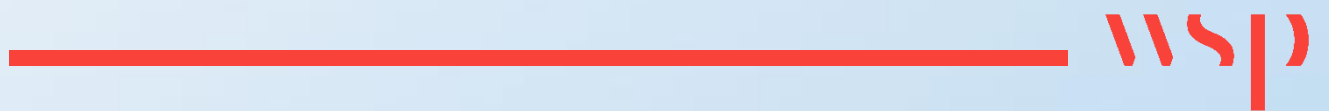


Appendix H-6

HERITAGE STUDY



HERITAGE IMPACT ASSESSMENT: PROPOSED IMPUMELELO WIND ENERGY FACILITY NEAR SECUNDA, MPUMALANGA

Required under Section 38(8) of the National Heritage Resources Act (No. 25 of 1999)

SAHRA Case ID: 20226

Report for:

WSP Group Africa (Pty) Ltd

Building C, Knightsbridge, 33 Sloane Street, Bryanston, 2191

Email: Ashlea.Strong@wsp.com

On behalf of:

ENERTRAG South Africa (Pty) Ltd



Dr Jayson Orton
ASHA Consulting (Pty) Ltd
23 Dover Road, Muizenberg, 7945
Tel: (021) 788 1025 | 083 272 3225
Email: jayson@asha-consulting.co.za



Jaco van der Walt
Beyond Heritage
37 Olienhout Street, Modimolle, 0510
Tel: 082 373 8491
Email: jaco@heritageconsultants.co.za

1st draft: 24 January 2023
Final report: 06 February 2023

SUMMARY

ASHA Consulting (Pty) Ltd was appointed by ENERTRAG South Africa (Pty) Ltd to assess the potential impacts to heritage resources that might occur through the proposed construction of the Impumelelo Wind Energy Facility (WEF) on a site of some 2800 ha in extent and located to the northeast of Greylingstad, Mpumalanga. The project would have a maximum export capacity of up to 200 MW. An approximate mid-point for the study area is S26° 40' 05" E28° 51' 10". The project is proposed across nine farm portions.

The proposed project would include approximately 28 wind turbines, access roads, electrical cabling, a substation, a battery energy storage system and construction camps and laydown areas.

The survey revealed some Late Iron Age settlements (with several more located remotely from aerial photography), historical ruins, a graveyard and a possible grave. Although farmsteads were not visited, a number of houses in the area are expected to be older than 60 years. None will be directly affected though. The landscape is a heritage resources but has been somewhat compromised by the presence of the Impumelelo coal mine to the north of the site. There are relatively few other large industrial facilities in the surrounding area.

The present layout will result in several impacts occurring, most notably to large Iron Age settlements. Relocation of infrastructure will be needed and it is expected that any remaining impacts discovered during a pre-construction survey of the final layout could be dealt with through micrositing of infrastructure during the final EMPr approval stage.

The Alternative 1 Substation location is preferred from a heritage point of view, although Alternative 2 could still be used if necessary, since about three quarters of the footprint is outside the heritage buffer zone there.

It is recommended that the proposed Impumelelo WEF be authorised with Substation Alternative 1 being preferred. The following recommendations which should be included as conditions of authorisation:

- Infrastructure should be relocated to avoid the Iron Age settlements known to occur on site (this affects WGT01, the access road to WGT03, WGT05, WGT16, WGT28 and WGT30, and construction camp 2);
- Construction Camp 2 should be relocated away from the archaeological site and potential grave;
- The road near WGT15 should be rerouted if feasible, but otherwise the historical features of the site should be marked no-go areas during construction;
- A pre-construction survey needs to be undertaken on all unploughed sections of the final layout;
- Substation Alternative 1 is preferred but should Alternative 2 be used then the facility should be placed so as to avoid the Iron Age site there;
- No stones may be removed from any archaeological site; and
- If any archaeological material or human burials are uncovered during the course of development then work in the immediate area should be halted. The find would need to be reported to the heritage authorities and may require inspection by an archaeologist. Such

heritage is the property of the state and may require excavation and curation in an approved institution.

Glossary

Early Stone Age: Period of the Stone Age extending approximately between 2 million and 200 000 years ago.

Hominid: a group consisting of all modern and extinct great apes (i.e. gorillas, chimpanzees, orangutans and humans) and their ancestors.

Iron Age: Period post-dating about AD 200 and occurring in Eastern South Africa and featuring farming communities who practised iron smelting. It is split into the Early Iron Age (AD 200 to AD 900), the Middle Iron Age (AD 900 to AD 1300) and the Late Iron Age (AD 1300 to AD 1840).

Later Stone Age: Period of the Stone Age extending over the last approximately 20 000 years.

Middle Stone Age: Period of the Stone Age extending approximately between 200 000 and 20 000 years ago.

Abbreviations

APHP: Association of Professional Heritage Practitioners

ASAPA: Association of Southern African Professional Archaeologists

BA: Basic Assessment

CRM: Cultural Resources Management

EA: Environmental Authorisation

ECO: Environmental Control Officer

EGI: Electricity Grid Infrastructure

EIA: Environmental Impact Assessment

EMPr: Environmental Management Program

ESA: Early Stone Age

GP: General Protection

GPS: global positioning system

HIA: Heritage Impact Assessment

LSA: Later Stone Age

MSA: Middle Stone Age

NEMA: National Environmental Management Act (No. 107 of 1998)

NHRA: National Heritage Resources Act (No. 25) of 1999

PPP: Public Participation Process

REDZ: Renewable Energy Development Zone

SAHRA: South African Heritage Resources Agency

SAHRIS: South African Heritage Resources Information System

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1. INTRODUCTION

ASHA Consulting (Pty) Ltd was appointed by ENERTRAG South Africa (Pty) Ltd to assess the potential impacts to heritage resources that might occur through the proposed construction of the Impumelelo Wind Energy Facility (WEF) on a site of some 2800 ha in extent and located to the northeast of Greylingstad, Mpumalanga (Figures 1 & 2). The project would have a maximum export capacity of up to 200 MW. An approximate mid-point for the study area is S26° 40' 05" E28° 51' 10". The project is proposed across nine farm portions as shown in Table 1.

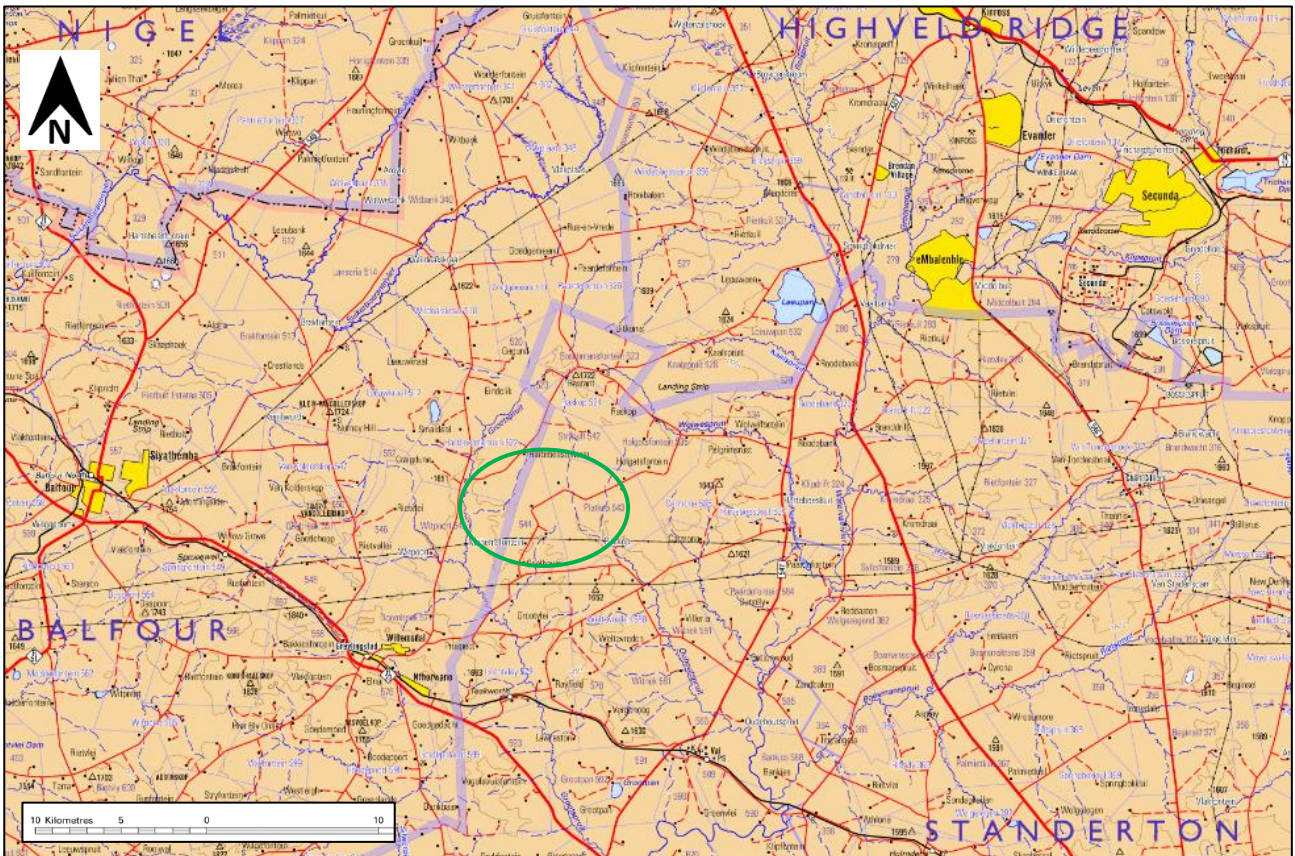


Figure 1: Extract from 1:50 000 topographic map 2628 showing the location of the site (within green oval). Source of basemap: Chief Directorate: National Geo-Spatial Information. Website: www.ngi.gov.za.

Table 1: List of farm portions affected by the proposed project.

Portion Number	Farm Number	Farm Name
6	522	Hartbeesfontein
25	522	Hartbeesfontein
2	543	Platkop
4	543	Platkop
5	543	Platkop
9	543	Platkop
7	544	Mahemsfontein

Portion Number	Farm Number	Farm Name
8	544	Mahemsfontein
Remainder	544	Mahemsfontein

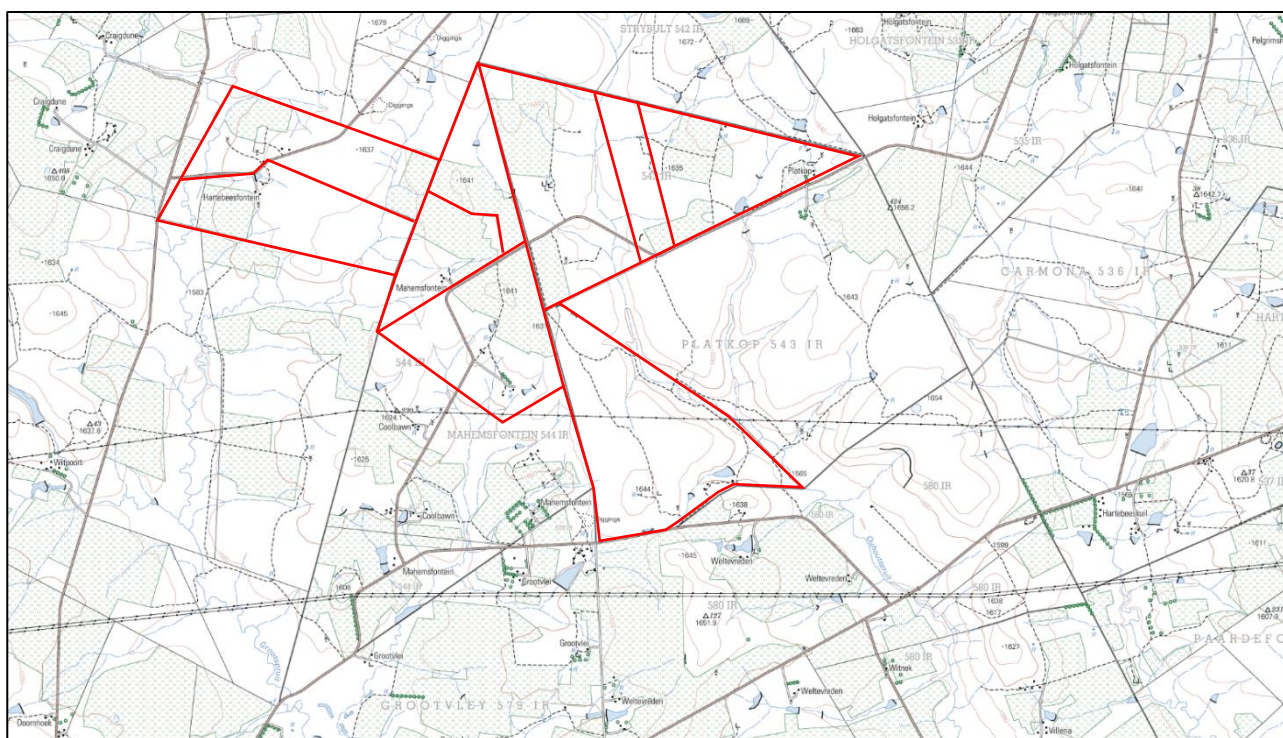


Figure 2: Extract from 1:50 000 topographic map 2628DB showing the location of the site (red polygons indicate farm portions involved).

1.1. The proposed project

1.1.1. Project description

The proposed Impumelelo WEF and associated infrastructure include various components as listed in Table 2. Figure 3 shows the proposed project layout.

Table 2: Project details for the Impumelelo WEF.

Facility Name	Impumelelo Wind Energy Facility
Applicant	Impumelelo Wind (Pty) Ltd (Registration Number: 2022/601923/07)
Municipalities	The project is located in the Dipaleseng local Municipality of the Gert Sibande District Municipality
Affected Farms¹	Portions 6 & 25 of the Farm 522 Hartbeesfontein; Portions 2, 4, 5 and 9 of the Farm 543 Platkop; Portions 0, 7 and 8 of the Farm 544 Mahemsfontein
Extent	2800 ha

¹ Based on the current conceptual layout.

Buildable area	Approximately 680 ha, subject to finalization based on technical and environmental requirements
Capacity	Up to 200MW
Number of turbines	~28
Turbine hub height:	Up to 200m
Rotor Diameter:	Up to 200m
Foundation	Approximately 25m ² diameter x 3m deep – 500 – 650m ³ concrete. Excavation approximately 1000m ² , in sandy soils due to access requirements and safe slop stability requirements.
Operations and Maintenance (O&M) building footprint:	<p>Located in close proximity to the substation. Septic tanks with portable toilets Typical areas include:</p> <ul style="list-style-type: none"> - Operations building – 20m x 10m = 200m² - Workshop – 15m x 10m = 150m² <p>Stores - 15m x 10m = 150m²</p>
Construction camp laydown (x3):	<p>Typical area 100m x 50m = 5000m². Sewage: Septic tanks and portable toilets</p>
Temporary laydown or staging area (x3):	Typical area 220m x 100m = 22000m ² . Laydown area could increase to 30000m ² for concrete towers, should they be required.
Batching plant (temporary):	Gravel and sand will be stored in separate heaps whilst the cement will be contained in a silo.
Internal Roads:	Width of internal road – Between 5m and 6m. Length of internal road – Approximately 60km. Where required for turning circle/bypass areas, access or internal roads may be up to 20m to allow for larger component transport.
Cables:	The medium voltage collector system will comprise of cables up to and including 33kV that run underground, except where a technical assessment suggest that overhead lines are required, within the facility connecting the turbines to the onsite substation.
Independent Power Producer (IPP) site substation and battery energy storage system (BESS):	<p>Total footprint will be up to 6.5ha in extent (5ha for the BESS and 1.5ha for the IPP portion of the substation). The substation will consist of a high voltage substation yard to allow for multiple (up to) 132kV feeder bays and transformers, control building, telecommunication infrastructure, access roads, and other substation components as required.</p> <p>The associated BESS storage capacity will be up to 200MW/800MWh with up to four hours of storage. It is proposed that Lithium Battery</p>

	Technologies, such as Lithium Iron Phosphate, Lithium Nickel Manganese Cobalt oxides or Vanadium Redox flow technologies will be considered as the preferred battery technology however the specific technology will only be determined following EPC procurement. The main components of the BESS include the batteries, power conversion system and transformer which will all be stored in various rows of containers.
Site access	R547 and R23
Height of substation fencing	Up to 3 m high Galvanised steel

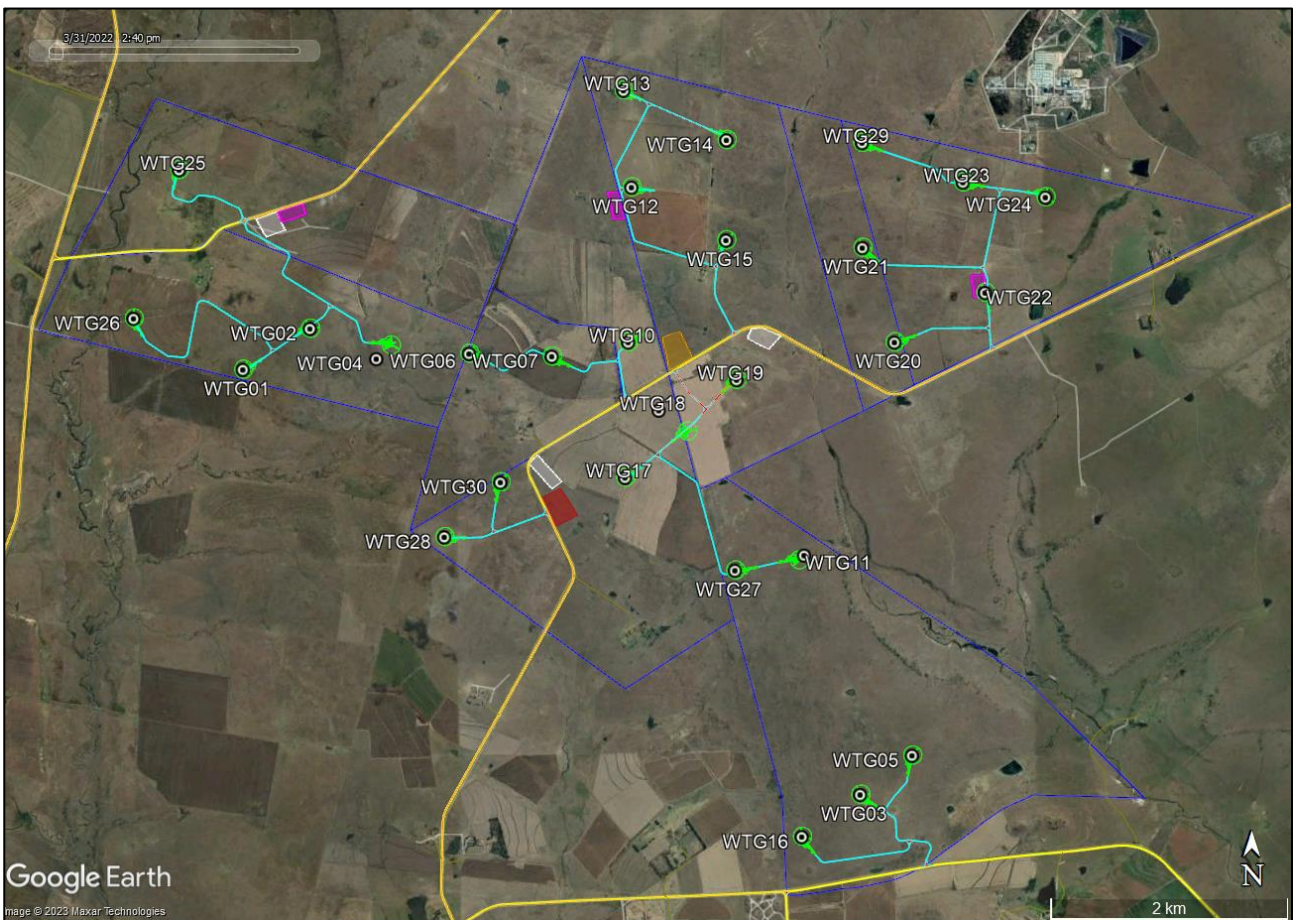


Figure 3: Proposed project layout. Black and white dots = turbines, orange square = Alternative 1 substation and BESS (within this area), red square = Alternative 2 substation and BESS (within this area), pink rectangles = three laydown areas, white rectangles = three construction camps.

