HERITAGE IMPACT ASSESSMENT

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

Proposed development of the Benya PV facility and associated grid infrastructure in the Limpopo province

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For

Cape EAPrac

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CTS HERITAGE

EXECUTIVE SUMMARY

1. Site Name:

Benya PV facility and associated grid infrastructure

2. Location:

Limpopo province.

3. Locality Plan:

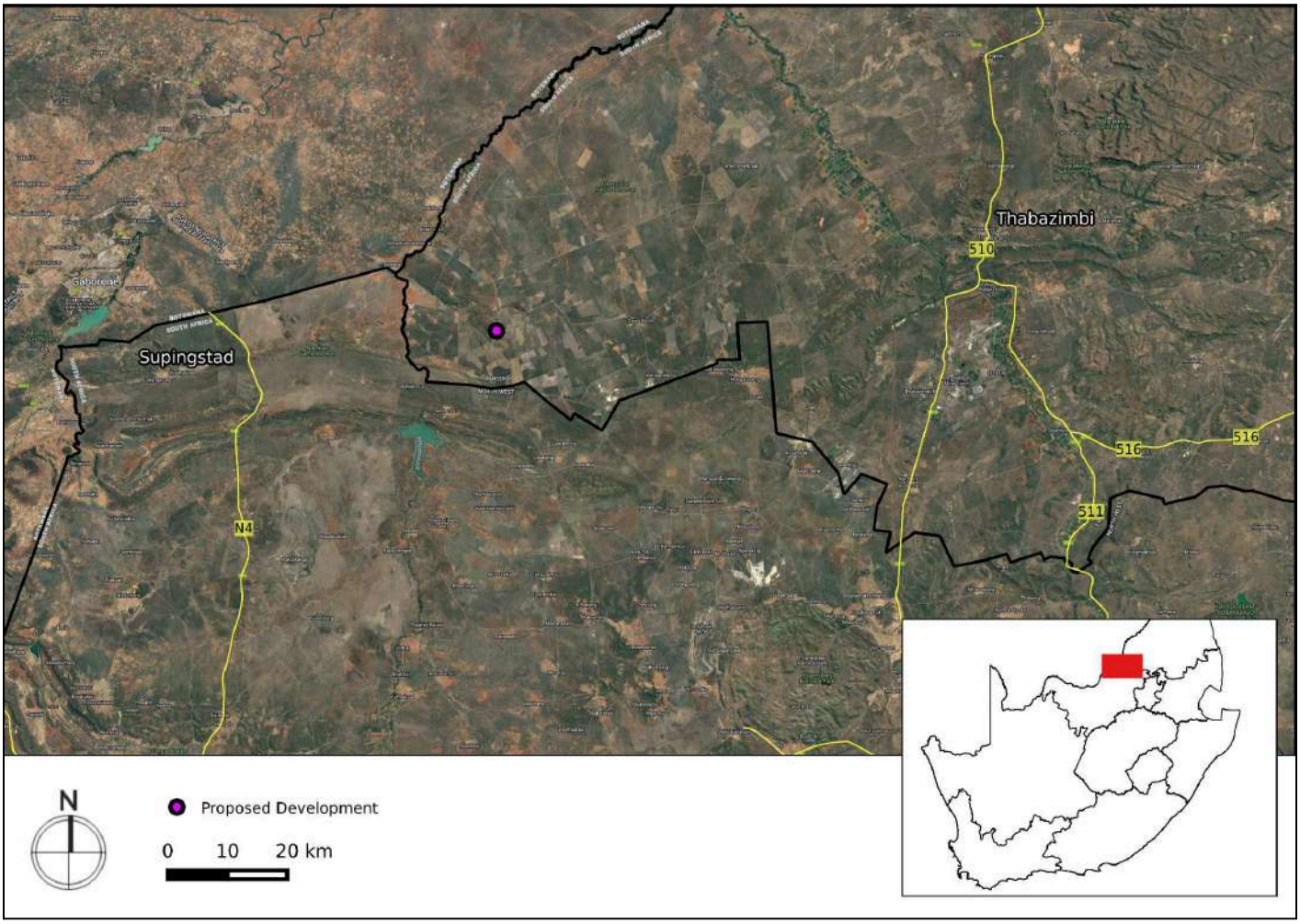

Figure A: Location of the proposed development area

4. Description of Proposed Development:

This report is drafted for the proposed development of the Benya PV facility and associated grid infrastructure in the Limpopo province.

5. Anticipated Impacts on Heritage Resources:

The survey proceeded without constraints or limitations, yet the project area was comprehensively surveyed for heritage resources. Some Later Stone Age archaeology of limited scientific value was identified, as were structures related to the historic farm occupation of this property. These resources include the remnants of an old farm werf and its associated farming infrastructure. None of these observations have any discernible cultural value and as such, these are considered to be Not Conservation-Worthy from a heritage perspective. No permits are required to remove or relocate these NCW observations during construction and no further action is warranted.

The field assessment confirmed the location of the monument (Site 002) as noted in the desktop review. This monument records the names of a number of victims of armed conflict from 1899 until 1981. Due to the social significance of this monument, it is determined to have high local cultural value and is graded IIIA. It is recommended that a no development buffer of 100m is implemented around this site to ensure its conservation and in order to retain its sense of place. This site and its 100m buffer are excluded from the development layout and as such, no impact to this site is anticipated. No further mitigation is recommended for this site.

As can be seen in Table 3.1, the significance of impacts to archaeological resources can be mitigated to acceptable levels (low) with the implementation of the appropriate mitigation measures and no fatal flaws have been identified.

The palaeontological sensitivity of the proposed Benya PV Facility development area in the Limpopo Province is assessed as **low**. The geological units underlying the site, including the Ventersdorp Supergroup (Klipriviersberg Group) and the Gaborone Granite Complex, possess negligible fossil preservation potential due to their volcanic and granitic origins. While the Malmani Subgroup of the Transvaal Supergroup has a high potential for fossil preservation, particularly stromatolites and organic-walled microfossils, the likelihood of significant fossil finds being affected by this development is minimal. Similarly, Tertiary to Quaternary deposits may sporadically yield fossils of limited significance, further supporting the low-impact assessment. The construction, operational, and decommissioning phases are unlikely to disturb palaeontological resources significantly.

As can be seen in Table 3.2, the significance of impacts to palaeontology resources are considered acceptable levels (low) with the implementation of the appropriate mitigation measures and no fatal flaws have been identified.

As per the findings of this assessment, and its supporting documentation, the outcome of the Site Sensitivity Verification disputes the results of the DFFE Screening Tool for Cultural Heritage and Palaeontology, which should

be MEDIUM and LOW respectively, and confirms the results of the screening tool for Archaeology, which is LOW. This evidence is provided in the body of this report and in the appendices (Appendix 1 and 2).

The recommended mitigation measures are adhered to in the final layout for this project and as such, no impact to significant heritage resources is anticipated as a result of this proposed development.

6. Recommendations:

There is no objection to the proposed development from a heritage perspective on condition that:

- A no development buffer of 100m is implemented around the monument recorded as Site 2. This is adhered to in the final layout.
- The attached Chance Fossil Finds Procedure is recommended for implementation within the deposits of the Malmani Subgroup (T1). This procedure should be in place to handle any unexpected fossil discoveries during construction.
- 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 since 2016 heads up the heritage division of the organisation. She 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. Prior to joining CTS Heritage, 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. 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

Benya Solar PV (RF) (Pty) Ltd is proposing the development of the proposed Benya Solar Photovoltaic (PV) Facility and associated infrastructure on the Remainder of Farm Portugal 198, as well as the Integrated Electrical Grid Connection Infrastructure (substations and power line) on the Remainder of Farm Portugal 198 and Farm Napoleon 216 in the Thabazimbi Local Municipality in the Waterberg District, Limpopo Province.

The solar PV facility will comprise of several arrays of PV panels and associated infrastructure and at this stage it is anticipated that it will have a contracted capacity of up to 300 MW. The solar PV facility will also include associated electrical grid connection infrastructure, to evacuate the electricity generated, which will include a 33kV/132kV Independent Power Producer (IPP) Step-up Substation, a 132kV Eskom Switching Substation and 132kV overhead power line. The project site is accessible via the existing D113 and D1629 roads that pass through the site.

A study site of approximately 1 500 ha[1] is being assessed as part of this Environmental Process for the PV facility and supporting infrastructure, which includes the on-site and switching substations and grid connection corridors for the placement of the power line infrastructure required to connect the substations to one (1) of the nearby existing 132kV Eskom overhead power lines. It should be noted that the solar PV and electrical grid connection infrastructure would not cover the entire extent of the study sites.

The key infrastructure associated with the Benya Solar PV Development includes the following:

- PV modules and mounting structures, up to 6m in height and a maximum footprint of up to 350 ha.
- Inverters and transformers.
- Operation and Maintenance buildings (up to 6m in height), including a gate house, ablution facilities, security building, control centre, offices, warehouses and workshops for storage and maintenance.
    - An area of up to 1.5 ha within the assessed development footprint will be occupied by buildings.
- Temporary and permanent laydown areas, situated within the assessed development footprint.
    - Temporary laydown areas will occupy up to 5 ha, while up to 1.5 ha will remain in place for the permanent laydown area, as required for facility operation.
- Site and internal access roads (between 6m and 8m wide). Existing internal roads will be used as far as possible.
- Perimeter fencing up to 3m in height.
- Battery Energy Storage System (BESS), up to 7.5 ha in extent and located within a 10 ha development area[2]

[1] Please note that this size depicts the total extent of the study site and not the development footprint. A section of one (1) of the electrical grid connection corridor alternatives is located within a 642 ha study site (i.e. grid property), while the entire extent of the solar PV facility and majority of the electrical grid connection infrastructure alternatives are proposed within an 856 ha study site (i.e., solar PV property).
[2] 10 ha development area assessed by specialists for the placement of BESS infrastructure.

- The infrastructure will be located within the assessed development footprint.

- Associated Electrical Grid Connection Infrastructure, including:
  - 33kV cabling between the project components and the on-site facility substation;
  - A 33kV/132kV IPP Step-up Substation, up to 1.83 ha in extent;
  - A 132kV Eskom Switching Substation, up to 1.64 ha in extent; and
  - A 132kV overhead power line (up to 40m in height) connecting the on-site switching substation to one (1) of the nearby 132kV Eskom overhead power lines, via a Loop In – Loop Out (LILO) connection.

Table 1: The following technical checklist is included as a quick reference roadmap for the proposed project.

Project Name		**Benya Solar PV Facility and Integrated Electrical Grid Connection Infrastructure.**
Applicant Details	Applicant Name:	Benya Solar PV (RF) (Pty) Ltd
	Company Registration Number:	2025/570171/07
	BBBEE Status:	N/A
	Project Name:	Benya Solar PV Facility and Integrated Electrical Grid Connection Infrastructure
Site Details		
Size of the property	Description of the affected property	PV Facility and Integrated Electrical Grid Connection Infrastructure ● Remainder of Farm Portugal 198 (PV Facility & Grid Infrastructure) ● Farm Napoleon 216 (Grid Infrastructure – one of the three power line corridor alternatives)
Size of the study area	Size in ha of initial study area.	PV Site: 856 ha[3] Electrical Grid Connection Site: 642 ha
Development Footprint	This includes the total footprint of PV panels, BESS auxiliary buildings, On-site Substation, Mini-substations, inverter stations and internal roads.	Approximately 440 ha[4]
PV Technology Details		
Capacity of the facility	Capacity of the PV facility (in MW)	Net generation capacity of up to 300 MWac
Solar technology selection	Type of technology	Solar photovoltaic (PV) with Monofacial or Bifacial PV panels to be utilised. The panels will either be fixed to a single- and/or double-axis horizontal tracking structures, or fixed-tilt structure. PV panels with single axis tracking is preferred over fixed-axis or double axis tracking systems from a technical perspective. Both technology options are considered feasible for the project site, however, the

[3] This includes majority of the grid connection corridor alternatives that are also being assessed as part of this environmental process.
[4] Total development footprint considering the largest/longest of the grid connection corridor alternatives currently under consideration. Only one (1) substation & O&M complex and grid connection corridor will however be proposed for authorisation and thus the total development footprint may be less than this (depending on preferred grid connection corridor).

		technology type will be determined during the final design phase.
	Structure height	• PV Panels up to 6m in height • Buildings up to 6m in height • Fencing up to 3m in height
	Surface area to be covered (including associated infrastructure such as roads)	~350 ha
	Structure orientation	PV panels will either be fixed to a single- and/or double-axis horizontal tracking structure, or fixed-tilt structure, where the orientation of the panel varies according to the time of the day, as the sun moves from east to west or tilted at a fixed angle equivalent to the latitude at which the site is located in order to capture the most sun.
	Laydown area dimensions	Temporary and permanent laydown areas will be situated within the assessed development footprint and will occupy up to 5 ha, while 1.5 ha will remain in place for the permanent laydown area, as required for facility operation.
BESS Technology Details		
BESS technology section	Capacity of BESS facility (in MWh)	Up to 300 MW capacity, with up to 1 800 MWh (6-hour) storage capacity
	Type of technology (preferred)	Pre-Assembled Solid state Lithium-Ion or Sodium-Ion
	Type of technology (alternatives)	The BESS will make use of solid state or flow battery technology. Three (3) types of battery technologies can be considered for the proposed project: Lithium-ion (Lithium-Phosphate), Sodium-sulphur or Vanadium Redox flow battery, depending on which is most feasible at the time of implementation.
	Structure height	Containerized types, including all solid-state types = maximum of 4m from ground level (may have vent pipes and lightning conductors exceeding 4m above ground level).
	Surface area to be covered (including associated infrastructure such as roads)	Up to 7.5 ha in extent and located within a 10 ha study area[2]. The infrastructure will be located within the assessed development footprint.
	Structure locations	DC Coupled BESS within the PV field and AC coupled BESS adjacent to the project substation.
Grid Connection Infrastructure Details		
Grid connection technology section	Power line capacity (in kV)	132kV
	Switching substation capacity (in kV)	132kV
	Switching substation footprint	1.64 ha
	Step-up substation capacity (in kV)	33kV/132kV

	Step-up substation footprint	1.83 ha
	Power line corridor length	OHL Corridor Alternative 1 = 1km OHL Corridor Alternative 2 = 1.5km OHL Corridor Alternative 3 = 1.3km
	Power line corridor footprint	OHL Corridor Alternative 1 = 21 ha OHL Corridor Alternative 2 = 36 ha OHL Corridor Alternative 3 = 25 ha
	Power line servitude	32m
	Power line pylons	Monopole or Lattice pylons, or a combination of both where required
	Structure height	• Switching substation = up to 6m in height • Power line = up to 40m in height

1.2 Description of Property and Affected Environment

The proposed Benya Solar PV project lies on the farm Portugal 198 KP and the grid connection runs over farm Napoleon 216KP in Limpopo Province. The Madikwe Game Reserve is approximately 12.5km west of the development, while the Weltevrede Private Nature Reserve is only about 2.2km west of the development. A series of prominent koppies (Batavia se Kop) to the north separate the farm from Kameelhoek farm. The farms bordering the eastern end and within the grid connection are tilled for maize and soya agriculture while Portugal farm (i.e., the solar PV property) itself has been primarily used as a cattle ranch. There are small fields where crop agriculture has taken place, but the majority of the infrastructure is centred around cattle troughs, kraals and camps for livestock.

Only one werf lies within the study site (Portugal) and the buildings date to the mid 20th century. The topography is generally flat and level besides on a small koppie northeast of the werf that rises up about 50m from the rest of the plain. Two well built gravel roads run through the property - one leads onto Dwaalboom while the other, if taken west, runs up the Derdepoort Border Post with Botswana. A structure is located on the adjacent property, Farm Napoleon 216, however this structure is located outside all of the proposed grid corridor alternatives.

Almost the entire study site is heavily overgrown with acacia and sickle-bush trees. Large areas of the property were formerly cleared in the past based on historical satellite imagery and the small koppie on the farm is covered in Ventersdorp quartzites.

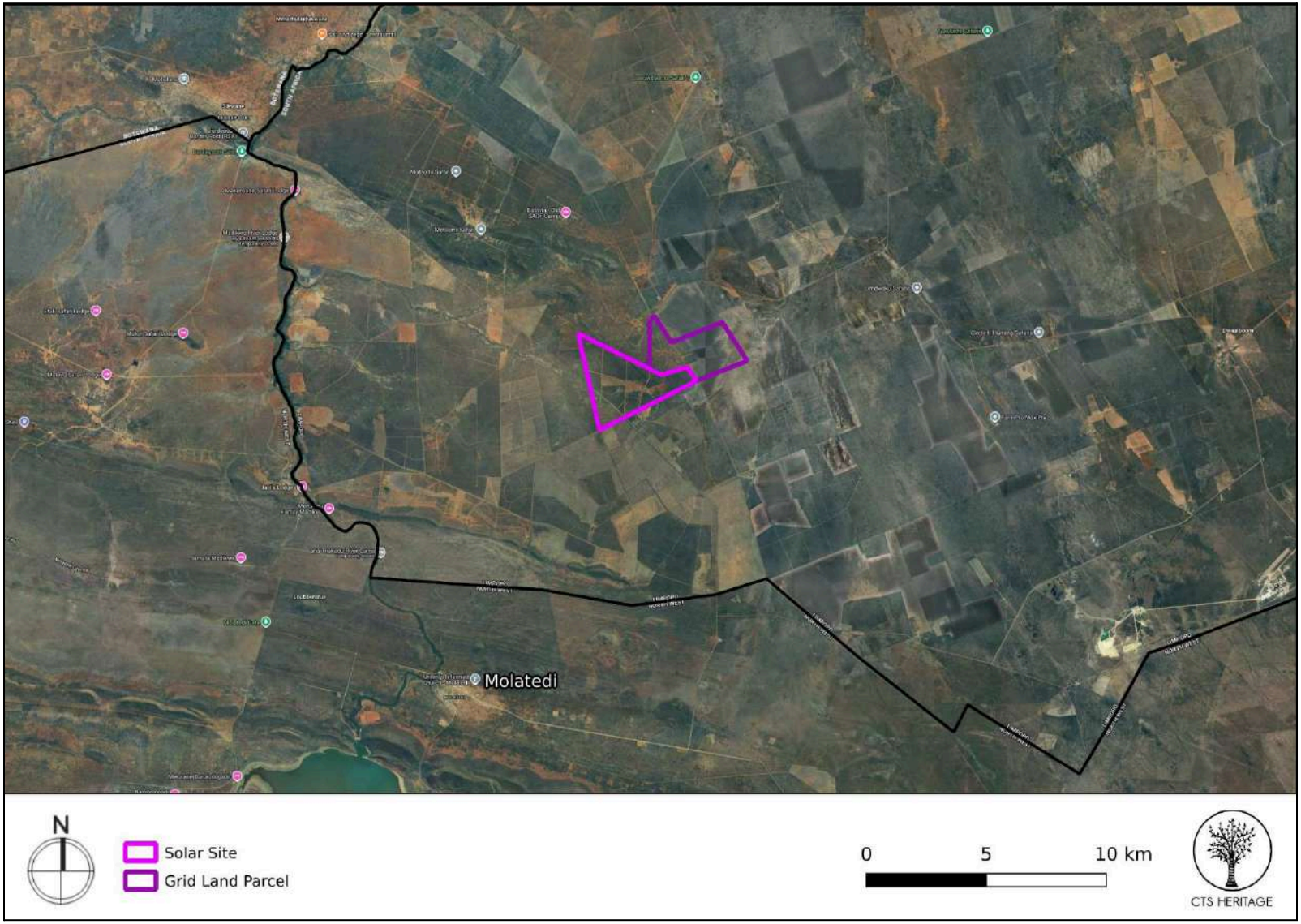

Figure 1.1 Overview Map. Satellite image (2024) indicating the proposed development area

