
2629BA-F03	Corrugated iron building	General Protection C	4 C	Low	No recording necessary

## 7. Statement of Significance & Recommendations

### 7.1 Statement of Significance

#### The study area: The Proposed Boschmanspoort Optimum Colliery

Two sites associated with demolished buildings (Sites B01 & B02), one building ruin (Site B03), four graves (Site F01) and two contemporary sites (F02 & F03) were noted near the south-eastern corner of the study area. All the sites, however, fall outside of the demarcated impact areas. The majority of the study area also falls within 500 m of a river, an area generally considered to be sensitive from a heritage perspective (**Figure 32**). However, according to historical aerial imagery and topographical maps, the majority of the study area was subjected to opencast mining activities and crop cultivation that significantly lower the sensitivity in terms of heritage resources.

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

No sites were located within the demarcated development footprints and the majority of these areas were cultivated and/or mined in the past. The proposed development footprints/impact areas (opencast area, topsoil stockpile, softs stockpile, hards stockpile, PCD) are therefore not considered to be sensitive from a heritage perspective.

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

Sites B01 – B03 were identified on the 1956 aerial image (**Appendix A: Figure 33**) as areas associated with buildings. Site B01 borders the nearest demarcated development area (softs stockpile) to the south, while Site B02 is located roughly 54 m east of the softs stockpile. Both Sites B01 and B02 exceed 60 years of age, but have completely been demolished. The boundary of Site B03 as plotted on historical aerial imagery is approximately 36 m from to the nearest proposed development (topsoil stockpile). Site B03 also exceeds 60 years of age, but is associated with a building ruin. It should be noted that the distance between the building ruin and the proposed topsoil stockpile is roughly 108 m. Since Sites B01 – B03 are located a considerable distance from the proposed opencast pit, no impact is foreseen.



Site F01 consists of four graves identified to the northeast of the building ruin at Site B03. The age of the graves is unknown, but might exceed 60 years of age, especially if the graves relate to Site B03. Site F01 is 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 No. 25 of 1999 apply. Site F01 is located approximately 68 m south of the proposed topsoil stockpile and is therefore unlikely to be impacted.



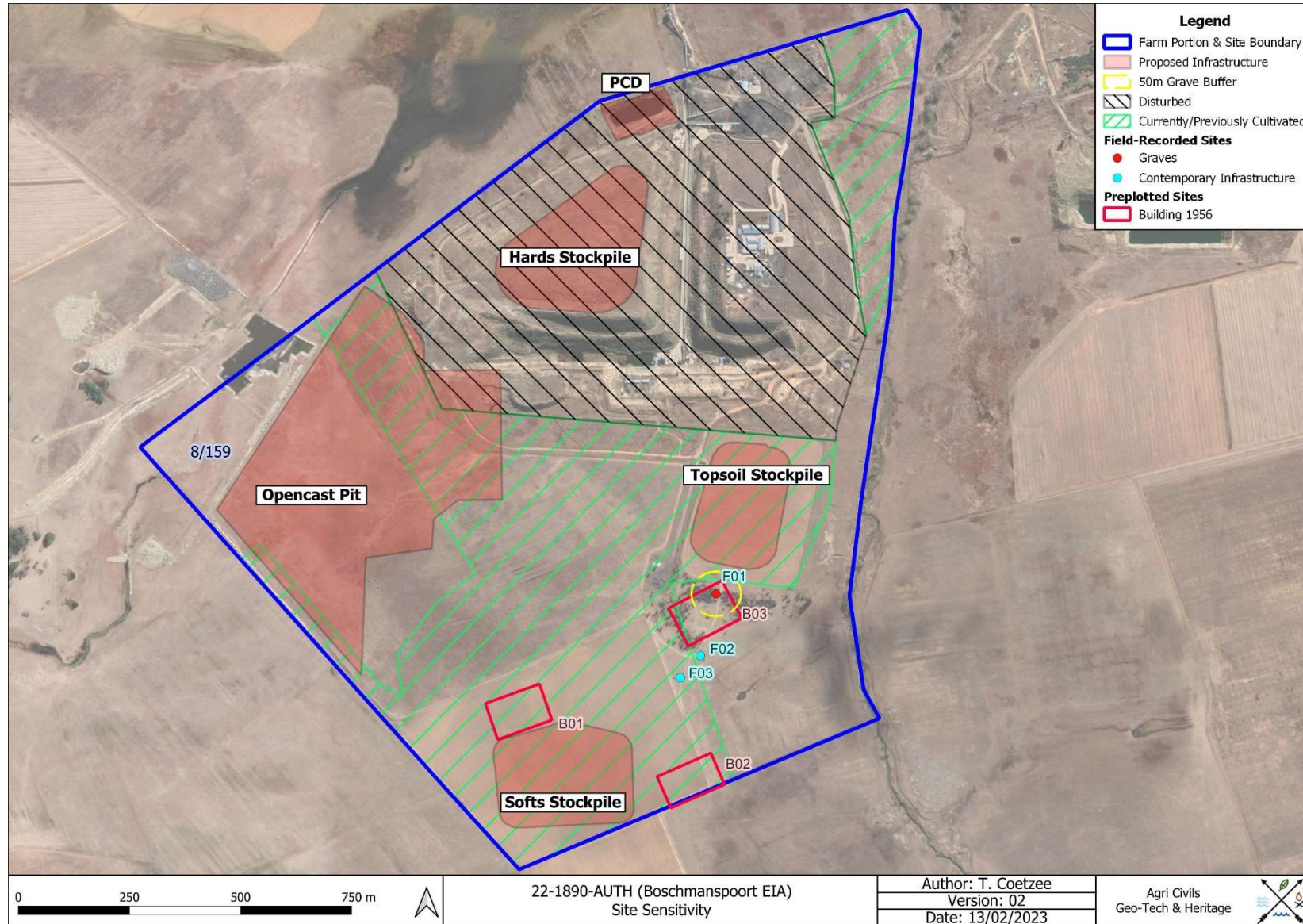


Figure 32: Study area and potentially sensitive areas portrayed on a 2022 satellite image.