1.1.2. Identification of alternatives

No alternative locations for the project have been identified. However, the WEF layout has been designed iteratively within the project site in order to minimise impacts to the environment. As such, alternative locations for the proposed infrastructure have already been explored.

There are two alternative locations for the on-site substation and BESS, with Alternative 1 being the applicant's preferred option.

1.1.3. Aspects of the project relevant to the heritage study

All aspects of the proposed development are relevant, since excavations for foundations and/or services may impact on archaeological and/or palaeontological remains, while all above-ground aspects create potential visual (contextual) impacts to the cultural landscape and any significant heritage sites that might be visually sensitive.

1.2. Terms of reference

ASHA Consulting was asked to:

- Describe regional and local features of the receiving environment;
- Conduct a field survey to search for sensitive areas and sites of heritage significance;
- Map sensitive features and provide spatial data to inform the final project layout;
- Assess the potential impacts on identified heritage resources;
- Identify relevant legislation and legal requirements; and
- Provide recommendations on possible mitigation measures and management guidelines.

1.3. Scope and purpose of the report

A heritage impact assessment (HIA) is a means of identifying any significant heritage resources before development begins so that these can be managed in such a way as to allow the development to proceed (if appropriate) without undue impacts to the fragile heritage of South Africa. This HIA report aims to fulfil the requirements of the heritage authorities such that a comment can be issued by them for consideration by the Mpumalanga Department of Environmental Affairs (DARDLEA) who will review the Environmental Impact Assessment (EIA) and grant or refuse authorisation. The HIA report will outline any management and/or mitigation requirements that will need to be complied with from a heritage point of view and that should be included in the conditions of authorisation should this be granted.

1.4. The authors

Dr Jayson Orton has an MA (UCT, 2004) and a D.Phil (Oxford, UK, 2013), both in archaeology, and has been conducting Heritage Impact Assessments and archaeological specialist studies in South Africa (primarily in the Western Cape and Northern Cape provinces) since 2004 (please see curriculum vitae included as Appendix 1). He has also conducted research on aspects of the Later Stone Age in these provinces and published widely on the topic. He is an accredited heritage practitioner with the Association of Professional Heritage Practitioners (APHP; Member #43) and also holds archaeological accreditation with the Association of Southern African Professional Archaeologists (ASAPA) CRM section (Member #233) as follows:

- Principal Investigator: Stone Age, Shell Middens & Grave Relocation; and
- Field Director: Colonial Period & Rock Art.

Jaco van der Walt has been practising as a CRM archaeologist for 20 years. He obtained an MA degree in Archaeology from the University of the Witwatersrand focussing on the Iron Age in 2012 and is a PhD candidate at the University of Johannesburg focusing on Stone Age Archaeology with specific interest in the Middle Stone Age (MSA) and Later Stone Age (LSA). Jaco is an accredited member of ASAPA (#159) and APHP (#114) and has conducted more than 500 impact assessments in Limpopo, Mpumalanga, North West, Free State, Gauteng, KZN as well as the Northern and Eastern Cape Provinces in South Africa.

Jaco has worked on various international projects in Zimbabwe, Botswana, Mozambique, Lesotho, DRC, Zambia, Guinea, Tanzania as well as Afghanistan. Through this, he has a sound understanding of the IFC Performance Standard requirements, with specific reference to Performance Standard 8 – Cultural Heritage.

1.5. Declaration of independence

ASHA Consulting (Pty) Ltd and its consultants have no financial or other interest in the proposed development and will derive no benefits other than fair remuneration for consulting services provided.

2. LEGISLATIVE CONTEXT

2.1. National Heritage Resources Act (NHRA) No. 25 of 1999

The NHRA protects a variety of heritage resources as follows:

- Section 34: structures older than 60 years;
- Section 35: prehistoric and historical material (including ruins) more than 100 years old as well as military remains more than 75 years old, palaeontological material and meteorites;
- Section 36: graves and human remains older than 60 years and located outside of a formal cemetery administered by a local authority; and
- Section 37: public monuments and memorials.

Following Section 2, the definitions applicable to the above protections are as follows:

- Structures: “any building, works, device or other facility made by people and which is fixed to land, and includes any fixtures, fittings and equipment associated therewith”;
- Palaeontological material: “any fossilised remains or fossil trace of animals or plants which lived in the geological past, other than fossil fuels or fossiliferous rock intended for industrial use, and any site which contains such fossilised remains or trace”;
- Archaeological material: a) “material remains resulting from human activity which are in a state of disuse and are in or on land and which are older than 100 years, including artefacts, human and hominid remains and artificial features and structures”; b) “rock art, being any form of painting, engraving or other graphic representation on a fixed rock surface or loose rock or stone, which was executed by human agency and which is older than 100 years, including any area within 10m of such representation”; c) “wrecks, being any vessel or aircraft, or any part thereof, which was wrecked in South Africa, whether on land, in the internal waters, the territorial waters or in the maritime culture zone of the Republic, as defined respectively in sections 3, 4 and 6 of the Maritime Zones Act, 1994 (Act No. 15 of

1994), and any cargo, debris or artefacts found or associated therewith, which is older than 60 years or which SAHRA considers to be worthy of conservation”; and d) “features, structures and artefacts associated with military history which are older than 75 years and the sites on which they are found”;

- Grave: “means a place of interment and includes the contents, headstone or other marker of such a place and any other structure on or associated with such place”; and
- Public monuments and memorials: “all monuments and memorials a) “erected on land belonging to any branch of central, provincial or local government, or on land belonging to any organisation funded by or established in terms of the legislation of such a branch of government”; or b) “which were paid for by public subscription, government funds, or a public-spirited or military organisation, and are on land belonging to any private individual.”

Section 3(3) describes the types of cultural significance that a place or object might have in order to be considered part of the national estate. These are as follows:

- a) its importance in the community, or pattern of South Africa’s history;
- b) its possession of uncommon, rare or endangered aspects of South Africa’s natural or cultural heritage;
- c) its potential to yield information that will contribute to an understanding of South Africa’s natural or cultural heritage;
- d) its importance in demonstrating the principal characteristics of a particular class of South Africa’s natural or cultural places or objects;
- e) its importance in exhibiting particular aesthetic characteristics valued by a community or cultural group;
- f) its importance in demonstrating a high degree of creative or technical achievement at a particular period;
- g) its strong or special association with a particular community or cultural group for social, cultural or spiritual reasons;
- h) its strong or special association with the life or work of a person, group or organisation of importance in the history of South Africa; and
- i) sites of significance relating to the history of slavery in South Africa.

While landscapes with cultural significance do not have a dedicated Section in the NHRA, they are protected under the definition of the National Estate (Section 3). Section 3(2)(c) and (d) list “historical settlements and townscapes” and “landscapes and natural features of cultural significance” as part of the National Estate. Furthermore, some of the points in Section 3(3) speak directly to cultural landscapes.

2.2. Approvals and permits

2.2.1. Assessment Phase

Section 38(8) of the NHRA states that if an impact assessment is required under any legislation other than the NHRA then it must include a heritage component that satisfies the requirements of S.38(3). Furthermore, the comments of the relevant heritage authority must be sought and considered by the consenting authority prior to the issuing of a decision. Under the National Environmental Management Act (No. 107 of 1998; NEMA), as amended, the project is subject to an EIA. The present report provides the heritage component. Mpumalanga Provincial Heritage Resource Authority

(MPHRA; for built environment and cultural landscapes) and the South African Heritage Resources Agency (SAHRA; for archaeology and palaeontology) are required to provide comment on the proposed project in order to facilitate final decision making by the DARDLEA.

2.2.2. Construction Phase

If archaeological or palaeontological mitigation is required prior to construction, then the appointed archaeologist or palaeontologist would need to obtain a permit from SAHRA. This would be issued in their name. This is so that the heritage authority can ensure that the appointed practitioner has proposed an appropriate methodology that will result in the mitigation being done properly. A built environment permit, if required, would need to be obtained from the PHRA.

2.3. Guidelines

SAHRA have issued minimum standards documents for archaeological and palaeontological specialist studies. There is also a Western Cape Provincial guideline for heritage specialists working in an EIA context and which is generally useful. The reporting has been prepared in accordance with these guidelines. The relevant documents are as follows:

- Winter, S. & Baumann, N. 2005. Guideline for involving heritage specialists in EIA processes: Edition 1. CSIR Report No ENV-S-C 2005 053 E. Republic of South Africa, Provincial Government of the Western Cape, Department of Environmental Affairs & Development Planning, Cape Town.
- SAHRA. 2007. Minimum Standards: archaeological and palaeontological components of impact assessment reports. Document produced by the South African Heritage Resources Agency, May 2007.

3. METHODS

3.1. Literature survey and information sources

A survey of available literature was carried out to assess the general heritage context into which the development would be set. The information sources used in this report are presented in Table 3 with relevant dates of each source referenced in the text as needed. Data were also collected via a field survey. The data quality is suitable for the purpose of informing this report.

Table 3: *Information sources used in this assessment.*

Data / Information	Source	Date	Type	Description
Maps	Chief Directorate: National Geo-Spatial Information	Various	Spatial	Historical and current 1:50 000 topographic maps of the study area and immediate surrounds
Aerial photographs	Chief Directorate: National Geo-Spatial Information	Various	Spatial	Historical aerial photography of the study area and immediate surrounds

Aerial photographs	Google Earth	Various	Spatial	Recent and historical aerial photography of the study area and immediate surrounds
Cadastral data	Chief Directorate: National Geo-Spatial Information	Various	Survey diagrams	Historical and current survey diagrams, property survey and registration dates
Background data	South African Heritage Resources Information System (SAHRIS)	Various	Reports	Previous impact assessments for any developments in the vicinity of the study area
Palaeontological sensitivity	South African Heritage Resources Information System (SAHRIS)	Current	Spatial	Map showing palaeontological sensitivity and required actions based on the sensitivity.
Background data	Books, journals, websites	Various	Books, journals, websites	Historical and current literature describing the study area and any relevant aspects of cultural heritage.

3.2. Field survey

The site was surveyed on 30 and 31 March 2022 using the original project layout. Due to some fairly significant changes to the layout a repeat visit was made on 18 January 2023 to check new areas included in the project and which were considered potentially sensitive. These were during summer and, being a summer rainfall area, the grass was dense which negatively affected the ground visibility for the archaeological survey. Planted fields also tended to be in full growth. Other heritage resources are not affected by seasonality. During the survey the positions of finds and survey tracks were recorded on a hand-held Garmin Global Positioning System (GPS) receiver set to the WGS84 datum (Figure 4). Photographs were taken at times in order to capture representative samples of both the affected heritage and the landscape setting of the proposed development.

It should be noted that the amount of time between the dates of the field inspection and final report do not materially affect the outcome of the report.

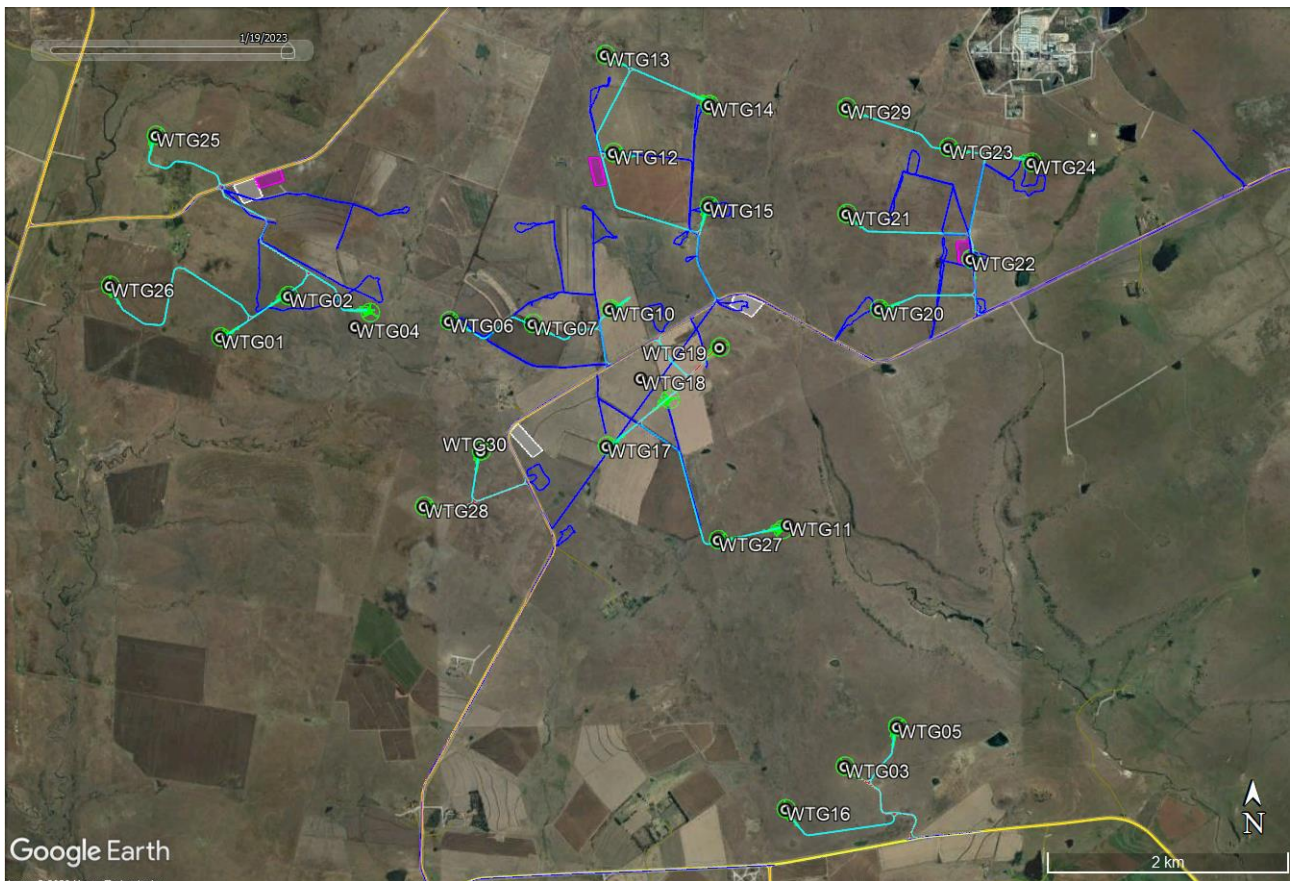


Figure 4: Aerial view of the study area (key as per Figure 3) showing the survey tracks (blue lines).

3.3. Specialist studies

A separate palaeontological specialist study has been compiled by Prof. Marion Bamford and is submitted separately with this HIA.

3.4. Impact assessment

For consistency among specialist studies, the impact assessment was conducted through application of a methodology supplied by WSP.

3.5. Grading

It is intended under S.7(2) that the various provincial authorities formulate a system for the further detailed grading of heritage resources of local significance but this is generally yet to happen. SAHRA (2007) has formulated its own system² for use in provinces where it has commenting authority. In this system sites of high local significance are given Grade IIIA (with the implication that the site should be preserved in its entirety) and Grade IIIB (with the implication that part of the site could be mitigated and part preserved as appropriate) while sites of lesser significance are referred to as having 'General Protection' (GP) and rated as GP A (high/medium significance, requires mitigation), GP B (medium significance, requires recording) or GP C (low significance, requires no further action).

² The system is intended for use on archaeological and palaeontological sites only.

3.6. Consultation

The NHRA requires consultation as part of an HIA but, since the present study falls within the context of an EIA which includes a public participation process (PPP), no dedicated consultation was undertaken as part of the HIA. Interested and affected parties would have the opportunity to provide comment on the heritage aspects of the project during the PPP.

3.7. Assumptions and limitations

The field study was carried out at the surface only and hence any completely buried archaeological sites would not be readily located. Similarly, it is not always possible to determine the depth of archaeological material visible at the surface. The original survey was based on a preliminary layout and not all turbine locations were checked due to planted fields. However, being in ploughed lands, it is assumed that intact archaeological features will not be present in those locations. In some non-planted areas the grass was also very dense which greatly reduced ground visibility. It is assumed that stone features would, however, generally be protruding from the grass but due to the height of the grass it is easily possible to miss small features and/or graves located more than a few meters away. No road layout was available for consideration during the first survey and the current turbine positions are now different which means that, despite the second site inspection during which access was limited, very little of the final layout has actually been surveyed. Nonetheless, aerial photography was scrutinised to locate any further obvious sites, some of which were visited during the second site visit.

Cumulative impacts are difficult to assess due to the variable site conditions that would have been experienced in different areas and in different seasons. Survey quality is thus likely to be variable. As such, some assumptions need to be made in terms of what and how much heritage might be impacted by other developments in the broader area.

4. PHYSICAL ENVIRONMENTAL CONTEXT

4.1. Site context

The study area is situated about 30 km southwest of the Sasol Secunda plant and about 11 km northeast of Greylingstad. The study area covers multiple farms that are used for various farming activities such as cattle and crop farming and farmsteads are scattered through the area. Local public roads are all gravel, and the Impumelelo Mine lies immediately north of the study area.

4.2. Site description

The study area is a relatively flat landscape characterised by open fields with dense grass cover and scattered thickets of small trees. Large, cultivated fields with maize, sunflower and beans are scattered across the study area with the open fields in between used for cattle grazing. Figures 5 to 14 shows the physical appearance of the study area.



Figure 5: View towards the Impumelelo Mine to the north of the study area.



Figure 6: Grass cover in an open field.



Figure 7: Crops in the study area.

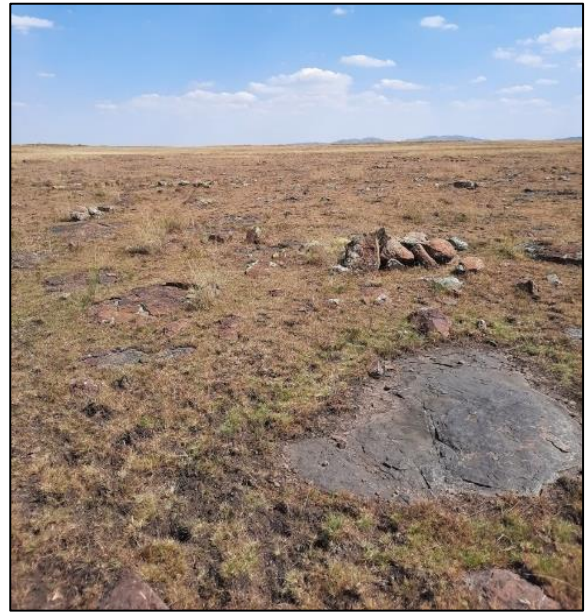


Figure 8: Rare dolerite outcrop in central/northern part of the study area.



Figure 9: Existing agricultural infrastructure (wind pump).



Figure 10: Underground pipeline.



Figure 11: Crops and disturbed soil in the study area.

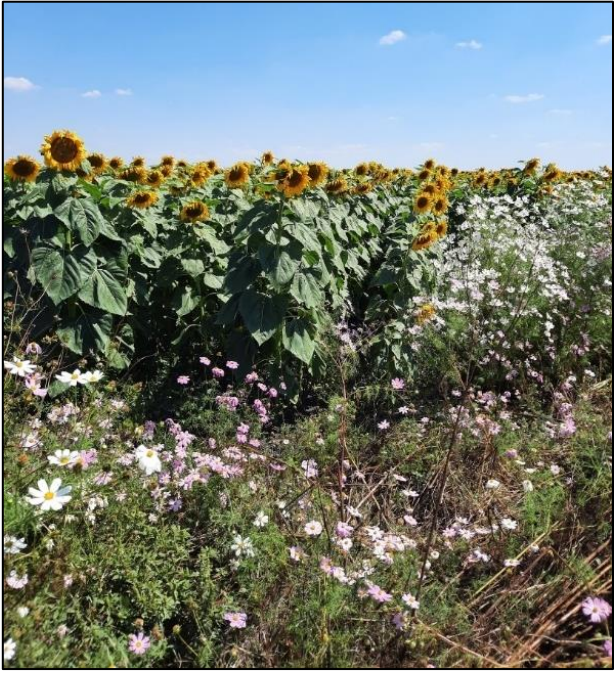


Figure 12: Crops in the study area.