Figure 1.2 Overview Map. Satellite image (2025) indicating the proposed development area

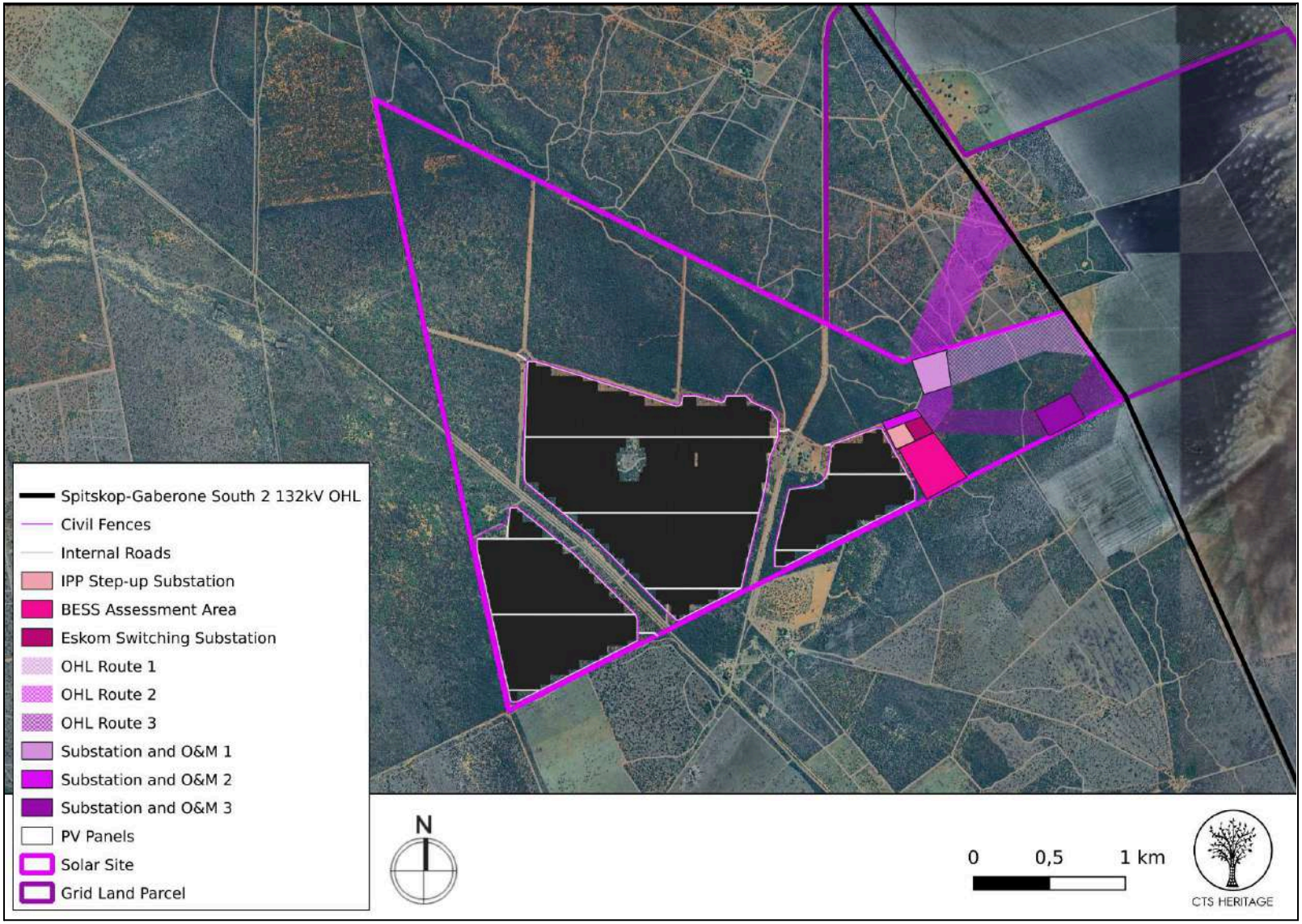

Figure 1.3 Overview Map. Satellite image (2025) indicating the proposed development area

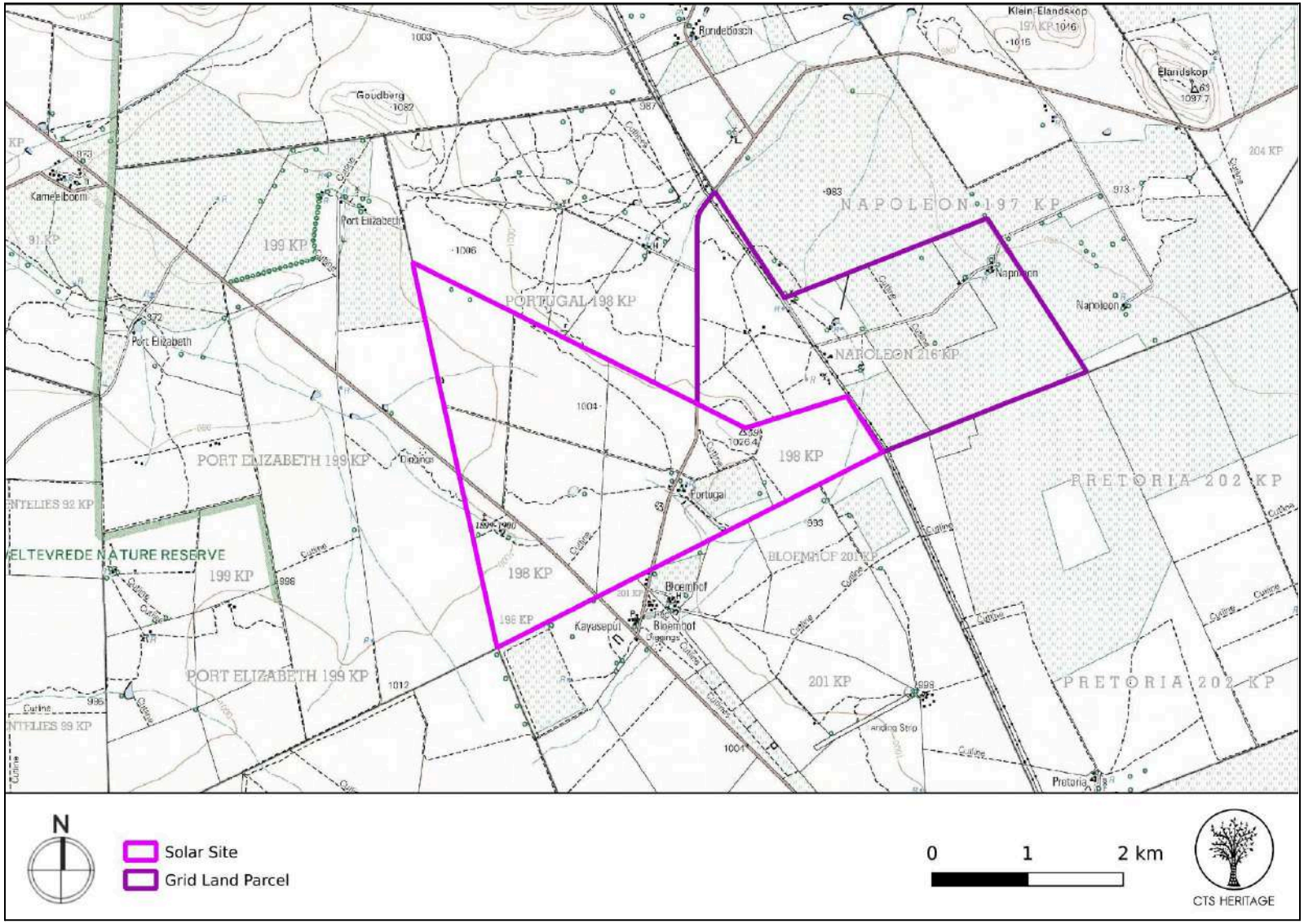

Figure 1.4 Overview Map. 1:50 000 Topo Map indicating the proposed development area

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 11 to 12 January 2025. The report detailing the results of the field assessment is included in Appendix 1.
- A palaeontologist conducted a desktop assessment of palaeontological resources likely to be disturbed by the proposed development. The report detailing the results of this assessment is included in Appendix 2.
- Subsequent to the completion of the specialist assessment reports (Appendix 1 and 2), a final layout was provided for assessment in this Heritage Impact Assessment report.
- In the final layout provided, the LILO corridor as mapped in Appendix 1 and 2, has been replaced with grid corridor alternatives as mapped in this report in Figure 1.3 above. As such, the maps included in the specialists reports differ slightly to the maps included in this HIA. However, it is important to note that the findings of these specialist reports remain relevant and applicable.
- The findings of the specialist reports (Appendix 1 and 2) have been used to inform the outcomes of this HIA report.
- 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

There are several well-made gravel roads criss-crossing the property to manage the cattle farm and access to all parts of the property was easily made. The vegetation has become very overgrown to the point of impenetrability in many sections and we had to survey the fringes of these zones or sample more open areas in between to gauge the level of archaeological sensitivity. The koppie, in particular, was covered thoroughly but it's very low profile does not stand out in the landscape and did not yield any Iron Age sites typical of the large outcrops to the north of the site or within Madikwe.

2.5 Impact Assessment Methodology

Direct, indirect and cumulative impacts of the issues identified through the Scoping & Environmental Impact Assessment (S&EIA) process were assessed in terms of the following criteria:

- The nature, which shall include a description of what causes the effect, what will be affected and how it will be affected.
- The extent, wherein it will be indicated whether the impact will be local (limited to the immediate area or site of development) or regional, and a value between 1 and 5 will be assigned as appropriate (with 1 being low and 5 being high).
- The duration, wherein it will be indicated whether:
    - The lifetime of the impact will be of a very short duration (0 – 1 years) – assigned a score of 1.
    - The lifetime of the impact will be of a short duration (2 – 5 years) – assigned a score of 2.
    - Medium-term (5 – 15 years) – assigned a score of 3.
    - Long term (> 15 years) – assigned a score of 4.
    - Permanent – assigned a score of 5.
- The consequences (magnitude), quantified on a scale from 0 – 10, where 0 is small and will have no effect on the environment, 2 is minor and will not result in an impact on processes, 4 is low and will cause a slight impact on processes, 6 is moderate and will result in processes continuing but in a modified way, 8 is high (processes are altered to the extent that they temporarily cease), and 10 is very high and results in complete destruction of patterns and permanent cessation of processes.

- The probability of occurrence, which shall describe the likelihood of the impact actually occurring. Probability will be estimated on a scale of 1 – 5, where 1 is very improbable (probably will not happen), 2 is improbable (some possibility, but low likelihood), 3 is probable (distinct possibility), 4 is highly probable (most likely) and 5 is definite (impact will occur regardless of any prevention measures).
- The significance, which shall be determined through a synthesis of the characteristics described above and can be assessed as low, medium or high.
- The status, which will be described as either positive, negative or neutral.
- The degree to which the impact can be reversed.
- The degree to which the impact may cause irreplaceable loss of resources.
- The degree to which the impact can be mitigated.

The significance is calculated by combining the criteria in the following formula:

S = (E + D + M) x P

S = Significance weighting

E = Extent

D = Duration

M = Magnitude

P = Probability

The significance weightings for each potential impact are as follows:

- < 30 points: Low (i.e. where this impact would not have a direct influence on the decision to develop in the area).
- 30 – 60 points: Medium (i.e. where the impact could influence the decision to develop in the area unless it is effectively mitigated).
- > 60 points: High (i.e. where the impact must have an influence on the decision process to develop in the area).

3. HISTORY AND EVOLUTION OF THE SITE AND CONTEXT

3.1 Desktop Assessment

3.1.1 Background

The proposed development lies less than 20km southeast of the border with Botswana at Derdepoort, and approximately 80km west of Thabazimbi. The name Thabazimbi means *mountain of iron* because of the large iron ore reef that was discovered in 1919 by J. H. Williams. The mine boasts one of the largest mining shafts in Africa. More than 2 million tons of ore are mined every year and hauled by train to Mittal's iron and steel works. The railway line from Rustenburg reached the area in the 1930s and full-scale iron and steel production began. The town was proclaimed in 1953 and its history is intimately linked with that of the mines in the area. Much of the central landscape of the Limpopo Province is defined by bushveld and grasslands scattered with trees and shrubs; the mountains, deep valleys, rivers and dams of the northeast; the flat and arid semi-deserts plains of the west; and the lush vegetation of areas bordering the Vaal River in the south.

3.1.2 Cultural Landscape, Built Environment and History

A broad history of the area is included in Murimbika (2010, SAHRIS NID 534905) and is referred to here. According to Murimbika (2010), the broader region was subject to a number of instances of migration and settlement from 450 AD and has yielded some significant Iron Age Sites such as the Mzonjani facies Broederstroom site (AD 430 to AD 780). Evidence indicates that Sotho-Tswana groups migrated in and out of the Magaliesberg region, and such groups are responsible for the many early stone-walled settlements in this region. One of the most documented migrations is the Mfecane (forced migration or scattering) which was a period of widespread chaos and warfare among indigenous ethnic communities in southern Africa during the period between 1815 and about 1840. During this time, the Ndebele under Mzilikazi reached the Magaliesberg region and were responsible for introducing the Doornspruit-type walled settlements that are known from this region. According to Murimbika (2010), this type of stone-walled settlement represents "typical Nguni-Sotho-Tswana acculturation". Murimbika (2010) further explains that one of the most acculturated groups in the region is known as the "Po", whose Chief Mogale lends his name to the Magaliesberg Mountains and the Mogale City Municipality. By the mid-1800's, Voortrekkers had begun to settle in the foothills of the Magaliesberg mountains and in so doing, clashed with Mzilikazi's Ndebele in 1837. These early colonial battles forced the Ndebele north of the Limpopo River and effectively ended the independence of African Chiefdoms in the area. The Voortrekkers went on to establish the Republic of the Transvaal.

The broader area is described by Kruger (2021, SAHRIS NID 33248) as "*situated in a rural agricultural zone along the western Waterberg Biosphere. The area has been impacted on by farming practices during the last century where portions of the Schoongezicht and Jakhalskraal property subject to this assessment has been transformed into cultivated lands in past decades. The region consists mostly of crop, cattle and game farms but an increasing*

number of mines and quarries occur around rich limestone and cement resources. Agriculture has resulted in severe bush densification with alien species such as Sickle Bush occurring through the project area in dense, impenetrable stands. Pockets of indigenous grassland and Bushveld vegetation remain in places and the rest of the terrain is undulated with a number of drainage lines bisecting the larger landscape."

Coetzee (2008, SAHRIS NID 7677) notes that "*The area is generally open and flat and is characterised by extensive limestone deposits and cotton soils. The area has been extensively utilised for farming (both agriculture and pastoralism) since the late 19th century (most of the farms were first surveyed in 1897). The remainder of the land has been under agricultural and pastoral farming practice which resulted in the following infrastructure developments:*

- *agricultural field*
- *farm homesteads and worker accommodation*
- *cattle kraals and dipping facilities*
- *wind pumps and reservoirs*
- *extensive fencing*
- *access roads, power lines and telephone lines*"

Coetzee (2008) goes on to note that "*The survey area consists of farms, most of which were first surveyed in 1897 (according to the original title deeds) and occupied soon thereafter. It would seem that none of the houses dating from this early period of occupation have survived as no example could be found. Local oral history also confirms that none of these wood and iron structures survived and that the last example was demolished a few years ago due to structural collapse. Most of the historical buildings and foundations that were recorded can be associated with the second building phase, which dates between the 1930s and 1940s. The structures were built with brick and cement (most houses also have corrugated iron roofs). These buildings are all older than 60 years. Modern buildings (not older than 60 years) are associated with a third phase of development (according to the recent title deeds) which probably started in the 1980s and continued until recent times.*" In his assessment, Coetzee (2008) identified a number of burial grounds and graves, existing structures as well as the ruins and foundations of structures that were likely thatched rondavels belonging to workers in the area dated to the 19th Century.

In terms of more recent cultural landscape developments, there are also some historical farm werfs located within the project area, as well as existing roads. Both the first edition Topo Map and the current Topo Map indicate the presence of a monument located within the area proposed for development dated 1899-1900.

3.1.3 Archaeology

Previous Heritage Impact Assessments conducted in the broader area of the proposed development have identified a number of significant archaeological sites. Kruger (2021, SAHRIS NID 33248) notes that "*The cultural historical landscape of the Waterberg area spans million years with evidence of hominin occupation, Stone Age traditions, Iron Age farmers and historical events. Makapansgat, a deep limestone cave near Mokopane has yielded remains of Australopithecus africanus that dates to more than 3 million years BP and also Homo erectus, dating to approximately 1 million years BP. However, Earlier Stone Age (ESA) material is scarce on the Waterberg plateau. The Middle Stone Age (MSA) is abundantly represented in the Waterberg area and archaeological excavations at sites such as the Olieboomspoort Shelter in the northwestern part of the Waterberg have yielded rich MSA deposits which display a large degree of specialisation and skill in stone working (Van der Ryst 1996). These groups occupied open camps which were situated in the proximity of water sources such as pans, lakes or rivers. There is a noticeable gap in the Waterberg between MSA assemblages and material from the Later Stone Age (LSA), suggesting that the Waterberg may not have seen dense human occupation for a long period of time. However, Later Stone Age groups, including the San hunter gatherers and Khoi herders frequented the area in the last few millennia, and numerous LSA sites have been discovered and excavated. Similarly, LSA evidence such as stone implements, ceramics and a wealth of rock paintings and markings are scattered over the plateau.*" Coetzee (2008, SAHRIS NID 7677) identified a scatter of MSA artefacts in his assessment located approximately 10km southeast of this proposed development.

