



# ARCHAEOLOGICAL DESKTOP STUDY

for the Proposed Okavango 17449 Prospecting Right Application near  
Balfour, Mpumalanga

**For:**

Eco Elementum (Pty) Ltd

**Project Ref:**

Okavango 17449 PR

**Date:**


21/03/2023

**Archaeological Desktop Study for the Proposed Okavango 17449 Prospecting Right Application near Balfour, Mpumalanga**

Project Ref: Okavango 17449 PR  
 Report No: EE\_2103231  
 Report Version: 1

I, Tobias Coetzee, declare that –

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

| Author         | Qualification         | Email                       | Date       | Signature   |
|----------------|-----------------------|-----------------------------|------------|---|
| Tobias Coetzee | MA (Archaeology – UP) | tcoetzee.heritage@gmail.com | 21/03/2023 |  |



## Executive Summary

Agri Civils Geo-Tech & Heritage was appointed by Eco Elementum (Pty) Ltd to undertake an Archaeological Desktop study for Okavango Holdings (Pty) Ltd on several portions of the Farms Wonderfontein 341 IR, Watervlashoek 350 IR, Kuilwater 347 IR and Gruisfontein 344 IR (**Table 1**) within the Govan Mbeki Local Municipality in the Mpumalanga Province. The study area is located roughly 30 km northeast of Balfour. The aim of this report is to contextualise the general study area in terms of heritage resources and will provide the developers with general information regarding potentially sensitive areas. This will also shed light on what is to be expected during a Phase 1 Archaeological Impact Assessment and aid in interpreting finds.

A total of 114 sites consisting of buildings/huts and three grave sites were noted on historical topographical maps and aerial imagery. Analysis indicates that 52 of the building/hut sites date to historical times, while nine sites potentially date to historical times. Fifty (50) of the historical and potentially historical sites, however, appear to have been demolished since no surface infrastructure could be identified on contemporary satellite imagery. Because buildings and structures are not always identifiable on aerial imagery and since some sites might be associated with subsurface historical material likely to exceed 60 years of age, the demarcated areas are considered to be sensitive from a heritage perspective. Should building remains dating to historical times be present, the remains might be protected under the National Heritage Resources Act (Act No. 25 of 1999). The 61 historical and potentially historical sites, as well as the three grave sites, should therefore be avoided by the proposed prospecting activities. Should this not be possible, the sites must first be inspected by a qualified archaeologist.

The remaining 53 sites, 33 of which were demolished, appear not to exceed 60 years of age and are unlikely to be significant from a heritage perspective. However, should impact to the sites be unavoidable, it is recommended that a qualified archaeologist inspect the sites prior to any impact.

The grave sites are considered to be sensitive and significant from a heritage perspective and a buffer zone of 50 m around the graves should be avoided by the proposed prospecting activities since the Human Tissues Act (Act No. 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) could apply.

The 500 m water source buffer is considered to be potentially sensitive from a heritage perspective and care should be exercised when prospecting within this area, while areas previously/currently associated with cultivated fields are considered to be disturbed and are less sensitive from a heritage perspective. Although the previously/currently cultivated areas that intersect the 500 m buffer are considered to be disturbed, the possibility of encountering subsurface cultural material still exists. Care should therefore be exercised when prospecting in such areas. The least sensitive areas are areas that are located more than 500 m from a water source, fall within previously/currently cultivated fields and are not located within close proximity of potential heritage sites or contemporary infrastructure.



Apart from the identified potential sites, open and undisturbed areas falling outside of the previously/currently cultivated areas and within the 500 m buffer zone are considered to be the most sensitive, especially due the potential presence of Late Iron Age and Historic sites in the general area. Care should therefore be exercised when prospecting in these areas. The possibility also exists that culturally sensitive sites, such as burial sites, might have been created after some cultivated fields fell into disuse, meaning that burial sites might be located on disturbed areas as well. Therefore, should uncertainty regarding heritage remains exist, it is advised that a qualified archaeologist be contacted prior to any impact.

A full Phase 1 Archaeological Impact Assessment must be conducted should any development that triggers an Archaeological Impact Assessment result from the prospecting project, including if the cumulative impact of the proposed prospecting project exceeds 0.5 ha.



## 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

**SAHRA** – South African Heritage Resources Agency



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# 1. Project Background

## 1.1 Introduction

Eco Elementum (Pty) Ltd appointed Agri Civils Geo-Tech & Heritage to undertake an Archaeological Desktop Study for the proposed Okavango 17449 prospecting right application on the entire extent of the Farms Kuilwater 347 IR, Gruisfontein 344 IR, as well as on portions 1-10, 12, 14, 15 of the Farm Wonderfontein 341 IR and portions 1, 3, 4, 17, 19, 26, 27, 28, 32 and 35 of the Farm Watervlashoek 350 IR within the Govan Mbeki Local Municipality in the Mpumalanga Province. The study area is located roughly 3 km southwest of Leandra and 30 km northeast of Balfour (**Figure 1 & Table 1**). The purpose of this study is to contextualise the demarcated study area in order to determine the scope of heritage resources that might be encountered during the prospecting phase and subsequent heritage studies, as well as to provide recommendations for the safeguarding of archaeological resources during prospecting. The aim of this report is to provide the developer with information regarding heritage resources in the vicinity of the study area based on results from previous studies, written historical information and historical topographical maps and aerial photographs.

In the following report, a broad overview of the proposed prospecting right application for coal is provided and the study area is contextualised in terms of heritage resources. The legislation section included serves as a guide towards the effective identification and protection of heritage resources and will apply to any such material unearthed during the prospecting phase.





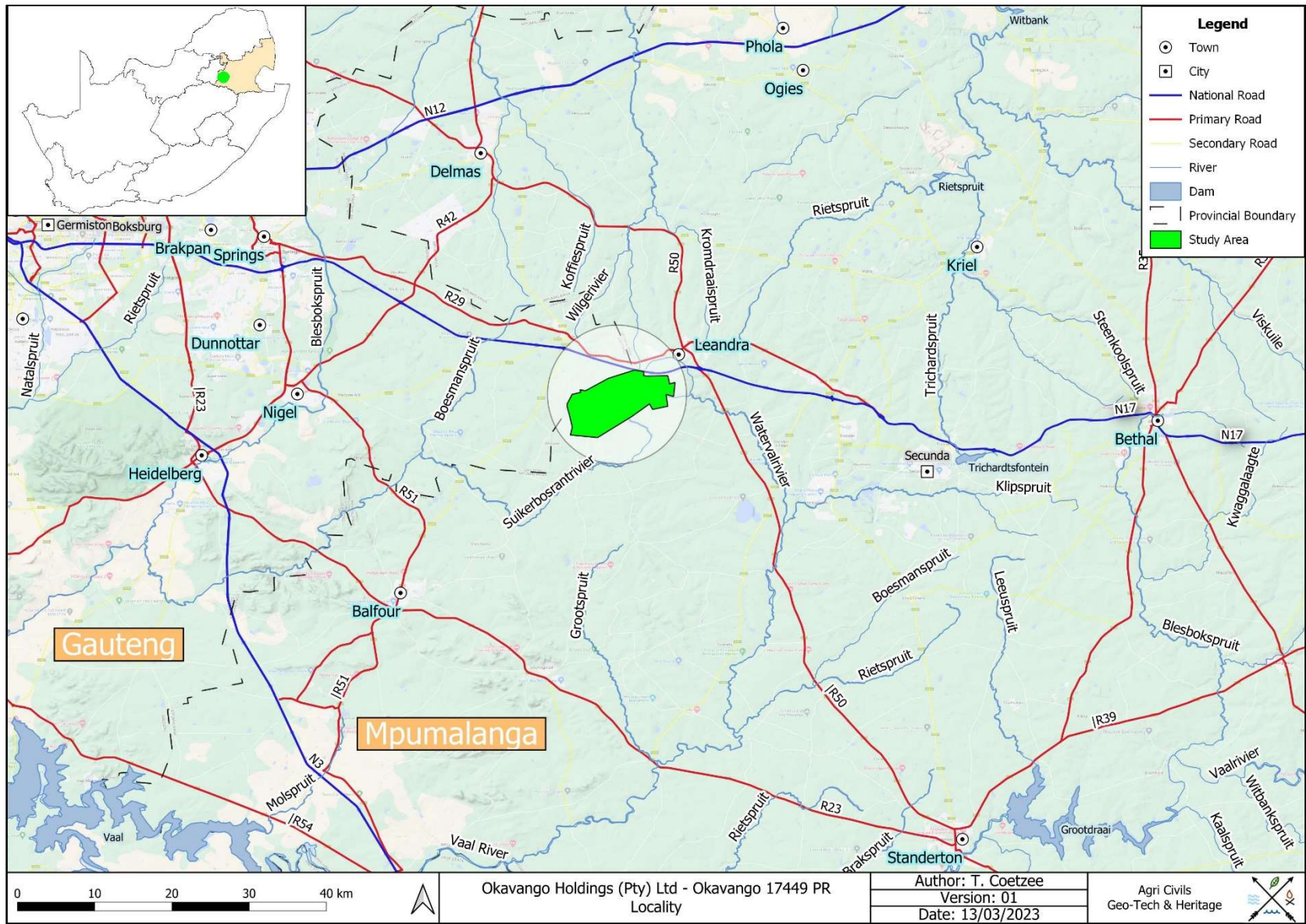


Figure 1: Regional and provincial location of the study area.



## 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 (Act No. 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 Okavango prospecting project is situated on the land parcels listed in **Table 1** and is illustrated in **Figure 2**.

**Table 1:** Land parcels & coordinates.

| No                  | Property             | Portion | Map Reference<br>(1:50 000) | Lat (y)    | Lon (x)   | Extent (ha)   |
|---------------------|----------------------|---------|-----------------------------|------------|-----------|---------------|
| 1                   | Wonderfontein 341 IR | 1/341   | 2628BD                      | -26.448942 | 28.813149 | 164.6         |
| 2                   | Wonderfontein 341 IR | 2/341   | 2628BD                      | -26.430707 | 28.808950 | 277.3         |
| 3                   | Wonderfontein 341 IR | 3/341   | 2628BD                      | -26.443776 | 28.825700 | 166.5         |
| 4                   | Wonderfontein 341 IR | 4/341   | 2628BD                      | -26.450206 | 28.835243 | 166.2         |
| 5                   | Wonderfontein 341 IR | 5/341   | 2628BD                      | -26.455479 | 28.824194 | 165.9         |
| 6                   | Wonderfontein 341 IR | 6/341   | 2628BD                      | -26.464953 | 28.819424 | 164.5         |
| 7                   | Wonderfontein 341 IR | 7/341   | 2628BD                      | -26.434147 | 28.841978 | 272.6         |
| 8                   | Wonderfontein 341 IR | 8/341   | 2628BD                      | -26.432284 | 28.819204 | 90.5          |
| 9                   | Wonderfontein 341 IR | 9/341   | 2628BD                      | -26.437112 | 28.794506 | 413.5         |
| 10                  | Wonderfontein 341 IR | 10/341  | 2628BD                      | -26.454285 | 28.799118 | 397.2         |
| 11                  | Wonderfontein 341 IR | 12/341  | 2628BD                      | -26.468769 | 28.803977 | 391.8         |
| 12                  | Wonderfontein 341 IR | 14/341  | 2628BD                      | -26.433763 | 28.830363 | 91.3          |
| 13                  | Wonderfontein 341 IR | 15/341  | 2628BD                      | -26.433049 | 28.824716 | 92.7          |
| 14                  | Gruisfontein 344 IR  | 1/344   | 2628BD                      | -26.431748 | 28.866041 | 625.4         |
| 15                  | Gruisfontein 344 IR  | 2/344   | 2628BD                      | -26.410552 | 28.850845 | 531.6         |
| 16                  | Gruisfontein 344 IR  | 3/344   | 2628BD                      | -26.420723 | 28.833837 | 569.1         |
| 17                  | Kuilwater 347 IR     | 347     | 2628BD                      | -26.452872 | 28.844665 | 533.2         |
| 18                  | Watervalshoek 350 IR | 1/350   | 2628BD                      | -26.432731 | 28.888361 | 431.6         |
| 19                  | Watervalshoek 350 IR | 3/350   | 2628BD                      | -26.418389 | 28.877307 | 166.4         |
| 20                  | Watervalshoek 350 IR | 4/350   | 2628BD                      | -26.408627 | 28.894427 | 112.3         |
| 21                  | Watervalshoek 350 IR | 17/350  | 2628BD                      | -26.420662 | 28.899776 | 248.5         |
| 22                  | Watervalshoek 350 IR | 19/350  | 2628BD                      | -26.417009 | 28.886775 | 25.7          |
| 23                  | Watervalshoek 350 IR | 26/350  | 2628BD                      | -26.410455 | 28.883000 | 126.8         |
| 24                  | Watervalshoek 350 IR | 27/350  | 2628BD                      | -26.414978 | 28.893484 | 27.7          |
| 25                  | Watervalshoek 350 IR | 28/350  | 2628BD                      | -26.413015 | 28.899737 | 28.0          |
| 26                  | Watervalshoek 350 IR | 32/350  | 2628BD                      | -26.407162 | 28.868392 | 76.7          |
| 27                  | Watervalshoek 350 IR | 35/350  | 2628BD                      | -26.403577 | 28.871014 | 72.8          |
| <b>Total Extent</b> |                      |         |                             |            |           | <b>6430.2</b> |



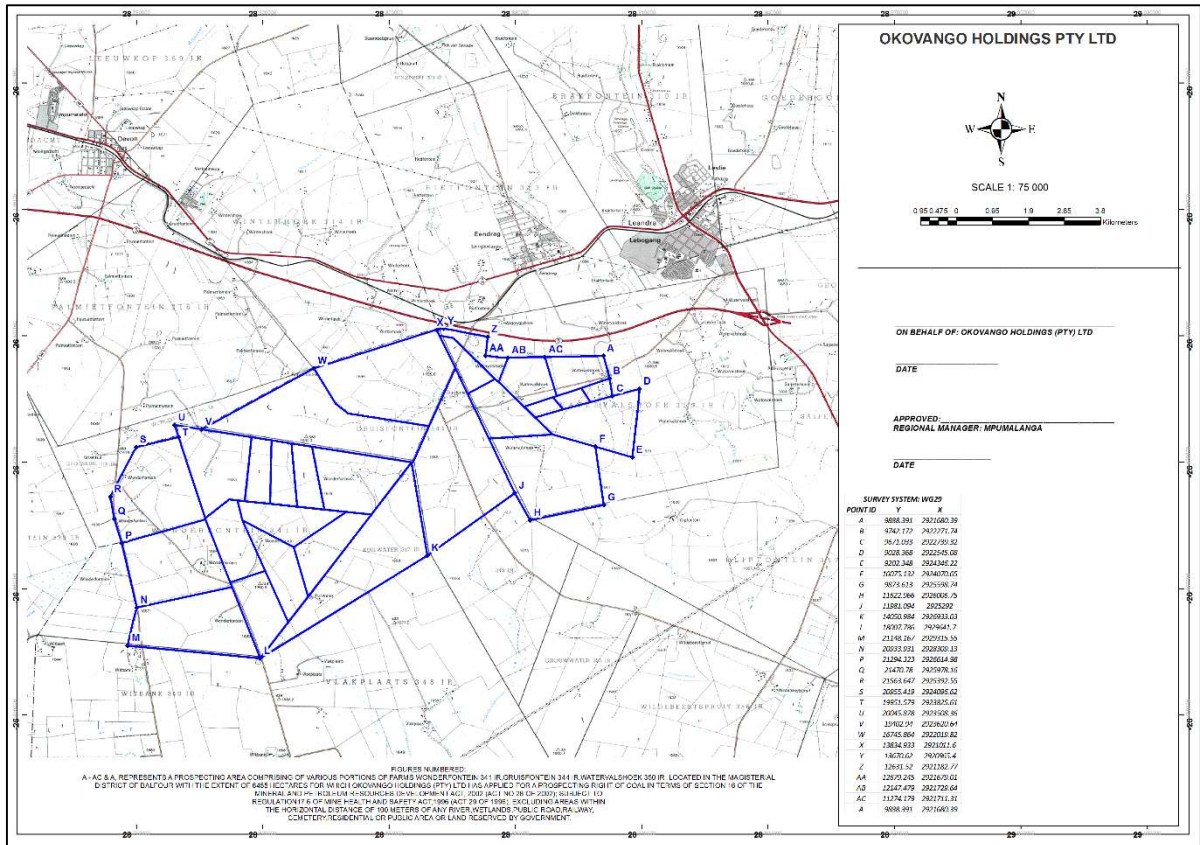


Figure 2: Reg 2(2) layout map (Provided by Eco Elementum 2023).

Leandra is located roughly 3 km to the northeast of the proposed prospecting area, while Balfour is located 30 km to the southwest and Delmas 34 km to the northwest. The demarcated study area falls within the Govan Mbeki Local Municipality and the Gert Sibande District Municipality in the Mpumalanga Province. The N17 national road runs in an east-west direction along a section of the northern boundary of the study area, while the R50 primary road runs in a northwest-southeast direction roughly 4 km to the east. The R548 secondary road runs in a northeast-southwest direction approximately 3.5 km to the west of the study area. Several local farm roads also intersect the study area.

In terms of vegetation, the study area falls within the Grassland Biome and Mesic Highveld Grassland Bioregion. On a local scale, the study area falls within the Soweto Highveld Grassland vegetation unit (Mucina & Rutherford 2006).

Soweto Highveld Grassland is found in the Mpumalanga and Gauteng Provinces between Ermelo and Johannesburg in the north, Perdekop in the southeast and the Vaal River in the south. The western parts extend along the southern edge of the Johannesburg Dome as far as Randfontein and include Vanderbijlpark and Vereeniging in southern Gauteng, as well as Sasolburg in the northern Free State. This type of vegetation is considered to be endangered and has a conservation target of 24%. Only small patches are conserved and



cultivation, urban sprawl, mining, dams and road infrastructure have transformed about half of the area. Erosion is generally very low (Mucina & Rutherford 2006).

According to Mucina & Rutherford (2006), the average elevation for Soweto Highveld Grassland ranges from 1420 to 1760 Metres Above Sea Level (MASL). The average elevation of the study area is 1670 MASL and the general area appears to be associated with an undulating landscape.

The study area falls within the summer rainfall region and the average annual rainfall is roughly 790 mm per year. The average annual temperature is 15.8 °C. The average summer temperature is 19.6 °C, while the winter temperature averages 9.3 °C (Climate-data.org accessed 14/03/2023).

The study area falls within in the B20E, C12D and C21A quaternary catchments. The B20E quaternary catchment forms part of the Olifants Water Management Area, while the C12D and C21A quaternary catchments fall within the Olifants Water Management Area. The Waterval perennial river intersects portions 1 and 17 of the Farm Watervalshoek 350 IR, while the Suikerbosrand perennial river intersects the Farm Kuilwater 347 IR and Portions 1 and 3 of the Farm Gruisfontein 344 IR, as well as Portion 7 of the Farm Wonderfontein 341 IR. Another perennial offshoot also intersects portion 2 of the Farm Gruisfontein 344 IR and portions 2 and 9 of the Farm Wonderfontein 341 IR. Additionally, several non-perennial streams and perennials pans intersect the demarcated study area. Westoe Dam is located approximately 37 km to the west of the study area and the Vaal Dam 64 km to the southwest.

Access to the demarcated study area appears to be through local roads turning from the R548 secondary road and R50 primary roads that run to the east and west. The majority of the study area appears to consist of open veldt and cultivated land. The land use of the open sections is unknown, but is likely to be utilised as pasture for cattle. The general surroundings appear to be associated with agricultural activities and crop cultivation. Several buildings and farmsteads are evident on the majority of the demarcated farm portions.

## 2.2 Project description

The prospecting right application for coal covers approximately 6430 ha (**Figures 3 & 4**). For the prospecting phase, however, several sites will be selected for geotechnical drilling. These boreholes and its associated activities will impact a surface area of between 250 and 625 m<sup>2</sup>. The full extent of the drill site will also be demarcated and no drilling will be done outside of the boundary.

### **Prospecting activities will include the following:**

Current access roads will be used as far as possible, but in cases where access roads to drill sites do not exist, a single track will be selected based on the area where the least environmental impact will occur. The same tracks will be used should repeated access be required. Vegetation and topsoil excavated during the drilling process





will be stockpiled next to sumps where it will serve as a storm water diversion berm. On completion of the drilling process, the rehabilitated sumps will be backfilled with the stockpiled material. Because a constant water supply is needed for the drilling process, 15 000l will be stored in tanks. The plastic-lined sumps will be used to recycle water through a filter process in order to maintain a constant clean water source for the purpose of drilling. In terms of potable water for employees and workers, a temporary 260l tank will be placed on-site. Additional facilities will include temporary portable toilets, berms, and a maximum of 60m<sup>3</sup> of diesel fuel located on an impermeable surface with bunds.