## 7.2 Recommendations

The following recommendations are made in terms with the National Heritage Resources Act (Act No. 25 of 1999) in order to avoid the destruction of heritage remains associated with the areas demarcated for development:

- Sites B01 & B02 used to be associated with buildings dating to the Historic Period. The buildings, however, have completely been demolished and no surface indications are present. The sites are not considered to be significant or sensitive from a heritage perspective and since the proposed development footprints don't intersect the Site B01 and B02 footprints, no impact is foreseen.
- Site B03 used to be associated with a building dating to the Historic Period. The building, however, has largely been demolished and is currently a ruin. The site is not considered to be significant or sensitive from a heritage perspective and since the structure is located approximately 108 m from the nearest development footprint (topsoil stockpile), the site is not at risk of being impacted.
- Site F01 consists of four graves located approximately 68 m from the nearest proposed development (topsoil stockpile). Although the age of the graves is unknown, it is likely to 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 proximity of the graves to the proposed development footprints, it is unlikely that the graves will be impacted by the proposed project. However, since the site appears not to be in use anymore and in order to prevent accidental damage to the graves, a fenced-off conservation buffer of 50 m must be established and maintained for effective in-situ preservation of the graves. The proposed fence infrastructure which should be at least 1.8 m high must include a gate to allow access by the family of the deceased individuals. A distance of at least 2 m must be maintained between the graves and fence. Should relocation of the graves be considered in future, a full 60 days consultation process as stipulated in the NHRA Regulations of 2000 must be implemented to identify the family of the deceased individuals who must then be consulted to give consent for the relocation.
- Sites F02 & F03 are of contemporary origin, do not exceed 60 years of age and are not considered to be significant or sensitive from a heritage perspective. No further action is required.
- The above recommendations are based on the specific project activities and extents as indicated by the figures in this report. Should the proposed surface impact areas be altered, a qualified archaeologist must inspect the new areas and amend the report accordingly.
- Should uncertainty regarding the presence of heritage remains exist, or if heritage resources are discovered by chance, it is advised that the potential site be avoided and that a qualified archaeologist be contacted as soon as possible.



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

## 8. Conclusion

The proposed Boschmanspoort Optimum Colliery consists of surface infrastructure and activities impacting approximately 42.7 ha of mostly cultivated, previously cultivated and previously mined land that is not considered to be sensitive from a heritage perspective. The four historical sites (B01 – B03, F01) do not intersect the proposed development footprints and are therefore not at risk of being impacted by the proposed activities. However, a fenced-off conservation buffer of 50 m is recommended for cemetery F01. Contemporary Sites F02 & F03 are not significant or sensitive from a heritage perspective and require no further action.

Should the recommendations made in this study be adhered to and with the approval of the South African Heritage Resources Agency, the proposed Boschmanspoort Optimum Colliery 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.



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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 Imagery & Topographical Maps



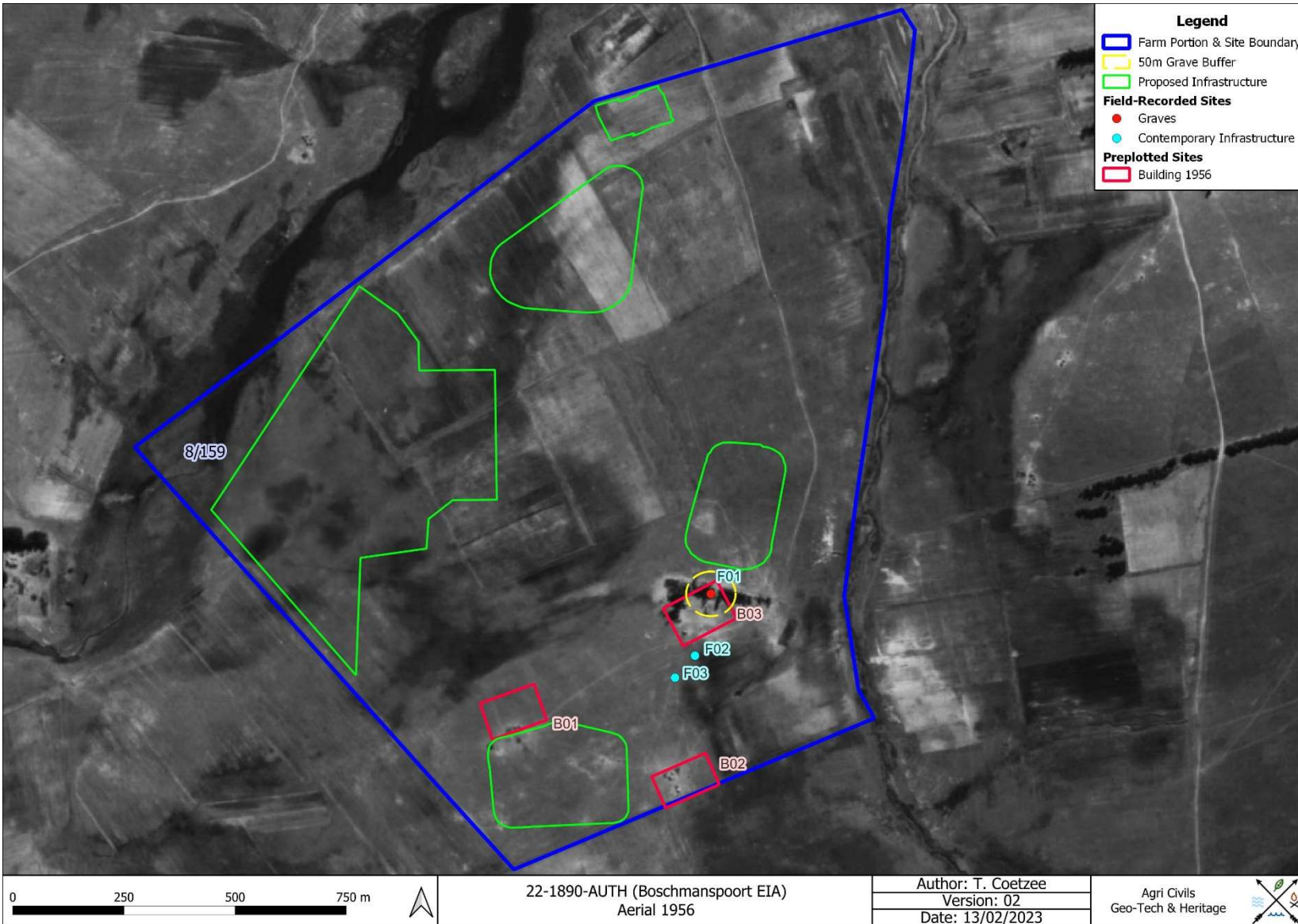


Figure 33: Study area superimposed on a 1956 aerial image.



