HERITAGE IMPACT ASSESSMENT

In terms of Section 38(8) of the NHRA for the

Proposed development of the Ujekamanzi Wind Energy Facility 1 LILO and MTS Infrastructure near Amersfoort, Mpumalanga Province

Prepared by CTS Heritage

CTS HERITAGE

For

SiVEST

April 2023

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EXECUTIVE SUMMARY

1. Site Name:

Ujekamanzi WEF 1 LILO and MTS Infrastructure

2. Location:

The proposed project is located south of Ermelo in the Dr. Pixley Ka Isaka Seme Local Municipality within the Mpumalanga Province.

3. Locality Plan:

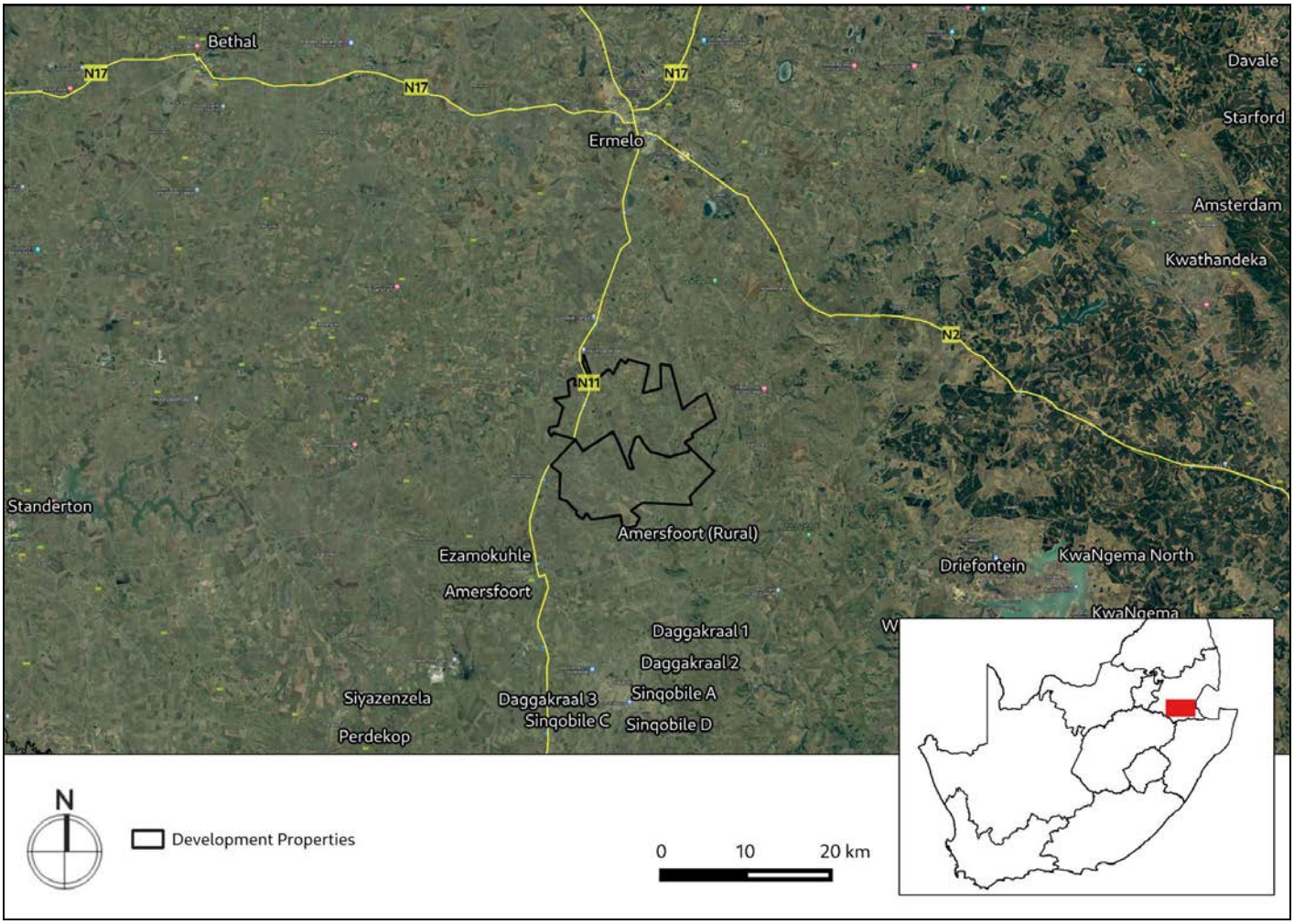

Figure A: Location of the proposed development area

4. Description of Proposed Development:

ABO Wind renewable energies (Pty) Ltd (hereafter referred to as "ABO"), has appointed SiVEST SA (Pty) Ltd (hereafter referred to as "SiVEST") to undertake the required Scoping and Environmental Impact Assessment (S&EIA) process for the proposed development of the renewable energy cluster, located south of Ermelo in the Mpumalanga province. The project will consist of four separate EIA's, 2x Wind Energy Facilities (WEF's), a Main Transmission Substation (MTS) (potentially including 2x 132kV overhead powerlines) and a Loop-In-Loop-Out (LILO) for the grid connection. Each of the projects will require its own Environmental Authorisation and possibly its own impact assessment.

The proposed project is located south of Ermelo in the Dr. Pixley Ka Isaka Seme Local Municipality within the Mpumalanga Province. This report is for the Scoping Phase of the Ujekamanzi WEF 1 LILO and MTS Project.

5. Anticipated Impacts on Heritage Resources:

The survey proceeded with some constraints and limitations, yet the project area was comprehensively surveyed for heritage resources. Some Later Stone Age archaeology of limited scientific value was identified. However, the majority of the significant heritage resources identified relate to the historic farm occupation of this property. These resources include the remnants of old farm werfs as well as burial sites that were identified.

None of the heritage resources identified fall within the areas for the WEF LILO and MTS infrastructure provided. Buffer areas have been recommended to ensure that these sites are not negatively impacted by the proposed development (Table 3). On condition that these buffer areas are respected, no direct impact to significant heritage resources is anticipated.

In order to ensure that no impact to the identified resources occurs during the construction or operational phases of the development, a number of recommendations are made below.

Based on the nature of the project, surface activities may impact upon the fossil heritage if preserved in the development footprint. The geological structures suggest that the rocks are the correct age and type to preserve fossils. The site visit and walk through confirmed that there were NO FOSSILS of any significance in the project footprint. Furthermore, the surface material to be excavated is soil and this does not preserve fossils. Since there is a small chance that fossils from the Vryheid Formation might occur below ground and might be disturbed by excavations for foundations and infrastructure, a Fossil Chance Find Protocol has been added to this report. Taking account of the defined criteria, the potential impact to fossil heritage resources is low to moderate.

The alternatives proposed for the MTS and LILO infrastructure developments are mapped throughout this report. No impacts to significant heritage resources are anticipated based on the layouts provided and there is no preferred alternative for either the LILO or the MTS from a heritage perspective.

6. Recommendations:

There is no objection to the proposed development from an archaeological perspective on condition that:

- The buffer areas recommended in Table 3 must be respected in the Final Layout
- Ongoing community access to the identified burials, as well as their conservation into the future, must be ensured. This can be managed through the development of a Heritage Management Plan for the burials to be implemented for the duration of the project.
- The attached Chance Fossil Finds Procedure must be implemented for the duration of construction activities
- Should any buried archaeological resources or human remains or burials be uncovered during the course of development activities, work must cease in the vicinity of these finds. The South African Heritage Resources Agency (SAHRA) must be contacted immediately in order to determine an appropriate way forward.

Details of Specialist who prepared the HIA

Jenna Lavin, an archaeologist with an MSc in Archaeology and Palaeoenvironments, and currently completing an MPhil in Conservation Management, heads up the heritage division of the organisation, and has a wealth of experience in the heritage management sector. Jenna's previous position as the Assistant Director for Policy, Research and Planning at Heritage Western Cape has provided her with an in-depth understanding of national and international heritage legislation. Her 8 years of experience at various heritage authorities in South Africa means that she has dealt extensively with permitting, policy formulation, compliance and heritage management at national and provincial level and has also been heavily involved in rolling out training on SAHRIS to the Provincial Heritage Resources Authorities and local authorities.

Jenna is a member of the Association of Professional Heritage Practitioners (APHP), and is also an active member of the International Committee on Monuments and Sites (ICOMOS) as well as the International Committee on Archaeological Heritage Management (ICAHM). In addition, Jenna has been a member of the Association of Southern African Professional Archaeologists (ASAPA) since 2009. Recently, Jenna has been responsible for conducting training in how to write Wikipedia articles for the Africa Centre's WikiAfrica project.

Since 2016, Jenna has drafted over 250 Screening and Heritage Impact Assessments throughout South Africa.

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APPENDICES

1. INTRODUCTION

1.1 Background Information on Project

ABO Wind renewable energies (Pty) Ltd (hereafter referred to as "ABO"), has appointed SiVEST SA (Pty) Ltd (hereafter referred to as "SiVEST") to undertake the required Scoping and Environmental Impact Assessment (S&EIA) process for the proposed development of the renewable energy cluster, located south of Ermelo in the Mpumalanga province. The project will consist of four separate EIA's, 2x Wind Energy Facilities (WEF's), a Main Transmission Substation (MTS) (potentially including 2x 132kV overhead powerlines) and a Loop-In-Loop-Out (LILO) for the grid connection. Each of the projects will require its own Environmental Authorisation and possibly its own impact assessment.

The proposed project is located south of Ermelo in the Dr. Pixley Ka Isaka Seme Local Municipality within the Mpumalanga Province. This report is for the Scoping Phase of the Ujekamanzi WEF 1 LILO and MTS Project.

According to the results of the DFFE Screening Tool, the area proposed for development has VERY HIGH sensitivity for impacts to archaeology and cultural heritage and VERY HIGH sensitivity for impacts to palaeontology.

Main Transmission Substation

The proposed development of a 400/132 kV Main Transmission Substation (MTS), including associated infrastructure at the MTS (such as 132 kV busbar and feeder bay(s) and 500 MVA 400/132 kV transformer with transformer bay). A single Substation hub could be combined with the Main Transmission Substation (MTS), alternatively a 132kV line will connect the Substation hub with the MTS.

Table 1: Project description for the MTS

Description of MTS	• The proposed development of a 400/132 kV MTS, including associated infrastructure at the MTS (see details from "On site Substation Hub")
Construction Methodology	• The construction of each on-site substation would require the following activities: • A survey of the site on which the proposed on-site substations will be constructed; • Site clearing and levelling; • Construction of access roads to the proposed substation site (where required); • Construction of substation terraces and foundations; • Assembly and installation of equipment (including transformers); • Connection of conductors to equipment; • Testing of equipment; and • Rehabilitation of any disturbed areas and protection of erosion sensitive areas.
Construction Cost	Estimated at R260 million

Estimated jobs during construction phase	Estimated at 130 employment opportunities
Will it be transferred to Eskom or Privately Operated?	Likely to be transferred to Eskom
Detailed map where MTS will be located on site	To be determined during the detailed design phase

Loop-In-Loop-Out (LILO) Grid Connection

To facilitate the connection of the proposed projects to the national grid, it is proposed that the electrical grid connection will likely comprise of a new 400 kV Loop-In-Loop-Out (LILO) from the existing 400 kV Overhead Power Line to the proposed MTS. The proposed LILO will be located at a point where the existing powerline cross the study area/ project site (where the specialists assessed the entire extent of the properties).

Table 2: Project description for the LILO

Description of Grid infrastructure	The proposed development of a 400 kV Loop-In-Loop-Out (LILO) from the existing 400 kV Overhead Power Line to the proposed on-site MTS
Construction Methodology	The construction of each OHL would require the following activities: • A survey of the site where the proposed OHL will be constructed; • Site clearing (where required); • Construction of access roads to the proposed pylon positions (where required); • Construction of foundations; • Assembly and installation of equipment; • Stringing and connection of conductors; • Testing of equipment; and • Rehabilitation of any disturbed areas and protection of erosion sensitive areas.
Construction Cost	Estimated at R9.5 million
Estimated jobs during construction phase	Estimated at 130 employment opportunities
Detailed map where cables will be installed and associated infrastructure	To be determined during the detailed design phase

1.2 Description of Property and Affected Environment

The Ujekamanzi WEF project spans an area roughly 20km north to south and 15km west to east. The most southerly end lies around 10km northeast of the Mpumalanga town of Amersfoort while the northern end runs up to an area near the Paul Kruger Bridge over the Vaal River. There are a number of working farms throughout the study area that are accessed either side of the N11 highway on the western side or the north-south gravel roads running from the Amersfoort-Piet Retief Road that join up to the Vaal River section. Most of the farms are growing large stands of maize crops interspersed with grazing grounds for cattle and some sheep. Smaller plots of fruit and potatoes were also seen.

Active werfs are often accompanied by an older footprint, either built over the older fabric or on a separate homestead marked with the same name as the original location of the werf. The terrain is dominated by gentle slopes that flow into each other and almost all of the farms are located in the valleys between the ridges on the higher ground. Werfs are usually surrounded by clumps of eucalyptus trees but other introduced species such as poplar and oak are also common. Very little indigenous vegetation is left as the entire area has been transformed over the last century by intensive stock and crop agriculture.

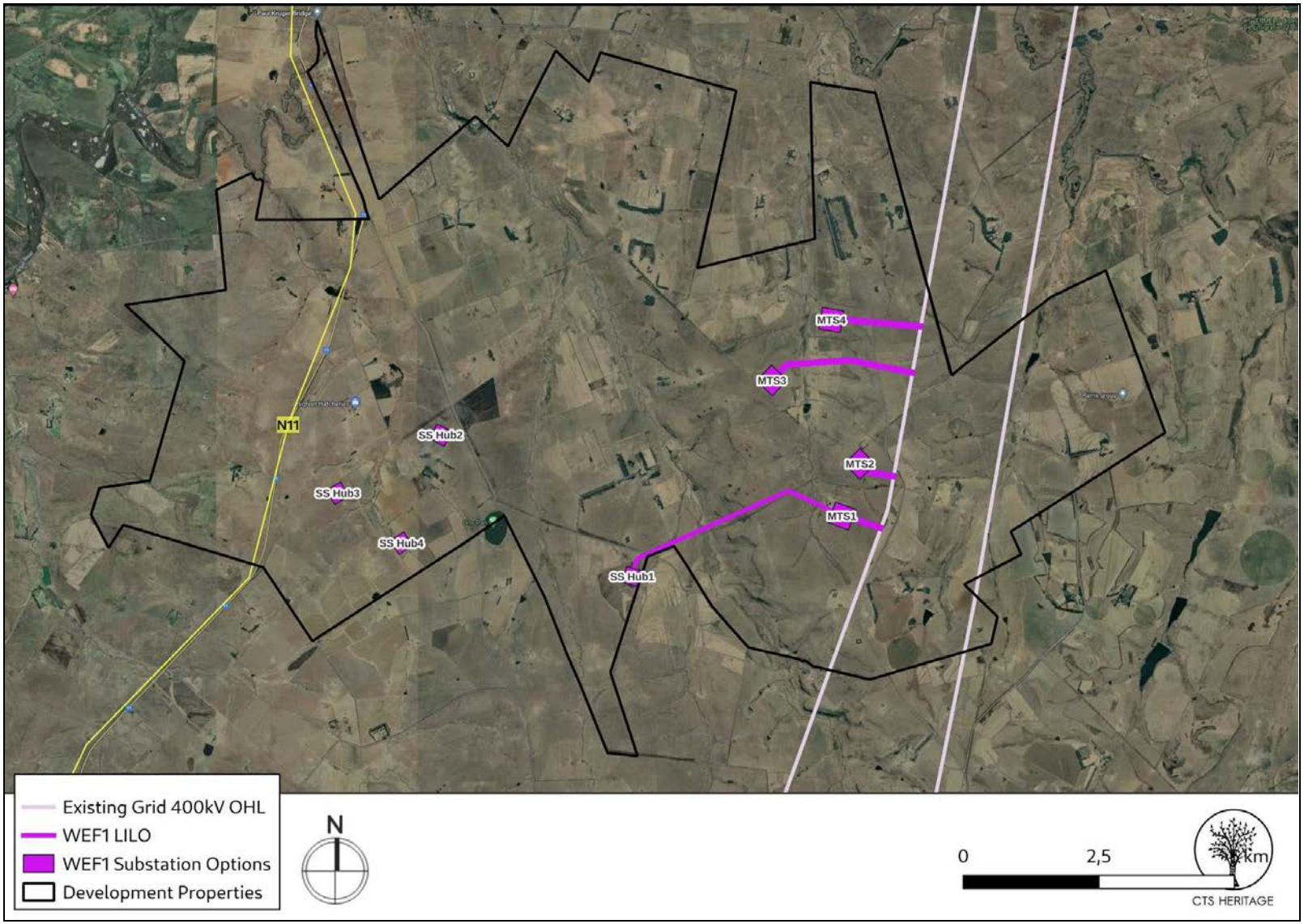

Figure 1.1: The proposed development layout of the WEF Infrastructure

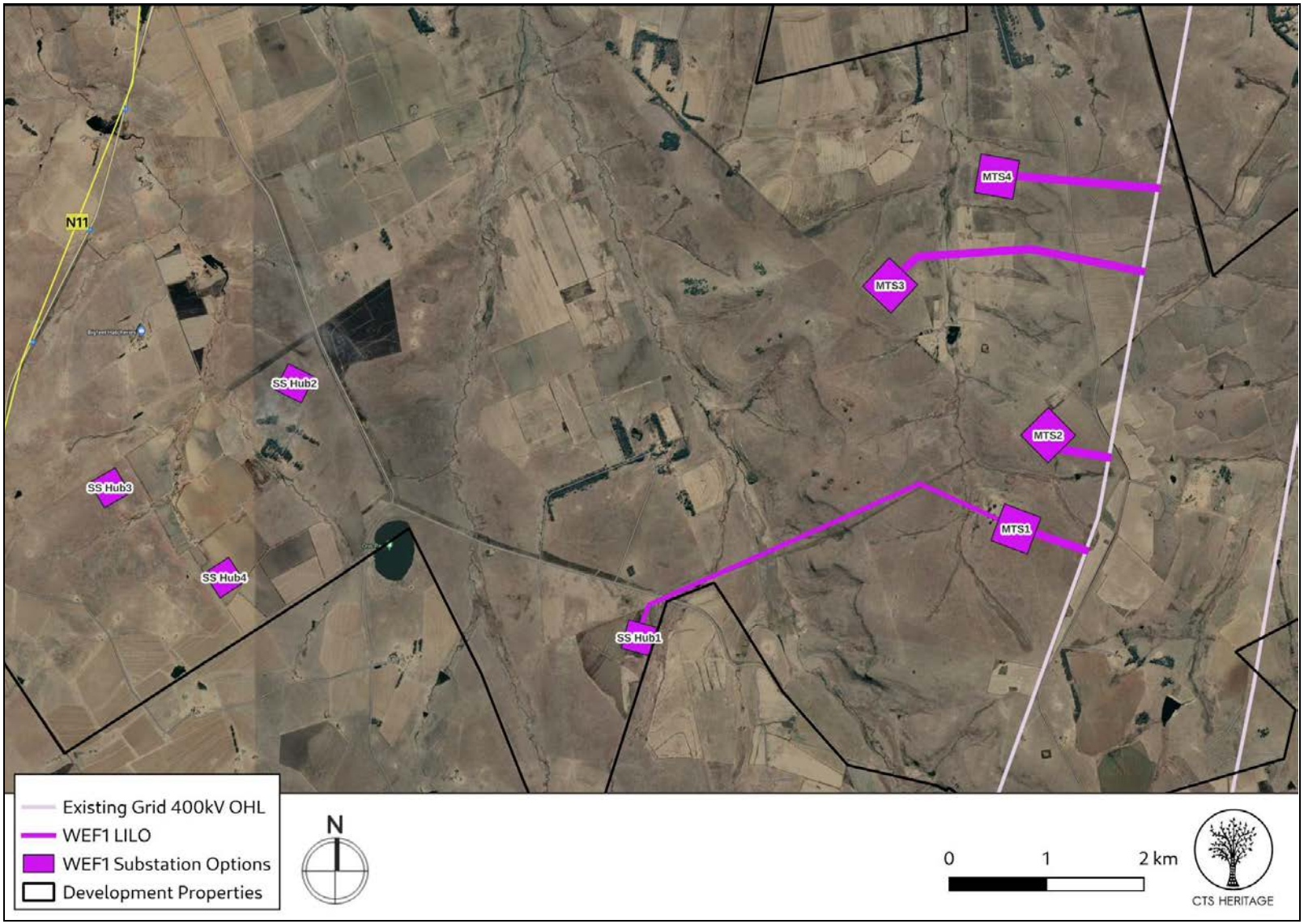

Figure 1.2: The proposed development layout of the WEF infrastructure

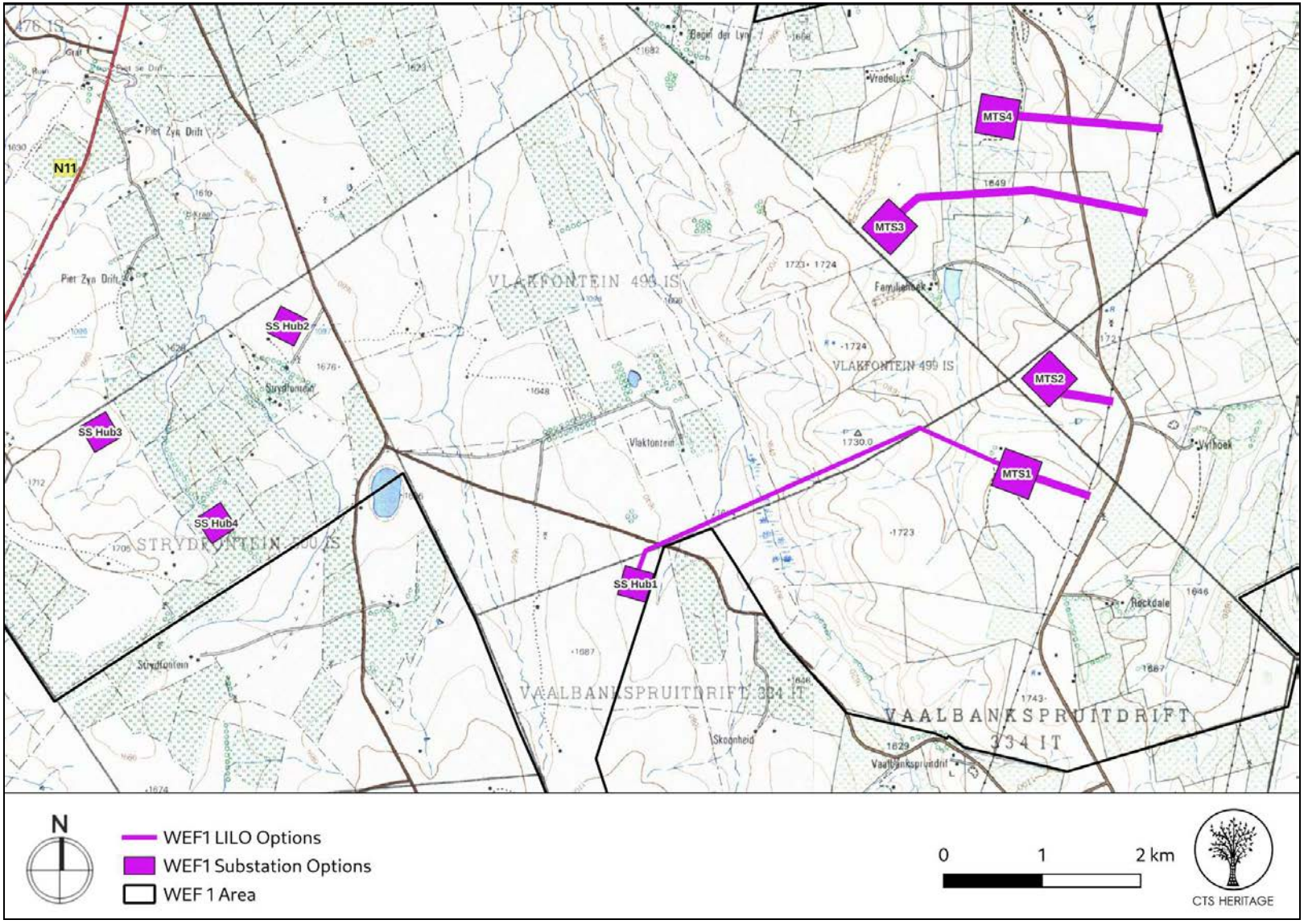

Figure 1.3: The proposed development layout of the WEF on an extract of the 1:50 000 Topo Map

2. METHODOLOGY

2.1 Purpose of HIA

The purpose of this Heritage Impact Assessment (HIA) is to satisfy the requirements of section 38(8), and therefore section 38(3) of the National Heritage Resources Act (Act 25 of 1999).

2.2 Summary of steps followed

- A Desktop Study was conducted of relevant reports previously written (please see the reference list for the age and nature of the reports used)
- An archaeologist conducted an assessment of archaeological resources likely to be disturbed by the proposed development. The archaeologists conducted their site visit from 10 to 13 February 2023. The results of the field assessment subsequently informed the layout assessed here.
- A palaeontologist conducted a field assessment of palaeontological resources likely to be disturbed by the proposed development from 11 to 12 February 2023.
- The identified resources were assessed to evaluate their heritage significance and impacts to these resources were assessed.
- Alternatives and mitigation options were discussed with the Environmental Assessment Practitioner

2.3 Assumptions and uncertainties

- The *significance* of the sites and artefacts is determined by means of their historical, social, aesthetic, technological and scientific value in relation to their uniqueness, condition of preservation and research potential. It must be kept in mind that the various aspects are not mutually exclusive, and that the evaluation of any site is done with reference to any number of these.

- It should be noted that archaeological and palaeontological deposits often occur below ground level. Should artefacts or skeletal material be revealed at the site during construction, such activities should be halted, and it would be required that the heritage consultants are notified for an investigation and evaluation of the find(s) to take place.

However, despite this, sufficient time and expertise was allocated to provide an accurate assessment of the heritage sensitivity of the area.

2.4 Constraints & Limitations

The survey took place during very heavy rainfall that fell over the general area. The veld and roads became waterlogged which made some areas unpassable until the ground had dried enough. However, the

interconnecting road infrastructure is very good and the placement of the preliminary areas designated for potential WEF and connecting grid infrastructure was placed within reach of the main connection roads by foot or mountain bike. Most of the ground is either cultivated or covered in grassland which made the detection of Stone Age or Iron Age artefacts quite difficult, especially where cattle have composted large grazing areas. The survey has therefore managed to achieve a reasonable level of coverage of the most significant heritage resources expected in the area but a final walkdown of the WEF locations in good weather will be required.

2.5 SiVEST Impact Assessment Methodology

The Environmental Impact Assessment (EIA) Methodology assists in evaluating the overall effect of a proposed activity on the environment. Determining the significance of an environmental impact on an environmental parameter is determined through a systematic analysis.

2.5.1 Determination of Significance of Impacts

Significance is determined through a synthesis of impact characteristics which include context and intensity of an impact. Context refers to the geographical scale (i.e. site, local, national or global), whereas intensity is defined by the severity of the impact e.g. the magnitude of deviation from background conditions, the size of the area affected, the duration of the impact and the overall probability of occurrence. Significance is calculated as shown in **Table 1**.

Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. The total number of points scored for each impact indicates the level of significance of the impact.

2.5.2 Impact Rating System

The impact assessment must take account of the nature, scale and duration of effects on the environment and whether such effects are positive (beneficial) or negative (detrimental). Each issue / impact is also assessed according to the various project stages, as follows:

- Planning;
- Construction;
- Operation; and
- Decommissioning.

Where necessary, the proposal for mitigation or optimisation of an impact should be detailed. A brief discussion of the impact and the rationale behind the assessment of its significance has also been included.

Rating System Used to Classify Impacts

The rating system is applied to the potential impact on the receiving environment and includes an objective evaluation of the possible mitigation of the impact. Impacts have been consolidated into one (1) rating. In assessing the significance of each issue the following criteria (including an allocated point system) is used:

Table 2: Rating of impacts criteria

ENVIRONMENTAL PARAMETER		
A brief description of the environmental aspect likely to be affected by the proposed activity.		
ISSUE / IMPACT / ENVIRONMENTAL EFFECT / NATURE		
Include a brief description of the impact of environmental parameter being assessed in the context of the project. This criterion includes a brief written statement of the environmental aspect being impacted upon by a particular action or activity (e.g. oil spill in surface water).		
EXTENT (E)		
This is defined as the area over which the impact will be expressed. Typically, the severity and significance of an impact have different scales and as such bracketing ranges are often required. This is often useful during the detailed assessment of a project in terms of further defining the determined		
1	Site	The impact will only affect the site
2	Local/district	Will affect the local area or district
3	Province/region	Will affect the entire province or region
4	International and National	Will affect the entire country
PROBABILITY (P)		
This describes the chance of occurrence of an impact		
1	Unlikely	The chance of the impact occurring is extremely low (Less than a 25% chance of occurrence).
2	Possible	The impact may occur (Between a 25% to 50% chance of occurrence).
3	Probable	The impact will likely occur (Between a 50% to 75% chance of occurrence)
4	Definite	Impact will certainly occur (Greater than a 75% chance of occurrence).
REVERSIBILITY (R)		
This describes the degree to which an impact on an environmental parameter can be successfully reversed upon completion of the proposed activity.		
1	Completely reversible	The impact is reversible with implementation of minor mitigation measures
2	Partly reversible	The impact is partly reversible but more intense mitigation measures are required.
3	Barely reversible	The impact is unlikely to be reversed even with intense mitigation measures.
4	Irreversible	The impact is irreversible and no mitigation measures exist.

IRREPLACEABLE LOSS OF RESOURCES (L)		
This describes the degree to which resources will be irreplaceably lost as a result of a proposed activity.		
1	No loss of resource.	The impact will not result in the loss of any resources.
2	Marginal loss of resource	The impact will result in marginal loss of resources.
3	Significant loss of resources	The impact will result in significant loss of resources.
4	Complete loss of resources	The impact is result in a complete loss of all resources.
DURATION (D)		
This describes the duration of the impacts on the environmental parameter. Duration indicates the lifetime of the impact as a result of the proposed activity		
1	Short term	The impact and its effects will either disappear with mitigation or will be mitigated through natural process in a span shorter than the construction phase (0 – 1 years), or the impact and its effects will last for the period of a relatively short construction period and a limited recovery time after construction, thereafter it will be entirely negated (0 – 2 years).
2	Medium term	The impact and its effects will continue or last for some time after the construction phase but will be mitigated by direct human action or by natural processes thereafter (2 – 10 years).
3	Long term	The impact and its effects will continue or last for the entire operational life of the development, but will be mitigated by direct human action or by natural processes thereafter (10 – 50 years).
4	Permanent	The only class of impact that will be non-transitory. Mitigation either by man or natural process will not occur in such a way or such a time span that the impact can be considered transient (Indefinite).
INTENSITY / MAGNITUDE (I / M)		
Describes the severity of an impact (i.e. whether the impact has the ability to alter the functionality or quality of a system permanently or temporarily).		
1	Low	Impact affects the quality, use and integrity of the system/component in a way that is barely perceptible.
2	Medium	Impact alters the quality, use and integrity of the system/component but system/ component still continues to function in a moderately modified way and maintains general integrity (some impact on integrity).
3	High	Impact affects the continued viability of the system/component and the quality, use, integrity and functionality of the system or component is severely impaired and may temporarily cease. High costs of rehabilitation and remediation.
4	Very high	Impact affects the continued viability of the system/component and the quality, use, integrity and functionality of the system or component permanently ceases and is irreversibly impaired (system collapse). Rehabilitation and remediation often impossible. If possible rehabilitation and remediation often unfeasible due to extremely high costs of rehabilitation and remediation.
SIGNIFICANCE (S)		
Significance is determined through a synthesis of impact characteristics. Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. This describes the significance of the impact on the environmental parameter. The calculation of the significance of an impact uses the following formula:		

Significance = (Extent + probability + reversibility + irreplaceability + duration) x magnitude/intensity. The summation of the different criteria will produce a non-weighted value. By multiplying this value with the magnitude/intensity, the resultant value acquires a weighted characteristic which can be measured and assigned a significance rating.		
Points	**Impact Significance Rating**	**Description**
5 to 23	Negative Low impact	The anticipated impact will have negligible negative effects and will require little to no mitigation.
5 to 23	Positive Low impact	The anticipated impact will have minor positive effects.
24 to 42	Negative Medium impact	The anticipated impact will have moderate negative effects and will require moderate mitigation measures.
24 to 42	Positive Medium impact	The anticipated impact will have moderate positive effects.
43 to 61	Negative High impact	The anticipated impact will have significant effects and will require significant mitigation measures to achieve an acceptable level of impact.
43 to 61	Positive High impact	The anticipated impact will have significant positive effects.
62 to 80	Negative Very high impact	The anticipated impact will have highly significant effects and are unlikely to be able to be mitigated adequately. These impacts could be considered "fatal flaws".
62 to 80	Positive Very high impact	The anticipated impact will have highly significant positive effects.

3. HISTORY AND EVOLUTION OF THE SITE AND CONTEXT

3.1 Desktop Assessment

The area proposed for this Renewable Energy Development is located immediately in between Ermelo and Amersfoort in Mpumalanga This area is known for its rolling hills and extensive coal mine infrastructure.

Cultural Landscape

Van Vollenhoven (2015) described the broader assessment area in his assessment completed for a de-stoning plan located nearby. Van Vollenhoven (2015) describes the environment as "disturbed by recent human activities, mainly agriculture. This consists of maize fields. Other disturbance visible is mining infrastructure..., a railway track... and power lines... Signs of old fields were also present which could be seen in the pioneer plant species consisting of weeds and grass. Almost half of the surveyed area consists of natural grassland. The vegetation cover varies between short and long grass... The topography of the area forms part of the rolling hills of the surrounding landscape."

Van Vollenhoven (2015) notes that "At the beginning of the 19th century the Phuthing, a South Sotho group, stayed in the vicinity of modern day Bethal. During the Difaquane they fled to the south (Bergh 1999: 10-11; 109). In 1829 the traveller Robert Scoon passed through an area to the north of Bethal (Bergh 1999: 13). The first white farmers only settled here during the late 1850's. By the 1890's this area was inhabited by many white farmers (Bergh 1999: 18-20). The town of Standerton was established in 1879 although it already was a district in 1878. Bethal was established in 1880 and it became an independent district in 1898 (Bergh 1999: 20-21). During the Anglo-Transvaal War (1880-1881) the British garrison in Standerton was beleaguered by the Boer forces (Bergh 1999: 46). The Highveld areas also saw much action consisting of various skirmishes between Boer and Brit during the Anglo-Boer War (1899-1902). It includes skirmishes on the farms Oshoek (4 December 1901), Trigaardsfontein (10 December 1901), Witbank (11 January 1902) and Nelspan (26 January 1902) (Bergh 1999: 51, 54)... At Standerton there was both a concentration camp for white and for black people (Bergh 1999: 54)."