Figure 13: Crops in the study area.



Figure 14: Crops in the study area.



Figure 15: Crops in the study area.



Figure 16: Crops in the study area.



Figure 17: View of the dolerite hill at the very far southern edge of the study area. Iron Age stone circles are visible in this Google Street view which was taken at a time of low grass cover.

5. FINDINGS OF THE HERITAGE STUDY

This section describes the heritage resources recorded in the study area during the course of the project.

5.1. Palaeontology

The SAHRIS Palaeosensitivity Map shows the site to be of largely zero palaeontological sensitivity (Figure 18). However, a few small areas of very high sensitivity and one of moderate do occur. It appears as though only two turbines fall within these zones. Due to the sandy substrate and generally dense vegetation covering throughout the study area, a desktop palaeontological study was carried out. This has been submitted separately with this HIA.

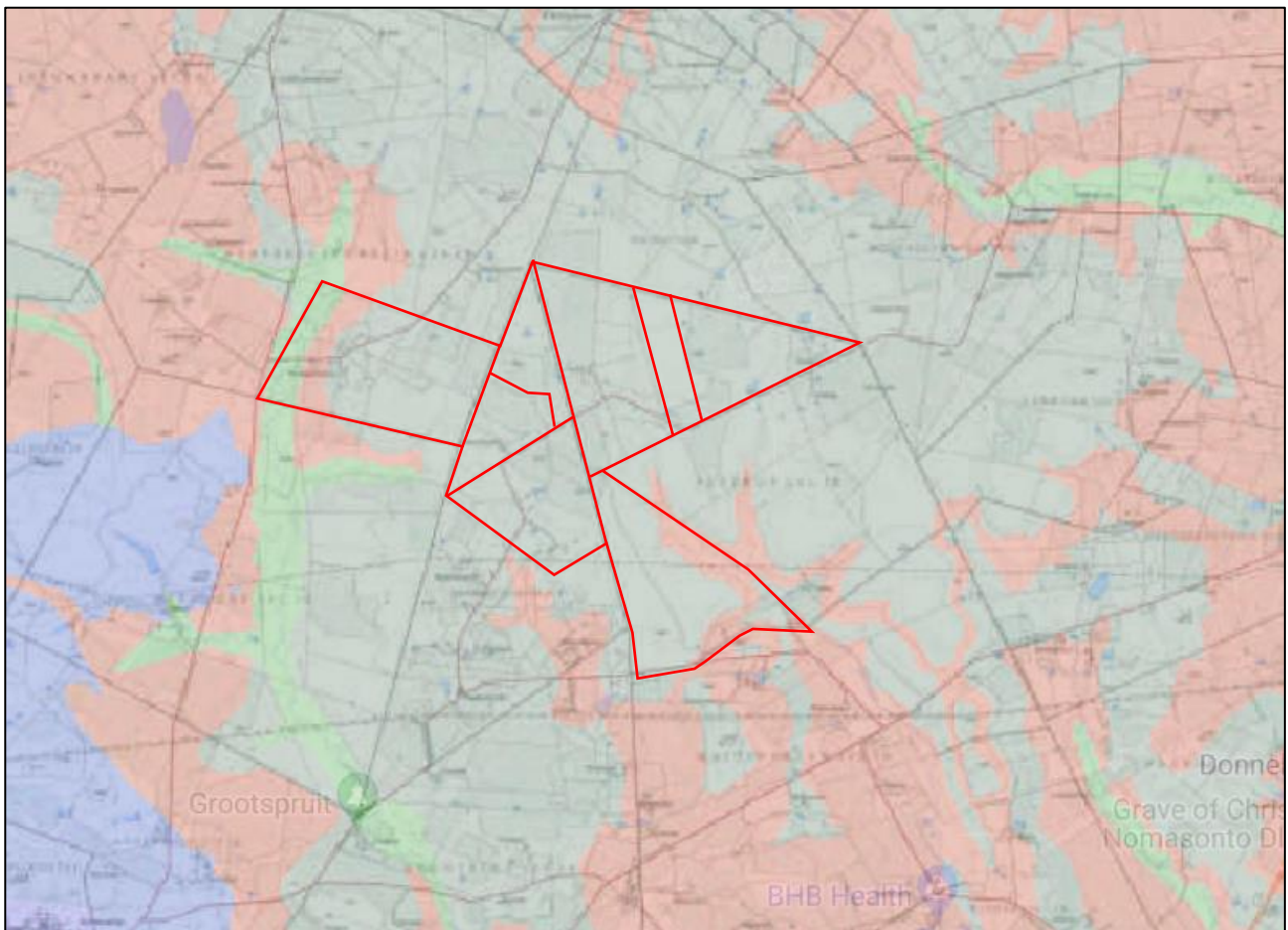


Figure 18: Extract from the SAHRIS Palaeosensitivity Map showing the site (red polygons) to be of largely zero palaeontological sensitivity (grey shading). A few small areas are rated as of very high (red) and moderate (green) sensitivity.

5.2. Archaeology

5.2.1. Desktop study

ESA assemblages have been investigated from the Maleoskop Site near Groblersdal, approximately 100 km south of the project area (Esterhuysen & Smith 2007). Other prolific Stone Age sites in

Mpumalanga include Bushman Rock Shelter and Heuningneskrans Shelter, located approximately 70 km southeast of the project area (Louw 1969; Plug 1982; Klein 1984). Within the vicinity of the project area, previous impact assessment surveys have shown that MSA and LSA stone tools are widely distributed as scatters across the landscape. Evidence for these periods has been excavated from Bushman Rock Shelter in the Ohrigstad District (Esterhuysen & Smith 2007) and it is known that San communities lived near Lake Chrissie as recently as the 1950s (e.g. Schlebusch *et al.* 2016).

Dates from Early Iron Age sites indicate that by the beginning of the 5th century CE Bantu-speaking farmers had settled in the Mpumalanga lowveld. Subsequently, farmers continued to move into and between the lowveld and highveld of Mpumalanga. By 1500 CE the escarpment was populated by chiefdoms, including Pedi and Bokoni communities. These chiefdoms would have had trade relations with Ndundza, Swazi and Zulu kingdoms, exchanging salt, cattle and metals as evidenced by the archaeological record (Esterhuysen & Smith 2007; Delius *et al.* 2012). Iron Age settlements within the surrounding areas include that of Wildebeestfontein near Kinross in the Bethal District. This site consisted of nine middens and several depressions indicating dwellings, with a layout pattern similar to Type V settlements with some possible alteration due to the Difeqane. Another important site is that of Robertsdrift, a Type V settlement at the confluence of the Vaal and Klip rivers outside Standerton. It was discovered after aerial photographs were taken of the area. Ceramics with comb stamping motifs were identified during excavations (Derricourt & Evers, 1973). Aerial imagery of the present study area has revealed the presence of Iron Age settlements in various areas, both within and outside of the study area. Unfortunately, most of these sites could not be visited due to access not being available.

Other CRM surveys that have taken place in the vicinity of the present study area reveal the variety of heritage resources commonly encountered in the area. These are listed in Table 4.

Table 4: CRM reports compiled for other projects close to the present study area.

Author	Year	Project	Findings
Henderson, Z & Koortzen, C	2007	2007. Heritage Assessment Report Zeus Substation Expansion, Vlakfontein 328, Gert Sibande (DC 30) District, Mpumalanga, South Africa. Unpublished report for PBA International.	A burial ground containing 56 graves was identified during the impact assessment. The oldest identified date on the headstone is 1922 (Henderson & Koortzen, 2007).
Van Schalkwyk, J.A.	2008	Heritage Impact Assessment for the Standerton Extension 8 Project, Standerton, Mpumalanga. Unpublished report for Interdesign Landscape Architects	A Second World War aerodrome was identified during the impact assessment. It was part of the vast Joint Air Training Scheme that was operated by the South African Air Force and the Royal Air Force.
Pistorius, J.C.C.	2008	A phase 1 Heritage Impact Assessment (HIA) study for Sasol's proposed new gas and liquid pipelines in Secunda (Mpumalanga) to Sasol Infrachem and Natref in Sasolburg (Free State) on the Highveld in the Republic of South Africa.	A total of three farmstead complexes, 11 historical houses and 14 burial grounds were identified along the proposed pipeline corridor (Pistorius, 2008).

Khan, S.K. & Higgitt, N.	2012	Heritage Statement for the Zandbaken Coal Mine Project, Zandbaken 585 IR, Sandbaken 363 IS and Bosman's Spruit 364 IS, Standerton, Mpumalanga	Desktop assessment highlighting graves and built environment sites in the region
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5.2.2. Site visit

A number of archaeological resources were recorded in the study area. These are listed in Table 5 and then individually described and illustrated below. Mapping is presented in Appendix 3.

Table 5: List of heritage finds recorded during the field survey.


Waypoint	Location	Nature	Grade
IM001	26°39'13.00"S 28°53'55.30"E	Graves	IIIA
IM002	26°39'44.83"S 28°52'05.10"E	Archaeological – stone feature	GPC
IM003	26°39'23.35"S 28°51'16.78"E	Archaeological – ruins	GPA
IM004	26°39'43.36"S 28°51'32.52"E	Archaeological – stone features & possible graves	GPC & IIIA
IM005	26°39'24.18"S 28°50'54.80"E	Archaeological – ruin	GPC
IM006	26°39'35.49"S 28°49'44.46"E	Archaeological – stone features	GPC
IM007	26°38'32.13"S 28°50'08.00"E	Archaeological – ruin	GPC
IM008	26°42'01.96"S 28°52'05.87"E	Archaeological – stone features	GPA
IM009	26°42'01.21"S 28°52'24.08"E	Graves	IIIA
IM010	26°39'13.50"S 28°53'55.24"E	Archaeological – ruin	GPC
IM011	26°40'25.71"S 28°50'28.81"E	Archaeological – stone feature	GPB
IM012	26°39'52.00"S 28°49'02.00"E	Archaeological – stone features	GPA
IM013	26°40'03.40"S 28°49'05.30"E	Archaeological – stone features	GPB
IM014	26°42'31.50"S 28°52'33.70"E	Archaeological – stone features	GPA
IM015	26°43'02.70"S 28°52'43.75"E	Archaeological – stone features	GPA
IM016	26°40'52.83"S 28°52'42.70"E	Archaeological – stone features	GPB
IM017	26°40'48.00"S 28°53'20.46"E	Archaeological – stone features	GPB
IM018	26°40'44.75"S 28°53'34.95"E	Archaeological – stone features	GPB

The most significant archaeological sites recorded are large stone-walled Iron Age settlements built on and around hills. These date to the Late Iron Age and follow the Central Cattle Pattern (CCP) (Huffman 2001) settlement layout. These sites were identified from aerial imagery as they stand out clearly on the landscape. Spatially these settlements show close affiliation with Type N settlements (Maggs 1976). Type N settlements date to the 15th to 17th centuries in the Free State, and during this time they spread across the Vaal into the hilly areas around Gauteng (Dreyer 1992). Here it developed into a settlement pattern referred to as Klipriviersberg (Huffman 2007) dating to the 18th and 19th centuries (the sites we identified, including IM011, are thus from this period). These sites are marked by several small stock kraals, and walls separating residential zones and unmarked graves are likely to occur in them. Larger settlements are also more common during this period.

Other stone-walled sites are historical and assumed to be the dwellings and associated structures of white farmers. Most of them likely have their roots in the 19th century but would have fallen into disuse during the 20th century. They are generally of quite low significance because of their poor

condition and relatively recent origin. Historical buildings were often purposefully demolished so that the stones could be reused elsewhere on the farms and this may explain the very limited rubble at most of the sites. It is possible that abandoned houses may have been used by farm labourers before their eventual demolition and, as such, the possibility of still-born babies having been buried there must be considered. The chances of this happening are, however, very small and such remains would likely not be found during earthmoving.

Also found were some ruined farm structures which, due to their poor condition and relatively recent age, have low significance.

Site Number: IM002	Description: Ephemeral stone packed foundation of what could have been a rectangular dwelling of farm labourers. The feature measures approximately 4 x 3 meters.	Period: Historic, recent
Coordinates: 26°39'44.83"S 28°52'5.10"E.		
 <p data-bbox="470 1691 1125 1736">Figure 19: Stone foundation barely visible in the grass.</p>		



Figures 20 & 21: Remains of stone wall foundation.



Figure 22: 1955 (201_009_04327) and modern aerial views of the site. A pale patch in the region of the site could indicate some activity there in 1955.

Statement of Significance and Grade:

Low, unless containing still born graves - GPC.

Site Number:	Description:	Period:
IM003	Farmstead with multiple structures and cattle handling facility. The most recent buildings are constructed with fired clay bricks with presumably older structures constructed with dressed stone slabs and cement but with concrete lintols above the doors and windows. Some features have been demolished.	Historic, recent.

Coordinates:
26°39'23.35"S
28°51'16.78"E



Figures 23 & 24: Views of the complex with ruins of cement and modern brick.

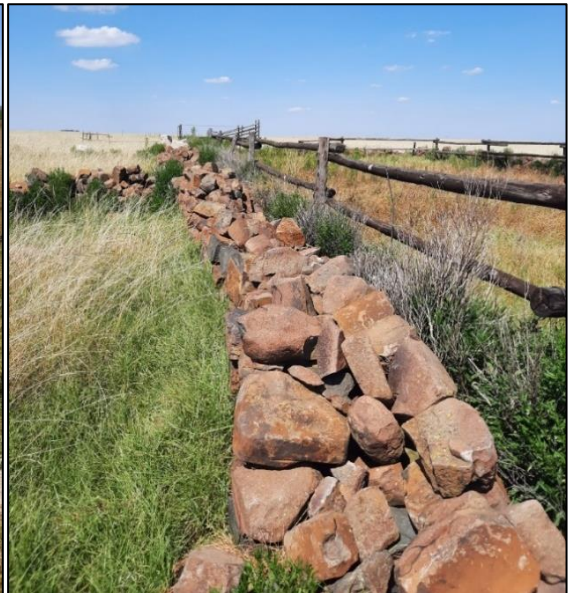


Figure 26: A ruin of cement and stone.

Figure 26: A drystone-walled animal enclosure.



Figure 27: A ruin of cement and modern brick.



Figure 28: A cement and stone house ruin.



Figure 29: A plastered ruin of cement and stone.



Figure 30: A cement and stone ruin with modern concrete lintels.



Figure 31 & 32: Drystone-walled animal enclosure.



Figure 33: 1955 (201_009_04328) and modern aerial views with the light and dark patches in the centre of the older one clearly showing activity in the vicinity of the site.

Statement of Significance and Grade:

Low - GPA

Site Number:	Description:	Period:
IM004	<p>Remnants of various packed stone foundations, stone packed kraals, stone outer walls and cement slabs. The features are found over an area of approximately 85 x 80 meters. This area also included oval stone packed cairns measuring approximately 2 meters long and 1.2 meters wide that could be graves.</p> <p>The possible graves are also located near the stone structures.</p>	Historic, recent
<p>Coordinates: 26°39'43.36" S 28°51'32.52" E</p>		



Figures 34 & 35: Drystone walling.



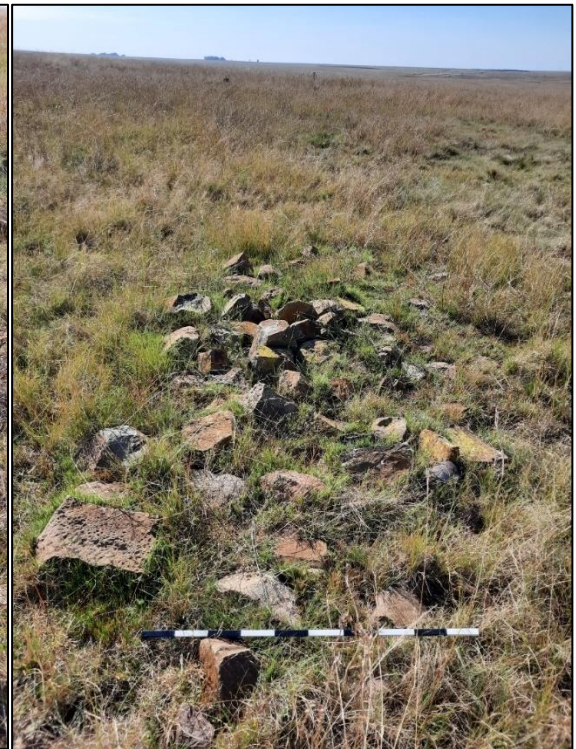
Figures 36 & 37: Drystone walling.



Figure 38: Remains of drystone-walled structures.



Figure 39: Remains of a cement floor.



Figures 40 & 41: Stone mounds that might be graves.



Figures 42 & 43: Stone mounds that might be graves, but the general scatter of rocks may suggest otherwise.

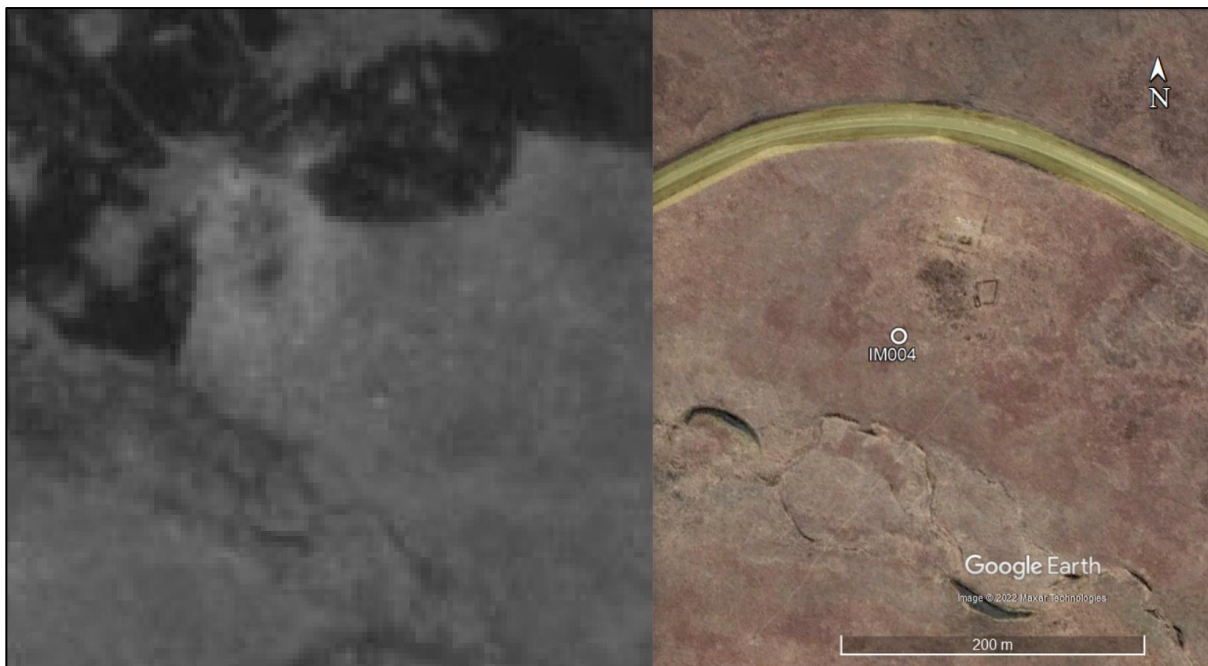


Figure 44: 1955 (201_009_04328) and modern aerial views showing a large light patch on the older image where the site is. The darkest central spot identifies the kraal.

Statement of Significance and Grade:

Low - GPC, but stone cairns could mark burial sites which would be high - IIIA.

Site Number: IM005	Description: Remnants of a stone and mud mortar dwelling (8 x 8 meters) consisting of two rooms. Ephemeral foundations of associated features were noted surrounding the structure. The larger site measures approximately 35 x 25 meters.	Period: Historic, recent
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Coordinates
26°39'24.18"S
28°50'54.80"E



Figures 45 & 46: Stone-walled house ruin.