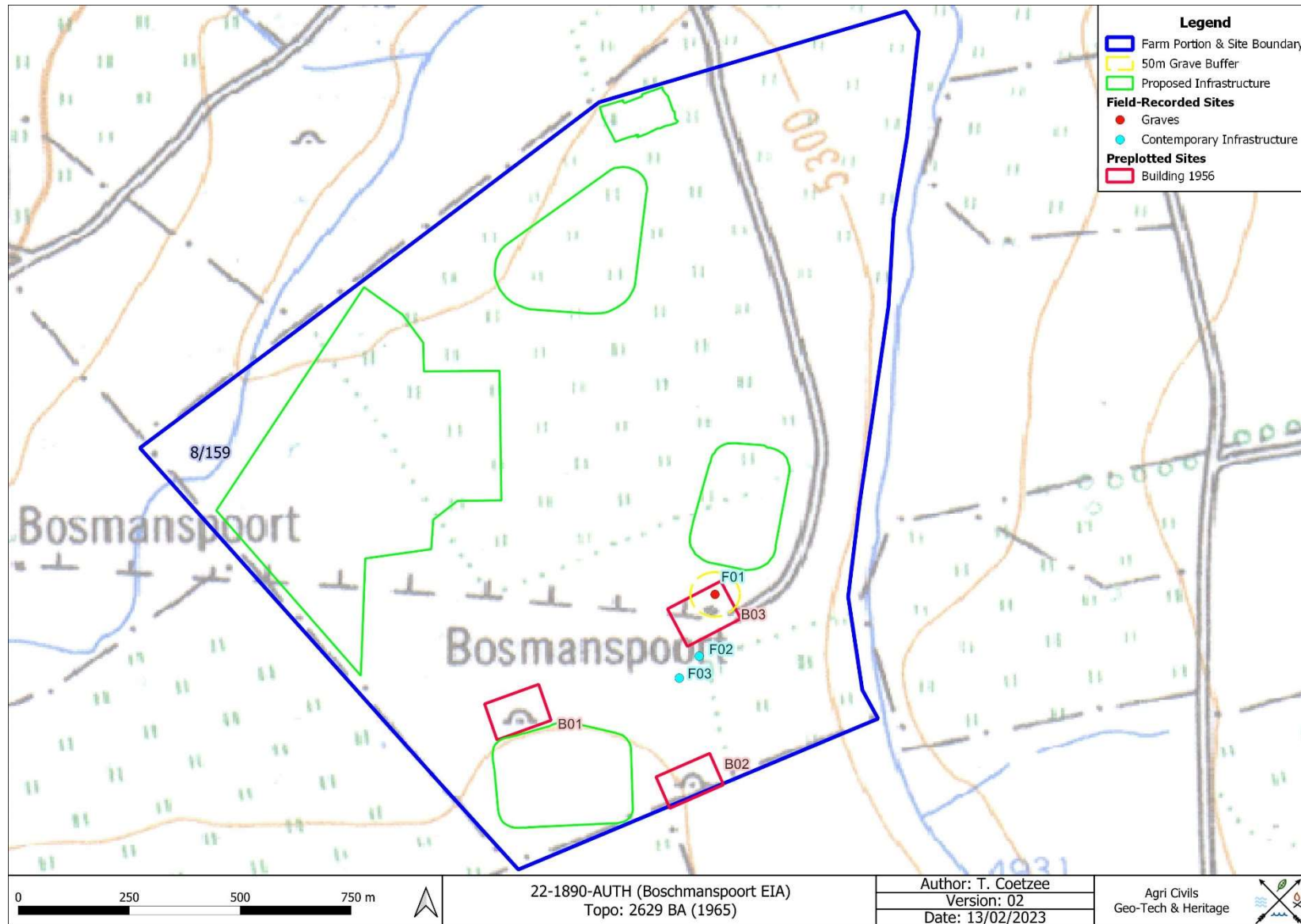


Figure 34: Study area superimposed on a 1965 topographical map.