This brief history points to the layered cultural landscape that is present in this area. Due to the scale of the proposed development, it is likely to change the sense of place associated with this landscape, and may impact the way that this historic landscape reads by obscuring layers of the past. Cognisance must be taken of this unique cultural landscape, consisting of farm werfs etc in the proposed layout.

Archaeology

None of the area proposed for development has been previously assessed in any heritage impact assessment process. Heritage Impact Assessments have been completed nearby for projects in Secunda and these can be used to infer the archaeological sensitivity in the development area. Van Vollenhoven (2015) notes that the

geographical area around the towns of Standerton and Bethal is not known to conserve Stone Age archaeology. He notes that "No such sites are indicated on maps contained in a historical atlas of this area (Bergh 1999: 4-5). However this may only be since no research has actually been done in this area. The closest known Stone Age occurrences are a Late Stone Age site at the town of Ermelo and rock art sites far to the west of Standerton (Bergh 1999: 4-5)." Van Vollenhoven (2015) noted no natural shelters during the survey; however, the good vegetation in the surrounding area and the rivers indicate that ample grazing and water may have been available, making it a prime spot for hunting in the past. Therefore one may assume that Stone Age people probably would have moved through the area. Late Iron Age sites are found in a large area around the towns of Bethal and Standerton and number at least 585 such sites.

In the heritage assessment of a powerline upgrade at the nearby Syferfontein Mine, Nel & Karodia (2013), noted that "*a heritage assessment was conducted in 2000 by the National Cultural History Museum and included in the Syferfontein Mine EMP in 2010. During the survey, a few Stone Age artefacts were identified. These artefacts were not considered to have any primary context and therefore were interpreted to have low significance value. No Early Iron Age sites were identified. The Late Iron Age sites found here conform to those identified in the literature for the Southern Highveld area (former southern Transvaal, northern Orange Free State) as Type V sites. As the soil is mostly turf, Iron Age settlement usually took place on the various dolerite outcrops. The added benefit of choosing these locations was that it was located at the source of building material used in constructing the settlements. One such site shows interesting features as the living units were actually excavated to obtain enough building material for the surrounding walls. A few of the farmsteads dating to early part of this century were identified as possibly having historical-architectural significance. A number of abandoned homesteads are located in the areas that were investigated. These seem to belong to farm labourers and were all abandoned within the last few years. They are therefore not viewed to be of cultural or historical significance. However, some graves are located in the vicinity of the homesteads and it is possible that more graves will be located nearby*".

In a recent HIA completed for a nearby WEF completed by CTS Heritage, it was noted that "Even though the area is rich in history, no significant archaeological heritage resources were identified during the field assessment. No Stone Age or Iron Age heritage resources were identified during the survey. The few heritage resources that were identified consist of the ruins of older farm structures and kraals." None of the sites identified in the assessment referenced are located within or near the development area, however the text provides a good assessment of resources that may be present. It is clear that the development area has not previously been assessed. It is therefore possible that the proposed development will impact negatively on archaeological resources associated with the Late Iron Age, burial grounds and graves as well as stone age archaeological resources. Further investigation of the archaeological significance of the development area is recommended.

Palaeontology

According to the SAHRIS Palaeosensitivity Map, the area proposed for development is underlain by sediments of zero, high and very high palaeontological sensitivity (Figure 4a). According to the extract from the Council of Science Map for East Rand 2628 (Figure 4b), the very highly palaeontologically sensitive geology of the area is ascribed to the Vryheid Formation of the Ecca Group of sediments and the highly sensitive geology is ascribed to the Volksrust Formation.

Groenewald (2014, SAHRIS NID 167013) completed a field-based palaeontological assessment for the Waaihoek WEF in which he interrogates the palaeontological sensitivity of this formation. In this assessment, Groenewald (2014) notes that "The Vryheid Formation consists of interbedded very coarse-grained sandstone and mudstone that yields plant and trace fossils as well as some prominent coal seams." In this assessment, Groenewald (2014) made the following recommendations for the WEF development within the Vryheid Formation "The PEA and CEO be made aware of the possibility of finding fossils in the Vryheid and Volksrust Formation sediments during excavation of the foundations for the turbines and other infrastructure. A professional palaeontologist is appointed to monitor possible palaeontological finds during excavation of turbine foundations and infrastructure where turbine positions and infrastructure fall on Vryheid and Volksrust Formation sediments." In a PIA completed for a nearby WEF, it is noted in relation to the Vryheid Formation that "The potential for rare, unrecorded fossil sites of high scientific and/or conservation value is very high in the areas proposed for development located within the Vryheid Formation and where excavation depth will exceed 1.5m."

According to the SAHRIS Fossil Heritage Browser, the Volksrust Formation is known to conserve "Trace Fossils, rare temnospondyl amphibian remains, invertebrates (bivalves, insects), minor coals with plant remains, petrified wood, organic microfossils (acritarchs), low-diversity marine to non-marine trace fossil assemblages" The sediments underlying the development area have high and very high levels of palaeontological sensitivity, the nature of the excavations associated with Renewable Energy facilities tends to be deep and as such, the likelihood of impacting intact Vryheid Formation sediments is high. Further investigation of the palaeontological sensitivity of the development area is recommended.

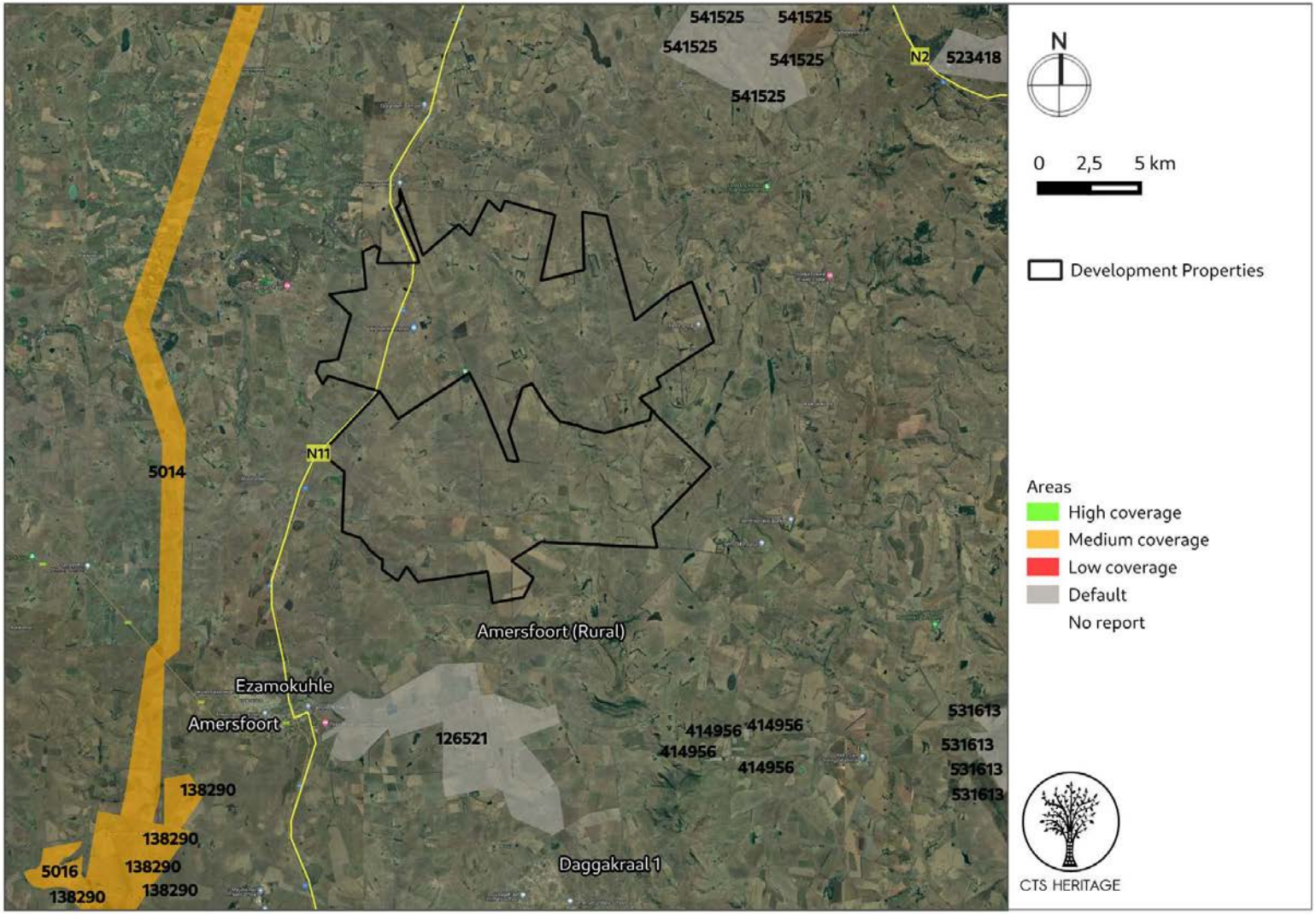

Figure 2: Spatialisation of heritage assessments conducted in proximity to the proposed development

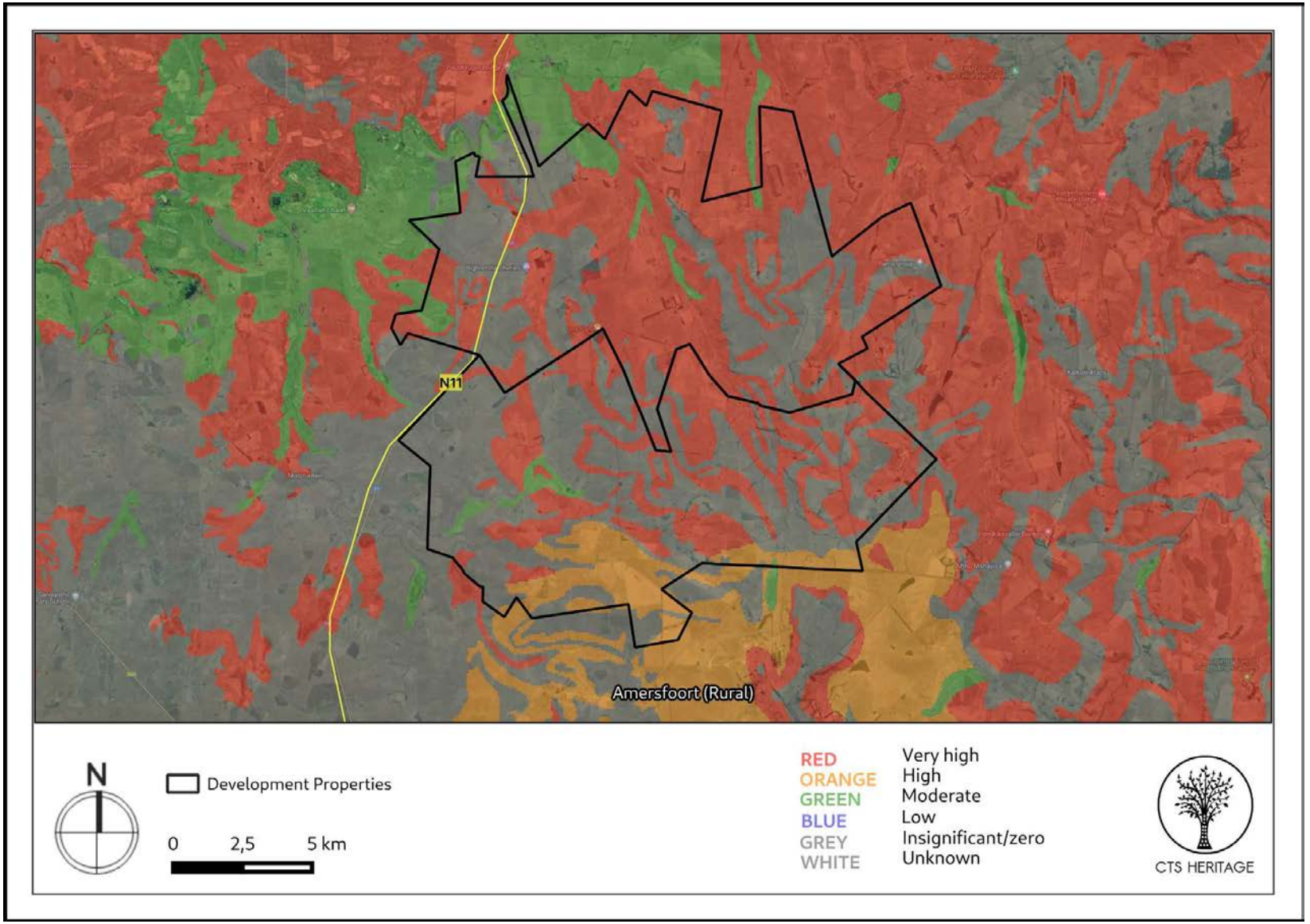

Figure 3.1: Palaeontological sensitivity of the proposed development area

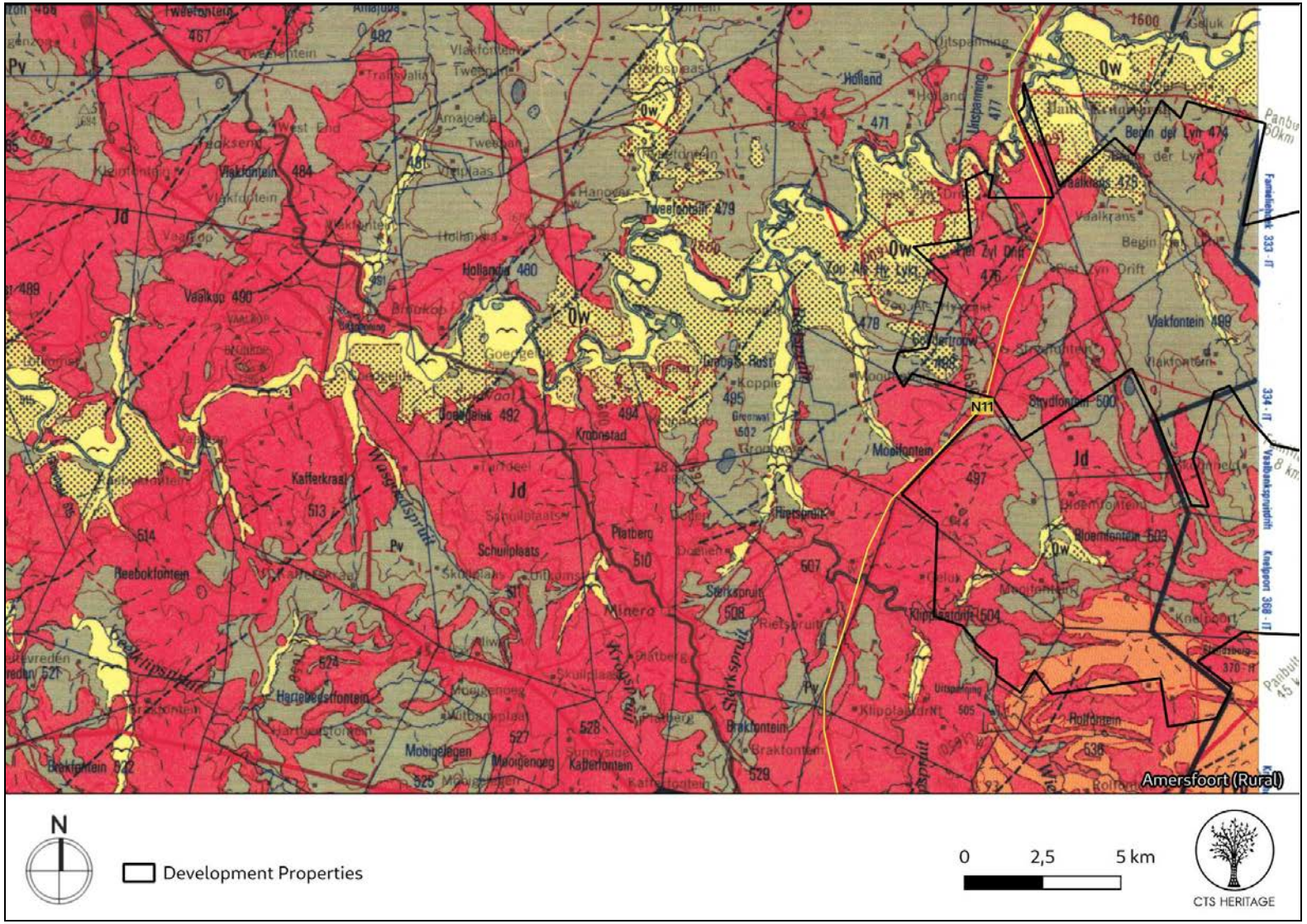

Figure 3.2. Geology Map. Extract from the CGS 2628 East Rand Map indicating that the development area for the REF development is underlain by sediments of Pv: Vryheid Formation of the Ecca Group and Jd: Jurassic Dolerite as well as the Pvo: Volkrust Formation and Quaternary Sands

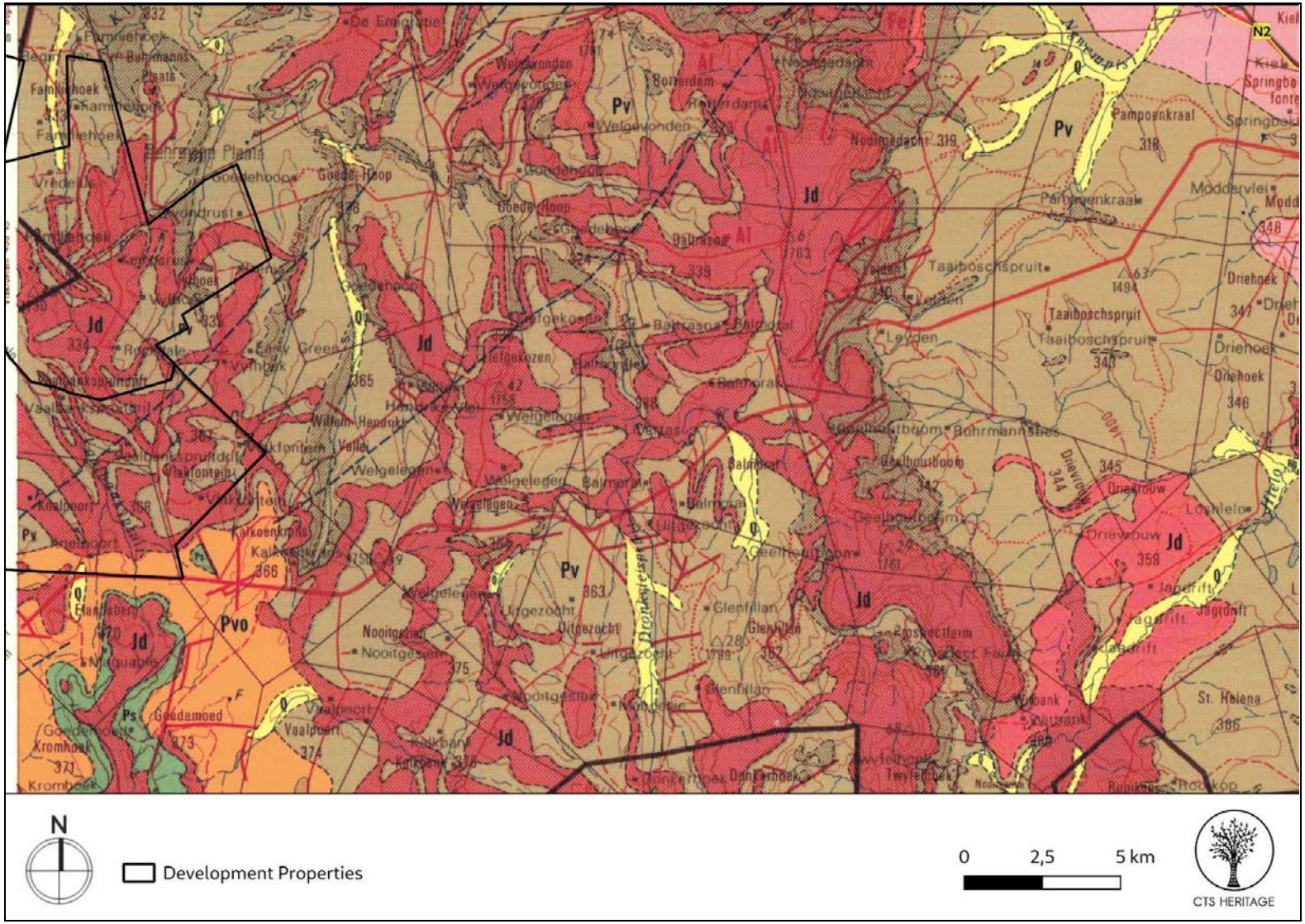

Figure 3.3. Geology Map. Extract from the CGS 2630 Mbabane Map indicating that the development area for the REF development is underlain by sediments of Pv: Vryheid Formation of the Ecca Group and Jd: Jurassic Dolerite as well as the Pvo: Volkrust Formation and Quaternary Sands

4. IDENTIFICATION OF HERITAGE RESOURCES

4.1 Summary of findings of Specialist Reports

Archaeology (Appendix 1)

In the 140 observations made during the field survey, the vast majority relate to buildings and structures that have been built in the 20th century and relate to the farming activities that have transformed the landscape in the study area. Small settlements occupied by farm labourers and their families dot the area with both formal and informal buildings. These settlements were mapped and recorded as many of these settlements are often associated with graves. At this stage none of the WEF assessment areas overlap the settlements. The formal homesteads/werfs typically have corrugated iron roofs, often painted red, with well-built stone stock kraals and barns. A mix of modern full corrugated iron farm buildings are also common. Ruins of buildings dating the latter half of the 19th and early 20th century were also common and these are usually marked with the same names as the working farms where the original location of the werfs were presumably laid down. Many of the older farms also have a family graveyard surrounded by wire fencing or stone and brick walls.

The Paul Kruger Bridge spans the Vaal River in the northern section of the study area and was built in 1896-1897. The bridge is still in good condition and is made of sandstone with 9 attractive arches. The Stone Age artefacts seen consisted of Middle Stone Age flakes made of quartz and quartzites sourced locally that appeared to be eroding out of the jeep tracks. The Later Stone Age artefacts were found on exposed areas of hard packed ground where the grassland had not hindered the visibility of the material.

The results of the field assessment subsequently informed the layout assessed here and as such, this layout has considered all of the heritage resources identified.

Palaeontology (Appendix 2)

According to the PIA completed for this project, the palaeontological sensitivity of the area under consideration lies on Jurassic dolerite and the Vryheid Formation.

The Vryheid Formation lies on the uneven topography of pre-Karoo or Dwyka Group rocks in the northern and northwestern margins, but lies directly on the Pietermaritzburg Formation in the central and eastern part. The lithofacies show a number of upward-coarsening cycles, some very thick, and they are essentially deltaic in origin. There are also delta-front deposits, evidence of delta switching, and fluvial deposits with associated meandering rivers, braided streams, back swamps or interfluves and abandoned channels (Cadle et al., 1993; Cairncross, 1990; 2001; Johnson et al., 2006). Coal seams originated where peat swamps developed on broad abandoned alluvial plains, and less commonly in the backswamps or interfluves. Most of the economically important coal seams occur in the fluvial successions (ibid). In the east (Mpumalanga and northern KwaZulu Natal), the Vryheid

formation can be subdivided into a lower fluvial-dominated deltaic interval, a middle fluvial interval, and an upper fluvial-dominated deltaic interval again (Taverner-Smith et al., 1988).

The Vryheid Formation preserves the distinctive Gondwanan flora, the *Glossopteris* flora. As the climate warmed up and the huge continent drifted polewards the land was rapidly colonised by luxuriant vegetation, in some parts. Peats formed in waterlogged environments and over time were buried, preserved and altered by heat and pressure to eventually form the coal seams typical of this formation and abundant in Mpumalanga and KwaZulu Natal coalfields. Coals themselves do not preserve the original plant structures, but plant impressions or compressions can be preserved in the lenses between the coals or in fine grained sediments. The flora is composed of the dominant *Glossopteris* plants (leaves, seeds, reproductive structures, roots and wood). Other plants are lycopods, sphenophytes, ferns, cordaitaleans and other early gymnosperms. Vertebrates are not found with the fossil plants because they require adifferent set of conditions for preservations. Plants require rapid burial in a reducing and anoxic environment, while bones can be preserved in oxidizing environments (Cowan, 1995).

The Jurassic dolerite does not preserve fossils because it is an intrusive volcanic rock. The very young Quaternary sands along the stream are also very unlikely to preserve fossils as they have been moved by the river floods and fossils would have been destroyed, if present in the first place.

4.2 Heritage Resources identified

In terms of the heritage resources identified in the archaeological field assessment, see Table 2 below and Appendix 1 for full descriptions and images.

Table 3: Artefacts identified during the field assessment of the broader development area

POINT ID	Description	Type	Period	Density	Co-ordinates		Grading	Mitigation
028	Piet Zyn Drift werf, some modern buildings mixed with older fabric	Structure	Modern, Historic	n/a	-26.828914	29.935558	IIIC	100m Buffer
035	Strydfontein werf in cluster of gum trees, stone walls	Structure	Historic	n/a	-26.845949	29.944318	IIIB	200m Buffer
059	Main Vlakfontein werf, mix of older buildings, barns, kraals and modern farm infrastructure	Structure	Modern, Historic	n/a	-26.845933	29.984561	IIIB	200m Buffer
061	Skoonheid ruins	Ruin	Historic	n/a	-26.8818614	29.9943163	IIIC	50m Buffer
062	Familiehoek werf, red corrugated iron roofs	Structure	Historic	n/a	-26.79639	30.017185	IIIB	200m Buffer
063	Farm stock building, red corrugated iron roof adjoined to stone walled kraal	Structure	Historic	n/a	-26.793983	30.011673	IIIC	100m Buffer
066	Vredelus werf red corrugated iron	Structure	Historic	n/a	-26.814844	30.009528	IIIC	100m

	roofs							Buffer
070	Familiehoek werf	Structure	Modern, Historic	n/a	-26.835184	30.012343	IIIC	100m Buffer
075	Rockdale werf, stone built barns, kraals	Structure	Modern, Historic	n/a	-26.864262	30.030307	IIIB	200m Buffer
080	Ruin, stone walled	Structure	Historic	n/a	-26.876298	30.014714	IIIC	50m Buffer
103	Irenia werf, stone buildings, red corrugated iron roofs, kraals, surrounded by stand of gum trees	Structure	Modern, Historic	n/a	-26.841127	30.069381	IIIC	100m Buffer
114	Kraal	Structure	Historic	n/a	-26.843148	29.907537	IIIC	50m Buffer
116	Piet se Drif werf, mainly modern but ruins of original farm also present	Structure, Ruin	Modern, Historic	n/a	-26.817042	29.925434	IIIC	100m Buffer
117	Piet Zyn Drift werf with stone walled kraal and main house 1940s	Structure	Modern, Historic	n/a	-26.820715	29.930703	IIIC	100m Buffer
120	Graveyard, about 17 graves. Kemp, Fick, Bezuidenhout etc	Graves/BurialGrounds	Historic	n/a	-26.813923	29.925529	IIIA	200m Buffer
121	Piet Zyn Drift werf, stone walled barns, modern house	Structure	Modern, Historic	n/a	-26.834888	29.930046	IIIC	100m Buffer
122	Sandstone farmhouse werf and kraal	Structure	Historic	n/a	-26.802668	29.907724	IIIB	200m Buffer
124	Kraal	Structure	Historic	n/a	-26.816275	29.919312	IIIC	50m Buffer
125	Vaalkrans older barns and outbuildings	Structure	Historic	n/a	-26.804019	29.948388	IIIC	100m Buffer
126	Ruined werf at Vaalkrans	Structure	Historic	n/a	-26.805446	29.95988	IIIC	100m Buffer
131	Begin der Lyn old werf and kraals	Structure	Historic	n/a	-26.785787	29.9688	IIIB	200m Buffer
132	Begin der Lyn barn and kraal	Structure	Historic	n/a	-26.78639	29.980937	IIIC	100m Buffer
133	Barn	Structure	Historic	n/a	-26.787112	29.981274	IIIC	50m Buffer
134	Begin der Lyn werf	Structure	Modern, Historic	n/a	-26.799106	29.985942	IIIC	100m Buffer
135	Kraal	Structure	Historic	n/a	-26.812313	29.986231	IIIC	50m Buffer

4.3 Mapping and spatialisation of heritage resources

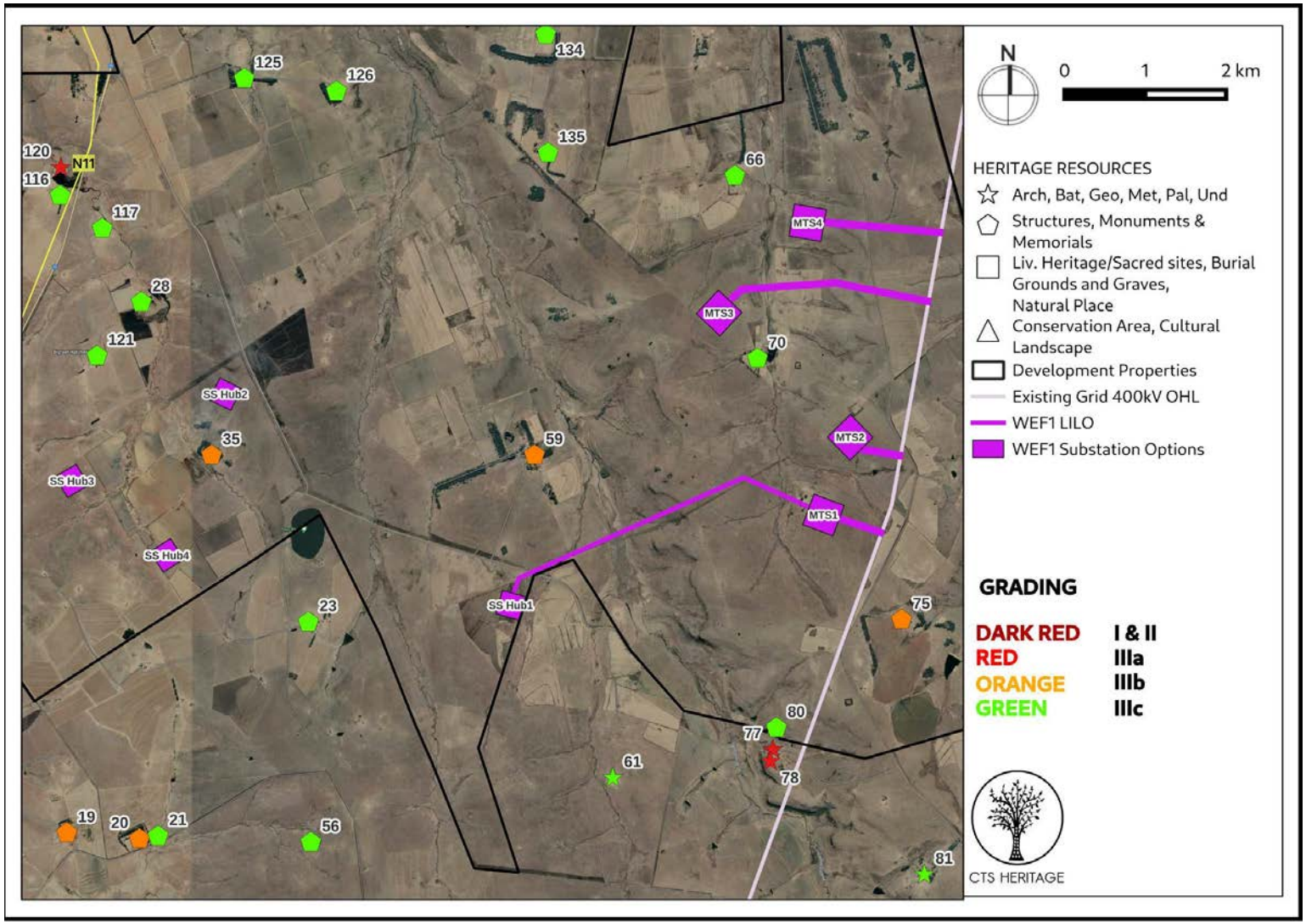

Figure 5.1: All heritage resources within proximity to the development area

5. ASSESSMENT OF THE IMPACT OF THE DEVELOPMENT

5.1 Assessment of impact to Heritage Resources

5.1.1 Cultural Landscape and VIA

Information available at the EIA Phase

5.1.2 Archaeology

Based on the information available at the time of this assessment, none of the significant heritage resources identified fall within the areas proposed for the WEF LILO or substation infrastructure. No-development buffers have been recommended for these sites to ensure that they are not inadvertently impacted by the proposed development.

On condition that the buffer areas detailed in Table 3 are adhered to, no negative impact to significant heritage resources is anticipated.

5.1.3 Palaeontology

Based on the geology of the area and the palaeontological record as we know it, it can be assumed that the formation and layout of the dolomites, sandstones, shales and sands are typical for the country and only some do contain fossil plant, insect, invertebrate and vertebrate material. The site visit and walk through in early February 2023 by palaeontologists confirmed that there are no fossils on the surface. There were no outcrops of shales that could potentially preserve fossils. It is not known what lies below the surface. The overlying soils and sands of the Quaternary period would not preserve fossils.

Based on the nature of the project, surface activities may impact upon the fossil heritage if preserved in the development footprint. The geological structures suggest that the rocks are the correct age and type to preserve fossils. The site visit and walk through confirmed that there were NO FOSSILS of any significance in the project footprint. Furthermore, the surface material to be excavated is soil and this does not preserve fossils. Since there is a small chance that fossils from the Vryheid Formation might occur below ground and might be disturbed by excavations for foundations and infrastructure, a Fossil Chance Find Protocol has been added to this report. Taking account of the defined criteria, the potential impact to fossil heritage resources is low to moderate.