Kruger (2021, SAHRIS NID 33248) goes on to note that "*The Waterberg Plateau is rich in rock art and rock markings and many such sites are still to be described and studied. At many sites "refined" San paintings occur with cruder depictions in red or white paint (sometimes black), painted directly with fingers by later Farmer groups. Numerous paintings of people in trance positions, dance scenes of men and women, men with hunting equipment, a large variety of antelope and other animals, imaginary rain animals, handprints, and geometric designs form part of the contents of the rock art of the Waterberg (Van der Ryst 1998). Two traditions of Rock Art occur in the Waterberg. First the more "naturalised" form of fine-line art, including skilled depictions of animals and people, attributed to San Hunter Gatherers. The second tradition, often called "Late White" art, is characterised by more geometric, schematic illustrations which includes a large amount of finger painting. This tradition is associated with Iron Age farmers.*" Such rock art is usually located in kloofs, caves or overhangs. No such topography is evident within the area proposed for this PV development and as such, direct impact to significant rock art is unlikely.

As noted by Pelser (2022, SAHRIS NID 20893), "*a large number of EIA to LIA sites are known to exist in the larger geographical landscape in which the study area falls. The closest and best known Iron Age site is located at Rooiberg near Thabazimbi to the north of the study area (Bergh 1999: 7). The closest Early Iron Age site is located at Broederstroom near Brits (Bergh 1999: 6). In a band stretching from Pretoria to Brits as many as 125 Late Iron*

Age sites have been identified and many more between Brits and Rustenburg (Bergh 1999: 7). Tswana chiefdoms flourished in the area during AD 1600 to 1840 (Pistorius 2009: 18). Late Iron Age sites are also known between Brits and Thabazimbi (Bergh 1999: 7). At the beginning of the 19th century different Tswana groups settled in the larger area. It includes the Kwena, Po and Kgatla. During the so-called Difaqane (period of war or stress) they fled to the north-west and the Ndebele of Mzilikazi settled in around the Brits area and further north between 1827 and 1832 (Bergh 1999: 10-11, 106-107, 111; Pistorius 2009: 18- 19)." Iron Age sites are usually associated with clear topographic features in the landscape such as koppies. A number of significant koppies are located around the proposed development area (Figure 3.4) although none are located within the proposed development area.

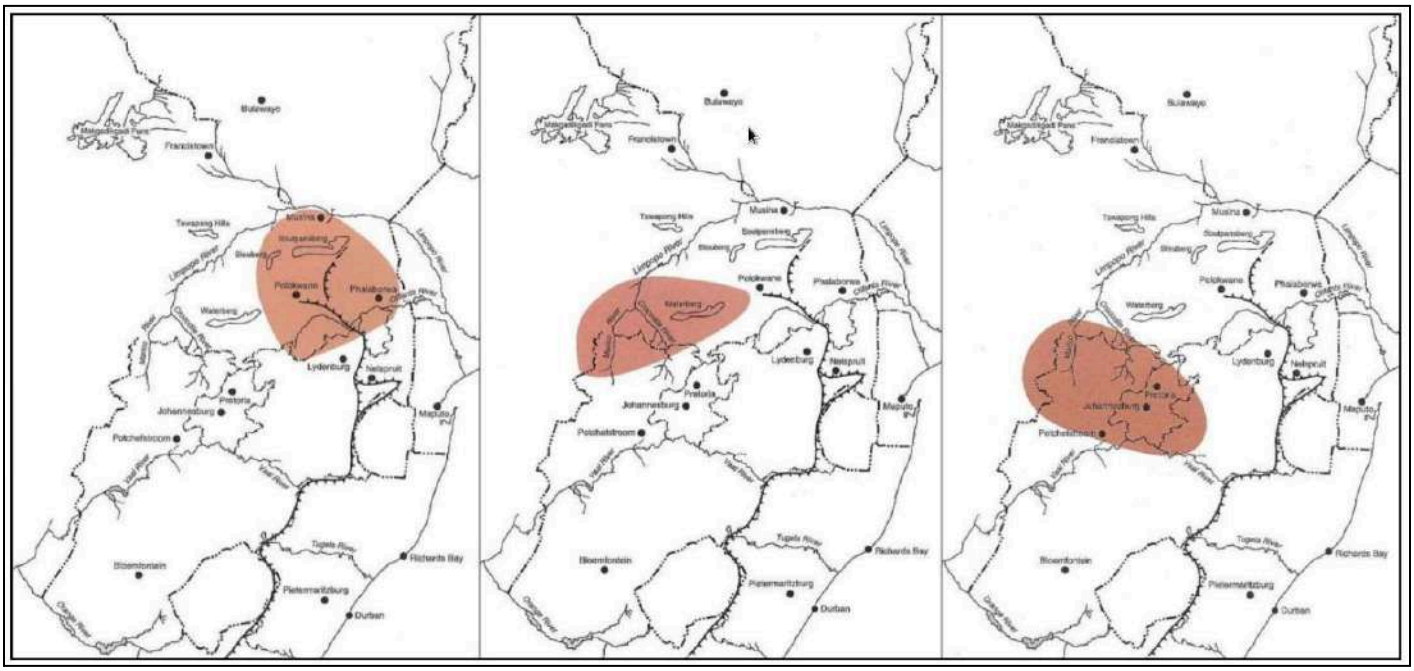

Figure 2.1 Map detailing the distribution of 16th century Maloko (left), 17th century Madikwe (centre) and 18th century Buispoort tradition sites (After Huffman 2007). From Kruger (2021)

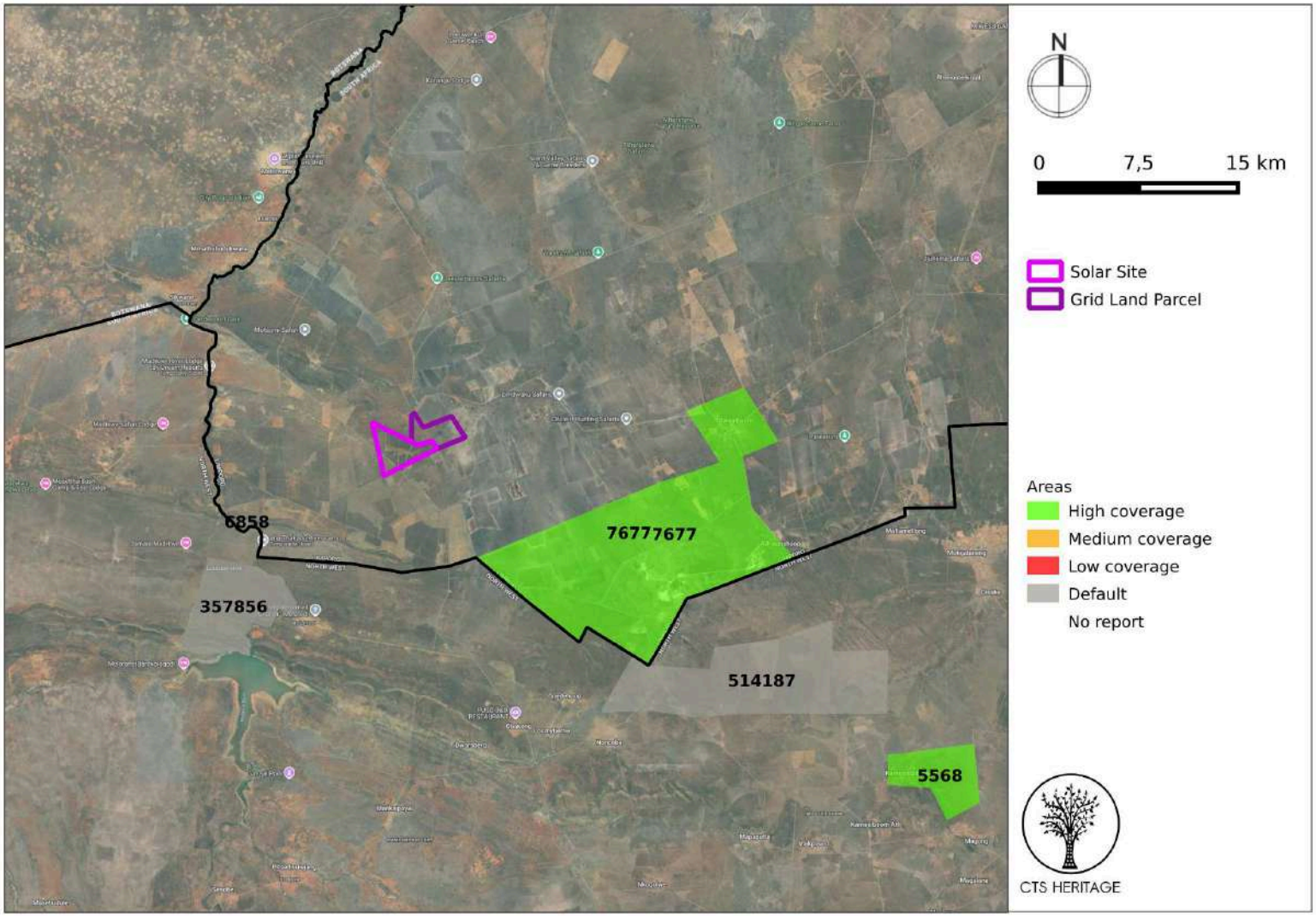

Figure 2.2: Spatialisation of heritage assessments conducted in proximity to the proposed development

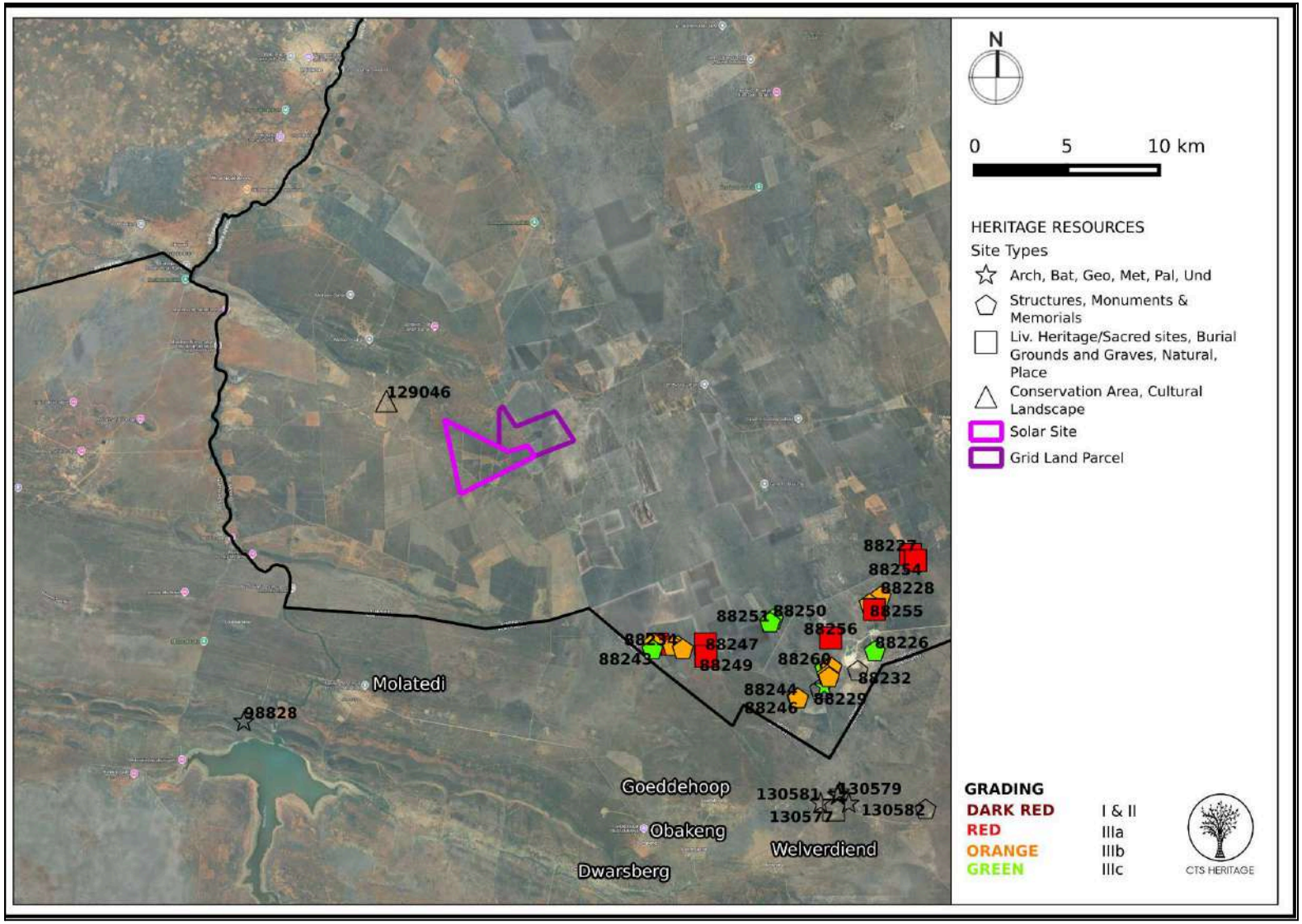

Figure 3.1 Heritage Resources Map. Heritage Resources previously identified in and near the study area, with SAHRIS Site IDs indicated

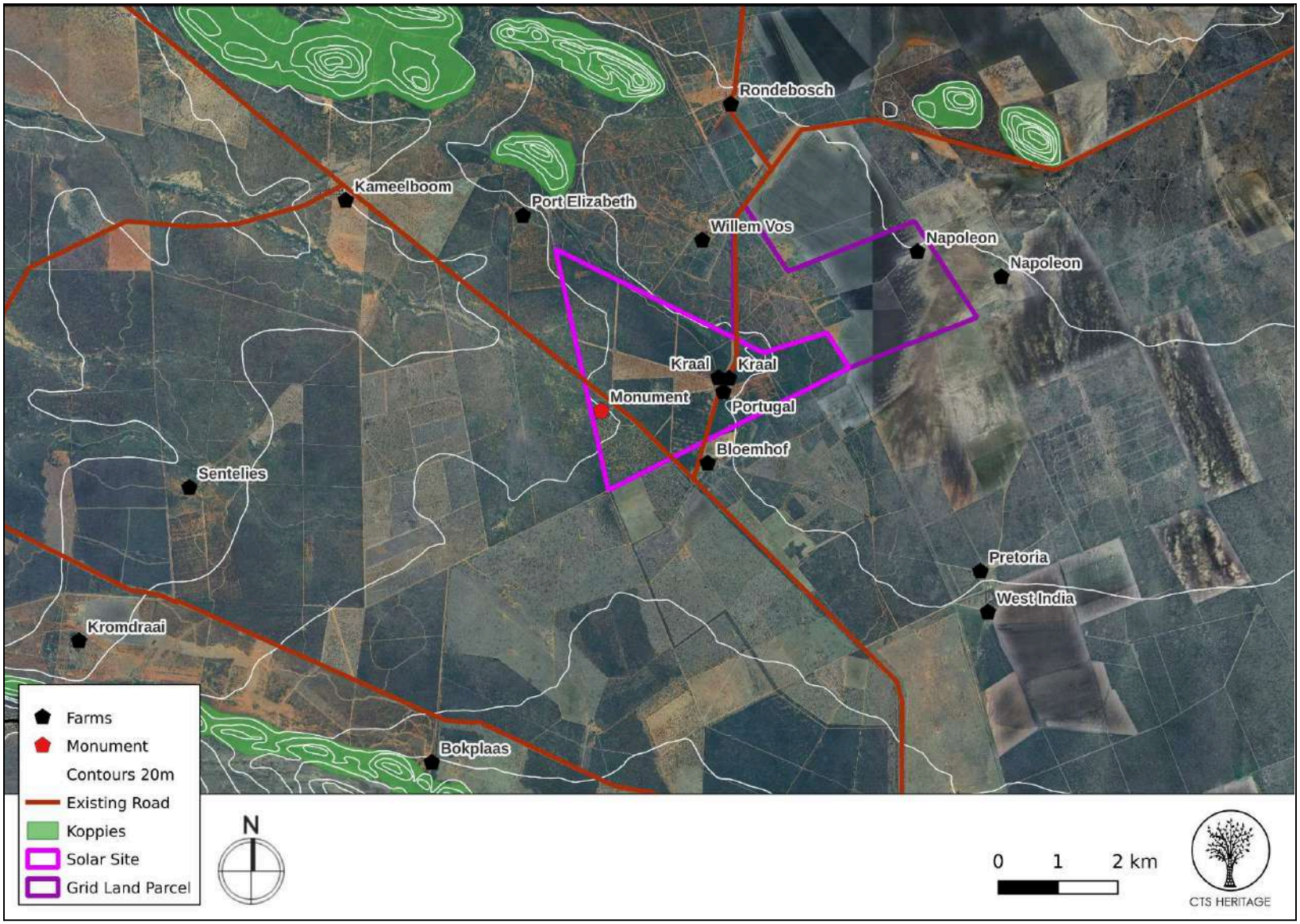

Figure 3.2 Cultural Landscape Map. Map identifying cultural landscape objects from the Topo 1:50 000 map

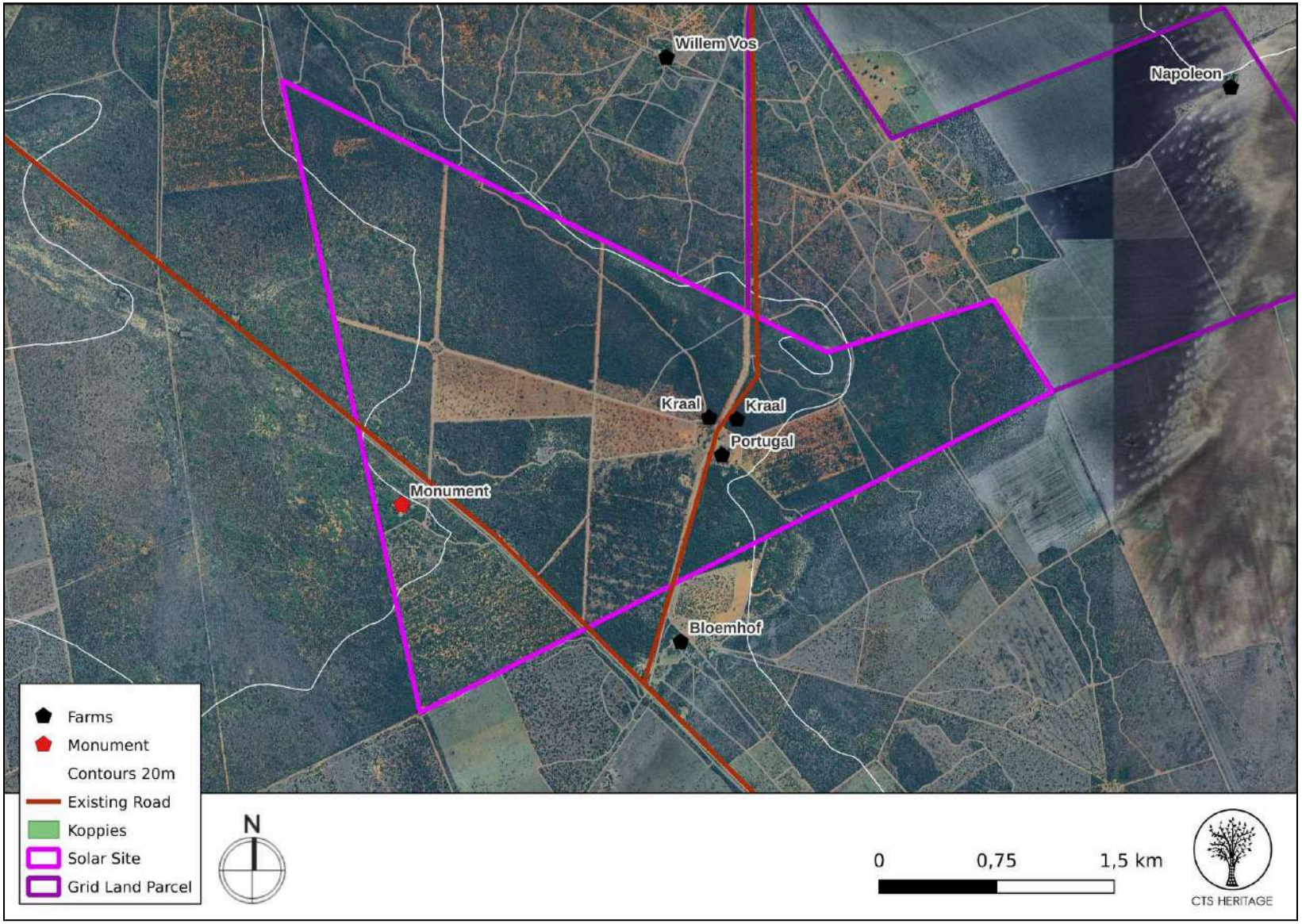

Figure 3.3 Cultural Landscape Map. Map identifying cultural landscape objects from the Topo 1:50 000 map

3.1.4 Palaeontology

According to the SAHRIS Palaeosensitivity Map (Figure 4), the area proposed for the development is underlain by rocks that have Insignificant/zero palaeontological sensitivity, low, moderate and very high palaeontological sensitivity. The area proposed for development is underlain by quaternary sediments which have moderate sensitivity, Gaborone Granite, which have insignificant/zero palaeontological sensitivity. The area also contains rocks of the Klipriviersberg Group, Ventersdorp Supergroup which has a low palaeontological sensitivity. These are all very unlikely to preserve significant fossil heritage.