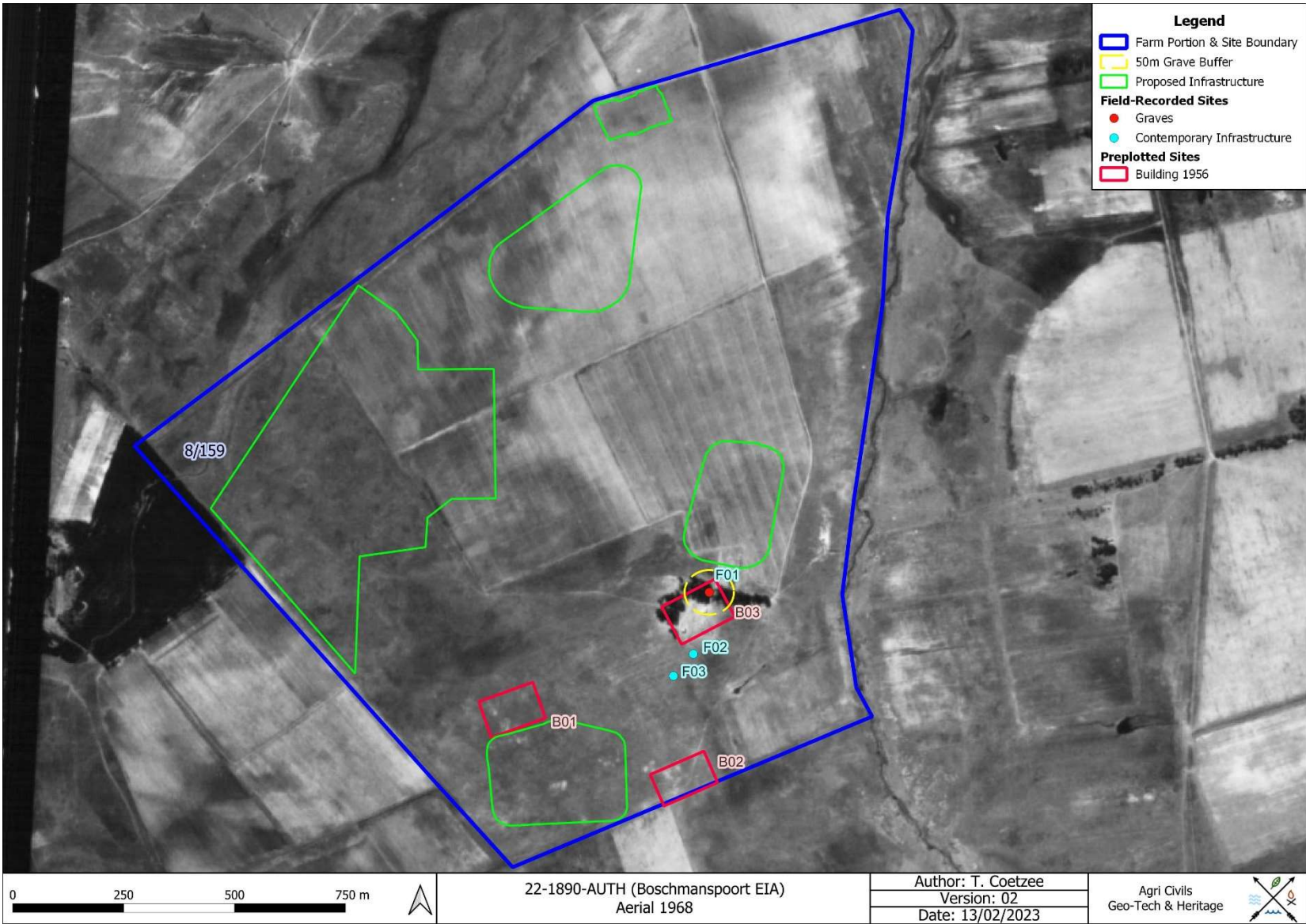


Figure 35: Study area superimposed on a 1968 aerial image.



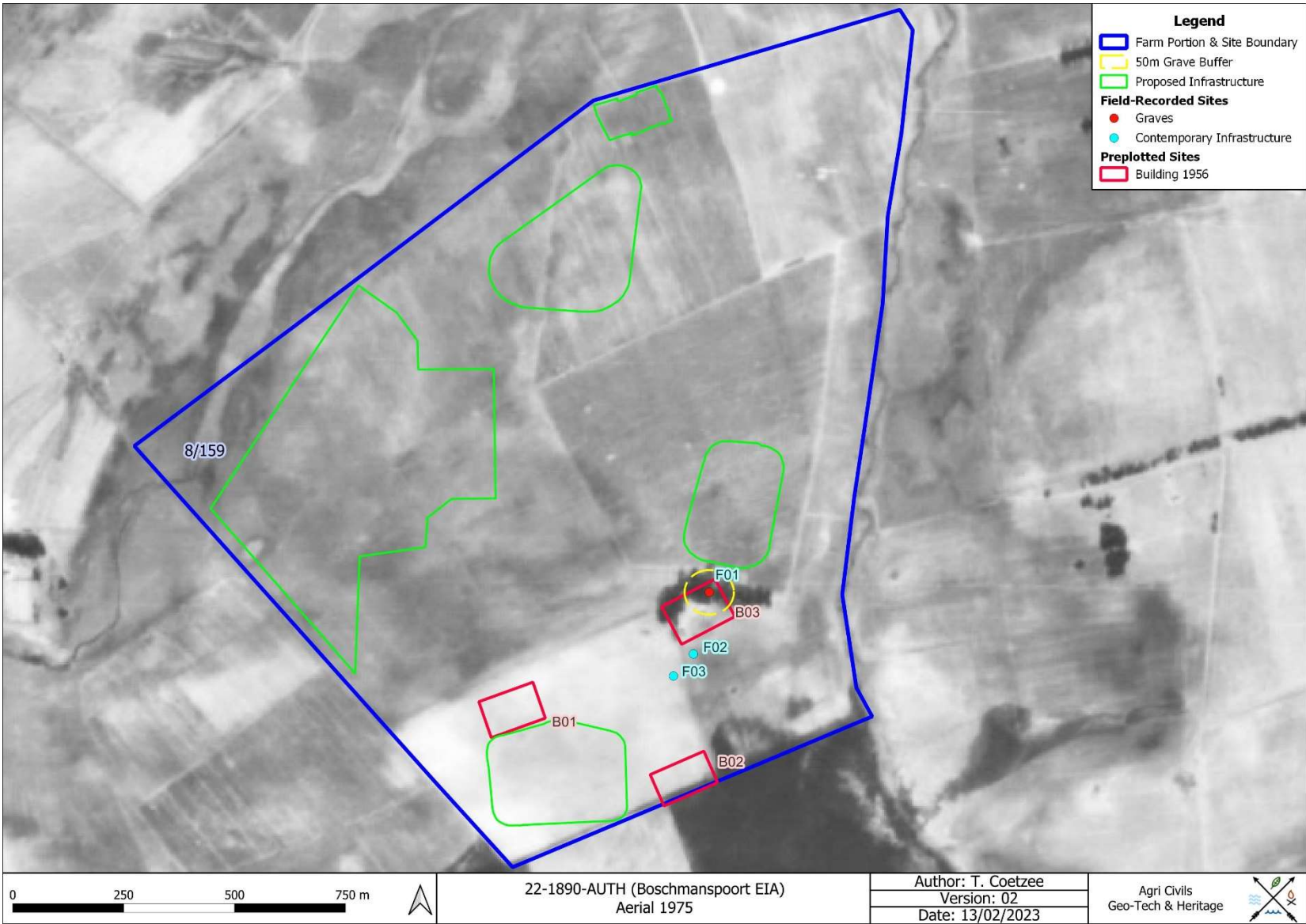


Figure 36: Study area superimposed on a 1975 aerial image.