Table 3: Impacts Table

Ujekamanzi WEF 1 LILO and MTS																				
ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
Construction Phase																				
Impacts to archaeological heritage resources	Construction activities that take place near to archaeological resources may result in their destruction	1	3	4	4	4	3	48	(-)	Negative High	No development activities within the buffer areas identified Should any previously unknown archaeological resources be impacted during construction, work must cese in the vicinity of the find and the relevant heritage authority must be contacted	1	1	4	4	4	1	14	(-)	Negative Low
Impacts to palaeontological resources	Construction activities that take place near to palaeontological resources may result in their destruction	1	2	4	4	4	1	15	(-)	Negative Low	Implementation of the Chance Fossil Finds Protocol	1	2	4	4	4	1	15	(-)	Negative Low
Impacts to the cultural ladscape	Construction activities that take place near to cultural landscape elements may result in their destruction	1	2	1	3	1	3	24	(-)	Negative Medium	Implementation of the recommended buffer areas and recommendations included in the VIA	1	1	4	1	4	1	11	(-)	Negative Low
Operational Phase																				
Impacts to archaeological heritage resources	Operational activities that take place near to archaeological resources may result in their destruction	1	1	4	2	4	3	36	(-)	Negative Medium	No development activities within the buffer areas identified Should any previously unknown archaeological resources be impacted during construction, work must cese in the vicinity of the find and the relevant heritage authority must be contacted	1	1	4	1	4	1	11	(-)	Negative Low
Impacts to palaeontological resources	Operational activities that take place near to palaeontological resources may result in their destruction	1	1	4	1	4	3	33	(-)	Negative Medium	Implementation of the Chance Fossil Finds Protocol	1	1	4	1	4	1	11	(-)	Negative Low
Impacts to the cultural landscape	Operational activities that take place near to cultural landscape elements may result in their destruction	2	3	4	3	3	3	45	(-)	Negative High	Implementation of the recommended buffer areas and recommendations included in the VIA	1	1	4	1	4	1	11	(-)	Negative Low
Decommissioning Phase																				
Impacts to archaeological heritage resources	Decommissioning activities that take place near to archaeological resources may result in their destruction	1	3	4	4	4	3	48	(-)	Negative High	No development activities within the buffer areas identified Should any previously unknown archaeological resources be impacted during construction, work must cese in the vicinity of the find and the relevant heritage authority must be contacted	1	1	4	4	4	1	14	(-)	Negative Low

Impacts to palaeontological resources	Decommissioning activities that take place near to palaeontological resources may result in their destruction	1	2	4	4	4	1	15	(-)	Negative Low	Implementation of the Chance Fossil Finds Protocol	1	2	4	4	4	1	15	(-)	Negative Low
Impacts to the cultural landscape	Decommissioning activities that take place near to cultural landscape elements may result in their destruction	1	2	1	3	1	3	24	(-)	Negative Medium	Implementation of the recommended buffer areas and recommendations included in the VIA	1	1	4	1	4	1	11	(-)	Negative Low
Cumulative																				
Impacts to archaeological heritage resources	Cumulative destruction of significant archaeological heritage	1	2	4	3	4	3	42	(-)	Negative Medium	No development activities within the buffer areas identified Should any previously unknown archaeological resources be impacted during construction, work must cese in the vicinity of the find and the relevant heritage authority must be contacted	1	1	4	1	4	1	11	(-)	Negative Low
Impacts to palaeontological resources	Cumulative destruction of significant palaeontological heritage	1	2	4	3	4	3	42	(-)	Negative Medium	Implementation of the Chance Fossil Finds Protocol	1	1	4	1	4	1	11	(-)	Negative Low
Impacts to the cultural landscape	Cumulative impact to the cultural landscape	1	2	4	3	4	3	42	(-)	Negative Medium	Implementation of the recommended buffer areas and recommendations included in the VIA	1	1	4	1	4	1	11	(-)	Negative Low

5.2 Sustainable Social and Economic Benefit

Information available at the EIA Phase

5.3 Proposed development alternatives

The alternatives proposed for the MTS and LILO infrastructure developments are mapped throughout this report. No impacts to significant heritage resources are anticipated based on the layouts provided and there is no preferred alternative for either the LILO or the MTS from a heritage perspective.

5.4 Site Verification Statement

According to the DFFE Screening Tool analysis, the development area has Very High levels of sensitivity for impacts to palaeontological heritage and Very High levels of sensitivity for impacts to archaeological and cultural heritage resources. The results of this assessment in terms of site sensitivity are summarised below:

- The cultural value of the broader area has some significance in terms of its mining and agricultural history (Moderate)
- Some significant archaeological resources were identified within the broader area (Moderate)
- No highly significant palaeontological resources were identified within the development area, however the geology underlying the development area is very sensitive for impacts to significant fossils (Moderate)

As per the findings of this assessment, and its supporting documentation, the outcome of the sensitivity verification confirms the results of the DFFE Screening Tool for Palaeontology and disputes the results of the screening tool for archaeology and cultural heritage - this should be considered to be Moderate. This evidence is provided in the body of this report and in the appendices (Appendix 1 and 2).

5.5 Cumulative Impacts

The character of the broader landscape is generally comprised of islands of large scale industrial mining operations surrounded by extensive rural areas. At this stage, there is the potential for the cumulative impact of proposed renewable energy facilities to negatively impact the cultural landscape due to a change in the landscape character from agricultural to semi-industrial. Although this project falls outside of a REDZ area, it is noted that it is preferable to have renewable energy facility development clustered in an area such as a REDZ.

To address concerns about the cumulative impact of RE facilities within the greater region, a cautious approach is required in terms of assessing the desirability of such development from a cultural landscape perspective. The placement of RE facilities must take cognisance of the very high visual impact on a relatively intact and representative cultural landscape, and the extremely limited ability to visually screen this infrastructural development.

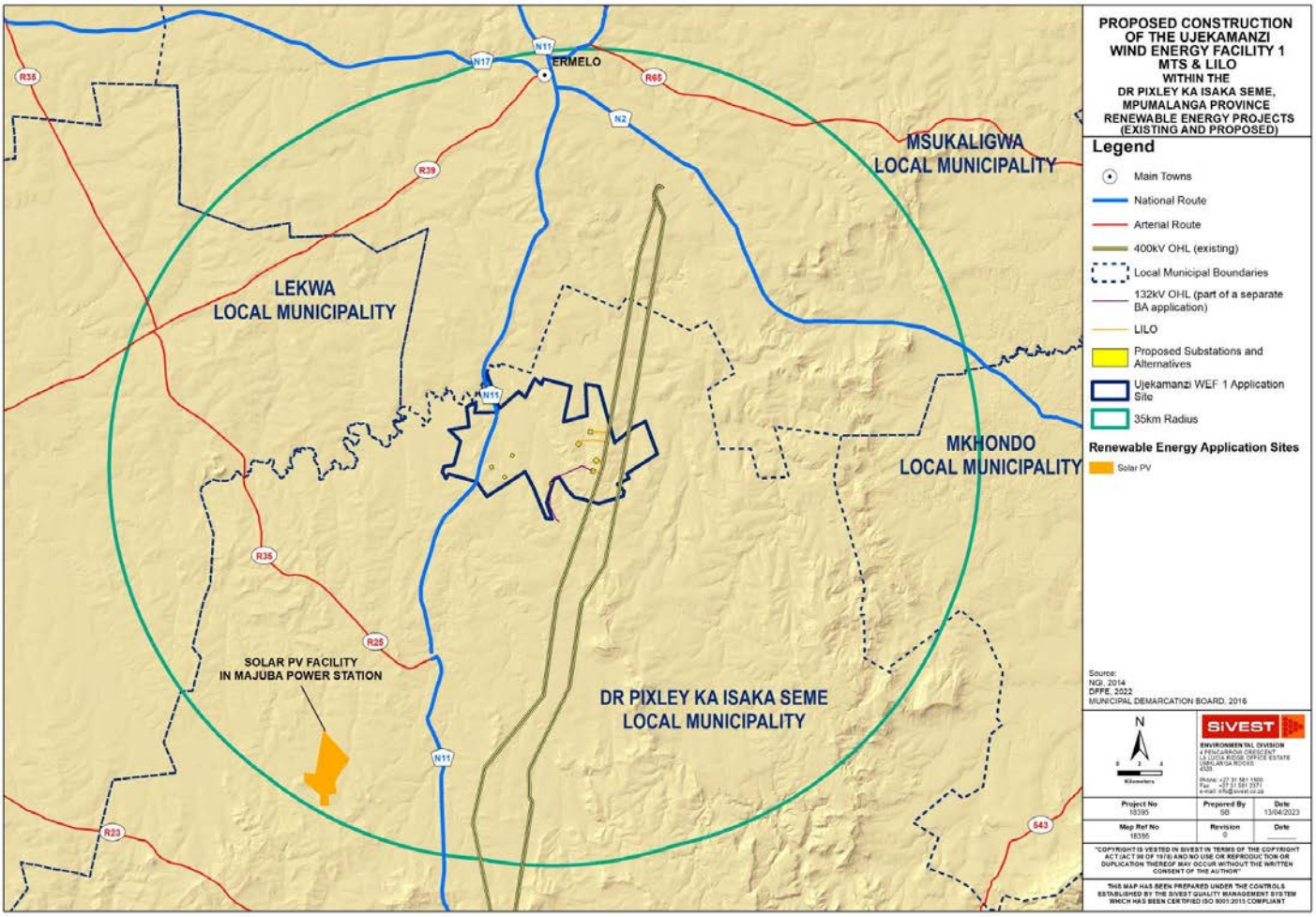

Figure 6: Approved REF projects within 35km of the proposed development area

6. RESULTS OF PUBLIC CONSULTATION

As this application is made in terms of NEMA, the public consultation on the HIA will take place with the broader public consultation process required for the Environmental Impact Assessment process and will be managed by the lead environmental consultants on the project.

7. CONCLUSION

The survey proceeded with some constraints and limitations, yet the project area was comprehensively surveyed for heritage resources. Some Later Stone Age archaeology of limited scientific value was identified. However, the majority of the significant heritage resources identified relate to the historic farm occupation of this property. These resources include the remnants of old farm werfs as well as burial sites that were identified.

None of the heritage resources identified fall within the areas for the WEF LILO and MTS infrastructure provided. Buffer areas have been recommended to ensure that these sites are not negatively impacted by the proposed development (Table 3). On condition that these buffer areas are respected, no direct impact to significant heritage resources is anticipated.

In order to ensure that no impact to the identified resources occurs during the construction or operational phases of the development, a number of recommendations are made below.

Based on the nature of the project, surface activities may impact upon the fossil heritage if preserved in the development footprint. The geological structures suggest that the rocks are the correct age and type to preserve fossils. The site visit and walk through confirmed that there were NO FOSSILS of any significance in the project footprint. Furthermore, the surface material to be excavated is soil and this does not preserve fossils. Since there is a small chance that fossils from the Vryheid Formation might occur below ground and might be disturbed by excavations for foundations and infrastructure, a Fossil Chance Find Protocol has been added to this report. Taking account of the defined criteria, the potential impact to fossil heritage resources is low to moderate.

The alternatives proposed for the MTS and LILO infrastructure developments are mapped throughout this report. No impacts to significant heritage resources are anticipated based on the layouts provided and there is no preferred alternative for either the LILO or the MTS from a heritage perspective.

8. RECOMMENDATIONS

There is no objection to the proposed development from an archaeological perspective on condition that:

- The buffer areas recommended in Table 3 must be respected in the Final Layout
- Ongoing community access to the identified burials, as well as their conservation into the future, must be ensured. This can be managed through the development of a Heritage Management Plan for the burials to be implemented for the duration of the project.
- The attached Chance Fossil Finds Procedure must be implemented for the duration of construction activities
- Should any buried archaeological resources or human remains or burials be uncovered during the course of development activities, work must cease in the vicinity of these finds. The South African Heritage Resources Agency (SAHRA) must be contacted immediately in order to determine an appropriate way forward.

9. REFERENCES

Heritage Impact Assessments				
Nid	**Report Type**	**Author/s**	**Date**	**Title**
104957	PIA Phase 1	Marion Bamford	30/11/2012	Palaeontological Impact Assessment for Majuba Underground Coal Gasification Project, Mpumalanga Phase 1 Report
126521	Heritage Impact Assessment Specialist Reports	Mamoluoan e Seliane	30/06/2013	Xstrata Amersfoort Mine: Phase 1 Cultural Heritage Impact Assessment
134121	HIA Phase 1	Johan Nel	01/05/2013	Heritage Impact Assessment Report: Proposed Kangra Coal Kusipongo Resource Expansion Project, Mpumalanga
138290	HIA Phase 1	Johnny Van Schalkwyk	01/12/2012	HERITAGE ASSESSMENT REPORT FOR THE UNDERGROUND COAL GASIFICATION PROJECT AND ASSOCIATED INFRASTRUCTURE IN SUPPORT OF CO-FIRING OF GAS AT THE MAJUBA POWER STATION, AMERSFOORT, MPUMALANGA
162749	Heritage Scoping	Polke Birkholtz	15/10/2013	Mashala Resources Leiden Colliery Project Heritage Study: Scoping Level Report
174410	HIA Phase 1	Anton van Vollenhoven	01/10/2013	Heritage Impact Assessment for the proposed consturction of a poultry abattoir located in Amersfoort, Mpumalanga
175506	HIA Phase 1			
185959	PIA Phase 1	Dr. Heidi Fourie	12/12/2014	Palaeontological Study for the proposed poultry abattoir located in Amersfoort, Mpumalanga
5014	AIA Phase 1	Julius CC Pistorius	01/06/2007	A Phase 1 Heritage Impact Assessment Study for the Proposed New 88 kV Power Line Running from the Majuba Power Station near Amersfoort to the Camden Power Station near Ermelo in the Mpumalanga Province
5016	AIA Phase 1	Johnny Van Schalkwyk	01/12/2007	Heritage Scoping Report for the Proposed Majuba CCGT Power Plant, Amersfoort Magisterial District, Mpumalanga
6241	AIA Phase 1	Thomas Huffman, R Steel	31/07/1995	Archaeological Survey of Balgarthan Colliery

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APPENDICES

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APPENDIX 1: Archaeological Assessment (2023)

ARCHAEOLOGICAL SPECIALIST STUDY

In terms of Section 38(8) of the NHRA for a

Proposed development of the Ujekamanzi Wind Energy Facility and associated infrastructure near Amersfoort, Mpumalanga Province

Prepared by

CTS HERITAGE

Jenna Lavin and
Nic Wiltshiire

In Association with

SiVEST

March 2023

CTS HERITAGE

EXECUTIVE SUMMARY

ABO Wind renewable energies (Pty) Ltd is proposing to develop a renewable energy cluster, located south of Ermelo in the Mpumalanga Province. The cluster is collectively referred to as "ABO Wind Ujekamanzi Wind Energy Facilities", consisting of 2 x Wind Energy Facilities (WEF's) and associated Electrical Grid Infrastructure (EGI): A Main Transmission Substation (MTS) and a Loop-In-Loop-Out (LILO) for the grid connection. There is a possibility of the inclusion of solar photovoltaic (PV) facilities, depending on the baseline "opportunities and constraints" findings. However, this is not included in the scope of work at this stage.

According to the results of the DFFE Screening Tool, the area proposed for development has LOW sensitivity for impacts to archaeology and cultural heritage.

The survey proceeded with some constraints and limitations, yet the project area was comprehensively surveyed for heritage resources. Some Later Stone Age archaeology of limited scientific value was identified. However, the majority of the significant heritage resources identified relate to the historic farm occupation of this property. These resources include the remnants of old farm werfs as well as three burial sites that were identified.

Only some of the heritage resources identified fall within the layout for the WEFs provided. Buffer areas have been recommended to ensure that these sites are not negatively impacted by the proposed development (Table 2). On condition that these buffer areas are respected, no direct impact to significant heritage resources is anticipated.

In order to ensure that no impact to the identified resources occurs during the construction or operational phases of the development, a number of recommendations are made below.

The results of the field assessment reveal that the development area has moderate to high sensitivity for impacts to heritage resources and as such, the results of the DFFE screening tool are disputed here.

Recommendations

There is no objection to the proposed development from an archaeological perspective on condition that:

- The buffer areas recommended in Table 1 and 2 must be respected in the Final Layout
- Ongoing community access to the identified burials, as well as their conservation into the future, must be ensured. This can be managed through the development of a Heritage Management Plan for the burials to be implemented for the duration of the project.
- Should any buried archaeological resources or human remains or burials be uncovered during the course of development activities, work must cease in the vicinity of these finds. The South African Heritage Resources Agency (SAHRA) must be contacted immediately in order to determine an appropriate way forward.

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CONTENTS

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1. INTRODUCTION

1.1 Background Information on Project

ABO Wind renewable energies (Pty) Ltd is proposing to develop a renewable energy cluster, located south of Ermelo in the Mpumalanga Province. The cluster is collectively referred to as "ABO Wind Ujekamanzi Wind Energy Facilities", consisting of 2 x Wind Energy Facilities (WEF's) and associated Electrical Grid Infrastructure (EGI): A Main Transmission Substation (MTS) and a Loop-In-Loop-Out (LILO) for the grid connection. There is a possibility of the inclusion of solar photovoltaic (PV) facilities, depending on the baseline "opportunities and constraints" findings. However, this is not included in the scope of work at this stage.

According to the results of the DFFE Screening Tool, the area proposed for development has LOW sensitivity for impacts to archaeology and cultural heritage.

1.2 Description of Property and Affected Environment

The Ujekamanzi WEF project spans an area roughly 20km north to south and 15km west to east. The most southerly end lies around 10km northeast of the Mpumalanga town of Amersfoort while the northern end runs up to an area near the Paul Kruger Bridge over the Vaal River. There are a number of working farms throughout the study area that are accessed either side of the N11 highway on the western side or the north-south gravel roads running from the Amersfoort-Piet Retief Road that join up to the Vaal River section. Most of the farms are growing large stands of maize crops interspersed with grazing grounds for cattle and some sheep. Smaller plots of fruit and potatoes were also seen.

Active werfs are often accompanied by an older footprint, either built over the older fabric or on a separate homestead marked with the same name as the original location of the werf. The terrain is dominated by gentle slopes that flow into each other and almost all of the farms are located in the valleys between the ridges on the higher ground. Werfs are usually surrounded by clumps of eucalyptus trees but other introduced species such as poplar and oak are also common. Very little indigenous vegetation is left as the entire area has been transformed over the last century by intensive stock and crop agriculture.

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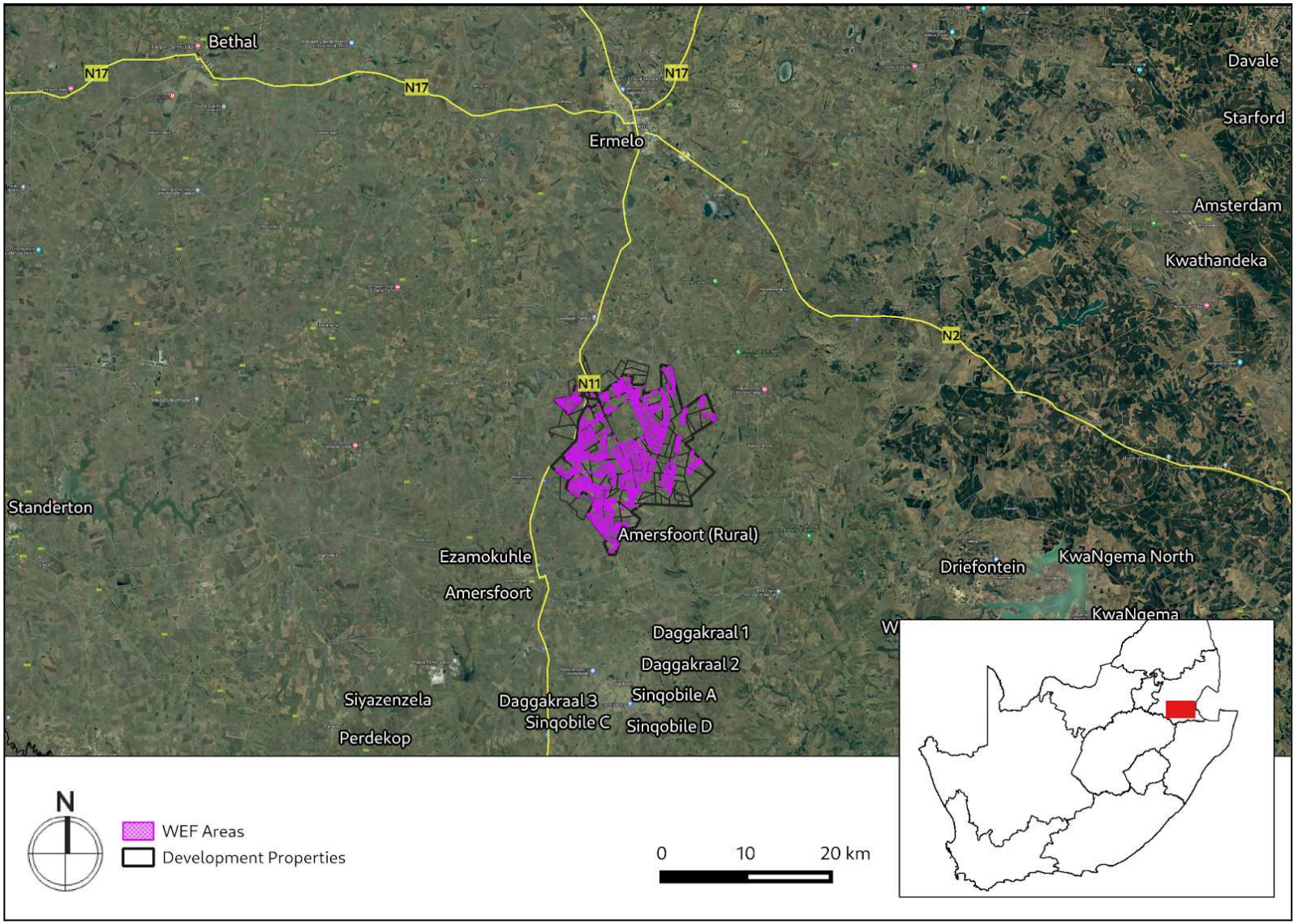

Figure 1.1: Satellite image indicating proposed location of development

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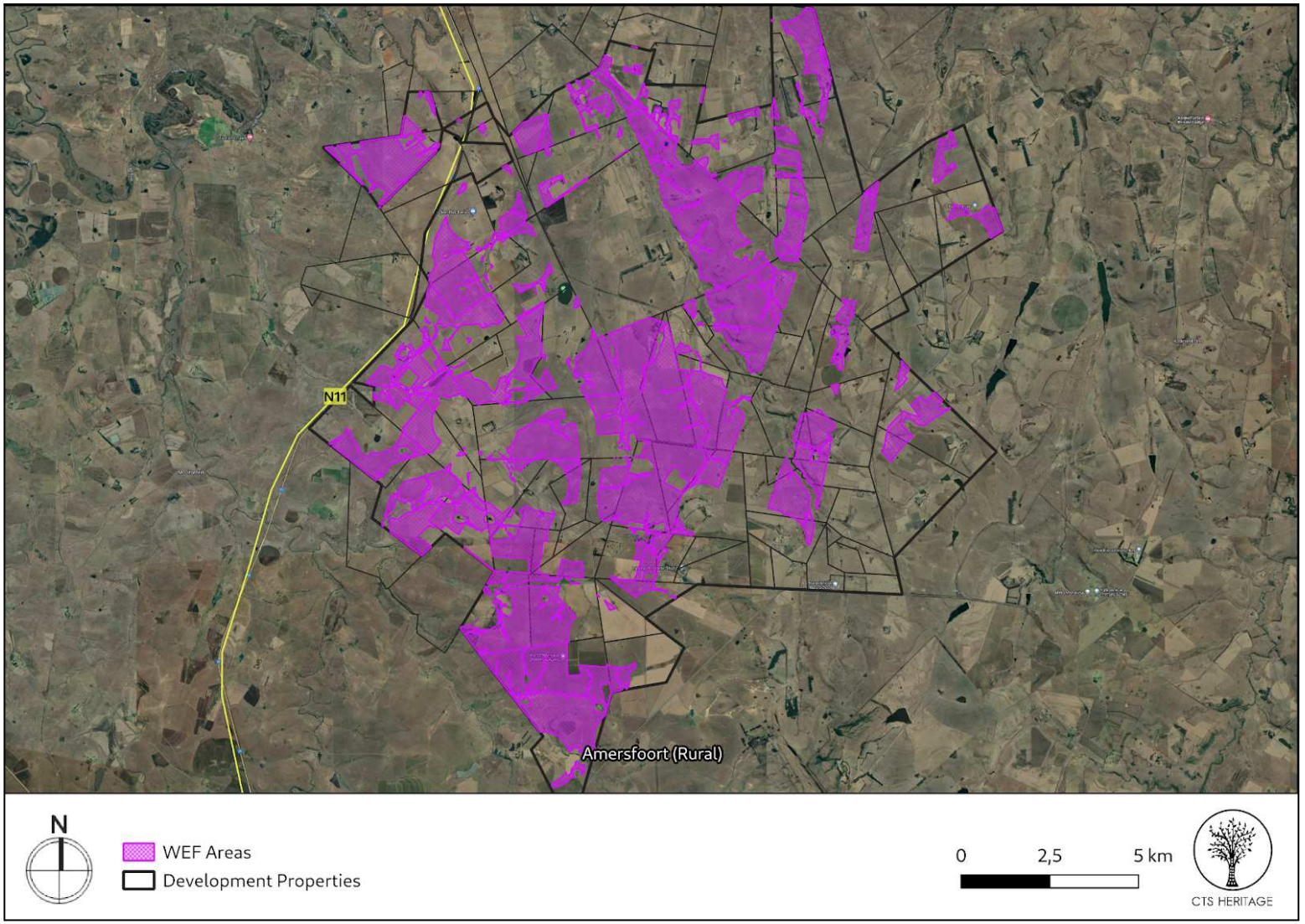

Figure 1.2: Proposed project boundary

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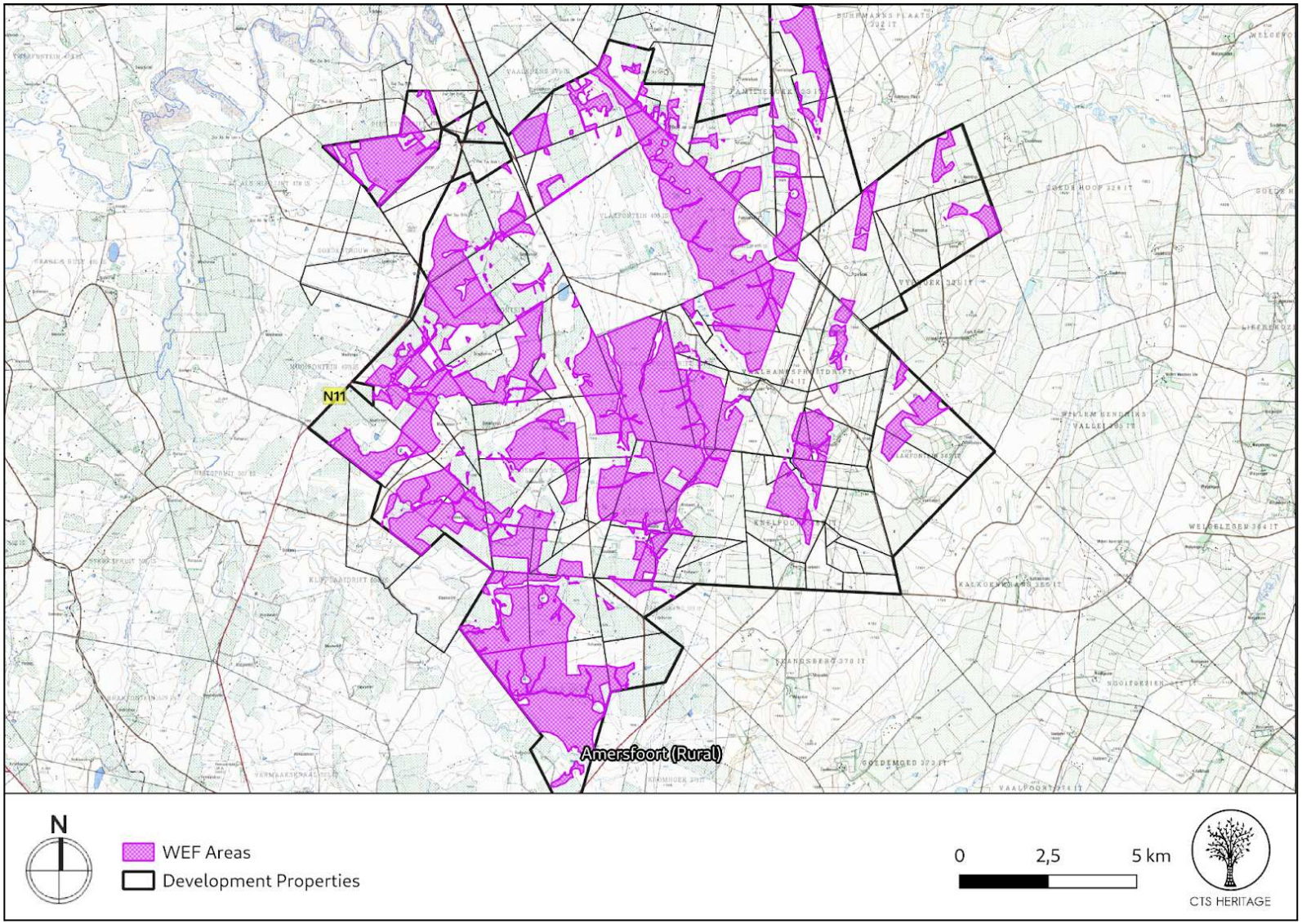

Figure 1.3: Proposed project boundary indicated on the 1:50 000 Topo Map

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2. METHODOLOGY

2.1 Purpose of Archaeological Study

The purpose of this archaeological study is to satisfy the requirements of section 38(8), and therefore section 38(3) of the National Heritage Resources Act (Act 25 of 1999) in terms of impacts to archaeological resources.

2.2 Summary of steps followed

- An archaeologist conducted a survey of the site and its environs from 10 to 13 February 2023 to determine what archaeological resources are likely to be impacted by the proposed development of the PV facility and grid connection.
- The area proposed for development was assessed on foot, photographs of the context and finds were taken, and tracks were recorded using a GPS.
- The identified resources were assessed to evaluate their heritage significance in terms of the grading system outlined in section 3 of the NHRA (Act 25 of 1999).
- Alternatives and mitigation options were discussed with the Environmental Assessment Practitioner.

2.3 Constraints & Limitations

The survey took place during very heavy rainfall that fell over the general area. The veld and roads became water logged which made some areas unpassable until the ground had dried enough. However, the interconnecting road infrastructure is very good and the placement of the preliminary areas designated for potential WEF and connecting grid infrastructure was placed within reach of the main connection roads by foot or mountain bike. Most of the ground is either cultivated or covered in grassland which made the detection of Stone Age or Iron Age artefacts quite difficult, especially where cattle have composted large grazing areas. The survey has therefore managed to achieve a reasonable level of coverage of the most significant heritage resources expected in the area but a final walkdown of the WEF locations in good weather will be required.

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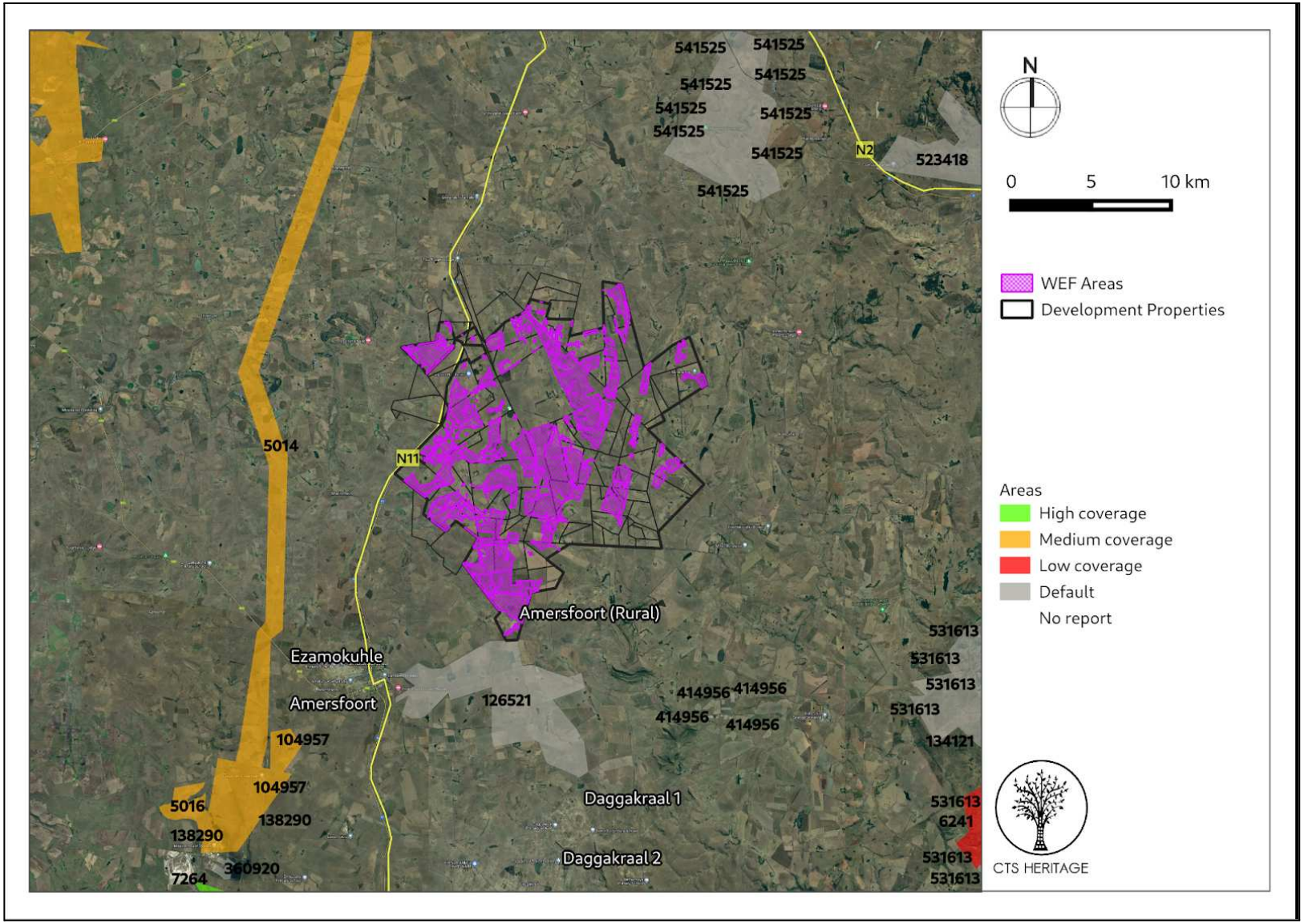

Figure 2: Close up satellite image indicating proposed location of development in relation to heritage studies previously conducted

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3. HISTORY AND EVOLUTION OF THE SITE AND CONTEXT

The area proposed for this Renewable Energy Development is located immediately in between Ermelo and Amersfoort in Mpumalanga This area is known for its rolling hills and extensive coal mine infrastructure.

Cultural Landscape

Van Vollenhoven (2015) described the broader assessment area in his assessment completed for a de-stoning plan located nearby. Van Vollenhoven (2015) describes the environment as "disturbed by recent human activities, mainly agriculture. This consists of maize fields. Other disturbance visible is mining infrastructure..., a railway track... and power lines... Signs of old fields were also present which could be seen in the pioneer plant species consisting of weeds and grass. Almost half of the surveyed area consists of natural grassland. The vegetation cover varies between short and long grass... The topography of the area forms part of the rolling hills of the surrounding landscape."

Van Vollenhoven (2015) notes that "At the beginning of the 19th century the Phuthing, a South Sotho group, stayed in the vicinity of modern day Bethal. During the Difaquane they fled to the south (Bergh 1999: 10-11; 109). In 1829 the traveller Robert Scoon passed through an area to the north of Bethal (Bergh 1999: 13). The first white farmers only settled here during the late 1850's. By the 1890's this area was inhabited by many white farmers (Bergh 1999: 18-20). The town of Standerton was established in 1879 although it already was a district in 1878. Bethal was established in 1880 and it became an independent district in 1898 (Bergh 1999: 20-21). During the Anglo-Transvaal War (1880-1881) the British garrison in Standerton was beleaguered by the Boer forces (Bergh 1999: 46). The Highveld areas also saw much action consisting of various skirmishes between Boer and Brit during the Anglo-Boer War (1899-1902). It includes skirmishes on the farms Oshoek (4 December 1901), Trigaardsfontein (10 December 1901), Witbank (11 January 1902) and Nelspan (26 January 1902) (Bergh 1999: 51, 54)... At Standerton there was both a concentration camp for white and for black people (Bergh 1999: 54)."