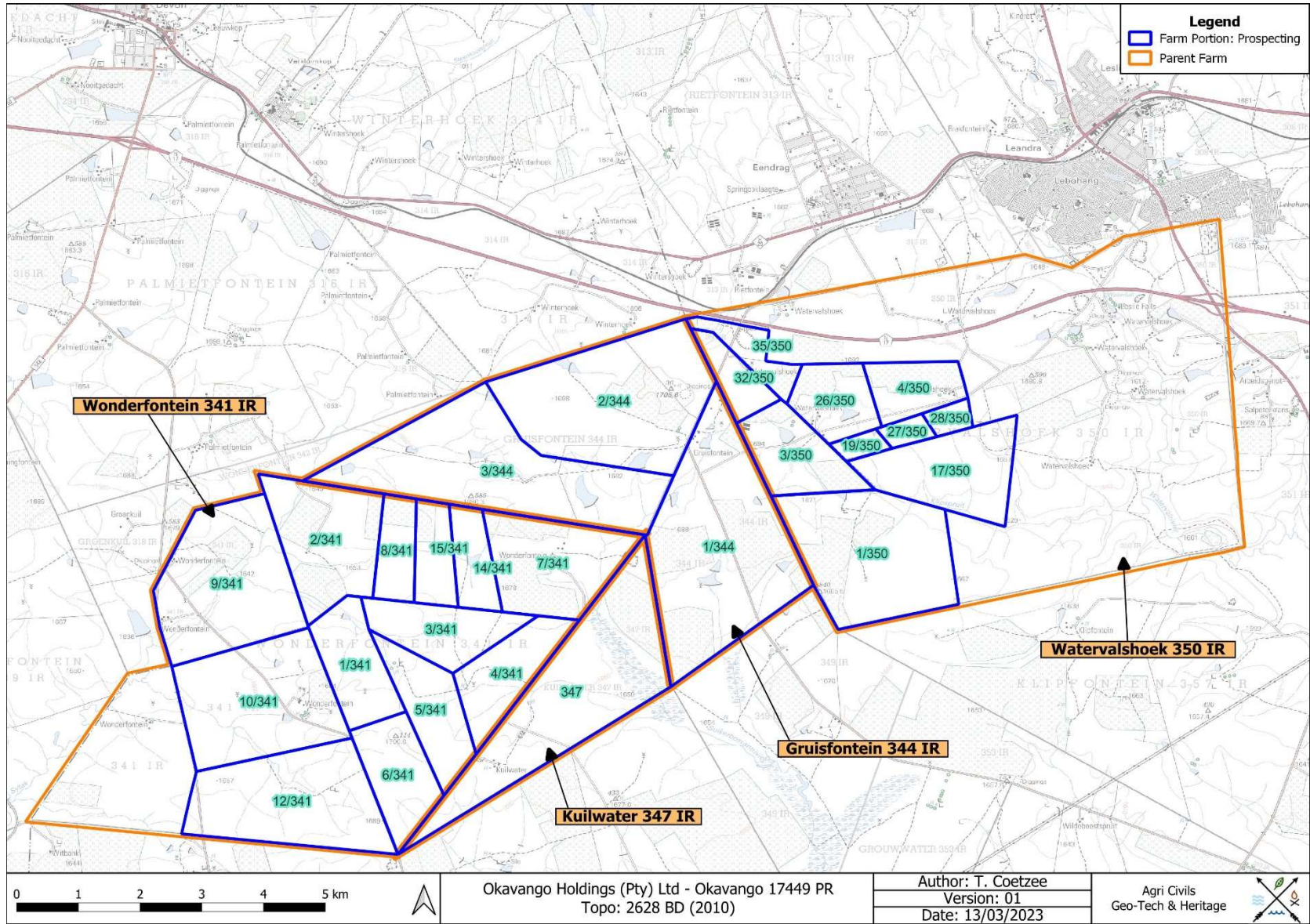


Figure 3: Segment of SA 1:50 000 2628 BD indicating the area demarcated for prospecting.



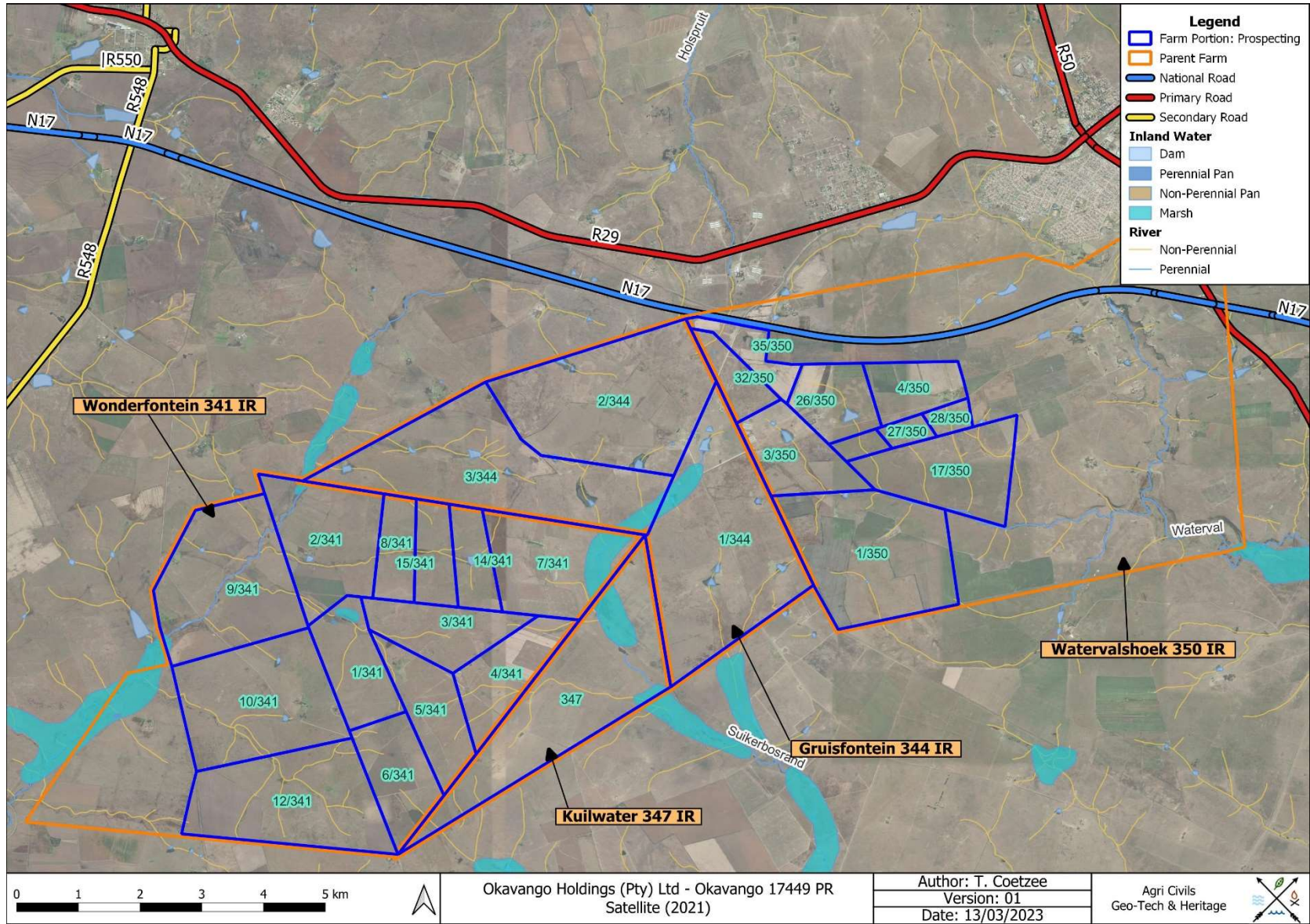


Figure 4: Proposed prospecting area portrayed on a 2021 satellite image.



### 3. Methodology

Archaeological reconnaissance of the study area was conducted by means of inspecting historical aerial imagery and topographical maps in order to identify potential heritage remains (**Appendix A**). The historical topographical datasets dating to 1965, 1984, 1995, and 2010, as well as the historical aerial images dating to 1953, 1958, 1969, 1975, 1991 and 2007, proved useful in terms of providing an indication of potential heritage sites and past land uses associated with the study area. One hundred and seventeen (117) potential sites were observed within the demarcated boundary using these data sources (**Table 2 & Figures 5 – 8**). It should be noted that the prefix '2628BD' is not used when referring to the site names due to the length of the name, but is recorded as such in **Tables 2 & 8**. Based on contemporary satellite imagery, 83 of the sites appear to have been demolished since no surface remains are visible (**Figures 9 – 11**). Three of the sites have been identified as graves, but it is unknown if surface remains are still present (Sites B-047, B-054, B-055). The remaining 31 sites appear to be associated with intact surface infrastructure, some that are likely to date to the historic period (B-001, B-004, B-005, B-007, B-008, B-010, B-016, B-018, B-022, B-058, B-061, B-066, B-067, B-071, B-072, B-083, B-084, B-092 – 096, B-098 – 105, B-109). The total area inspected was 6430.2 ha. Because heritage resources are often associated with water sources such as perennial and non-perennial rivers/streams, these water sources were buffered by a distance of 500 m, indicating a potentially sensitive area (**Figure 24**). The areas previously/currently associated with cultivated land were traced and plotted as shown on topographical maps, indicating disturbed areas that are less sensitive from a heritage perspective (**Figure 24**).



**Table 2:** Site & potential site location.

| Site No      | Type     | Parent Farm          | Farm Portion | Current Status     | Age        | Estimated Extent (ha) | Lat (y)    | Lon (x)   |
|--------------|----------|----------------------|--------------|--------------------|------------|-----------------------|------------|-----------|
| 2628BD-B-001 | Building | Wonderfontein 341 IR | 12/341       | Surface Remains    | Historical | 5.15                  | -26.467346 | 28.809614 |
| 2628BD-B-002 | Building | Wonderfontein 341 IR | 12/341       | No Surface Remains | Historical | 9.84                  | -26.463590 | 28.812563 |
| 2628BD-B-003 | Building | Wonderfontein 341 IR | 10,12/341    | No Surface Remains | Historical | 20.53                 | -26.460339 | 28.808585 |
| 2628BD-B-004 | Building | Wonderfontein 341 IR | 10/341       | Surface Remains    | Historical | 7.89                  | -26.454331 | 28.805266 |
| 2628BD-B-005 | Building | Wonderfontein 341 IR | 9/341        | Surface Remains    | Historical | 7.08                  | -26.442474 | 28.785815 |
| 2628BD-B-006 | Building | Wonderfontein 341 IR | 1/341        | No Surface Remains | Historical | 3.13                  | -26.439609 | 28.813338 |
| 2628BD-B-007 | Building | Wonderfontein 341 IR | 2/341        | Surface Remains    | Historical | 5.05                  | -26.432517 | 28.805843 |
| 2628BD-B-008 | Building | Wonderfontein 341 IR | 5/341        | Surface Remains    | Historical | 1.88                  | -26.448746 | 28.819696 |
| 2628BD-B-009 | Building | Wonderfontein 341 IR | 3/341        | No Surface Remains | Historical | 2.21                  | -26.439553 | 28.817260 |
| 2628BD-B-010 | Building | Wonderfontein 341 IR | 7/341        | Surface Remains    | Historical | 2.91                  | -26.433801 | 28.841964 |
| 2628BD-B-011 | Building | Wonderfontein 341 IR | 14/341       | No Surface Remains | Historical | 16.07                 | -26.431246 | 28.830394 |
| 2628BD-B-012 | Building | Wonderfontein 341 IR | 15/341       | No Surface Remains | Historical | 3.77                  | -26.434551 | 28.826865 |
| 2628BD-B-013 | Building | Gruisfontein 344 IR  | 3/344        | No Surface Remains | Historical | 1.51                  | -26.417524 | 28.815361 |
| 2628BD-B-014 | Building | Gruisfontein 344 IR  | 2/344        | No Surface Remains | Historical | 1.16                  | -26.420015 | 28.856225 |
| 2628BD-B-015 | Building | Watervalshoek 350 IR | 32/350       | No Surface Remains | Historical | 1.12                  | -26.407907 | 28.866471 |
| 2628BD-B-016 | Building | Watervalshoek 350 IR | 32/350       | Surface Remains    | Historical | 2.13                  | -26.406241 | 28.869869 |
| 2628BD-B-017 | Building | Watervalshoek 350 IR | 3/350        | No Surface Remains | Historical | 2.19                  | -26.414006 | 28.877028 |
| 2628BD-B-018 | Building | Watervalshoek 350 IR | 4/350        | Surface Remains    | Historical | 0.36                  | -26.409144 | 28.900519 |
| 2628BD-B-019 | Building | Watervalshoek 350 IR | 17/350       | No Surface Remains | Historical | 1.87                  | -26.420267 | 28.900845 |
| 2628BD-B-020 | Building | Watervalshoek 350 IR | 17/350       | No Surface Remains | Historical | 1.6                   | -26.421514 | 28.905385 |
| 2628BD-B-021 | Building | Watervalshoek 350 IR | 17/350       | No Surface Remains | Historical | 1.97                  | -26.419351 | 28.906597 |
| 2628BD-B-022 | Building | Gruisfontein 344 IR  | 2/344        | Surface Remains    | Historical | 1.84                  | -26.416639 | 28.860201 |
| 2628BD-B-023 | Building | Gruisfontein 344 IR  | 2,3/344      | No Surface Remains | Historical | 2.66                  | -26.421079 | 28.857294 |
| 2628BD-B-024 | Building | Wonderfontein 341 IR | 7/341        | No Surface Remains | Historical | 13.91                 | -26.430417 | 28.845307 |
| 2628BD-B-025 | Building | Watervalshoek 350 IR | 35/350       | No Surface Remains | Historical | 0.55                  | -26.404774 | 28.872774 |
| 2628BD-B-026 | Building | Watervalshoek 350 IR | 1/350        | No Surface Remains | Historical | 77.1                  | -26.428162 | 28.892691 |
| 2628BD-B-027 | Building | Watervalshoek 350 IR | 1/350        | No Surface Remains | Historical | 3.63                  | -26.437018 | 28.892499 |
| 2628BD-B-028 | Building | Gruisfontein 344 IR  | 1/344        | No Surface Remains | Historical | 13.68                 | -26.417379 | 28.864841 |
| 2628BD-B-029 | Building | Kuilwater 347 IR     | 0/347        | No Surface Remains | Historical | 6.8                   | -26.434092 | 28.855437 |
| 2628BD-B-030 | Building | Kuilwater 347 IR     | 0/347        | No Surface Remains | Historical | 8.71                  | -26.462256 | 28.835339 |
| 2628BD-B-031 | Building | Kuilwater 347 IR     | 0/347        | No Surface Remains | Historical | 29.59                 | -26.467901 | 28.828866 |
| 2628BD-B-032 | Building | Gruisfontein 344 IR  | 2/344        | No Surface Remains | Historical | 22.4                  | -26.409675 | 28.861057 |
| 2628BD-B-033 | Building | Gruisfontein 344 IR  | 2/344        | No Surface Remains | Historical | 4.88                  | -26.403624 | 28.854191 |

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| Site No      | Type     | Parent Farm          | Farm Portion | Current Status     | Age                    | Estimated Extent (ha) | Lat (y)    | Lon (x)   |
|--------------|----------|----------------------|--------------|--------------------|------------------------|-----------------------|------------|-----------|
| 2628BD-B-034 | Building | Gruisfontein 344 IR  | 3/344        | No Surface Remains | Historical             | 5.83                  | -26.422772 | 28.843691 |
| 2628BD-B-035 | Building | Gruisfontein 344 IR  | 3/344        | No Surface Remains | Historical             | 1.18                  | -26.419373 | 28.839262 |
| 2628BD-B-036 | Building | Gruisfontein 344 IR  | 3/344        | No Surface Remains | Historical             | 0.59                  | -26.422789 | 28.835979 |
| 2628BD-B-037 | Building | Wonderfontein 341 IR | 7/341        | No Surface Remains | Historical             | 8.35                  | -26.429426 | 28.840886 |
| 2628BD-B-038 | Building | Wonderfontein 341 IR | 2/341        | No Surface Remains | Historical             | 5.96                  | -26.430784 | 28.812063 |
| 2628BD-B-039 | Building | Wonderfontein 341 IR | 1/341        | No Surface Remains | Historical             | 2.42                  | -26.444170 | 28.807324 |
| 2628BD-B-040 | Building | Wonderfontein 341 IR | 10/341       | No Surface Remains | Historical             | 1.54                  | -26.458133 | 28.807198 |
| 2628BD-B-041 | Hut      | Wonderfontein 341 IR | 9/341        | No Surface Remains | Potentially Historical | 1.32                  | -26.438134 | 28.791518 |
| 2628BD-B-042 | Hut      | Wonderfontein 341 IR | 1/341        | No Surface Remains | Potentially Historical | 1.34                  | -26.455874 | 28.816234 |
| 2628BD-B-043 | Building | Wonderfontein 341 IR | 1/341        | No Surface Remains | Historical             | 9.18                  | -26.443939 | 28.810769 |
| 2628BD-B-044 | Hut      | Wonderfontein 341 IR | 1/341        | No Surface Remains | Potentially Historical | 1.05                  | -26.442563 | 28.807990 |
| 2628BD-B-045 | Building | Wonderfontein 341 IR | 2/341        | No Surface Remains | Historical             | 4.93                  | -26.431337 | 28.815089 |
| 2628BD-B-046 | Building | Wonderfontein 341 IR | 8/341        | No Surface Remains | Historical             | 1.15                  | -26.429366 | 28.818608 |
| 2628BD-B-047 | Grave    | Gruisfontein 344 IR  | 3/344        | Unknown            | Potentially Historical | 1.13                  | -26.420043 | 28.830526 |
| 2628BD-B-048 | Hut      | Gruisfontein 344 IR  | 2/344        | No Surface Remains | Potentially Historical | 1.53                  | -26.418657 | 28.858811 |
| 2628BD-B-049 | Building | Watervalshoek 350 IR | 4/350        | No Surface Remains | Potentially Historical | 0.55                  | -26.410390 | 28.899647 |
| 2628BD-B-050 | Building | Watervalshoek 350 IR | 28/350       | No Surface Remains | Historical             | 0.62                  | -26.412990 | 28.902828 |
| 2628BD-B-051 | Hut      | Watervalshoek 350 IR | 28/350       | No Surface Remains | Potentially Historical | 0.92                  | -26.414832 | 28.898256 |
| 2628BD-B-052 | Hut      | Watervalshoek 350 IR | 28/350       | No Surface Remains | Potentially Historical | 1.16                  | -26.413430 | 28.896954 |
| 2628BD-B-053 | Hut      | Watervalshoek 350 IR | 27/350       | No Surface Remains | Potentially Historical | 0.98                  | -26.414306 | 28.894672 |
| 2628BD-B-054 | Grave    | Watervalshoek 350 IR | 1/350        | Unknown            | Potentially Historical | 0.52                  | -26.431745 | 28.899612 |
| 2628BD-B-055 | Grave    | Watervalshoek 350 IR | 1/350        | Unknown            | Potentially Historical | 1.23                  | -26.433075 | 28.888226 |
| 2628BD-B-056 | Building | Watervalshoek 350 IR | 1/350        | No Surface Remains | Potentially Historical | 1.21                  | -26.433843 | 28.891729 |
| 2628BD-B-057 | Building | Watervalshoek 350 IR | 1/350        | No Surface Remains | No                     | 0.86                  | -26.433252 | 28.889803 |
| 2628BD-B-058 | Building | Watervalshoek 350 IR | 1/350        | Surface Remains    | No                     | 4.33                  | -26.427154 | 28.884917 |
| 2628BD-B-059 | Building | Watervalshoek 350 IR | 17/350       | No Surface Remains | No                     | 1.53                  | -26.423152 | 28.905638 |
| 2628BD-B-060 | Building | Watervalshoek 350 IR | 17/350       | No Surface Remains | No                     | 1.26                  | -26.420165 | 28.904981 |
| 2628BD-B-061 | Building | Watervalshoek 350 IR | 26/350       | Surface Remains    | No                     | 0.73                  | -26.412266 | 28.880430 |
| 2628BD-B-062 | Building | Watervalshoek 350 IR | 4/350        | No Surface Remains | No                     | 0.8                   | -26.409166 | 28.898039 |
| 2628BD-B-063 | Building | Watervalshoek 350 IR | 4/350        | No Surface Remains | No                     | 1.1                   | -26.410572 | 28.897525 |
| 2628BD-B-064 | Building | Watervalshoek 350 IR | 4/350        | No Surface Remains | Historical             | 0.73                  | -26.408945 | 28.901807 |
| 2628BD-B-065 | Building | Watervalshoek 350 IR | 4/350        | No Surface Remains | No                     | 0.32                  | -26.409315 | 28.901098 |
| 2628BD-B-066 | Building | Watervalshoek 350 IR | 4/350        | Surface Remains    | No                     | 0.5                   | -26.409500 | 28.899822 |
| 2628BD-B-067 | Building | Watervalshoek 350 IR | 4/350        | Surface Remains    | Historical             | 0.21                  | -26.409890 | 28.900203 |

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| Site No      | Type     | Parent Farm          | Farm Portion | Current Status     | Age | Estimated Extent (ha) | Lat (y)    | Lon (x)   |
|--------------|----------|----------------------|--------------|--------------------|-----|-----------------------|------------|-----------|
| 2628BD-B-068 | Building | Watervalshoek 350 IR | 28/350       | No Surface Remains | No  | 0.65                  | -26.412757 | 28.898289 |
| 2628BD-B-069 | Building | Watervalshoek 350 IR | 28/350       | No Surface Remains | No  | 3.36                  | -26.414126 | 28.899445 |
| 2628BD-B-070 | Building | Watervalshoek 350 IR | 28/350       | No Surface Remains | No  | 0.59                  | -26.411995 | 28.900479 |
| 2628BD-B-071 | Building | Gruisfontein 344 IR  | 1/344        | Surface Remains    | No  | 1.57                  | -26.415713 | 28.862833 |
| 2628BD-B-072 | Building | Kuilwater 347 IR     | 0/347        | Surface Remains    | No  | 2.63                  | -26.463457 | 28.833394 |
| 2628BD-B-073 | Building | Gruisfontein 344 IR  | 2/344        | No Surface Remains | No  | 0.64                  | -26.400805 | 28.855072 |
| 2628BD-B-074 | Building | Gruisfontein 344 IR  | 2/344        | No Surface Remains | No  | 1.08                  | -26.402166 | 28.855550 |
| 2628BD-B-075 | Building | Gruisfontein 344 IR  | 2/344        | No Surface Remains | No  | 0.6                   | -26.418167 | 28.859862 |
| 2628BD-B-076 | Building | Gruisfontein 344 IR  | 2/344        | No Surface Remains | No  | 0.69                  | -26.419271 | 28.856697 |
| 2628BD-B-077 | Building | Gruisfontein 344 IR  | 2/344        | No Surface Remains | No  | 0.55                  | -26.419582 | 28.857876 |
| 2628BD-B-078 | Building | Gruisfontein 344 IR  | 3/344        | No Surface Remains | No  | 0.65                  | -26.420258 | 28.843895 |
| 2628BD-B-079 | Building | Wonderfontein 341 IR | 7/341        | No Surface Remains | No  | 1.46                  | -26.435623 | 28.842247 |
| 2628BD-B-080 | Building | Wonderfontein 341 IR | 7/341        | No Surface Remains | No  | 0.68                  | -26.430341 | 28.854657 |
| 2628BD-B-081 | Building | Wonderfontein 341 IR | 2/341        | No Surface Remains | No  | 0.91                  | -26.431818 | 28.804243 |
| 2628BD-B-082 | Building | Wonderfontein 341 IR | 1/341        | No Surface Remains | No  | 1.37                  | -26.439902 | 28.811723 |
| 2628BD-B-083 | Building | Wonderfontein 341 IR | 5/341        | Surface Remains    | No  | 0.48                  | -26.449447 | 28.818402 |
| 2628BD-B-084 | Building | Wonderfontein 341 IR | 5/341        | Surface Remains    | No  | 0.71                  | -26.450218 | 28.819899 |
| 2628BD-B-085 | Building | Wonderfontein 341 IR | 3/341        | No Surface Remains | No  | 1.31                  | -26.446311 | 28.824291 |
| 2628BD-B-086 | Building | Wonderfontein 341 IR | 3/341        | No Surface Remains | No  | 0.59                  | -26.449073 | 28.828750 |
| 2628BD-B-087 | Building | Wonderfontein 341 IR | 4/341        | No Surface Remains | No  | 0.79                  | -26.448919 | 28.830480 |
| 2628BD-B-088 | Building | Wonderfontein 341 IR | 4/341        | No Surface Remains | No  | 0.78                  | -26.450189 | 28.829148 |
| 2628BD-B-089 | Building | Wonderfontein 341 IR | 5/341        | No Surface Remains | No  | 0.98                  | -26.463551 | 28.826432 |
| 2628BD-B-090 | Building | Wonderfontein 341 IR | 10/341       | No Surface Remains | No  | 4.49                  | -26.458020 | 28.810860 |
| 2628BD-B-091 | Building | Wonderfontein 341 IR | 9/341        | No Surface Remains | No  | 0.85                  | -26.439307 | 28.790898 |
| 2628BD-B-092 | Building | Wonderfontein 341 IR | 9/341        | Surface Remains    | No  | 4.59                  | -26.436958 | 28.791808 |
| 2628BD-B-093 | Building | Wonderfontein 341 IR | 9/341        | Surface Remains    | No  | 3.71                  | -26.433622 | 28.787486 |
| 2628BD-B-094 | Building | Watervalshoek 350 IR | 26/350       | Surface Remains    | No  | 1.32                  | -26.415422 | 28.881294 |
| 2628BD-B-095 | Building | Watervalshoek 350 IR | 26/350       | Surface Remains    | No  | 1.5                   | -26.413809 | 28.879751 |
| 2628BD-B-096 | Building | Watervalshoek 350 IR | 26/350       | Surface Remains    | No  | 0.45                  | -26.412902 | 28.880556 |
| 2628BD-B-097 | Building | Watervalshoek 350 IR | 35/350       | No Surface Remains | No  | 0.6                   | -26.404443 | 28.869659 |
| 2628BD-B-098 | Building | Watervalshoek 350 IR | 35/350       | Surface Remains    | No  | 1.53                  | -26.400154 | 28.867958 |
| 2628BD-B-099 | Building | Gruisfontein 344 IR  | 1/344        | Surface Remains    | No  | 2.23                  | -26.410704 | 28.866567 |
| 2628BD-B-100 | Building | Wonderfontein 341 IR | 4/341        | Surface Remains    | No  | 0.4                   | -26.449677 | 28.828765 |
| 2628BD-B-101 | Building | Wonderfontein 341 IR | 7/341        | Surface Remains    | No  | 0.66                  | -26.432041 | 28.842637 |