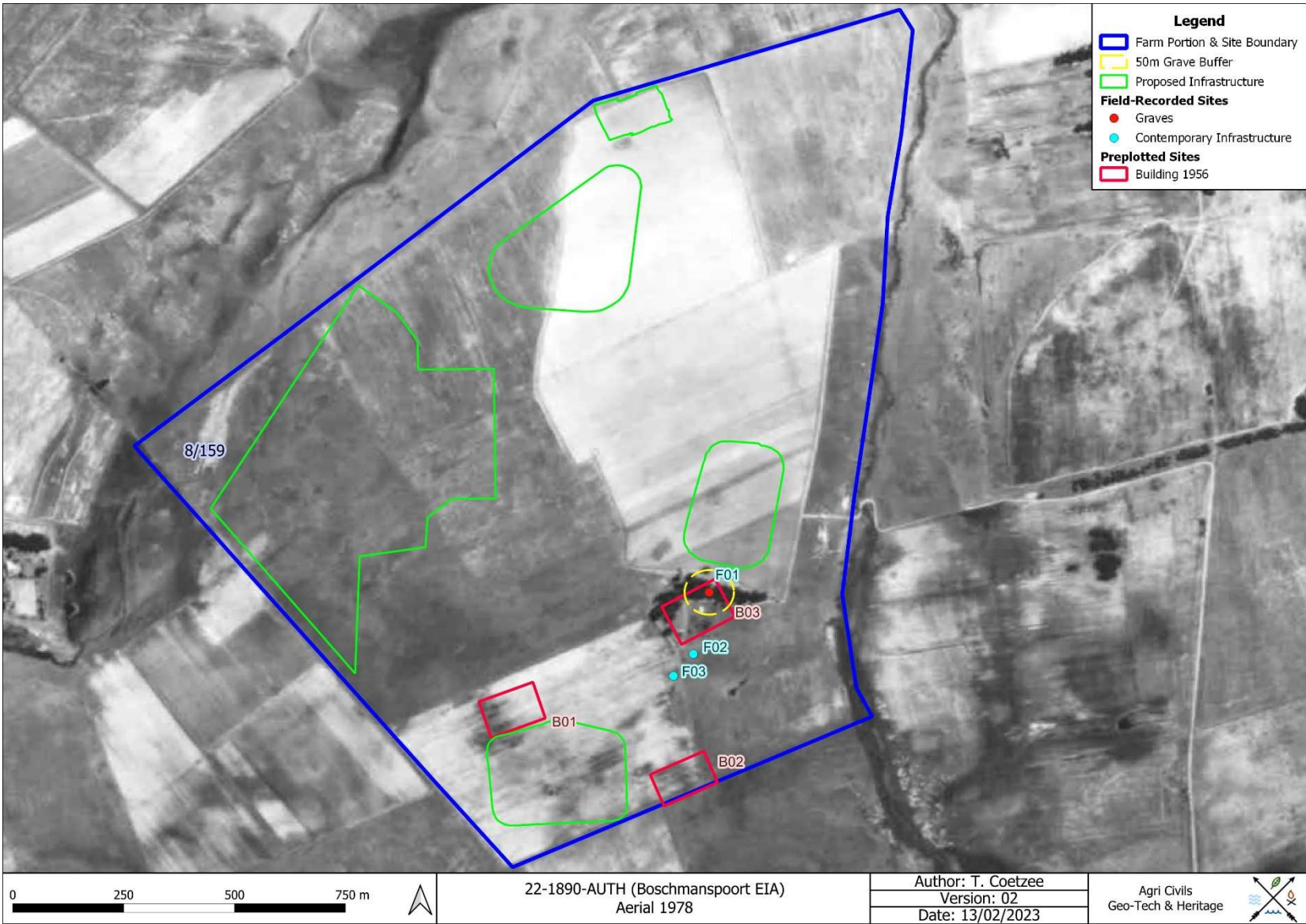


Figure 37: Study area superimposed on a 1978 aerial image.