Figures 47 & 48: Stone-walled house ruin.



Figure 49: 1955 (201_009_04328) and modern aerial views of the site. The pale areas in the older image indicate disturbance at the site.

Statement of Significance and Grade:

Low - GPC

Site Number: IM006	Description: Remnant drystone-walled foundations of rectangular structures. Two features consisting of multiple rooms are found together, with a single room square structure located 68 meters to the west	Period: Historic, recent
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Coordinates:
26°39'35.49"S
28°49'44.46"E



Figures 50 & 51: Drystone walling.



Figures 52 & 53: Remnants of drystone walling.



Figure 54: Remnants of drystone-walled structure.



Figure 55: The landscape context of the features illustrated above.

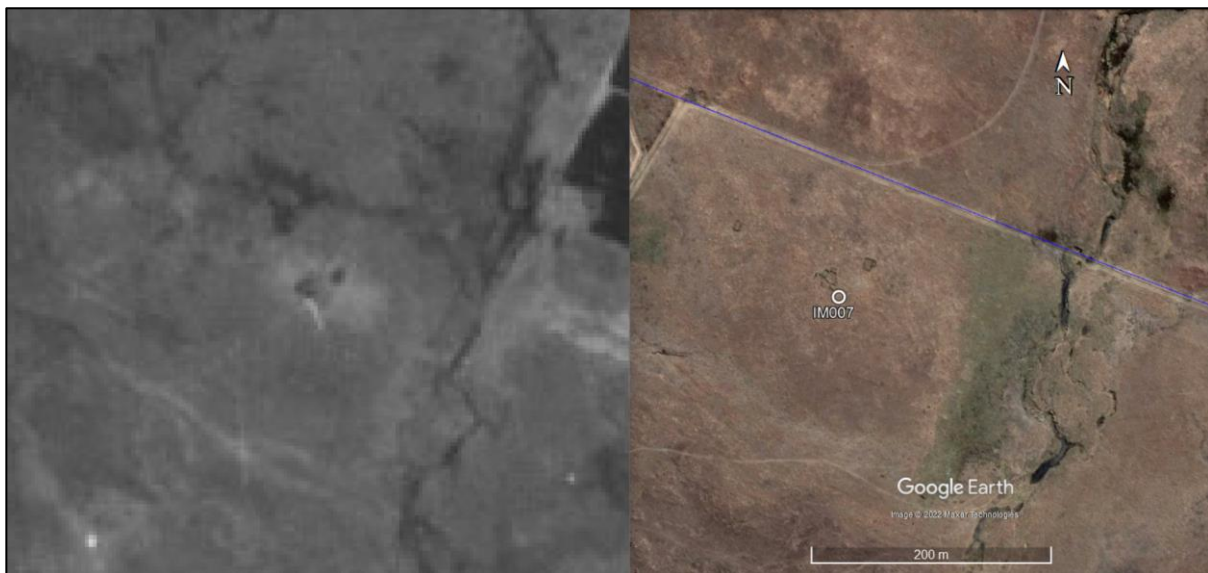


Figure 56: 1955 (201_009_04329) and modern views of the complex. The pale area with two darker spots in the older image clearly identifies the two features in the east.

Statement of Significance and Grade:

Low - GPC

Site Number:	Description:	Period:
IM007	Remnants of a large farmstead with packed stone structures. Seen from the road. Not in study area so only examined from a distance.	Historic, recent

Coordinates
26°38'32.13"S
28°50'08.00"E



Figure 57: Ruined complex seen from the road.



Figure 58: 1955 (201_009_04327) and modern views of the site. The small dam is clear in the older image with the site to its west. The dark square may represent a kraal, but is more likely a planted area since no sign of a stone kraal occurs there today.

Statement of Significance and Grade:
Low - GPC

<p>Site Number:</p> <p>IM008</p>	<p>Description:</p> <p>Late Iron Age stonewalled settlement marked by various enclosures and low walls (~30 cm high). Recording was done from the road due to lack of access. The site is located around low hills that also provide building materials for these settlements. The site covers a large area. One section in the northeast (not visible from the road behind the hill) is likely historical as a square enclosure is visible. Another large complex is situated on a hill to the south (outside study area – IM014). A small cemetery is situated at the foot of the hill on the eastern edge of the settlement (IM009).</p>	<p>Period:</p> <p>Historic</p>
<p>Coordinates: 26°42'1.96"S 28°52'5.87"E</p>		
<div data-bbox="242 719 1351 1167" data-label="Image"> </div> <p data-bbox="389 1207 1206 1240">Figure 59: <i>View of the stone-walled feature lying closest to the road.</i></p>		



Figures 60 & 61: General site conditions showing the low hill around and on which the site lies.



Figure 62: Aerial view dated 2012 showing the site with various sections enlarged.

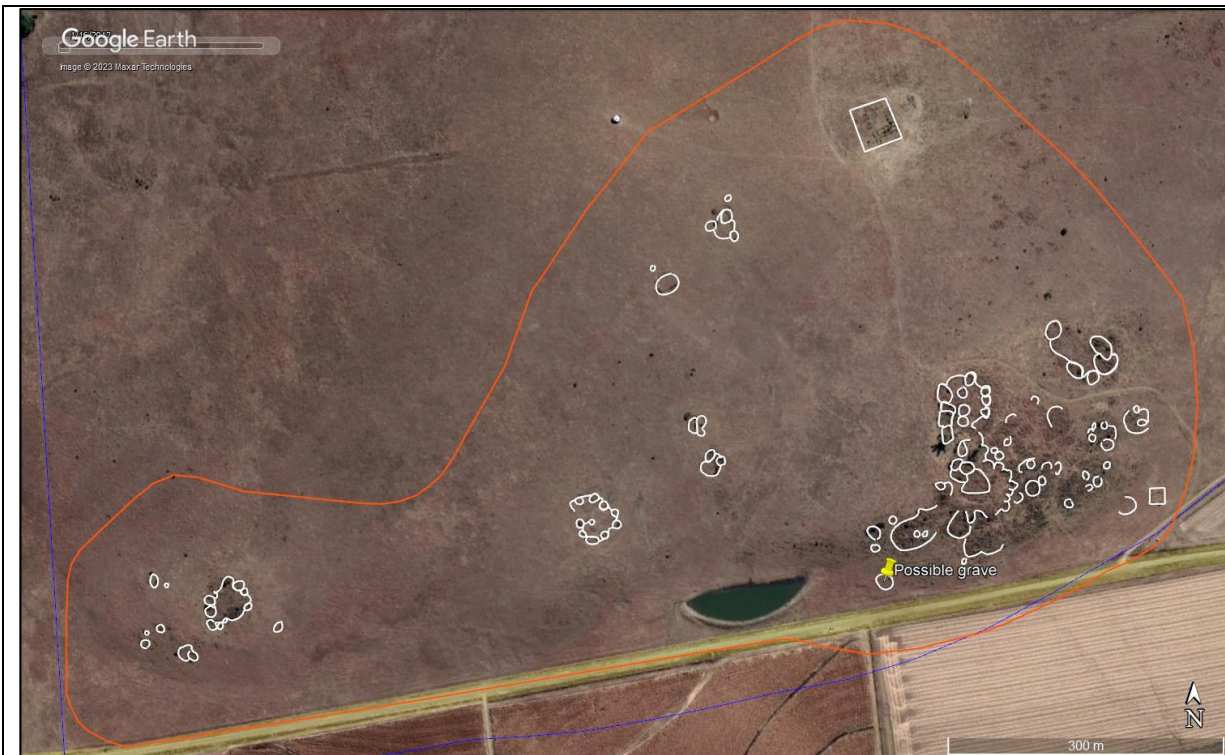


Figure 63: Aerial view of the site with an attempt made to identify all the stone walling from the photograph. The square in the northeast contains several square enclosures and may be historical. The small square in the southeast is a cemetery (IM009).

Statement of Significance:

Larger site is medium– III B.

Graves are high – IIIA

Site Number:	Description:	Period:
IM010	Small farm settlement containing 3 degraded structures scattered across a ~1ha area. The ruins are fairly intact apart from the rooves that have collapsed. The structures do not seem to be of heritage value. Possibly the remnants of worker’s housing. The structures are built from cement and brick. Sites like these could contain unmarked burial sites.	Recent

Coordinates:

26°39'13.50"S

28°53'55.24"E





Figures 64 – 70: Views of the ruins at IM010 and their context.

Statement of Significance:

Low - GPC

Low potential for graves which would be high significance if older than 60 years - IIIA

Site Number:	Description:	Period:
IM011	Small Late Iron Age settlement marked by the ephemeral remains of enclosures and stone walling of which only the foundations remain. The site is situated on a small, low hill. The small hill is overgrown with tall grass making it difficult to determine the site layout and extent. High likelihood of graves occurring in association with this site.	Historic

Coordinates:
26°40'25.71"S
28°50'28.81"E





Figures 71 – 76: General site conditions at IM011 showing the remains of stone walling scattered across the low overgrown hill.

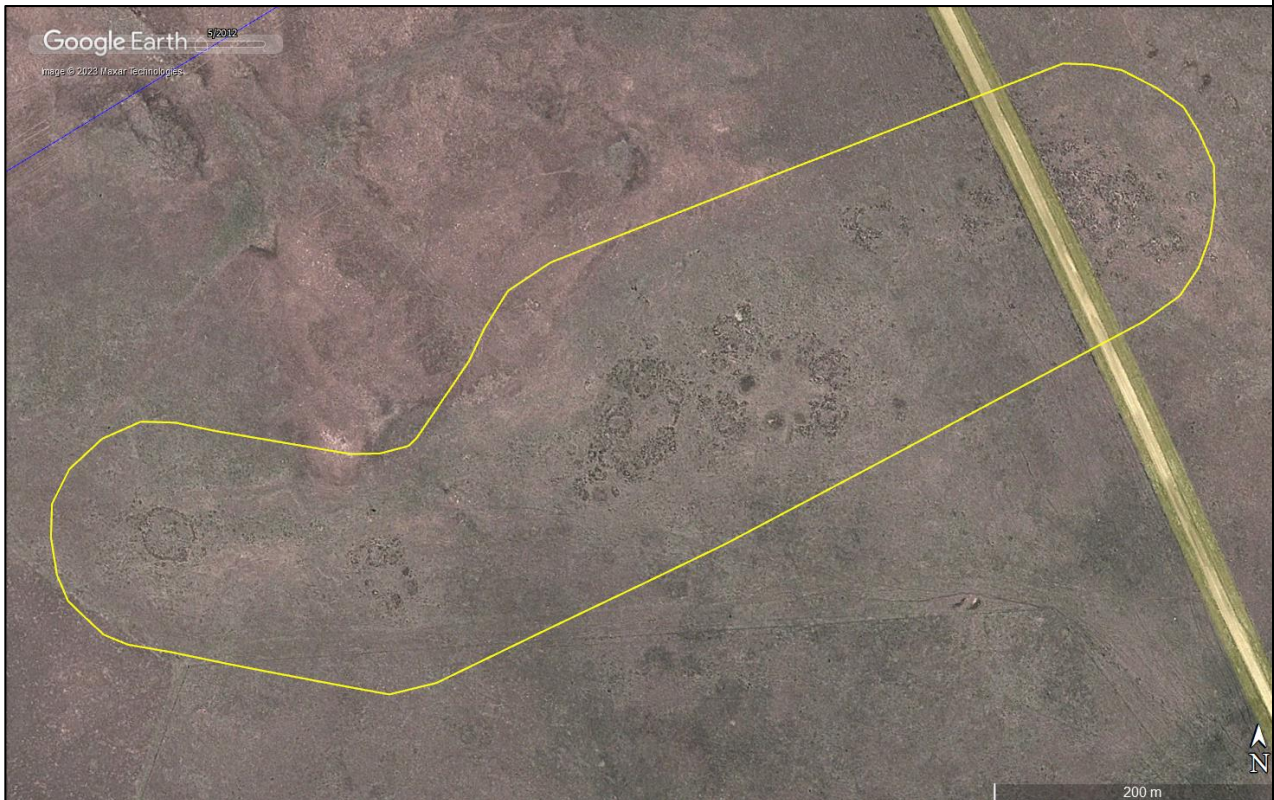


Figure 77: Aerial view dated 2012 with the site in the 50 m buffer polygon. This is the clearest imagery available, but the enclosures to the east of the road (and which were surveyed) are not readily visible.

Statement of Significance:

Low to medium – GPB

Graves, if present are high – IIIA

Site Number:	Description:	Period:
IM012	An extensive Late Iron Age settlement seen from Google Earth and not visited during the survey. It is extensive containing many enclosures over a distance of some 650 m.	Historic

Coordinates: 26°39'51.50"S 28°48'59.69"E

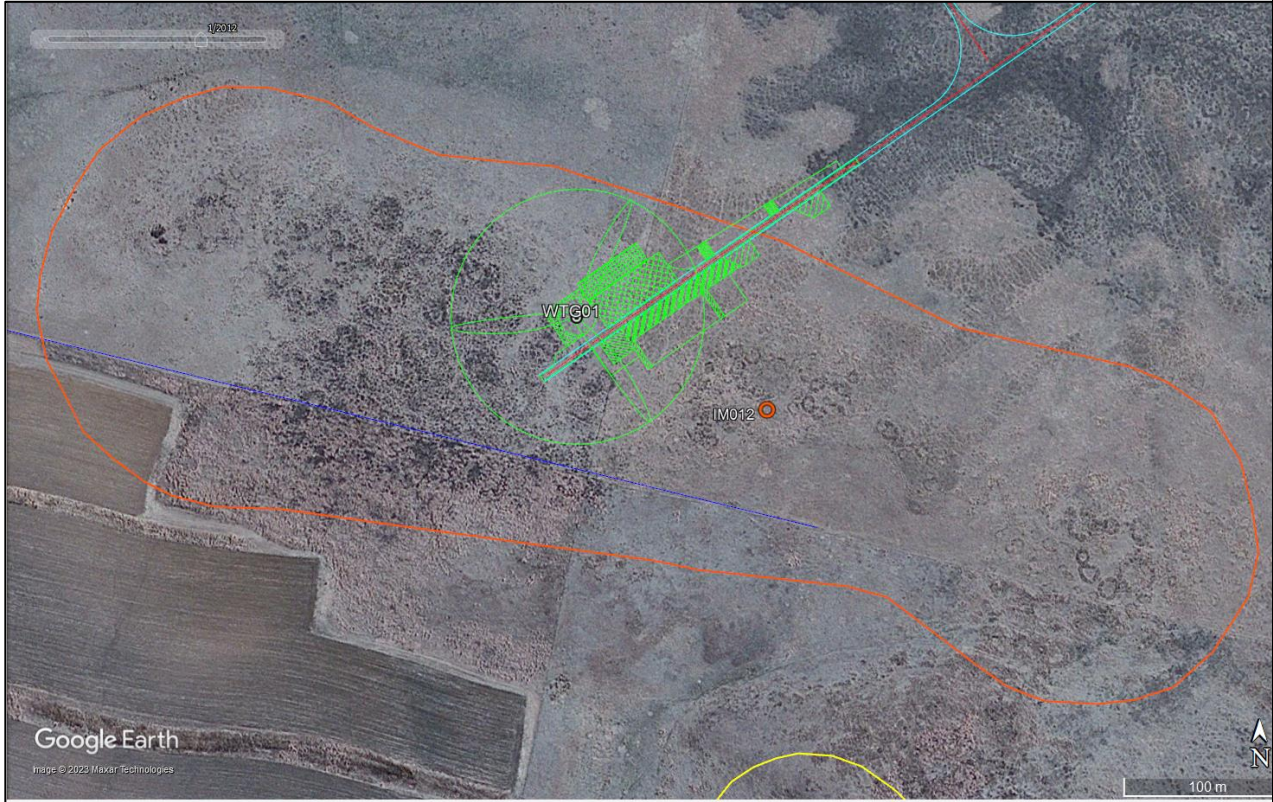


Figure 78: 2012 aerial image showing the IM012 site (orange outline includes 50 m buffer). IM013 is to the south (yellow).

Statement of Significance: Low to medium – GPA Graves, if present are high – IIIA
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Site Number:	Description:	Period:
IM013	A small stone-walled site located just outside the study area and not visited. It looks Iron Age, but part in the southeast seems well preserved and includes a rectangular feature that may be historical. Only a few enclosures visible over a distance of some 230 m. High likelihood of graves occurring in association with this site.	Historic

Coordinates: 26°40'03.40"S 28°49'05.30"E

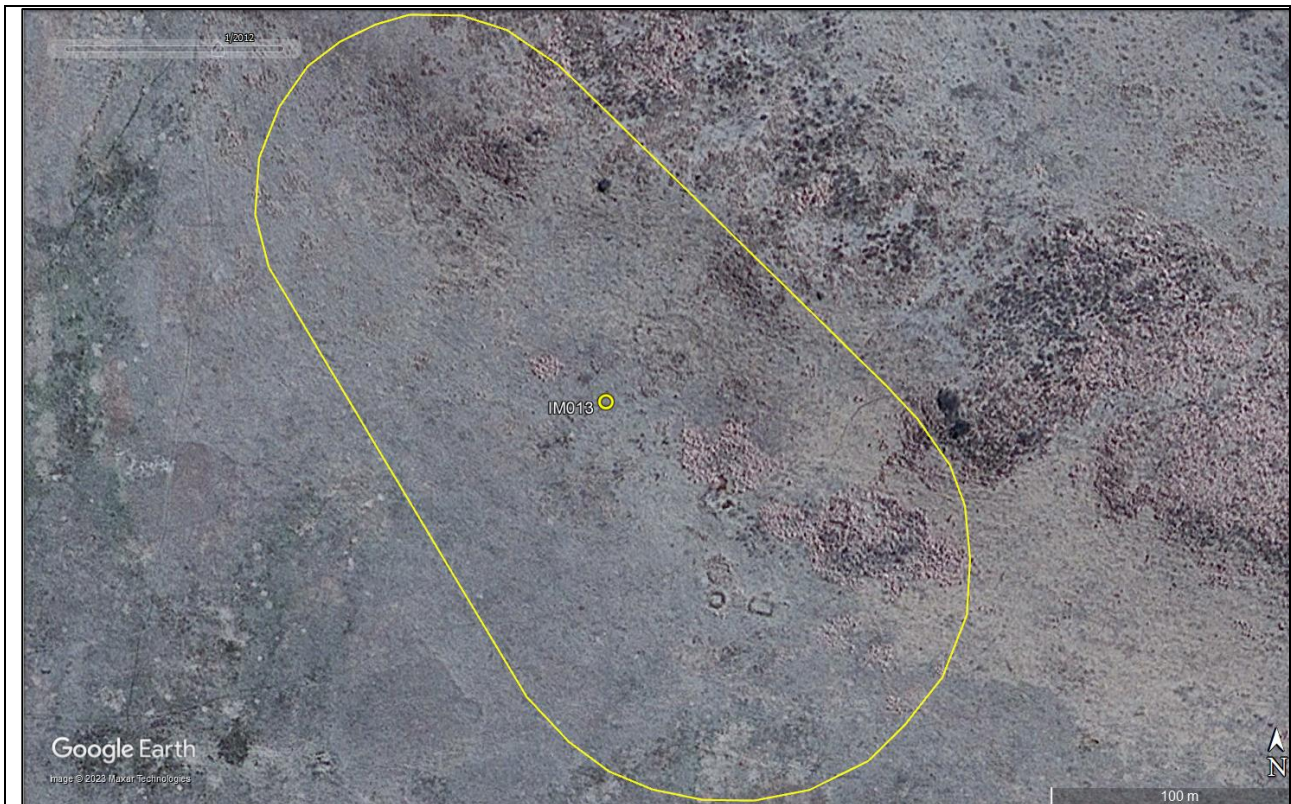


Figure 79: 2012 aerial image showing the IM012 site (orange outline includes 50 m buffer). IM013 is to the south (yellow).