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| Site No      | Type     | Parent Farm          | Farm Portion | Current Status     | Age        | Estimated Extent (ha) | Lat (y)    | Lon (x)   |
|--------------|----------|----------------------|--------------|--------------------|------------|-----------------------|------------|-----------|
| 2628BD-B-102 | Building | Wonderfontein 341 IR | 9/341        | Surface Remains    | No         | 0.28                  | -26.433498 | 28.786465 |
| 2628BD-B-103 | Building | Watervalshoek 350 IR | 3/350        | Surface Remains    | No         | 4.46                  | -26.414630 | 28.870058 |
| 2628BD-B-104 | Building | Gruisfontein 344 IR  | 1/344        | Surface Remains    | No         | 0.85                  | -26.411655 | 28.864967 |
| 2628BD-B-105 | Building | Gruisfontein 344 IR  | 1/344        | Surface Remains    | No         | 0.47                  | -26.412090 | 28.866373 |
| 2628BD-B-106 | Building | Wonderfontein 341 IR | 7/341        | No Surface Remains | No         | 0.91                  | -26.431737 | 28.843417 |
| 2628BD-B-107 | Building | Watervalshoek 350 IR | 17/350       | No Surface Remains | Historical | 0.99                  | -26.420666 | 28.903742 |
| 2628BD-B-108 | Building | Watervalshoek 350 IR | 17/350       | No Surface Remains | Historical | 1.12                  | -26.419536 | 28.907749 |
| 2628BD-B-109 | Building | Watervalshoek 350 IR | 28/350       | Surface Remains    | Historical | 0.7                   | -26.410979 | 28.900564 |
| 2628BD-B-110 | Building | Watervalshoek 350 IR | 3/350        | No Surface Remains | Historical | 39.74                 | -26.416734 | 28.874731 |
| 2628BD-B-111 | Building | Watervalshoek 350 IR | 1/350        | No Surface Remains | No         | 1.37                  | -26.432774 | 28.885868 |
| 2628BD-B-112 | Building | Watervalshoek 350 IR | 1/350        | No Surface Remains | No         | 1.05                  | -26.435192 | 28.885480 |
| 2628BD-B-113 | Building | Watervalshoek 350 IR | 1/350        | No Surface Remains | No         | 0.86                  | -26.433913 | 28.887285 |
| 2628BD-B-114 | Building | Gruisfontein 344 IR  | 2/344        | No Surface Remains | Historical | 10.32                 | -26.405014 | 28.857224 |
| 2628BD-B-115 | Building | Wonderfontein 341 IR | 7/341        | No Surface Remains | Historical | 0.7                   | -26.434721 | 28.840814 |
| 2628BD-B-116 | Building | Wonderfontein 341 IR | 7/341        | No Surface Remains | No         | 4.78                  | -26.432440 | 28.839646 |
| 2628BD-B-117 | Building | Wonderfontein 341 IR | 3/341        | No Surface Remains | No         | 1.18                  | -26.439732 | 28.814982 |





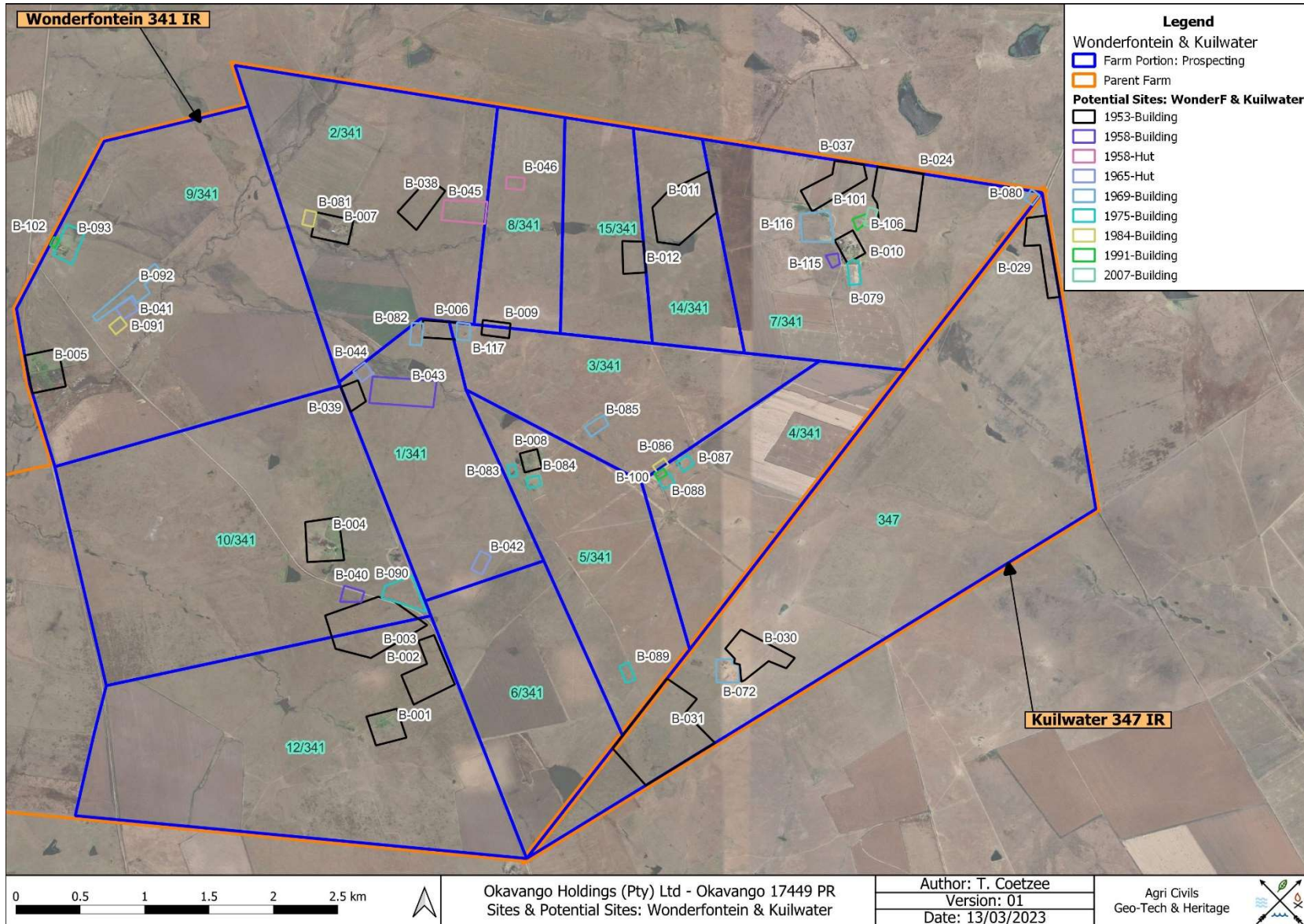


Figure 5: Sites & Potential Sites: Wonderfontein & Kuilwater.



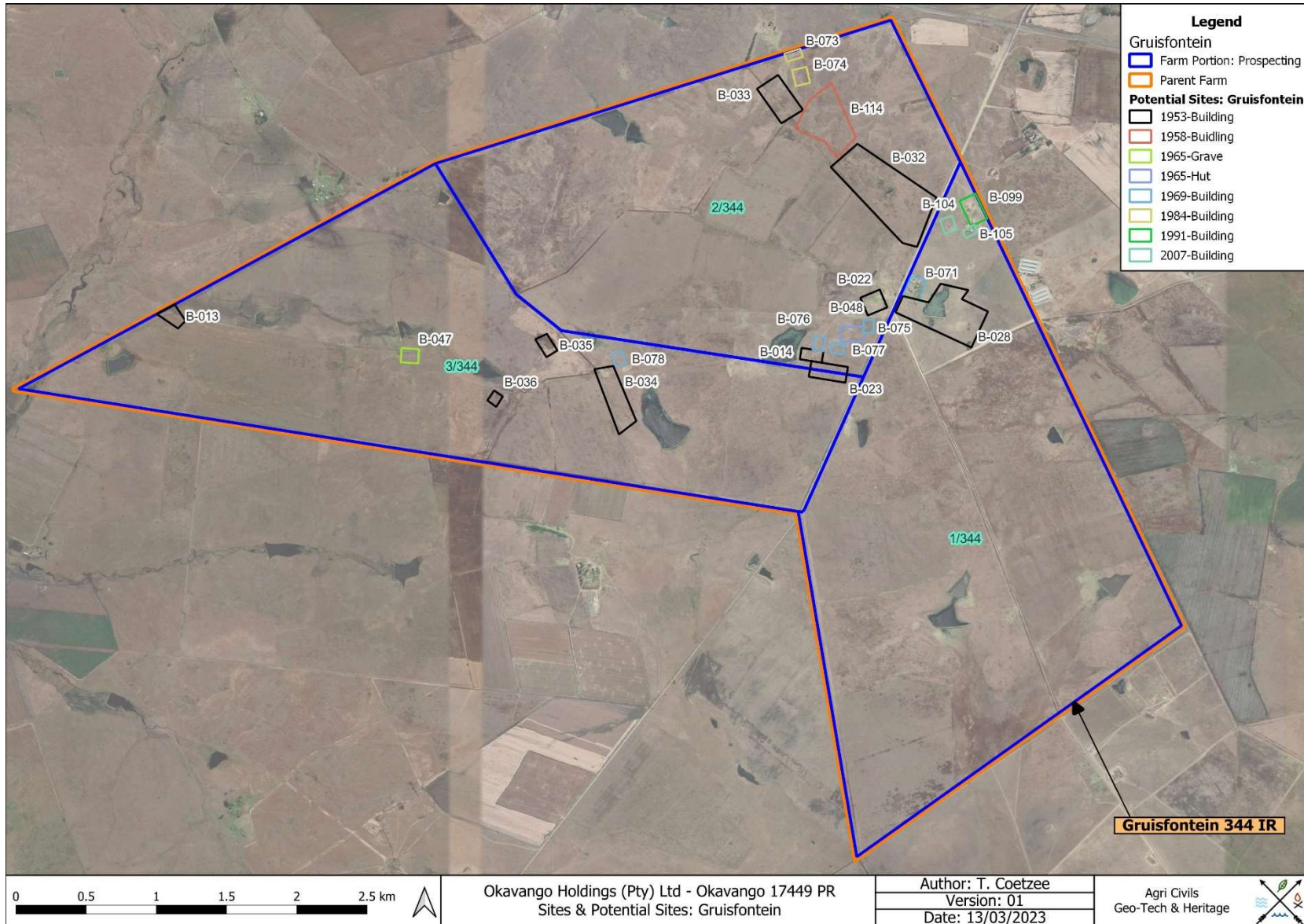


Figure 6: Sites & Potential Sites: Gruitfontein.



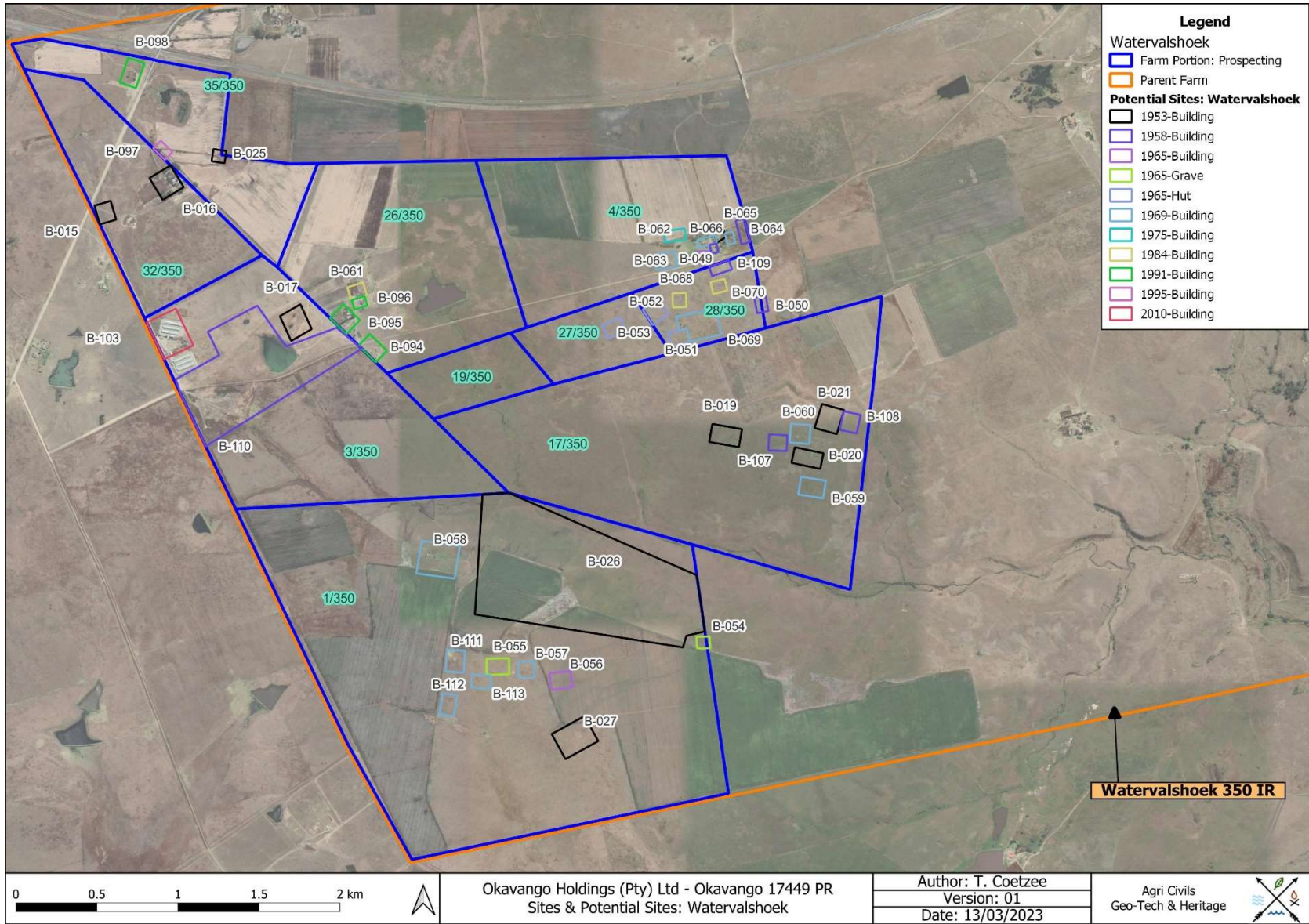
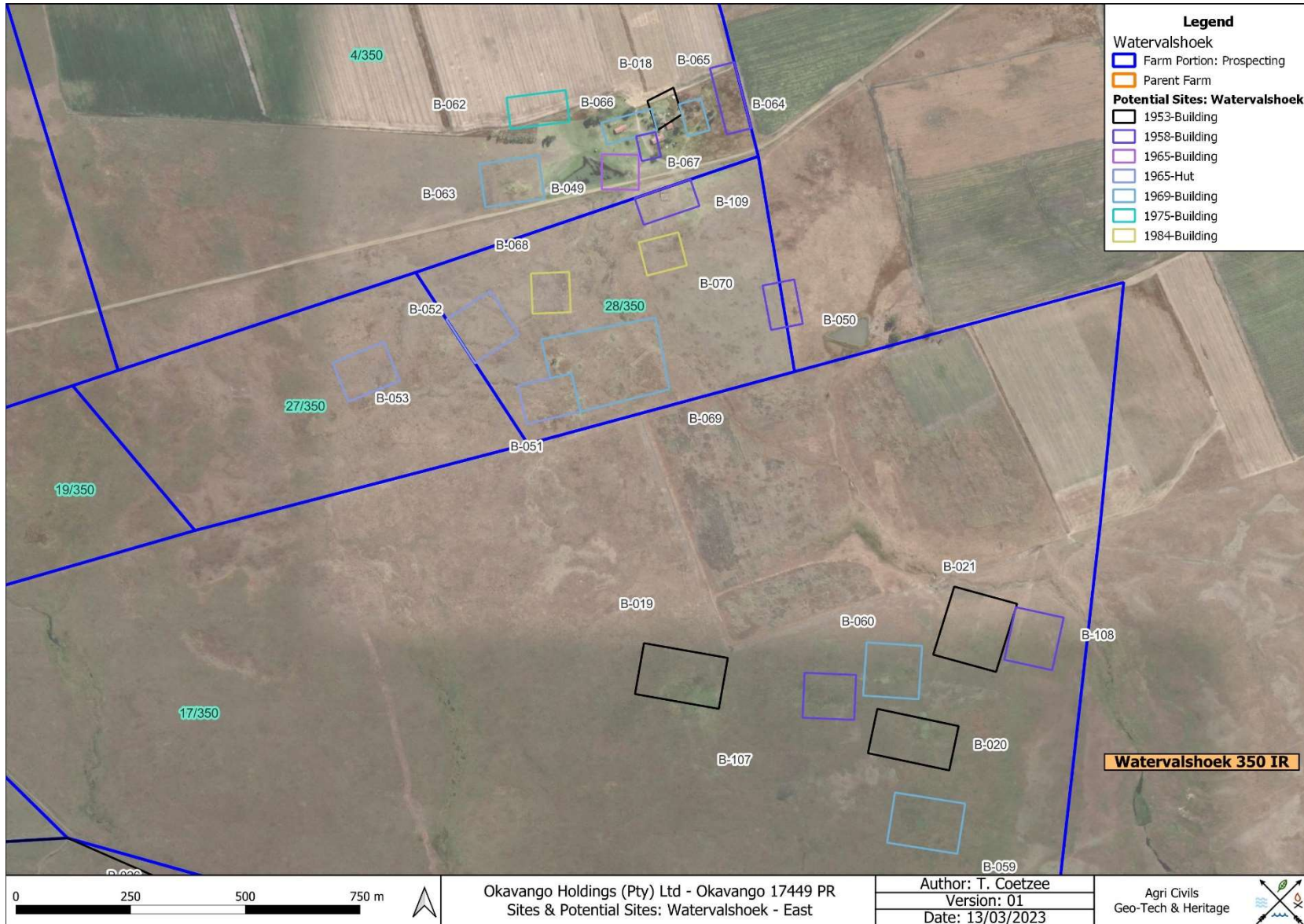


Figure 7: Sites & Potential Sites: Watervalshoek.





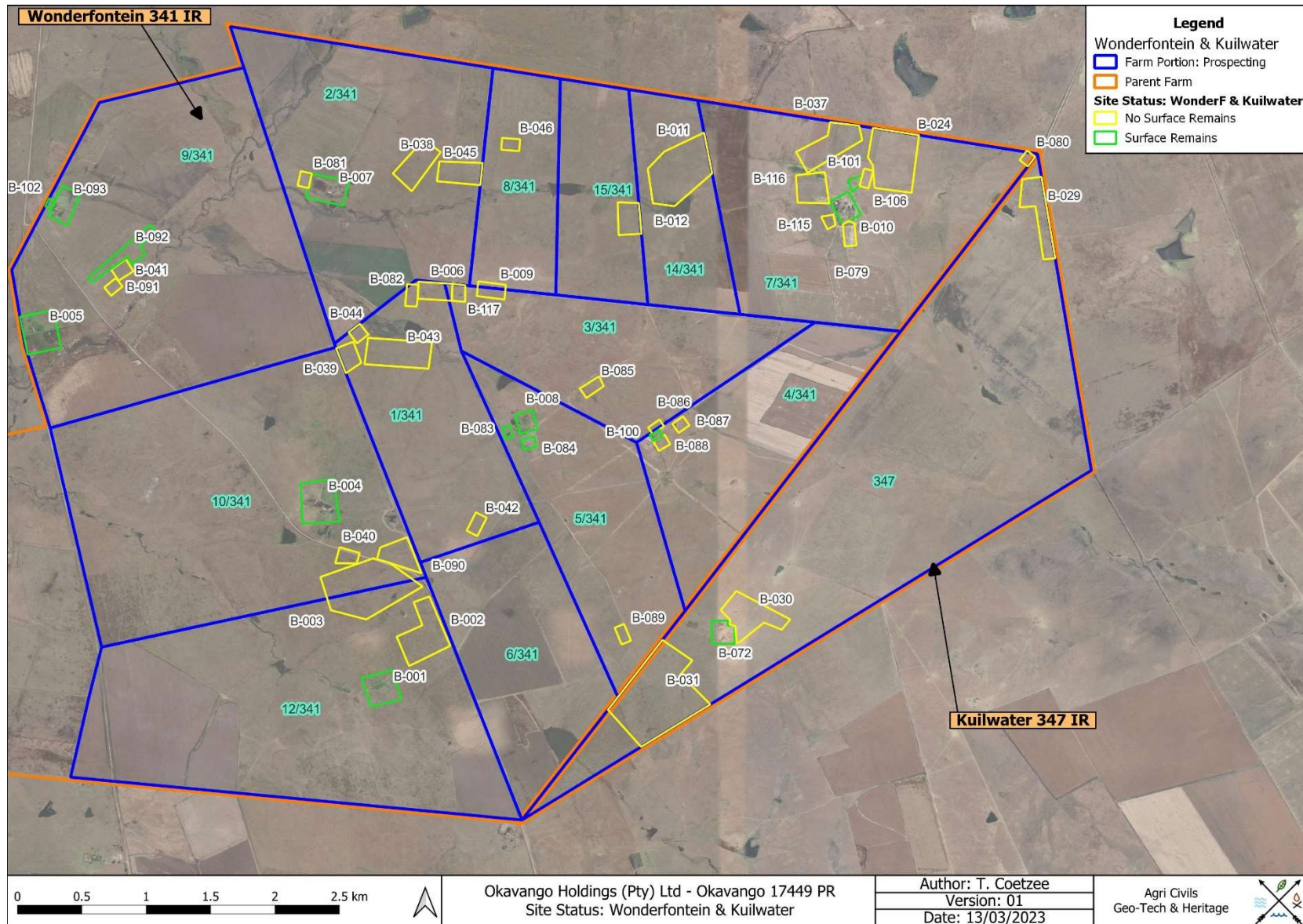


Figure 9: Site Status: Wonderfontein & Kuilwater.