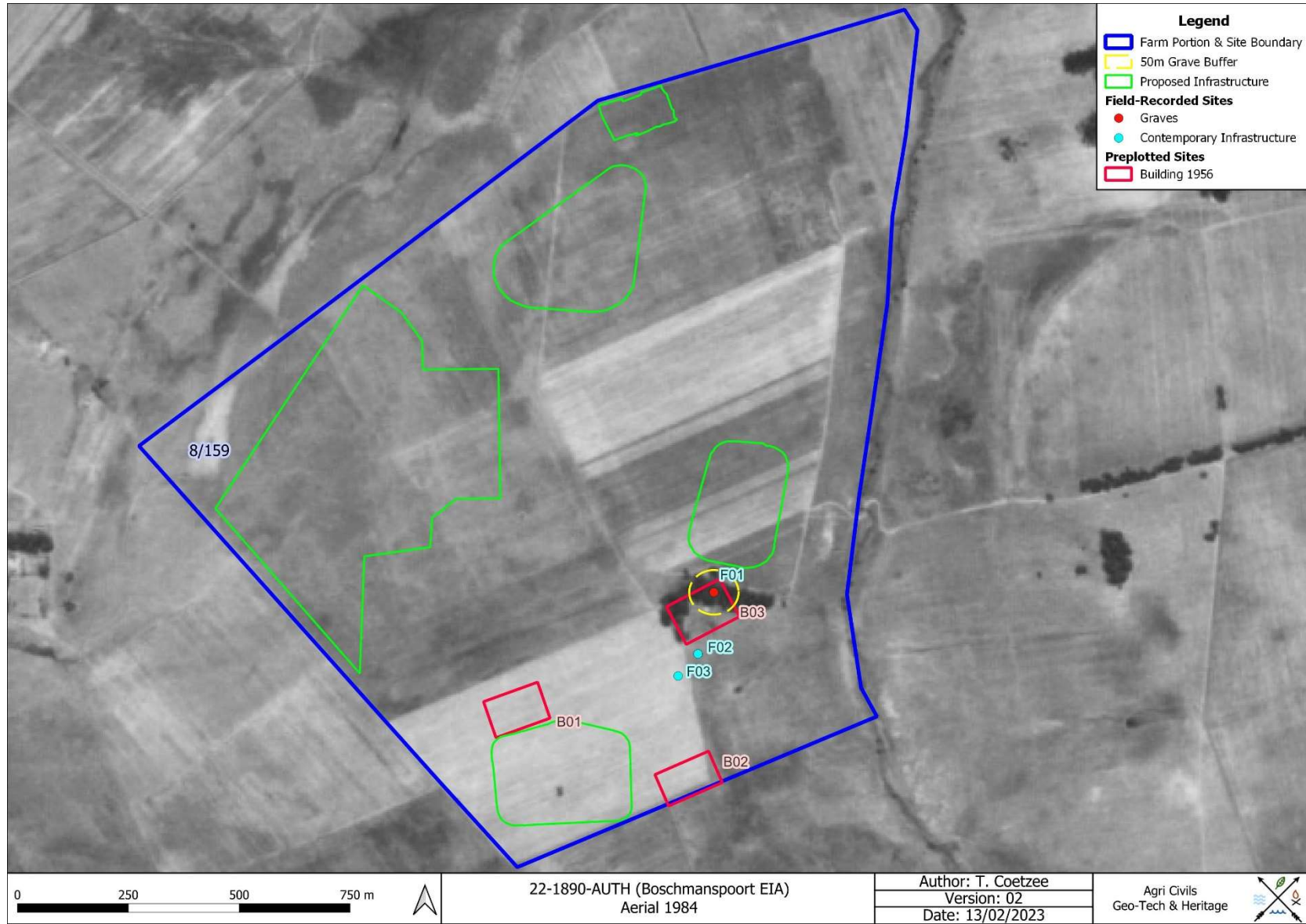


Figure 38: Study area superimposed on a 1984 aerial image.





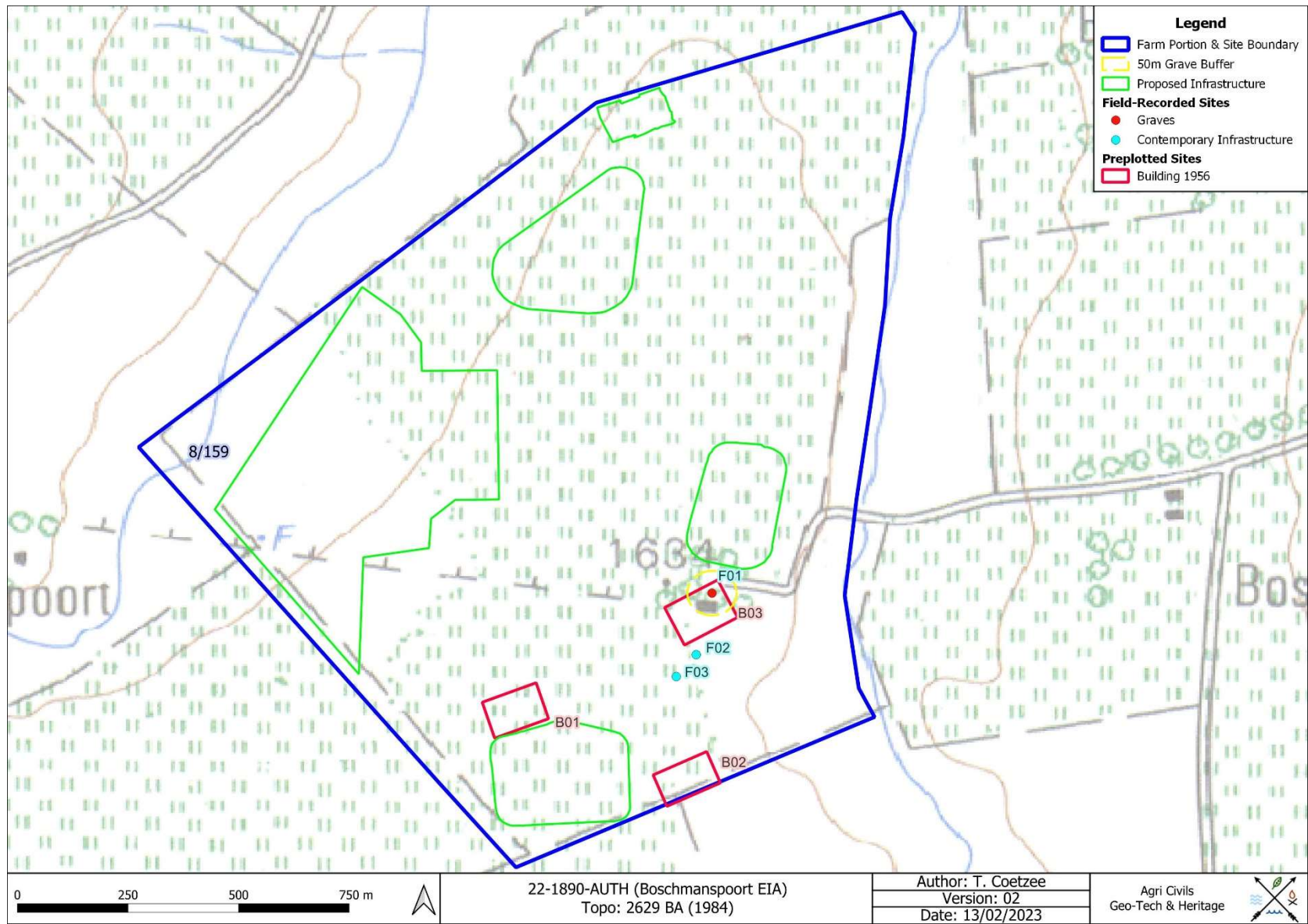


Figure 39: Study area superimposed on a 1984 topographical map.