Statement of Significance:

Low to medium – GPB

Graves, if present are high – IIIA

Site Number:	Description:	Period:
IM014	A large stone-walled Late Iron Age settlement located just outside the far southern edge of the study area and not visited. It has a large number of enclosures visible and scattered over an area about 1.2 km long. High likelihood of graves occurring in association with this site.	Historic

Coordinates:

26°40'03.40"S

28°49'05.30"E



Figure 80: This hill to the south of the study area contains a large Late Iron Age settlement.



Figure 81: 2021 aerial view of the northern part of IM014 with the stone-walled enclosures clearly visible.



Figure 82: 2021 aerial view of the central part of IM014 with the stone-walled enclosures clearly visible and a high voltage powerline cutting through the site.

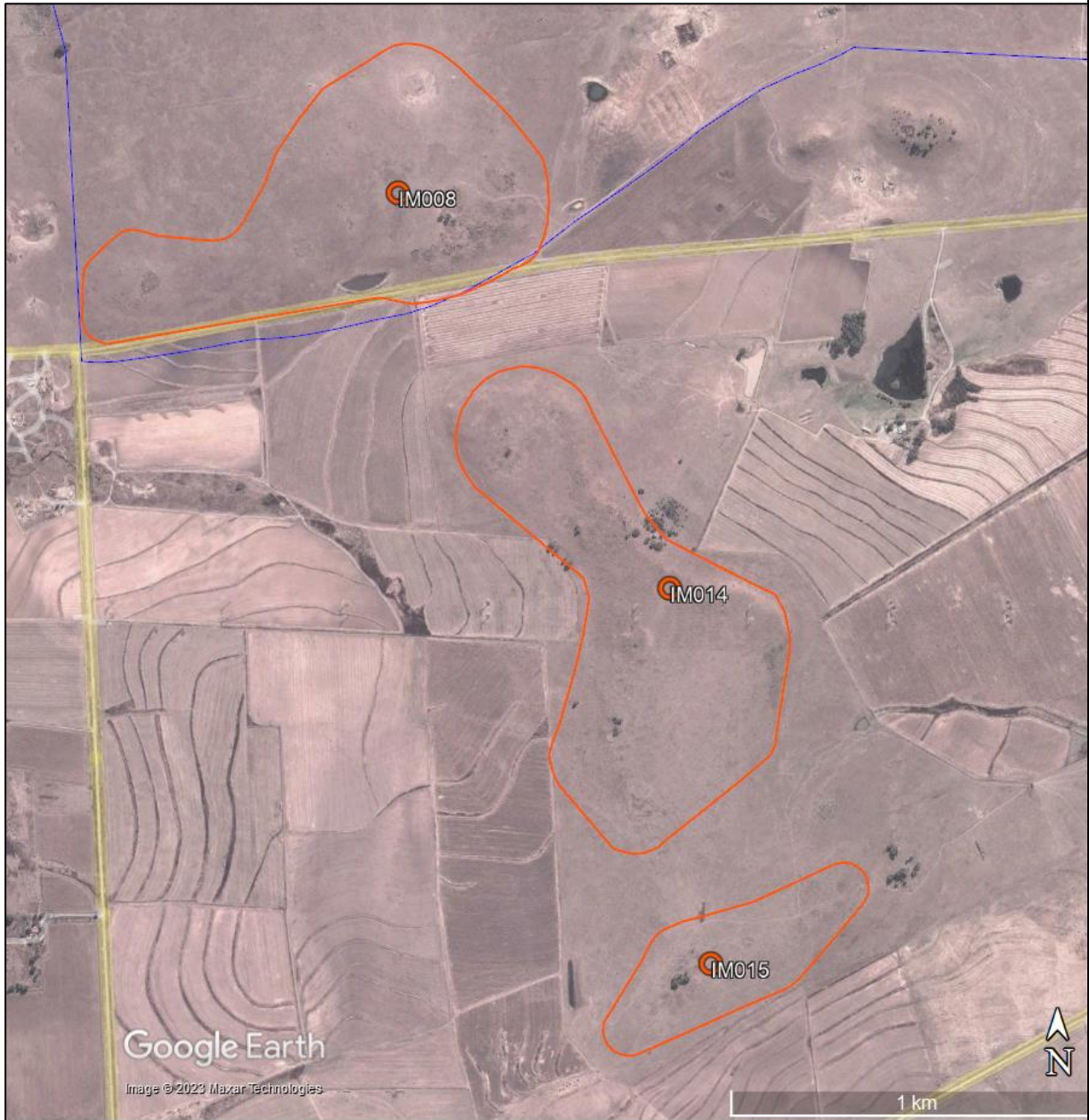


Figure 83: 2012 aerial view showing the spatial extent of IM014 and IM015 and their relationship to IM008. The blue polygon is the southern edge of the study area.

Statement of Significance:

Low to medium – GPA
Graves, if present are high – IIIA

Site Number:	Description:	Period:
IM015	A small stone-walled site late Iron Age settlement located well outside the study area but spatially related to IM014. Many enclosures visible over a distance of some 700 m. High likelihood of graves occurring in association with this site.	Historic

Coordinates:

26°43'02.70"S

28°52'43.75"E



Figure 84: 2012 aerial image showing the IM015 site (orange outline includes 50 m buffer).

Statement of Significance:

Medium – GPA

Graves, if present are high – IIIA

Site Number:	Description:	Period:
IM016	A small stone-walled site late Iron Age settlement located outside the study area.	Historic
Coordinates: 26°40'52.83"S 28°52'42.70"E		

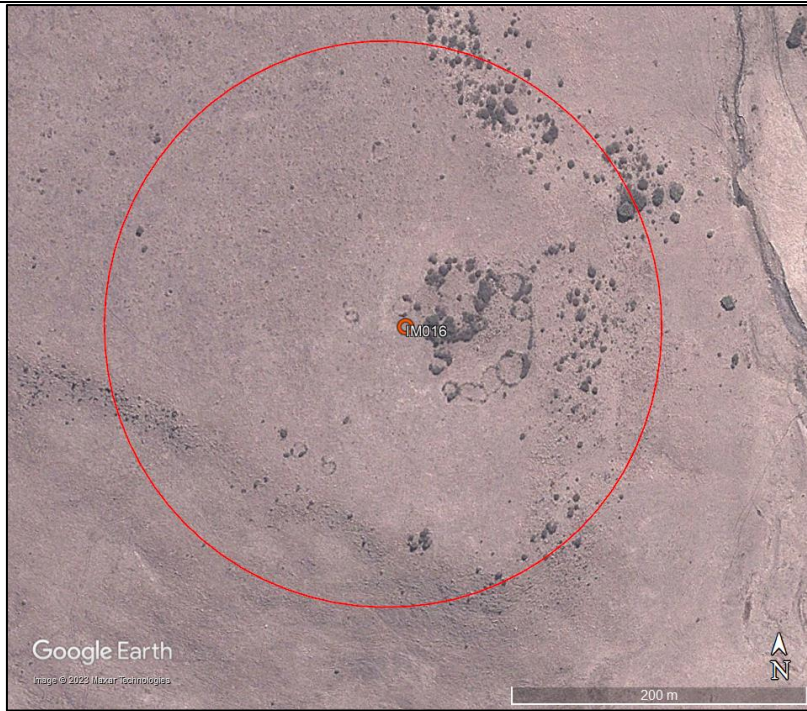


Figure 85: 2012 aerial image showing the IM016 site (orange outline includes 50 m buffer).

Statement of Significance:

Medium – GPB

Graves, if present are high – IIIA

Site Number:	Description:	Period:
IM017	A small stone-walled site late Iron Age settlement located outside the study area.	Historic
<p>Coordinates: 26°40'48.00"S 28°53'20.46"E</p>		



Figure 86: 2012 aerial image showing the IM017 site (orange outline includes 50 m buffer).

Statement of Significance:

Medium – GPB

Graves, if present are high – IIIA

Site Number:	Description:	Period:
IM018	A small stone-walled site late Iron Age settlement located outside the study area.	Historic
<p>Coordinates: 26°40'44.75"S 28°53'34.95"E</p>		

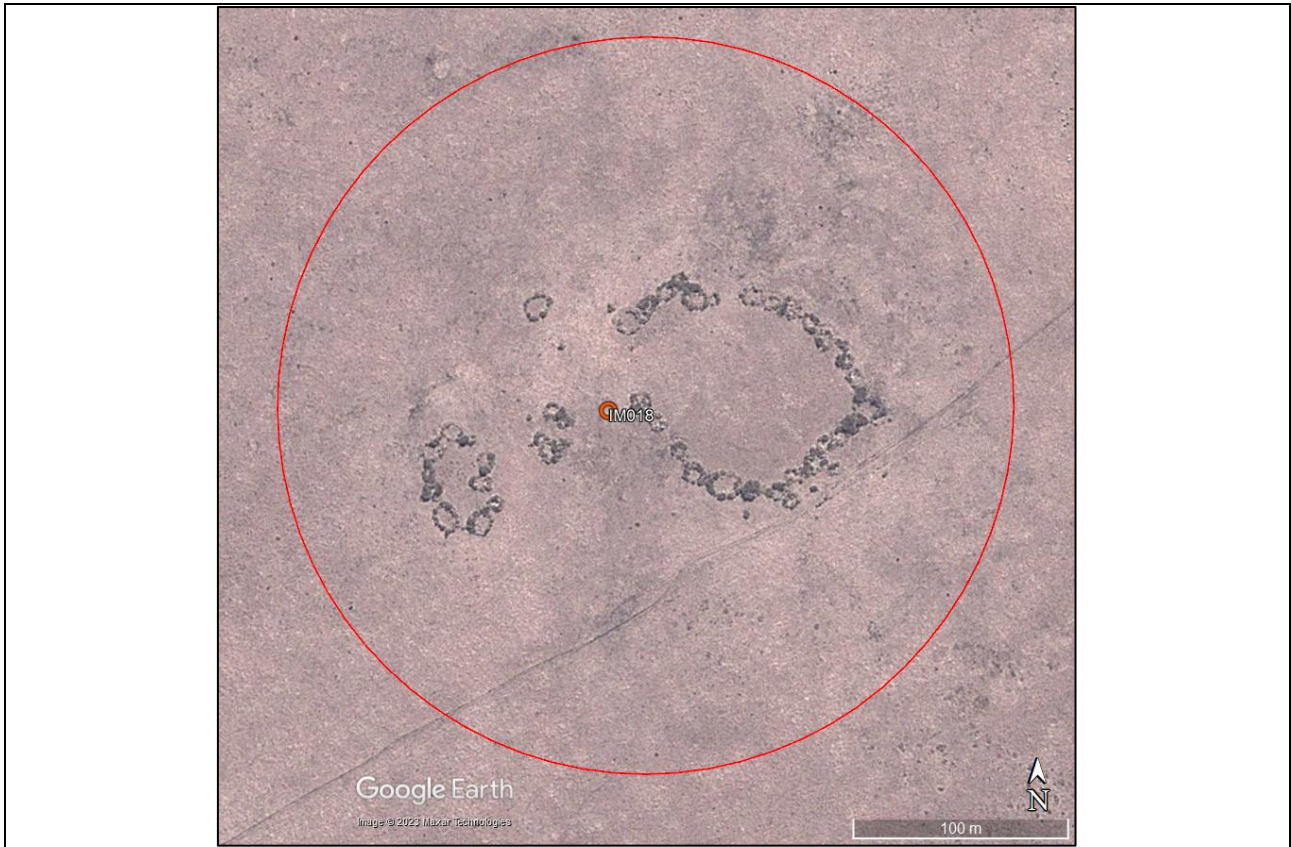


Figure 87: 2012 aerial image showing the IM018 site (orange outline includes 50 m buffer).

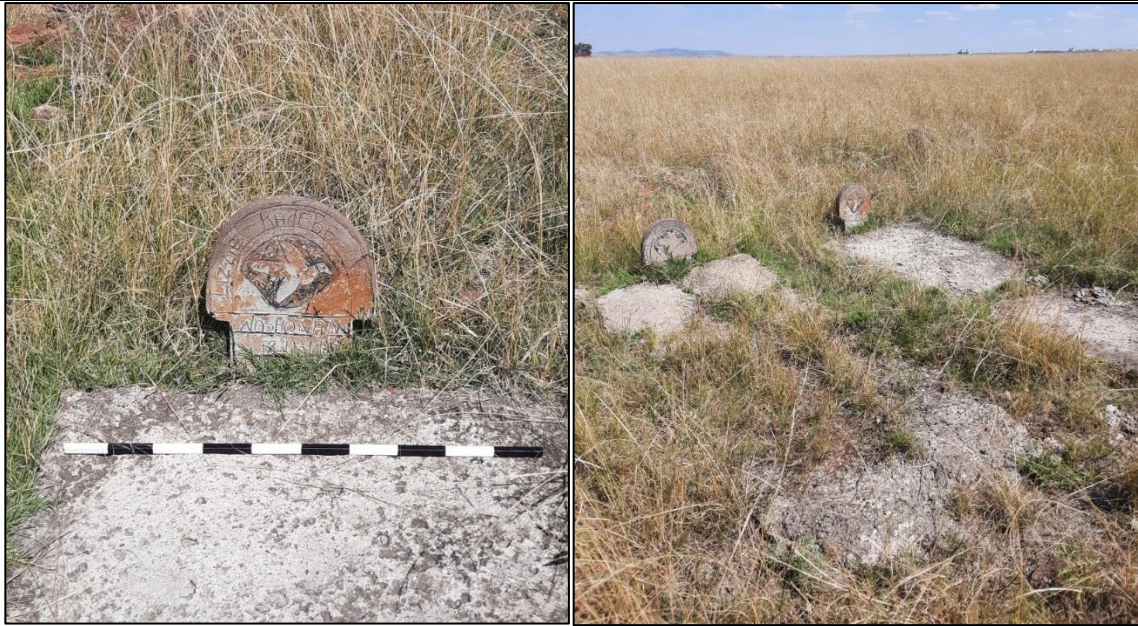
Statement of Significance:

Medium – GPB

Graves, if present are high – IIIA

5.3. Graves

Site Number:	Description:	Period:
IM001	Small cemetery located on the fence line adjacent to a public road. Some graves possibly older than 60 years and thus the site could be heritage (included for precautionary reasons). There two cement graves with cement headstones dating to 1971 of the Radebe family and a further three packed stone graves, which are quite likely older. Some stones along the fence may indicate a disturbed grave.	Historic, recent
<p align="center">Coordinates: 26°39'13.00"S 28°53'55.30"E</p>		



Figures 88 & 89: Cement graves and gravestones.



Figure 90: Stone adjacent to the fence that may have been removed from a grave and placed along the fence or could indicate a disturbed grave.

Figure 91: One of the stone mound graves lying just to the west of the two cement graves. The road is visible at far right.



Figure 92: Graves and general site conditions recorded at IM001.

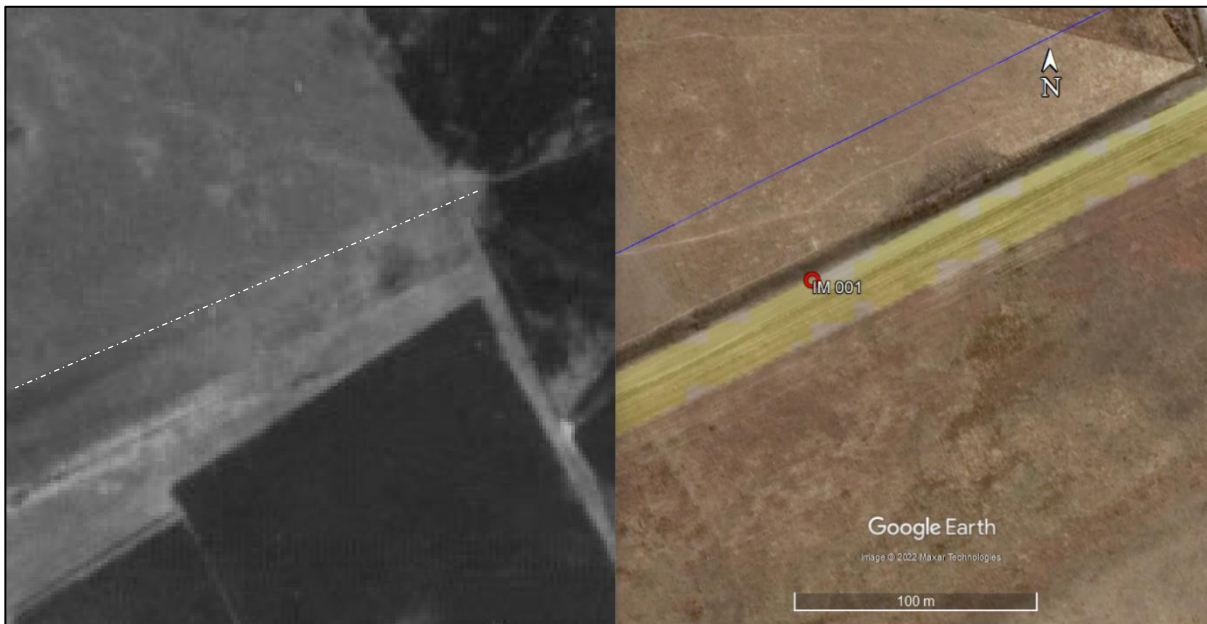


Figure 93: 1955 (201_009_04327) and modern aerial views showing that the road was not there yet in 1955. The modern road alignment is indicated by the white dashed line.

Statement of Significance and Grade:

High – IIIA

Site Number:	Description:	Period:
IM009	Small historical cemetery located on the eastern boundary of the IM008 Iron Age settlement near the main access road along the southern boundary of the project area. The cemetery is situated about 70m from the road and is fenced off. Contains multiple graves including some with granite headstones	Historic, Recent

that are visible from the road. The site was recorded from the road due to lack of access.

Coordinates:
26°42'1.21"S
28°52'24.08"E



Figure 94: View from the road showing the location of the cemetery at the foot of the hill.



Figure 95: Zoomed in view of the small cemetery and general site conditions showing the fence and gravestones.

Statement of Significance:

High – IIIA

5.4. Historical aspects and the Built environment

5.4.1. Desktop study

During the mid-17th century, the Dutch East India Company established a trading post at modern-day Cape Town. Simultaneously, the Portuguese colonised Lourenço Marques (Maputo), Mozambique. As such, the Mpumalanga landscape became a thoroughfare for local and foreign

traders. However, the increasing intensity of interaction among indigenous peoples and European merchants led to intensified competition over control of trade routes and accumulating wealth. Consequently, political centralisation led to warfare and population displacement (Derricourt & Evers 1973; Esterhuysen & Smith 2007; Delius *et al.* 2012).

By the 1830s, Dutch-speaking farmers started to migrate from modern-day Cape Town towards the interior regions of South Africa. Dutch-speaking migrants entering the region were confronted with existing tension between local groups due to the ongoing Mfecane, trade conflicts, and pressure from foreign merchants. Motivated to improve their own economic position within the area, more conflict between the Dutch, Sotho-Tswana and Nguni speaking communities started to take place (Giliomee & Mbenga 2007). Ultimately, Dutch-speaking farmers did settle in Mpumalanga and neighbouring provinces.

The discovery of coal, gold and diamonds during the mid-19th century led to a variety of socio-economic changes within South Africa. Since the discovery of mineral wealth, the new wage-economy and migrant labour systems contributed to the demise of traditional homestead economies and social organisation. In addition, competition for resources led to conflict, political upheavals and ultimately warfare (e.g., Crush & Soutter 1999; Delius 2014).

During the 1850s coalfields were already being exploited. Coal served a variety of purposes, as it still does today. From powering steam trains, ships, furnaces for smelting metals, it was also utilised within a domestic context, to heat up space and cook food. Since the discovery of diamonds and gold the industrial demand for coal increased significantly. Lucrative mining continued until the onset of the South African War of 1899 -1902 when the workforce joined the war effort, and, as usual during wartime, railways and infrastructure were destroyed. Following the end of the South African War, activities within the South African Union (formed in 1910) were aimed at stabilising the economy by focusing on agriculture and coal mining. However, post-war socio-economic and political crises, especially after World War I (1914-1918) had a profound economic and political impact on the South African coal industry and mine workers (Giliomee & Mbenga 2007). Due to the relative economic and political stability after World War II (1939-1945), mining towns were established and coal mining continued. Today coal is still an integral part of the South African economy, used for the generation of electricity, synthetic fuels, and petrochemical products (Mathu & Chinomona 2013).