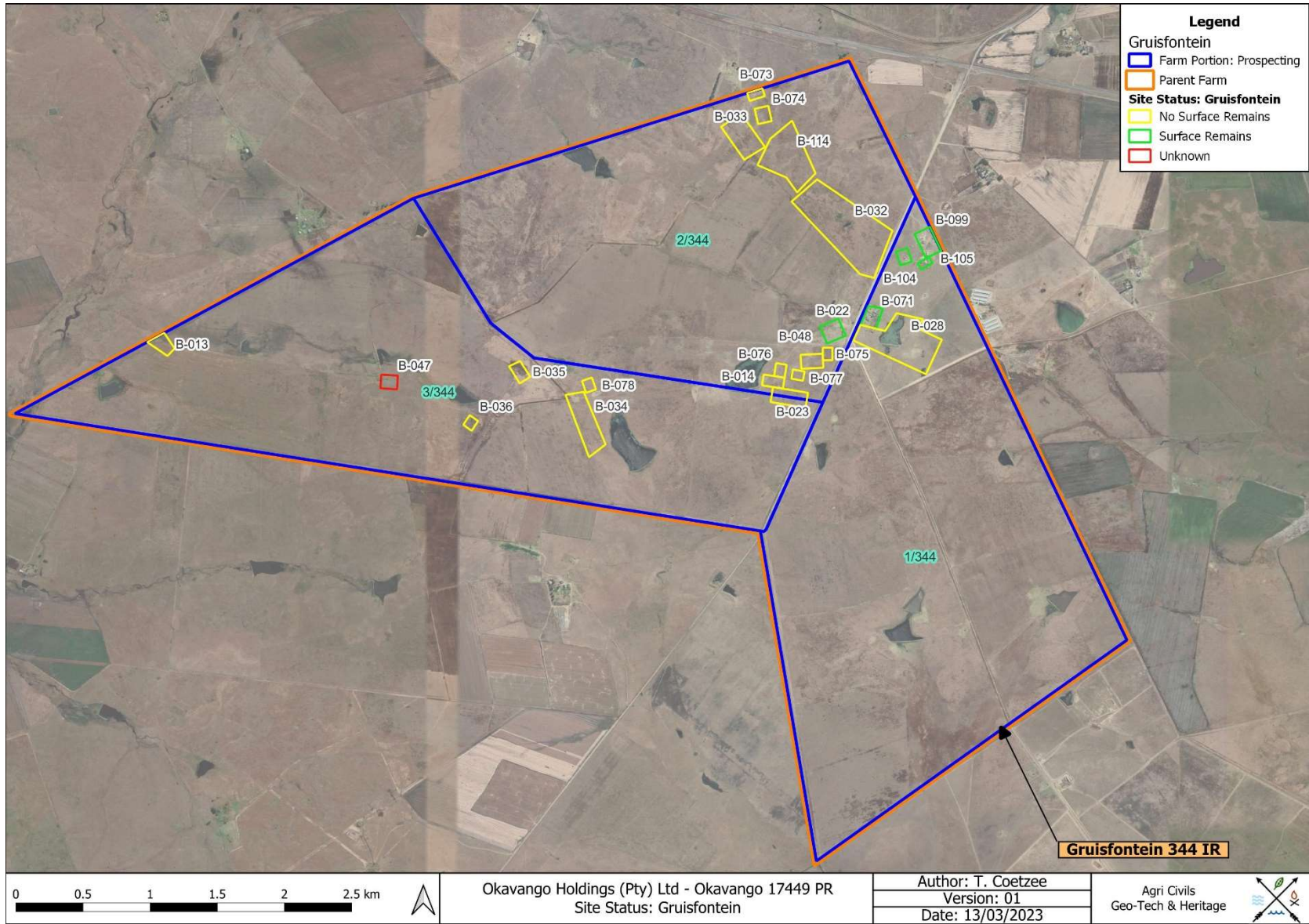


Figure 10: Site Status: Gruisfontein.



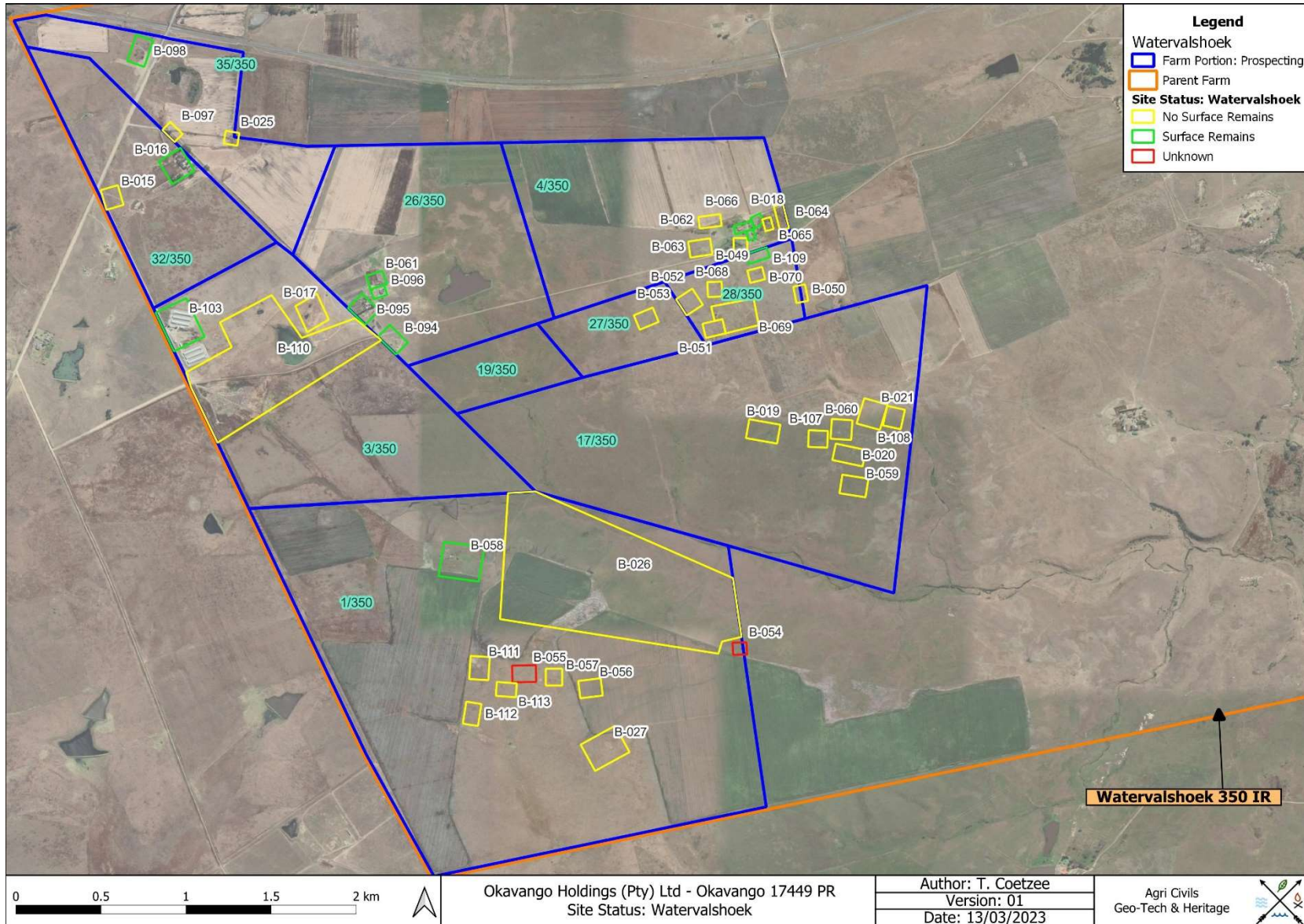


Figure 11: Site Status: Watervalshoek.



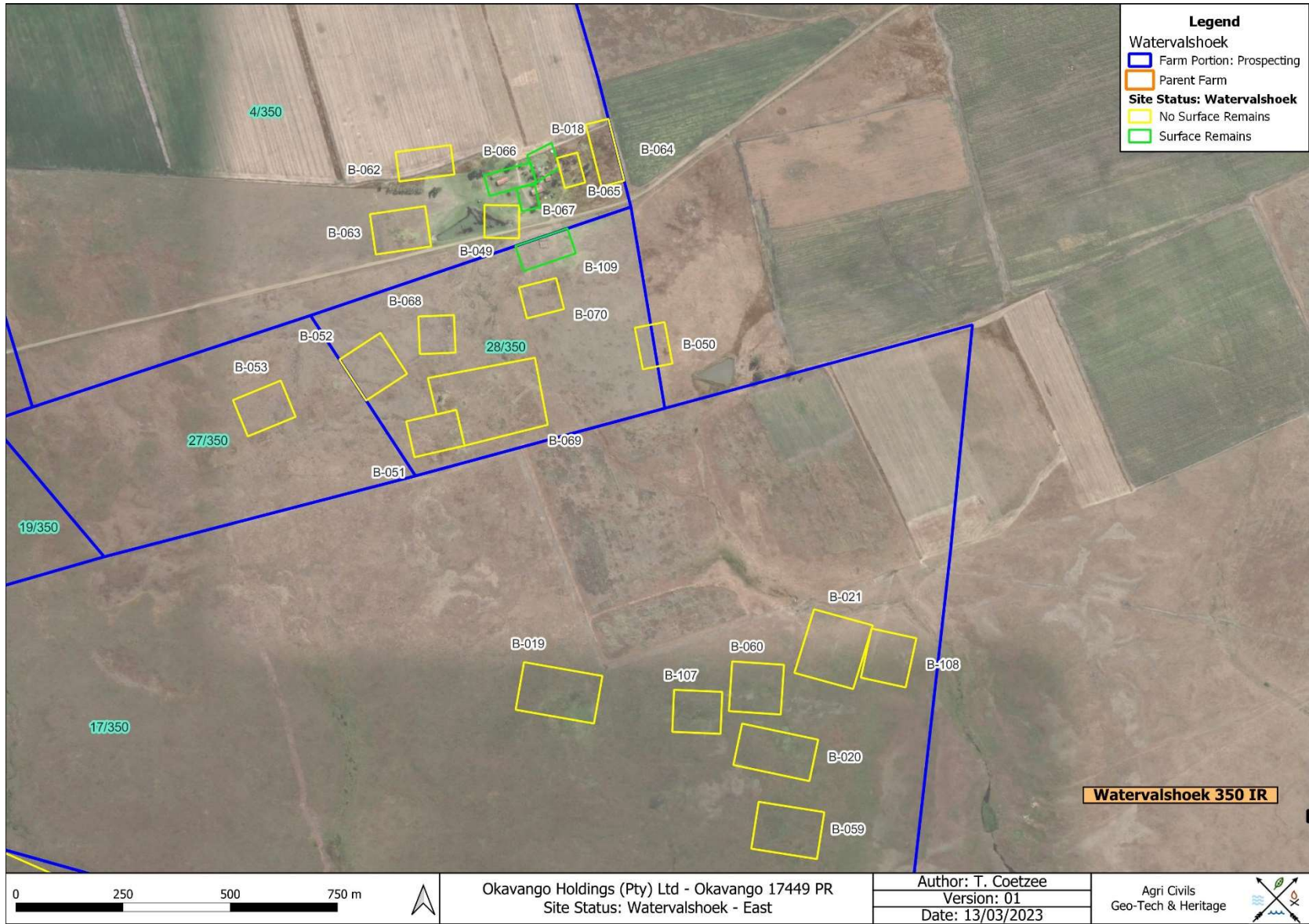


Figure 12: Site Status: Watervalshoek – East.





### 3.1 Limitations

Using historical topographical maps and historical aerial images for locating heritage resources have several shortcomings. Potential heritage remains, such as buildings, structures and graves/cemeteries, are not always indicated on topographical maps and are often omitted between different publications. Historical aerial imagery, on the other hand, might have a poor image resolution that renders potential heritage sites invisible. Inaccuracies during the georeferencing process may also lead to some heritage sites not being plotted, as well as dense vegetation obscuring heritage sites. Due to the small size of some heritage sites, such as Stone Age sites, small Iron Age features, rock art sites and burials, such sites are rarely visible on aerial imagery and are generally only detected during pedestrian surveys.

## 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. 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 Bakenlaagte, located approximately 20 km northeast 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 Coal mining general history on the Highveld

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).

#### 4.2.3 Balfour general history

The town of Balfour was established in 1896 with the name of McHattiesburg. In 1906 the town was renamed Balfour in honour of Arthur Balfour, the British Prime Minister who made a speech on the local railway station. In 1920 the municipality was established (Bulpin 1986: 642).

According to Bergh (1998), a rather large area to the south of the study area is associated with LIA sites. Bergh (1998) also noted the movement of the Ndzundza-Ndebele through the general area during the *Difaqane*.

#### 4.2.4 Historical aerial imagery and topographical maps

Historical images and topographical maps dating to 1953, 1958, 1965, 1969, 1975, 1984, 1991, 1995, 2007 and 2010 (**Appendix A**) were used to determine the location and relative age of the structures and buildings associated with the demarcated portion (**Table 3**), as well as to establish historical land uses associated with the demarcated area.

**Table 3** indicates the identified sites, the date of the aerial images and topographical maps on which the sites are visible, as well as the date range for the construction and demolition of the sites. One hundred and seventeen (117) sites were identified. These consist of 107 sites associated with buildings, three grave sites and seven areas associated with huts. Fifty-two historical sites were identified and 12 potentially historical sites. The remaining 53 sites date to contemporary times. Also, 31 of the sites appear to be associated with surface remains, while no surface remains were noted at 83 of the sites. It is unknown whether surface remains are associated with the three grave sites. Potential sites were identified on all the demarcated farm portions, except portion 19 of the Farm Watervalshoek 350 IR.



**Table 3:** Site age.

| Site No | 1953 Aerial | 1958 Aerial | 1965 Topo | 1969 Aerial | 1975 Aerial | 1984 Topo | 1991 Aerial | 1995 Topo | 2007 Aerial | 2010 Topo | Constructed | Demolished |
|---------|-------------|-------------|-----------|-------------|-------------|-----------|-------------|-----------|-------------|-----------|-------------|------------|
| B-001   | Yes         | Yes         | Yes       | Yes         | Yes         | Yes       | Yes         | Yes       | Yes         | Yes       | <=1953      | N/A        |
| B-002   | Yes         | Yes         | Yes       | Yes         | Yes         | No        | No          | No        | No          | No        | <=1953      | 1975-1984  |
| B-003   | Yes         | Yes         | Yes       | Yes         | No          | No        | No          | No        | No          | No        | <=1953      | 1969-1975  |
| B-004   | Yes         | Yes         | Yes       | Yes         | Yes         | Yes       | Yes         | Yes       | Yes         | Yes       | <=1953      | N/A        |
| B-005   | Yes         | Yes         | Yes       | Yes         | Yes         | Yes       | Yes         | Yes       | Yes         | Yes       | <=1953      | N/A        |
| B-006   | Yes         | Yes         | Yes       | Yes         | Yes         | Yes       | No          | No        | No          | No        | <=1953      | 1984-1991  |
| B-007   | Yes         | Yes         | Yes       | Yes         | Yes         | Yes       | Yes         | Yes       | Yes         | Yes       | <=1953      | N/A        |
| B-008   | Yes         | Yes         | Yes       | Yes         | Yes         | Yes       | Yes         | Yes       | Yes         | Yes       | <=1953      | N/A        |
| B-009   | Yes         | Yes         | Yes       | No          | No          | No        | No          | No        | No          | No        | <=1953      | 1965-1969  |
| B-010   | Yes         | Yes         | Yes       | Yes         | Yes         | Yes       | Yes         | Yes       | Yes         | Yes       | <=1953      | N/A        |
| B-011   | Yes         | Yes         | Yes       | Yes         | No          | No        | No          | No        | No          | No        | <=1953      | 1969-1975  |
| B-012   | Yes         | Yes         | Yes       | Yes         | No          | No        | No          | No        | No          | No        | <=1953      | 1969-1975  |
| B-013   | Yes         | Yes         | Yes       | Yes         | No          | No        | No          | No        | No          | No        | <=1953      | 1969-1975  |
| B-014   | Yes         | Yes         | Yes       | Yes         | Yes         | Yes       | No          | No        | No          | No        | <=1953      | 1984-1991  |
| B-015   | Yes         | Yes         | Yes       | No          | No          | No        | No          | No        | No          | No        | <=1953      | 1965-1969  |
| B-016   | Yes         | Yes         | Yes       | Yes         | Yes         | Yes       | Yes         | Yes       | Yes         | Yes       | <=1953      | N/A        |
| B-017   | Yes         | Yes         | Yes       | Yes         | Yes         | Yes       | Yes         | Yes       | No          | No        | <=1953      | 1995-2007  |
| B-018   | Yes         | Yes         | Yes       | Yes         | No          | No        | No          | No        | Yes         | No        | <=1953      | N/A        |
| B-019   | Yes         | Yes         | Yes       | Yes         | Yes         | Yes       | Yes         | Yes       | No          | No        | <=1953      | 1995-2007  |
| B-020   | Yes         | Yes         | Yes       | Yes         | Yes         | Yes       | Yes         | Yes       | No          | No        | <=1953      | 1995-2007  |
| B-021   | Yes         | Yes         | Yes       | Yes         | Yes         | Yes       | No          | No        | No          | No        | <=1953      | 1984-1991  |
| B-022   | Yes         | Yes         | No        | No          | Yes         | Yes       | No          | No        | Yes         | No        | <=1953      | N/A        |
| B-023   | Yes         | Yes         | No        | Yes         | Yes         | Yes       | No          | No        | No          | No        | <=1953      | 1984-1991  |
| B-024   | Yes         | Yes         | Yes       | Yes         | Yes         | Yes       | No          | No        | No          | No        | <=1953      | 1984-1991  |
| B-025   | Yes         | No          | No        | No          | No          | No        | No          | No        | No          | No        | <=1953      | 1953-1958  |
| B-026   | Yes         | Yes         | Yes       | Yes         | Yes         | Yes       | Yes         | Yes       | No          | No        | <=1953      | 1995-2007  |
| B-027   | Yes         | Yes         | No        | Yes         | Yes         | No        | No          | No        | No          | No        | <=1953      | 1975-1984  |
| B-028   | Yes         | Yes         | Yes       | Yes         | Yes         | Yes       | Yes         | Yes       | No          | No        | <=1953      | 1995-2007  |
| B-029   | Yes         | Yes         | Yes       | No          | No          | No        | No          | No        | No          | No        | <=1953      | 1965-1969  |
| B-030   | Yes         | Yes         | Yes       | Yes         | Yes         | Yes       | No          | No        | No          | No        | <=1953      | 1984-1991  |
| B-031   | Yes         | Yes         | Yes       | No          | Yes         | Yes       | No          | No        | No          | No        | <=1953      | 1984-1991  |
| B-032   | Yes         | Yes         | Yes       | Yes         | Yes         | Yes       | No          | No        | No          | No        | <=1953      | 1984-1991  |
| B-033   | Yes         | Yes         | Yes       | Yes         | Yes         | Yes       | No          | No        | No          | No        | <=1953      | 1984-1991  |