This brief history points to the layered cultural landscape that is present in this area. Due to the scale of the proposed development, it is likely to change the sense of place associated with this landscape, and may impact the way that this historic landscape reads by obscuring layers of the past. Cognisance must be taken of this unique cultural landscape, consisting of farm werfs etc in the proposed layout.

Archaeology

None of the area proposed for development has been previously assessed in any heritage impact assessment process. Heritage Impact Assessments have been completed nearby for projects in Secunda and these can be used to infer the archaeological sensitivity in the development area. Van Vollenhoven (2015) notes that the geographical area around the towns of Standerton and Bethal is not known to conserve Stone Age archaeology. He notes that "No such sites are indicated on maps contained in a historical atlas of this area (Bergh 1999: 4-5). However this may only be since no research has actually been done in this area. The closest known Stone Age occurrences are a Late Stone Age site at the town of Ermelo and rock art sites far to the west of Standerton (Bergh 1999: 4-5)." Van Vollenhoven (2015) noted no natural shelters during the survey; however, the good vegetation in the surrounding area and the rivers indicate that

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ample grazing and water may have been available, making it a prime spot for hunting in the past. Therefore one may assume that Stone Age people probably would have moved through the area. Late Iron Age sites are found in a large area around the towns of Bethal and Standerton and number at least 585 such sites.

In the heritage assessment of a powerline upgrade at the nearby Syferfontein Mine, Nel & Karodia (2013), noted that "*a heritage assessment was conducted in 2000 by the National Cultural History Museum and included in the Syferfontein Mine EMP in 2010. During the survey, a few Stone Age artefacts were identified. These artefacts were not considered to have any primary context and therefore were interpreted to have low significance value. No Early Iron Age sites were identified. The Late Iron Age sites found here conform to those identified in the literature for the Southern Highveld area (former southern Transvaal, northern Orange Free State) as Type V sites. As the soil is mostly turf, Iron Age settlement usually took place on the various dolerite outcrops. The added benefit of choosing these locations was that it was located at the source of building material used in constructing the settlements. One such site shows interesting features as the living units were actually excavated to obtain enough building material for the surrounding walls. A few of the farmsteads dating to early part of this century were identified as possibly having historical-architectural significance. A number of abandoned homesteads are located in the areas that were investigated. These seem to belong to farm labourers and were all abandoned within the last few years. They are therefore not viewed to be of cultural or historical significance. However, some graves are located in the vicinity of the homesteads and it is possible that more graves will be located nearby*".

In a recent HIA completed for a nearby WEF completed by CTS Heritage, it was noted that "Even though the area is rich in history, no significant archaeological heritage resources were identified during the field assessment. No Stone Age or Iron Age heritage resources were identified during the survey. The few heritage resources that were identified consist of the ruins of older farm structures and kraals." None of the sites identified in the assessment referenced are located within or near the development area, however the text provides a good assessment of resources that may be present. It is clear that the development area has not previously been assessed. It is therefore possible that the proposed development will impact negatively on archaeological resources associated with the Late Iron Age, burial grounds and graves as well as stone age archaeological resources. Further investigation of the archaeological significance of the development area is recommended.

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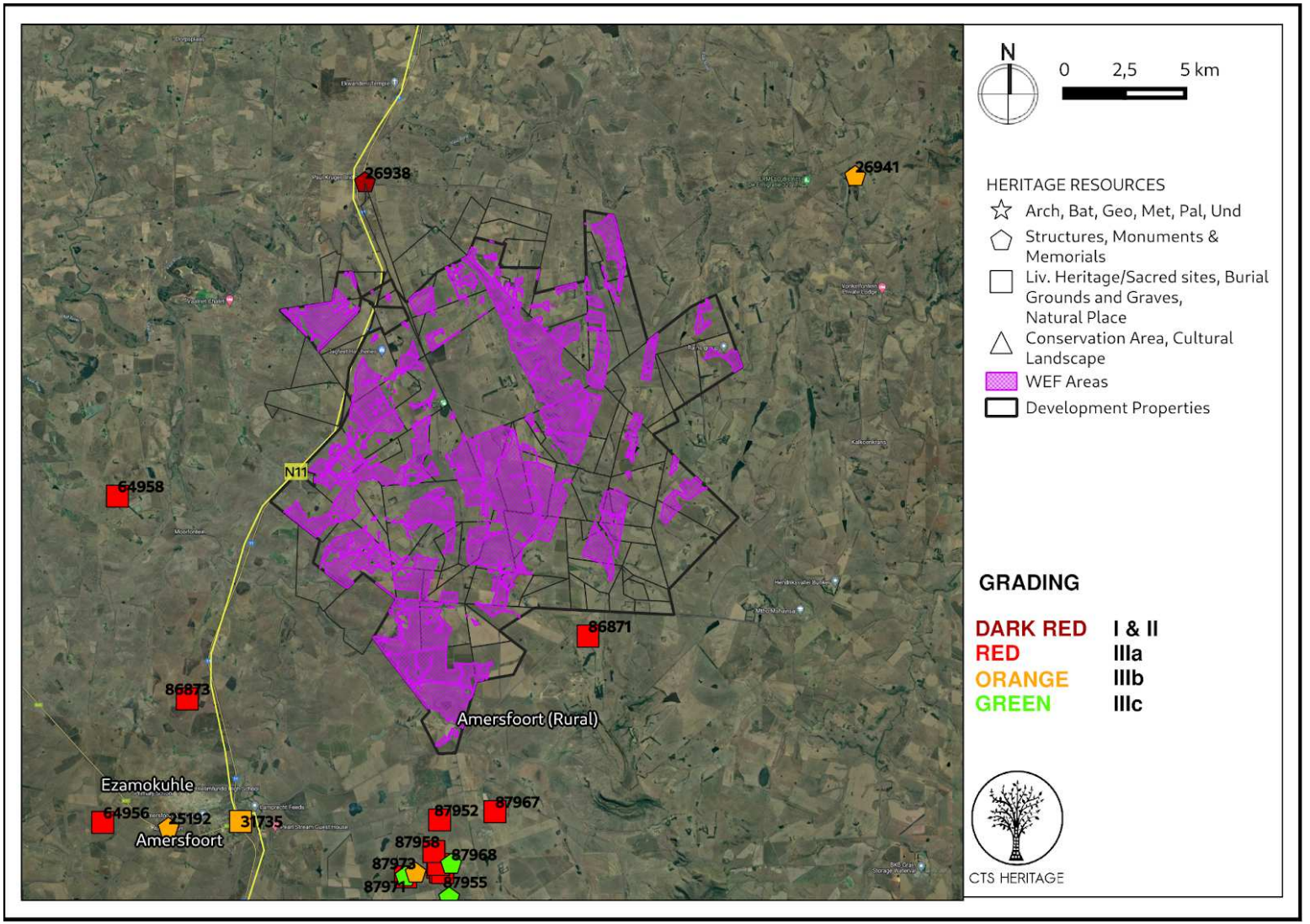

Figure 3. Heritage Resources Map. Heritage Resources previously identified in and near the study area, with SAHRIS Site IDs indicated

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4. IDENTIFICATION OF HERITAGE RESOURCES

4.1 Field Assessment

In the 140 observations made during the field survey, the vast majority relate to buildings and structures that have been built in the 20th century and relate to the farming activities that have transformed the landscape in the study area. Small settlements occupied by farm labourers and their families dot the area with both formal and informal buildings. These settlements were mapped and recorded as many of these settlements are often associated with graves. At this stage none of the WEF assessment areas overlap the settlements. The formal homesteads/werfs typically have corrugated iron roofs, often painted red, with well-built stone stock kraals and barns. A mix of modern full corrugated iron farm buildings are also common. Ruins of buildings dating the latter half of the 19th and early 20th century were also common and these are usually marked with the same names as the working farms where the original location of the werfs were presumably laid down. Many of the older farms also have a family graveyard surrounded by wire fencing or stone and brick walls.

The Paul Kruger Bridge spans the Vaal River in the northern section of the study area and was built in 1896-1897. The bridge is still in good condition and is made of sandstone with 9 attractive arches. The Stone Age artefacts seen consisted of Middle Stone Age flakes made of quartz and quartzites sourced locally that appeared to be eroding out of the jeep tracks. The Later Stone Age artefacts were found on exposed areas of hard packed ground where the grassland had not hindered the visibility of the material.

Figure 4.1 Contextual Images near Mooifontein

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Figure 4.2 Contextual Images of the more level ground in the western zone of the study area

Figure 4.3 Contextual Images of the more level ground in the western zone of the study area

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Figure 4.4 Contextual Images near Vlakfontein

Figure 4.5 Previously ploughed ground in the western section

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Figure 4.6 Contextual Images near Mooifontein

Figure 4.7 Deep grassland in the grazing areas

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Figure 4.8 More contextual images showing the gently sloping terrain

Figure 4.9 More contextual images showing the gently sloping terrain

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Figure 4.10 Contextual images in the heavily vegetated grasslands

Figure 4.11 Contextual Images showing maize and grazing fields.

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Figure 4.12 Knelpoort ruined werf surrounded by trees.

Figure 4.13 Water-logged farm tracks, clumps of trees surrounding ruined werf

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Figure 4.14 Contextual Image

Figure 4.15 Contextual Images near Bloemfontein werf showing a small stream and grassland. Maize field in background

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Figure 4.16 Typical werf surrounded by trees and surrounded by maize and grassland grazing fields.

Figure 4.17 Connecting gravel road in the eastern zone of the study area towards the higher ground.

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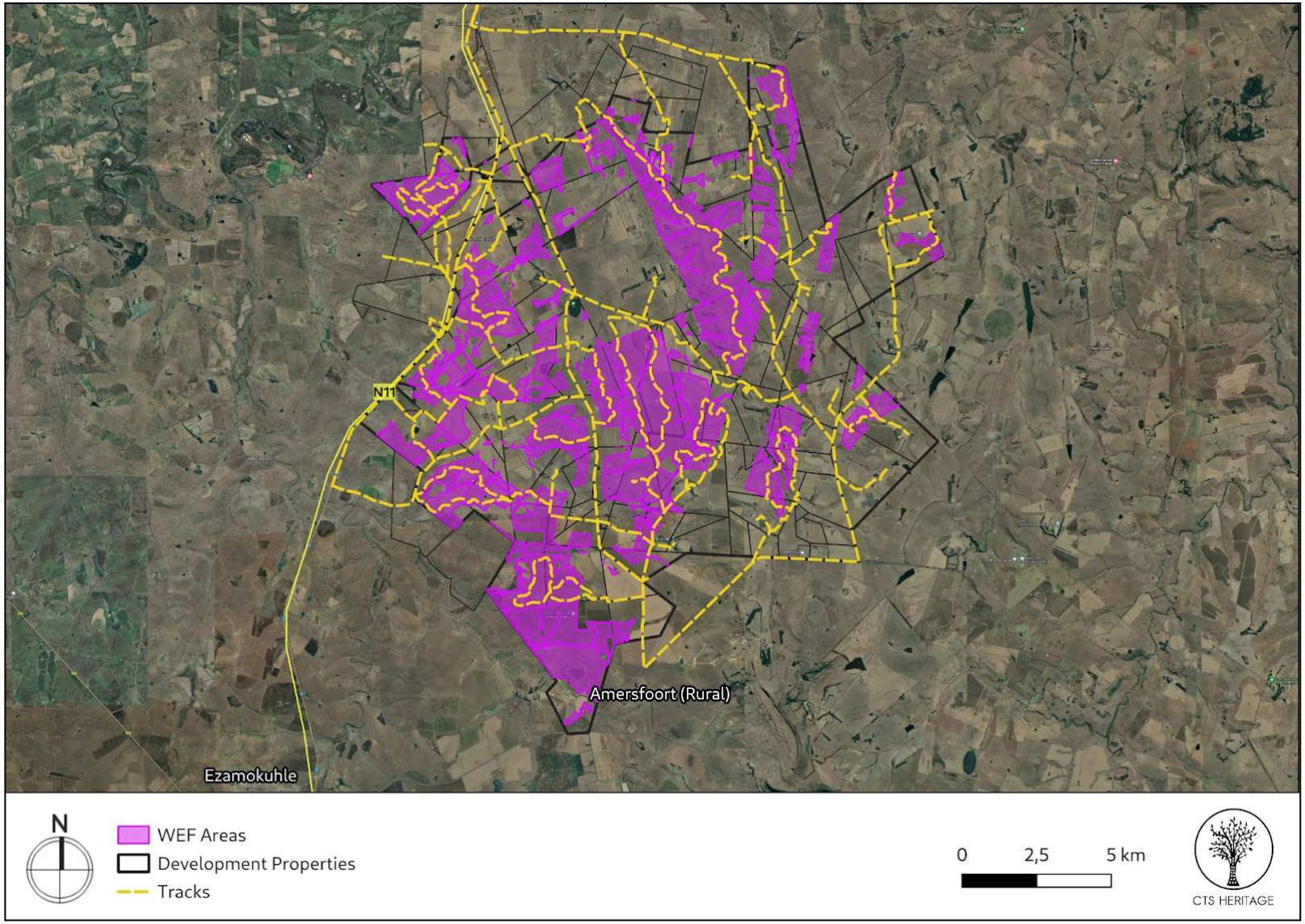

Figure 5. Track paths of archaeological field assessment - the dense vegetation impacted the survey (see Constraints and Limitations)

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4.2 Archaeological Resources identified

Table 1: Observations noted during the field assessment

POINT ID	Description	Type	Period	Density	Co-ordinates		Grading	Mitigation
001	Geluk werf with current butchery, modern buildings and some older stone walling	Structure	Modern, Historic	n/a	-26.911517	29.890907	IIIC	100m Buffer
002	Four mixed informal/formal settlements and school	Structure	Modern	n/a	-26.91468	29.897249	NCW	n/a
003	Two mixed informal/formal settlements	Structure	Modern	n/a	-26.918184	29.90403	NCW	n/a
004	Stock farming offload/loading platform built from local stone	Structure	Historic	n/a	-26.910543	29.902823	IIIC	50m Buffer
005	Quartz and quartzite cores, microliths	Artefacts	LSA	0 to 5	-26.9042364	29.92366921	NCW	n/a
006	Quartzite point with dorsal scarring	Artefacts	MSA	0 to 5	-26.8905222	29.94346852	NCW	n/a
007	Crystal quartz core	Artefacts	LSA	0 to 5	-26.8563729	29.9336596	NCW	n/a
008	Quartzite point, quartz cores	Artefacts	LSA	5 to 10	-26.8387533	29.92085371	NCW	n/a
009	Quartzite flake	Artefacts	MSA	0 to 5	-26.8152303	29.98261303	NCW	n/a
010	Semi-formal labourers cottage	Structure	Modern	n/a	-26.894704	29.9015	NCW	n/a
011	Mooifontein farm werf, mix of modern and older buildings	Structure	Modern, Historic	n/a	-26.888577	29.902916	IIIC	100m Buffer
012	Quartz and quartzite microliths	Artefacts	LSA	0 to 5	-26.8460191	30.00313893	NCW	n/a
013	CCS and quartzite flakes	Artefacts	LSA	0 to 5	-26.8155936	29.9071395	NCW	n/a
014	Quartzite flake with radial scarring on dorsal surface	Artefacts	MSA	0 to 5	-26.7983373	29.96862636	NCW	n/a
015	Quartzite flakes	Artefacts	MSA	0 to 5	-26.7841690	30.0260262	NCW	n/a
016	Quartz flakes and cores	Artefacts	MSA	5 to 10	-26.8976972	30.0247546	NCW	n/a
017	Quartzite core	Artefacts	MSA	0 to 5	-26.9307566	29.94274194	NCW	n/a
018	Formal settlement built in traditional design with round roofs	Structure	Modern	n/a	-26.895688	29.925133	NCW	n/a
019	Mooifontein main farm werf, modern buildings and older walling repurposed	Structure	Historic, Modern	n/a	-26.887995	29.926285	IIIB	200m Buffer
020	Bloemfontein werf, sandstone quoins and locally cut stone, old barn at the back of the werf, surrounded by extensive gum trees	Structure	Historic	n/a	-26.888658	29.935332	IIIB	200m Buffer
021	Stone walled kraals	Structure	Historic	n/a	-26.888342	29.937651	IIIC	100m Buffer
022	Strydfontein werf. Original buildings now ruined with modern (1970s/80s) added that are rented out	Structure	Modern, Historic	n/a	-26.869571	29.936076	NCW	n/a
023	Strydfontein active farm werf, sandstone main building heavily altered with modern farm buildings	Structure	Modern, Historic	n/a	-26.864542	29.956375	IIIC	100m Buffer
024	“Ons Pan” resort with chalets on dam edge	Structure	Modern	n/a	-26.855616	29.953992	NCW	n/a
025	Informal settlement near Vaalkrans	Structure	Modern	n/a	-26.830478	29.948206	NCW	n/a
026	Farm buildings with red corrugated iron roofs	Structure	Modern	n/a	-26.827273	29.949645	NCW	n/a
027	Mixed formal/informal settlement	Structure	Modern	n/a	-26.82686	29.942291	NCW	n/a

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	on Piet Zyn Drift							
028	Piet Zyn Drift werf, some modern buildings mixed with older fabric	Structure	Modern, Historic	n/a	-26.828914	29.935558	IIIC	100m Buffer
029	Vaalkrans werf, mostly modern buildings at main werf	Structure	Modern	n/a	-26.803219	29.947577	NCW	n/a
030	Four mixed informal/formal settlements and school	Structure	Modern	n/a	-26.917169	29.89669	NCW	n/a
031	Four mixed informal/formal settlements and school	Structure	Modern	n/a	-26.915825	29.895981	NCW	n/a
032	Four mixed informal/formal settlements and school	Structure	Modern	n/a	-26.915958	29.894673	NCW	n/a
033	Four mixed informal/formal settlements and school	Structure	Modern	n/a	-26.914443	29.898531	NCW	n/a
034	Two mixed informal/formal settlements	Structure	Modern	n/a	-26.917289	29.905693	NCW	n/a
035	Strydfontein werf in cluster of gum trees, stone walls	Structure	Historic	n/a	-26.845949	29.944318	IIIB	200m Buffer
036	Rolfontein werf, modern buildings	Structure	Modern	n/a	-26.943281	29.97159	NCW	n/a
037	Rolfontein werf, modern buildings	Structure	Modern	n/a	-26.941356	29.964535	NCW	n/a
038	Elandsberg werf, circa 1950. Mostly modern buildings	Structure	Modern	n/a	-26.936404	29.981713	NCW	n/a
039	**Ruin, sandstone walls in middle of maize fields**	**Ruin**	**Historic**	**n/a**	**-26.934298**	**29.968734**	**IIIB**	**200m Buffer**
040	Settlement	Structure	Modern	n/a	-26.932506	29.926155	NCW	n/a
041	Ruined Knelpoort werf, corrugated iron roof, sandstone walls, quoins	Ruin	Historic	n/a	-26.918775	29.969279	IIIB	200m Buffer
042	Stone walled kraal, Knelpoort werf	Structure	Historic	n/a	-26.920916	29.968521	IIIC	100m Buffer
043	Sandstone barn, still relatively intact, Knelpoort werf	Structure	Historic	n/a	-26.921065	29.9696	IIIB	200m Buffer
044	Settlement	Structure	Modern	n/a	-26.916174	29.958667	NCW	n/a
045	Settlement	Structure	Modern	n/a	-26.916121	29.960813	NCW	n/a
046	Settlement	Structure	Modern	n/a	-26.905495	29.917707	NCW	n/a
047	Bloemfontein werf, red corrugated iron roofs, stone walls and kraals	Structure	Historic	n/a	-26.903519	29.950187	IIIB	200m Buffer
048	Settlement	Structure	Modern	n/a	-26.914077	29.959745	NCW	n/a
049	**Mooifontein ruined werf**	**Ruin**	**Historic**	**n/a**	**-26.9105613**	**29.9294321**	**IIIC**	**100m Buffer**
050	**Mooifontein ruined werf**	**Ruin**	**Historic**	**n/a**	**-26.9114469**	**29.9295173**	**IIIC**	**100m Buffer**
051	**Mooifontein ruined werf**	**Ruin**	**Historic**	**n/a**	**-26.9111006**	**29.9282004**	**IIIC**	**100m Buffer**
052	Small labourers cottages, one without roof, the other thatched	Structure	Historic	n/a	-26.924866	29.983261	IIIC	100m Buffer
053	Knelpoort active werf, mix of modern and older buildings, stone barns and kraals	Structure	Modern, Historic	n/a	-26.925449	29.989762	IIIC	100m Buffer
054	Ruin of building with no significance alongside small settlement	Structure, Ruin	Modern, Historic	n/a	-26.906666	29.975445	NCW	n/a
055	Werf, some older stone walling, Main house 1960s/70s	Structure	Modern, Historic	n/a	-26.90858	29.99446	IIIC	100m Buffer
056	**Settlement and old kraal at**	**Structure**	**Modern,**	**n/a**	**-26.889035**	**29.956689**	**IIIC**	**100m**

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	Bloemfontein werf		**Historic**					**Buffer**
057	Settlement cluster	Structure	Modern	n/a	-26.862727	29.93239	NCW	n/a
058	Vlakfontein farm buildings in gum tree grove, weathered red corrugated iron roof, brick buildings	Structure	Modern, Historic	n/a	-26.849899	29.986236	NCW	n/a
059	Main Vlakfontein werf, mix of older buildings, barns, kraals and modern farm infrastructure	Structure	Modern, Historic	n/a	-26.845933	29.984561	IIIB	200m Buffer
060	Settlement	Structure	Modern	n/a	-26.876216	29.995759	NCW	n/a
061	**Skoonheid ruins**	**Ruin**	**Historic**	**n/a**	**-26.8818614**	**29.9943163**	**IIIC**	**50m Buffer**
062	Familiehoek werf, red corrugated iron roofs	Structure	Historic	n/a	-26.79639	30.017185	IIIB	200m Buffer
063	Farm stock building, red corrugated iron roof adjoined to stone walled kraal	Structure	Historic	n/a	-26.793983	30.011673	IIIC	100m Buffer
064	Settlement	Structure	Modern	n/a	-26.798323	30.011277	NCW	n/a
065	Settlement	Structure	Modern	n/a	-26.812594	30.008981	NCW	n/a
066	Vredelus werf red corrugated iron roofs	Structure	Historic	n/a	-26.814844	30.009528	IIIC	100m Buffer
067	Vredelus main house	Structure	Modern	n/a	-26.816327	30.009281	NCW	n/a
068	Stone fence posts	Structure	Historic	n/a	-26.810078	30.019757	NCW	n/a
069	Settlement	Structure	Modern	n/a	-26.836025	30.017253	NCW	n/a
070	Familiehoek werf	Structure	Modern, Historic	n/a	-26.835184	30.012343	IIIC	100m Buffer
071	Vyfhoek werf, modern	Structure	Modern	n/a	-26.850096	30.038538	NCW	n/a
072	Settlement	Structure	Modern	n/a	-26.847726	30.039413	NCW	n/a
073	Settlement	Structure	Modern	n/a	-26.836986	30.053321	NCW	n/a
074	Cleared stones on edge of maize fields	Observation	Modern	n/a	-26.850462	30.034778	NCW	n/a
075	Rockdale werf, stone built barns, kraals	Structure	Modern, Historic	n/a	-26.864262	30.030307	IIIB	200m Buffer
076	Settlement	Structure	Modern	n/a	-26.872358	30.025627	NCW	n/a
077	Vaalbankspruitdrift ruins	Ruin	Historic	n/a	-26.878714	30.01426	IIIA	500m Buffer
078	Kemp and Swart family graveyard. Late 19th to 20th c. Fenced off	Graves/ BurialGrounds	Historic	n/a	-26.8800152	30.01395249	IIIA	200m Buffer
079	**Kraal**	**Structure**	**Historic**	**n/a**	**-26.908981**	**30.028318**	**IIIC**	**50m Buffer**
080	Ruin, stone walled	Structure	Historic	n/a	-26.876298	30.014714	IIIC	50m Buffer
081	Ruined barn + kraal, stone walling, sandstone walls	Ruin	Historic	n/a	-26.892617	30.033136	IIIC	50m Buffer
082	Kraal	Structure	Historic	n/a	-26.913072	30.032717	IIIC	50m Buffer
083	Settlement	Structure	Modern	n/a	-26.897392	30.043213	NCW	n/a
084	Settlement	Structure	Modern	n/a	-26.899418	30.04341	NCW	n/a
085	Settlement	Structure	Modern	n/a	-26.900947	30.04379	NCW	n/a
086	Settlement	Structure	Modern	n/a	-26.928237	30.038759	NCW	n/a
087	Settlement	Structure	Modern	n/a	-26.926728	30.037411	NCW	n/a
088	Settlement	Structure	Modern	n/a	-26.927711	30.035157	NCW	n/a

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089	Settlement	Structure	Modern	n/a	-26.929575	30.035133	NCW	n/a
090	Settlement	Structure	Modern	n/a	-26.929439	30.03333	NCW	n/a
091	Knelpoort modern farm, new silos	Structure	Modern	n/a	-26.923735	30.021002	NCW	n/a
092	Stone kraal on slopes	Structure	Historic	n/a	-26.923372	30.024543	IIIC	50m Buffer
093	Settlement	Structure	Modern	n/a	-26.91976	30.022161	NCW	n/a
094	Knelpoort werf, mostly modern, some older structures and alterations	Structure	Modern, Historic	n/a	-26.918053	30.017678	NCW	n/a
095	Kraal	Structure	Historic	n/a	-26.913771	30.029372	IIIC	50m Buffer
096	Kraal	Structure	Historic	n/a	-26.911927	30.029656	IIIC	50m Buffer
097	Vlakfontein werf, stone and brick buildings, mix of modern and older buildings and some altered barns showing brick and stone construction	Structure	Modern, Historic	n/a	-26.906299	30.057698	IIIB	200m Buffer
098	Settlement	Structure	Modern	n/a	-26.88095	30.048539	NCW	n/a
099	Settlement	Structure	Modern	n/a	-26.879544	30.049729	NCW	n/a
100	Settlement	Structure	Modern	n/a	-26.881076	30.051309	NCW	n/a
101	Settlement	Structure	Modern	n/a	-26.878018	30.05194	NCW	n/a
102	Settlement	Structure	Modern	n/a	-26.876366	30.053215	NCW	n/a
103	Irenia werf, stone buildings, red corrugated iron roofs, kraals, surrounded by stand of gum trees	Structure	Modern, Historic	n/a	-26.841127	30.069381	IIIC	100m Buffer
104	Settlement	Structure	Modern	n/a	-26.876319	29.900607	NCW	n/a
105	Settlement	Structure	Modern	n/a	-26.876499	29.90176	NCW	n/a
106	Mooifontein werf circa 1940s onwards	Structure	Modern	n/a	-26.868433	29.910829	NCW	n/a
107	Settlement	Structure	Modern	n/a	-26.862792	29.906312	NCW	n/a
108	Settlement	Structure	Modern	n/a	-26.861006	29.906854	NCW	n/a
109	Settlement	Structure	Modern	n/a	-26.860789	29.90508	NCW	n/a
110	More walling less formalised than the other	Structure	Modern	n/a	-26.85786	29.907628	NCW	n/a
111	Kraal with circular and rectangular structures	Structure	Modern	n/a	-26.859644	29.907241	NCW	n/a
112	Quartz flake	Artefacts	LSA	0 to 5	-26.870192	29.972676	NCW	n/a
113	Goedertrou werf mainly modern buildings	Structure	Modern	n/a	-26.84531	29.910129	NCW	n/a
114	Kraal	Structure	Historic	n/a	-26.843148	29.907537	IIIC	50m Buffer
115	Settlement	Structure	Modern	n/a	-26.841352	29.902549	NCW	n/a
116	Piet se Drif werf, mainly modern but ruins of original farm also present	Structure, Ruin	Modern, Historic	n/a	-26.817042	29.925434	IIIC	100m Buffer
117	Piet Zyn Drift werf with stone walled kraal and main house 1940s	Structure	Modern, Historic	n/a	-26.820715	29.930703	IIIC	100m Buffer
118	Settlement	Structure	Modern	n/a	-26.827059	29.929763	NCW	n/a
119	Settlement	Structure	Modern	n/a	-26.825872	29.925983	NCW	n/a
120	Graveyard, about 17 graves. Kemp, Fick, Bezuidenhout etc	Graves/BurialGrounds	Historic	n/a	-26.813923	29.925529	IIIA	200m Buffer

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121	Piet Zyn Drift werf, stone walled barns, modern house	Structure	Modern, Historic	n/a	-26.834888	29.930046	IIIC	100m Buffer
122	Sandstone farmhouse werf and kraal	Structure	Historic	n/a	-26.802668	29.907724	IIIB	200m Buffer
123	Piet Zyn Drift werf, mainly modern	Structure	Modern	n/a	-26.80486	29.927932	NCW	n/a
124	**Kraal**	**Structure**	**Historic**	**n/a**	**-26.816275**	**29.919312**	**IIIC**	**50m Buffer**
125	Vaalkrans older barns and outbuildings	Structure	Historic	n/a	-26.804019	29.948388	IIIC	100m Buffer
126	**Ruined werf at Vaalkrans**	**Structure**	**Historic**	**n/a**	**-26.805446**	**29.95988**	**IIIC**	**100m Buffer**
127	Ruined more modern barn at Vaalkrans	Structure	Modern, Historic	n/a	-26.806821	29.960885	NCW	n/a
128	Ruin	Structure	Historic	n/a	-26.807167	29.960032	NCW	n/a
129	Large settlement	Structure	Modern	n/a	-26.796791	29.942452	NCW	n/a
130	Paul Kruger bridge, 1896-1897. Sandstone bridge over the Vaal River	Structure	Historic	n/a	-26.770208	29.923318	IIIA	No impact anticipated
131	Begin der Lyn old werf and kraals	Structure	Historic	n/a	-26.785787	29.9688	IIIB	200m Buffer
132	Begin der Lyn barn and kraal	Structure	Historic	n/a	-26.78639	29.980937	IIIC	100m Buffer
133	Barn	Structure	Historic	n/a	-26.787112	29.981274	IIIC	50m Buffer
134	Begin der Lyn werf	Structure	Modern, Historic	n/a	-26.799106	29.985942	IIIC	100m Buffer
135	**Kraal**	**Structure**	**Historic**	**n/a**	**-26.812313**	**29.986231**	**IIIC**	**50m Buffer**
136	Settlement	Structure	Modern	n/a	-26.885173	30.059008	NCW	n/a
137	Vlakfontein werf	Structure	Modern, Historic	n/a	-26.892563	30.069524	IIIC	100m Buffer
138	Settlement	Structure	Modern	n/a	-26.880354	29.926459	NCW	n/a
139	Settlement	Structure	Modern	n/a	-26.881876	29.926874	NCW	n/a
140	Settlement	Structure	Modern	n/a	-26.884068	29.924567	NCW	n/a

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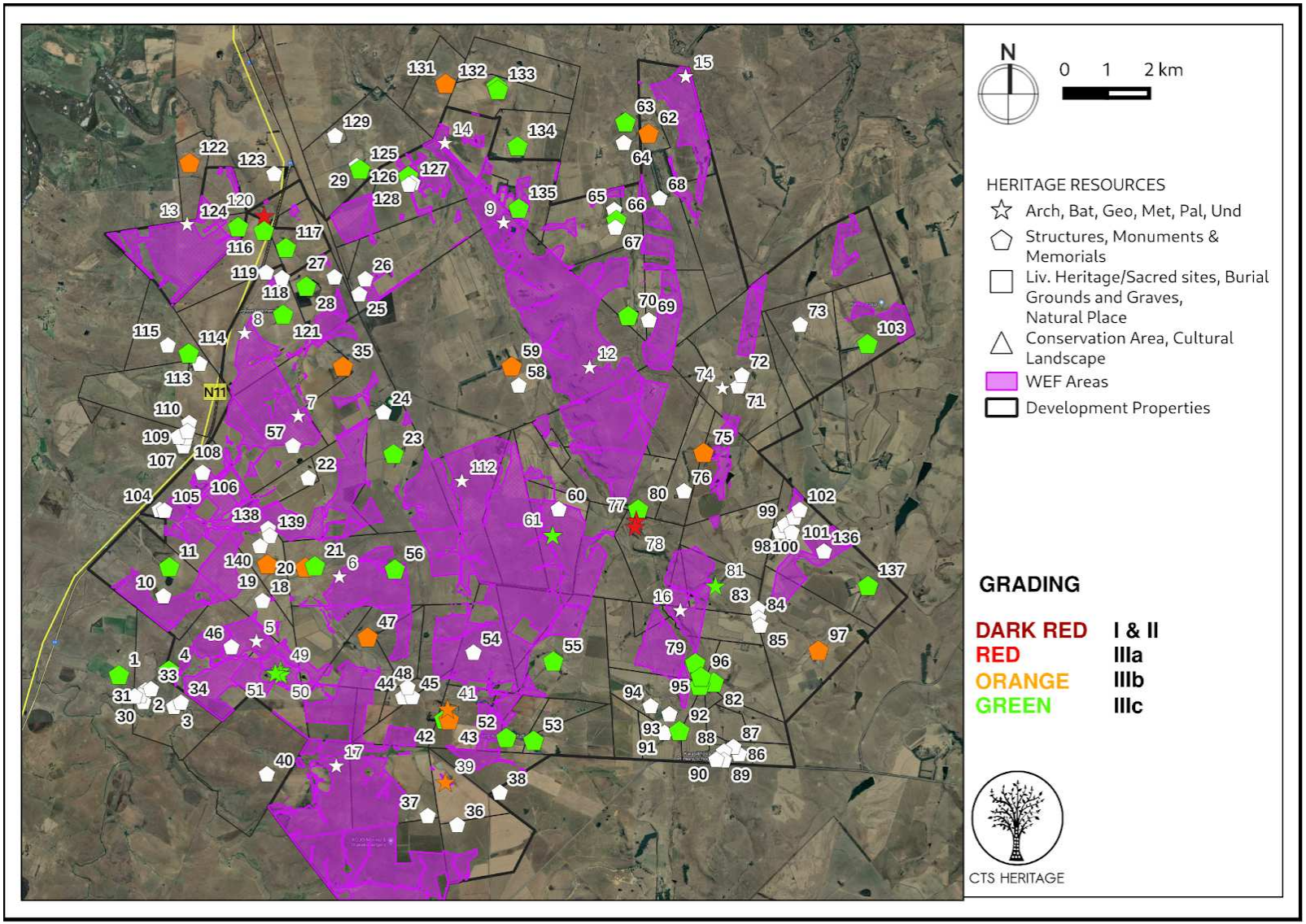