The site itself is an agricultural landscape and, as shown on the historical aerial photography in Figure 96 and modern view in Figure 97, its overall character has not changed over the last 67 years. A few specific changes are noticeable, however:

- The cultivated lands have changed slightly with some no longer in use and some new or extended ones;
- Some new farmsteads have been added in the area since 1955 (including one within the study area);
- Some farmsteads have had new structures added (including two or possible three within the study area; Figures 98 & 99);
- The Impumelelo Mine has been developed immediately north of the study area; and
- Various small farm dams have been added to the landscape.

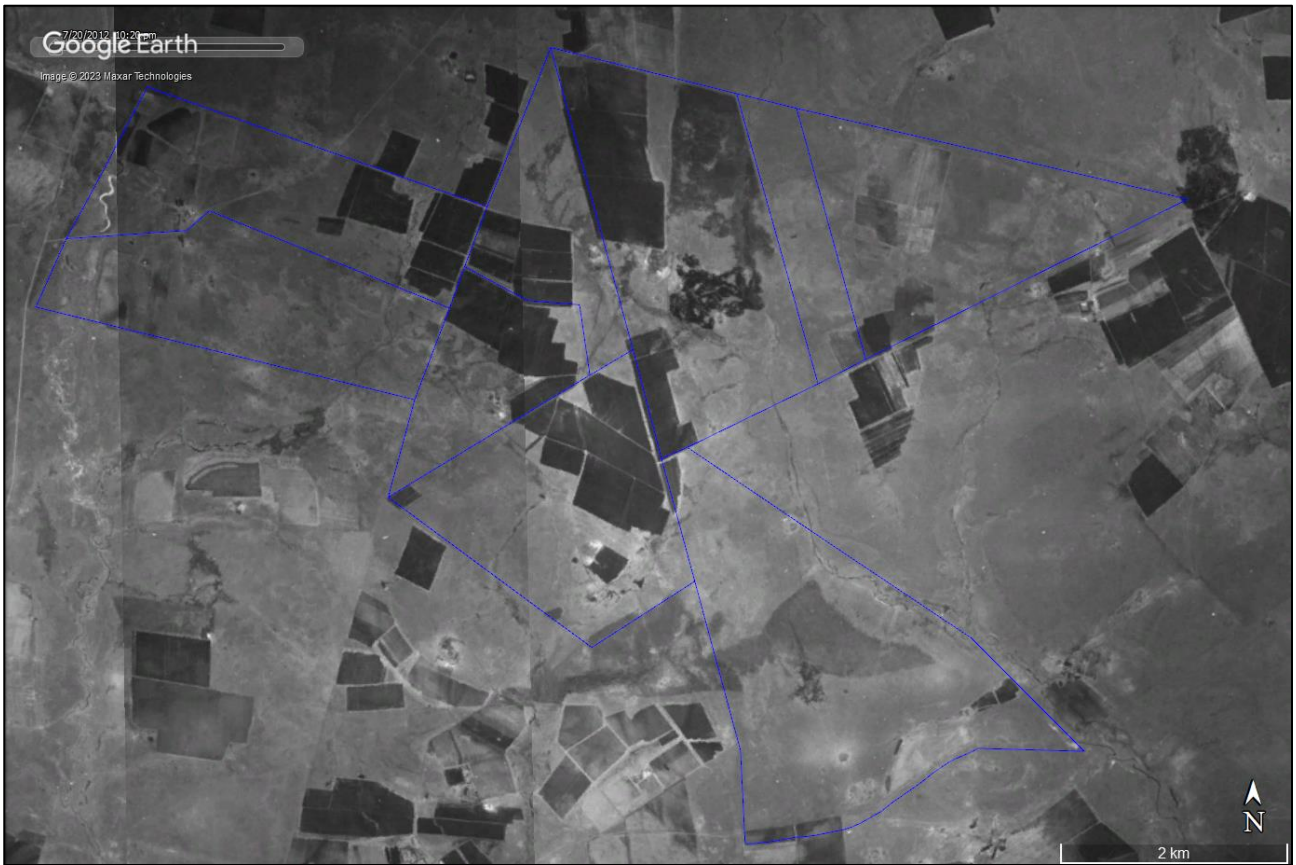


Figure 96: Aerial view from 1955 (201_009_04327 to 29) showing the landscape as a patchwork of arable lands (dark areas) and grassland.



Figure 97: Modern aerial view (Google Earth) showing a similar patchwork of arable lands and grassland.

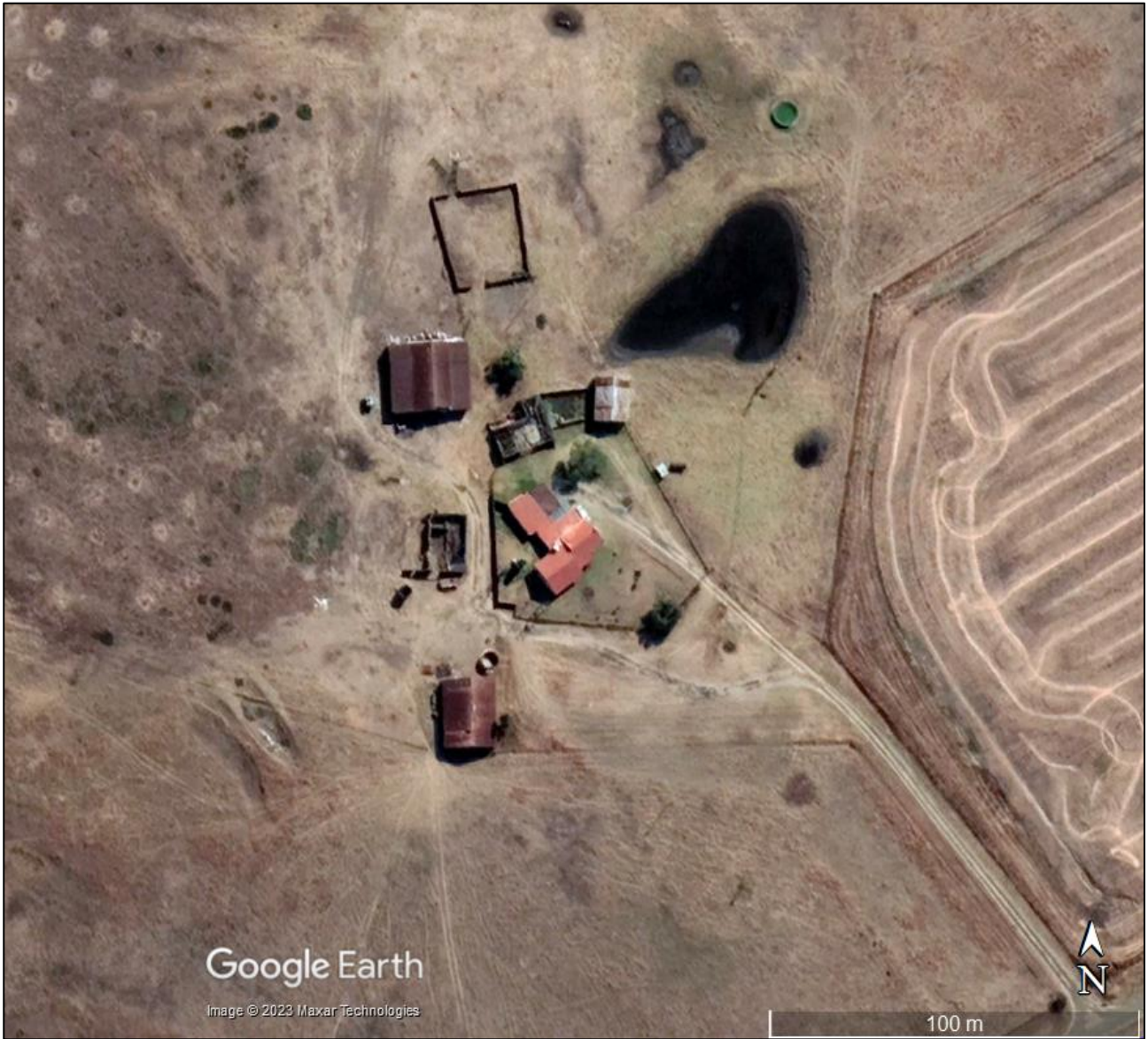


Figure 98: Historical farm complex on Portion 8 of Farm 544 with one new house with a brighter roof added ($26^{\circ}40'7.06''S$ $28^{\circ}50'22.59''E$).



Figure 99: Historical farm complex on the remainder of Farm 544 with some new structures with brighter roofs added (26°41'0.75"S 28°50'56.17"E).

5.4.2. Site visit

It is evident from the historical archaeological finds that the agricultural landscape is historical, but many structures in the area (including a number now in ruin) seem to be relatively modern. A number of existing structures are older than 60 years as shown above but, because the survey focused on the then-proposed turbine locations, no houses were visited. No buildings, historical or otherwise, will be directly impacted.

5.5. Cultural landscapes and scenic routes

Cultural landscapes are the product of the interactions between humans and nature in a particular area. Sauer (1925) defined them thus: "The cultural landscape is fashioned from a natural landscape by a cultural group. Culture is the agent, the natural area is the medium, the cultural landscape the result".

As shown in Figure 93, the historical landscape is an agricultural one characterised by grazing lands (grass) and arable lands (planted with crops). The landscape is extensive and is punctuated by towns and coal mines. It is not a particularly sensitive cultural landscape with most of its development

having taken place during the 20th century. Locally, it is compromised by the coal mine located immediately north of the study area. Landscape integrity is better in the southern part of the study area where some hills contribute to the scenic aspect.

There are no scenic routes in the area and all the roads in and adjacent to the study area are gravelled. The nearest tar road is the access road to the Impumelelo Coal Mine.

5.6. Statement of significance and provisional grading

Section 38(3)(b) of the NHRA requires an assessment of the significance of all heritage resources. In terms of Section 2(vi), “cultural significance” means aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance. The reasons that a place may have cultural significance are outlined in Section 3(3) of the NHRA (see Section 2 above).

The archaeological resources are deemed to have low to high cultural significance at the local level for their scientific value and can be variably graded from IIIB to GPC.

Graves are deemed to have high cultural significance at the local level for their social value. They are allocated a grade of IIIA. Possible graves are included here for precautionary reasons.

The cultural landscape is largely an agricultural landscape with medium to low aesthetic value due to the visual intrusion from the nearby Impumelelo coal mine which adds an industrial component. It is rated as having low cultural significance at the local level.

Figure 100 shows a grade map with all currently known heritage resources indicated with 50 m buffers. Occupied farmsteads are omitted as they were not recorded on site and will not be impacted no matter what layout changes occur. Note that sites located remotely and occurring outside but close to the study area have also been included for the record.

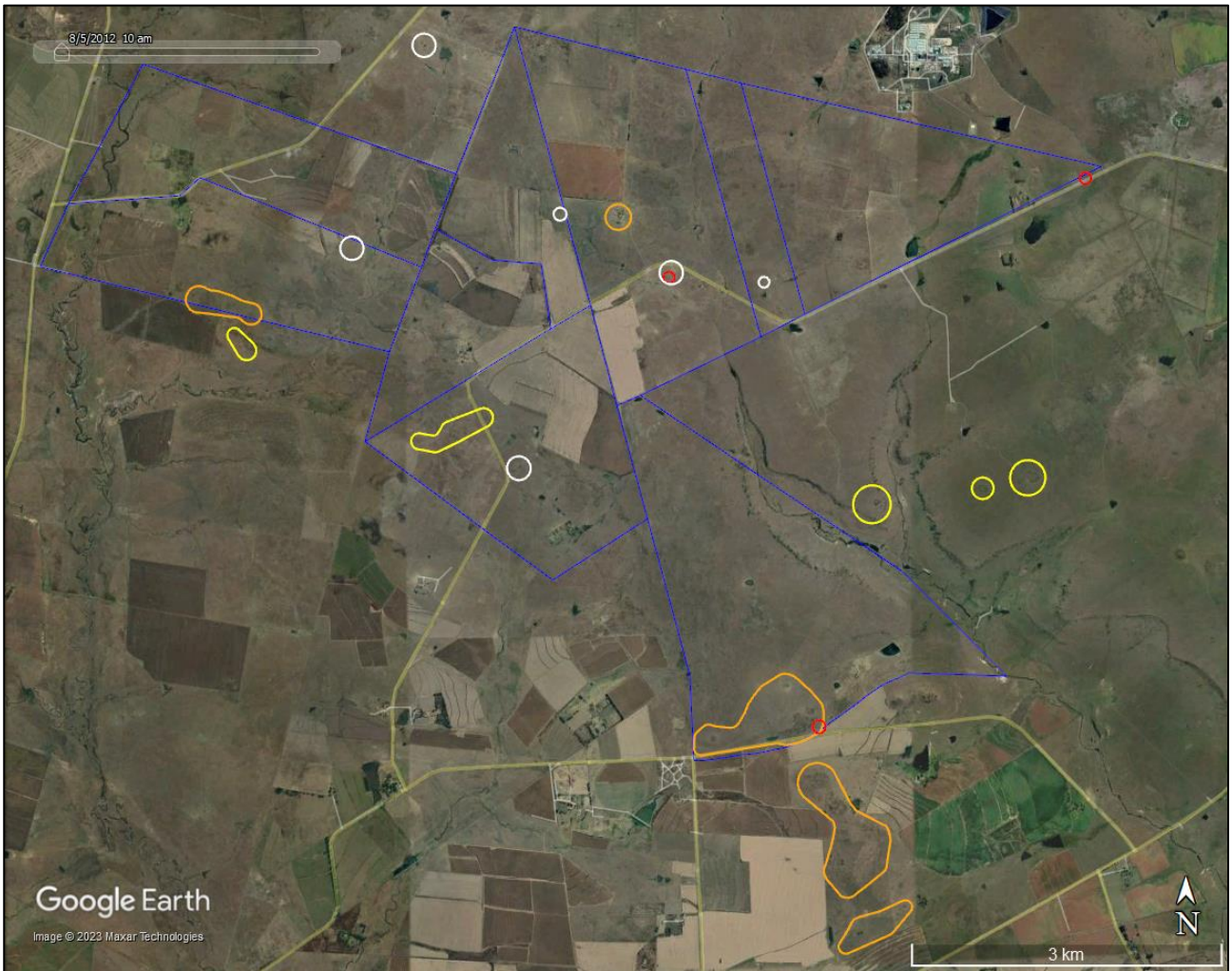


Figure 100: Grade map of the study area showing the locations of all sites found. They are coloured as follows: Graded IIIA = red, GPA = light orange, GPB = yellow and GPC = white.

6. ASSESSMENT OF IMPACTS

The impacts identified for the Impumelelo WEF are as follows:

- *Construction phase:*
 - Impacts to palaeontology
 - Impacts to archaeology
 - Impacts to graves
 - Impacts to the cultural landscape
- *Operation phase:*
 - Impacts to the cultural landscape
- *Decommissioning phase:*
 - Impacts to the cultural landscape

While palaeontological heritage is assessed in the separate specialist study, all the other impacts are considered here. It should be noted that because all three construction camps and all three temporary laydown areas are assessed together these have been included within the overall WEF

assessment. The two substation locations, however, are alternatives and are provided with separate assessments.

6.1. Construction Phase

6.1.1. Impacts to archaeological resources

Direct impacts to archaeological resources would occur during the construction phase when grubbing and construction commence. Several culturally significant archaeological sites may be impacted by the proposed project and will result in impacts of high magnitude. The impact significance calculates to **very high negative** (Table 6). Mitigation would entail firstly moving turbines and other infrastructure out of areas containing Iron Age settlements and then surveying the entire footprint of the layout to determine whether any archaeological mitigation might still be required or if further micro-siting can prevent impacts. If direct impacts cannot be avoided then full mapping and recording of the stone walling to be destroyed will need to take place. The risk of graves in these settlements must be remembered, although archaeological deposits tend to be uncommon. Any infrastructure placed within arable lands does not need to be examined. Once construction is underway any further sites discovered during construction should be protected and reported. With mitigation, the significance reduces to **low negative**.

On current knowledge there are no fatal flaws in terms of construction phase impacts to archaeology, since small sites like graves could easily be avoided while any sites can have mitigation conducted if avoidance is not possible. However, the potential exists for extensive mitigation to be required and avoiding these sensitive areas is strongly advised.

6.1.2. Impacts to graves

Several graves or possible graves have been recorded in the overall study area. One possible grave falls within a construction camp and there is the possibility of encountering graves within Iron Age settlements. Because of the very high cultural significance of graves the magnitude of impacts to graves is rated high. Because most of the layout remains unsurveyed there is still a chance of impacts occurring elsewhere as well. The resulting impact significance is **moderate negative** (Table 6). Mitigation will entail avoiding all graves and potential graves and reporting any chance finds of unmarked graves during construction. A pre-construction survey should also be undertaken to determine whether any graves are visible in the final footprint. With mitigation the significance would reduce to **very low negative**.

Impacts to graves would be considered a fatal flaw but if all graves and possible graves are avoided then there are no fatal flaws in terms of construction phase impacts to graves.

6.1.3. Impacts to the cultural landscape

The local landscape is already heavily compromised by the nearby Sasol facility and coal mines. As such, the intrusion into this landscape of the construction equipment and solar panels is considered to be of low magnitude. Due to the certainty of an impact occurring, the significance calculates to **moderate negative** (Table 6). Minimising the construction duration, minimising landscape disturbance in general and ensuring rehabilitation of areas not needed during operation will result in a reduction in the calculated significance numerically, but the rating is still **moderate negative**.

There are no fatal flaws in terms of construction phase impacts to the cultural landscape.

6.2. Operation Phase

6.2.1. Impacts to the cultural landscape

As before, the local landscape is already heavily compromised by the nearby Sasol facility and coal mines. As such, the intrusion into this landscape of the solar panels and related infrastructure is considered to be of only low magnitude. Due to the certainty of an impact occurring, the significance calculates to **moderate negative** (Table 6). There are no specific mitigation measures that can be applied during operation other than the best practice measure of ensuring that all maintenance work occurs within designated areas. Post-mitigation significance would remain at the **moderate negative** level.

There are no fatal flaws in terms of operation phase impacts to the cultural landscape.

6.3. Decommissioning Phase

Decommissioning impacts are essentially the same as those in the construction phase. The significance calculates to **moderate negative** (Table 6). Minimising the decommissioning duration and ensuring full rehabilitation post-closure will not change the rating which remains **moderate negative**.

There are no fatal flaws in terms of decommissioning phase impacts to the cultural landscape.

6.4. Substation Construction Phase

6.4.1. Alternative 1

The Alternative 1 substation location does not appear to contain any archaeology and the expected significance is **very low negative** (Table 7). No mitigation is required and the post-mitigation is thus also **very low negative**.

6.4.2. Alternative 2

The Alternative 2 substation footprint was found to overlap with the western end of an Iron Age settlement. The significance of the impact calculates to **high negative** (Table 7). Mitigation would entail avoiding the site or else conducting archaeological mitigation work to record the section of the site to be impacted and sampling any areas of deposit that might be present. The post-mitigation significance is then **low negative**, although complete avoidance would result in a rating of **very low negative**.

Table 6: Assessment of impacts for the Impumelelo WEF excluding substations.