| Site No | 1953 Aerial | 1958 Aerial | 1965 Topo | 1969 Aerial | 1975 Aerial | 1984 Topo | 1991 Aerial | 1995 Topo | 2007 Aerial | 2010 Topo | Constructed | Demolished |
|---------|-------------|-------------|-----------|-------------|-------------|-----------|-------------|-----------|-------------|-----------|-------------|------------|
| B-034   | Yes         | Yes         | Yes       | Yes         | Yes         | Yes       | Yes         | No        | No          | No        | <=1953      | 1991-1995  |
| B-035   | Yes         | Yes         | No        | Yes         | No          | No        | No          | No        | No          | No        | <=1953      | 1969-1975  |
| B-036   | Yes         | Yes         | No        | No          | No          | No        | No          | No        | No          | No        | <=1953      | 1958-1965  |
| B-037   | Yes         | Yes         | Yes       | No          | No          | No        | No          | No        | No          | No        | <=1953      | 1965-1969  |
| B-038   | Yes         | Yes         | No        | Yes         | No          | No        | No          | No        | No          | No        | <=1953      | 1969-1975  |
| B-039   | Yes         | No          | No        | No          | No          | No        | No          | No        | No          | No        | <=1953      | 1953-1958  |
| B-040   | No          | Yes         | Yes       | Yes         | No          | No        | No          | No        | No          | No        | 1953-1958   | 1969-1975  |
| B-041   | No          | No          | Yes       | Yes         | Yes         | No        | No          | No        | No          | No        | 1958-1965   | 1975-1984  |
| B-042   | No          | No          | Yes       | Yes         | No          | No        | No          | No        | No          | No        | 1958-1965   | 1969-1975  |
| B-043   | No          | Yes         | Yes       | Yes         | No          | No        | No          | No        | No          | No        | 1953-1958   | 1969-1975  |
| B-044   | No          | No          | Yes       | No          | No          | No        | No          | No        | No          | No        | 1958-1965   | 1965-1969  |
| B-045   | No          | Yes         | Yes       | No          | No          | No        | No          | No        | No          | No        | 1953-1958   | 1965-1969  |
| B-046   | No          | Yes         | Yes       | No          | No          | No        | No          | No        | No          | No        | 1953-1958   | 1965-1969  |
| B-047   | No          | No          | Yes       | No          | No          | No        | No          | No        | No          | No        | 1958-1965   | N/A        |
| B-048   | No          | No          | Yes       | Yes         | Yes         | Yes       | No          | No        | No          | No        | 1958-1965   | 1984-1991  |
| B-049   | No          | No          | Yes       | No          | No          | No        | No          | No        | No          | No        | 1958-1965   | 1965-1969  |
| B-050   | No          | Yes         | Yes       | No          | No          | No        | No          | No        | No          | No        | 1953-1958   | 1965-1969  |
| B-051   | No          | No          | Yes       | Yes         | Yes         | Yes       | Yes         | Yes       | No          | No        | 1958-1965   | 1995-2007  |
| B-052   | No          | No          | Yes       | No          | No          | No        | No          | No        | No          | No        | 1958-1965   | 1965-1969  |
| B-053   | No          | No          | Yes       | No          | No          | No        | No          | No        | No          | No        | 1958-1965   | 1965-1969  |
| B-054   | No          | No          | Yes       | No          | No          | No        | No          | No        | No          | No        | 1958-1965   | N/A        |
| B-055   | No          | No          | Yes       | No          | No          | No        | No          | No        | No          | No        | 1958-1965   | N/A        |
| B-056   | No          | No          | Yes       | No          | No          | No        | No          | No        | No          | No        | 1958-1965   | 1965-1969  |
| B-057   | No          | No          | No        | Yes         | Yes         | Yes       | No          | No        | No          | No        | 1965-1969   | 1984-1991  |
| B-058   | No          | No          | No        | Yes         | Yes         | Yes       | Yes         | Yes       | Yes         | Yes       | 1965-1969   | N/A        |
| B-059   | No          | No          | No        | Yes         | Yes         | Yes       | No          | No        | No          | No        | 1965-1969   | 1984-1991  |
| B-060   | No          | No          | No        | Yes         | Yes         | Yes       | Yes         | No        | No          | No        | 1965-1969   | 1991-1995  |
| B-061   | No          | No          | No        | No          | No          | Yes       | Yes         | Yes       | Yes         | Yes       | 1975-1984   | N/A        |
| B-062   | No          | No          | No        | No          | Yes         | Yes       | Yes         | Yes       | No          | No        | 1969-1975   | 1995-2007  |
| B-063   | No          | No          | No        | Yes         | Yes         | Yes       | Yes         | No        | No          | No        | 1965-1969   | 1991-1995  |
| B-064   | No          | Yes         | No        | No          | No          | Yes       | Yes         | Yes       | No          | No        | 1953-1958   | 1995-2007  |
| B-065   | No          | No          | No        | Yes         | Yes         | Yes       | Yes         | Yes       | Yes         | No        | 1965-1969   | 2007-2010  |
| B-066   | No          | No          | No        | Yes         | Yes         | Yes       | Yes         | Yes       | Yes         | Yes       | 1965-1969   | N/A        |
| B-067   | No          | Yes         | No        | Yes         | Yes         | Yes       | Yes         | Yes       | Yes         | Yes       | 1953-1958   | N/A        |



| Site No | 1953 Aerial | 1958 Aerial | 1965 Topo | 1969 Aerial | 1975 Aerial | 1984 Topo | 1991 Aerial | 1995 Topo | 2007 Aerial | 2010 Topo | Constructed | Demolished |
|---------|-------------|-------------|-----------|-------------|-------------|-----------|-------------|-----------|-------------|-----------|-------------|------------|
| B-068   | No          | No          | No        | No          | No          | Yes       | No          | No        | No          | No        | 1975-1984   | 1984-1991  |
| B-069   | No          | No          | No        | Yes         | Yes         | Yes       | Yes         | Yes       | No          | No        | 1965-1969   | 1995-2007  |
| B-070   | No          | No          | No        | No          | No          | Yes       | No          | Yes       | No          | No        | 1975-1984   | 1995-2007  |
| B-071   | No          | No          | No        | Yes         | Yes         | Yes       | Yes         | Yes       | Yes         | Yes       | 1965-1969   | N/A        |
| B-072   | No          | No          | No        | Yes         | Yes         | Yes       | Yes         | Yes       | Yes         | Yes       | 1965-1969   | N/A        |
| B-073   | No          | No          | No        | No          | No          | Yes       | No          | No        | No          | No        | 1975-1984   | 1984-1991  |
| B-074   | No          | No          | No        | No          | No          | Yes       | No          | No        | No          | No        | 1975-1984   | 1984-1991  |
| B-075   | No          | No          | No        | Yes         | Yes         | Yes       | No          | No        | No          | No        | 1965-1969   | 1984-1991  |
| B-076   | No          | No          | No        | Yes         | Yes         | Yes       | No          | No        | No          | No        | 1965-1969   | 1984-1991  |
| B-077   | No          | No          | No        | Yes         | Yes         | Yes       | No          | No        | No          | No        | 1965-1969   | 1984-1991  |
| B-078   | No          | No          | No        | Yes         | Yes         | Yes       | Yes         | No        | No          | No        | 1965-1969   | 1991-1995  |
| B-079   | No          | No          | No        | No          | Yes         | Yes       | No          | No        | No          | No        | 1969-1975   | 1984-1991  |
| B-080   | No          | No          | No        | Yes         | Yes         | Yes       | No          | No        | No          | No        | 1965-1969   | 1984-1991  |
| B-081   | No          | No          | No        | No          | No          | Yes       | Yes         | No        | Yes         | No        | 1975-1984   | 2007-2010  |
| B-082   | No          | No          | No        | Yes         | Yes         | Yes       | No          | No        | No          | No        | 1965-1969   | 1984-1991  |
| B-083   | No          | No          | No        | No          | Yes         | Yes       | Yes         | Yes       | Yes         | No        | 1969-1975   | N/A        |
| B-084   | No          | No          | No        | No          | Yes         | Yes       | Yes         | Yes       | Yes         | No        | 1969-1975   | N/A        |
| B-085   | No          | No          | No        | Yes         | Yes         | Yes       | No          | No        | No          | No        | 1965-1969   | 1984-1991  |
| B-086   | No          | No          | No        | No          | No          | Yes       | No          | No        | No          | No        | 1975-1984   | 1984-1991  |
| B-087   | No          | No          | No        | No          | Yes         | Yes       | No          | No        | No          | No        | 1969-1975   | 1984-1991  |
| B-088   | No          | No          | No        | No          | Yes         | Yes       | Yes         | No        | No          | No        | 1969-1975   | 1991-1995  |
| B-089   | No          | No          | No        | No          | Yes         | Yes       | No          | Yes       | No          | No        | 1969-1975   | 1984-1991  |
| B-090   | No          | No          | No        | No          | Yes         | Yes       | No          | No        | No          | No        | 1969-1975   | 1984-1991  |
| B-091   | No          | No          | No        | No          | No          | Yes       | No          | No        | No          | No        | 1975-1984   | 1984-1991  |
| B-092   | No          | No          | No        | Yes         | Yes         | Yes       | Yes         | Yes       | Yes         | No        | 1965-1969   | N/A        |
| B-093   | No          | No          | No        | No          | Yes         | Yes       | Yes         | Yes       | Yes         | Yes       | 1969-1975   | N/A        |
| B-094   | No          | No          | No        | No          | No          | No        | Yes         | Yes       | Yes         | Yes       | 1984-1991   | N/A        |
| B-095   | No          | No          | No        | No          | No          | No        | Yes         | Yes       | Yes         | Yes       | 1984-1991   | N/A        |
| B-096   | No          | No          | No        | No          | No          | No        | Yes         | Yes       | Yes         | Yes       | 1984-1991   | N/A        |
| B-097   | No          | No          | No        | No          | No          | No        | No          | Yes       | No          | No        | 1991-1995   | 1995-2007  |
| B-098   | No          | No          | No        | No          | No          | No        | Yes         | Yes       | Yes         | No        | 1984-1991   | N/A        |
| B-099   | No          | No          | No        | No          | No          | No        | Yes         | Yes       | Yes         | Yes       | 1984-1991   | N/A        |
| B-100   | No          | No          | No        | No          | No          | No        | Yes         | Yes       | Yes         | Yes       | 1984-1991   | N/A        |
| B-101   | No          | No          | No        | No          | No          | No        | Yes         | Yes       | Yes         | Yes       | 1984-1991   | N/A        |





| Site No | 1953 Aerial | 1958 Aerial | 1965 Topo | 1969 Aerial | 1975 Aerial | 1984 Topo | 1991 Aerial | 1995 Topo | 2007 Aerial | 2010 Topo | Constructed | Demolished |
|---------|-------------|-------------|-----------|-------------|-------------|-----------|-------------|-----------|-------------|-----------|-------------|------------|
| B-102   | No          | No          | No        | No          | No          | No        | Yes         | Yes       | Yes         | Yes       | 1984-1991   | N/A        |
| B-103   | No          | No          | No        | No          | No          | No        | No          | No        | No          | Yes       | 2007-2010   | N/A        |
| B-104   | No          | No          | No        | No          | No          | No        | No          | No        | Yes         | Yes       | 1995-2007   | N/A        |
| B-105   | No          | No          | No        | No          | No          | No        | No          | No        | Yes         | Yes       | 1995-2007   | N/A        |
| B-106   | No          | No          | No        | No          | No          | No        | No          | No        | Yes         | Yes       | 1995-2007   | >=2010     |
| B-107   | No          | Yes         | No        | Yes         | No          | No        | No          | No        | No          | No        | 1953-1958   | 1969-1975  |
| B-108   | No          | Yes         | No        | Yes         | No          | No        | No          | No        | No          | No        | 1953-1958   | 1969-1975  |
| B-109   | No          | Yes         | No        | Yes         | Yes         | Yes       | Yes         | No        | Yes         | No        | 1953-1958   | N/A        |
| B-110   | No          | Yes         | Yes       | Yes         | No          | No        | No          | No        | No          | No        | 1953-1958   | 1969-1975  |
| B-111   | No          | No          | No        | Yes         | No          | No        | No          | No        | No          | No        | 1965-1969   | 1969-1975  |
| B-112   | No          | No          | No        | Yes         | No          | No        | No          | No        | No          | No        | 1965-1969   | 1969-1975  |
| B-113   | No          | No          | No        | Yes         | No          | No        | No          | No        | No          | No        | 1965-1969   | 1969-1975  |
| B-114   | No          | Yes         | Yes       | Yes         | Yes         | Yes       | No          | No        | No          | No        | 1953-1958   | 1984-1991  |
| B-115   | No          | Yes         | No        | No          | No          | No        | No          | No        | No          | No        | 1953-1958   | 1958-1965  |
| B-116   | No          | No          | No        | Yes         | No          | No        | No          | No        | No          | No        | 1965-1969   | 1969-1975  |
| B-117   | No          | No          | No        | Yes         | Yes         | No        | No          | No        | No          | No        | 1965-1969   | 1975-1984  |



### 4.3 Examples of Heritage Sites

Figures 13 – 23 are examples of heritage sites often encountered. Iron Age and Stone Age sites are often associated with water sources, rocky outcrops and hills and should be avoided by the proposed prospecting activities.

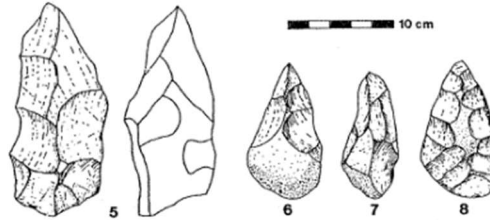


Figure 13: ESA artefacts from Sterkfontein (Volman 1984).

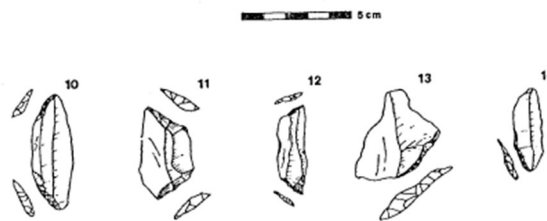


Figure 14: MSA artefacts from Howiesons Poort (Volman 1984).



Figure 15: LSA scrapers (Klein 1984).



Figure 16: Example of undecorated Iron Age potsherds.





**Figure 17:** Example of a decorated Iron Age potsherd.



**Figure 18:** Example of a potential Iron Age granary base.



**Figure 19:** Example of a stone-walled Iron Age site.



**Figure 20 :** Example of a broken lower grinding stone dating to the LIA.



**Figure 21:** Example of a dilapidated stone-walled site dating to the LIA.



**Figure 22:** Example of a historical building.





**Figure 23:** Example of a potential informal grave.

## 4.4 Previous Heritage Studies

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

Matakoma Heritage Consultants (2007) conducted a Heritage Impact Assessment for the BHP Billiton Khutala Colliery on certain portions of the farms Zondagsvlei, Schoongezicht, Leeuwfontein, Klippoortje, Springboklaagte, Cologne, Bombardie and Smithfield in the Nkangala district. The HIA recorded 24 cemeteries consisting of approximately 735 graves, as well as 15 historical structures. This development is located roughly 33 km northeast of the proposed Okavango prospecting project.

### **Coal mining on the Farm Grootfontein 165 IR, District Nigel**

A Cultural Heritage Impact Assessment, conducted by Francois Coetzee (2017) for a mining right application on the Farm Grootfontein 165 IR, revealed no material of heritage importance. According to the report, the survey area focused on Portions 23, 52 and 85 of the Farm Grootfontein 165 IR, as well as the remaining extent of the Farm Vogelstruisbult 127 IR and covered 170 hectares. The surveyed area is located approximately 32 km to the west-northwest of the study area concerned in this report.

### **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 56 km east of the proposed Okavango prospecting 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 study areas were observed and would therefore not be impacted.



## 5. Archaeological and Historical Remains

This section serves as an indication of heritage material associated with the study area based on previous research, as well as historical aerial images and topographical maps.

### 5.1 Stone Age Remains

The heritage studies conducted in the general area did not locate any stone age material. Also, according to Bergh (1998), no major Stone Age site is located in the direct vicinity of the study area. Since such sites are often associated with water sources, Stone Age material is more likely to be encountered within the 500 m river buffer zone of the study area.

### 5.2 Iron Age Farmer Remains

Stone-walled sites are often detectable on satellite and aerial imagery. However, no such sites were observed. It should also be noted that the presence of such sites might be obscured by dense vegetation and poor preservation and are therefore more likely to be located in the undisturbed sections of the study area. Bergh (1998) also noted the presence of LIA sites directly to the south of the study area.

The heritage studies conducted by Matakoma Heritage Consultants (2007), Coetzee (2017) and the National Cultural History Museum (2003) located no Iron Age sites.

### 5.3 Historical Remains

Fifty-two sites associated with buildings/huts were identified on historical aerial imagery and topographical maps. These sites date to 1953 or earlier and to between 1953 and 1958. Nine (9) sites were also identified on the 1965 topographical map (**Appendix A: Figure 27**), suggesting that the buildings/huts were constructed between 1958 and 1965 and could therefore potentially date to historical times (**Table 4**). Based on contemporary satellite imagery, 11 of the identified historical and potentially historical sites are associated with surface infrastructure, while no surface remains were observed at the remaining 50 sites. It should be kept in mind that the sites still associated with surface remains might have been demolished and replaced by more recent buildings. Also, the 50 sites where no surface remains were noted might be associated with subsurface cultural remains and might therefore be sensitive from a heritage perspective.

The heritage study conducted by Matakoma Heritage Consultants (2007) recorded several structures and buildings that might date to the Historic Period.



**Table 4:** Historical Sites.

| Site No | Dataset date & site type | Current Status     | Age                    | Farm Portion | Lat (y)    | Lon (x)   |
|---------|--------------------------|--------------------|------------------------|--------------|------------|-----------|
| B-001   | 1953-Building            | Surface Remains    | Historical             | 12/341       | -26.467346 | 28.809614 |
| B-002   | 1953-Building            | No Surface Remains | Historical             | 12/341       | -26.463590 | 28.812563 |
| B-003   | 1953-Building            | No Surface Remains | Historical             | 10,12/341    | -26.460339 | 28.808585 |
| B-004   | 1953-Building            | Surface Remains    | Historical             | 10/341       | -26.454331 | 28.805266 |
| B-005   | 1953-Building            | Surface Remains    | Historical             | 9/341        | -26.442474 | 28.785815 |
| B-006   | 1953-Building            | No Surface Remains | Historical             | 1/341        | -26.439609 | 28.813338 |
| B-007   | 1953-Building            | Surface Remains    | Historical             | 2/341        | -26.432517 | 28.805843 |
| B-008   | 1953-Building            | Surface Remains    | Historical             | 5/341        | -26.448746 | 28.819696 |
| B-009   | 1953-Building            | No Surface Remains | Historical             | 3/341        | -26.439553 | 28.817260 |
| B-010   | 1953-Building            | Surface Remains    | Historical             | 7/341        | -26.433801 | 28.841964 |
| B-011   | 1953-Building            | No Surface Remains | Historical             | 14/341       | -26.431246 | 28.830394 |
| B-012   | 1953-Building            | No Surface Remains | Historical             | 15/341       | -26.434551 | 28.826865 |
| B-013   | 1953-Building            | No Surface Remains | Historical             | 3/344        | -26.417524 | 28.815361 |
| B-014   | 1953-Building            | No Surface Remains | Historical             | 2/344        | -26.420015 | 28.856225 |
| B-015   | 1953-Building            | No Surface Remains | Historical             | 32/350       | -26.407907 | 28.866471 |
| B-016   | 1953-Building            | Surface Remains    | Historical             | 32/350       | -26.406241 | 28.869869 |
| B-017   | 1953-Building            | No Surface Remains | Historical             | 3/350        | -26.414006 | 28.877028 |
| B-018   | 1953-Building            | Surface Remains    | Historical             | 4/350        | -26.409144 | 28.900519 |
| B-019   | 1953-Building            | No Surface Remains | Historical             | 17/350       | -26.420267 | 28.900845 |
| B-020   | 1953-Building            | No Surface Remains | Historical             | 17/350       | -26.421514 | 28.905385 |
| B-021   | 1953-Building            | No Surface Remains | Historical             | 17/350       | -26.419351 | 28.906597 |
| B-022   | 1953-Building            | Surface Remains    | Historical             | 2/344        | -26.416639 | 28.860201 |
| B-023   | 1953-Building            | No Surface Remains | Historical             | 2,3/344      | -26.421079 | 28.857294 |
| B-024   | 1953-Building            | No Surface Remains | Historical             | 7/341        | -26.430417 | 28.845307 |
| B-025   | 1953-Building            | No Surface Remains | Historical             | 35/350       | -26.404774 | 28.872774 |
| B-026   | 1953-Building            | No Surface Remains | Historical             | 1/350        | -26.428162 | 28.892691 |
| B-027   | 1953-Building            | No Surface Remains | Historical             | 1/350        | -26.437018 | 28.892499 |
| B-028   | 1953-Building            | No Surface Remains | Historical             | 1/344        | -26.417379 | 28.864841 |
| B-029   | 1953-Building            | No Surface Remains | Historical             | 0/347        | -26.434092 | 28.855437 |
| B-030   | 1953-Building            | No Surface Remains | Historical             | 0/347        | -26.462256 | 28.835339 |
| B-031   | 1953-Building            | No Surface Remains | Historical             | 0/347        | -26.467901 | 28.828866 |
| B-032   | 1953-Building            | No Surface Remains | Historical             | 2/344        | -26.409675 | 28.861057 |
| B-033   | 1953-Building            | No Surface Remains | Historical             | 2/344        | -26.403624 | 28.854191 |
| B-034   | 1953-Building            | No Surface Remains | Historical             | 3/344        | -26.422772 | 28.843691 |
| B-035   | 1953-Building            | No Surface Remains | Historical             | 3/344        | -26.419373 | 28.839262 |
| B-036   | 1953-Building            | No Surface Remains | Historical             | 3/344        | -26.422789 | 28.835979 |
| B-037   | 1953-Building            | No Surface Remains | Historical             | 7/341        | -26.429426 | 28.840886 |
| B-038   | 1953-Building            | No Surface Remains | Historical             | 2/341        | -26.430784 | 28.812063 |
| B-039   | 1953-Building            | No Surface Remains | Historical             | 1/341        | -26.444170 | 28.807324 |
| B-040   | 1958-Building            | No Surface Remains | Historical             | 10/341       | -26.458133 | 28.807198 |
| B-041   | 1965-Hut                 | No Surface Remains | Potentially Historical | 9/341        | -26.438134 | 28.791518 |
| B-042   | 1965-Hut                 | No Surface Remains | Potentially Historical | 1/341        | -26.455874 | 28.816234 |
| B-043   | 1958-Building            | No Surface Remains | Historical             | 1/341        | -26.443939 | 28.810769 |
| B-044   | 1965-Hut                 | No Surface Remains | Potentially Historical | 1/341        | -26.442563 | 28.807990 |
| B-045   | 1958-Hut                 | No Surface Remains | Historical             | 2/341        | -26.431337 | 28.815089 |
| B-046   | 1958-Hut                 | No Surface Remains | Historical             | 8/341        | -26.429366 | 28.818608 |
| B-048   | 1965-Hut                 | No Surface Remains | Potentially Historical | 2/344        | -26.418657 | 28.858811 |
| B-049   | 1965-Building            | No Surface Remains | Potentially Historical | 4/350        | -26.410390 | 28.899647 |
| B-050   | 1958-Building            | No Surface Remains | Historical             | 28/350       | -26.412990 | 28.902828 |
| B-051   | 1965-Hut                 | No Surface Remains | Potentially Historical | 28/350       | -26.414832 | 28.898256 |



| Site No | Dataset date & site type | Current Status     | Age                    | Farm Portion | Lat (y)    | Lon (x)   |
|---------|--------------------------|--------------------|------------------------|--------------|------------|-----------|
| B-052   | 1965-Hut                 | No Surface Remains | Potentially Historical | 28/350       | -26.413430 | 28.896954 |
| B-053   | 1965-Hut                 | No Surface Remains | Potentially Historical | 27/350       | -26.414306 | 28.894672 |
| B-056   | 1965-Building            | No Surface Remains | Potentially Historical | 1/350        | -26.433843 | 28.891729 |
| B-064   | 1958-Building            | No Surface Remains | Historical             | 4/350        | -26.408945 | 28.901807 |
| B-067   | 1958-Building            | Surface Remains    | Historical             | 4/350        | -26.409890 | 28.900203 |
| B-107   | 1958-Building            | No Surface Remains | Historical             | 17/350       | -26.420666 | 28.903742 |
| B-108   | 1958-Building            | No Surface Remains | Historical             | 17/350       | -26.419536 | 28.907749 |
| B-109   | 1958-Building            | Surface Remains    | Historical             | 28/350       | -26.410979 | 28.900564 |
| B-110   | 1958-Building            | No Surface Remains | Historical             | 3/350        | -26.416734 | 28.874731 |
| B-114   | 1958-Building            | No Surface Remains | Historical             | 2/344        | -26.405014 | 28.857224 |
| B-115   | 1958-Building            | No Surface Remains | Historical             | 7/341        | -26.434721 | 28.840814 |

## 5.4 Contemporary Remains

Evidence from satellite and aerial imagery, as well as topographical maps, indicate the presence of 53 areas associated with modern infrastructure (**Table 5**). These buildings and structures were constructed after 1965. Thirty-three (33) of these sites, however, appear to have been demolished. The 53 identified sites do not exceed 60 years of age.