Rocks that may contain fossils form part of the Malmani Subgroup and the Transvaal Supergroup. The Malmani Subgroup contains a range of shallow marine to intertidal stromatolites (domes, columns etc), organic walled microfossils (Groenewald & Groenewald, 2014). The Malmani Subgroup is from the same geological group that has resulted in the preservation of fossil remains at the Cradle of Humankind in its Transvaal Dolomite outcrop area. More broadly, the Chuniespoort Group is known for its preservation of Stromatolitic carbonates (limestones/dolomites), minor secondary cherts and mudrocks including carbonaceous shales. The presence of any fossils from the Malmani Subgroup in the area has not yet been identified, and are unlikely to be present.

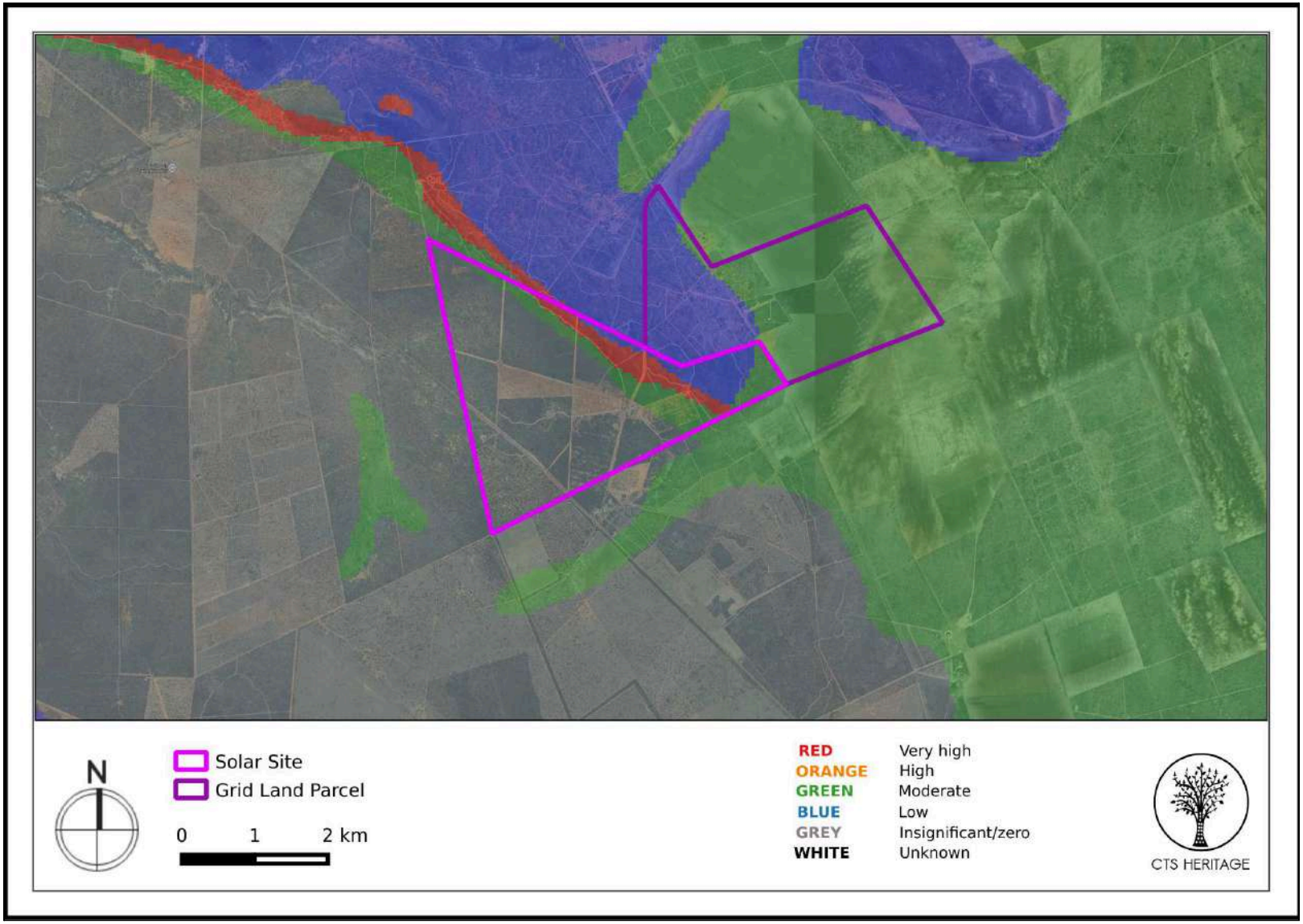

Figure 4.1: Palaeontological sensitivity of the proposed development area

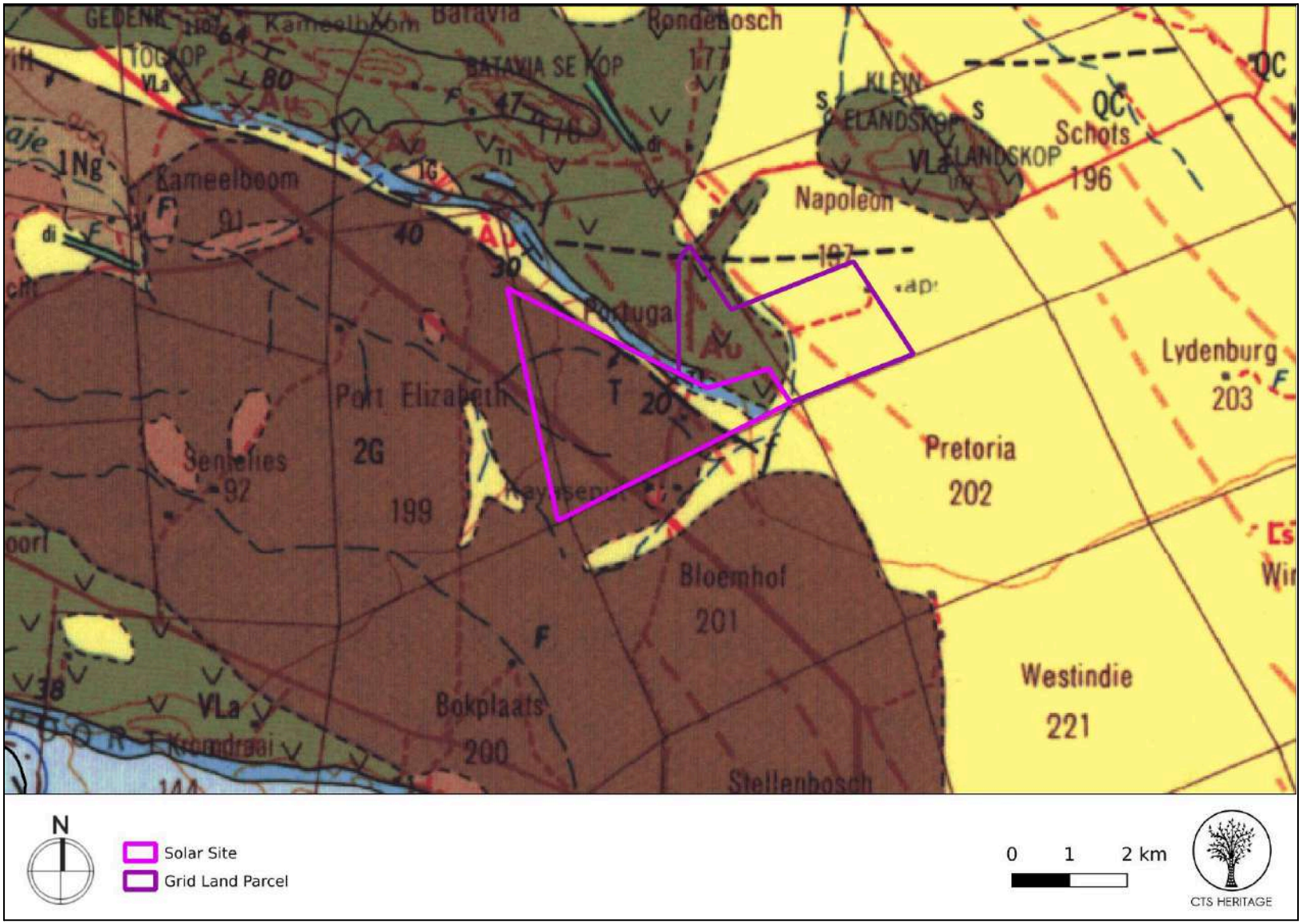

Figure 4.2. Geology Map. Extract from the CGS 2426 Thabazimbi Geology Map indicating that the grid is underlain by 2G - Gaborone Granite Complex, QC - Quaternary Sands, VLa - Ventersdorp Supergroup and T1 - Malmani Subgroup of the Transvaal Supergroup

4. IDENTIFICATION OF HERITAGE RESOURCES

4.1 Summary of Findings of Specialist Reports

4.1.1 Archaeology (Appendix 1)

Very few Stone Age artefacts were found in the property and the overall distribution of open sites appears to be low. It is much more likely that the density of material escalates significantly on the neighbouring farm to the north at Kameelhoek where large and prominent outcrops can be found. A Second Boer War/South African War monument was erected in the 1940s on the farm and it commemorates the Derdepoort 'massacre' which involved an attack on a Boer laager[5]. There are toilet facilities, parking, commemoration area and an additional headstone to M.N. Ras who also died during the war - his grave has since been relocated.

The Portugal farmhouse buildings date to the mid 20th century and no significant historical structures were found on the property. The old borehole pumps recorded on the farm are still functioning and it appears that farming preceded the more modern buildings, perhaps with structures that have since been demolished at the main werf.

4.1.2 Palaeontology (Appendix 2)

The palaeontological sensitivity of the proposed development area (Figure 2) corresponds to the geological units as mapped on the 1:250000 Thabazimbi Geological Map (2426, Council for Geoscience, Pretoria), comprising Archean-age rocks from the Gaborone Granite Complex, the Ventersdorp Supergroup, the Transvaal Supergroup (Malmani Subgroup), and Tertiary-Quaternary deposits. The palaeontological sensitivity of these formations therefore also varies significantly due to differences in their geological and depositional contexts.

Gaborone Granite Complex

The plutonic complex is characterized by granitic rocks, including rapakivi granite, leucogranite, and quartz porphyry, as well as volcanic sequences from the Kanye Formation. Due to their igneous origin, these rocks lack any fossil-bearing potential, resulting in an **insignificant/zero** palaeontological sensitivity as indicated on the SAHRIS palaeosensitivity map (Figure 2).

Ventersdorp Supergroup (Klipriviersberg Group)

The Ventersdorp Supergroup comprises predominantly andesitic and basaltic lavas. These rocks, being of volcanic origin, do not typically preserve fossils, and the SAHRIS palaeosensitivity map classifies this unit as having **low** palaeontological sensitivity.

[5] https://en.wikipedia.org/wiki/Derdepoort_massacre

Transvaal Supergroup (Malmani Subgroup)

The Malmani Subgroup consists of a thick succession of carbonate and siliciclastic rocks. These deposits are known for containing shallow marine and intertidal stromatolites, as well as organic-walled microfossils (Groenewald & Groenewald, 2014). This unit is classified as having **high** palaeontological sensitivity according to the SAHRIS palaeosensitivity map, however, the likelihood of fossil discovery being affected by the proposed development is **low**.

Tertiary-Quaternary Deposits

These deposits include black and red soils, ferricrete, surface conglomerate, breccia, calcrete, and limestone. While some of these units may occasionally preserve fossils, their palaeontological sensitivity is generally regarded as **low.** The potential for yielding fossils of scientific importance in the project area is limited.

Only the Malmani Subgroup and the Tertiary-Quaternary sediments hold potential for fossil preservation, with the latter unlikely to yield fossils of significance. Based on these factors, the **overall palaeontological sensitivity of the project area can be classified as low for this development**.

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 2: Artefacts identified during the field assessment development area

POINT ID	Description	Density	Type	Period	Co-ordinates		Grading	Mitigation
002	2nd Boer War monument to the deceased at battle of Oerdepoort, 1899. M.N. Ras monument – grave was relocated from this spot. Site visited by tourists	n/a	Memorial	Modern	-24.742778	26.551733	IIIA	100m Buffer