Impact number	Aspect	Description	Stage	Character	Ease of Mitigation	Pre-Mitigation							Post-Mitigation						
						(M+	E+	R+	D)x	P=	S	Rating	(M+	E+	R+	D)x	P=	S	Rating
Impact 1:	Archaeology	Damage to or destruction of archaeological resources	Construction	Negative	High	4	3	5	5	5	85	N5	2	1	5	5	2	26	N2
Significance						N5 - Very High							N2 - Low						
Impact 2:	Graves	Damage to or destruction of graves	Construction	Negative	High	5	1	5	5	3	54	N3	1	1	5	5	1	12	N1
Significance						N3 - Moderate							N1 - Very Low						
Impact 3:	Cultural landscape	Visual intrusion into and change of character of the cultural landscape	Construction	Negative	Low	2	2	3	2	5	45	N3	1	2	3	2	5	40	N3
Significance						N3 - Moderate							N3 - Moderate						
Impact 4:	Cultural landscape	Visual intrusion into and change of character of the cultural landscape	Operation	Negative	Low	2	2	3	4	5	55	N3	1	2	3	4	5	50	N3
Significance						N3 - Moderate							N3 - Moderate						
Impact 5:	Cultural landscape	Visual intrusion into and change of character of the cultural landscape	Decommissioning	Negative	Low	2	2	3	2	5	45	N3	1	2	3	2	5	40	N3
Significance						N3 - Moderate							N3 - Moderate						

Table 7: Assessment of impacts to archaeology for the Impumelelo WEF substations only.

Impact number	Aspect	Description	Stage	Character	Ease of Mitigation	Pre-Mitigation							Post-Mitigation						
						(M+	E+	R+	D)x	P=	S	Rating	(M+	E+	R+	D)x	P=	S	Rating
Impact 1:	Archaeology (ALT 1 SUBSTATION ONLY)	Damage to or destruction of archaeological resources	Construction	Negative	High	1	1	5	5	1	12	N1	1	1	5	5	1	12	N1
Significance						N1 - Very Low							N1 - Very Low						
Impact 2:	Archaeology (ALT 2 SUBSTATION ONLY)	Damage to or destruction of archaeological resources	Construction	Negative	High	3	3	5	5	4	64	N4	1	1	5	5	2	24	N2
Significance						N4 - High							N2 - Low						

6.5. Cumulative impacts

Various other projects are proposed in the wider area and might impact upon heritage resources. Cumulative impacts would occur through the construction, operation and decommissioning of many projects in the same general area. The projects considered in the assessment of cumulative impacts are listed in Table 8. In terms of archaeology, Iron Age settlements are large and quite widespread which means that there is a fair chance of impacts (most notably from the present project). Mitigation (as proposed for the various projects) would bring the significance down from **very high negative** to **low negative** (Table 8). Graves are generally unlikely to be impacted but are present widely in the landscape and one potential grave in the present project is at risk of impacts. Furthermore, graves can be present within the Iron Age settlements. Mitigation would reduce the impact significance from **high negative** to **low negative**. Cumulative impacts to the landscape are likely to be **moderate negative** both before and after mitigation for all three phases.

Table 8: Other projects considered for the cumulative impact assessment.

Project	Relative location
The authorised Tutuka 65.9 MW Solar Photovoltaic (PV) Energy Facility and its associated infrastructure (Ref: 14/12/16/3/3/2/754)	46km to the southeast
The authorised Grootvlei 75 MW Solar (PV) electricity installation (Ref: 12/12/20/2060)	27km to the southwest
The proposed Mukondeleli WEF	Approximately 25km to the east
The proposed Vhuvhili Solar Energy Facility (NEAS No. MPP/EIA/0001063/2022)	Approximately 10km to the east
The lapsed 75MW PV power plant on Portion 17 of the Farm Rusplaas No.1388 and Portions 2 & 3 of the Farm Heartsease No 420, Free State Province (Ref: 14/12/16/3/3/2/315)	23km to the southwest

6.6. Evaluation of impacts relative to sustainable social and economic benefits

Section 38(3)(d) of the NHRA requires an evaluation of the impacts on heritage resources relative to the sustainable social and economic benefits to be derived from the development.

The proposed facility will be providing electricity to South Africa which will result in obvious benefits to society at many levels. There will be local job creation during construction and operation but, more widely, an improvement in electricity supply in South Africa will stimulate the economy and result in new job opportunities opening up and quality of life improving. These are clear economic and social benefits and, if mitigation is applied as suggested above, then the socio-economic benefits outweigh the residual impacts.

6.7. Existing impacts to heritage resources

There are currently no obvious threats to heritage resources on the site aside from the natural degradation, weathering and erosion that will affect archaeological materials. Trampling from grazing animals and/or farm/other vehicles could also occur. These impacts would be of **very low negative** significance. The local landscape, which is generally agricultural in nature, is, as noted

above, already impacted by the Impumelelo coal mine but there are relatively few mines in this area compared to other parts of the Highveld so the impact is considered only **moderate negative**. Such mines are an expected part of the Highveld landscape and have been for many years.

Table 8: Assessment of cumulative impacts.

Impact number	Aspect	Description	Stage	Character	Ease of Mitigation	Pre-Mitigation							Post-Mitigation						
						(M+	E+	R+	D)x	P=	S	Rating	(M+	E+	R+	D)x	P=	S	Rating
Impact 1:	Archaeology	Damage to or destruction of archaeological resources	Construction	Negative	High	4	3	5	5	5	85	N5	1	3	5	5	2	28	N2
Significance						N5 - Very High							N2 - Low						
Impact 2:	Graves	Damage to or destruction of graves	Construction	Negative	High	5	3	5	5	4	72	N4	1	3	5	5	2	28	N2
Significance						N4 - High							N2 - Low						
Impact 3:	Cultural landscape	Visual intrusion into and change of character of the cultural landscape	Construction	Negative	Low	2	3	3	2	5	50	N3	1	3	3	2	5	45	N3
Significance						N3 - Moderate							N3 - Moderate						
Impact 4:	Cultural landscape	Visual intrusion into and change of character of the cultural landscape	Operation	Negative	Low	2	3	3	4	5	60	N3	1	3	3	4	5	55	N3
Significance						N3 - Moderate							N3 - Moderate						
Impact 5:	Cultural landscape	Visual intrusion into and change of character of the cultural landscape	Decommissioning	Negative	Low	2	3	3	2	5	50	N3	1	3	3	2	5	45	N3
Significance						N3 - Moderate							N3 - Moderate						

6.8. The No-Go alternative

If the project were not implemented then the site would stay as it currently is (impact significance of **low negative**). Although the heritage impacts with implementation would be greater than the existing impacts, the loss of socio-economic benefits is more significant and suggests that the No-Go option is less desirable in heritage terms.

6.9. Levels of acceptable change

Any impact to an archaeological or palaeontological resource or a grave is deemed unacceptable until such time as the resource has been inspected and studied further if necessary. Impacts to the landscape are difficult to quantify but in general a development that visually dominates the landscape from many publicly accessible vantage points is undesirable. Because of the height of the majority of the proposed development and the flatness of the landscape, such an impact to the landscape is envisaged but, despite the generally limited existing visual clutter, it is not deemed unacceptable.

7. INPUT TO THE ENVIRONMENTAL MANAGEMENT PROGRAM

The actions recorded in Table 9 should be included in the environmental management program (EMPr) for the project.

Table 9: Heritage considerations for inclusion in the EMPr.

Impact	Mitigation / management objectives & outcomes	Mitigation / management actions	Monitoring		
			Methodology	Frequency	Responsibility
Impacts to archaeology and graves					
Damage or destruction of archaeological sites or graves	Avoid impacts (preferred) or locate and sample or rescue sites/burials before disturbance	Pre-construction survey, micro-siting of infrastructure, make recommendations for mitigation.	Appoint archaeologist to conduct survey well before construction	Once-off	Project developer
Damage or destruction of archaeological sites or graves	Rescue information, artefacts or burials before extensive damage occurs	Reporting chance finds as early as possible, protect in situ and stop work in immediate area.	Inform staff to be vigilant and carry out inspections of new excavations	Ongoing basis	Construction Manager or Contractor
				Whenever on site (at least weekly)	ECO
Impacts to the cultural landscape					
Visible landscape scarring	Minimise landscape scarring	Ensure disturbance is kept to a minimum and does not exceed project requirements. Rehabilitate areas not needed during operation.	Monitoring of surface clearance relative to approved layout	Ongoing basis	Construction Manager or Contractor
				As required	ECO

8. CONCLUSIONS

Archaeological materials were seen in various places, primarily in the form of Iron Age settlements and historical ruins. These are of generally low to medium significance but the former have a high likelihood of impacts due to their extensive nature. Several areas are currently under threat as shown in Figures 101 to 104. The primary concern for any project in this area is graves and one possible grave is under threat from construction camp 2 (Figure 105). With so little of the layout surveyed there is always a chance that more graves may come to light. A pre-construction survey will be very important to minimise potential impacts. A fair amount of the overall layout is within ploughed lands and these are considered as being of very low sensitivity. Only sections of the final layout located out of the ploughed lands need to a pre-construction survey.

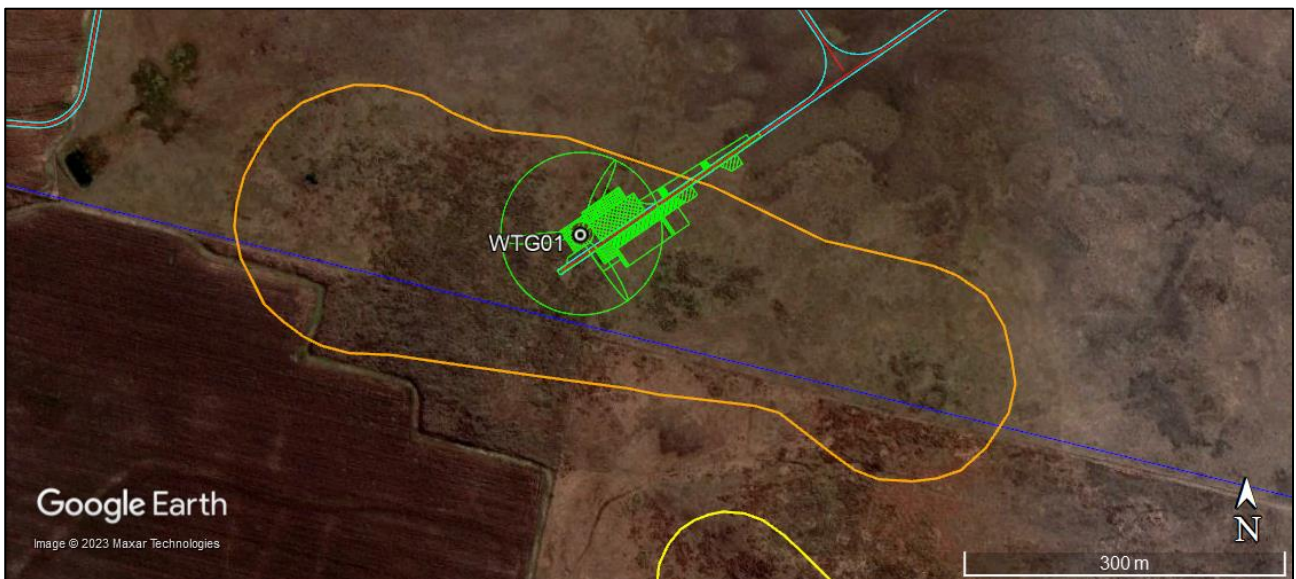


Figure 101: Aerial view of the vicinity of turbine WGT01 showing its location to be within an Iron Age settlement (orange polygon, including buffer).

Alternative layouts will need to be devised for the areas of the project falling within the Iron Age settlements. Although not of high cultural significance, mitigation would still be extensive due to the nature of the sites and they (and their 50 m buffers as mapped in this report) are best avoided.

The expected impacts for the two substation alternatives vary with Alternative 2 likely to result in more significant impacts. As such, the Alternative 1 Substation is strongly preferred from a heritage point of view.

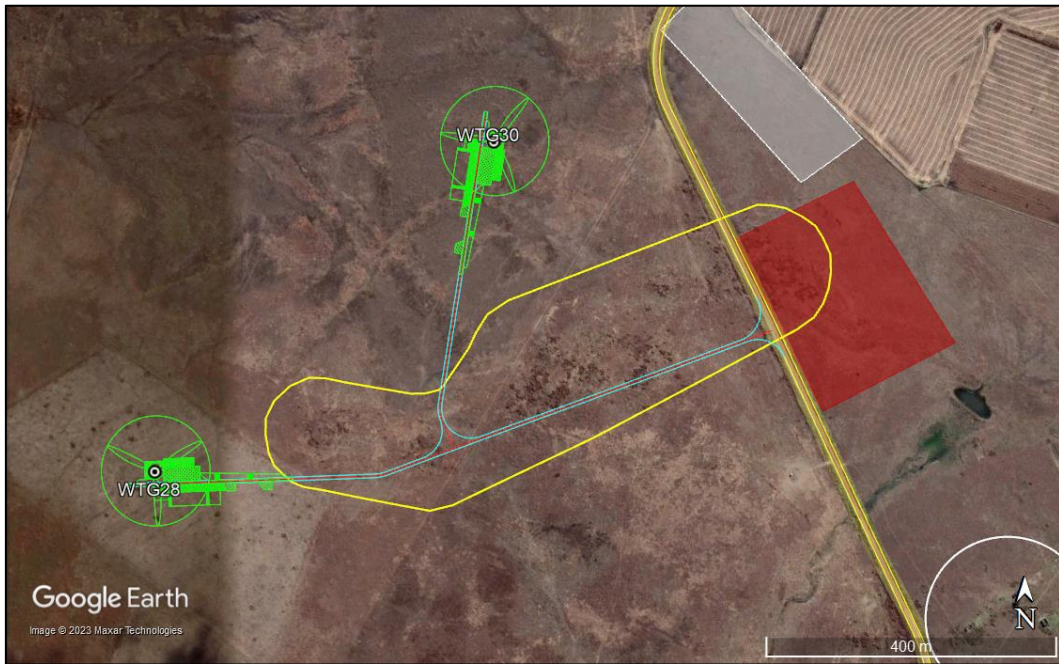


Figure 102: Aerial view of the vicinity of turbines WGT28 and WGT30 showing their access road to run through an Iron Age settlement (yellow polygon, including buffer). The shaded red polygon is Substation Alternative 2 which also overlaps the Iron Age site.

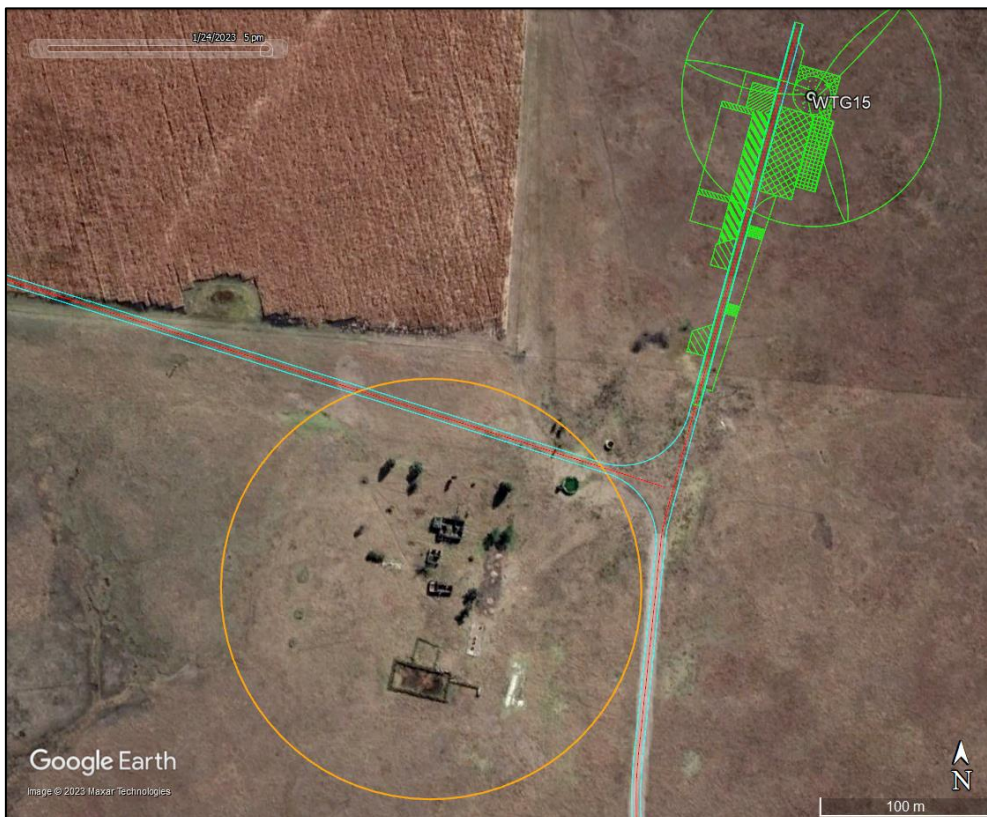


Figure 103: Aerial view of the vicinity of turbine WGT15 showing an access road to run through the buffer of a historical site. While it is preferred that the buffer be avoided, the present alignment can be retained if required by other specialists.

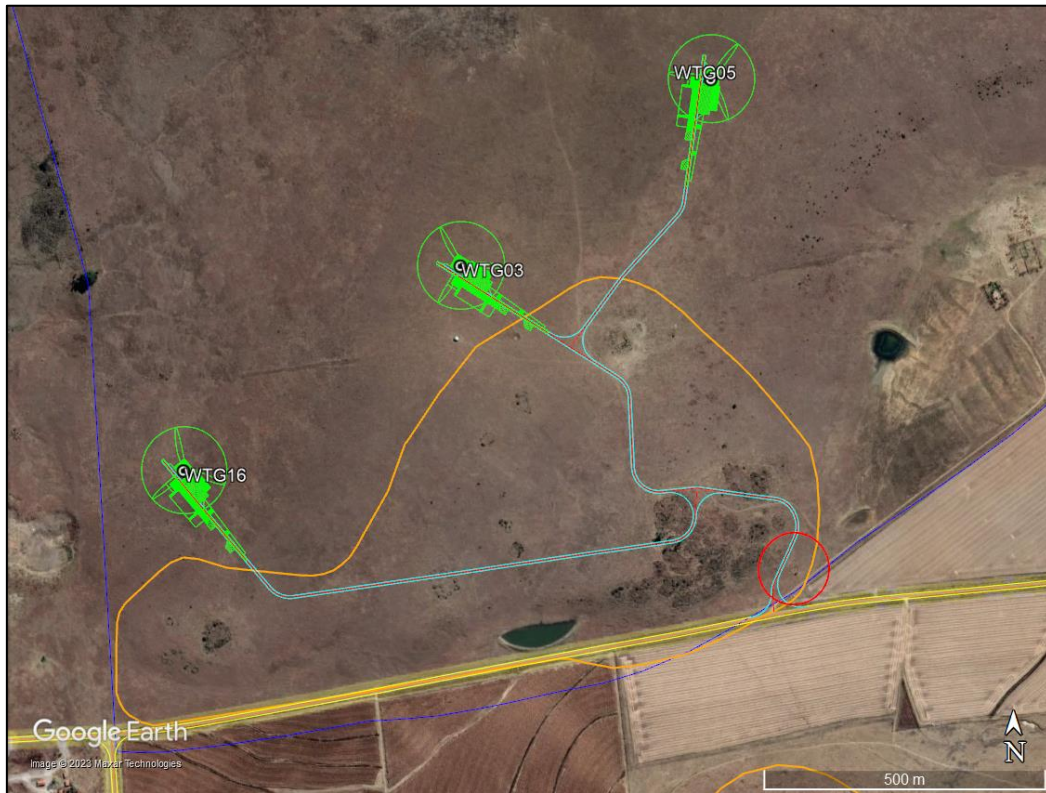


Figure 104: Aerial view of the vicinity of turbines WGT03, WGT05 and WGT16 showing their access road to run through an Iron Age settlement (orange polygon, including buffer). The road also passes through the buffer of a graveyard (red circle).



Figure 105: Aerial view of construction camp 2 (white shaded polygon) showing the buffer around the GPC archaeological site (white circle) and the buffer around the potential grave (red circle).

8.1. Reasoned opinion of the specialist

Most of the study area is, or is likely to be, of low sensitivity. Micro-siting of infrastructure during the final EMP approval stage will certainly be required and further micro-siting may still be needed after the pre-construction survey. The main concerns for this project are the Iron Age settlements, the potential for graves to be found within these settlements and the potential grave in the Substation Alternative 2 footprint. It is the opinion of the heritage consultant that the proposed Impumelelo WEF may be authorised in full with Alternative 1 substation being preferred and on condition that layout changes are made to account for the archaeological sites currently under threat.