Figure 6.1: Map of all sites and observations noted within the development area

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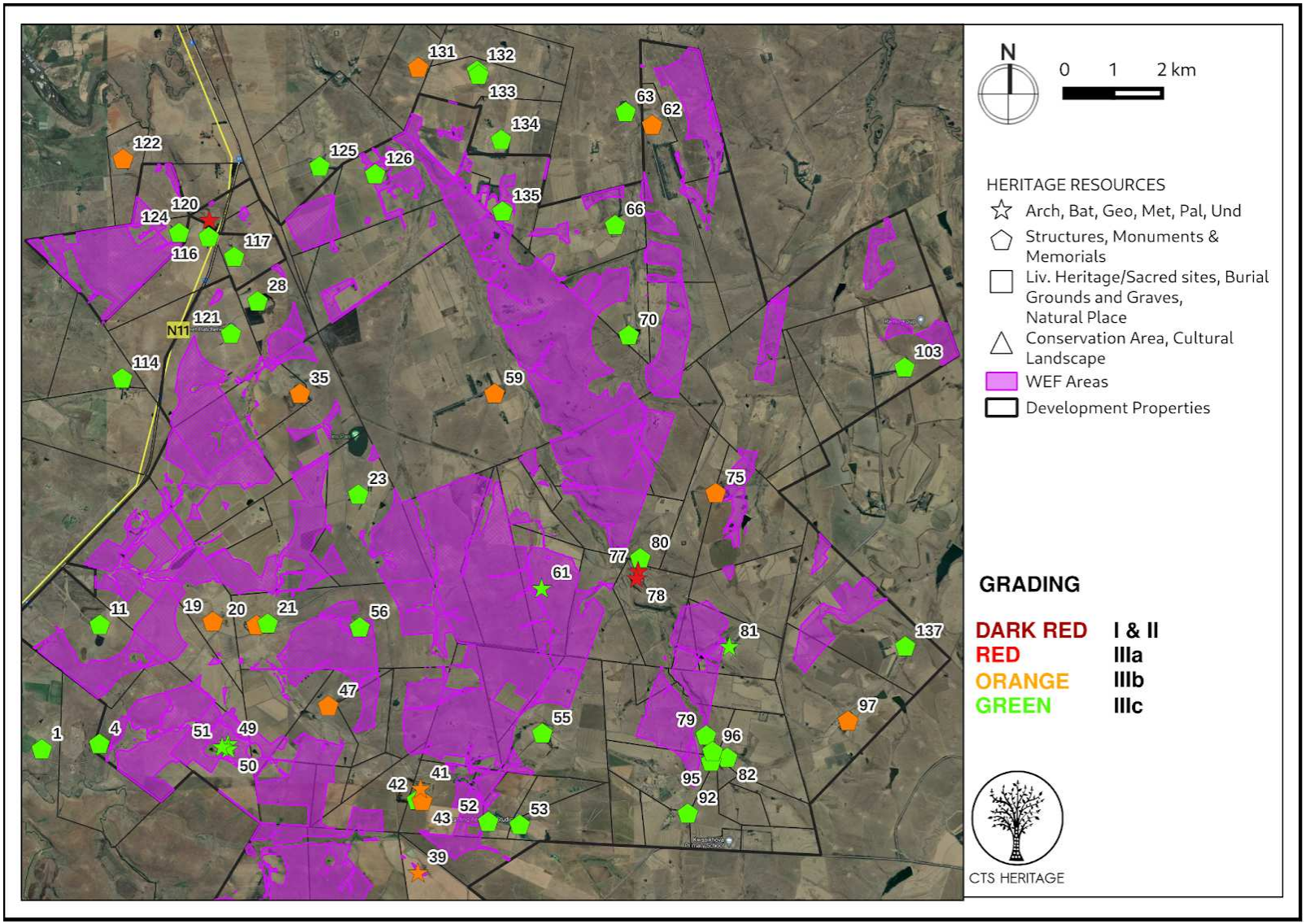

Figure 6.2: Map of all sites and observations noted within the development area

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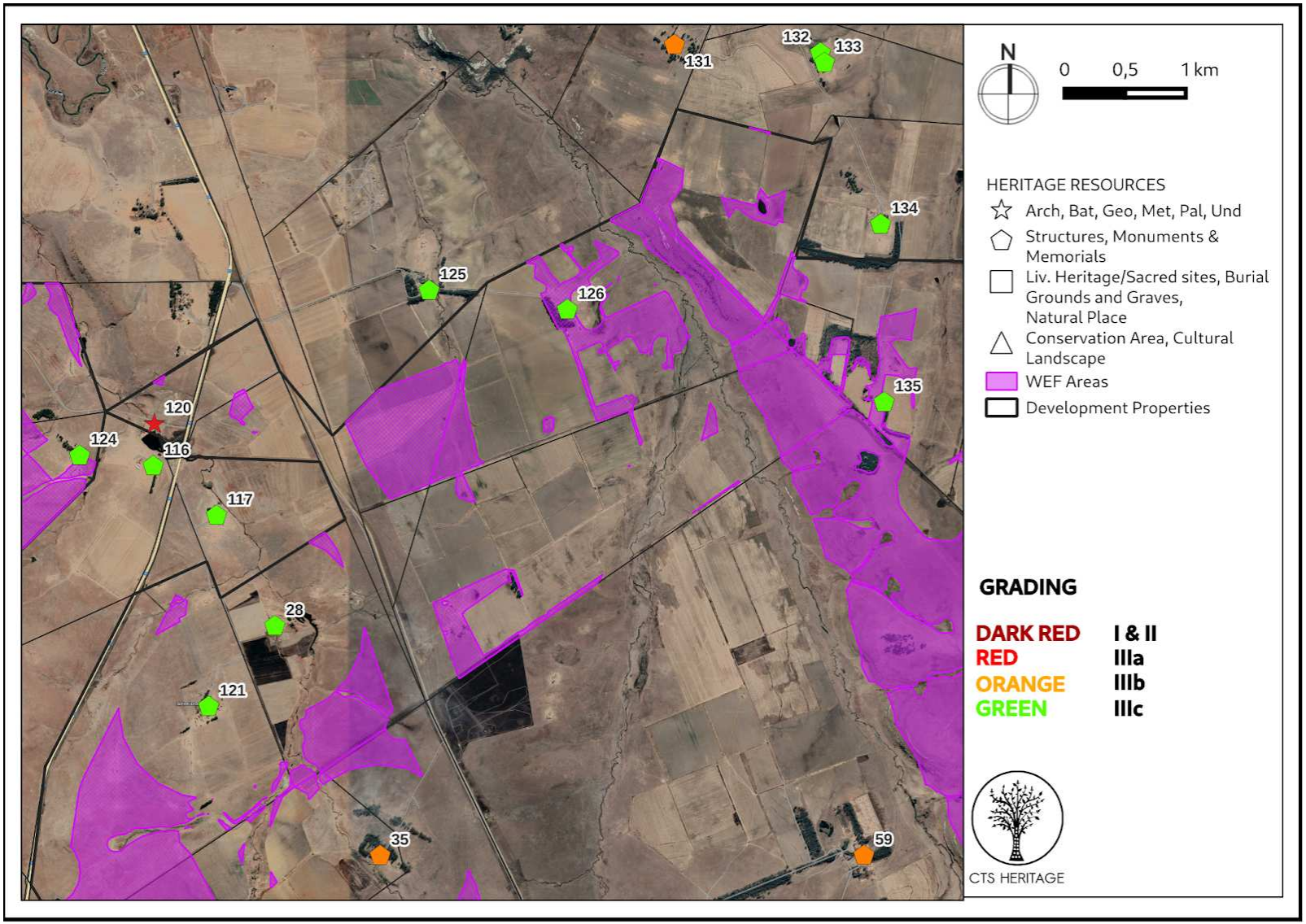

Figure 6.3: Map of all sites and observations noted within the development area

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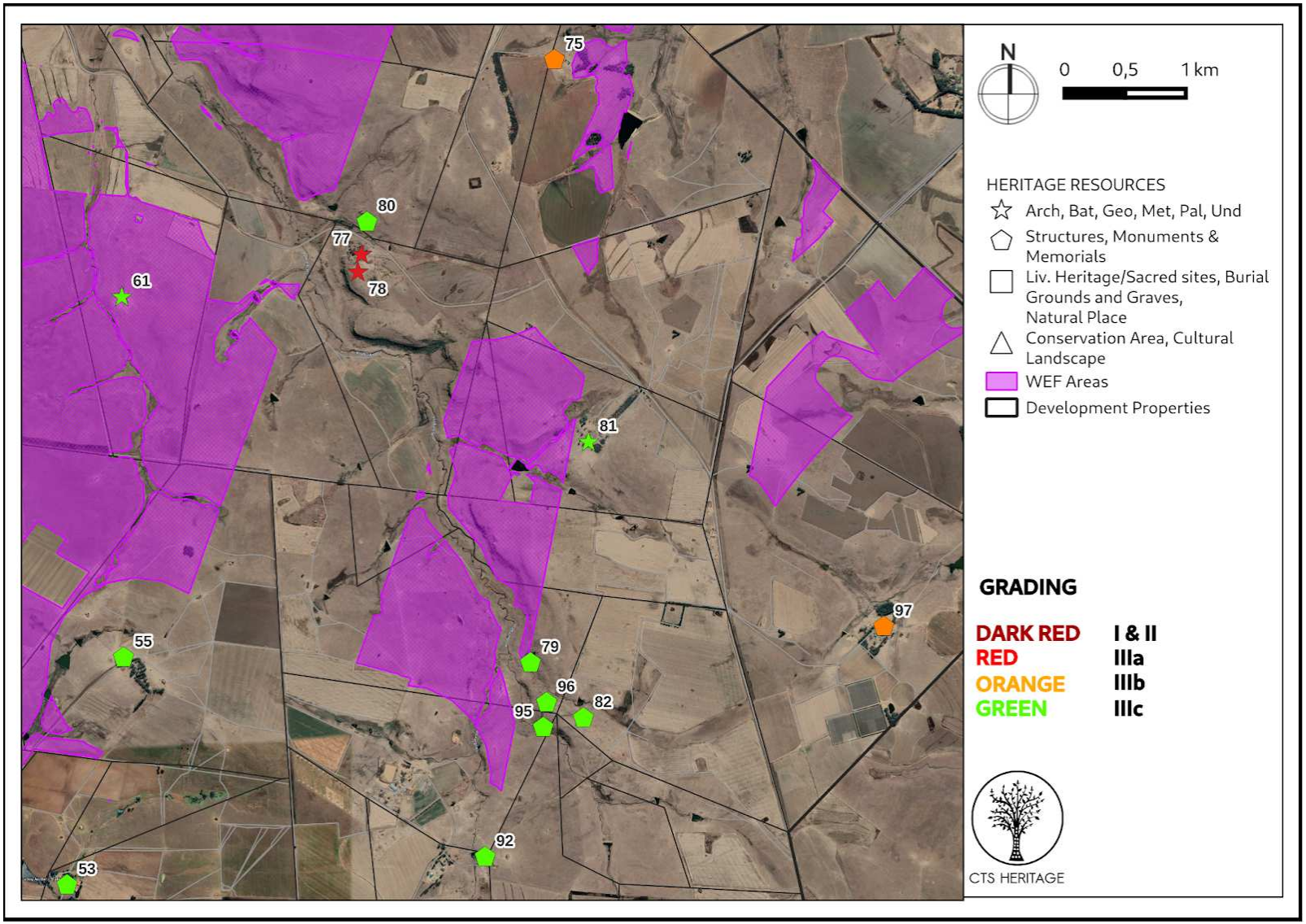

Figure 6.4: Map of all sites and observations noted within the development area

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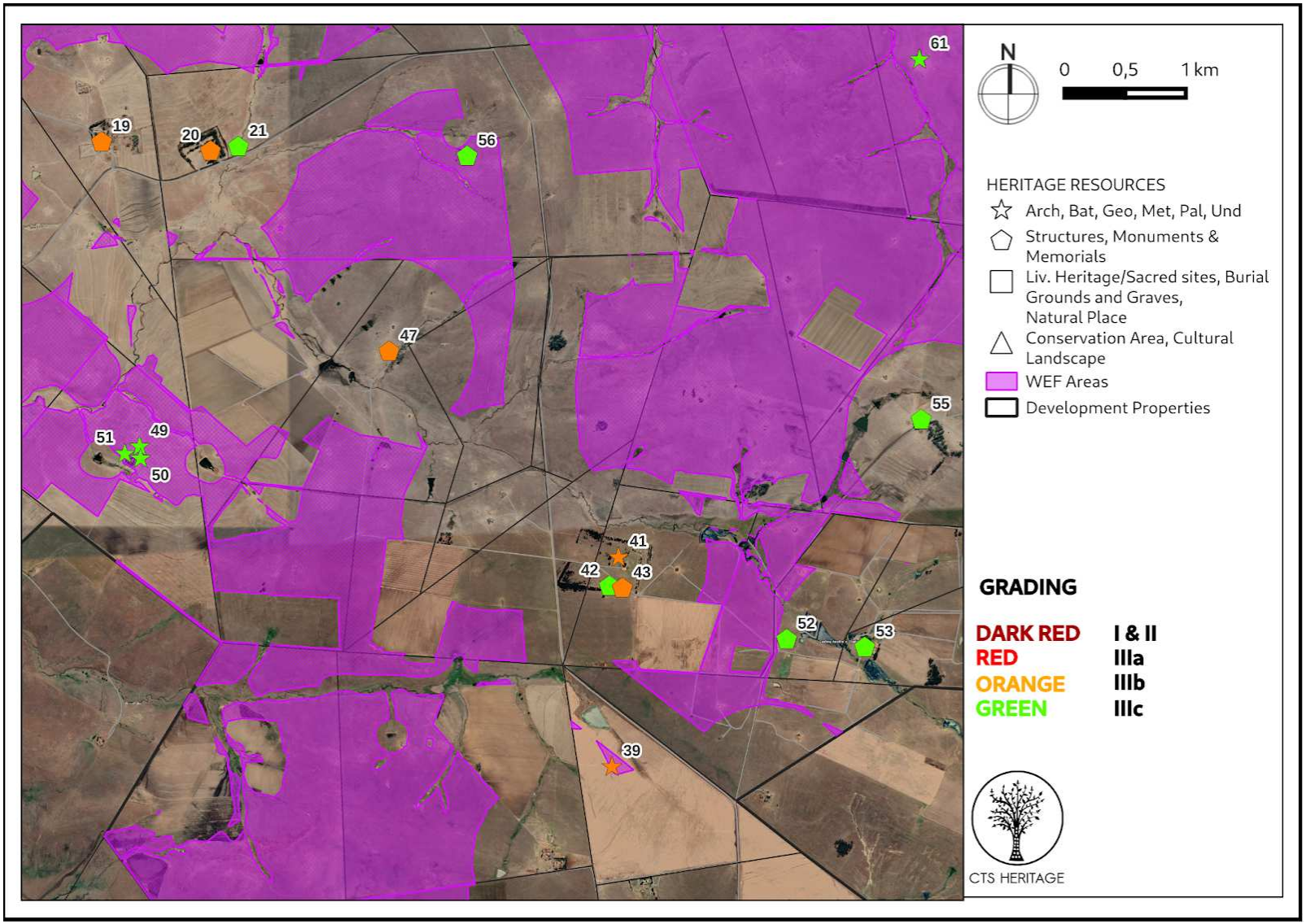

Figure 6.5: Map of all sites and observations noted within the development area

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4.3 Selected photographic record

(a full photographic record is available upon request)

Figure 7.1 001

Figure 7.2 004

Figure 7.3 011

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Figure 7.4 019


Figure 7.5 020

Figure 7.6 021

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Figure 7.7 023


Figure 7.8 028

Figure 7.9 035

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Figure 7.10 039

Figure 7.11 041

Figure 7.12 042

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Figure 7.13 043

Figure 7.14 047

Figure 7.15 049, 050 and 051

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Figure 7.16 052

Figure 7.17 053

Figure 7.18 055

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Figure 7.19 056

Figure 7.20 059

Figure 7.21 061

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Figure 7.22 062

Figure 7.23 063

Figure 7.24 066

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Figure 7.25 070

Figure 7.26 075

Figure 7.27 077

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Figure 7.28 078

Figure 7.29 078

Figure 7.30 080

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Figure 7.32 081

Figure 7.33 092

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Figure 7.34 097

Figure 7.35 097

Figure 7.36 103

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Figure 7.38 117


Figure 7.39 120

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Figure 7.48 131

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5. ASSESSMENT OF THE IMPACT OF THE DEVELOPMENT

5.1 Assessment of impact to Archaeological Resources

Based on the information available at the time of this assessment, only some of the significant heritage resources identified fall within the areas proposed for the WEF development. These sites are sites 39, 49, 50, 51, 56, 61, 79, 124, 126 and 135 and are marked in bold in Table 1 above. No-development buffers have been recommended for these sites to ensure that they are not impacted by the proposed development.

Table 2: Observations within the WEF footprint

POINT ID	Description	Type	Period	Density	Co-ordinates		Grading	Mitigation
039	Ruin, sandstone walls in middle of maize fields	Ruin	Historic	n/a	-26.934298	29.968734	IIIB	200m Buffer
049	Mooifontein ruined werf	Ruin	Historic	n/a	-26.9105613	29.9294321	IIIC	100m Buffer
050	Mooifontein ruined werf	Ruin	Historic	n/a	-26.9114469	29.9295173	IIIC	100m Buffer
051	Mooifontein ruined werf	Ruin	Historic	n/a	-26.9111006	29.9282004	IIIC	100m Buffer
056	Settlement and old kraal at Bloemfontein werf	Structure	Modern, Historic	n/a	-26.889035	29.956689	IIIC	100m Buffer
061	Skoonheid ruins	Ruin	Historic	n/a	-26.8818614	29.9943163	IIIC	50m Buffer
079	Kraal	Structure	Historic	n/a	-26.908981	30.028318	IIIC	50m Buffer
124	Kraal	Structure	Historic	n/a	-26.816275	29.919312	IIIC	50m Buffer
126	Ruined werf at Vaalkrans	Structure	Historic	n/a	-26.805446	29.95988	IIIC	100m Buffer
135	Kraal	Structure	Historic	n/a	-26.812313	29.986231	IIIC	50m Buffer

On condition that the buffer areas detailed in Table 1 and 2 are adhered to, no negative impact to significant archaeological heritage is anticipated.

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6. CONCLUSION AND RECOMMENDATIONS

The survey proceeded with some constraints and limitations, yet the project area was comprehensively surveyed for heritage resources. Some Later Stone Age archaeology of limited scientific value was identified. However, the majority of the significant heritage resources identified relate to the historic farm occupation of this property. These resources include the remnants of old farm werfs as well as three burial sites that were identified.

Only some of the heritage resources identified fall within the layout for the WEFs provided. Buffer areas have been recommended to ensure that these sites are not negatively impacted by the proposed development (Table 2). On condition that these buffer areas are respected, no direct impact to significant heritage resources is anticipated.

In order to ensure that no impact to the identified resources occurs during the construction or operational phases of the development, a number of recommendations are made below.

The results of the field assessment reveal that the development area has moderate to high sensitivity for impacts to heritage resources and as such, the results of the DFFE screening tool are disputed here.

Recommendations

There is no objection to the proposed development from an archaeological perspective on condition that:

- The buffer areas recommended in Table 1 and 2 must be respected in the Final Layout
- Ongoing community access to the identified burials, as well as their conservation into the future, must be ensured. This can be managed through the development of a Heritage Management Plan for the burials to be implemented for the duration of the project.
- Should any buried archaeological resources or human remains or burials be uncovered during the course of development activities, work must cease in the vicinity of these finds. The South African Heritage Resources Agency (SAHRA) must be contacted immediately in order to determine an appropriate way forward.

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7. REFERENCES

Heritage Impact Assessments				
Nid	**Report Type**	**Author/s**	**Date**	**Title**
104957	PIA Phase 1	Marion Bamford	30/11/2012	Palaeontological Impact Assessment for Majuba Underground Coal Gasification Project, Mpumalanga Phase 1 Report
126521	Heritage Impact Assessment Specialist Reports	Mamoluoane Seliane	30/06/2013	Xstrata Amersfoort Mine: Phase 1 Cultural Heritage Impact Assessment
134121	HIA Phase 1	Johan Nel	01/05/2013	Heritage Impact Assessment Report: Proposed Kangra Coal Kusipongo Resource Expansion Project, Mpumalanga
138290	HIA Phase 1	Johnny Van Schalkwyk	01/12/2012	HERITAGE ASSESSMENT REPORT FOR THE UNDERGROUND COAL GASIFICATION PROJECT AND ASSOCIATED INFRASTRUCTURE IN SUPPORT OF CO-FIRING OF GAS AT THE MAJUBA POWER STATION, AMERSFOORT, MPUMALANGA
162749	Heritage Scoping	Polke Birkholtz	15/10/2013	Mashala Resources Leiden Colliery Project Heritage Study: Scoping Level Report
174410	HIA Phase 1	Anton van Vollenhoven	01/10/2013	Heritage Impact Assessment for the proposed consturction of a poultry abattoir located in Amersfoort, Mpumalanga
175506	HIA Phase 1			
185959	PIA Phase 1	Dr. Heidi Fourie	12/12/2014	Palaeontological Study for the proposed poultry abattoir located in Amersfoort, Mpumalanga
5014	AIA Phase 1	Julius CC Pistorius	01/06/2007	A Phase 1 Heritage Impact Assessment Study for the Proposed New 88 kV Power Line Running from the Majuba Power Station near Amersfoort to the Camden Power Station near Ermelo in the Mpumalanga Province
5016	AIA Phase 1	Johnny Van Schalkwyk	01/12/2007	Heritage Scoping Report for the Proposed Majuba CCGT Power Plant, Amersfoort Magisterial District, Mpumalanga
6241	AIA Phase 1	Thomas Huffman, R Steel	31/07/1995	Archaeological Survey of Balgarthan Colliery
8402	Udo Kusel	11/12/2007	HIA Phase 1	Cultural Heritage Resources Impact Assessment of Holding 109 Wilkoppies Portion 430 (A Portion of Portion 59) of the Farm Elandsheuvel 402 IP Klerksdorp, North West Province
8491	Udo Kusel	01/12/2007	HIA Phase 1	Cultural Heritage Resources Impact Assessment of Portion 2 of the Farm Elandsheuwel 436 IQ Tlokwe Local Municipality, North West Province

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CTS HERITAGE

APPENDIX 2: Palaeontological Assessment (2023)

Palaeontological Impact Assessment for the proposed Ujekamanzi Wind Energy Facilities, between Ermelo and Amersfoort, Mpumalanga Province

CTS22_324_SiVest_ABO_Ujekamanzi

Site Visit Report (Phase 2)

For

CTS Heritage

11 February 2023

Prof Marion Bamford
Palaeobotanist
P Bag 652, WITS 2050
Johannesburg, South Africa
Marion.bamford@wits.ac.za

Expertise of Specialist

The Palaeontologist Consultant: Prof Marion Bamford
Qualifications: PhD (Wits Univ, 1990); FRSSAf, ASSAf
Experience: 34years research; 26 years PIA studies
Over 350 projects completed.

Declaration of Independence

This report has been compiled by Professor Marion Bamford, of the University of the Witwatersrand, sub-contracted by CTS Heritage, Simonstown, South Africa. The views expressed in this report are entirely those of the author and no other interest was displayed during the decision making process for the Project.

Specialist: Prof Marion Bamford

Signature: 

Executive Summary

A site visit (Phase 2) Palaeontological impact Assessment was completed for the proposed Ujekamanzi Wind Energy Facility. ABO Wind renewable energies (Pty) Ltd is proposing to develop a renewable energy cluster, located south of Ermelo in the Mpumalanga Province. The cluster is collectively referred to as "ABO Wind Ujekamanzi Wind Energy Facilities", consisting of 2 x Wind Energy Facilities (WEF's) and associated Electrical Grid Infrastructure (EGI): A Main Transmission Substation (MTS) and a Loop-In-Loop-Out (LILO) for the grid connection.

There is a possibility of the inclusion of solar photovoltaic (PV) facilities, depending on the baseline "opportunities and constraints" findings. However, this is not included in the scope of work at this stage.

The cluster of farms is in the Govan Mbeki Local Municipality and the Gert Sibande District Municipality.

To comply with the regulations of the South African Heritage Resources Agency (SAHRA) in terms of Section 38(8) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA), a site visit (Phase 2) Palaeontological Impact Assessment (PIA) was completed for the proposed development.

The proposed sites lie on non-fossiliferous Jurassic dolerite and on potentially very highly sensitive rocks of the Vryheid Formation (Ecca Group, Karoo Supergroup) that could preserve impressions of fossil plants of the *Glossopteris* flora. The site visit and walk through by the palaeontologists in early February 2023 confirmed that there are NO FOSSIL PLANTS of the *Glossopteris* flora present on the surface. The area is flat and open with secondary grassland or recently ploughed and cultivated land. Most of the area has been cultivated or cleared for grazing previously. It is unknown if there are fossils below the ground surface, therefore, a Fossil Chance Find Protocol should be added to the EMPr. Based on this information it is recommended that no further palaeontological impact assessment is required unless fossils are found by the contractor, developer, environmental officer or other designated responsible person once excavations or drilling activities have commenced. Since the impact will be low to moderate, as far as the palaeontology is concerned, the project should be authorised provided that any fossils found are rescued and that SAHRA is notified.

Table of Contents

1. Background

ABO Wind renewable energies (Pty) Ltd is proposing to develop a renewable energy cluster, located south of Ermelo in the Mpumalanga Province. The cluster is collectively referred to as "ABO Wind Ujekamanzi Wind Energy Facilities", consisting of 2 x Wind Energy Facilities (WEF's) and associated Electrical Grid Infrastructure (EGI): A Main Transmission Substation (MTS) and a Loop-In-Loop-Out (LILO) for the grid connection. There is a possibility of the inclusion of solar photovoltaic (PV) facilities, depending on the baseline "opportunities and constraints" findings. However, this is not included in the scope of work at this stage.

This report is for the WEFs only. No details of the proposed layout of the turbines or infrastructure is available, however, for the palaeontological impact only the below ground and ground surface are relevant.

A site visit (Phase 2) Palaeontological impact Assessment was completed for the Ujekamanzi WEFs projects. Not all the land parcels were visited, only the land that is considered as very highly sensitive, namely the Vryheid Formation shales (Ecca Group, Karoo Supergroup), farms were visited along the route.

A Palaeontological Impact Assessment was requested for the two Ujekamanzi WEF projects. To comply with the regulations of the South African Heritage Resources Agency (SAHRA) in terms of Section 38(8) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA), a site visit and walkthrough (Phase 2) Palaeontological Impact Assessment (PIA) was completed for the proposed development and is reported herein.

Table 1: National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) and Environmental Impact Assessment (EIA) Regulations, 2014 (as amended) - Requirements for Specialist Reports (Appendix 6).

	A specialist report prepared in terms of the Environmental Impact Regulations of 2017 must contain:	**Relevant section in report**
ai	Details of the specialist who prepared the report,	Appendix B
aii	The expertise of that person to compile a specialist report including a curriculum vitae	Appendix B
b	A declaration that the person is independent in a form as may be specified by the competent authority	Page
c	An indication of the scope of, and the purpose for which, the report was prepared	Section 1
ci	An indication of the quality and age of the base data used for the specialist report: SAHRIS palaeosensitivity map accessed – date of this report	Yes
cii	A description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change	Section 5

	A specialist report prepared in terms of the Environmental Impact Regulations of 2017 must contain:	**Relevant section in report**
d	The date and season of the site investigation and the relevance of the season to the outcome of the assessment	N/A
e	A description of the methodology adopted in preparing the report or carrying out the specialised process	Section 2
f	The specific identified sensitivity of the site related to the activity and its associated structures and infrastructure	Section 4
g	An identification of any areas to be avoided, including buffers	N/A
h	A map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	N/A
i	A description of any assumptions made and any uncertainties or gaps in knowledge;	Section 5
j	A description of the findings and potential implications of such findings on the impact of the proposed activity, including identified alternatives, on the environment	Section 4
k	Any mitigation measures for inclusion in the EMPr	Section 8, Appendix A
l	Any conditions for inclusion in the environmental authorisation	N/A
m	Any monitoring requirements for inclusion in the EMPr or environmental authorisation	Section 8, Appendix A
ni	A reasoned opinion as to whether the proposed activity or portions thereof should be authorised	Section 6
nii	If the opinion is that the proposed activity or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan	Sections 6, 8
o	A description of any consultation process that was undertaken during the course of carrying out the study	N/A
p	A summary and copies of any comments that were received during any consultation process	N/A
q	Any other information requested by the competent authority.	N/A
2	Where a government notice gazetted by the Minister provides for any protocol or minimum information requirement to be applied to a specialist report, the requirements as indicated in such notice will apply.	N/A

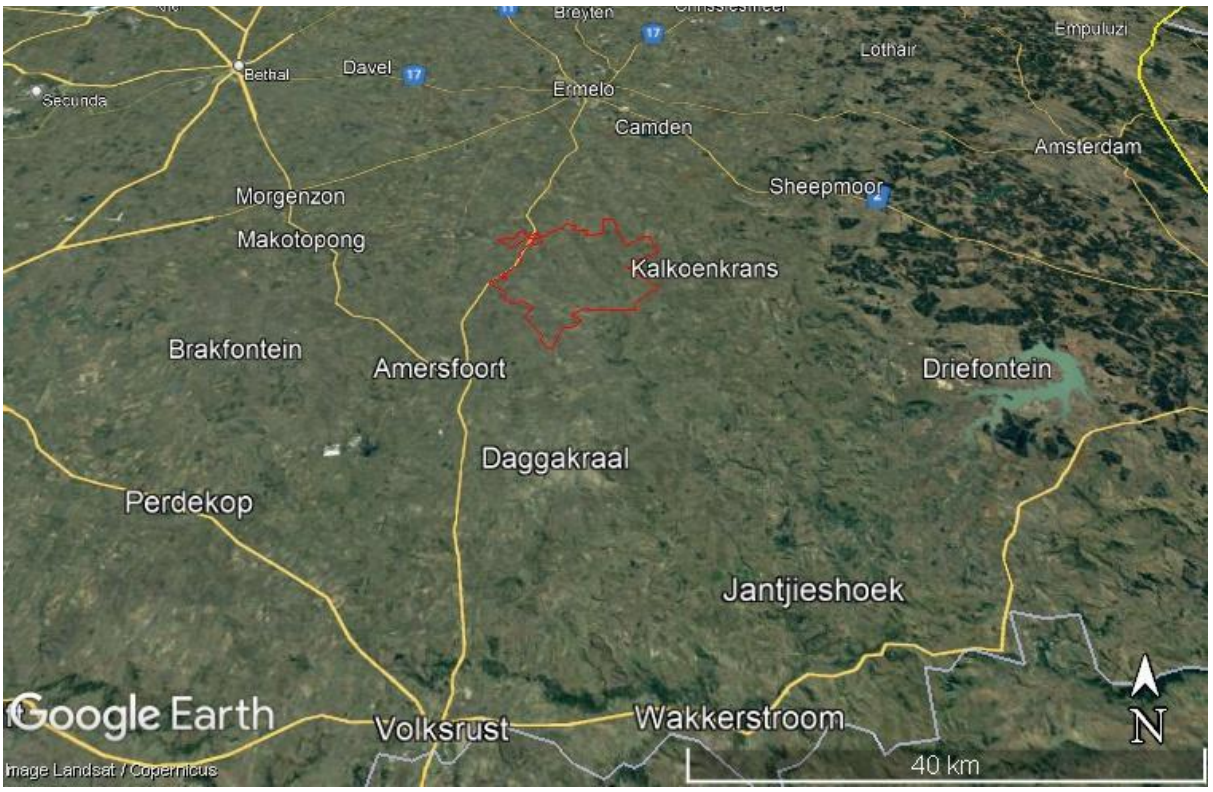

Figure 1: Google Earth map of the proposed Ujekamanzi WEF site area on a number of farms shown within the red outline, and the relevant landmarks.

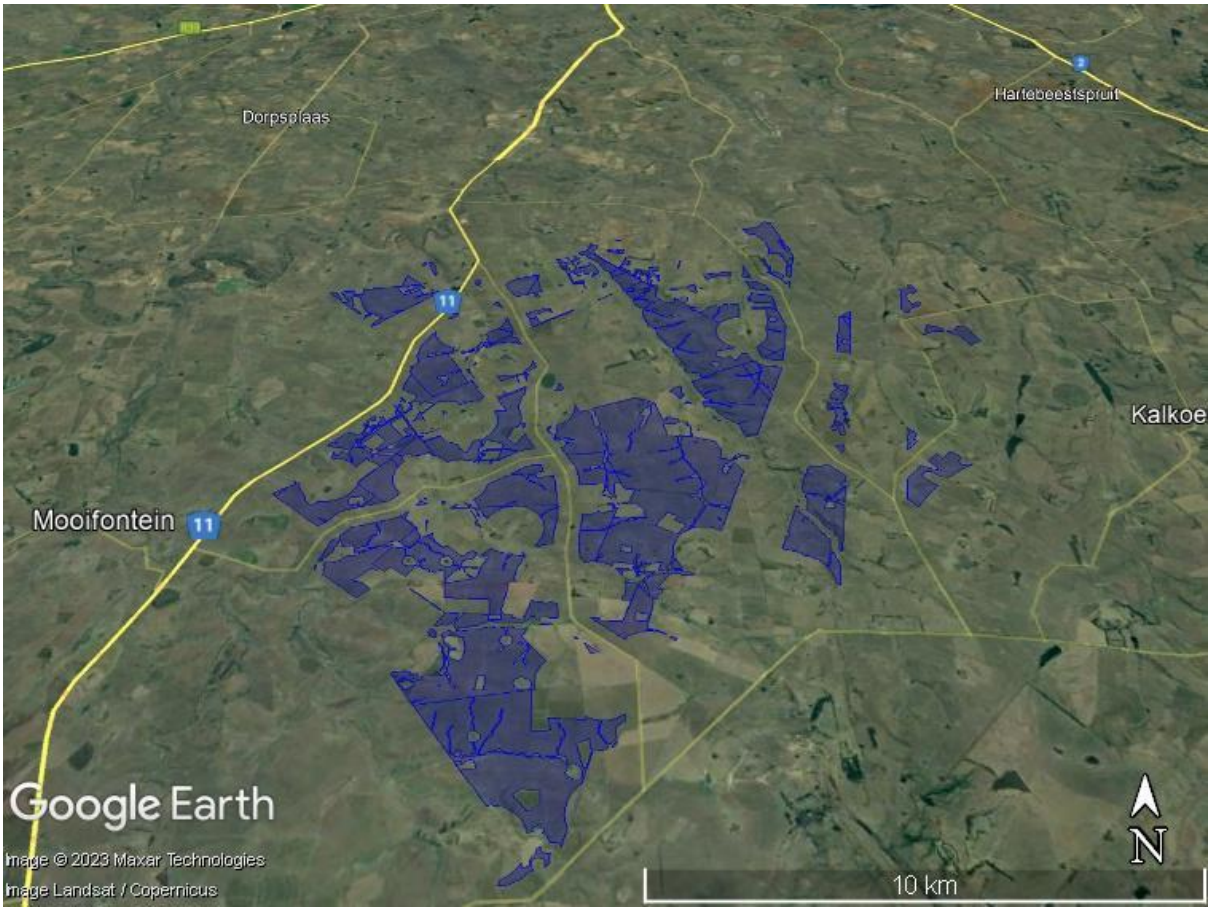

Figure 2: Annotated Google Earth map for the proposed Ujekamanzi WEFs land parcels shown by the blue shading.