Figure 40: Study area superimposed on a 1991 aerial image.



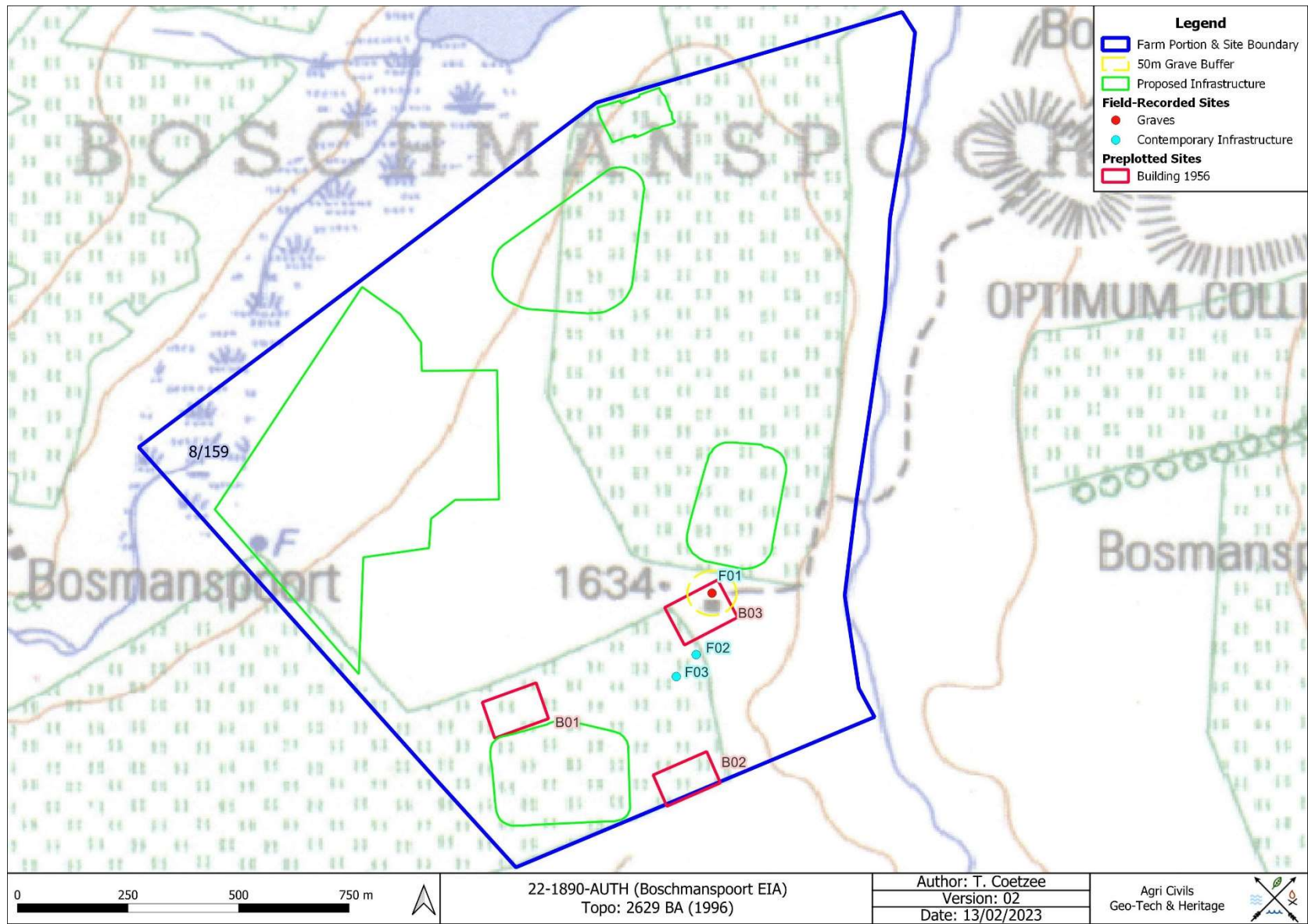
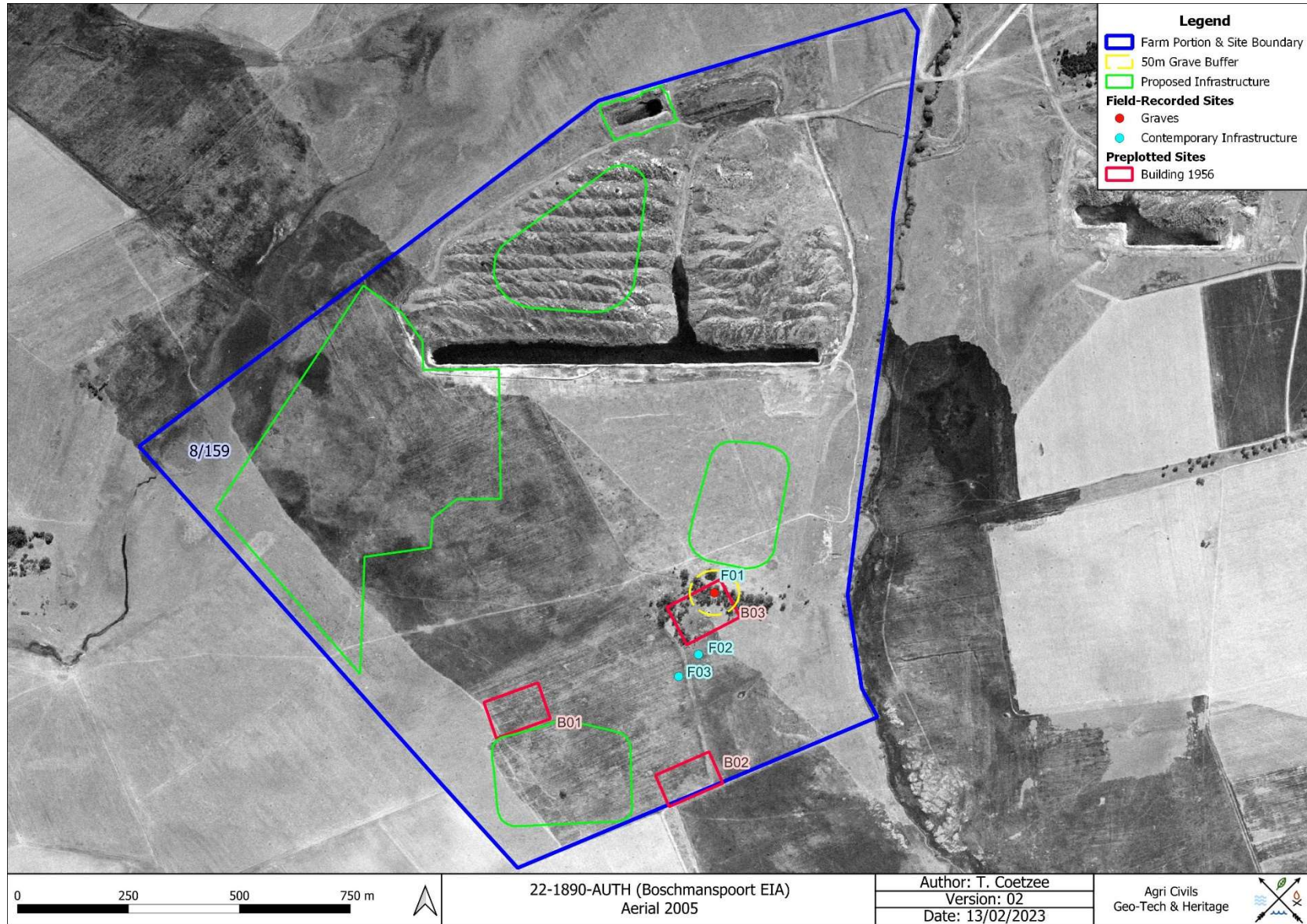