The heritage studies conducted by Matakoma Heritage Consultants (2007), Coetzee (2017) and the National Cultural History Museum (2003) did not record significant contemporary sites.

**Table 5:** Contemporary Sites.

| Site No | Dataset date & site type | Current Status     | Age          | Farm Portion | Lat (y)    | Lon (x)   |
|---------|--------------------------|--------------------|--------------|--------------|------------|-----------|
| B-057   | 1969-Building            | No Surface Remains | Contemporary | 12/341       | -26.433252 | 28.889803 |
| B-058   | 1969-Building            | Surface Remains    | Contemporary | 12/341       | -26.427154 | 28.884917 |
| B-059   | 1969-Building            | No Surface Remains | Contemporary | 10,12/341    | -26.423152 | 28.905638 |
| B-060   | 1969-Building            | No Surface Remains | Contemporary | 10/341       | -26.420165 | 28.904981 |
| B-061   | 1984-Building            | Surface Remains    | Contemporary | 9/341        | -26.412266 | 28.880430 |
| B-062   | 1975-Building            | No Surface Remains | Contemporary | 1/341        | -26.409166 | 28.898039 |
| B-063   | 1969-Building            | No Surface Remains | Contemporary | 2/341        | -26.410572 | 28.897525 |
| B-065   | 1969-Building            | No Surface Remains | Contemporary | 5/341        | -26.409315 | 28.901098 |
| B-066   | 1969-Building            | Surface Remains    | Contemporary | 3/341        | -26.409500 | 28.899822 |
| B-068   | 1984-Building            | No Surface Remains | Contemporary | 7/341        | -26.412757 | 28.898289 |
| B-069   | 1969-Building            | No Surface Remains | Contemporary | 14/341       | -26.414126 | 28.899445 |
| B-070   | 1984-Building            | No Surface Remains | Contemporary | 15/341       | -26.411995 | 28.900479 |
| B-071   | 1969-Building            | Surface Remains    | Contemporary | 1/350        | -26.415713 | 28.862833 |
| B-072   | 1969-Building            | Surface Remains    | Contemporary | 1/350        | -26.463457 | 28.833394 |
| B-073   | 1984-Building            | No Surface Remains | Contemporary | 17/350       | -26.400805 | 28.855072 |
| B-074   | 1984-Building            | No Surface Remains | Contemporary | 17/350       | -26.402166 | 28.855550 |
| B-075   | 1969-Building            | No Surface Remains | Contemporary | 26/350       | -26.418167 | 28.859862 |
| B-076   | 1969-Building            | No Surface Remains | Contemporary | 4/350        | -26.419271 | 28.856697 |
| B-077   | 1969-Building            | No Surface Remains | Contemporary | 4/350        | -26.419582 | 28.857876 |
| B-078   | 1969-Building            | No Surface Remains | Contemporary | 4/350        | -26.420258 | 28.843895 |
| B-079   | 1975-Building            | No Surface Remains | Contemporary | 4/350        | -26.435623 | 28.842247 |
| B-080   | 1969-Building            | No Surface Remains | Contemporary | 28/350       | -26.430341 | 28.854657 |





| Site No | Dataset date & site type | Current Status     | Age          | Farm Portion | Lat (y)    | Lon (x)   |
|---------|--------------------------|--------------------|--------------|--------------|------------|-----------|
| B-081   | 1984-Building            | No Surface Remains | Contemporary | 28/350       | -26.431818 | 28.804243 |
| B-082   | 1969-Building            | No Surface Remains | Contemporary | 28/350       | -26.439902 | 28.811723 |
| B-083   | 1975-Building            | Surface Remains    | Contemporary | 1/344        | -26.449447 | 28.818402 |
| B-084   | 1975-Building            | Surface Remains    | Contemporary | 0/347        | -26.450218 | 28.819899 |
| B-085   | 1969-Building            | No Surface Remains | Contemporary | 2/344        | -26.446311 | 28.824291 |
| B-086   | 1984-Building            | No Surface Remains | Contemporary | 2/344        | -26.449073 | 28.828750 |
| B-087   | 1975-Building            | No Surface Remains | Contemporary | 2/344        | -26.448919 | 28.830480 |
| B-088   | 1975-Building            | No Surface Remains | Contemporary | 2/344        | -26.450189 | 28.829148 |
| B-089   | 1975-Building            | No Surface Remains | Contemporary | 2/344        | -26.463551 | 28.826432 |
| B-090   | 1975-Building            | No Surface Remains | Contemporary | 3/344        | -26.458020 | 28.810860 |
| B-091   | 1984-Building            | No Surface Remains | Contemporary | 7/341        | -26.439307 | 28.790898 |
| B-092   | 1969-Building            | Surface Remains    | Contemporary | 7/341        | -26.436958 | 28.791808 |
| B-093   | 1975-Building            | Surface Remains    | Contemporary | 2/341        | -26.433622 | 28.787486 |
| B-094   | 1991-Building            | Surface Remains    | Contemporary | 1/341        | -26.415422 | 28.881294 |
| B-095   | 1991-Building            | Surface Remains    | Contemporary | 5/341        | -26.413809 | 28.879751 |
| B-096   | 1991-Building            | Surface Remains    | Contemporary | 5/341        | -26.412902 | 28.880556 |
| B-097   | 1995-Building            | No Surface Remains | Contemporary | 3/341        | -26.404443 | 28.869659 |
| B-098   | 1991-Building            | Surface Remains    | Contemporary | 3/341        | -26.400154 | 28.867958 |
| B-099   | 1991-Building            | Surface Remains    | Contemporary | 4/341        | -26.410704 | 28.866567 |
| B-100   | 1991-Building            | Surface Remains    | Contemporary | 4/341        | -26.449677 | 28.828765 |
| B-101   | 1991-Building            | Surface Remains    | Contemporary | 5/341        | -26.432041 | 28.842637 |
| B-102   | 1991-Building            | Surface Remains    | Contemporary | 10/341       | -26.433498 | 28.786465 |
| B-103   | 2010-Building            | Surface Remains    | Contemporary | 9/341        | -26.414630 | 28.870058 |
| B-104   | 2007-Building            | Surface Remains    | Contemporary | 9/341        | -26.411655 | 28.864967 |
| B-105   | 2007-Building            | Surface Remains    | Contemporary | 9/341        | -26.412090 | 28.866373 |
| B-106   | 2007-Building            | No Surface Remains | Contemporary | 26/350       | -26.431737 | 28.843417 |
| B-111   | 1969-Building            | No Surface Remains | Contemporary | 26/350       | -26.432774 | 28.885868 |
| B-112   | 1969-Building            | No Surface Remains | Contemporary | 26/350       | -26.435192 | 28.885480 |
| B-113   | 1969-Building            | No Surface Remains | Contemporary | 35/350       | -26.433913 | 28.887285 |
| B-116   | 1969-Building            | No Surface Remains | Contemporary | 35/350       | -26.432440 | 28.839646 |
| B-117   | 1969-Building            | No Surface Remains | Contemporary | 1/344        | -26.439732 | 28.814982 |

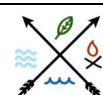
## 5.5 Graves

Three graves were noted on the topographical map dating to 1965 (**Table 6 & Appendix A: Figure 27**). The current status of the graves, however, is unknown. Such sites are rarely visible on aerial imagery and are not always indicated on topographical maps. Burial sites are also often associated with historical farm- and homesteads and the possibility therefore exists that additional graves may be associated with the study area.

The heritage studies conducted by Matakoma Heritage Consultants (2007) and the National Cultural History Museum (2003) mention the presence of several graves and cemeteries in the general area.

**Table 6:** Graves & Cemeteries.

| Site No | Dataset date & site type | Current Status | Age                    | Farm Portion | Lat (y)    | Lon (x)   |
|---------|--------------------------|----------------|------------------------|--------------|------------|-----------|
| B-047   | Grave                    | Unknown        | Potentially Historical | 3/344        | -26.420043 | 28.830526 |
| B-054   | Grave                    | Unknown        | Potentially Historical | 1/350        | -26.431745 | 28.899612 |
| B-055   | Grave                    | Unknown        | Potentially Historical | 1/350        | -26.433075 | 28.888226 |



## 6. Evaluation

The significance of an archaeological site is based on the amount of deposit, the integrity of the context, the kind of deposit and the potential to help answer present research questions. Historical structures are defined by Section 34 of the National Heritage Resources Act, 1999, while other historical and cultural significant sites, places and features, are generally determined by community preferences.

A fundamental aspect in the conservation of a heritage resource relates to whether the sustainable social and economic benefits of a proposed development outweigh the conservation issues at stake. There are many aspects that must be taken into consideration when determining significance, such as rarity, national significance, scientific importance, cultural and religious significance, and not least, community preferences. When, for whatever reason the protection of a heritage site is not deemed necessary or practical, its research potential must be assessed and if appropriate mitigated in order to gain data / information which would otherwise be lost. Such sites must be adequately recorded and sampled before being destroyed.

### 6.1 Field Ratings

All sites should include a field rating in order to comply with section 38 of the National Heritage Resources Act (Act No. 25 of 1999). The field rating and classification in this report are prescribed by SAHRA.

**Table 7:** 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          |

\*These site ratings can only be assigned following a Phase 1 AIA.



## 7. Statement of Significance & Recommendations

### 7.1 Statement of Significance

#### The study area: Okavango PR

As can be seen from previous research conducted in the area, the general study area appears to be sensitive from a heritage perspective and sites are likely to include LIA sites, historical infrastructure, graves and cemeteries. Since heritage sites, such as burial sites, are not always clearly identifiable due to disturbed/removed surface features, care must be exercised when prospecting.

**Figure 24** indicates historical and potentially historical sites, as well as a 500 m buffer area around water sources. The 500 m buffer area is considered to be potentially sensitive from a heritage perspective since archaeological sites are often located within this zone. Areas previously/currently associated with cultivated fields are indicated as well. These areas are considered to be less sensitive from a heritage perspective due to the areas being disturbed. The least sensitive areas are therefore areas that are located more than 500 m from a water source, fall within previously/currently cultivated fields and are not located within close proximity of potential heritage sites or contemporary infrastructure. From a heritage perspective, these areas are considered to be more favourable for the proposed prospecting activities. Also, the cultivated sections located within the 500 m buffer zone indicate a disturbed context, but the potential for subsurface cultural material is slightly higher compared to areas falling outside of the buffer zone. Apart from the identified potential sites, open grassland areas falling outside of the previously/currently cultivated areas and within 500 m of a water source are considered to be the most sensitive areas from a heritage perspective. The possibility also exists that culturally sensitive sites, such as burial sites, might have been created after some of the cultivated fields fell into disuse, meaning that burial sites might be located on disturbed areas as well.

The 64 sites listed in **Table 8** are associated with intact and demolished historical and potentially historical infrastructure that might exceed 60 years of age. The sites associated with surface remains are considered to be sensitive from a heritage perspective, while the sites where no surface remains are visible are considered to be potentially sensitive. The listed sites might therefore be protected under the NHRA (Act No. 25 of 1999). The three identified grave sites are also considered to be sensitive and significant from a heritage perspective as the Human Tissues Act (Act No. 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) could apply. The remaining 53 sites are of contemporary origin and are unlikely to be sensitive from a heritage perspective.



**Table 8:** Sensitive Sites.

| Site No      | Type     | Farm Portion | Lat (y)    | Lon (x)   | Current Status     | Age        | Sensitivity           |
|--------------|----------|--------------|------------|-----------|--------------------|------------|-----------------------|
| 2628BD-B-001 | Building | 12/341       | -26.467346 | 28.809614 | Surface Remains    | Historical | Sensitive             |
| 2628BD-B-002 | Building | 12/341       | -26.463590 | 28.812563 | No Surface Remains | Historical | Potentially Sensitive |
| 2628BD-B-003 | Building | 10,12/341    | -26.460339 | 28.808585 | No Surface Remains | Historical | Potentially Sensitive |
| 2628BD-B-004 | Building | 10/341       | -26.454331 | 28.805266 | Surface Remains    | Historical | Sensitive             |
| 2628BD-B-005 | Building | 9/341        | -26.442474 | 28.785815 | Surface Remains    | Historical | Sensitive             |
| 2628BD-B-006 | Building | 1/341        | -26.439609 | 28.813338 | No Surface Remains | Historical | Potentially Sensitive |
| 2628BD-B-007 | Building | 2/341        | -26.432517 | 28.805843 | Surface Remains    | Historical | Sensitive             |
| 2628BD-B-008 | Building | 5/341        | -26.448746 | 28.819696 | Surface Remains    | Historical | Sensitive             |
| 2628BD-B-009 | Building | 3/341        | -26.439553 | 28.817260 | No Surface Remains | Historical | Potentially Sensitive |
| 2628BD-B-010 | Building | 7/341        | -26.433801 | 28.841964 | Surface Remains    | Historical | Sensitive             |
| 2628BD-B-011 | Building | 14/341       | -26.431246 | 28.830394 | No Surface Remains | Historical | Potentially Sensitive |
| 2628BD-B-012 | Building | 15/341       | -26.434551 | 28.826865 | No Surface Remains | Historical | Potentially Sensitive |
| 2628BD-B-013 | Building | 3/344        | -26.417524 | 28.815361 | No Surface Remains | Historical | Potentially Sensitive |
| 2628BD-B-014 | Building | 2/344        | -26.420015 | 28.856225 | No Surface Remains | Historical | Potentially Sensitive |
| 2628BD-B-015 | Building | 32/350       | -26.407907 | 28.866471 | No Surface Remains | Historical | Potentially Sensitive |
| 2628BD-B-016 | Building | 32/350       | -26.406241 | 28.869869 | Surface Remains    | Historical | Sensitive             |
| 2628BD-B-017 | Building | 3/350        | -26.414006 | 28.877028 | No Surface Remains | Historical | Potentially Sensitive |
| 2628BD-B-018 | Building | 4/350        | -26.409144 | 28.900519 | Surface Remains    | Historical | Sensitive             |
| 2628BD-B-019 | Building | 17/350       | -26.420267 | 28.900845 | No Surface Remains | Historical | Potentially Sensitive |
| 2628BD-B-020 | Building | 17/350       | -26.421514 | 28.905385 | No Surface Remains | Historical | Potentially Sensitive |
| 2628BD-B-021 | Building | 17/350       | -26.419351 | 28.906597 | No Surface Remains | Historical | Potentially Sensitive |
| 2628BD-B-022 | Building | 2/344        | -26.416639 | 28.860201 | Surface Remains    | Historical | Sensitive             |
| 2628BD-B-023 | Building | 2,3/344      | -26.421079 | 28.857294 | No Surface Remains | Historical | Potentially Sensitive |
| 2628BD-B-024 | Building | 7/341        | -26.430417 | 28.845307 | No Surface Remains | Historical | Potentially Sensitive |
| 2628BD-B-025 | Building | 35/350       | -26.404774 | 28.872774 | No Surface Remains | Historical | Potentially Sensitive |
| 2628BD-B-026 | Building | 1/350        | -26.428162 | 28.892691 | No Surface Remains | Historical | Potentially Sensitive |
| 2628BD-B-027 | Building | 1/350        | -26.437018 | 28.892499 | No Surface Remains | Historical | Potentially Sensitive |
| 2628BD-B-028 | Building | 1/344        | -26.417379 | 28.864841 | No Surface Remains | Historical | Potentially Sensitive |
| 2628BD-B-029 | Building | 0/347        | -26.434092 | 28.855437 | No Surface Remains | Historical | Potentially Sensitive |
| 2628BD-B-030 | Building | 0/347        | -26.462256 | 28.835339 | No Surface Remains | Historical | Potentially Sensitive |
| 2628BD-B-031 | Building | 0/347        | -26.467901 | 28.828866 | No Surface Remains | Historical | Potentially Sensitive |
| 2628BD-B-032 | Building | 2/344        | -26.409675 | 28.861057 | No Surface Remains | Historical | Potentially Sensitive |
| 2628BD-B-033 | Building | 2/344        | -26.403624 | 28.854191 | No Surface Remains | Historical | Potentially Sensitive |



| Site No      | Type     | Farm Portion | Lat (y)    | Lon (x)   | Current Status     | Age                    | Sensitivity           |
|--------------|----------|--------------|------------|-----------|--------------------|------------------------|-----------------------|
| 2628BD-B-034 | Building | 3/344        | -26.422772 | 28.843691 | No Surface Remains | Historical             | Potentially Sensitive |
| 2628BD-B-035 | Building | 3/344        | -26.419373 | 28.839262 | No Surface Remains | Historical             | Potentially Sensitive |
| 2628BD-B-036 | Building | 3/344        | -26.422789 | 28.835979 | No Surface Remains | Historical             | Potentially Sensitive |
| 2628BD-B-037 | Building | 7/341        | -26.429426 | 28.840886 | No Surface Remains | Historical             | Potentially Sensitive |
| 2628BD-B-038 | Building | 2/341        | -26.430784 | 28.812063 | No Surface Remains | Historical             | Potentially Sensitive |
| 2628BD-B-039 | Building | 1/341        | -26.444170 | 28.807324 | No Surface Remains | Historical             | Potentially Sensitive |
| 2628BD-B-040 | Building | 10/341       | -26.458133 | 28.807198 | No Surface Remains | Historical             | Potentially Sensitive |
| 2628BD-B-041 | Hut      | 9/341        | -26.438134 | 28.791518 | No Surface Remains | Potentially Historical | Potentially Sensitive |
| 2628BD-B-042 | Hut      | 1/341        | -26.455874 | 28.816234 | No Surface Remains | Potentially Historical | Potentially Sensitive |
| 2628BD-B-043 | Building | 1/341        | -26.443939 | 28.810769 | No Surface Remains | Historical             | Potentially Sensitive |
| 2628BD-B-044 | Hut      | 1/341        | -26.442563 | 28.807990 | No Surface Remains | Potentially Historical | Potentially Sensitive |
| 2628BD-B-045 | Building | 2/341        | -26.431337 | 28.815089 | No Surface Remains | Historical             | Potentially Sensitive |
| 2628BD-B-046 | Building | 8/341        | -26.429366 | 28.818608 | No Surface Remains | Historical             | Potentially Sensitive |
| 2628BD-B-047 | Grave    | 3/344        | -26.420043 | 28.830526 | Unknown            | Potentially Historical | Sensitive             |
| 2628BD-B-048 | Hut      | 2/344        | -26.418657 | 28.858811 | No Surface Remains | Potentially Historical | Potentially Sensitive |
| 2628BD-B-049 | Building | 4/350        | -26.410390 | 28.899647 | No Surface Remains | Potentially Historical | Potentially Sensitive |
| 2628BD-B-050 | Building | 28/350       | -26.412990 | 28.902828 | No Surface Remains | Historical             | Potentially Sensitive |
| 2628BD-B-051 | Hut      | 28/350       | -26.414832 | 28.898256 | No Surface Remains | Potentially Historical | Potentially Sensitive |
| 2628BD-B-052 | Hut      | 28/350       | -26.413430 | 28.896954 | No Surface Remains | Potentially Historical | Potentially Sensitive |
| 2628BD-B-053 | Hut      | 27/350       | -26.414306 | 28.894672 | No Surface Remains | Potentially Historical | Potentially Sensitive |
| 2628BD-B-054 | Grave    | 1/350        | -26.431745 | 28.899612 | Unknown            | Potentially Historical | Sensitive             |
| 2628BD-B-055 | Grave    | 1/350        | -26.433075 | 28.888226 | Unknown            | Potentially Historical | Sensitive             |
| 2628BD-B-056 | Building | 1/350        | -26.433843 | 28.891729 | No Surface Remains | Potentially Historical | Potentially Sensitive |
| 2628BD-B-064 | Building | 4/350        | -26.408945 | 28.901807 | No Surface Remains | Historical             | Potentially Sensitive |
| 2628BD-B-067 | Building | 4/350        | -26.409890 | 28.900203 | Surface Remains    | Historical             | Sensitive             |
| 2628BD-B-107 | Building | 17/350       | -26.420666 | 28.903742 | No Surface Remains | Historical             | Potentially Sensitive |
| 2628BD-B-108 | Building | 17/350       | -26.419536 | 28.907749 | No Surface Remains | Historical             | Potentially Sensitive |
| 2628BD-B-109 | Building | 28/350       | -26.410979 | 28.900564 | Surface Remains    | Historical             | Sensitive             |
| 2628BD-B-110 | Building | 3/350        | -26.416734 | 28.874731 | No Surface Remains | Historical             | Potentially Sensitive |
| 2628BD-B-114 | Building | 2/344        | -26.405014 | 28.857224 | No Surface Remains | Historical             | Potentially Sensitive |
| 2628BD-B-115 | Building | 7/341        | -26.434721 | 28.840814 | No Surface Remains | Historical             | Potentially Sensitive |



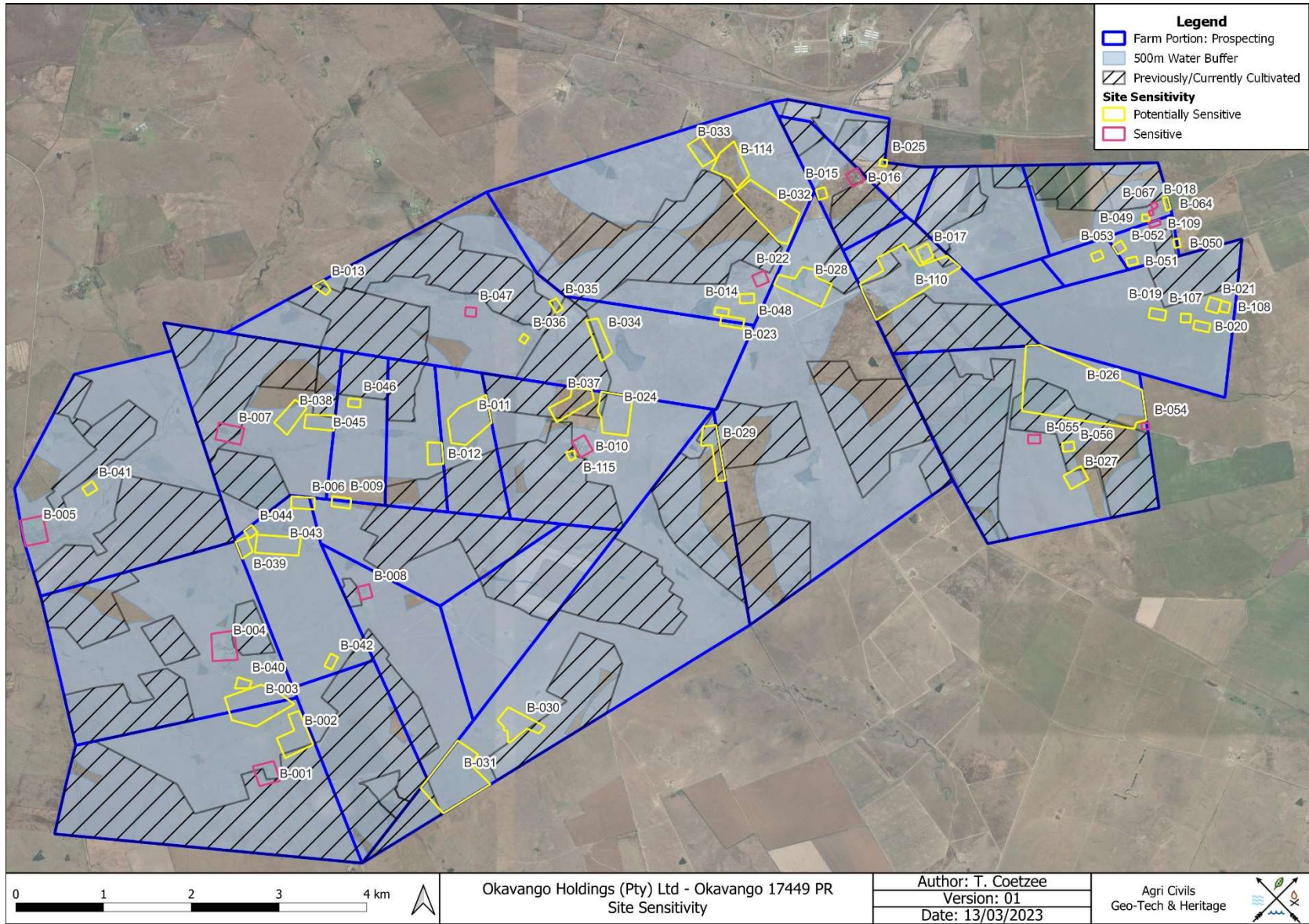


Figure 24: Sensitive Areas.