9. RECOMMENDATIONS

It is recommended that the proposed Impumelelo WEF be authorised with Substation Alternative 1 being preferred. The following recommendations which should be included as conditions of authorisation:

- Infrastructure should be relocated to avoid the Iron Age settlements known to occur on site (this affects WGT01, the access road to WGT03, WGT05, WGT16, WGT28 and WGT30, and construction camp 2);
- Construction Camp 2 should be relocated away from the archaeological site and potential grave;
- The road near WGT15 should be rerouted if feasible, but otherwise the historical features of the site should be marked no-go areas during construction;
- A pre-construction survey needs to be undertaken on all unploughed sections of the final layout;
- Substation Alternative 1 is preferred but should Alternative 2 be used then the facility should be placed so as to avoid the Iron Age site there;
- No stones may be removed from any archaeological site; and
- If any archaeological material or human burials are uncovered during the course of development then work in the immediate area should be halted. The find would need to be reported to the heritage authorities and may require inspection by an archaeologist. Such heritage is the property of the state and may require excavation and curation in an approved institution.

10. REFERENCES

- Crush, J. & Soutter, C. 1999. Natural Family Conditions: Narratives of stabilization and the South African Coal Mines, 1910–1970. *South African Geographical Journal* 81: 5-14.
- Delius, P. 2014. The Making and Changing of Migrant Workers' Worlds (1800–2014). *African Studies* 73: 313-322.

- Delius, P., Maggs, T. & Schoeman, M. 2012. Bokoni: Old structures, new paradigms? Rethinking pre-colonial society from the perspective of the stone-walled sites in Mpumalanga. *Journal of Southern African Studies* 38:399-414.
- Derricourt, R.M. & Evers, T.M. 1973. Robertsdrift, an Iron Age site and settlement on the banks of the Vaal and Klip rivers near Standerton, South-Eastern Transvaal. *African Studies* 32:183-193.
- Dreyer, J.J.B. 1992. 1995. Late Iron Age sites in the Magaliesberg Valley: Jones' (1935) stone structures revisited. *Southern African Field Archaeology* 4: 5-7.
- Esterhuysen, A. & Smith, J. 2007. The Archaeology of Mpumalanga. In: Delius, P. (ed.) *Mpumalanga History and Heritage: Recapturing the Past, Defining the Future* pp: 7-18. KwaZulu-Natal: University of KwaZulu-Natal Press.
- Giliomee, H. Mbenga, B. 2007. *New history of South Africa*. Cape Town: Tafelberg Publishers.
- Henderson, Z & Koortzen, C. 2007. Heritage Assessment Report Zeus Substation Expansion, Vlakfontein 328, Gert Sibande (DC 30) District, Mpumalanga, South Africa. Unpublished report for PBA International.
- Huffman, T.N. 2001. The Central Cattle Pattern and interpreting the past. *Southern African Humanities* 13: 19-35.
- Huffman, T.N. 2007. *Handbook to the Iron Age: The archaeology of pre-colonial farming societies in southern Africa*. Pietermaritzburg: University of KwaZulu-Natal Press.
- Khan, S.K & Higgitt, N. 2012. Heritage Statement for the Zandbaken Coal Mine Project, Zandbaken 585 IR, Sandbaken 363 IS and Bosman's Spruit 364 IS, Standerton, Mpumalanga.
- Lombard, M., Wadley, L., Deacon, J., Wurz, S. Parsons, I., Moleboheng, M., Swart, J. & Mitchell, P.J. 2012. South African and Lesotho Stone Age sequence updated. *South African Archaeological Bulletin* 67: 120-144.
- Maggs, T.M. 1976. *Iron Age Communities of the Southern Highveld*. (Occasional Publication 2) Pietermaritzberg: Natal Museum.
- Mathu, K. & Chinomona, R. 2013. South African coal mining industry: Socio-economic attributes. *Mediterranean Journal of Social Sciences* 4: 337-357.
- Mitchell, P.J. 2002. *The Archaeology of southern Africa*. Cape Town: Cambridge University Press.
- Pistorius, C.C.J. 2008. A Phase I Heritage Impact Assessment (HIA) study for Sasol's proposed new gas and liquid pipelines (along a corridor) from Sasol Synfuels in Secunda (Mpumalanga) to Sasol Infrachem and Natref in Sasolburg (Free State) on the Highveld in the Republic of South Africa. Report prepared for Nature and Business Alliance Africa (Pty) Ltd.

- Pistorius, C.C.J. 2020. A Phase I Heritage Impact Assessment Study for The Shondoni and Middelbult Mining Areas Near Secunda in the Mpumalanga Province. Report prepared for JMA Consulting (Pty) Ltd. Rustenburg: Dr Julius CC Pistorius.
- SAHRA. 2007. Minimum Standards: archaeological and palaeontological components of impact assessment reports. Document produced by the South African Heritage Resources Agency, May 2007.
- Sauer, C.O. 1925. The Morphology of Landscape. University of California Publications on Geography 2(2): 19-54.
- Schirmer, S. 2007. Enterprise and exploitation in the 20th century. In: P. Delius, ed. *Mpumalanga History and Heritage: Recapturing the Past, Defining the Future*. Scottsville: University of KwaZulu-Natal Press, pp. 291-350.
- Schlebusch, C.M. Prins, F. Lombard, M. Jakobsson, M. & Soodyall, H. 2016. The disappearing San of south-eastern Africa and their genetic affinities. *Human Genetics* 135: 1365-1373.
- Van Schalkwyk, J.A. 1998. A Survey of Cultural Resources for Secunda Collieries Block 5 And Syferfontein Mining Area Highveld Ridge District, Mpumalanga. Report prepared for Walmsley Environmental Consultants. Sunnyside: National Cultural History Museum.
- Van Vollenhoven, A.C. & Pelsler, A.J. 2010. A Report on a Heritage Impact Assessment the Proposed Secunda X 52 Industrial Township, Mpumalanga Province. Report prepared for The African Planning Partnership. Groenkloof: Archaetnos Culture & Cultural Resource Consultants.
- Winter, S. & Baumann, N. 2005. Guideline for involving heritage specialists in EIA processes: Edition 1. CSIR Report No ENV-S-C 2005 053 E. Republic of South Africa, Provincial Government of the Western Cape, Department of Environmental Affairs & Development Planning, Cape Town.

APPENDIX 1 – Curriculum Vitae



Curriculum Vitae

Jayson David John Orton

ARCHAEOLOGIST AND HERITAGE CONSULTANT

Contact Details and personal information:

Address: 23 Dover Road, Muizenberg, 7945
Telephone: (021) 788 1025
Cell Phone: 083 272 3225
Email: jayson@asha-consulting.co.za

Birth date and place: 22 June 1976, Cape Town, South Africa
Citizenship: South African
ID no: 760622 522 4085
Driver's License: Code 08
Marital Status: Married to Carol Orton
Languages spoken: English and Afrikaans

Education:

SA College High School	Matric	1994
University of Cape Town	B.A. (Archaeology, Environmental & Geographical Science) 1997	
University of Cape Town	B.A. (Honours) (Archaeology)*	1998
University of Cape Town	M.A. (Archaeology)	2004
University of Oxford	D.Phil. (Archaeology)	2013

*Frank Schweitzer memorial book prize for an outstanding student and the degree in the First Class.

Employment History:

Spatial Archaeology Research Unit, UCT	Research assistant	Jan 1996 – Dec 1998
Department of Archaeology, UCT	Field archaeologist	Jan 1998 – Dec 1998
UCT Archaeology Contracts Office	Field archaeologist	Jan 1999 – May 2004
UCT Archaeology Contracts Office	Heritage & archaeological consultant	Jun 2004 – May 2012
School of Archaeology, University of Oxford	Undergraduate Tutor	Oct 2008 – Dec 2008
ACO Associates cc	Associate, Heritage & archaeological consultant	Jan 2011 – Dec 2013
ASHA Consulting (Pty) Ltd	Director, Heritage & archaeological consultant	Jan 2014 –

Professional Accreditation:

Association of Southern African Professional Archaeologists (ASAPA) membership number: 233

CRM Section member with the following accreditation:

- Principal Investigator: Coastal shell middens (awarded 2007)
Stone Age archaeology (awarded 2007)
Grave relocation (awarded 2014)
- Field Director: Rock art (awarded 2007)
Colonial period archaeology (awarded 2007)

Association of Professional Heritage Practitioners (APHP) membership number: 43

- Accredited Professional Heritage Practitioner

➤ **Memberships and affiliations:**

South African Archaeological Society Council member	2004 – 2016
Assoc. Southern African Professional Archaeologists (ASAPA) member	2006 –
UCT Department of Archaeology Research Associate	2013 – 2017
Heritage Western Cape APM Committee member	2013 –
UNISA Department of Archaeology and Anthropology Research Fellow	2014 –
Fish Hoek Valley Historical Association	2014 –
Kalk Bay Historical Association	2016 –
Association of Professional Heritage Practitioners member	2016 –

Fieldwork and project experience:

Extensive fieldwork and experience as both Field Director and Principle Investigator throughout the Western and Northern Cape, and also in the western parts of the Free State and Eastern Cape as follows:

Feasibility studies:

- Heritage feasibility studies examining all aspects of heritage from the desktop

Phase 1 surveys and impact assessments:

- Project types
 - Notification of Intent to Develop applications (for Heritage Western Cape)
 - Desktop-based Letter of Exemption (for the South African Heritage Resources Agency)
 - Heritage Impact Assessments (largely in the Environmental Impact Assessment or Basic Assessment context under NEMA and Section 38(8) of the NHRA, but also self-standing assessments under Section 38(1) of the NHRA)
 - Archaeological specialist studies
 - Phase 1 archaeological test excavations in historical and prehistoric sites
 - Archaeological research projects
- Development types
 - Mining and borrow pits
 - Roads (new and upgrades)
 - Residential, commercial and industrial development
 - Dams and pipe lines
 - Power lines and substations
 - Renewable energy facilities (wind energy, solar energy and hydro-electric facilities)

Phase 2 mitigation and research excavations:

- ESA open sites
 - Duinefontein, Gouda, Namaqualand
- MSA rock shelters
 - Fish Hoek, Yzerfontein, Cederberg, Namaqualand
- MSA open sites
 - Swartland, Bushmanland, Namaqualand
- LSA rock shelters
 - Cederberg, Namaqualand, Bushmanland
- LSA open sites (inland)
 - Swartland, Franschhoek, Namaqualand, Bushmanland
- LSA coastal shell middens
 - Melkbosstrand, Yzerfontein, Saldanha Bay, Paternoster, Dwarskersbos, Infanta, Knysna, Namaqualand
- LSA burials
 - Melkbosstrand, Saldanha Bay, Namaqualand, Knysna
- Historical sites
 - Franschhoek (farmstead and well), Waterfront (fort, dump and well), Noordhoek (cottage), variety of small excavations in central Cape Town and surrounding suburbs
- Historic burial grounds
 - Green Point (Prestwich Street), V&A Waterfront (Marina Residential), Paarl

Awards:

Western Cape Government Cultural Affairs Awards 2015/2016: Best Heritage Project.

APPENDIX 2 – Site Sensitivity Verification

As required in Part A of the Government Gazette 43110, GN 320, a site sensitivity verification was undertaken in order to confirm the current land use and environmental sensitivity of the proposed project area as identified by the National Web-Based Environmental Screening Tool. The details of the site sensitivity verification are noted below:

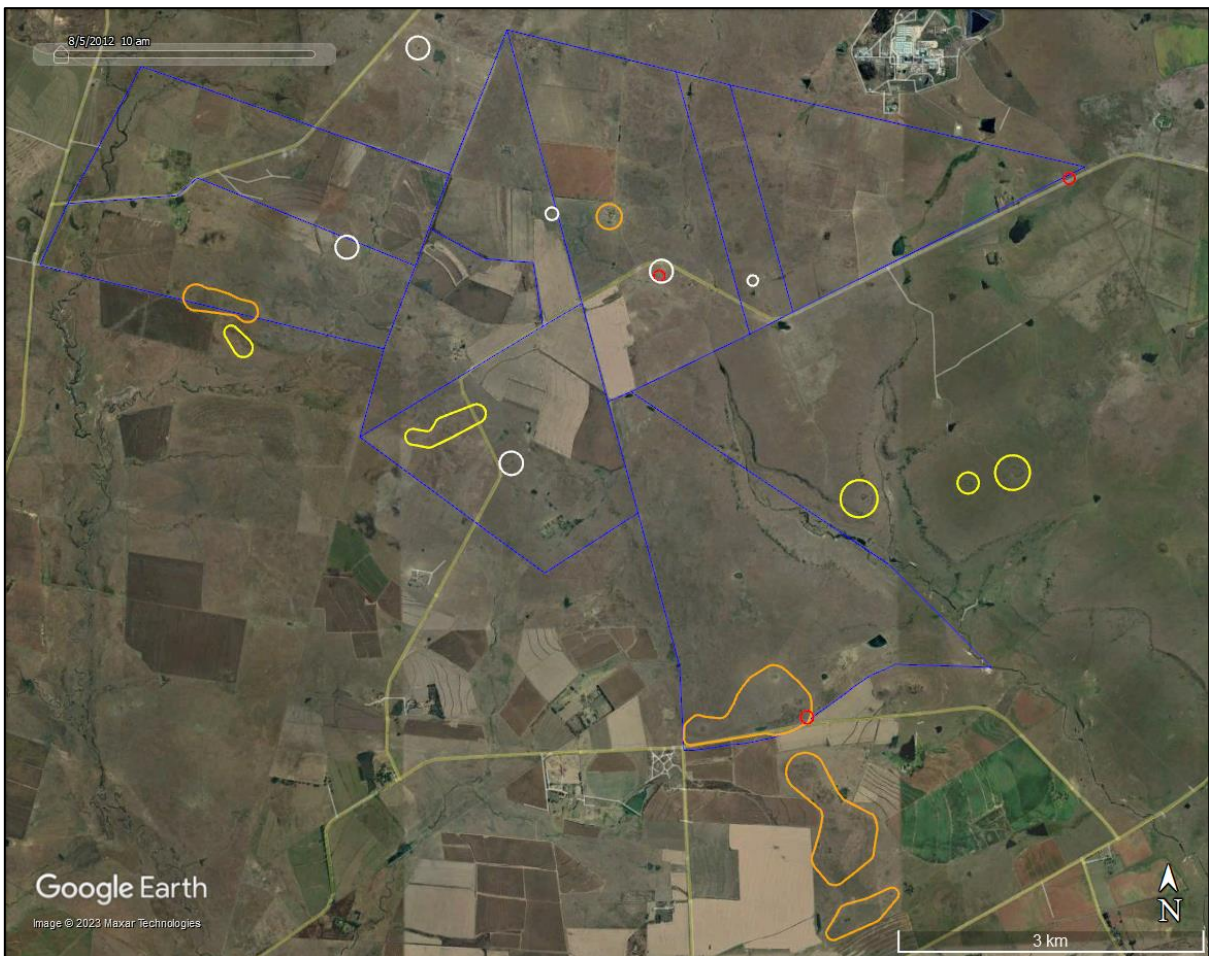
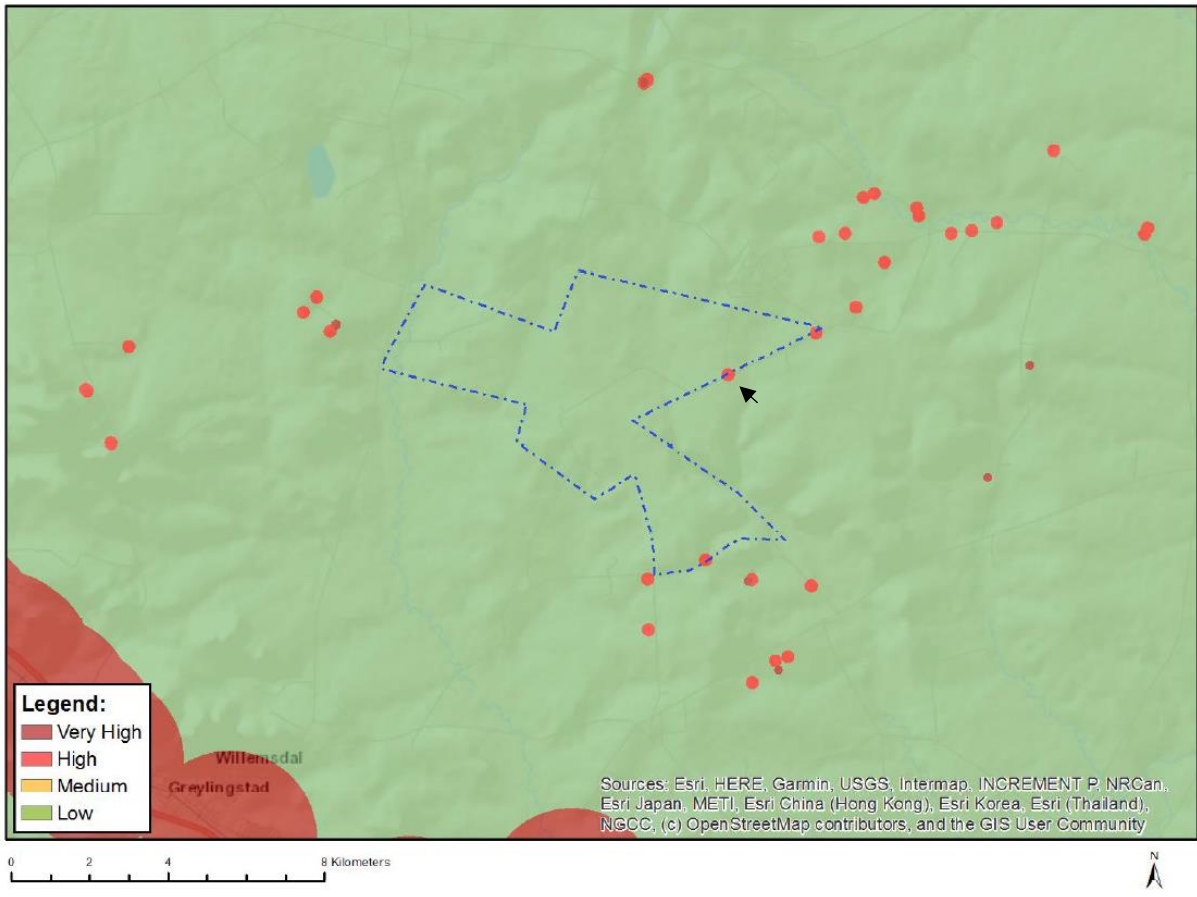
<i>Date of Site Visit</i>	30 and 31 March 2022 and 18 January 2023
<i>Specialist Name</i>	Jaco van der Walt
<i>Professional Registration Number</i>	ASAPA: 159; APHP: 114
<i>Specialist Affiliation / Company</i>	Beyond Heritage (Pty) Ltd

Method of the Site Sensitivity Verification

Initial work was carried out through field study of the preliminary turbine layout. Subsequent work included assessing modern and historical aerial photography in combination with the authors' accumulated knowledge of the local landscape. A final site visit looked at some key areas affected by changes to the preliminary layout. Desktop research was also used to inform on the heritage context of the area. This information is presented in the report (Sections 5.2.1 and 5.4.1).

Outcome

The first map below is extracted from the screening tool report and shows the archaeological and heritage sensitivity to be low throughout the study area with the exception of three small areas of high sensitivity along the margins of the site. Two of these were confirmed to be graveyards but nothing was found at the third location (arrowed in the map below). The site visit showed that the majority of the site is of low sensitivity but that a number of small areas (where heritage resources were found) should be considered to be of medium to high sensitivity. The second map below shows the areas considered to be sensitive from a heritage point of view. Medium to high cultural significance site (orange and red) can be considered high sensitivity while low cultural significance sites (yellow) can be considered as being of medium sensitivity. A photographic record and description of the relevant heritage resources are contained within the impact assessment report.



APPENDIX 3 – Mapping

The mapping below shows the locations of all finds.

Grade IIIA = red

Grade GPA = orange

Grade GPB = yellow

Grade GPC = white