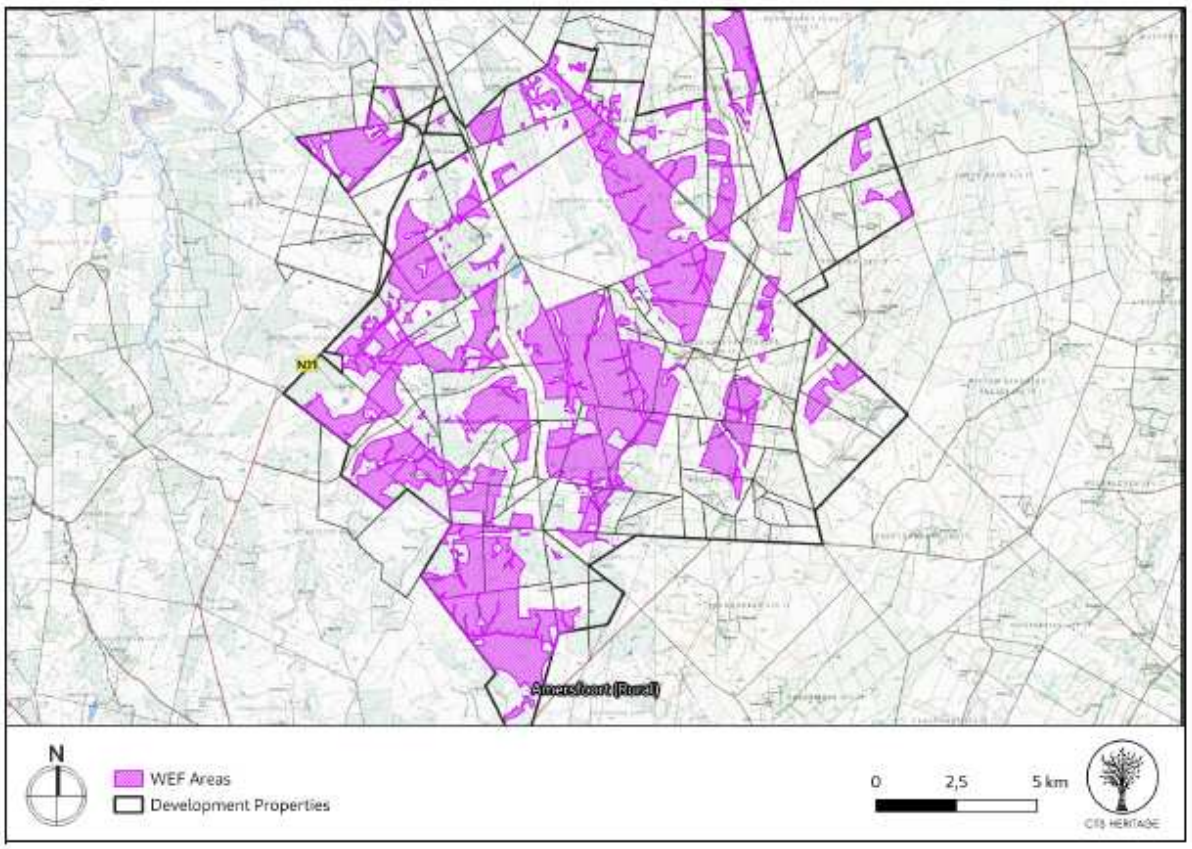

Figure 3: Topographic map with the proposed Ujekamanzi WEF land parcels as indicated. (from CTS Scoping Report)

2. Methods and Terms of Reference

The Terms of Reference (ToR) for this study were to undertake a PIA and provide feasible management measures to comply with the requirements of SAHRA.
The methods employed to address the ToR included:

1. Consultation of geological maps, literature, palaeontological databases, published and unpublished records to determine the likelihood of fossils occurring in the affected areas. Sources included records housed at the Evolutionary Studies Institute at the University of the Witwatersrand and SAHRA databases;
2. Where necessary, site visits by a qualified palaeontologist to locate any fossils and assess their importance, as is the case here;
3. Where appropriate, collection of unique or rare fossils with the necessary permits for storage and curation at an appropriate facility (*not applicable to this assessment*); and
4. Determination of fossils' representivity or scientific importance to decide if the fossils can be destroyed or a representative sample collected (*not applicable to this assessment*).

3. Geology and Palaeontology

i. Project location and geological context

The site lies in the northeastern part of the Karoo basin where the lower Karoo Supergroup strata are exposed (Figure 4). Along the rivers and streams much younger reworked sands and alluvium overly the older strata.

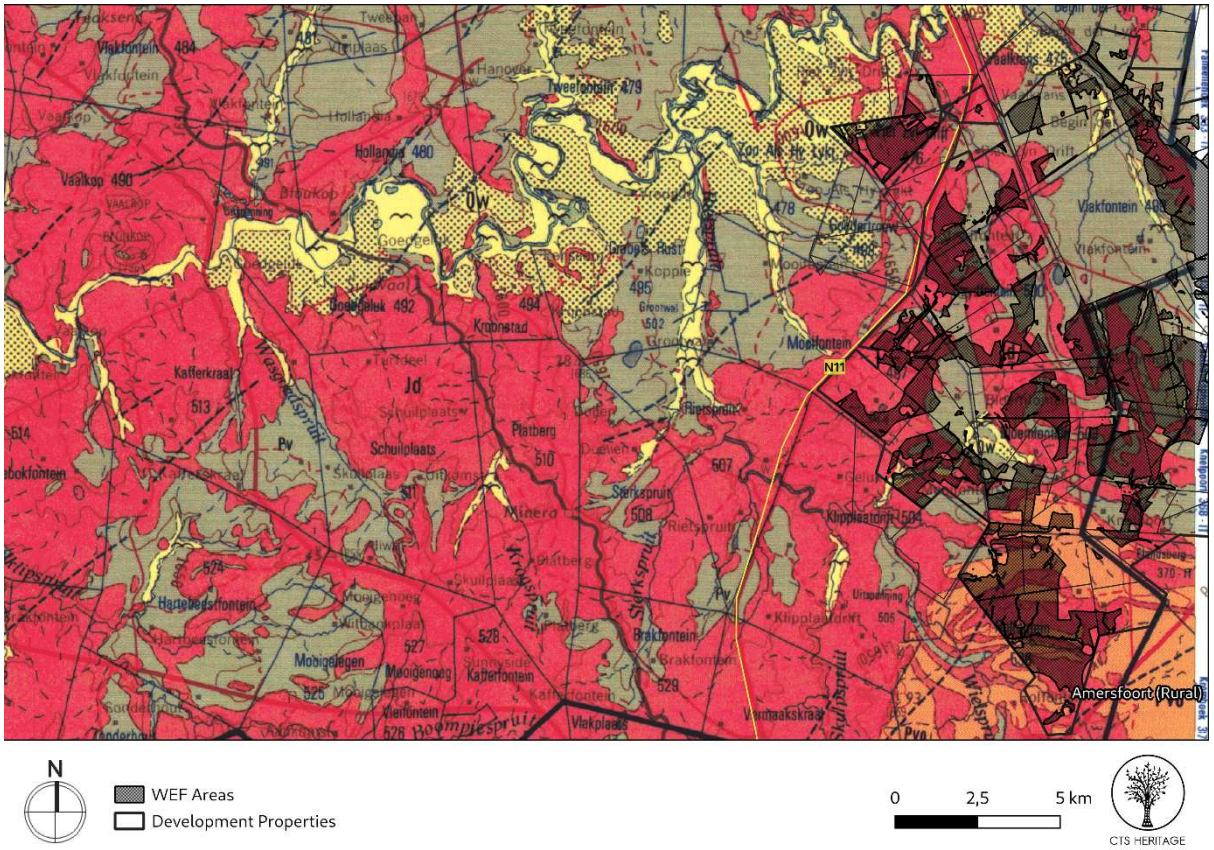

Figure 4: Geological map of the area around the western part of the Ujekamanzi WEFs. Abbreviations of the rock types are explained in Table 2. Map enlarged from the Geological Survey 1: 250 000 map 2628 East Rand.

Table 2: Explanation of symbols for the geological map and approximate ages (Johnson et al., 2006; Partridge et al., 2006). SG = Supergroup; Fm = Formation; Ma = million years; grey shading = formations impacted by the project.

Symbol	Group/Formation	Lithology	Approximate Age
Qc	Quaternary	Alluvium, sand, calcrete	Neogene, ca 2.5 Ma to present
Jd	Jurassic dykes	Dolerite dykes, intrusive	Jurassic, Ca 183 Ma
Pv	Vryheid Fm, Ecca Group, Karoo SG	Shales, mudstone, sandstone, coal seams	Early Permian Ca 290-270 Ma

Figure 5: Geological map of the area around the eastern part of the Ujekamanzi WEFs. Abbreviations of the rock types are explained in Table 2. Map enlarged from the Geological Survey 1: 250 000 map 2630 Mbabane.

The Karoo Supergroup rocks cover a very large proportion of South Africa and extend from the northeast (east of Pretoria) to the southwest and across to almost the KwaZulu Natal south coast. It is bounded along the southern margin by the Cape Fold Belt and along the northern margin by the much older Transvaal Supergroup rocks. Representing some 120 million years (300 – 183Ma), the Karoo Supergroup rocks have preserved a diversity of fossil plants, insects, vertebrates and invertebrates.

During the Carboniferous Period South Africa was part of the huge continental landmass known as Gondwanaland and it was positioned over the South Pole. As a result, there were several ice sheets that formed and melted, and covered most of South Africa (Visser, 1986, 1989; Isbell et al., 2012). Gradual melting of the ice as the continental mass moved northwards and the earth warmed, formed fine-grained sediments in the large inland sea. These are the oldest rocks in the system and are exposed around the outer part of the ancient Karoo Basin, and are known as the Dwyka Group. They comprise tillites, diamictites, mudstones, siltstones and sandstones that were deposited as the basin filled. This group has been divided into two formations with Elandsvlei Formation occurring throughout the basin and the upper Mbizane Formation occurring only in the Free State and KwaZulu Natal (Johnson et al., 2006).

Overlying the Dwyka Group rocks are rocks of the Ecca Group that are Early Permian in age. There are eleven formations recognised in this group but they do not all extend throughout the Karoo Basin. In Mpumalanga, the Free State and KwaZulu Natal, from the base upwards are the Pietermaritzburg Formation, **Vryheid Formation** and the Volksrust Formation. All of these sediments have varying proportions of sandstones, mudstones, shales and siltstones and represent shallow to deep water settings, deltas, rivers, streams and overbank depositional environments.

Large exposures of **Jurassic dolerite** dykes occur throughout the area. These intruded through the Karoo sediments around 183 million years ago at about the same time as the Drakensberg basaltic eruption.

ii. Palaeontological context

The palaeontological sensitivity of the area under consideration is presented in Figures 6 and lies on Jurassic dolerite and the Vryheid Formation.

The Vryheid Formation lies on the uneven topography of pre-Karoo or Dwyka Group rocks in the northern and northwestern margins, but lies directly on the Pietermaritzburg Formation in the central and eastern part. The lithofacies show a number of upward-coarsening cycles, some very thick, and they are essentially deltaic in origin. There are also delta-front deposits, evidence of delta switching, and fluvial deposits with associated meandering rivers, braided streams, back swamps or interfluves and abandoned channels (Cadle et al., 1993; Cairncross, 1990; 2001; Johnson et al., 2006). Coal seams originated where peat swamps developed on broad abandoned alluvial plains, and less commonly in the backswamps or interfluves. Most of the economically important coal seams occur in the fluvial successions (ibid). In the east (Mpumalanga and northern KwaZulu Natal), the Vryheid formation can be subdivided into a lower fluvial-dominated deltaic interval, a middle fluvial interval, and an upper fluvial-dominated deltaic interval again (Taverner-Smith et al., 1988).

The Vryheid Formation preserves the distinctive Gondwanan flora, the *Glossopteris* flora. As the climate warmed up and the huge continent drifted polewards the land was rapidly colonised by luxuriant vegetation, in some parts. Peats formed in waterlogged environments and over time were buried, preserved and altered by heat and pressure to eventually form the coal seams typical of this formation and abundant in Mpumalanga and KwaZulu Natal coalfields. Coals themselves do not preserve the original plant structures, but plant impressions or compressions can be preserved in the lenses between the coals or in fine grained sediments. The flora is composed of the dominant *Glossopteris* plants (leaves, seeds, reproductive structures, roots and wood). Other plants are lycopods, sphenophytes, ferns, cordaitaleans and other early gymnosperms. Vertebrates are not found with the fossil plants because they require adifferent set of conditions for preservations. Plants require rapid burial in a reducing and anoxic environment, while bones can be preserved in oxidizing environments (Cowan, 1995).

The Jurassic dolerite does not preserve fossils because it is an intrusive volcanic rock. The very young Quaternary sands along the stream are also very unlikely to preserve

fossils as they have been moved by the river floods and fossils would have been destroyed, if present in the first place.

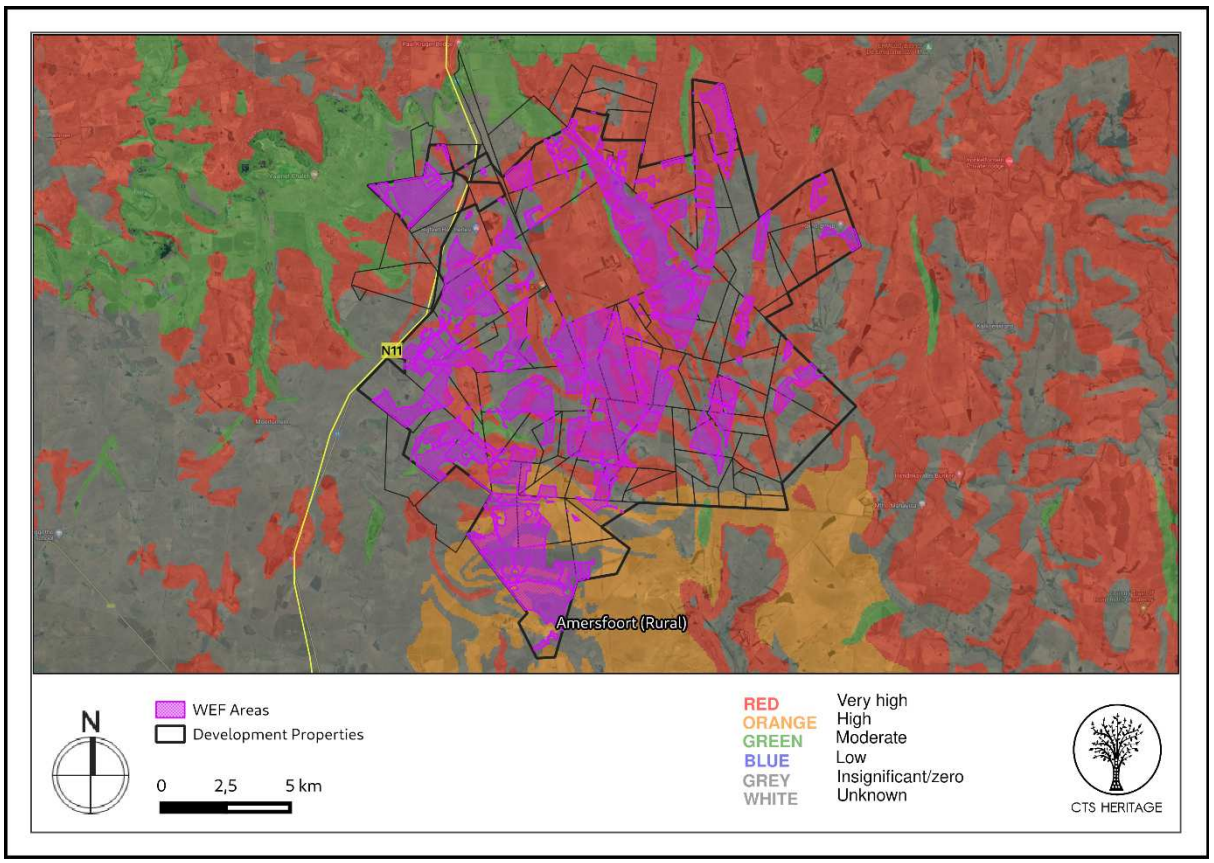

Figure 6: SAHRIS palaeosensitivity map for the site for the proposed Ujekamanzi WEFs shown within the lilac polygons. Background colours indicate the following degrees of sensitivity: red = very highly sensitive; orange/yellow = high; green = moderate; blue = low; grey = insignificant/zero.

iii. Site visit observations

The proposed project area is situated south of Ermelo and north of Amersfoort, east of the N11. The land has been cultivated for decades and so is highly disturbed from clearing of the land of rocks for cultivation and ploughing. There are no rocky outcrops within the cultivated land. With a gently rolling topography covered with either secondary grassland or exposed soils after ploughing, the visibility was generally good. Streams were not surveyed for fossils because they are seldom permitted to be developed, but more importantly, water and water-logged areas are not good for the preservation of fossils.

The vehicle route tracking is shown in Figure 7 but the palaeontologists walked onto the land to observe and take photographs (Figures 8 -14). Site observations are provided in the figure captions

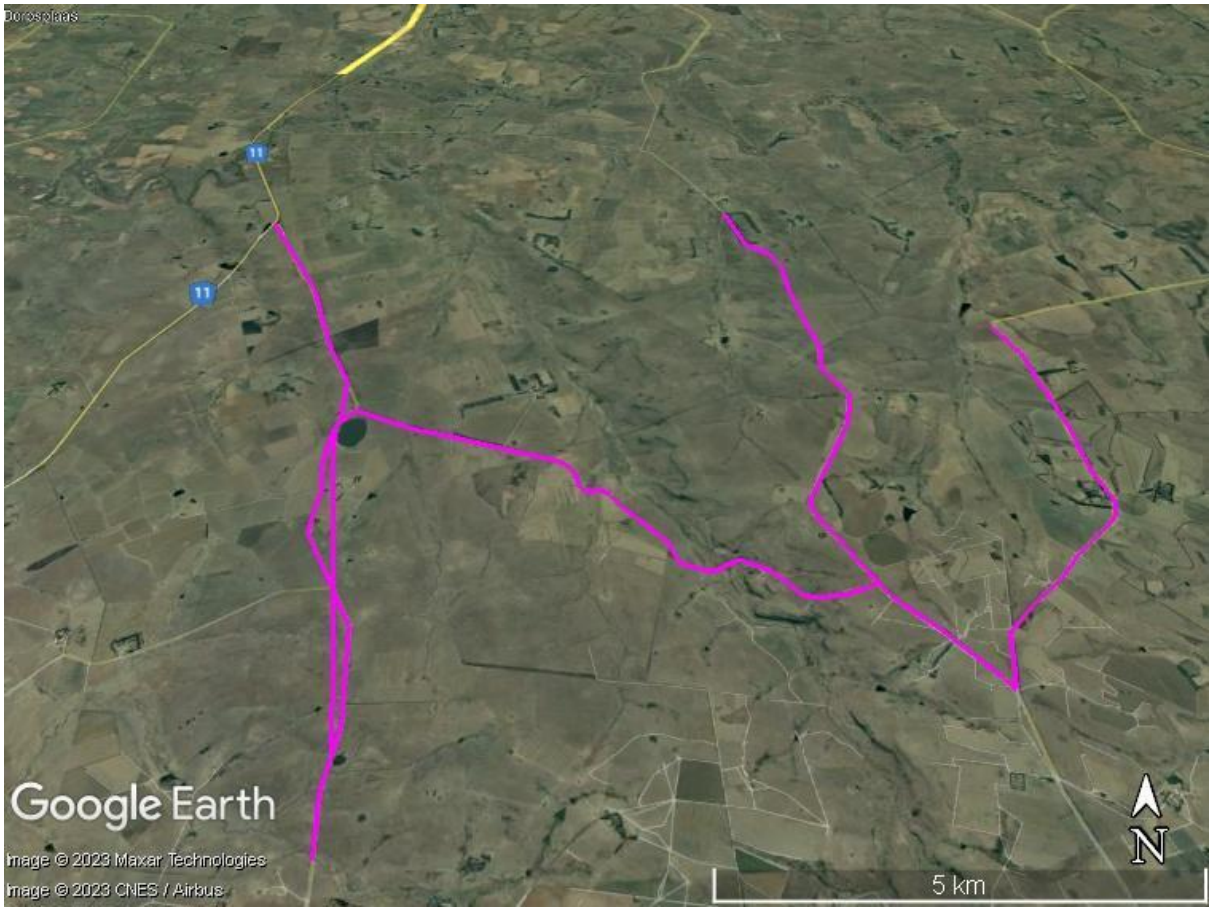

Figure 7: Vehicle tracked route for the site visit on 7-8 February 2023 by PhD students Rick Tolchard, Brandon Weiss and Roxane Matias (photographer). Purple line shows the route. Following plates show the western part, central part and eastern part.

Figure 8: Site photographs for the Ujekamanzi WEFs site visit (western part). A -

Figure 9: Site photographs for the Ujekamanzi WEFs site visit (western part). A – general view in the north western part. B – C – rare exposures of the soils below the surface and grassland. The hard material is sandstone but has no fossils. D – open grassland with a powerline in the background. No outcrops of shales that could preserve fossils.

Figure 10: Site photographs for the Ujekamanzi WEFs site visit (western part). A – another grassland with a powerline in the background. B – rare copse of exotic trees. C – open grassland and gently rolling topography. D – another open grassland but soils appear to be shallower as the grass cover is not so thick in the foreground.

Figure 11: Site photographs for the Ujekamanzi WEFs site visit (central part). A – open grassland in the foreground with files planed with mealies in the background. B – open grassland with mealies in the distance on the left. C – secondary grassland that has been reaped for hay with bales still on site. D – dam and sourrounding grassland on Farm Ons Pan.

Figure 12: Site photographs for the Ujekamanzi WEFs site visit (central part). A – D – same kind of open grasslands on gently rolling topography. No outcrops of dolomite or shales.

Figure 13: Site photographs for the Ujekamanzi WEFs site visit (central part). A – open grassland with a track that reveals sandy soil. B – cultivated field with mealies. C – D – open grassland on thinner soils so shorter grass but no outcrops of shale visible.

Figure 14: Site photographs for the Ujekamanzi WEFs site visit (eastern part). A – shallow valley with stream in the foreground and exotic trees n the background, possibly associated with the water source. B – open grassland. C – D - open grassland in the foreground and cultivated fields in the distance. Note smooth topography and absence of rocky outcrops.

4. Impact assessment

An assessment of the potential impacts to possible palaeontological resources considers the criteria encapsulated in Table 4:

Table 4a: Criteria for assessing impacts

PART A: DEFINITION AND CRITERIA		
Criteria for ranking of the SEVERITY/NATURE of environmental impacts	**H**	Substantial deterioration (death, illness or injury). Recommended level will often be violated. Vigorous community action.
	M	Moderate/ measurable deterioration (discomfort). Recommended level will occasionally be violated. Widespread complaints.

	L	Minor deterioration (nuisance or minor deterioration). Change not measurable/ will remain in the current range. Recommended level will never be violated. Sporadic complaints.
	L+	Minor improvement. Change not measurable/ will remain in the current range. Recommended level will never be violated. Sporadic complaints.
	M+	Moderate improvement. Will be within or better than the recommended level. No observed reaction.
	H+	Substantial improvement. Will be within or better than the recommended level. Favourable publicity.
Criteria for ranking the DURATION of impacts	**L**	Quickly reversible. Less than the project life. Short term
	M	Reversible over time. Life of the project. Medium term
	H	Permanent. Beyond closure. Long term.
Criteria for ranking the SPATIAL SCALE of impacts	**L**	Localised - Within the site boundary.
	M	Fairly widespread – Beyond the site boundary. Local
	H	Widespread – Far beyond site boundary. Regional/ national
PROBABILITY (of exposure to impacts)	**H**	Definite/ Continuous
	M	Possible/ frequent
	L	Unlikely/ seldom

Table 4b: Impact Assessment

PART B: Assessment		
SEVERITY/NATURE	**H**	-
	M	-
	L	Soils do not preserve plant fossils; so far there are no records from the Vryheid formation of plant or animal fossils in this region so it is very unlikely that fossils occur on the site. The impact would be very unlikely.
	L+	-
	M+	-
	H+	-
DURATION	**L**	-
	M	-
	H	Where manifest, the impact will be permanent.
SPATIAL SCALE	**L**	Since the only possible fossils within the area would be fossil plants from the *Glossopteris* flora in the shales, the spatial scale will be localised within the site boundary.
	M	-
	H	-
PROBABILITY	**H**	**-**
	M	**-**

PART B: Assessment		
	L	It is extremely unlikely that any fossils would be found in the loose sand that will be developed for infrastructure but it is unknown what lies below the soils. Therefore, a Fossil Chance Find Protocol should be added to the eventual EMPr.

Based on the nature of the project, surface activities may impact upon the fossil heritage if preserved in the development footprint. The geological structures suggest that the rocks are the correct age and type to preserve fossils. The site visit and walk through confirmed that there were NO FOSSILS of any significance in the project footprint. Furthermore, the surface material to be excavated is soil and this does not preserve fossils. Since there is a small chance that fossils from the Vryheid Formation might occur below ground and might be disturbed by excavations for foundations and infrastructure, a Fossil Chance Find Protocol has been added to this report. Taking account of the defined criteria, the potential impact to fossil heritage resources is low to moderate.

5. Assumptions and uncertainties

Based on the geology of the area and the palaeontological record as we know it, it can be assumed that the formation and layout of the dolomites, sandstones, shales and sands are typical for the country and only some do contain fossil plant, insect, invertebrate and vertebrate material. The site visit and walk through in early February 2023 by palaeontologists confirmed that there are no fossils on the surface. There were no outcrops of shales that could potentially preserve fossils. It is not known what lies below the surface. The overlying soils and sands of the Quaternary period would not preserve fossils.

6. Recommendation

Based on the fossil record but confirmed by the site visit and walk through there are NO FOSSILS of any significance such as those of recognisable *Glossopteris* floral elements, even though fossils have been recorded from rocks of a similar age and type in South Africa. It is extremely unlikely that any fossils would be preserved in the overlying soils and sands of the Quaternary. There is a very small chance that fossils may occur below the ground surface in the shales of the Vryheid Formation so a Fossil Chance Find Protocol should be added to the EMPr. If fossils are found by the environmental officer, or other responsible person once excavations and drilling have commenced for the foundations for the wind turbines and related infrastructure, then they should be rescued and SAHRA notified so that a palaeontologist can be called to assess and collect a representative sample. As far as the palaeontology is concerned, the impact would be low to moderate.

7. References

Anderson, J.M., Anderson, H.M., 1985. Palaeoflora of Southern Africa: Prodromus of South African megafloras, Devonian to Lower Cretaceous. A.A. Balkema, Rotterdam.

Cadle, A.B., Cairncross, B., Christie, A.D.M., Roberts, D.L., 1993. The Karoo basin of South Africa: the type basin for the coal bearing deposits of southern Africa. International Journal of Coal Geology 23, 117-157.

Cairncross, B. 1990. Tectono-sedimentary settings and controls of the Karoo Basin Permian coals, South Africa. *International Journal of Coal Geology* **16**: 175-178.

Cairncross, B. 2001. An overview of the Permian (Karoo) coal deposits of southern Africa. *African Earth Sciences* **33**: 529–562.

Cowan, R., 1995. History of Life. 2nd Edition. Blackwell Scientific Publications, Boston. 462pp.

Isbell, J.L., Henry, L.C., Gulbranson, E.L., Limarino, C.O., Fraiser, F.L., Koch, Z.J., Ciccioli, P.l., Dineen, A.A., 2012. Glacial paradoxes during the late Paleozoic ice age: Evaluating the equilibrium line altitude as a control on glaciation. Gondwana Research 22, 1-19.

Johnson, M.R., van Vuuren, C.J., Visser, J.N.J., Cole, D.I., Wickens, H.deV., Christie, A.D.M., Roberts, D.L., Brandl, G., 2006. Sedimentary rocks of the Karoo Supergroup. In: Johnson, M.R., Anhaeusser, C.R. and Thomas, R.J., (Eds). The Geology of South Africa. Geological Society of South Africa, Johannesburg / Council for Geoscience, Pretoria. Pp 461 – 499.

Plumstead, E.P., 1969. Three thousand million years of plant life in Africa. Geological Society of southern Africa, Annexure to Volume LXXII. 72pp + 25 plates.

Snyman, C.P., 1998. Coal. In: Wilson, M.G.C., and Anhaeusser, C.P., (Eds). The Mineral Resources of South Africa: Handbook, Council for Geosciences 16, 136-205.

Taverner-Smith, R., Mason, T.R., Christie, A.D.M., Smith, A.M., van der Spuy, M., 1988. Sedimentary models for coal formation in the Vryheid Formation, northern Natal. Bulletin of the Geological Survey of South Africa, 94. 46pp.

Visser, J.N.J., 1989. The Permo-Carboniferous Dwyka Formation of southern Africa: deposition by a predominantly subpolar marine icesheet. Palaeogeography, Palaeoclimatology, Palaeoecology 70, 377-391.

8. Chance Find Protocol

Monitoring Programme for Palaeontology – to commence once the excavations / drilling activities begin.

1. The following procedure is only required if fossils are seen on the surface and when drilling/excavations commence.

2. When excavations begin the rocks and discard must be given a cursory inspection by the environmental officer or designated person. Any fossiliferous material (trace fossils, fossils of plants, insects, bone or coalified material) should be put aside in a suitably protected place. This way the project activities will not be interrupted.
3. Photographs of similar fossils must be provided to the developer to assist in recognizing the fossil plants, vertebrates, invertebrates or trace fossils in the shales and mudstones (for example see Figure 15). This information will be built into the EMP's training and awareness plan and procedures.
4. Photographs of the putative fossils can be sent to the palaeontologist for a preliminary assessment.
5. If there is any possible fossil material found by the contractor or environmental officer then a qualified palaeontologist sub-contracted for this project, should visit the site to inspect the selected material and check the dumps where feasible.
6. Fossil plants or vertebrates that are considered to be of good quality or scientific interest by the palaeontologist must be removed, catalogued and housed in a suitable institution where they can be made available for further study. Before the fossils are removed from the site a SAHRA permit must be obtained. Annual reports must be submitted to SAHRA as required by the relevant permits.
7. If no good fossil material is recovered then no site inspections by the palaeontologist will be necessary. A final report by the palaeontologist must be sent to SAHRA once the project has been completed and only if there are fossils.
8. If no fossils are found and the excavations and mining have finished then no further monitoring is required.

9. Appendix A – Examples of fossils from the Vryheid Formation

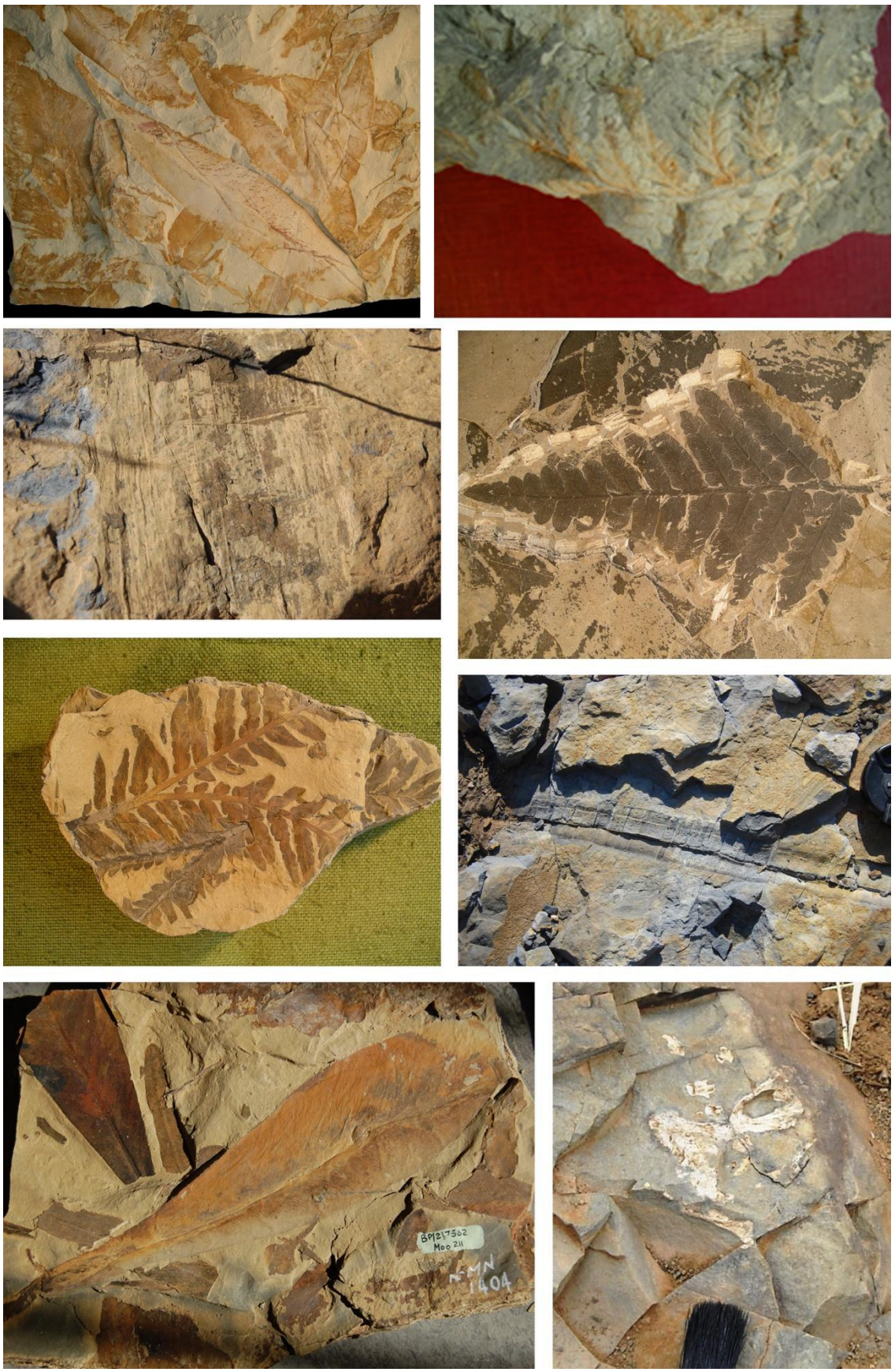

Figure 15: Photographs of fossil plants of the *Glossopteris* flora from the Vryheid formation that would be expected to occur.