Figure 41: Study area superimposed on a 1996 topographical map.





**Figure 42:** Study area superimposed on a 2005 aerial image.



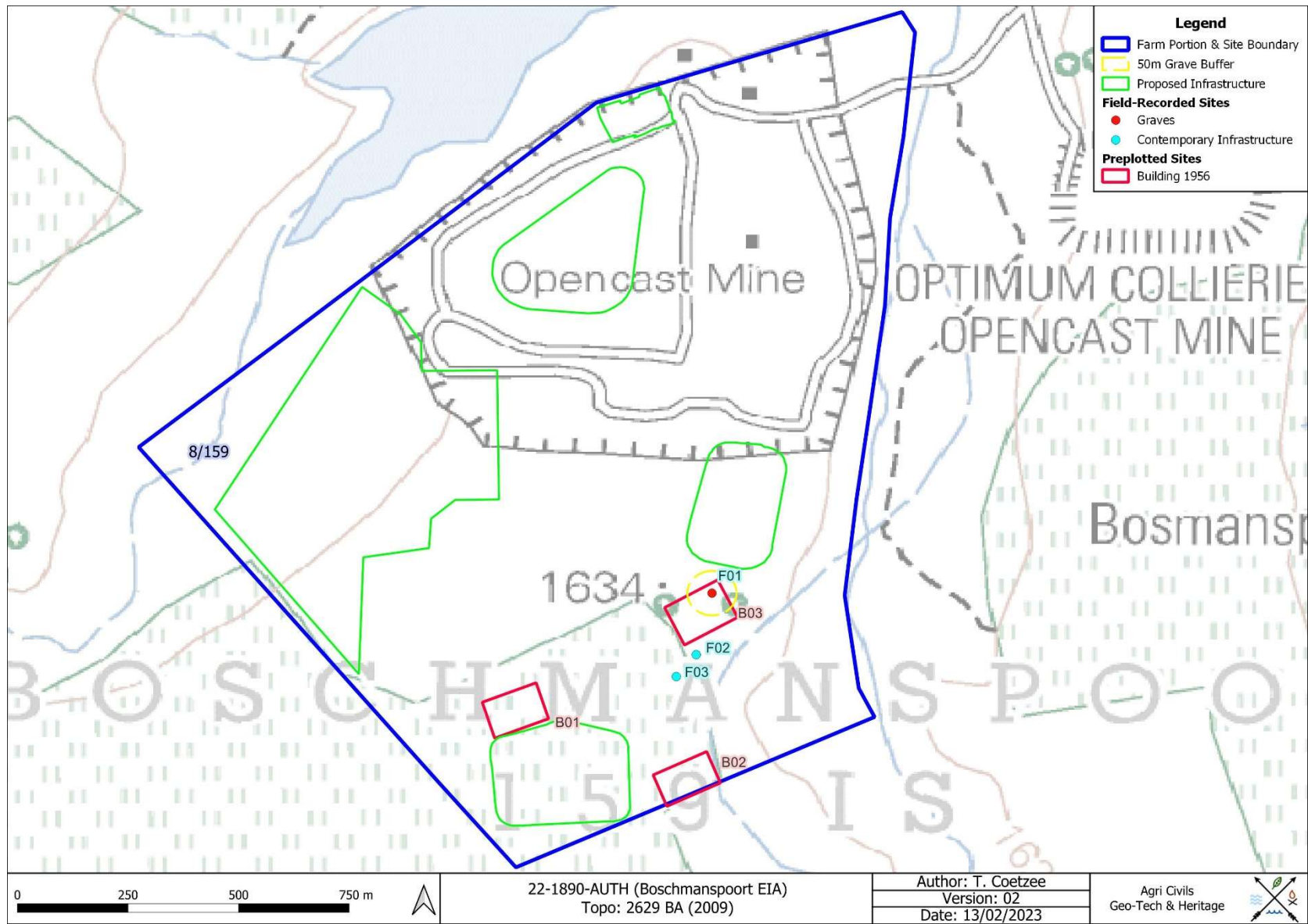


Figure 43: Study area superimposed on a 2009 topographical map.