## 7.2 Recommendations

The following recommendations are made in order to avoid the destruction of heritage remains within the area demarcated for prospecting:

- Although the 50 demolished historical and potentially historical sites (**Table 8**) appear not to be associated with surface remains anymore, subsurface culturally significant material might be present. The possibility also exists that historical surface remains exceeding 60 years of age are present, but are not detectable on aerial imagery. Therefore, it is recommended that the demarcated areas be avoided by the proposed prospecting activities. Should this not be possible, a qualified archaeologist should first inspect the sites in order to determine the potential presence of heritage remains.
- The 11 sites that appear to be associated with historical surface infrastructure are likely to exceed 60 years of age (**Table 8**). Therefore, it is recommended that the demarcated areas be avoided by the proposed prospecting activities. Should this not be possible, a qualified archaeologist should first inspect the sites in order to determine the significance of the sites.
- The buildings and structures associated with the 53 sites listed in **Table 5** appear not to exceed 60 years of age and are unlikely to be significant from a heritage perspective. However, should impact to the sites be unavoidable, it is recommended that a qualified archaeologist inspect the sites prior to any impact.
- The three identified grave sites are considered to be sensitive from a heritage perspective. Therefore, a radius of 50 m from the sites must be avoided by the proposed prospecting activities. Should this not be possible, it is recommended that a qualified archaeologist first inspect the sites to provide the required recommendations.
- The 500 m buffer zone surrounding the perennial and non-perennial rivers is potentially sensitive from a heritage perspective. Although the previously/currently cultivated areas that intersect the 500 m buffer zone are disturbed, the potential for subsurface cultural material still exists. Care should be exercised when prospecting in this vicinity.
- The least sensitive areas are associated with cultivated fields located outside of the 500 m buffer zone and areas not located within close proximity of potential heritage sites or contemporary infrastructure. These areas should therefore be considered when selecting prospecting sites.



- Apart from the identified potential sites, undisturbed areas located within 500 m of a water source are considered to be the most sensitive from a heritage perspective. Care should therefore be exercised when prospecting in these areas.
- Should uncertainty regarding the presence of heritage remains exist, or of heritage sites are discovered by chance, it is advised that the potential site be avoided and that a qualified archaeologist be contacted. Alternatively, once the prospecting localities have been identified, a qualified archaeologist can inspect the proposed sites and provide recommendations that will aid the protection of heritage resources.
- Prospecting should not take place in the vicinity of stone cairns, potential burial sites, stone-walling, building ruins or any other heritage material or structures.
- Should the prospecting outcome result in further development or construction, a full Phase 1 Archaeological Impact Assessment must be conducted on the affected area if triggered. Also, a full Phase 1 AIA must be conducted should the cumulative impact of the proposed prospecting exceed 0.5 ha.
- Since archaeological artefacts generally occur below surface, the possibility exists that culturally significant material may be exposed during the prospecting phase, in which case all activities must be suspended pending further archaeological investigations by a qualified archaeologist. Also, should skeletal remains be exposed, 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, prospecting may proceed on the demarcated portions, subject to the abovementioned conditions and recommendations.

## 8. Conclusion

The proposed Okavango Prospecting Project that consists of the prospecting of coal on the demarcated farm portions intersecting the Farms Watervalshoek 350 IR, Gruisfontein 344 IR, Wonderfontein 341 IR and Kuilwater 347 IR covers approximately 6430.2 ha. The general area is characterised by open grassland and cultivated land. The Archaeological Desktop Study examined the area using a combination of historical aerial imagery, historical topographical maps, contemporary satellite imagery, as well as written sources and previous heritage studies conducted in the area. Sixty-one (61) historical and potentially historical sites, 53 areas associated with contemporary infrastructure, as well as three grave sites were noted. These areas should be avoided by the proposed prospecting activities. Other potentially sensitive areas include the 500 m buffer zone surrounding rivers, as well as undisturbed sections.

Should the recommendations made in this study be adhered to, the proposed Okavango Prospecting Project 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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*Human Tissue Act No. 65 of 1983, Government Gazette, Cape Town*

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

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



# Appendix A: Historical Aerial Imagery & Topographical Maps



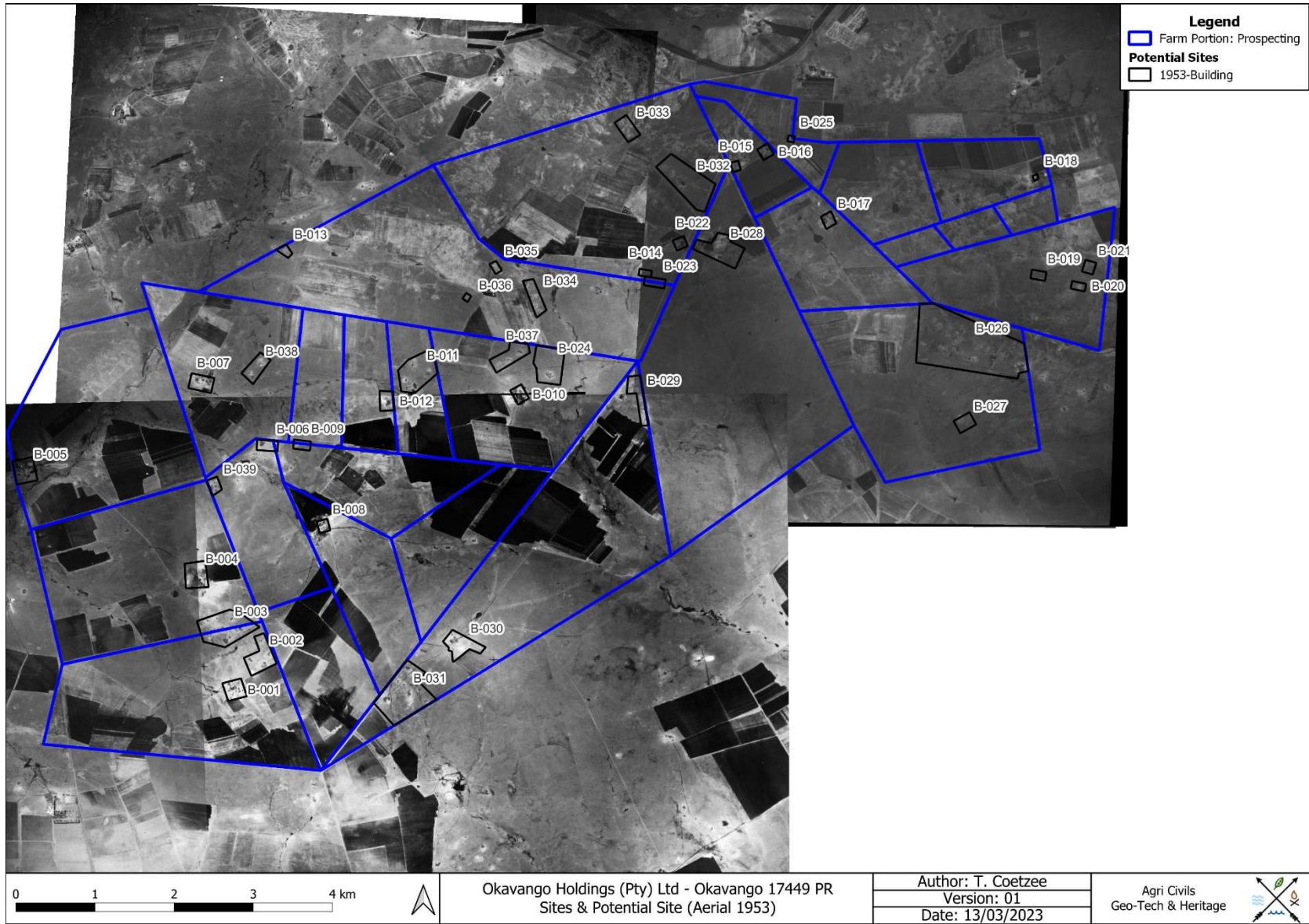


Figure 25: 1953 Aerial image of the study area.



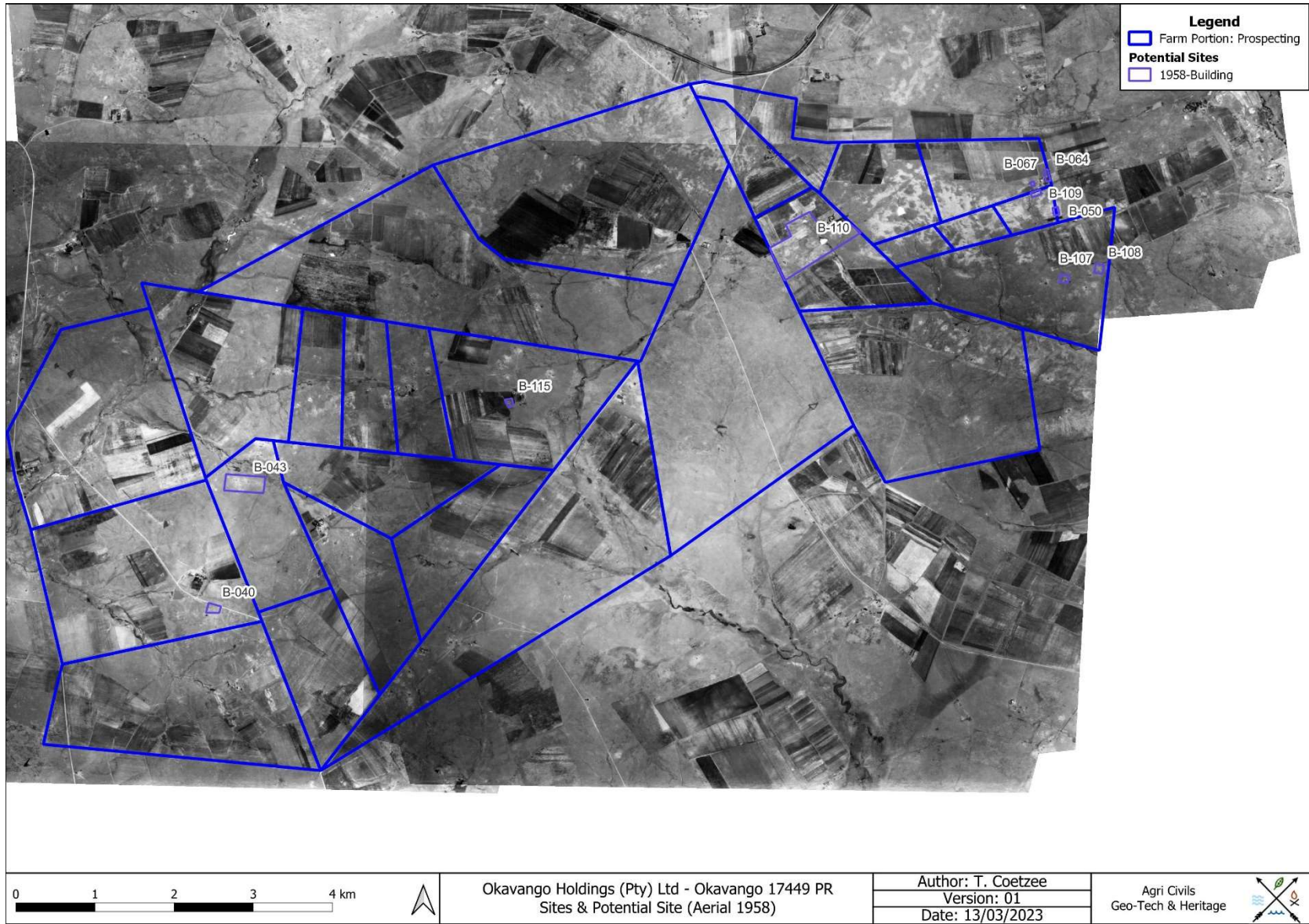


Figure 26: 1958 Aerial image of the study area.



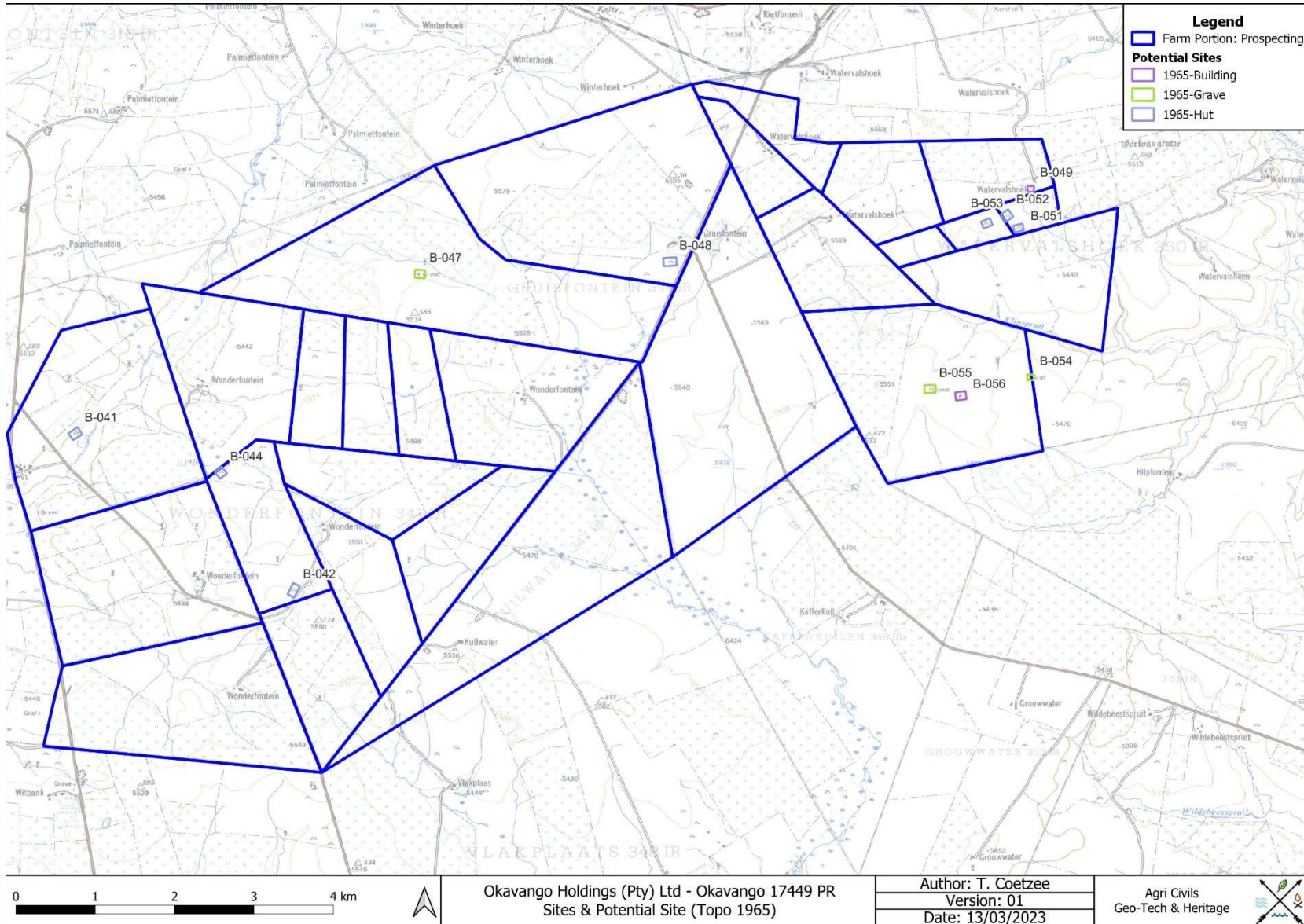


Figure 27: Segment of 1965 1:50 000 2628 BD indicating the study area.



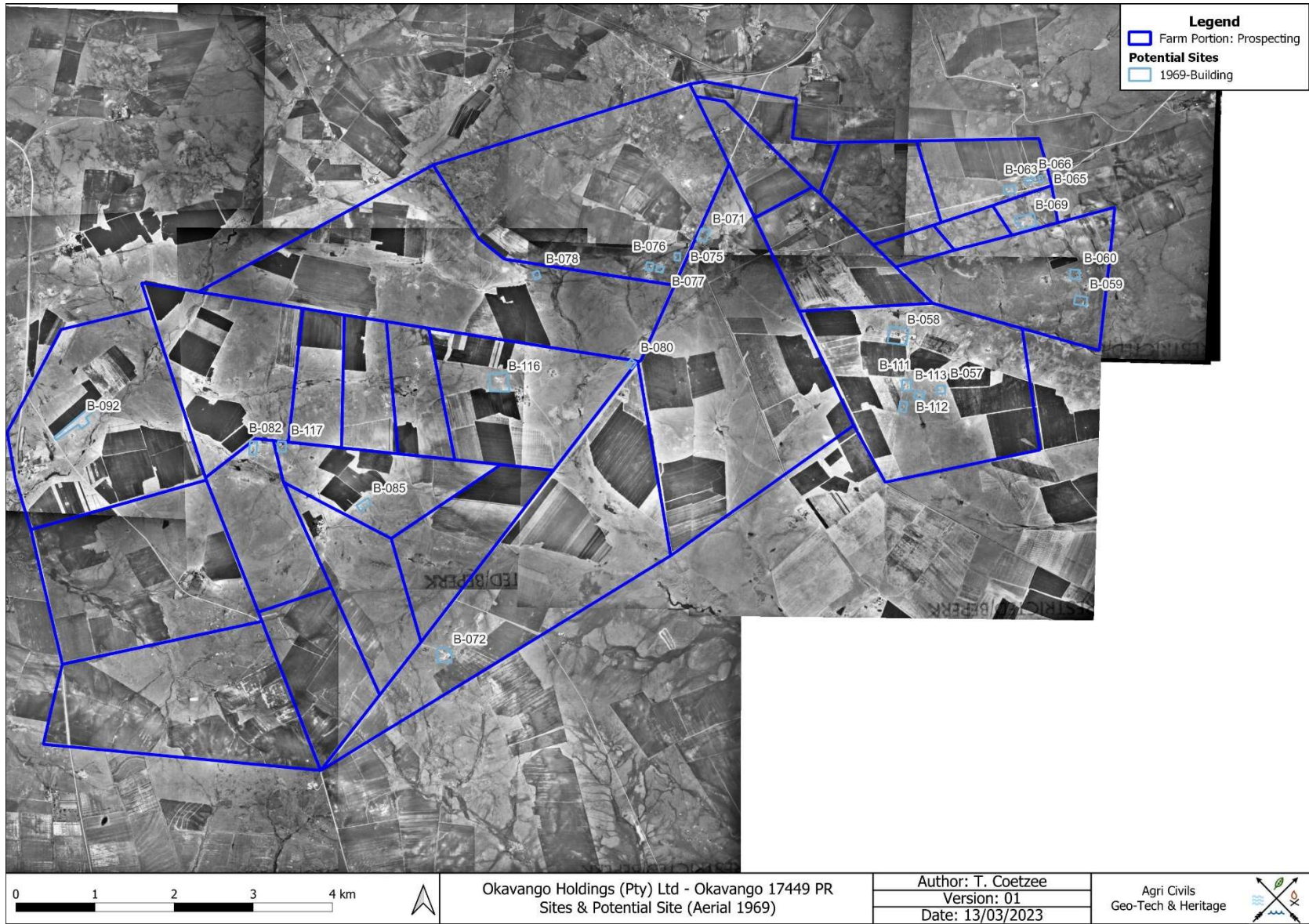


Figure 28: 1969 Aerial image of the study area.