10. Appendix B – Details of specialist

Marion Bamford (PhD)

Short CV for PIAs – July 2022

I) **Personal details**

Present employment: Professor; Director of the Evolutionary Studies Institute. Member Management Committee of the NRF/DST Centre of Excellence Palaeosciences, University of the Witwatersrand, Johannesburg, South Africa

Telephone : +27 11 717 6690
Fax : +27 11 717 6694
Cell : 082 555 6937
E-mail : marion.bamford@wits.ac.za ; marionbamford12@gmail.com

ii) **Academic qualifications**

Tertiary Education: All at the University of the Witwatersrand:
1980-1982: BSc, majors in Botany and Microbiology. Graduated April 1983.
1983: BSc Honours, Botany and Palaeobotany. Graduated April 1984.
1984-1986: MSc in Palaeobotany. Graduated with Distinction, November 1986.
1986-1989: PhD in Palaeobotany. Graduated in June 1990.

iii) **Professional qualifications**

Wood Anatomy Training (overseas as nothing was available in South Africa):
1994 - Service d'Anatomie des Bois, Musée Royal de l'Afrique Centrale, Tervuren, Belgium, by Roger Dechamps
1997 - Université Pierre et Marie Curie, Paris, France, by Dr Jean-Claude Koeniguer
1997 - Université Claude Bernard, Lyon, France by Prof Georges Barale, Dr Jean-Pierre Gros, and Dr Marc Philippe

iv) **Membership of professional bodies/associations**

Palaeontological Society of Southern Africa
Royal Society of Southern Africa - Fellow: 2006 onwards
Academy of Sciences of South Africa - Member: Oct 2014 onwards
International Association of Wood Anatomists - First enrolled: January 1991
International Organization of Palaeobotany – 1993+
Botanical Society of South Africa
South African Committee on Stratigraphy – Biostratigraphy - 1997 - 2016
SASQUA (South African Society for Quaternary Research) – 1997+
PAGES - 2008 –onwards: South African representative
ROCEEH / WAVE – 2008+
INQUA – PALCOMM – 2011+onwards

vii) **Supervision of Higher Degrees**

All at Wits University

Degree	Graduated/completed	Current
Honours	11	0
Masters	14	1
PhD	11	6
Postdoctoral fellows	12	2

viii) **Undergraduate teaching**
Geology II – Palaeobotany GEOL2008 – average 65 students per year
Biology III – Palaeobotany APES3029 – average 25 students per year
Honours – Evolution of Terrestrial Ecosystems; African Plio-Pleistocene Palaeoecology; Micropalaeontology – average 12 - 20 students per year.

ix) **Editing and reviewing**
Editor: Palaeontologia africana: 2003 to 2013; 2014 – Assistant editor
Guest Editor: Quaternary International: 2005 volume
Member of Board of Review: Review of Palaeobotany and Palynology: 2010 –
Associate Editor: Cretaceous Research: 2018-2020
Associate Editor: Royal Society Open: 2021 -
Review of manuscripts for ISI-listed journals: 25 local and international journals

x) **Palaeontological Impact Assessments**

Selected from recent project only – list not complete:

- Mala Mala 2017 for Henwood
- Modimolle 2017 for Green Vision
- Klipoortjie and Finaalspan 2017 for Delta BEC
- Ledjadja borrow pits 2018 for Digby Wells
- Lungile poultry farm 2018 for CTS
- Olienhout Dam 2018 for JP Celliers
- Isondlo and Kwasobabili 2018 for GCS
- Kanakies Gypsum 2018 for Cabanga
- Nababeep Copper mine 2018
- Glencore-Mbali pipeline 2018 for Digby Wells
- Remhoogte PR 2019 for A&HAS
- Bospoort Agriculture 2019 for Kudzala
- Overlooked Quarry 2019 for Cabanga
- Richards Bay Powerline 2019 for NGT
- Eilandia dam 2019 for ACO
- Eastlands Residential 2019 for HCAC
- Fairview MR 2019 for Cabanga
- Graspan project 2019 for HCAC
- Lieliefontein N&D 2019 for Enviropro
- Skeerpoort Farm Mast 2020 for HCAC
- Vulindlela Eco village 2020 for 1World
- KwaZamakhule Township 2020 for Kudzala
- Sunset Copper 2020 for Digby Wells
- McCarthy-Salene 2020 for Prescali
- VLNR Lodge 2020 for HCAC
- Madadeni mixed use 2020 for Enviropro

- Frankfort-Windfield Eskom Powerline 2020 for 1World
- Beaufort West PV Facility 2021 for ACO Associates
- Copper Sunset MR 2021 for Digby Wells
- Sannaspos PV facility 2021 for CTS Heritage
- Smithfield-Rouxville-Zastron PL 2021 for TheroServe
- Glosam Mine 2021 for AHSA

XI) **Research Output**
Publications by M K Bamford up to July 2022 peer-reviewed journals or scholarly books: over 165 articles published; 5 submitted/in press; 10 book chapters.
Scopus h-index = 30; Google Scholar h-index = 36; -i10-index = 95
Conferences: numerous presentations at local and international conferences.

Mr Frederick Tolchard
Brief Curriculum Vitae – January 2023

Academic training
BA Archaeology – University of the Witwatersrand, graduated 2015
BSc (Honours) Palaeontology – University of the Witwatersrand, 2017 with distinction
MSc Palaeontology – University of the Witwatersrand, 2018 – 2019. Graduated 2020 with Distinction
PhD Palaeontology – Wits – 2020 - current

Field Experience
Honours Fieldtrip – Karoo biostratigraphy – April 2017
Research fieldwork – Elliot Formation with Prof Choiniere – April 2018, Nov 2018; April 2019; Sept 2021

Publications
Tolchard, F., Nesbitt, S.J., Desojo, J.B., Viglietti, P.A., Butler, R.J. and Choiniere, J.N., 2019. 'Rauisuchian' material from the lower Elliot Formation of South Africa: Implications for late Triassic biogeography and biostratigraphy. Journal of African Earth Sciences, 160, 103610.

Viglietti, P.A., McPhee, B.W., Bordy, E.M., Sciscio, L., Barrett, P.M., Benson, R.B.J., Wills, F., Tolchard, F., Choiniere, J.N., 2020. Biostratigraphy of the Scalenodontoides Assemblage Zone (Stormberg Group, Karoo Supergroup), South Africa. South African Journal of Geology 123, 239-248.

Tolchard F., Kammerer C., Butler R.J., Abdala F., Hendrickx C., Benoit J., Choinière J.N. (2021.) A very large new trirachodontid from the Triassic of South Africa and its implications for Gondwanan biostratigraphy. Journal of Vertebrate Paleontology. DOI: 10.1080/02724634.2021.1929265.

PIA fieldwork projects
2018 May – Williston area – SARAO project, Digby Wells
2018 September – Lichtenburg PVs – CTS Heritage
2018 November – Nomalanga farming – Digby Wells
2019 January – Thubelisha coal – Digby Wells
2019 March – Matla coal – Digby Wells

2019 March – Musina-Machado SEZ – Digby Wells
2019 June – Temo coal – Digby Wells
2019 September – Makapanstad Agripark – Plantago
2020 January – Hendrina, Kwazamakuhle – Kudzala
2020 February – Hartebeestpoort Dam - Prescali
2020 March – Twyfelaar Coal mine – Digby Wells
2020 March – Ceres Borrow Pits – ACO Associates
2020 March – Copper Sunset Sand – Digby Wells
2020 October – Belfast loop and Expansion – Nsovo
2020 October – VLNR lodge Mapungubwe – HCAC
2020 November – Delmore Park BWSS - HCAC
2020 December – Kromdraai commercial – HCAC
2021 January – Welgedacht Siding – Elemental Sustainability
2021 March – Shango Kroonstad – Digby Wells
2021 May – Copper Sunset sand mining – Digby Wells
2021 August – New Largo Pit – Golder
2021 August – Khutsong Ext 8 housing, Carletonville, for Afzelia
2021 September – Lichtenburg PV facility – CTS Heritage
2021 October – Ogies South MR – beyondgreen
2021 October – Nooitgedacht Colliery MR – Shangoni
2022 January – Sigma PVs Sasolburg – CTS Heritage
2022 March – Taaibosch Puts PVs – CTS Heritage
2022 March – Modder East Operations – Prime Resources
2022 March – Driefontein mine revised infrastructure – Amber Earth
2022 March – Transnet MPP Access routes, inland and coastal - ENVASS
2022 June – Roodepoort MRA, Rietspruit – Eco-Elementum
2022 July – Highveld Colliery for Eco-Elementum
2022 July – Doornrug and Kleinwater Collieries for Eco-Elementum
2022 November – Kendal Plots, Ogies, for Amber Earth
2022 November – Boschmanspoort, Hendrina for Eco-Elementum
2022 December – Newcastle Coal for Cabanga Environmental
2023 January – Virginia SEFs x 4 for AGES Limpopo (Pty) Ltd

Brandon Stuart CV
January 2023

After completing my BSc degree majoring in Zoology and Genetics in 2019, in 2020 I enrolled and completed a BSc Honours degree majoring in Zoology and specializing in Paleontology. My Honours research project was focused on describing the postcranial anatomy of the therocephalian *Moschorhinus kitchingi,* supervised by Dr. Jennifer Botha at the National Museum, Bloemfontein.

I have just completed my Masters degree at the University of the Free State for in Palaeobiology (awaiting examiners' reports). I carried out my research through the National Museum, Bloemfontein supervised by Dr. Jennifer Botha. My research is focused on studying the postcranial morphology of therocephalian therapsids from the Karoo Basin of South Africa. In February 2023, I will register for a doctoral degree at the University of the Witwatersrand, in the Evolutionary Studies Institute and will be supervised by Prof Botha and Prof Jonah Choiniere.

Qualifications
BSc – Majors: Genetics and Geology - University of the Free State – 2019
BSc Honours – Palaeontology – University of the Free State – 2020
MSc – Palaeontology – University of the Free State – registered 2021, submitted for examination.
PhD – Palaeontology – University of the Witwatersrand – Feb 2023 onwards.

PIA Fieldwork Experience
July 2021 – Sannaspos SEF, Free State, for CTS Heritage
October 2021 – Beatrix Mine-Theunissen Eskom Powerline for 1World
January 2022 – Fouriesburg residential development for Mang Geoenviron-mental
February 2022 – Balkfontein-Doornhoek 11 kV powerline for 1World
March 2022 – Transnet MPP Access routes, inland and coastal for ENVASS
June 2022 – Koria-Boesmanshoek 22 kV powerline for 1World
January 2023 – Virginia SEFs x 4 Phase 2 for AGES Limpopo (Pty) Ltd.

References:
Dr Jennifer Botha, Head of Palaeontology, National Museum, Bloemfontein
jbotha@nasmus.ac.za

Prof Jonah Choiniere, Evolutionary Studies Institute, University of the Witwatersrand, Johannesburg
Jonah.choiniere@wits.ac.za

CTS HERITAGE

APPENDIX 3: Heritage Screening Assessment

CTS HERITAGE

HERITAGE SCREENER

CTS Reference Number:	**CTS22_324**
SAHRIS Reference:	
Client:	**SiVEST**
Date:	**January 2023**
Title:	**Ujekamanzi WEF**

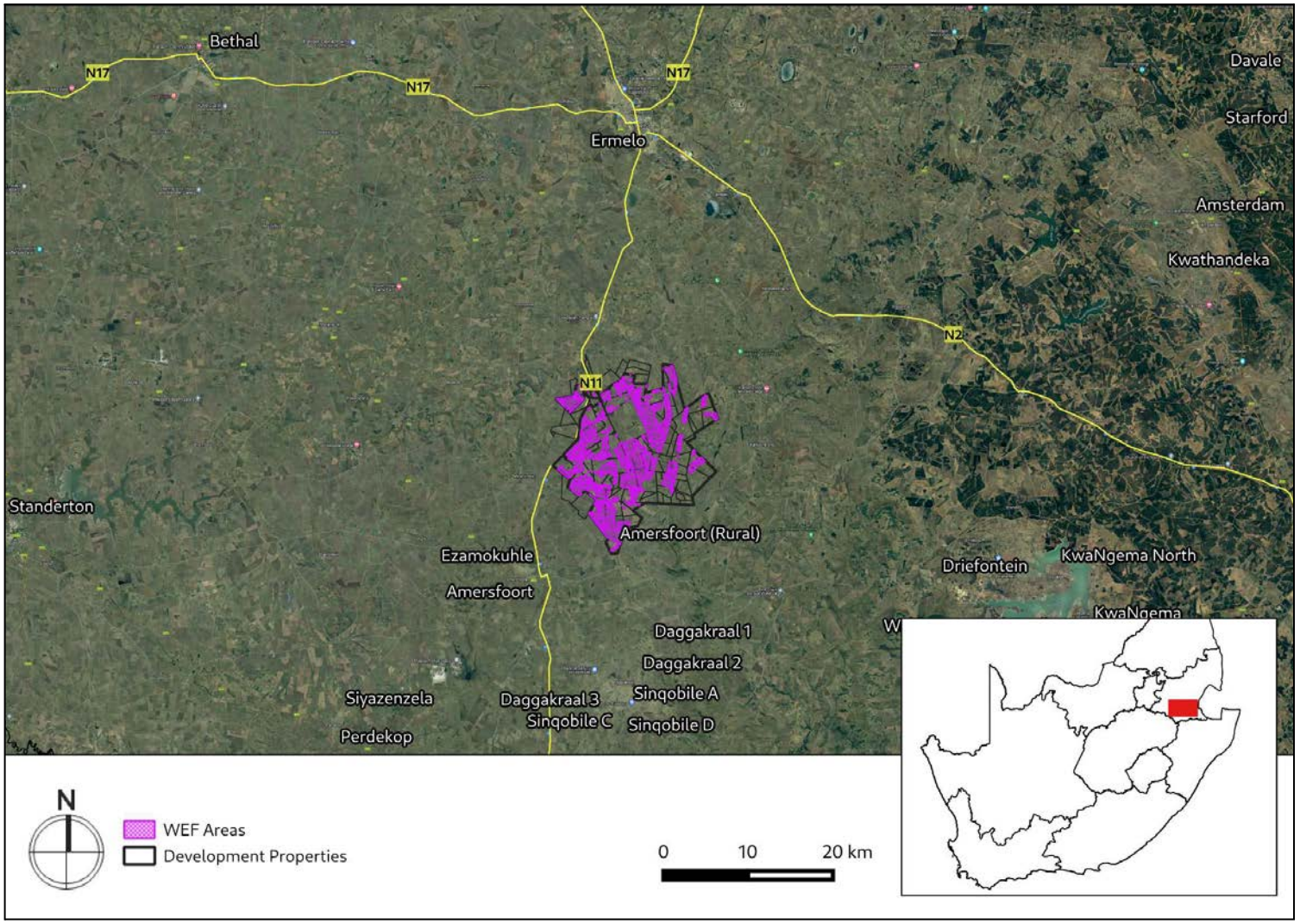

Figure 1a. Satellite map indicating the location of the proposed development in the Mpumalanga Province

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CTS HERITAGE

1. Proposed Development Summary

ABO Wind renewable energies (Pty) Ltd is proposing to develop a renewable energy cluster, located south of Ermelo in the Mpumalanga Province. The cluster is collectively referred to as “ABO Wind Ujekamanzi Wind Energy Facilities”, consisting of 2 x Wind Energy Facilities (WEF’s) and associated Electrical Grid Infrastructure (EGI): A Main Transmission Substation (MTS) and a Loop-In-Loop-Out (LILO) for the grid connection. There is a possibility of the inclusion of solar photovoltaic (PV) facilities, depending on the baseline “opportunities and constraints” findings. However, this is not included in the scope of work at this stage.

According to the results of the DFFE Screening Tool, the area proposed for development has LOW sensitivity for impacts to archaeology and cultural heritage and VERY HIGH sensitivity for impacts to palaeontology.

2. Application References

Name of relevant heritage authority(s)	SAHRA
Name of decision making authority(s)	DFFE

3. Property Information

Latitude / Longitude	
Local Municipality	Govan Mbeki
District Municipality	Gert Sibande
Province	Mpumalanga
Current Use	Agricultural
Current Zoning	Agricultural

4. Nature of the Proposed Development

Total Area	
Depth of excavation (m)	

Height of development (m)	

5. Category of Development

x	**Triggers: Section 38(8) of the National Heritage Resources Act**
	Triggers: Section 38(1) of the National Heritage Resources Act
	1. Construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier over 300m in length.
	2. Construction of a bridge or similar structure exceeding 50m in length.
	3. Any development or activity that will change the character of a site-
x	a) exceeding 5 000m^2 in extent
	b) involving three or more existing erven or subdivisions thereof
	c) involving three or more erven or divisions thereof which have been consolidated within the past five years
	4. Rezoning of a site exceeding 10 000m^2
	5. Other (state):

6. Additional Infrastructure Required for this Development

See project description

7. Mapping (please see Appendix 3 and 4 for a full description of our methodology and map legends)

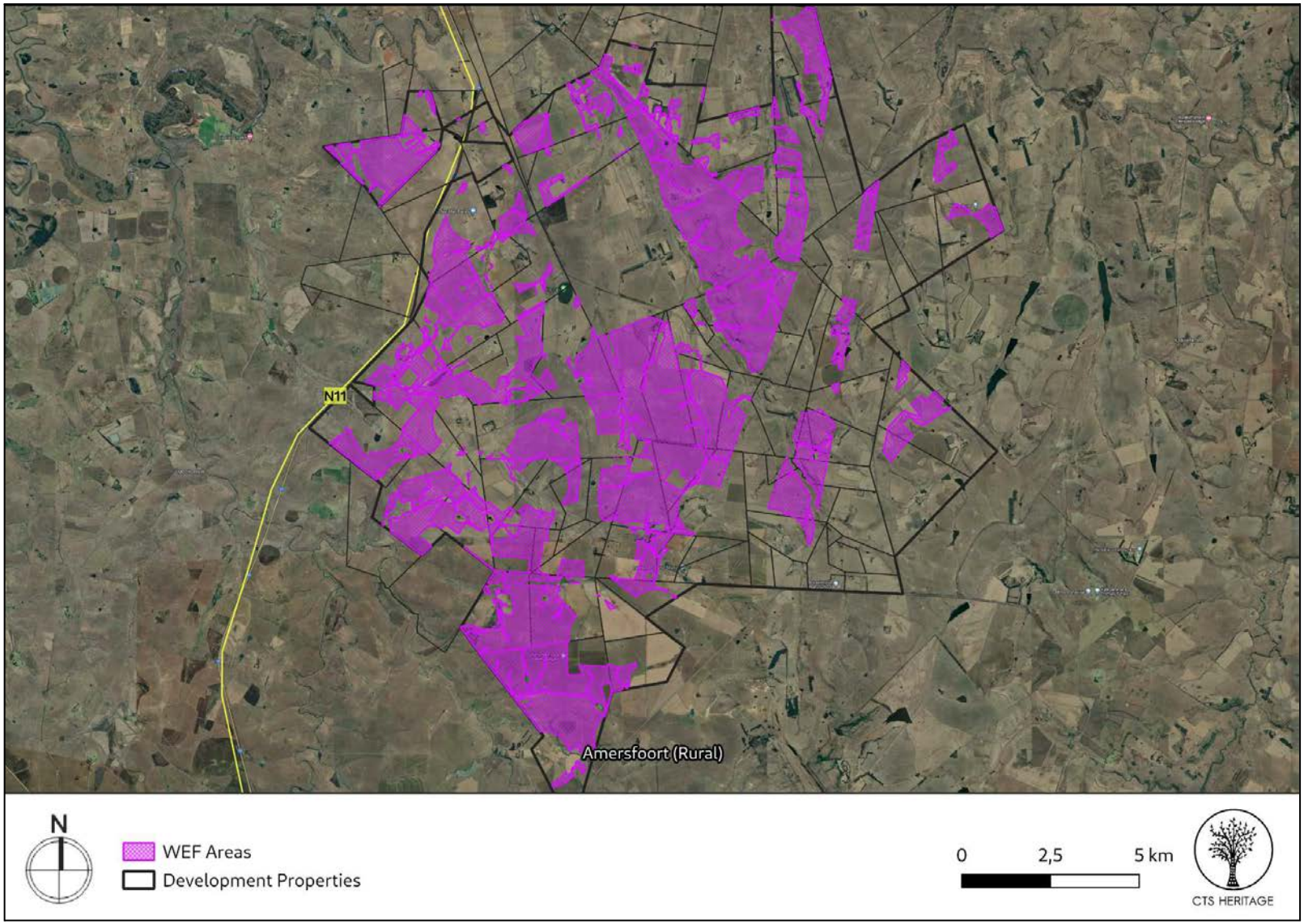

Figure 1b. Overview Map. Satellite image (2022) indicating the proposed development area

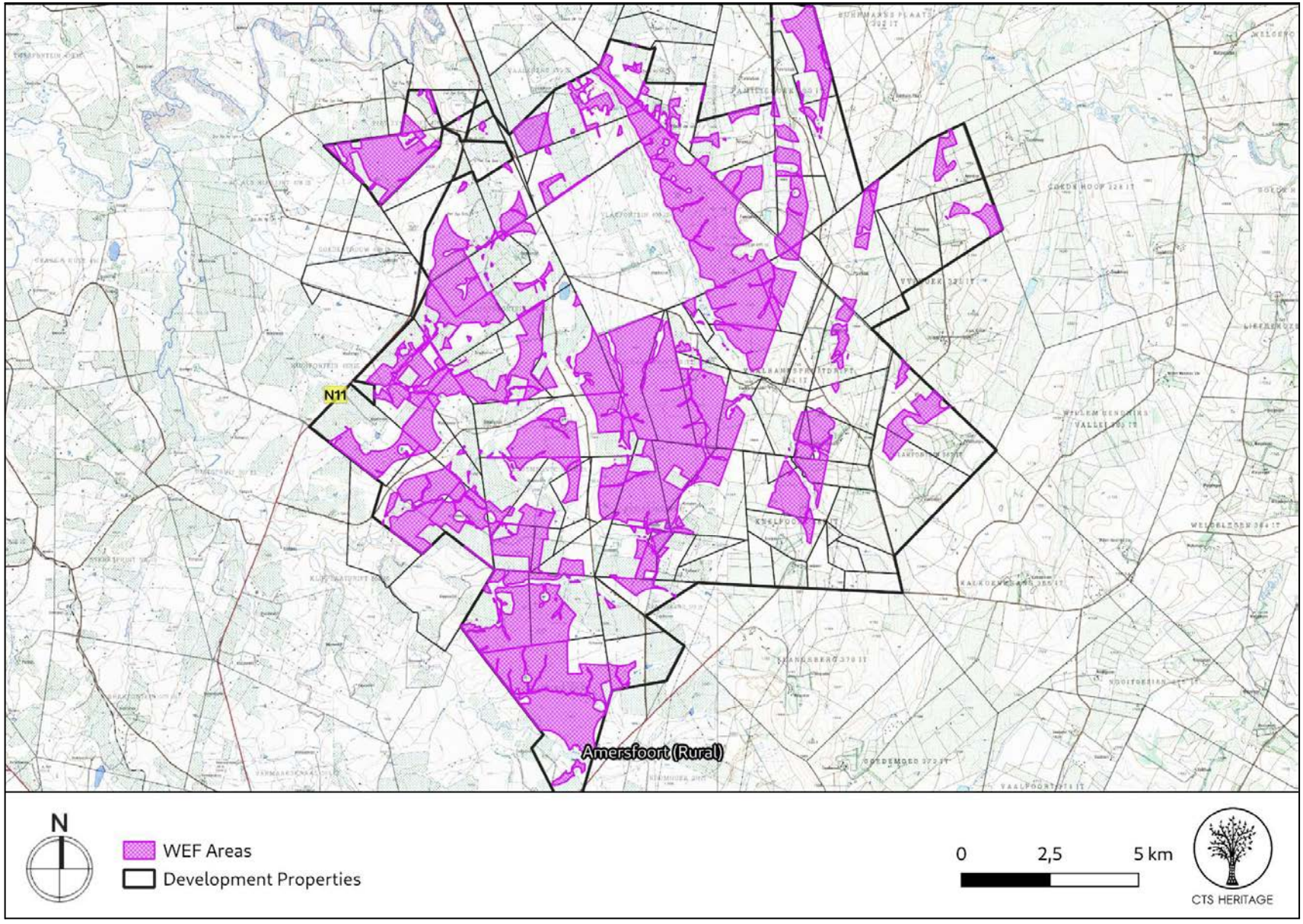

Figure 1c. Overview Map. 1:50 000 Topo Map indicating the proposed development area

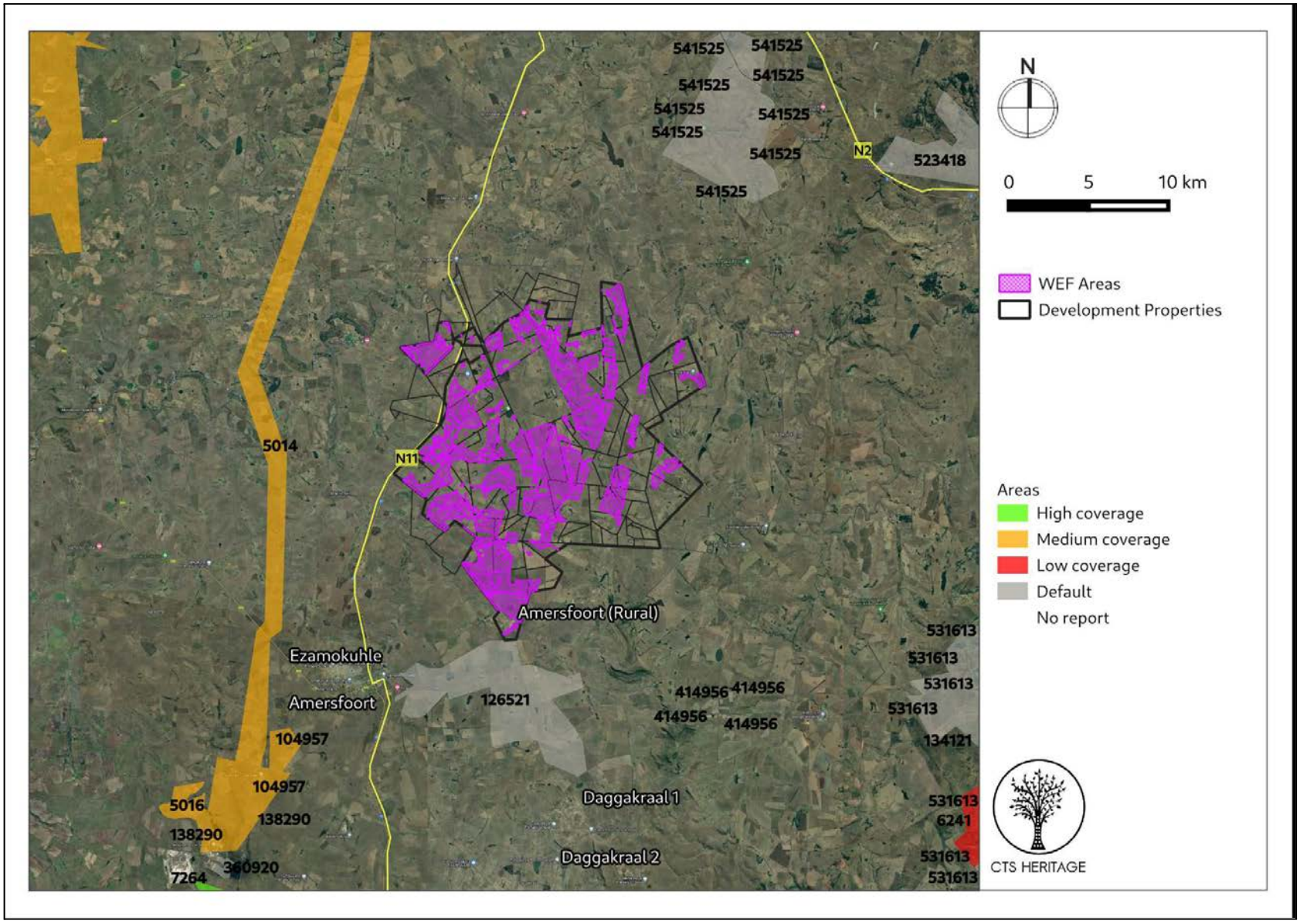

Figure 2a. Previous HIAs Map. Previous Heritage Impact Assessments covering the proposed development area with SAHRIS NIDS indicated. Please see Appendix 2 for a full reference list.

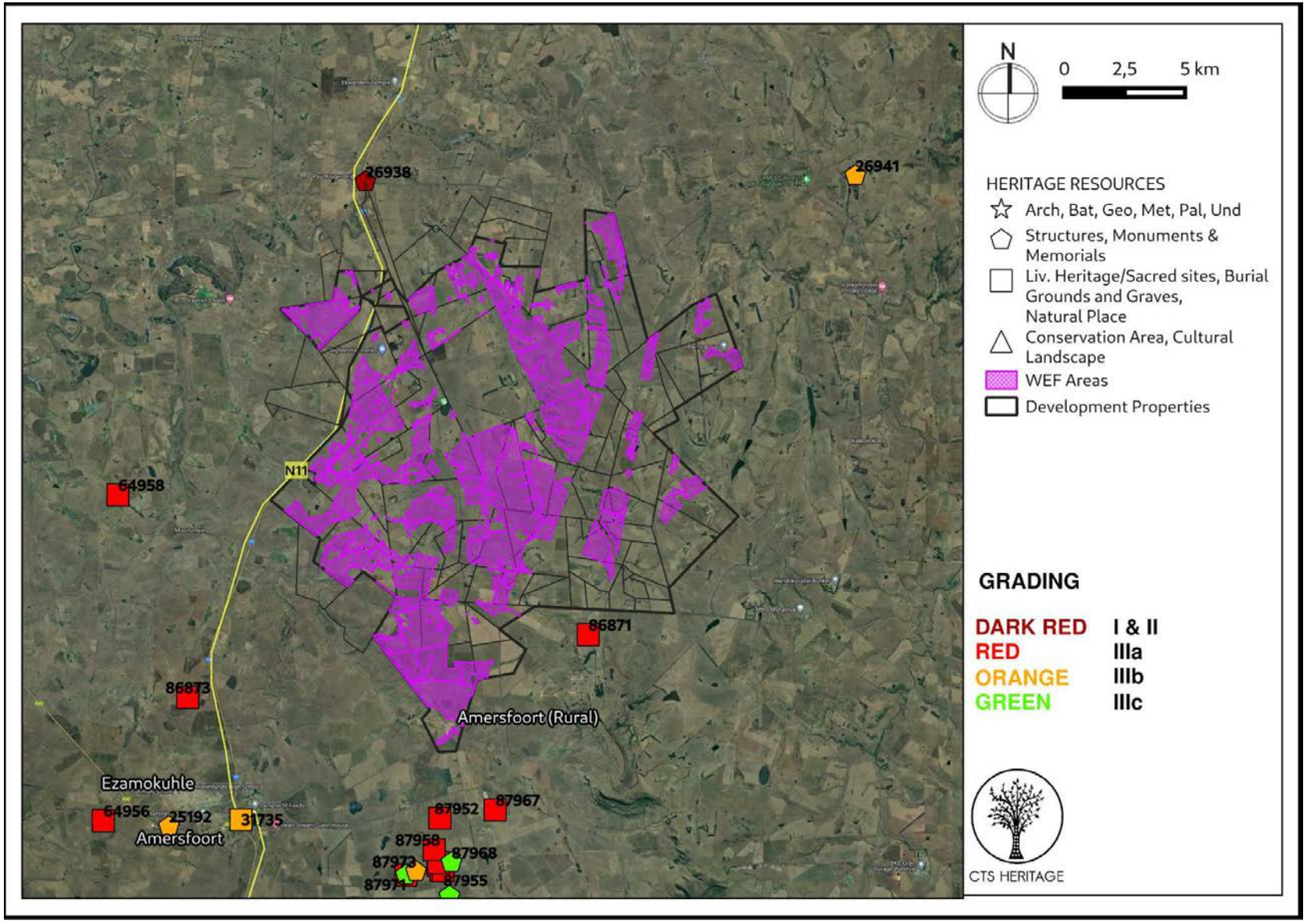

Figure 3. Heritage Resources Map. Heritage Resources previously identified within the study area, with SAHRIS Site IDs indicated in the insets below. Please See Appendix 4 for a full description of heritage resource types.

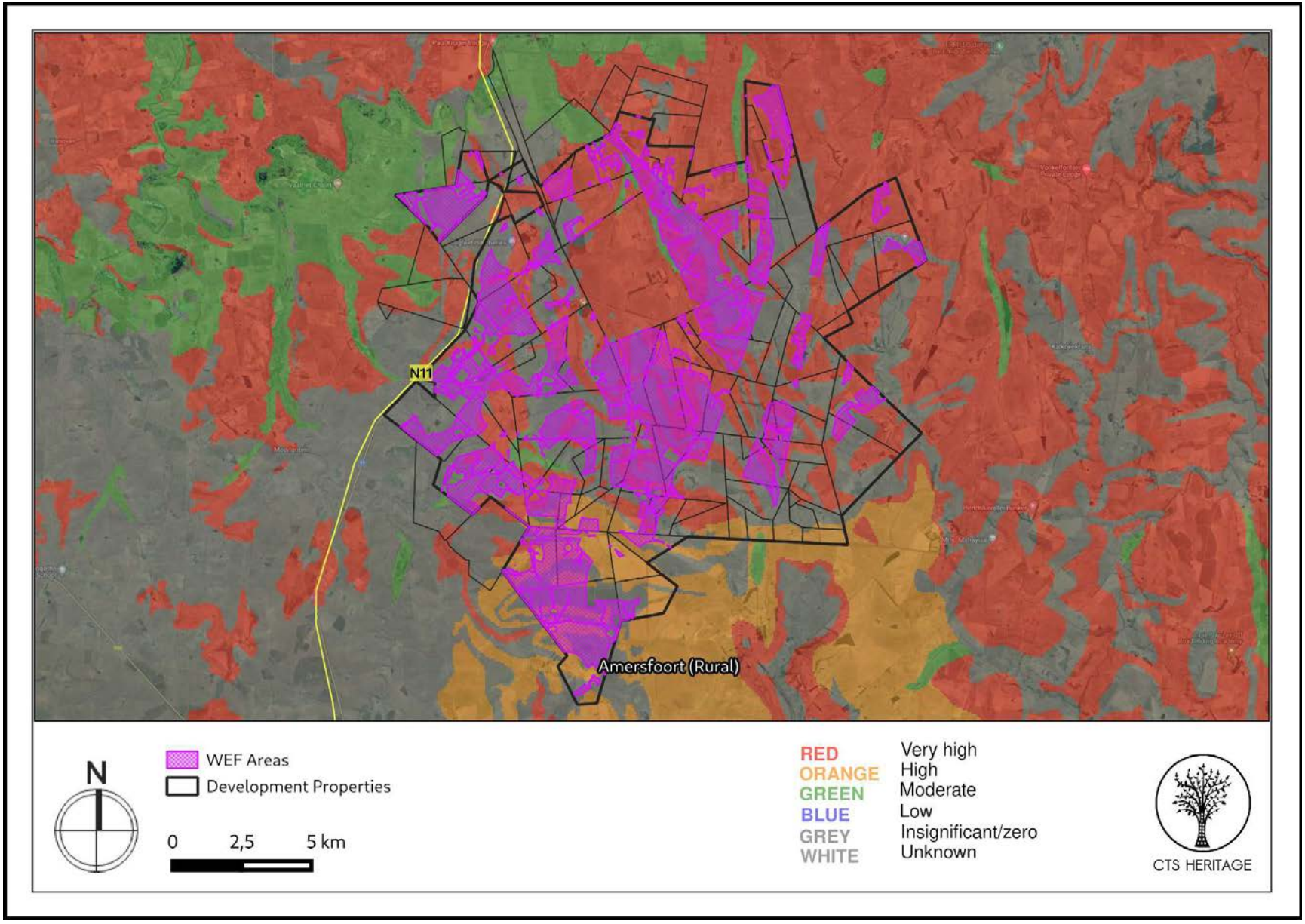

Figure 4a. Palaeosensitivity Map. Indicating fossil sensitivity underlying the study area. Please See Appendix 3 for a full guide to the legend.