4.3 Mapping and Spatialisation of Heritage Resources

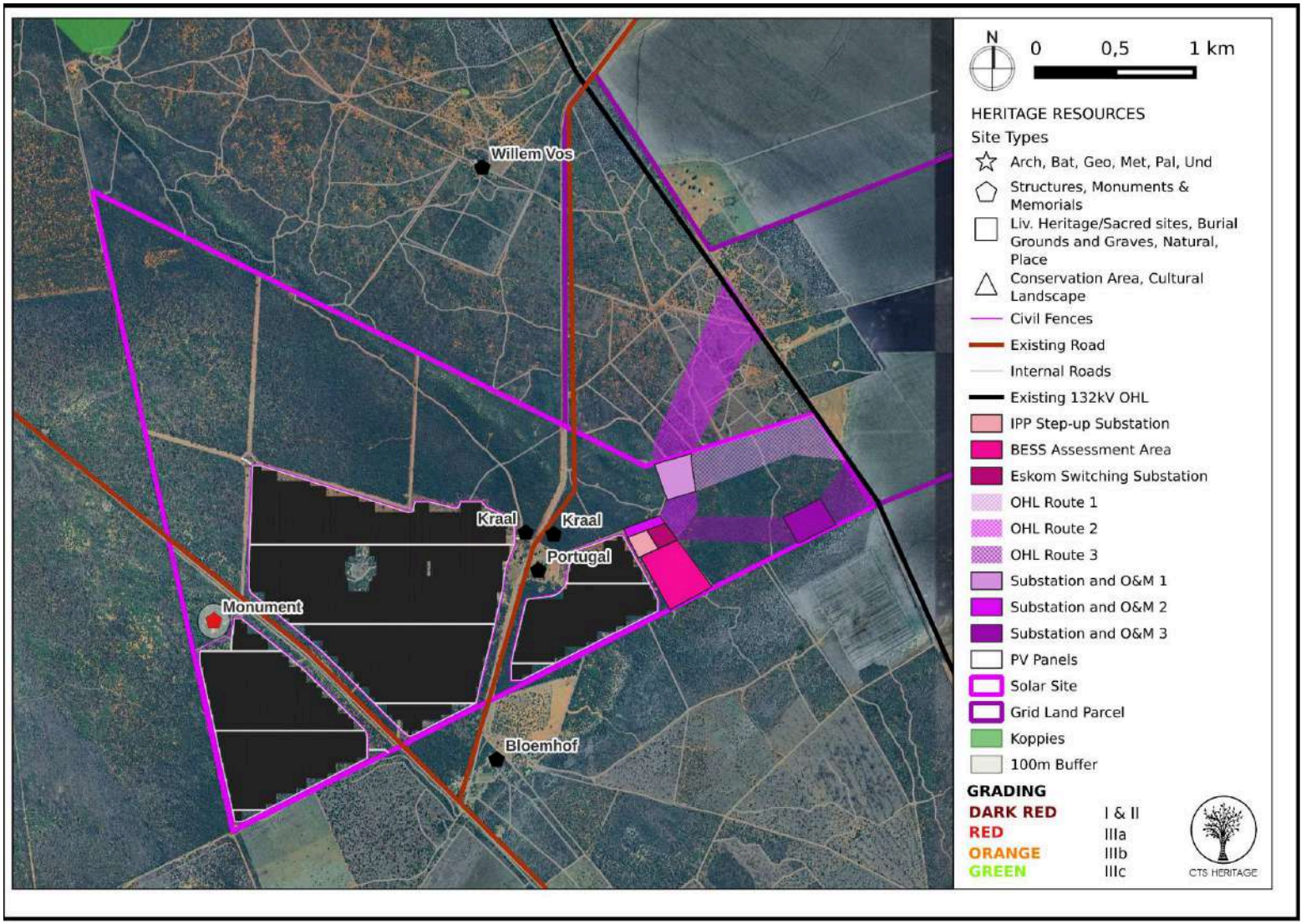

Figure 5.1: All heritage resources within proximity to the development area

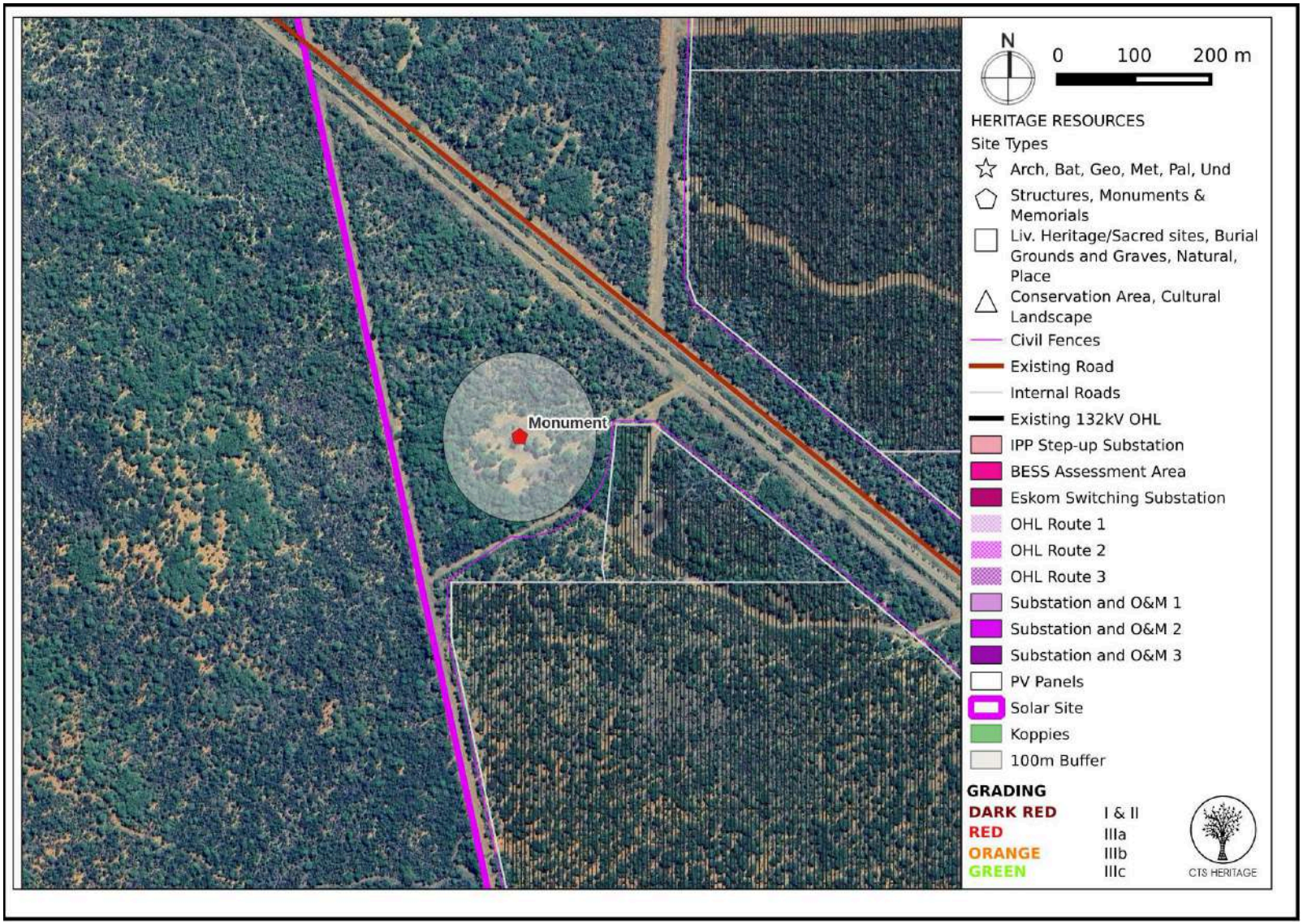

Figure 5.2: Map of heritage resources identified within the PV development area

5. ASSESSMENT OF THE IMPACT OF THE DEVELOPMENT

5.1 Assessment of Impact to Heritage Resources

Due to the nature of heritage resources, impacts to archaeological and palaeontological heritage resources are unlikely to occur during the PLANNING, OPERATIONAL and DECOMMISSIONING phases of the project. Potential impacts to the cultural landscape occur throughout the OPERATIONAL phase of the project. These are discussed in the section below as well as the section that deals with Cumulative Impacts.

5.1.1 Cultural Landscape and VIA

According to the Scoping VIA completed for this project (Donaway Environmental, 2025), "*The proposed development is situated in the Dwaalboom Thornveld, which forms part of the Savanna, which covers a very large part of South Africa. The area encompasses a distinct sense of place that is shaped by its unique blend of agriculture and breathtaking Bushveld surroundings. The allure of the bushveld captivates visitors (mostly hunters) and locals alike. The picturesque scenery, characterised by sprawling plains, dense vegetation, and an abundance of wildlife, draws frequent hunters seeking thrilling adventures in the bushveld wilderness. Yet, it is not only the natural wonders that make the Bushveld special. Amidst the tranquillity and picturesque wilderness that the Bushveld offers, a profound peace washes over visitors, offering respite from the clamour of the modern world.*"

It goes on to note that "*The bushveld landscape links to the more prominent "Africa setting" which boasts a variety of traditional (and newer) African cultures seeing the Bushveld as a cultural source of tradition, sense of place, interaction and co-existence with nature. Furthermore, in many households, hunting is also seen as a tradition and part of the culture. The Bushveld is almost synonymous with the word "hunting", giving the hunter the tranquil setting and feel of Africa and a complete African hunting experience.*"

The VIA concludes that *"The proposed development has the potential to alter the visual aesthetics and sense of place in the surrounding natural landscape. The removal of vegetation and the introduction of industrial infrastructure within a predominantly natural setting can significantly transform the visual character of the area. Given the ample existing vegetation cover in the proposed development region, there should not be challenges in mitigating the visual impact. The natural landscape's inherent features, such as changes in elevation and landforms, provide a level of screening effect, albeit not sufficient to fully mitigate the visual intrusion caused by the large-scale development. The proximity of the development to district roads and surrounding landowners increases the potential visual intrusion. The increased visibility of industrial elements against the backdrop of the natural landscape can compromise the area's scenic qualities and affect the sense of place for residents and visitors alike. The associated impacts of the proposed development can be minimised through the implementation of appropriate mitigation measures. The significance of the project at this stage might be negative medium."*

5.1.2 Archaeology

The field assessment for this project was successful in that a comprehensive understanding of the overall archaeological sensitivity of the area proposed for development was established. The field assessment recorded 4 observations reflecting superficial scatters of low density Middle and Later Stone Age artefacts (Observations 4, 5, 6 and 7). These archaeological observations have limited scientific value and their recording herein is considered to be sufficient. As such, these observations are considered to be Not Conservation-Worthy and are not considered further. No permits are required to remove or relocate these NCW observations during construction and no further action is warranted.

The other observations noted during the field assessment reflect evidence of the historic and ongoing agricultural use of the area. The Portugal farm werf (Observation 1) and its associated agricultural infrastructure (Observations 8 and 9) was noted. None of the structures identified have any discernible cultural value and as such are considered to be Not Conservation-Worthy from a heritage perspective.

While no burial grounds were identified during the field assessment, these can often be associated with historic farm werfs and as such, care must be taken during vegetation clearance to ensure that no marked or unmarked burials are impacted by the proposed development. Due to their high levels of local social and spiritual significance, burials are graded IIIA and a no development buffer of 100m is recommended around any identified burials to ensure their conservation.

The field assessment confirmed the location of the monument (Site 002) as noted in the desktop review. This monument records the names of a number of victims of armed conflict from 1899 until 1981. Due to the social significance of this monument, it is determined to have high local cultural value and is graded IIIA. It is recommended that a no development buffer of 100m is implemented around this site to ensure its conservation and in order to retain its sense of place. This site and its 100m buffer are excluded from the development layout and as such, no impact to this site is anticipated. No further mitigation is recommended for this site.

The above mitigation measures are adhered to in the final layout for this project and as such, no impact to significant heritage resources is anticipated as a result of this proposed development.

Table 3.1 Impacts of the proposed development to archaeological resources

NATURE: The construction phase of the project will require excavation, which may impact on archaeological heritage resources if present.				
		Without Mitigation		**With Mitigation**
MAGNITUDE	**H (8)**	A significant heritage resource of significance was identified within the development footprint	**L (1)**	A significant heritage resource of significance was identified within the development footprint
DURATION	**H (5)**	Where an impact to a resource occurs, the	**H (5)**	Where an impact to resources occurs, the

		impact will be permanent.		impact will be permanent.
EXTENT	**L (1)**	Localised within the site boundary	**L (1)**	Localised within the site boundary
PROBABILITY	**H (5)**	It is likely that significant heritage resources will be impacted	**L (1)**	It is unlikely that significant heritage resources will be impacted
SIGNIFICANCE	**H**	(8+5+1) x 5=70	**L**	(1+5+1) x1 =7
STATUS		Neutral		Neutral
REVERSIBILITY	**L**	Any impacts to heritage resources that do occur are irreversible	**L**	Any impacts to heritage resources that do occur are irreversible
IRREPLACEABLE LOSS OF RESOURCES?	**M**	Possible	**L**	Unlikely
CAN IMPACTS BE MITIGATED		Yes		Yes
MITIGATION: - A no development buffer of 100m is to be implemented around the monument recorded as Site 2. This is adhered to in the layout provided. - 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.				
RESIDUAL RISK: Should any significant resources be impacted (however unlikely) residual impacts may occur, including a negative impact due to the loss of potentially scientific cultural resources.				

As can be seen in Table 3.1 above, the significance of impacts to archaeological resources can be mitigated to acceptable levels (low) with the implementation of the appropriate mitigation measures and no fatal flaws have been identified.

5.1.3 Palaeontology

The palaeontological sensitivity of the area proposed for the Benya PV Facility, located in the Limpopo Province, is assessed as **Low** overall, with low (negative) potential impacts on palaeontological heritage resources. This evaluation encompasses all phases of the project, including the construction, operational, and decommissioning stages, along with associated infrastructure such as photovoltaic panels, the LILO corridor, internal and external access roads, substations, and temporary construction yards. While minor disruptions to the subsurface may occur during construction, the likelihood of encountering significant fossil material remains low. Confidence in this assessment is high.

The proposed development area is underlain by geological formations of varying palaeontological significance. The Ventersdorp Supergroup (Klipriviersberg Group) and the Gaborone Granite Complex, which form the primary geological units of the site, are predominantly volcanic and granitic in origin, respectively, and thus have low to negligible fossil preservation potential. However, the Malmani Subgroup of the Transvaal Supergroup, present in some portions of the site, contains carbonate rocks known for preserving stromatolitic structures and microfossils, warranting a classification of high palaeontological sensitivity in these specific contexts. Tertiary to Quaternary

deposits, consisting of black and red soils, ferricrete, calcrete, and surface conglomerates, may occasionally yield fossil remains, though the likelihood of significant discoveries is minimal.

Previous palaeontological investigations in the region, such as those conducted by Groenewald and Groenewald (2014), have documented a limited occurrence of fossils within similar geological contexts. Stromatolites and organic-walled microfossils recorded in the Malmani Subgroup highlight the potential for scientific discovery but are unlikely to be impacted significantly by the proposed development. Furthermore, the cumulative impact of alternative energy developments in the region remains low, given the largely unfossiliferous nature of the broader geological formations.

**Stromatolites - fossilized microbial structures - hold scientific value as they provide evidence for stratigraphic and biostratigraphic correlation, aiding in the higher resolution correlation of geological strata across different regions. These structures also provide insights into palaeoenvironmental settings. The scientific significance of stromatolites is further emphasised when discovered in poorly studied areas. Their presence in such contexts can substantially enhance understanding of the region's geological history.*

Table 3.2: Impacts of the proposed development of the PV facility to palaeontological resources

NATURE: The construction phase of the project will require excavation, which may impact on palaeontological heritage resources if present.				
		Without Mitigation		**With Mitigation**
MAGNITUDE	**H (8)**	A small portion of the area proposed for development is underlain by sediments of very high palaeontological sensitivity although no specific areas for exclusion are identified	**H (8)**	A small portion of the area proposed for development is underlain by sediments of very high palaeontological sensitivity although no specific areas for exclusion are identified
DURATION	**H (5)**	Where an impact to resources occurs, the impact will be permanent.	**H (5)**	Where an impact to resources occurs, the impact will be permanent.
EXTENT	**L (1)**	Localised within the site boundary.	**L (1)**	Localised within the site boundary.
PROBABILITY	**L (1)**	The potential impact to fossil heritage resources is extremely low	**L (1)**	The potential impact to fossil heritage resources is extremely low
SIGNIFICANCE	**L**	(8+5+1) x 1=14	**L**	(8+5+1) x 1=14
STATUS		Negative		Positive
REVERSIBILITY	**L**	Any impacts to heritage resources that do occur are irreversible	**L**	Any impacts to heritage resources that do occur are irreversible
IRREPLACEABLE LOSS OF RESOURCES?	**H**	Possible	**H**	Possible
CAN IMPACTS BE MITIGATED		Yes		Yes
MITIGATION: The attached Chance Fossil Finds Procedure must be implemented				
RESIDUAL RISK: Should any significant resources be impacted (however unlikely) residual impacts may occur, including a negative impact due to the loss of potentially scientific cultural resources.				

As can be seen in Table 3.2 above, the significance of impacts to palaeontology resources are considered acceptable levels (low) with the implementation of the appropriate mitigation measures and no fatal flaws have been identified.

5.2 Sustainable Social and Economic Benefit

The SIA (Donaway Environmental, 2025) has assessed the development of the Benya Solar PV Facility and grid connection infrastructure project, located on the Remaining Extent of Farm Portugal No. 198 and Farm Napoleon No. 216, approximately 72km north west of the town of Northam in the Limpopo Province. Several positive and negative social impacts have been identified for the project.

The construction phase is traditionally associated with the greatest social impact on communities, with residents and businesses in Dwaalboom/Northam and its surrounding communities most likely affected. Many of the social impacts are unavoidable and will take place to some extent, but can be managed through the careful planning and implementation of appropriate mitigation measures. Based on the social impact assessment, the following general conclusions and findings can be made:

- The construction phase of the Benya Solar PV Facility and grid connection infrastructure, like any other construction project, may bring about negative social impacts, such as the influx of non-local workers and job seekers, disturbance due to noise and dust pollution, increase in road usage which could lead to road damage, and safety concerns in the region. The impacts are not limited to PV and grid projects but are rather common in most construction projects. These impacts can be reduced by implementing proposed mitigation measures. Therefore, taking proactive measures to minimise the significance of these impacts on Dwaalboom/Northam and the surrounding communities.
- The proposed Benya Solar PV Facility and associated grid connection infrastructure will introduce visual intrusion into the surrounding regions of the project. Although it will be screened by the vegetation cover in the region and therefore not affect nearby communities as much.
- The development of the Benya Solar PV Facility and grid connection infrastructure will generate employment opportunities for individuals from the Dwaalboom/Northam and surrounding communities. Specifically, this would benefit the Thabazimbi LM as a large proportion of the population is not economically active (34.4%) or is unemployed (13.1%).
- The implementation of the Benya Solar PV Facility is expected to enhance skill development in the community and lead to better employment opportunities. This, in turn, will equip the workers with valuable knowledge and skills that can be beneficial for their future professional endeavours.
- The Thabazimbi LM's economy has the potential to benefit from the proposed project by fostering entrepreneurial growth and opportunities, particularly for local businesses in Dwaalboom/Northam. These

businesses, involved in the provision of general materials, goods, and services during both the construction and operational phases, are likely to experience positive impacts. Furthermore, the cumulative effects of developing additional solar facilities to the currently proposed facilities could amplify these benefits.

- The proposed development of the Benya Solar PV Facility represents an investment in non-polluting and renewable energy infrastructure. In comparison to energy generated through the combustion of fossil fuels, this presents a favourable social benefit for society.
- Some of the surrounding landowners have raised their concerns regarding the project. They are concerned about the change in the sense of place, ecological impacts and safety and security during the construction phase. One business in the area is concerned about the impact that might be associated with a change in aesthetics in the area.

The following recommendations are made based on the SIA. The proposed mitigation measures should be implemented to limit the negative impacts and enhance the positive impacts associated with the project. Based on the social assessment, the following recommendations are made:

- The appointment of a Community Liaison Officer (CLO) to assist with the management of social impacts and to deal with community issues, if feasible.
- It is imperative that local labour be sourced, wherever possible, to ensure that benefits accrue to the local communities. Efforts should be made to involve local businesses during the construction activities, where possible. Local procurement of labour and services/products would greatly benefit the community during the construction and operational phases of the project.
- Local procurement of services and equipment is required where possible to enhance the multiplier effect.
- Involve the community in the process as far as possible (encourage cooperative decision-making and partnerships with local entrepreneurs). In particular, the community needs to be involved during the public participation process of the EIA, whereby their comments are relevant, feasible, practical and of concern, should be addressed.
- Employ mitigation measures to minimise dust and noise pollution and damage to existing roads. In particular, the project should be subject to adherence to the National Environmental Management: Air Quality Act (Act No 39 of 2004) and measures in respect of dust control. Employing the National Dust Control Regulations of November 2013 during the construction phase will limit gaseous or particulate emissions as anticipated from exhaust emissions from construction vehicles and equipment on-site, as well as vehicle-entrained dust from the movement of vehicles on the internal access roads.
- National noise control regulations & SANS 10103:2008: the Measurement and Rating of Environmental Noise should be implemented to reduce the overall noise impact.

- Construction activities will ensure that damage to public roads and access roads attributable to construction vehicles is repaired prior to the completion of the construction phase.
- Safety and security risks should be considered during the construction phase of the proposed project. Access control, security, and management should be implemented to limit the risk of crime increasing in the area. In particular, the scoping phase of the EIA should identify possible safety and security risks associated with the proposed development to be implemented prior to the construction phase.

Based on the outcomes of this heritage assessment, the anticipated socio-economic benefits to be derived from the project outweigh any anticipated negative impacts to heritage resources on condition that the mitigation measures outlined in the SIA and in this report are implemented.

5.3 Proposed Development Alternatives

The entire assessment area was surveyed for impacts to heritage resources. The developer has proposed alternative locations for the substation & O&M complex and power line corridors, which are included in the maps in this report. No heritage resources have been identified that will be impacted by any of the proposed alternatives considered in this report. As such, there is no preferred alternative for the substation & O&M complex and power line corridors from a heritage perspective.

The layout provided for the Benya PV Facility is unlikely to negatively impact on significant heritage resources and as such, no alternatives are proposed from a heritage perspective.

5.4 Site Sensitivity Verification Statement

A Site Sensitivity Verification process was undertaken as part of the assessment to verify (confirm or dispute) the sensitivities identified in the DFFE screening tool for the Cultural Heritage, Archaeology and Palaeontology themes. The results of the Site Sensitivity Verification are presented in Table 4 below.