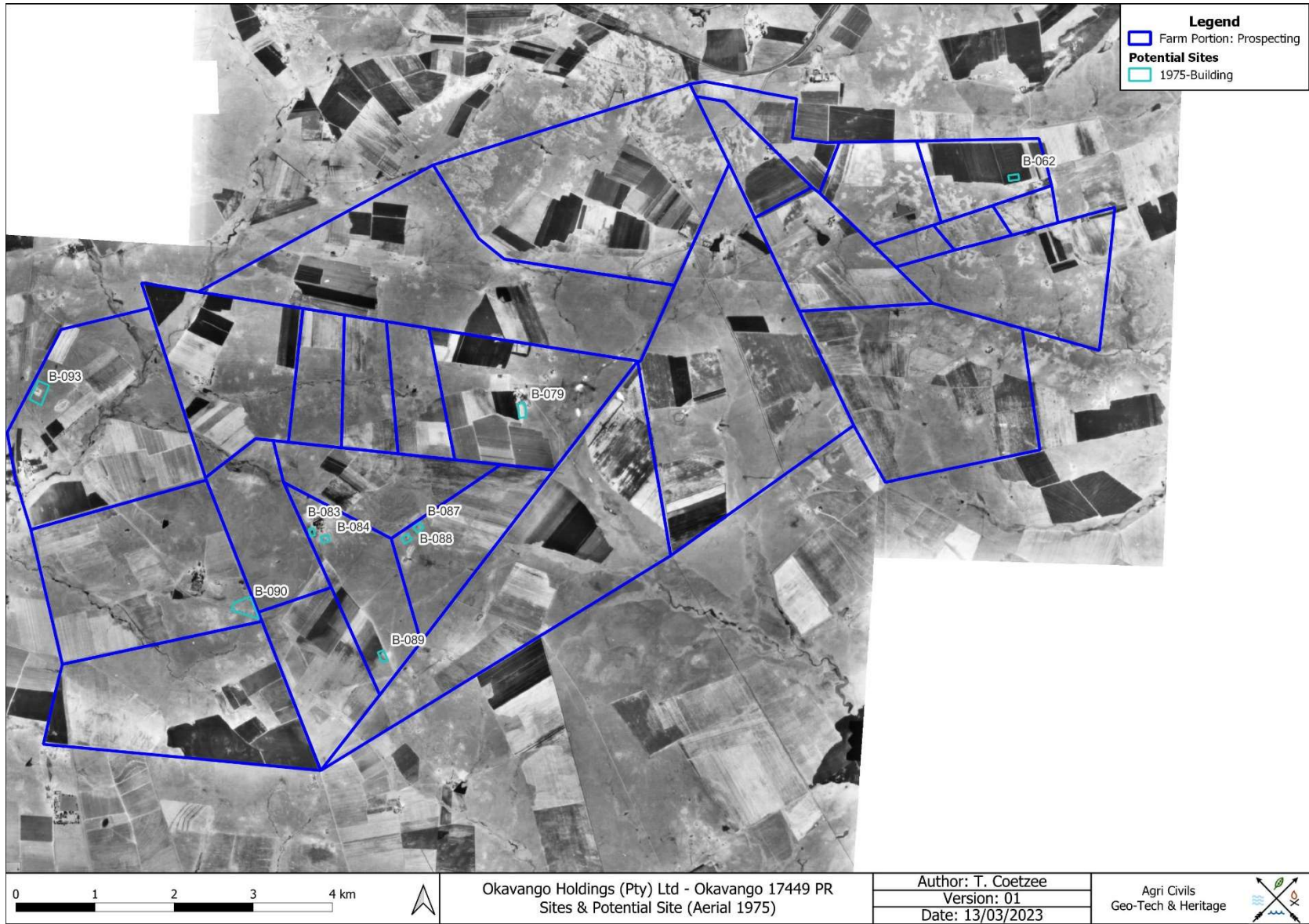


Figure 29: 1975 Aerial image of the study area.



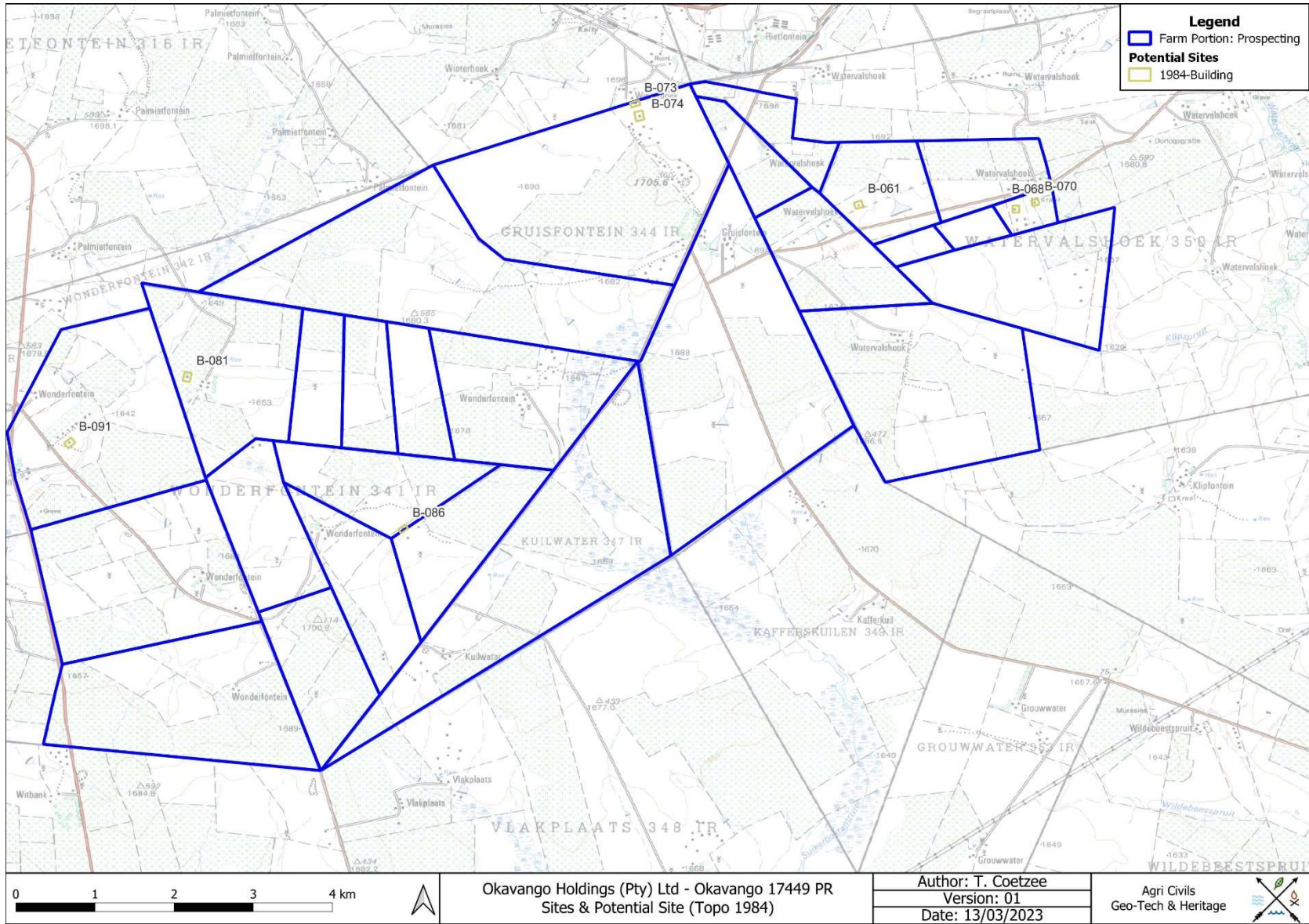


Figure 30: Segment of 1984 1:50 000 2628 BD indicating the study area.



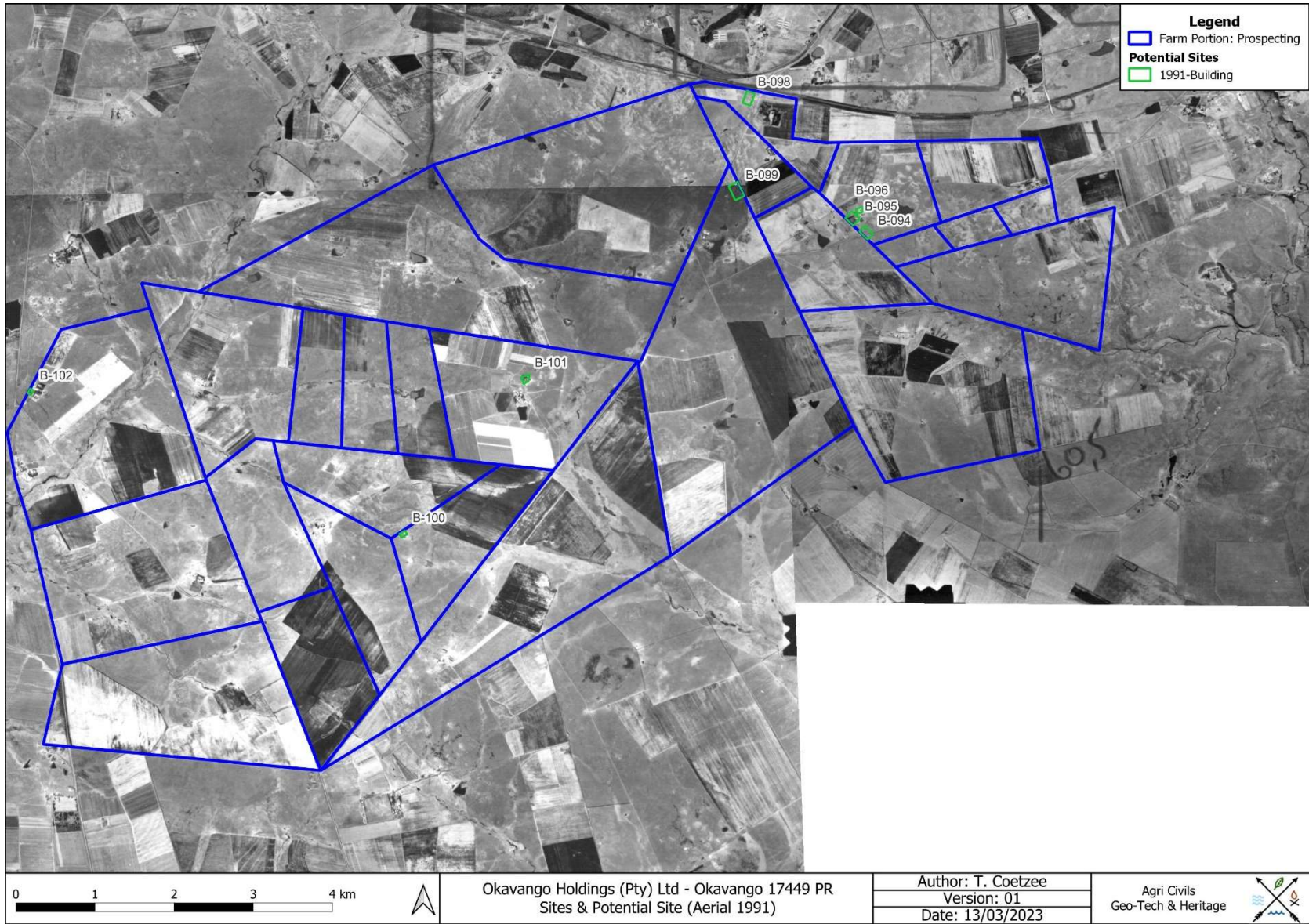


Figure 31: 1991 Aerial image of the study area.



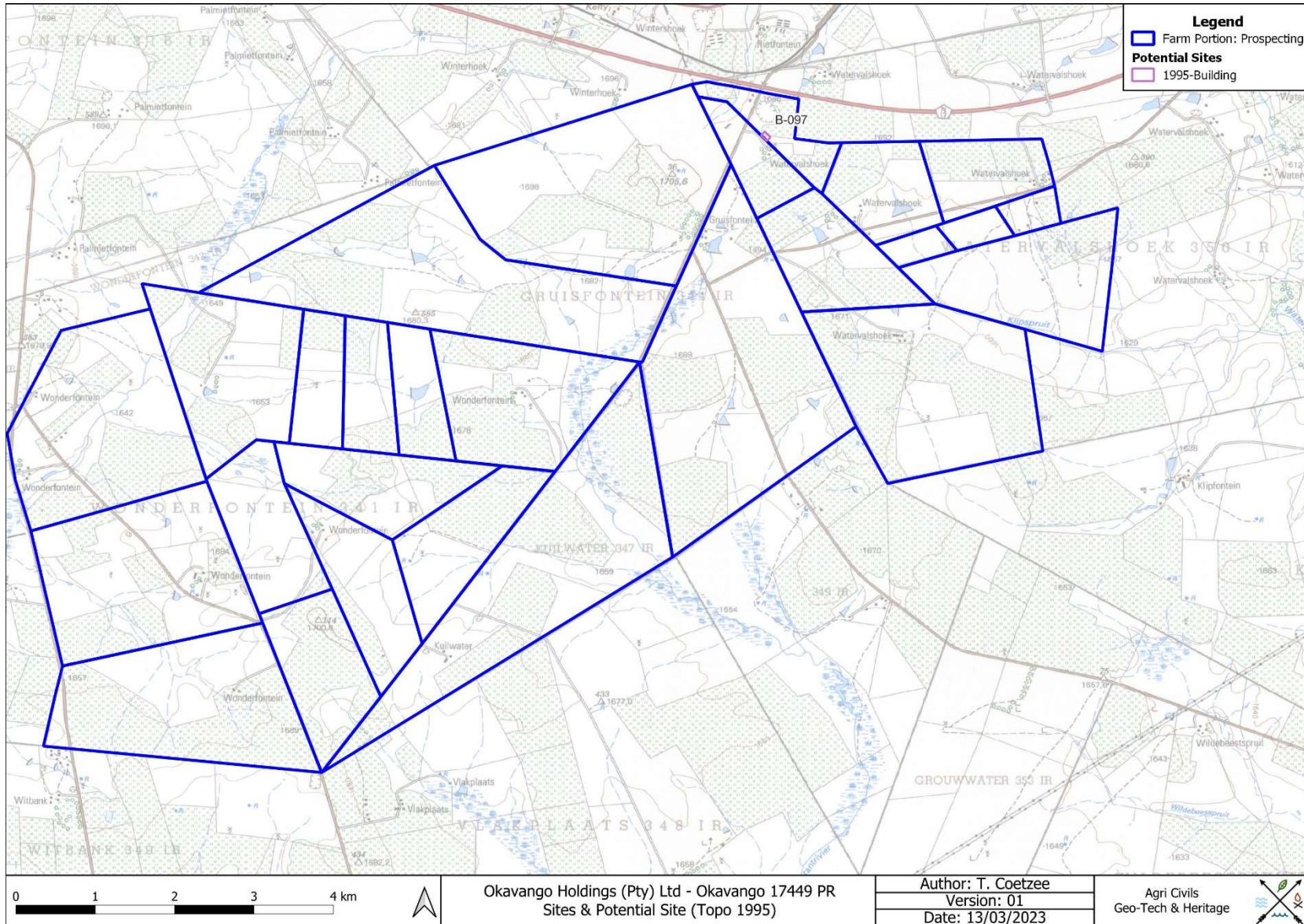


Figure 32: Segment of 1995 1:50 000 2628 BD indicating the study area.



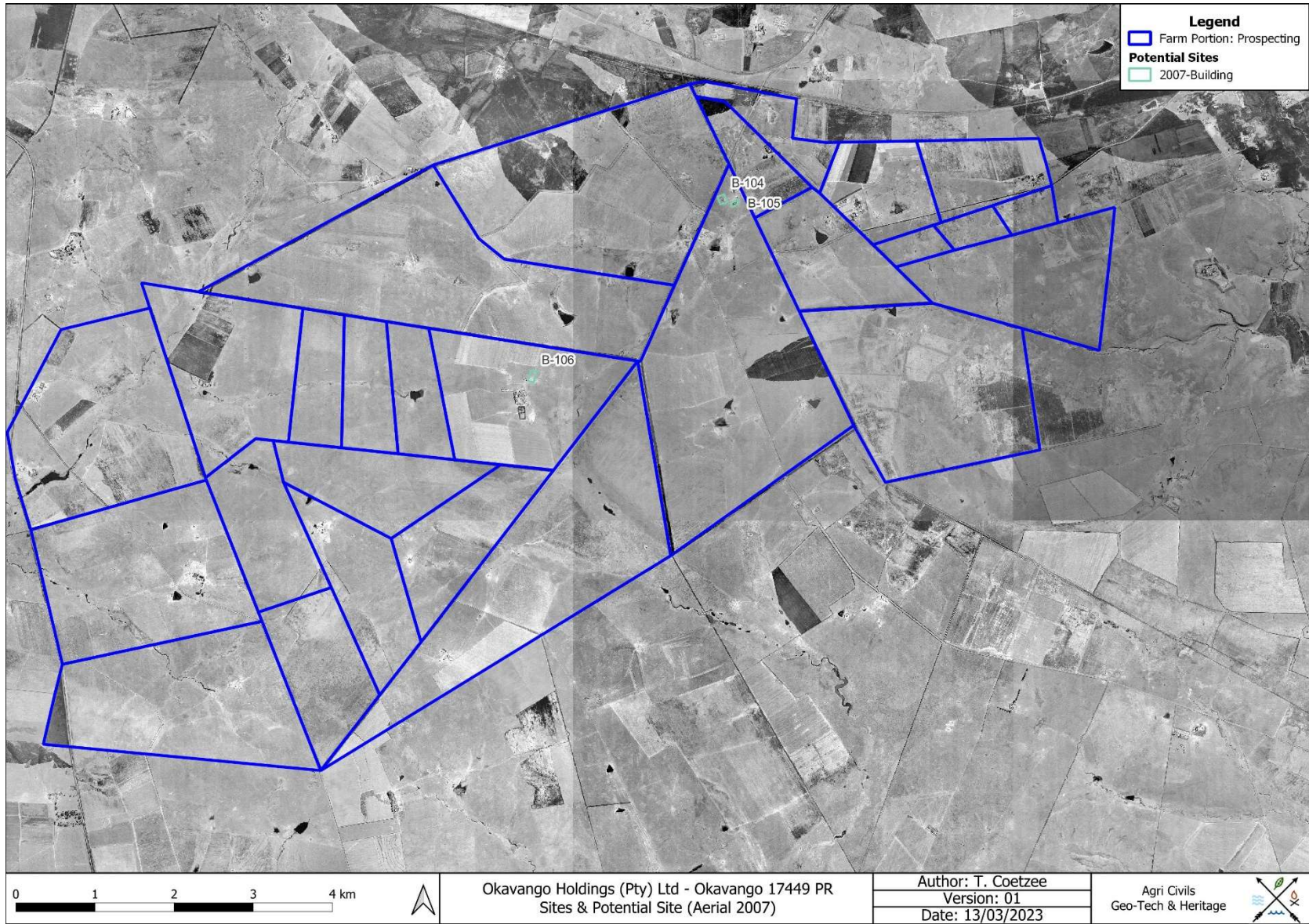


Figure 33: 2007 Aerial image of the study area.



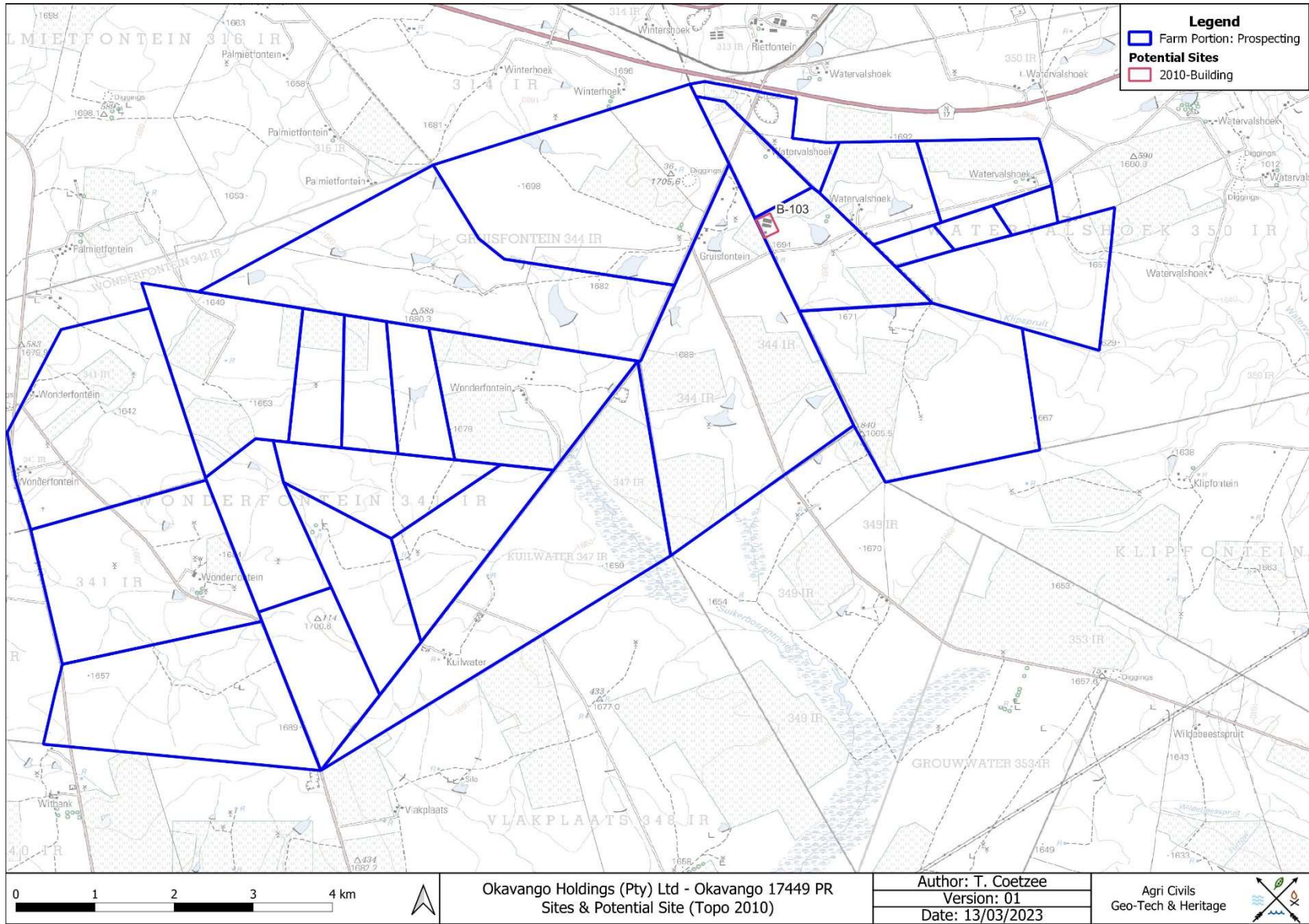


Figure 34: Segment of 2010 1:50 000 2628 BD indicating the study area.