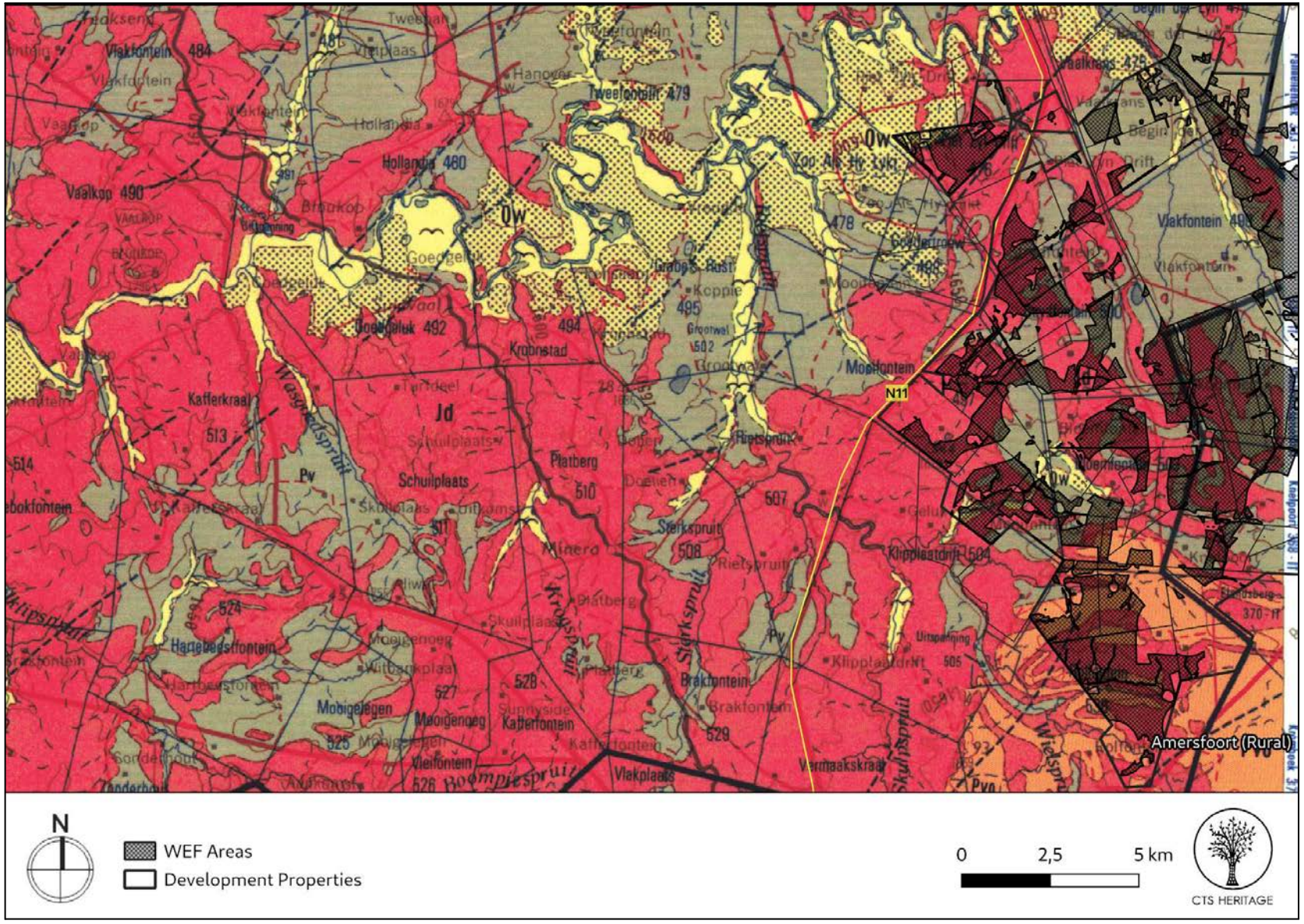

Figure 4b. Geology Map. Extract from the CGS 2628 East Rand Map indicating that the development area for the REF development is underlain by sediments of Pv: Vryheid Formation of the Ecca Group and Jd: Jurassic Dolerite as well as the Pvo: Volkrust Formation and Quaternary Sands

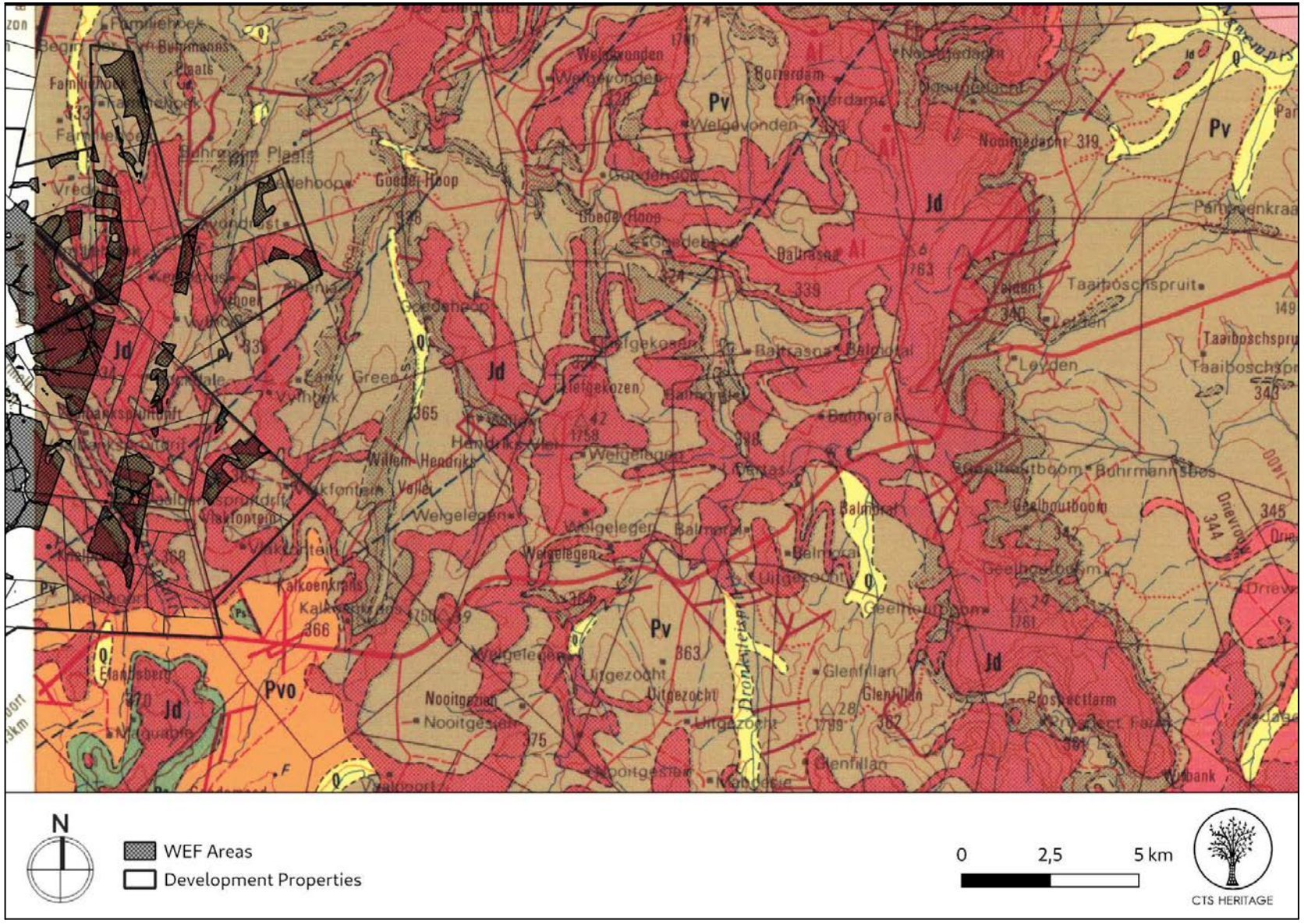

Figure 4c. Geology Map. Extract from the CGS 2630 Mbabane Map indicating that the development area for the REF development is underlain by sediments of Pv: Vryheid Formation of the Ecca Group and Jd: Jurassic Dolerite as well as the Pvo: Volkrust Formation and Quaternary Sands

8. Heritage Assessment

The area proposed for this Renewable Energy Development is located immediately in between Ermelo and Amersfoort in Mpumalanga This area is known for its rolling hills and extensive coal mine infrastructure.

Cultural Landscape

Van Vollenhoven (2015) described the broader assessment area in his assessment completed for a de-stoning plan located nearby. Van Vollenhoven (2015) describes the environment as "disturbed by recent human activities, mainly agriculture. This consists of maize fields. Other disturbance visible is mining infrastructure…, a railway track… and power lines... Signs of old fields were also present which could be seen in the pioneer plant species consisting of weeds and grass. Almost half of the surveyed area consists of natural grassland. The vegetation cover varies between short and long grass... The topography of the area forms part of the rolling hills of the surrounding landscape."

Van Vollenhoven (2015) notes that "At the beginning of the 19th century the Phuthing, a South Sotho group, stayed in the vicinity of modern day Bethal. During the Difaquane they fled to the south (Bergh 1999: 10-11; 109). In 1829 the traveller Robert Scoon passed through an area to the north of Bethal (Bergh 1999: 13). The first white farmers only settled here during the late 1850's. By the 1890's this area was inhabited by many white farmers (Bergh 1999: 18-20). The town of Standerton was established in 1879 although it already was a district in 1878. Bethal was established in 1880 and it became an independent district in 1898 (Bergh 1999: 20-21). During the Anglo-Transvaal War (1880-1881) the British garrison in Standerton was beleaguered by the Boer forces (Bergh 1999: 46). The Highveld areas also saw much action consisting of various skirmishes between Boer and Brit during the Anglo-Boer War (1899-1902). It includes skirmishes on the farms Oshoek (4 December 1901), Trigaardsfontein (10 December 1901), Witbank (11 January 1902) and Nelspan (26 January 1902) (Bergh 1999: 51, 54)... At Standerton there was both a concentration camp for white and for black people (Bergh 1999: 54)."

This brief history points to the layered cultural landscape that is present in this area. Due to the scale of the proposed development, it is likely to change the sense of place associated with this landscape, and may impact the way that this historic landscape reads by obscuring layers of the past. Cognisance must be taken of this unique cultural landscape, consisting of farm werfs etc in the proposed layout.

Archaeology

None of the area proposed for development has been previously assessed in any heritage impact assessment process. Heritage Impact Assessments have been completed nearby for projects in Secunda and these can be used to infer the archaeological sensitivity in the development area. Van Vollenhoven (2015) notes that the geographical area around the towns of Standerton and Bethal is not known to conserve Stone Age archaeology. He notes that "No such sites are indicated on maps contained in a historical atlas of this area (Bergh 1999: 4-5). However this may only be since no research has actually been done in this area. The closest known Stone Age occurrences are a Late Stone Age site at the town of Ermelo and rock art sites far to the west of Standerton (Bergh 1999: 4-5)." Van Vollenhoven (2015) noted no natural shelters during the survey; however, the good vegetation in the surrounding area and the rivers indicate that ample grazing and water may have been available, making it a prime spot for hunting in the past. Therefore one may assume that Stone Age people probably would have moved through the area. Late Iron Age sites are found in a large area around the towns of Bethal and Standerton and number at least 585 such sites.

In the heritage assessment of a powerline upgrade at the nearby Syferfontein Mine, Nel & Karodia (2013), noted that "*a heritage assessment was conducted in 2000 by the National Cultural History Museum and included in the Syferfontein Mine EMP in 2010. During the survey, a few Stone Age artefacts were identified. These artefacts were not considered to have any primary context and therefore were interpreted to have low significance value. No Early Iron Age sites were identified. The Late Iron Age sites found here conform to those identified in the literature for the Southern Highveld area (former southern Transvaal, northern Orange Free State) as Type V sites. As the soil is mostly turf, Iron Age settlement usually took place on the various dolerite outcrops. The added benefit of choosing these locations was that it was located at the source of building material used in constructing the settlements. One such site shows interesting features as the living units were actually excavated to obtain enough building material for the surrounding walls. A few of the farmsteads dating to early part of this century were identified as possibly having historical-architectural significance. A number of abandoned homesteads are located in the areas that were*

investigated. These seem to belong to farm labourers and were all abandoned within the last few years. They are therefore not viewed to be of cultural or historical significance. However, some graves are located in the vicinity of the homesteads and it is possible that more graves will be located nearby".

In a recent HIA completed for a nearby WEF completed by CTS Heritage, it was noted that "Even though the area is rich in history, no significant archaeological heritage resources were identified during the field assessment. No Stone Age or Iron Age heritage resources were identified during the survey. The few heritage resources that were identified consist of the ruins of older farm structures and kraals." None of the sites identified in the assessment referenced are located within or near the development area, however the text provides a good assessment of resources that may be present. It is clear that the development area has not previously been assessed. It is therefore possible that the proposed development will impact negatively on archaeological resources associated with the Late Iron Age, burial grounds and graves as well as stone age archaeological resources. Further investigation of the archaeological significance of the development area is recommended.

Palaeontology

According to the SAHRIS Palaeosensitivity Map, the area proposed for development is underlain by sediments of zero, high and very high palaeontological sensitivity (Figure 4a). According to the extract from the Council of Science Map for East Rand 2628 (Figure 4b), the very highly palaeontologically sensitive geology of the area is ascribed to the Vryheid Formation of the Ecca Group of sediments and the highly sensitive geology is ascribed to the Volksrust Formation.

Groenewald (2014, SAHRIS NID 167013) completed a field-based palaeontological assessment for the Waaihoek WEF in which he interrogates the palaeontological sensitivity of this formation. In this assessment, Groenewald (2014) notes that "The Vryheid Formation consists of interbedded very coarse-grained sandstone and mudstone that yields plant and trace fossils as well as some prominent coal seams." In this assessment, Groenewald (2014) made the following recommendations for the WEF development within the Vryheid Formation "The PEA and CEO be made aware of the possibility of finding fossils in the Vryheid and Volksrust Formation sediments during excavation of the foundations for the turbines and other infrastructure. A professional palaeontologist is appointed to monitor possible palaeontological finds during excavation of turbine foundations and infrastructure where turbine positions and infrastructure fall on Vryheid and Volksrust Formation sediments." In a PIA completed for a nearby WEF, it is noted in relation to the Vryheid Formation that "The potential for rare, unrecorded fossil sites of high scientific and/or conservation value is very high in the areas proposed for development located within the Vryheid Formation and where excavation depth will exceed 1.5m."

According to the SAHRIS Fossil Heritage Browser, the Volksrust Formation is known to conserve "Trace Fossils, rare temnospondyl amphibian remains, invertebrates (bivalves, insects), minor coals with plant remains, petrified wood, organic microfossils (acritarchs), low-diversity marine to non-marine trace fossil assemblages" The sediments underlying the development area have high and very high levels of palaeontological sensitivity, the nature of the excavations associated with Renewable Energy facilities tends to be deep and as such, the likelihood of impacting intact Vryheid Formation sediments is high. Further investigation of the palaeontological sensitivity of the development area is recommended.

9. Scoping Assessment

Impact Destruction of significant heritage resources			
Issue	**Nature of Impact**	**Extent of Impact**	**No-go Areas**
Destruction of archaeological heritage	Direct impact to archaeological heritage of scientific significance	Within project boundary	None identified at this stage
Destruction of palaeontological heritage	Direct impact to palaeontological heritage of scientific significance	Within project boundary	None identified at this stage
Negative impact to significant cultural landscapes	Indirect impact to significant cultural landscapes and cultural landscape elements including historic farm werfs	Regional	Buffer areas identified around farm werfs - 1km recommended
Description of expected significance of impact Field assessment will determine the significance of the resources likely to be impacted. Impacts can be minimised through the implementation of appropriate mitigation measures.			
Gaps in knowledge & recommendations for further study The project area and the area more broadly have not been subjected to many heritage impact assessments and therefore substantial gaps in knowledge exist. Field assessment will fill these gaps.			
Recommendations with regards to general field surveys Archaeological field surveys must provide sufficient ground-coverage of the areas to be developed to be able to determine the nature of the resources likely to be impacted. Palaeontological and cultural landscape field surveys will target sensitive geological and cultural landscape features.			

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APPENDIX 1

List of heritage resources within close proximity to the development area

Site ID	Site no	Full Site Name	Site Type	Grading
26941	9/2/222/0006	De Emigratie, Ermelo District	Building	Grade IIIb
26938	9/2/222/0008	Begin-der-Lijn Bridge, Vaal River, Ermelo District	Bridge	Grade II
25192	Portion 1 of Erf 130	Standard Bank Amersfoort	Structures	Grade IIIb
87953	XSTRA002	Xstrata Amersfoort 002	Burial Grounds & Graves	Grade IIIa
87954	XSTRA003	Xstrata Amersfoort 003	Burial Grounds & Graves	Grade IIIa
87955	XSTRA004	Xstrata Amersfoort 004	Burial Grounds & Graves	Grade IIIa
87956	XSTRA005	Xstrata Amersfoort 005	Burial Grounds & Graves	Grade IIIa
87957	XSTRA006	Xstrata Amersfoort 006	Burial Grounds & Graves	Grade IIIa
87958	XSTRA007	Xstrata Amersfoort 007	Burial Grounds & Graves	Grade IIIa
87959	XSTRA008	Xstrata Amersfoort 008	Burial Grounds & Graves	Grade IIIa
45771	ROODK16	Roodekopjes 16	Burial Grounds & Graves	Grade IIIa
87952	XSTRA001	Xstrata Amersfoort 001	Burial Grounds & Graves	Grade IIIa
87967	XSTRA011	Xstrata Amersfoort 011	Burial Grounds & Graves	Grade IIIa
87969	XSTRA013	Xstrata Amersfoort 013	Structures	Grade IIIc
87970	XSTRA014	Xstrata Amersfoort 014	Structures	Grade IIIc
87971	XSTRA015	Xstrata Amersfoort 015	Structures	Grade IIIc

87973	XSTRA017	Xstrata Amersfoort 017	Structures	Grade IIIb
87974	XSTRA018	Xstrata Amersfoort 018	Structures	Grade IIIc
85062	Leiden002	Leiden Heritage Scoping Report 002	Rock Art	Grade IIIb
85063	Leiden003	Leiden Heritage Scoping Report 003	Structures	Grade IIIb
87975	XSTRA019	Xstrata Amersfoort 019	Structures	Grade IIIc
87976	XSTRA020	Xstrata Amersfoort 020	Structures	Grade IIIc
85065	Leiden005	Leiden Heritage Scoping Report 005	Burial Grounds & Graves	Grade IIIa
85066	Leiden006	Leiden Heritage Scoping Report 006	Burial Grounds & Graves	Grade IIIa
85067	Leiden007	Leiden Heritage Scoping Report 007	Burial Grounds & Graves	Grade IIIa
85068	Leiden008	Leiden Heritage Scoping Report 008	Burial Grounds & Graves	Grade IIIa
87968	XSTRA012	Xstrata Amersfoort 012	Structures	Grade IIIc
86871	MAJ007	MAJUBA 007	Burial Grounds & Graves	Grade IIIa
86873	MAJ009	MAJUBA 009	Burial Grounds & Graves	Grade IIIa
64956	MAJ001	MAJUBA 001	Burial Grounds & Graves	Grade IIIa
64958	MAJ002	MAJUBA 002	Burial Grounds & Graves	Grade IIIa
31735	Majuba 1	Majuba Graves	Burial Grounds & Graves	Grade IIIb
105810	Transvalia 1/444	Paardekop Test Excavations on Portion 1 on the Farm Transvalia 444, Mpumalanga	Burial Grounds & Graves	
139150	2729BB/ Mining/ Farm Roodekopjes/ Site No.16	Farm cemetery, Amersfoort	Burial Grounds & Graves	Grade IIIa

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APPENDIX 2

Reference List with relevant AIAs and PIAs

Heritage Impact Assessments				
Nid	**Report Type**	**Author/s**	**Date**	**Title**
104957	PIA Phase 1	Marion Bamford	30/11/2012	Palaeontological Impact Assessment for Majuba Underground Coal Gasification Project, Mpumalanga Phase 1 Report
126521	Heritage Impact Assessment Specialist Reports	Mamoluoane Seliane	30/06/2013	Xstrata Amersfoort Mine: Phase 1 Cultural Heritage Impact Assessment
134121	HIA Phase 1	Johan Nel	01/05/2013	Heritage Impact Assessment Report: Proposed Kangra Coal Kusipongo Resource Expansion Project, Mpumalanga
138290	HIA Phase 1	Johnny Van Schalkwyk	01/12/2012	HERITAGE ASSESSMENT REPORT FOR THE UNDERGROUND COAL GASIFICATION PROJECT AND ASSOCIATED INFRASTRUCTURE IN SUPPORT OF CO-FIRING OF GAS AT THE MAJUBA POWER STATION, AMERSFOORT, MPUMALANGA
162749	Heritage Scoping	Polke Birkholtz	15/10/2013	Mashala Resources Leiden Colliery Project Heritage Study: Scoping Level Report
174410	HIA Phase 1	Anton van Vollenhoven	01/10/2013	Heritage Impact Assessment for the proposed consturction of a poultry abattoir located in Amersfoort, Mpumalanga
175506	HIA Phase 1			
185959	PIA Phase 1	Dr. Heidi Fourie	12/12/2014	Palaeontological Study for the proposed poultry abattoir located in Amersfoort, Mpumalanga
5014	AIA Phase 1	Julius CC Pistorius	01/06/2007	A Phase 1 Heritage Impact Assessment Study for the Proposed New 88 kV Power Line Running from the Majuba Power Station near Amersfoort to the Camden Power Station near Ermelo in the Mpumalanga Province

5016	AIA Phase 1	Johnny Van Schalkwyk	01/12/2007	Heritage Scoping Report for the Proposed Majuba CCGT Power Plant, Amersfoort Magisterial District, Mpumalanga
6241	AIA Phase 1	Thomas Huffman, R Steel	31/07/1995	Archaeological Survey of Balgarthan Colliery

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APPENDIX 3 - Keys/Guides

Key/Guide to Acronyms

AIA	Archaeological Impact Assessment
DARD	Department of Agriculture and Rural Development (KwaZulu-Natal)
DEA	Department of Environmental Affairs (National)
DEADP	Department of Environmental Affairs and Development Planning (Western Cape)
DEDEAT	Department of Economic Development, Environmental Affairs and Tourism (Eastern Cape)
DEDECT	Department of Economic Development, Environment, Conservation and Tourism (North West)
DEDT	Department of Economic Development and Tourism (Mpumalanga)
DEDTEA	Department of economic Development, Tourism and Environmental Affairs (Free State)
DENC	Department of Environment and Nature Conservation (Northern Cape)
DMR	Department of Mineral Resources (National)
GDARD	Gauteng Department of Agriculture and Rural Development (Gauteng)
HIA	Heritage Impact Assessment
LEDET	Department of Economic Development, Environment and Tourism (Limpopo)
MPRDA	Mineral and Petroleum Resources Development Act, no 28 of 2002
NEMA	National Environmental Management Act, no 107 of 1998
NHRA	National Heritage Resources Act, no 25 of 1999
PIA	Palaeontological Impact Assessment
SAHRA	South African Heritage Resources Agency
SAHRIS	South African Heritage Resources Information System
VIA	Visual Impact Assessment

Full guide to Palaeosensitivity Map legend

	RED:	VERY HIGH - field assessment and protocol for finds is required
	ORANGE/YELLOW:	HIGH - desktop study is required and based on the outcome of the desktop study, a field assessment is likely
	GREEN:	MODERATE - desktop study is required
	BLUE/PURPLE:	LOW - no palaeontological studies are required however a protocol for chance finds is required
	GREY:	INSIGNIFICANT/ZERO - no palaeontological studies are required
	WHITE/CLEAR:	UNKNOWN - these areas will require a minimum of a desktop study.

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APPENDIX 4 - Methodology

The Heritage Screener summarises the heritage impact assessments and studies previously undertaken within the area of the proposed development and its surroundings. Heritage resources identified in these reports are assessed by our team during the screening process.

The heritage resources will be described both in terms of **type**:

- Group 1: Archaeological, Underwater, Palaeontological and Geological sites, Meteorites, and Battlefields
- Group 2: Structures, Monuments and Memorials
- Group 3: Burial Grounds and Graves, Living Heritage, Sacred and Natural sites
- Group 4: Cultural Landscapes, Conservation Areas and Scenic routes

and **significance** (Grade I, II, IIIa, b or c, ungraded), as determined by the author of the original heritage impact assessment report or by formal grading and/or protection by the heritage authorities.

Sites identified and mapped during research projects will also be considered.

DETERMINATION OF THE EXTENT OF THE INCLUSION ZONE TO BE TAKEN INTO CONSIDERATION

The extent of the inclusion zone to be considered for the Heritage Screener will be determined by CTS based on:

- the size of the development,
- the number and outcome of previous surveys existing in the area
- the potential cumulative impact of the application.

The inclusion zone will be considered as the region within a maximum distance of 50 km from the boundary of the proposed development.

DETERMINATION OF THE PALAEONTOLOGICAL SENSITIVITY

The possible impact of the proposed development on palaeontological resources is gauged by:

- reviewing the fossil sensitivity maps available on the South African Heritage Resources Information System (SAHRIS)
- considering the nature of the proposed development
- when available, taking information provided by the applicant related to the geological background of the area into account

DETERMINATION OF THE COVERAGE RATING ASCRIBED TO A REPORT POLYGON

Each report assessed for the compilation of the Heritage Screener is colour-coded according to the level of coverage accomplished. The extent of the surveyed coverage is labeled in three categories, namely low, medium and high. In most instances the extent of the map corresponds to the extent of the development for which the specific report was undertaken.

Low coverage will be used for:

- desktop studies where no field assessment of the area was undertaken;
- reports where the sites are listed and described but no GPS coordinates were provided.
- older reports with GPS coordinates with low accuracy ratings;
- reports where the entire property was mapped, but only a small/limited area was surveyed.
- uploads on the National Inventory which are not properly mapped.

Medium coverage will be used for

- reports for which a field survey was undertaken but the area was not extensively covered. This may apply to instances where some impediments did not allow for full coverage such as thick vegetation, etc.
- reports for which the entire property was mapped, but only a specific area was surveyed thoroughly. This is differentiated from low ratings listed above when these surveys cover up to around 50% of the property.

High coverage will be used for

- reports where the area highlighted in the map was extensively surveyed as shown by the GPS track coordinates. This category will also apply to permit reports.

RECOMMENDATION GUIDE

The Heritage Screener includes a set of recommendations to the applicant based on whether an impact on heritage resources is anticipated. One of three possible recommendations is formulated:

(1) The heritage resources in the area proposed for development are sufficiently recorded - The surveys undertaken in the area adequately captured the heritage resources. There are no known sites which require mitigation or management plans. No further heritage work is recommended for the proposed development.

This recommendation is made when:

- enough work has been undertaken in the area
- it is the professional opinion of CTS that the area has already been assessed adequately from a heritage perspective for the type of development proposed

(2) The heritage resources and the area proposed for development are only partially recorded - The surveys undertaken in the area have not adequately captured the heritage resources and/or there are sites which require mitigation or management plans. Further specific heritage work is recommended for the proposed development.

This recommendation is made in instances in which there are already some studies undertaken in the area and/or in the adjacent area for the proposed development. Further studies in a limited HIA may include:

- improvement on some components of the heritage assessments already undertaken, for instance with a renewed field survey and/or with a specific specialist for the type of heritage resources expected in the area
- compilation of a report for a component of a heritage impact assessment not already undertaken in the area

- undertaking mitigation measures requested in previous assessments/records of decision.

(3) The heritage resources within the area proposed for the development have not been adequately surveyed yet - Few or no surveys have been undertaken in the area proposed for development. A full Heritage Impact Assessment with a detailed field component is recommended for the proposed development.

Note:
The responsibility for generating a response detailing the requirements for the development lies with the heritage authority. However, since the methodology utilised for the compilation of the Heritage Screeners is thorough and consistent, contradictory outcomes to the recommendations made by CTS should rarely occur. Should a discrepancy arise, CTS will immediately take up the matter with the heritage authority to clarify the dispute.

APPENDIX 5 -Summary of Specialist Expertise

Jenna Lavin, an archaeologist with an MSc in Archaeology and Palaeoenvironments, and currently completing an MPhil in Conservation Management , heads up the heritage division of the organisation since 2016, and has a wealth of experience in the heritage management sector. Jenna's previous position as the Assistant Director for Policy, Research and Planning at Heritage Western Cape has provided her with an in-depth understanding of national and international heritage legislation. Her 8 years of experience at various heritage authorities in South Africa means that she has dealt extensively with permitting, policy formulation, compliance and heritage management at national and provincial level and has also been heavily involved in rolling out training on SAHRIS to the Provincial Heritage Resources Authorities and local authorities.

Jenna is on the Executive Committee of the Association of Professional Heritage Practitioners (APHP), and is also an active member of the International Committee on Monuments and Sites (ICOMOS) as well as the International Committee on Archaeological Heritage Management (ICAHM). In addition, Jenna has been a member of the Association of Southern African Professional Archaeologists (ASAPA) since 2009. Recently, Jenna has been responsible for conducting training in how to write Wikipedia articles for the Africa Centre's WikiAfrica project.

Since 2016, Jenna has drafted over 100 Heritage Impact Assessments and Screening Assessments throughout South Africa.

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APPENDIX 4: Site Verification Report

SITE SENSITIVITY VERIFICATION
(IN TERMS OF PART A OF THE ASSESSMENT PROTOCOLS PUBLISHED IN GN 320 ON 20 MARCH 2020

1 INTRODUCTION

ABO Wind renewable energies (Pty) Ltd (hereafter referred to as "ABO"), has appointed SiVEST SA (Pty) Ltd (hereafter referred to as "SiVEST") to undertake the required Scoping and Environmental Impact Assessment (S&EIA) process for the proposed development of the renewable energy cluster, located south of Ermelo in the Mpumalanga province. The project will consist of four separate EIA's, 2x Wind Energy Facilities (WEF's), a Main Transmission Substation (MTS) (potentially including 2x 132kV overhead powerlines) and a Loop-In-Loop-Out (LILO) for the grid connection. Each of the projects will require its own Environmental Authorisation and possibly its own impact assessment. This report is for the Scoping Phase of the Ujekamanzi WEF 1 LILO and MTS Project.

According to the results of the DFFE Screening Tool, the area proposed for development has VERY HIGH sensitivity for impacts to archaeology and cultural heritage and VERY HIGH sensitivity for impacts to palaeontology.

In accordance with Appendix 6 of the National Environmental Management Act (Act 107 of 1998, as amended) (NEMA) Environmental Impact Assessment (EIA) Regulations of 2014, a site sensitivity verification has been 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 (Screening Tool).

2 SITE SENSITIVITY VERIFICATION

The site sensitivity verification was undertaken as follows:

- A Desktop Study was conducted of relevant reports previously written (please see the reference list for the age and nature of the reports used)
- An archaeologist conducted an assessment of archaeological resources likely to be disturbed by the proposed development. The archaeologists conducted their site visit from 10 to 13 February 2023
- A palaeontologist conducted a field assessment of palaeontological resources likely to be disturbed by the proposed development from 11 to 12 February 2023.

3 OUTCOME OF SITE SENSITIVITY VERIFICATION

Archaeology and Heritage:

In the 140 observations made during the field survey, the vast majority relate to buildings and structures that have been built in the 20th century and relate to the farming activities that have transformed the landscape in the study area. Small settlements occupied by farm labourers and their families dot the area with both formal and informal buildings. These settlements were mapped and recorded as many of these settlements are often associated with graves. At this stage none of the WEF assessment areas overlap the settlements. The formal homesteads/werfs typically have corrugated iron roofs, often painted red, with well-built stone stock kraals and

barns. A mix of modern full corrugated iron farm buildings are also common. Ruins of buildings dating the latter half of the 19th and early 20th century were also common and these are usually marked with the same names as the working farms where the original location of the werfs were presumably laid down. Many of the older farms also have a family graveyard surrounded by wire fencing or stone and brick walls.

The Paul Kruger Bridge spans the Vaal River in the northern section of the study area and was built in 1896-1897. The bridge is still in good condition and is made of sandstone with 9 attractive arches. The Stone Age artefacts seen consisted of Middle Stone Age flakes made of quartz and quartzites sourced locally that appeared to be eroding out of the jeep tracks. The Later Stone Age artefacts were found on exposed areas of hard packed ground where the grassland had not hindered the visibility of the material.

Palaeontology

Based on the geology of the area and the palaeontological record as we know it, it can be assumed that the formation and layout of the dolomites, sandstones, shales and sands are typical for the country and only some do contain fossil plant, insect, invertebrate and vertebrate material. The site visit and walk through in early February 2023 by palaeontologists confirmed that there are no fossils on the surface. There were no outcrops of shales that could potentially preserve fossils. It is not known what lies below the surface. The overlying soils and sands of the Quaternary period would not preserve fossils.

Based on the nature of the project, surface activities may impact upon the fossil heritage if preserved in the development footprint. The geological structures suggest that the rocks are the correct age and type to preserve fossils. The site visit and walk through confirmed that there were NO FOSSILS of any significance in the project footprint. Furthermore, the surface material to be excavated is soil and this does not preserve fossils. Since there is a small chance that fossils from the Vryheid Formation might occur below ground and might be disturbed by excavations for foundations and infrastructure, a Fossil Chance Find Protocol has been added to this report. Taking account of the defined criteria, the potential impact to fossil heritage resources is low to moderate.

4 National environmental screening tool

According to the DFFE Screening Tool analysis, the development area has Very High levels of sensitivity for impacts to palaeontological heritage and Very High levels of sensitivity for impacts to archaeological and cultural heritage resources. The results of this assessment in terms of site sensitivity are summarised below:

- The cultural value of the broader area has some significance in terms of its mining and agricultural history (Moderate)
- Some significant archaeological resources were identified within the broader area (Moderate)
- No highly significant palaeontological resources were identified within the development area, however the geology underlying the development area is very sensitive for impacts to significant fossils (Moderate)

As per the findings of this assessment, and its supporting documentation, the outcome of the sensitivity verification disputes the results of the DFFE Screening Tool for Palaeontology and disputes the results of the screening tool for archaeology and cultural heritage - these should be

considered to be Moderate. This evidence is provided in the body of this report and in the appendices (Appendix 1 and 2).

5 CONCLUSION

It is confirmed that the site sensitivities identified in the specialist study have been verified.