Table 4: Site Sensitivity Verification Table

Theme	DFFE Screening Tool Report Sensitivity	Specialist Sensitivity	Rating Confirmed/ disputed and Reasons	Compliance Statement or Full Assessment
Cultural Heritage	LOW	MEDIUM	***Disputed*** **-** The cultural value of the broader area has significance in terms of its settler and agricultural history, with intact cultural landscape resources located within the development footprint (Monument)	Full Assessment
Archaeology	LOW	LOW	***Confirmed*** **-** Some stone age archaeological resources of low significance were identified within the development footprint	Full Assessment

Palaeontology	VERY HIGH	LOW	***Disputed -*** The palaeontological sensitivity of the area proposed for the Benya PV Facility, located in the Limpopo Province, is assessed as **Low** overall	Full Assessment

As per the findings of this assessment, and its supporting documentation, the outcome of the Site Sensitivity Verification disputes the results of the DFFE Screening Tool for Cultural Heritage and Palaeontology, which should be MEDIUM and LOW respectively, and confirms the results of the screening tool for Archaeology, which is LOW. This evidence is provided in the body of this report and in the appendices (Appendix 1 and 2).

5.5 Cumulative Impacts

The cumulative impact of a development is the impact that development will have when its impact is added to the incremental impacts of other past, present or reasonably foreseeable future activities in similar nature that will affect the same environment. It is important to note that the cumulative impact assessment for a particular project, like what is being done here, is not the same as an assessment of the impact of all surrounding projects. The cumulative assessment for this project is an assessment only of the impacts associated with this project, but seen in the context of all surrounding impacts. It is concerned with this project's contribution to the overall impact, within the context of the overall impact. But it is not simply the overall impact itself.

The most important concept related to a cumulative impact is that of an acceptable level of change to an environment. A cumulative impact only becomes relevant when the impact of the proposed development will lead directly to the sum of impacts of all similar developments causing an acceptable level of change to be exceeded in the surrounding area. If the impact of the development being assessed does not cause that level to be exceeded, then the cumulative impact associated with that development is not significant.

In terms of cumulative impacts to heritage resources, impacts to archaeological and palaeontological resources are sufficiently dealt with on a case by case basis. The primary concern from a cumulative impact perspective would be to the cultural landscape. The cultural landscape is defined as the interaction between people and the places that they have occupied and impacted. In some places in South Africa, the cultural landscape can be more than 1 million years old where we find evidence of Early Stone Age archaeology (up to 2 million years old), Middle Stone Age archaeology (up to 200 000 years old), Later Stone Age archaeology (up to 20 000 years old), evidence of indigenous herder populations (up to 2000 years old) as well as evidence of colonial frontier settlement (up to 300 years old) and more recent agricultural layers.

Modern interventions into such landscapes, such as renewable energy development and its associated grid connection infrastructure, constitutes an additional layer onto the cultural landscape which must be acceptable in Renewable Energy Development Zone (REDZ) areas and in Strategic Transmission Corridors. The primary risk in

terms of negative impact to the cultural landscape resulting from renewable energy development lies in the eradication of older layers that make up the cultural landscape. There are various ways that such impact can be mitigated.

The area proposed for development is dominated by agricultural and wilderness landscapes and the development of a PV facility and associated grid connection infrastructure here is likely to impact on the sense of place created by the dominant land uses present here. According to the DFFE's database there are no other renewable energy applications, however there is a Petroleum Plant application that has been submitted to the Department within the geographic area of investigation.

The broader landscape does not warrant specific heritage conservation and as such, the broader area can accommodate the proposed development activities.

Table 5: Cumulative Impact Table

NATURE: Cumulative Impact to the sense of place				
		Overall impact of the proposed project considered in isolation		**Cumulative impact of the project and other projects in the area**
MAGNITUDE	**L (3)**	Medium	**L (3)**	Medium
DURATION	**M (3)**	Medium-term	**H (4)**	Long-term
EXTENT	**L (1)**	Low	**L (1)**	Low
PROBABILITY	**M (3)**	Probable	**L (2)**	Probable
SIGNIFICANCE	**L**	(3+3+1)x3=21	**L**	(3+3+1)x3=21
STATUS		Negative		Negative
REVERSIBILITY	**H**	High	**M**	Medium
IRREPLACEABLE LOSS OF RESOURCES?	**M**	Possible	**M**	Possible
CAN IMPACTS BE MITIGATED		NA		NA
CONFIDENCE IN FINDINGS: High				
MITIGATION: Implementation of recommended mitigation measures outlined in the VIA				

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 (EIA) process and will be managed by the lead environmental consultants on the project.

7. CONCLUSION

The survey proceeded without constraints or limitations, yet the project area was comprehensively surveyed for heritage resources. Some Later Stone Age archaeology of limited scientific value was identified, as were structures related to the historic farm occupation of this property. These resources include the remnants of an old farm werf and its associated farming infrastructure. None of these observations have any discernible cultural value and as such, these are considered to be Not Conservation-Worthy from a heritage perspective. No permits are required to remove or relocate these NCW observations during construction and no further action is warranted.

The field assessment confirmed the location of the monument (Site 002) as noted in the desktop review. This monument records the names of a number of victims of armed conflict from 1899 until 1981. Due to the social significance of this monument, it is determined to have high local cultural value and is graded IIIA. It is recommended that a no development buffer of 100m is implemented around this site to ensure its conservation and in order to retain its sense of place. This site and its 100m buffer are excluded from the development layout and as such, no impact to this site is anticipated. No further mitigation is recommended for this site.

As can be seen in Table 3.1, the significance of impacts to archaeological resources can be mitigated to acceptable levels (low) with the implementation of the appropriate mitigation measures and no fatal flaws have been identified.

The palaeontological sensitivity of the proposed Benya PV Facility development area in the Limpopo Province is assessed as **low**. The geological units underlying the site, including the Ventersdorp Supergroup (Klipriviersberg Group) and the Gaborone Granite Complex, possess negligible fossil preservation potential due to their volcanic and granitic origins. While the Malmani Subgroup of the Transvaal Supergroup has a high potential for fossil preservation, particularly stromatolites and organic-walled microfossils, the likelihood of significant fossil finds being affected by this development is minimal. Similarly, Tertiary to Quaternary deposits may sporadically yield fossils of limited significance, further supporting the low-impact assessment. The construction, operational, and decommissioning phases are unlikely to disturb palaeontological resources significantly.

As can be seen in Table 3.2, the significance of impacts to palaeontology resources are considered acceptable levels (low) with the implementation of the appropriate mitigation measures and no fatal flaws have been identified.

As per the findings of this assessment, and its supporting documentation, the outcome of the Site Sensitivity Verification disputes the results of the DFFE Screening Tool for Cultural Heritage and Palaeontology, which should be MEDIUM and LOW respectively, and confirms the results of the screening tool for Archaeology, which is LOW. This evidence is provided in the body of this report and in the appendices (Appendix 1 and 2).

The recommended mitigation measures are adhered to in the final layout for this project and as such, no impact to significant heritage resources is anticipated as a result of this proposed development.

8. RECOMMENDATIONS

There is no objection to the proposed development from a heritage perspective on condition that:

- A no development buffer of 100m is implemented around the monument recorded as Site 2. This is adhered to in the final layout.
- The attached Chance Fossil Finds Procedure is recommended for implementation within the deposits of the Malmani Subgroup (T1). This procedure should be in place to handle any unexpected fossil discoveries during construction.
- 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.

Table 6: EMPr Inputs

CONSTRUCTION PHASE							
Ref #	**Impact Management Actions**	**Implementation**			**Monitoring**		
		Responsible person	**Method of implementation**	**Timeframe for implementation**	**Responsible person**	**Frequency**	**Evidence of compliance**
1.1	All site crew should be informed of the heritage significance of the resources in the study area	ECO	Once-off meeting held with site crew	Prior to construction	ECO	Once off	Minutes of meeting
1.2	Implementation of the Chance Fossil Finds Procedure within the deposits of the Malmani Subgroup (T1).	Site Manager	Implementation of the HWC Chance Fossil Finds Procedure	During construction	ECO	Throughout Construction Phase	Written correspondence with relevant heritage authority regarding and minutes of relevant meetings
1.3	If any archaeological material or human burials are uncovered during the course of development, then work in the immediate area should be halted at once. The find should be reported to the heritage authorities (SAHRA) and may require inspection by an archaeologist to determine whether mitigation should take place and what form that mitigation should take.	ECO	On-Site monitoring	During construction	ECO	Throughout Construction Phase	Written correspondence with relevant heritage authority regarding and minutes of relevant meetings

OPERATIONAL PHASE							
2.1	Should it be necessary that structures that have been graded or structures that are older than 60 years require alteration or demolition during this phase, the relevant heritage authority (LIHRA) must be contacted regarding permission in terms of section 34 of the NHRA.	Site Manager	Section 34 permit application to LIHRA	Throughout Operations	Site Manager	Throughout Operations	Permit issued in terms of section 34 from the relevant heritage authority or correspondence in this regard.
DECOMMISSIONING PHASE							
3.1	All site crew should be informed of the heritage significance of the resources in the study area	Site Manager	Meeting held with site crew	Decommissioning Phase	Site Manager	Decommissioning Phase	Minutes of meeting
3.2	Should it be necessary that structures that have been graded or structures that are older than 60 years require alteration or demolition during this phase, the relevant heritage authority (LIHRA) must be contacted regarding permission in terms of section 34 of the NHRA.	Site Manager	Section 34 permit application to LIHRA	Decommissioning Phase	Site Manager	Decommissioning Phase	Permit issued in terms of section 34 from the relevant heritage authority or correspondence in this regard.

9. REFERENCES

Heritage Impact Assessments				
Nid	**Report Type**	**Author/s**	**Date**	**Title**
357856	Francois P Coetzee	10/01/2016	HIA Phase 1	Cultural Heritage Assessment for the Proposed Sebele Lodge Development, Ramotshere Moiloa Local Municipality, Ngaka Modiri Molema District Municipality, Madikwe Magisterial District, North West Province
5568	Johnny Van Schalkwyk	01/02/1997	AIA Phase 1	Kgatla Iron Age Site: Exhibition Proposal and Management Plan
5702	Johnny Van Schalkwyk	01/02/2003	AIA Phase 1	Arch Survey Mantserre-Kraalhoek-Mopyane Water Scheme, NW Province
6858	Johnny Van Schalkwyk	01/09/2008	AIA Phase 1	Heritage Impact Survey Report for the Proposed Green House Lodge, Madikwe Game Reserve, Thabazimbi Magisterial District, Limpopo Province
7677	Francois P Coetzee	01/11/2008	AIA Phase 1	Cultural Heritage Survey of PPC Dwaalboom
20893	Anton Pelser	23/03/2022	HIA Phase 1	A REPORT ON A PHASE 1 HERITAGE IMPACT ASSESSMENT FOR THE PROPOSED NEW TYRE STORAGE FACILITY AT PPC DWAALBOOM NORTHWEST OF NORTHAM, LIMPOPO PROVINCE
22834	Heidi Fourie	04/03/2021	PIA Phase 1	Palaeontological Impact Assessment: Desktop Study. Sturdee Energy PPC Dwaalboom Solar Project, Thabazimbi Local Municipality, Waterberg District Municipality, Limpopo Province
33248	Neels Kruger	03/07/2021	HIA Phase 1	HERITAGE IMPACT ASSESSMENT (HIA) ON PORTIONS OF THE FARMS SCHOONGEZICHT 238KP AND JAKHALSKRAAL 239KP FOR THE PROPOSED STURDEE ENERGY PPC DWAALBOOM SOLAR PROJECT, THABAZIMBI LOCAL MUNICIPALITY, LIMPOPO PROVINCE

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APPENDICES

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APPENDIX 1: Archaeological Assessment (2025)

ARCHAEOLOGICAL SPECIALIST STUDY

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

Proposed Benya PV Facility

Prepared by

CTS HERITAGE

Jenna Lavin
Nic Wiltshire
Mabeth Crafford

In Association with

Cape EAPrac

January 2024

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EXECUTIVE SUMMARY

This report is drafted for the proposed development of the Benya PV facility and associated grid infrastructure in the Limpopo province.

The survey proceeded without constraints or limitations, yet the project area was comprehensively surveyed for heritage resources. Some Later Stone Age archaeology of limited scientific value was identified, as were structures related to the historic farm occupation of this property. These resources include the remnants of an old farm werf and its associated farming infrastructure. None of these observations have any discernible cultural value and as such, these are considered to be Not Conservation-Worthy from a heritage perspective.

The field assessment confirmed the location of the monument (Site 002) as noted in the desktop review. This monument records the names of a number of victims of armed conflict from 1899 until 1981. Due to the social significance of this monument, it is determined to have high local cultural value and is graded IIIA. It is recommended that a no development buffer of 100m is implemented around this site to ensure its conservation and in order to retain its sense of place.

On condition that the above mitigation measures are adhered to, no impact to significant heritage resources is anticipated as a result of this proposed development.

Recommendations

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

- A no development buffer of 100m is implemented around the monument recorded as Site 2
- 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

This report is drafted for the proposed development of the Benya PV facility and associated grid infrastructure in the Limpopo province.

1.2 Description of Property and Affected Environment

The proposed Benya solar PV project lies on the farm Portugal 198 KP and the grid connection runs over farm Napoleon 216KP in Limpopo Province. The Madikwe Game Reserve is only about 3.5km west of the development. A series of prominent koppies (Batavia se Kop) to the north separate the farm from Kameelhoek farm. The farms bordering the eastern end and within the grid connection are tilled for maize and soya agriculture while Portugal farm itself has been used primarily used as a cattle ranch. There are small fields where crop agriculture has taken place but the majority of the infrastructure is centred around cattle troughs, kraals and camps for livestock.

Only one werf lies in the study site (Portugal) and the buildings date to the mid 20th century. The topography is generally flat and level besides on small koppie northeast of the werf that rises up about 50m from the rest of the plain. Two well built gravel roads run through the property - one leads onto Dwaalboom while the other, if taken west, runs up the Derdepoort Border Post with Botswana.

Almost the entire study site is heavily overgrown with acacia and sickle-bush trees. Large areas of the property were formerly cleared in the past based on historical satellite imagery and the small koppie on the farm is covered in Ventersdorp quartzites.

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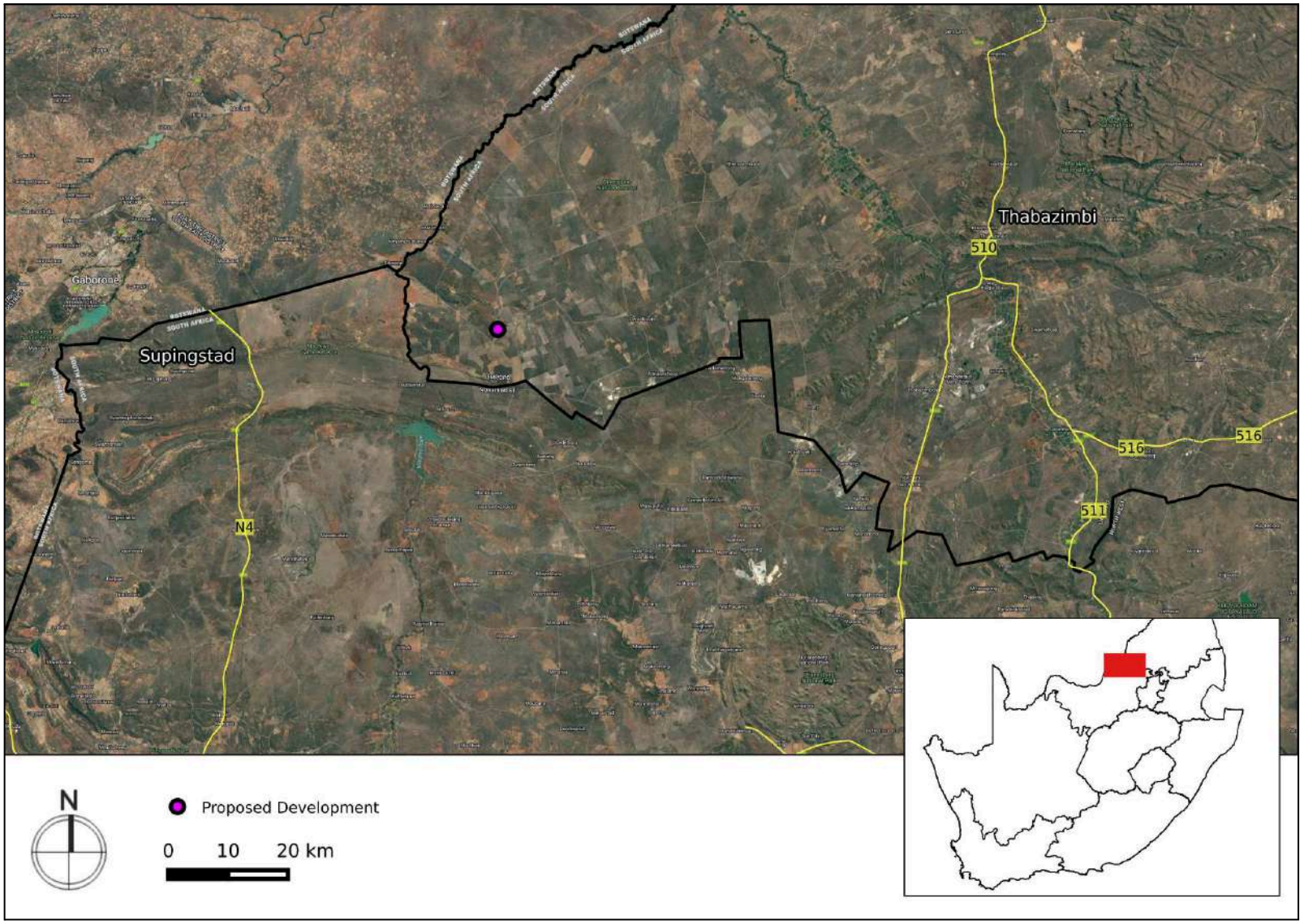

Figure 1.1: Satellite image indicating proposed location of development

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Figure 1.2: Proposed project boundary

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Figure 1.3: Proposed project boundary

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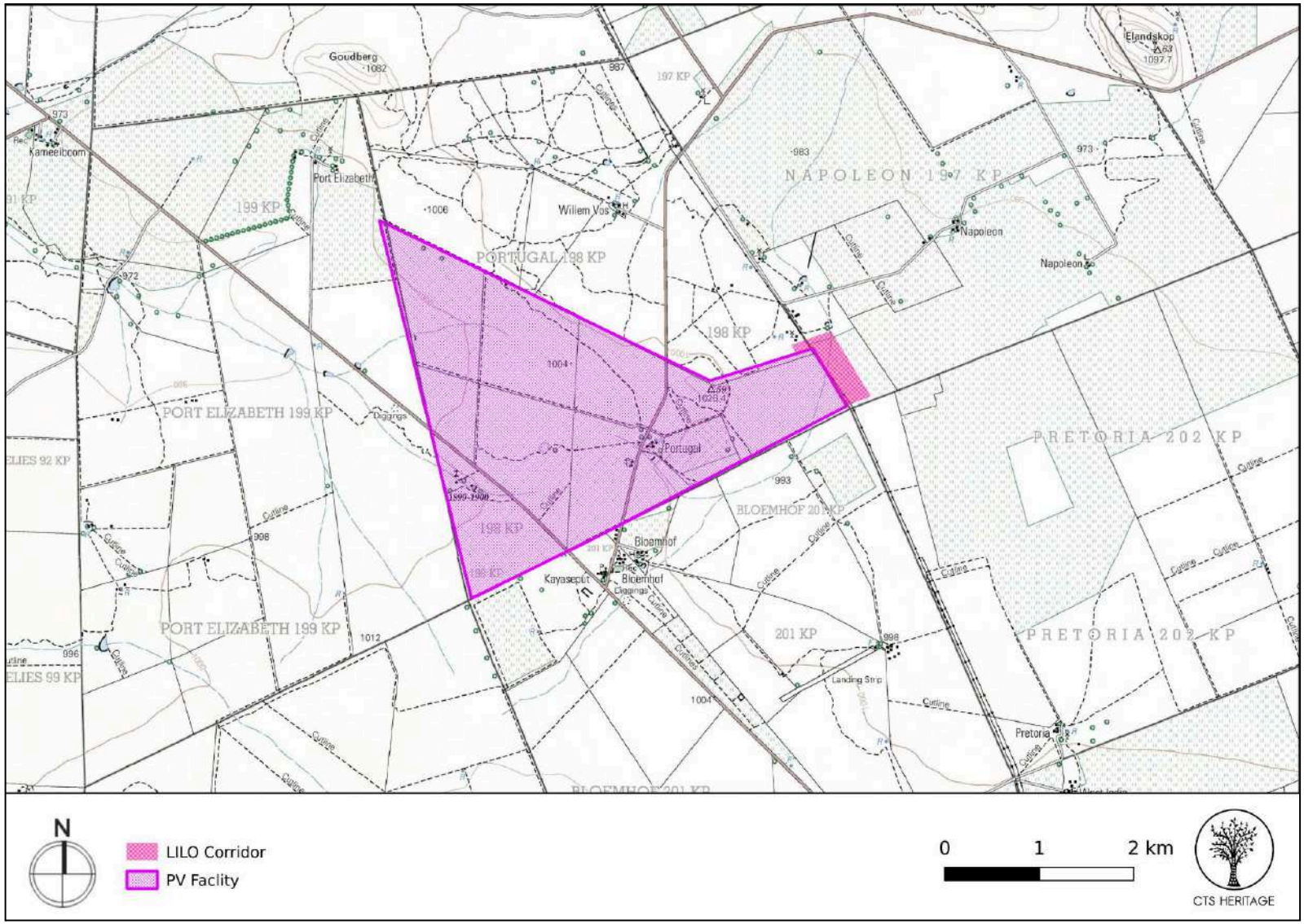

Figure 1.4: Proposed project boundary indicated on the 1:50 000 Topo Map

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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 11-12 January 2025 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

There are several well-made gravel roads criss-crossing the property to manage the cattle farm and access to all parts of the property was easily made. The vegetation has become very overgrown to the point of impenetrability in many sections and we had to survey the fringes of these zones or sample more open areas in between to gauge the level of archaeological sensitivity. The koppie, in particular, was covered thoroughly but it's very low profile does not stand out in the landscape and did not yield any Iron Age sites typical of the large outcrops to the north of the site or within Madikwe.

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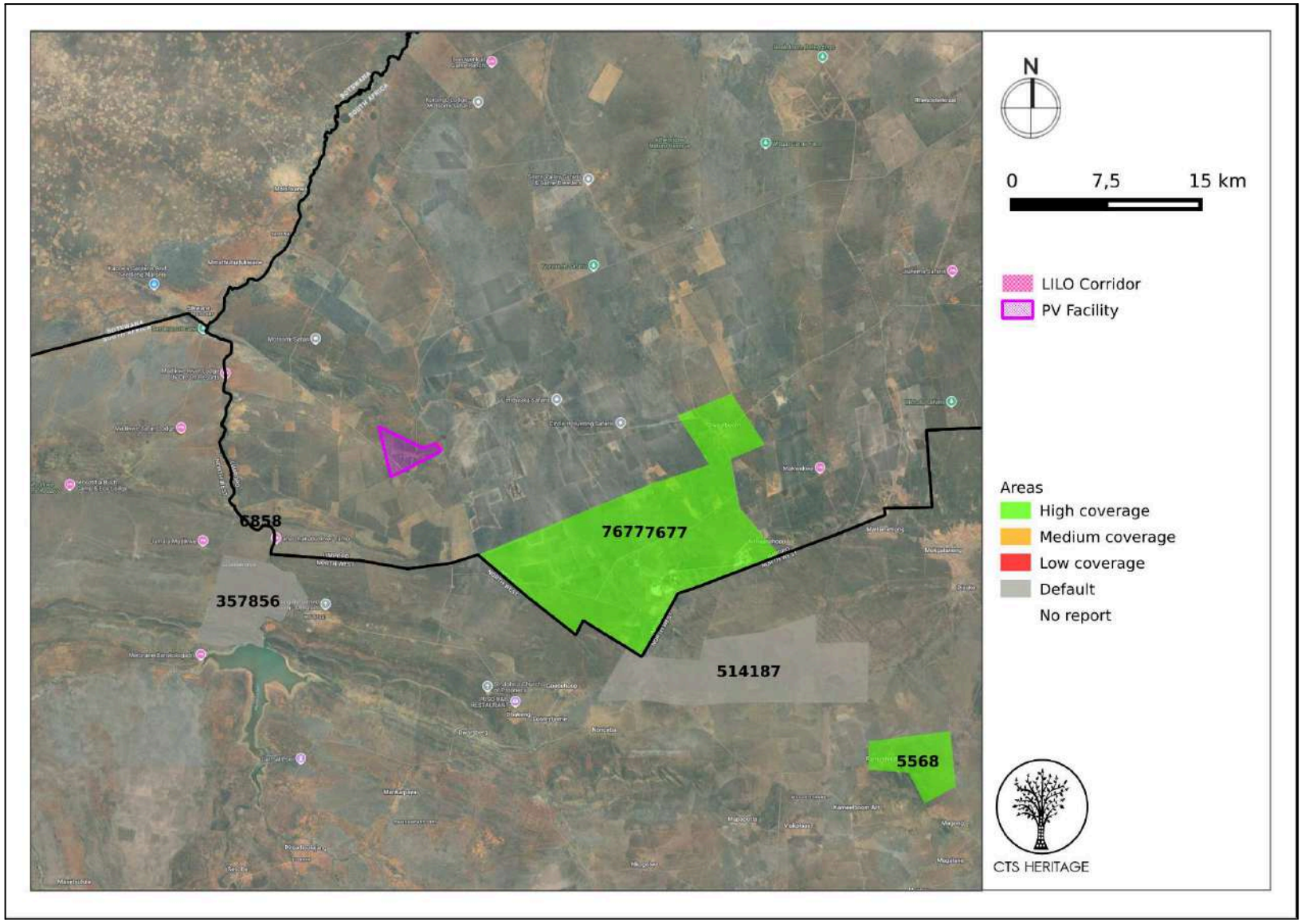

Figure 2: Close up satellite image indicating proposed location of development in relation to heritage studies previously conducted

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3. HISTORY AND EVOLUTION OF THE SITE AND CONTEXT

3.1 Background

The proposed development lies less than 20km southeast of the border with Botswana at Derdepoort, and approximately 80km west of Thabazimbi. The name Thabazimbi means *mountain of iron* because of the large iron ore reef that was discovered in 1919 by J. H. Williams. The mine boasts one of the largest mining shafts in Africa. More than 2 million tons of ore are mined every year and hauled by train to Mittal's iron and steel works. The railway line from Rustenburg reached the area in the 1930s and full-scale iron and steel production began. The town was proclaimed in 1953 and its history is intimately linked with that of the mines in the area. Much of the central landscape of the North West Province is defined by bushveld and grasslands scattered with trees and shrubs; the mountains, deep valleys, rivers and dams of the northeast; the flat and arid semi-deserts plains of the west; and the lush vegetation of areas bordering the Vaal River in the south.

3.2 Cultural Landscape, Built Environment and History

A broad history of the area is included in Murimbika (2010, SAHRIS NID 534905) and is referred to here. According to Murimbika (2010), the broader region was subject to a number of instances of migration and settlement from 450 AD and has yielded some significant Iron Age Sites such as the Mzonjani facies Broederstroom site (AD 430 to AD 780). Evidence indicates that Sotho-Tswana groups migrated in and out of the Magaliesberg region, and such groups are responsible for the many early stone-walled settlements in this region. One of the most documented migrations is the Mfecane (forced migration or scattering) which was a period of widespread chaos and warfare among indigenous ethnic communities in southern Africa during the period between 1815 and about 1840. During this time, the Ndebele under Mzilikazi reached the Magaliesberg region and were responsible for introducing the Doornspruit-type walled settlements that are known from this region. According to Murimbika (2010), this type of stone-walled settlement represents "typical Nguni-Sotho-Tswana acculturation". Murimbika (2010) further explains that one of the most acculturated groups in the region is known as the "Po", whose Chief Mogale lends his name to the Magaliesberg Mountains and the Mogale City Municipality. By the mid-1800's, Voortrekkers had begun to settle in the foothills of the Magaliesberg mountains and in so doing, clashed with Mzilikazi's Ndebele in 1837. These early colonial battles forced the Ndebele north of the Limpopo River and effectively ended the independence of African Chiefdoms in the area. The Voortrekkers went on to establish the Republic of the Transvaal.

The broader area is described by Kruger (2021, SAHRIS NID 33248) as "*situated in a rural agricultural zone along the western Waterberg Biosphere. The area has been impacted on by farming practices during the last century where portions of the Schoongezicht and Jakhalskraal property subject to this assessment has been transformed into cultivated lands in past decades. The region consists mostly of crop, cattle and game farms but an increasing number of mines and quarries occur around rich limestone and cement resources. Agriculture has resulted in severe bush densification with alien species such as Sickle Bush occurring through the project area in dense, impenetrable stands. Pockets of indigenous grassland and Bushveld vegetation remain in places and the rest of the terrain is undulated with a number of drainage lines bisecting the larger landscape.*"

Coetzee (2008, SAHRIS NID 7677) notes that "*The area is generally open and flat and is characterised by extensive limestone deposits and cotton soils. The area has been extensively utilised for farming (both agriculture and*

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pastoralism) since the late 19th century (most of the farms were first surveyed in 1897). The remainder of the land has been under agricultural and pastoral farming practice which resulted in the following infrastructure developments:

- *agricultural field*
- *farm homesteads and worker accommodation*
- *cattle kraals and dipping facilities*
- *wind pumps and reservoirs*
- *extensive fencing*
- *access roads, power lines and telephone lines*"

Coetzee (2008) goes on to note that "*The survey area consists of farms, most of which were first surveyed in 1897 (according to the original title deeds) and occupied soon thereafter. It would seem that none of the houses dating from this early period of occupation have survived as no example could be found. Local oral history also confirms that none of these wood and iron structures survived and that the last example was demolished a few years ago due to structural collapse. Most of the historical buildings and foundations that were recorded can be associated with the second building phase, which dates between the 1930s and 1940s. The structures were built with brick and cement (most houses also have corrugated iron roofs). These buildings are all older than 60 years. Modern buildings (not older than 60 years) are associated with a third phase of development (according to the recent title deeds) which probably started in the 1980s and continued until recent times.*" In his assessment, Coetzee (2008) identified a number of burial grounds and graves, existing structures as well as the ruins and foundations of structures that were likely thatched rondavels belonging to workers in the area dated to the 19th Century.

In terms of more recent cultural landscape developments, there are also some historical farm werfs located within the project area, as well as existing roads. Both the first edition Topo Map and the current Topo Map indicate the presence of a monument located within the area proposed for development dated 1899-1900.

3.3 Archaeology

Previous Heritage Impact Assessments conducted in the broader area of the proposed development have identified a number of significant archaeological sites. Kruger (2021, SAHRIS NID 33248) notes that "*The cultural historical landscape of the Waterberg area spans million years with evidence of hominin occupation, Stone Age traditions, Iron Age farmers and historical events. Makapansgat, a deep limestone cave near Mokopane has yielded remains of Australopithecus africanus that dates to more than 3 million years BP and also Homo erectus, dating to approximately 1 million years BP. However, Earlier Stone Age (ESA) material is scarce on the Waterberg plateau. The Middle Stone Age (MSA) is abundantly represented in the Waterberg area and archaeological excavations at sites such as the Olieboomspoort Shelter in the northwestern part of the Waterberg have yielded rich MSA deposits which display a large degree of specialisation and skill in stone working (Van der Ryst 1996). These groups occupied open camps which were situated in the proximity of water sources such as pans, lakes or rivers. There is a noticeable gap in the Waterberg between MSA assemblages and material from the Later Stone Age (LSA), suggesting that the Waterberg may not have seen dense human occupation for a long period of time. However, Later Stone Age groups, including the San hunter gatherers and Khoi herders frequented the area in the last few millennia, and numerous LSA sites have been discovered*

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and excavated. Similarly, LSA evidence such as stone implements, ceramics and a wealth of rock paintings and markings are scattered over the plateau." Coetzee (2008, SAHRIS NID 7677) identified a scatter of MSA artefacts in his assessment located approximately 10km southeast of this proposed development.

Kruger (2021, SAHRIS NID 33248) goes on to note that "*The Waterberg Plateau is rich in rock art and rock markings and many such sites are still to be described and studied. At many sites "refined" San paintings occur with cruder depictions in red or white paint (sometimes black), painted directly with fingers by later Farmer groups. Numerous paintings of people in trance positions, dance scenes of men and women, men with hunting equipment, a large variety of antelope and other animals, imaginary rain animals, handprints, and geometric designs form part of the contents of the rock art of the Waterberg (Van der Ryst 1998). Two traditions of Rock Art occur in the Waterberg. First the more "naturalised" form of fine-line art, including skilled depictions of animals and people, attributed to San Hunter Gatherers. The second tradition, often called "Late White" art, is characterised by more geometric, schematic illustrations which includes a large amount of finger painting. This tradition is associated with Iron Age farmers.*" Such rick art is usually located in kloofs, caves or overhangs. No such topography is evident within the area proposed for this PV development and as such, direct impact to significant rock art is unlikely.

As noted by Pelser (2022, SAHRIS NID 20893), "*a large number of EIA to LIA sites are known to exist in the larger geographical landscape in which the study area falls. The closest and best known Iron Age site is located at Rooiberg near Thabazimbi to the north of the study area (Bergh 1999: 7). The closest Early Iron Age site is located at Broederstroom near Brits (Bergh 1999: 6). In a band stretching from Pretoria to Brits as many as 125 Late Iron Age sites have been identified and many more between Brits and Rustenburg (Bergh 1999: 7). Tswana chiefdoms flourished in the area during AD 1600 to 1840 (Pistorius 2009: 18). Late Iron Age sites are also known between Brits and Thabazimbi (Bergh 1999: 7). At the beginning of the 19th century different Tswana groups settled in the larger area. It includes the Kwena, Po and Kgatla. During the so-called Difaqane (period of war or stress) they fled to the north-west and the Ndebele of Mzilikazi settled in around the Brits area and further north between 1827 and 1832 (Bergh 1999: 10-11, 106-107, 111; Pistorius 2009: 18- 19).*" Iron Age sites are usually associated with clear topographic features in the landscape such as koppies. A number of significant koppies are located around the proposed development area (Figure 3.4) although none are located within the proposed development area.

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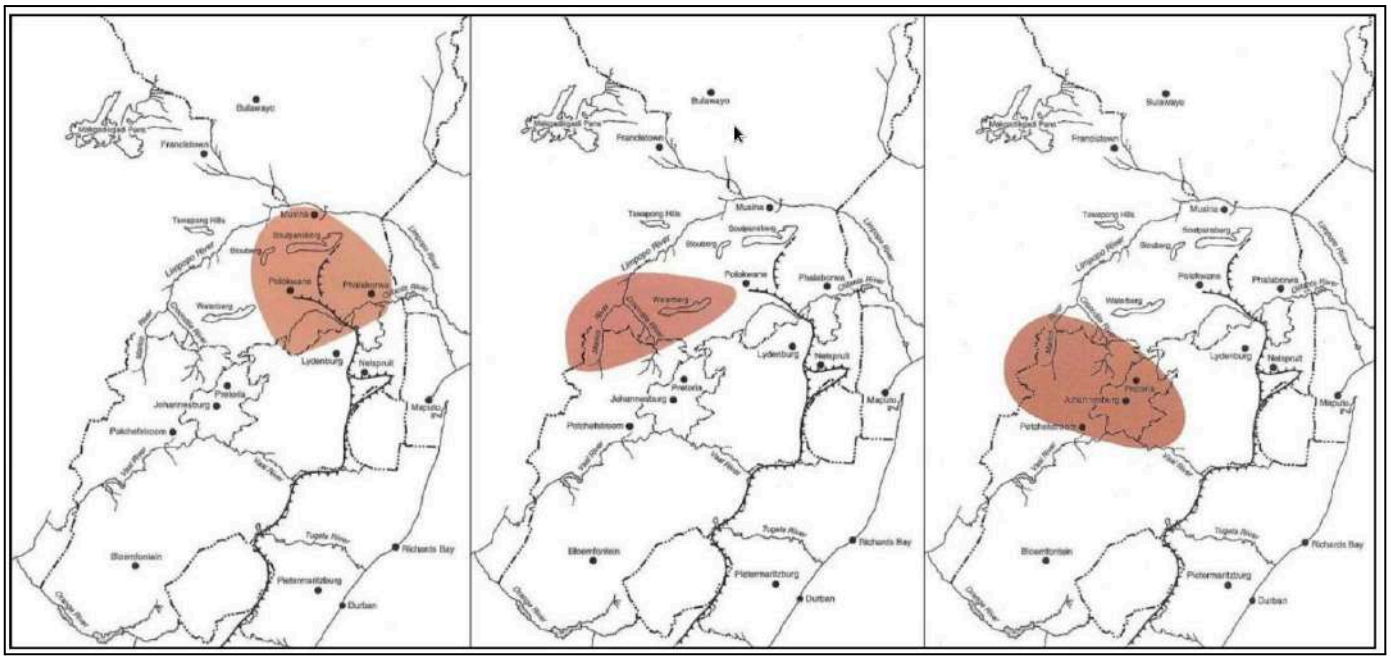

Figure 2.1 Map detailing the distribution of 16th-century Maloko (left), 17th-century Madikwe (centre) and 18th-century Buispoort tradition sites (After Huffman 2007). From Kruger (2021)

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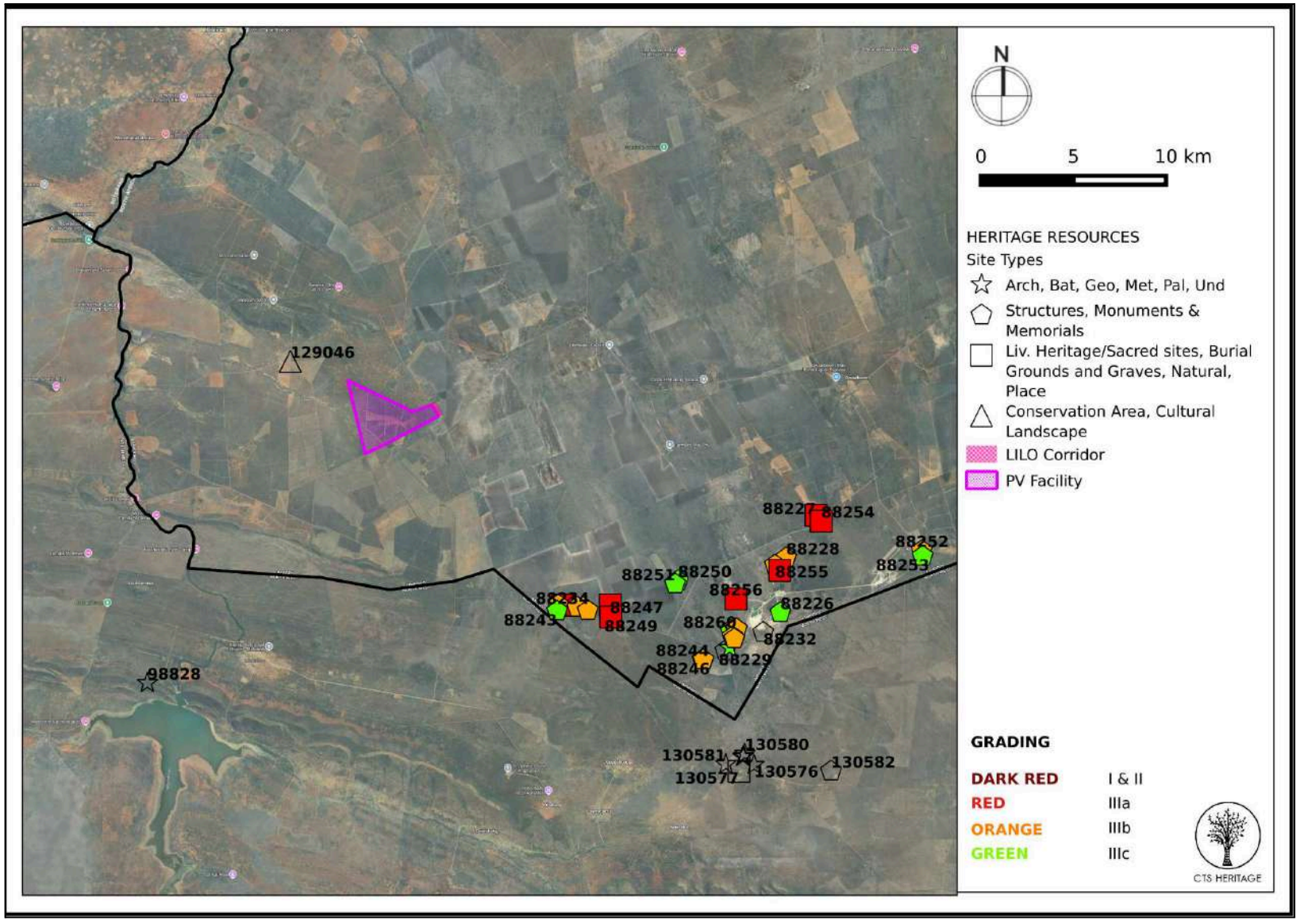

Figure 3. Heritage Resources Map. Heritage Resources previously identified in and near the study area, with SAHRIS Site IDs indicated

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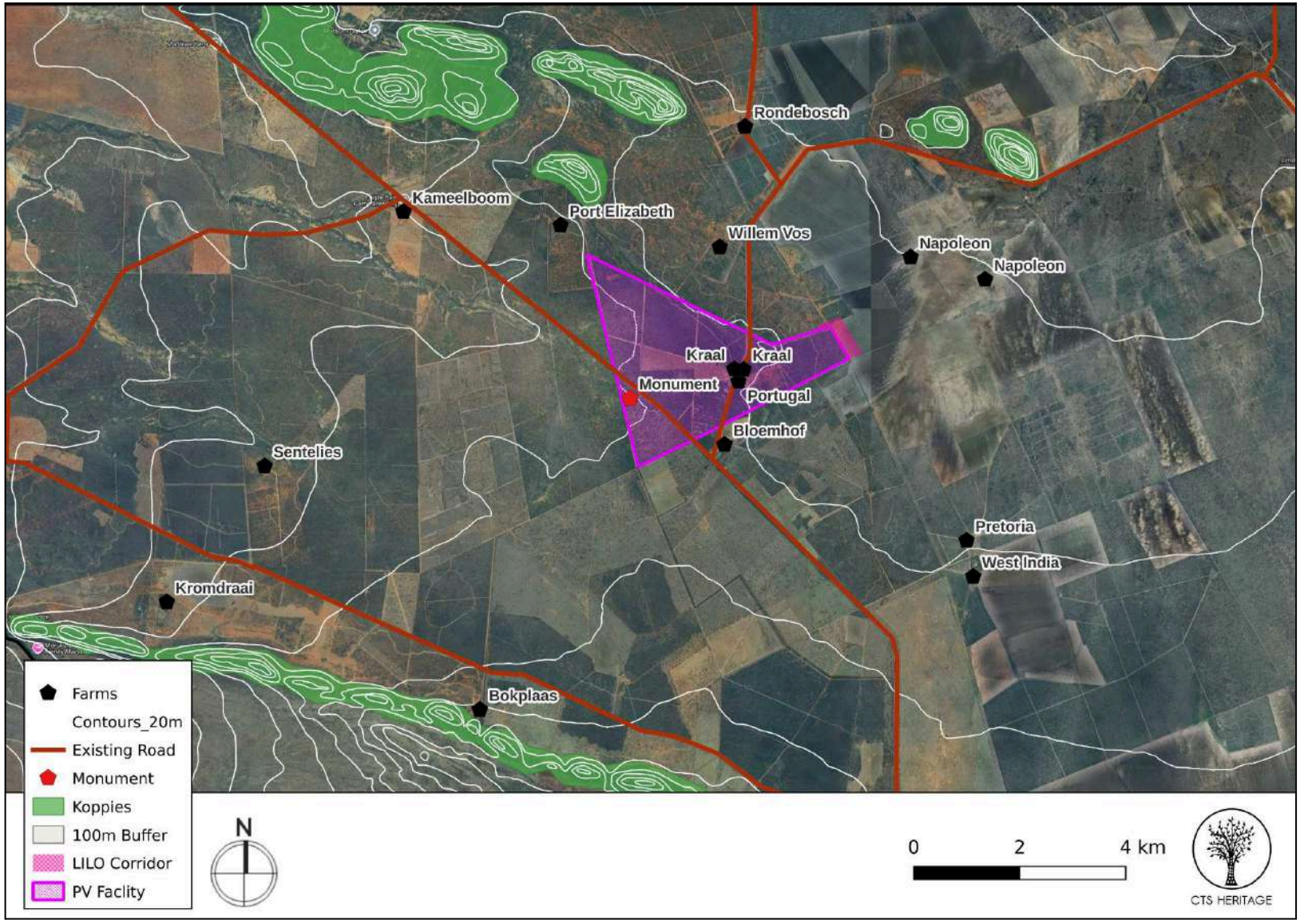

Figure 3.3 Cultural Landscape Map. Map identifying cultural landscape objects from the Topo 1:50 000 map

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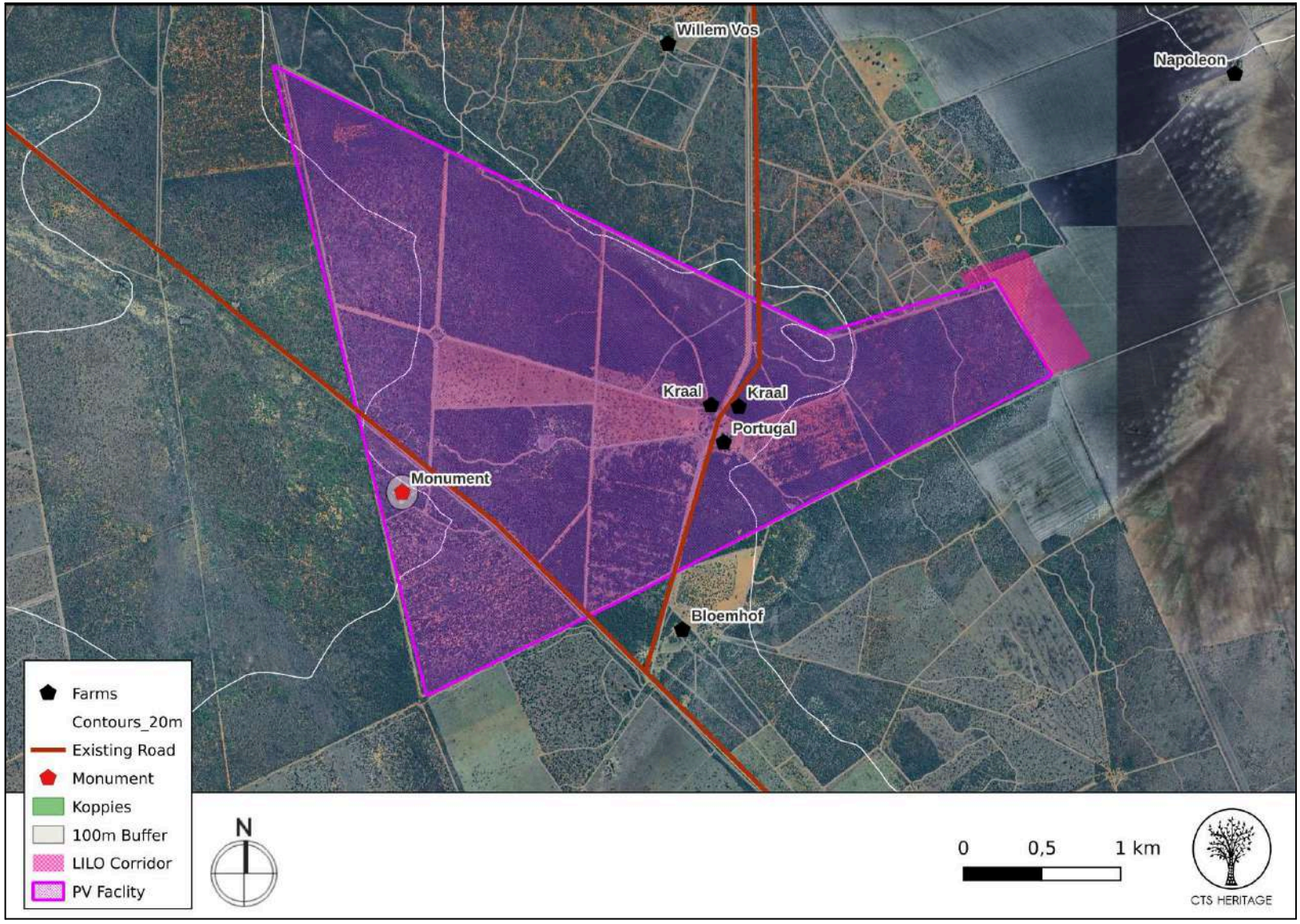

Figure 3.4 Cultural Landscape Map. Map identifying cultural landscape objects from the Topo 1:50 000 map

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4. IDENTIFICATION OF HERITAGE RESOURCES

4.1 Field Assessment

Very few Stone Age artefacts were found in the property and the overall distribution of open sites appears to be low. It is much more likely that the density of material escalates significantly on the neighbouring farm to the north at Kameelhoek where large and prominent outcrops can be found. A Second Boer War/South African War monument was erected in the 1940s on the farm and it commemorates the Derdepoort 'massacre' which involved an attack on a Boer laager[1]. There are toilet facilities, parking, commemoration area and an additional headstone to M.N. Ras who also died during the war - his grave has since been relocated.

The Portugal farmhouse buildings date to the mid 20th century and no significant historical structures were found on the property. The old borehole pumps recorded on the farm are still functioning and it appears that farming preceded the more modern buildings, perhaps with structures that have since been demolished at the main werf.

Figure 4.1: View of the cleared area surrounding the Portugal werf.

[1] https://en.wikipedia.org/wiki/Derdepoort_massacre

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Figure 4.2: View of the dense bush on the farm.

Figure 4.3: View of the dense bush on the farm.

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Figure 4.4: View along one the gravel roads linking the farm to Dwaalboom.

Figure 4.5: View of farm dust road bordered by dense bush.

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Figure 4.6: View looking northeast towards Napoleon farm near the koppie.

Figure 4.7: View of the bush and quartzites on the koppie.

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Figure 4.8: View across the proposed project area from the high ground available on the small koppie.

Figure 4.9: View towards Kameelhoek's prominent koppies to the north.

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Figure 4.10: View at one of several gravel road junctions on the farm near a water tower.

Figure 4.11: View along the southern boundary of the farm.

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Figure 4.12: View looking east towards the existing OHL pylons and Napoleon farm.

Figure 4.13: Dense bush fringing the jeep track.

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Figure 4.14: Some slightly more open areas in amongst the dense bush.

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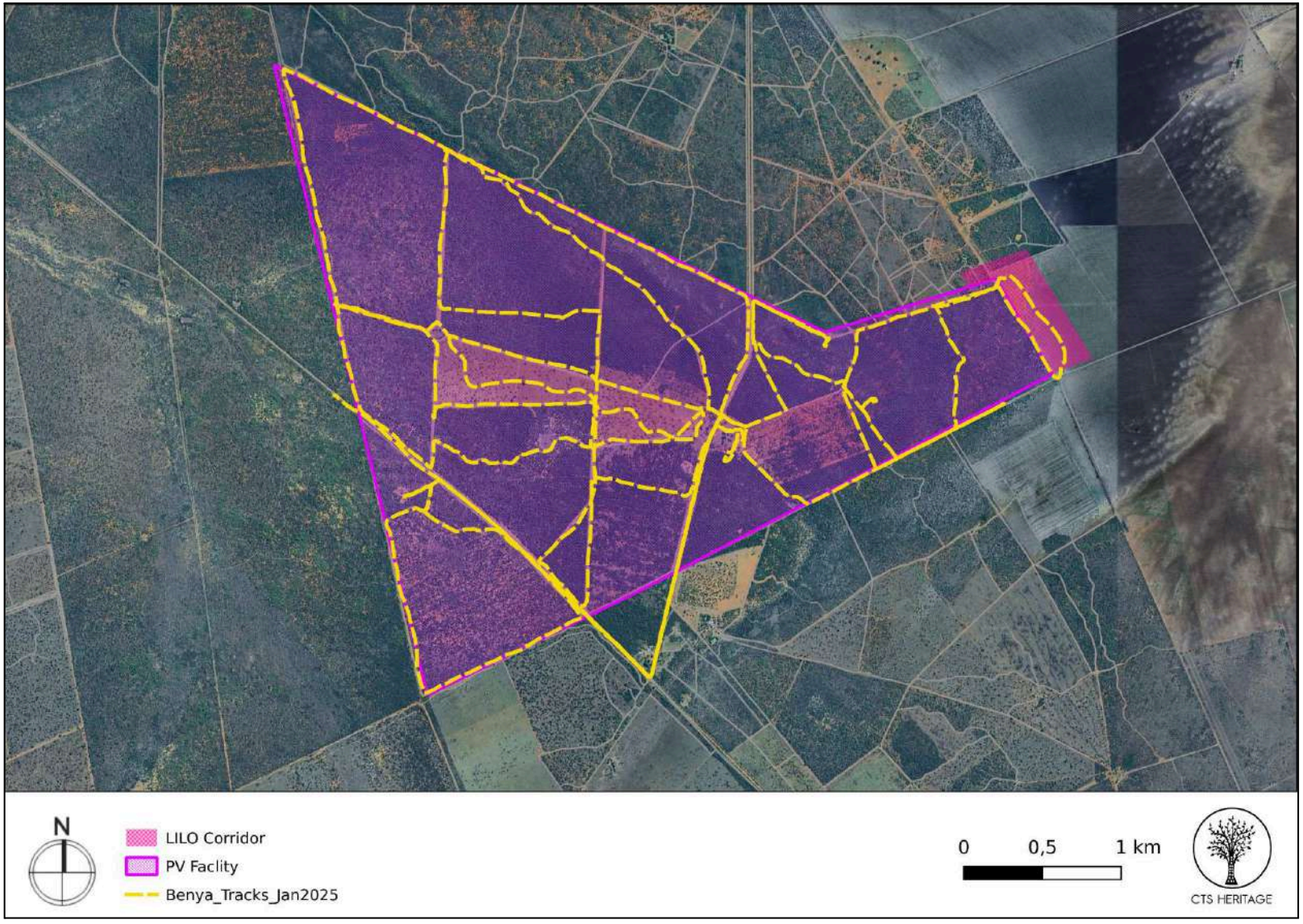

Figure 5.1. Track paths of archaeological field assessment - the dense vegetation impacted the survey (see Constraints and Limitations)

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4.2 Archaeological Resources Identified

Table 1: Observations noted during the field assessment

POINT ID	Description	Density	Type	Period	Co-ordinates		Grading	Mitigation
001	Portugal werf, modern mid 20th c building, tiled roof	n/a	Structure	Modern	-24.739082	26.572327	NCW	NA
002	2nd Boer War monument to deceased at of Derdepoort, 1899. M.N. Ras monument – grave was relocated from this spot. Site visited by tourists	n/a	Memorial	Modern	-24.742778	26.551733	IIIA	100m Buffer
003	Modern kraal, JoJo tanks, drinking trough (round)	n/a	Structure	Modern	-24.74323	26.553143	NCW	NA
004	Quartz and quartzite flakes	0 to 5	Artefacts	LSA	-24.733838	26.573954	NCW	NA
005	Quartz point	0 to 5	Artefacts	LSA	-24.739886	26.58103	NCW	NA
006	Quartz flake along fence	0 to 5	Artefacts	MSA	-24.732954	26.577433	NCW	NA
007	Siltstone core	0 to 5	Artefacts	MSA	-24.736284	26.586689	NCW	NA
008	Old borehole pump and modern tank	n/a	Structure	Historic, Modern	-24.736229	26.579631	NCW	NA
009	Old borehole pump, still in operation	n/a	Structure	Historic, Modern	-24.743063	26.577164	NCW	NA

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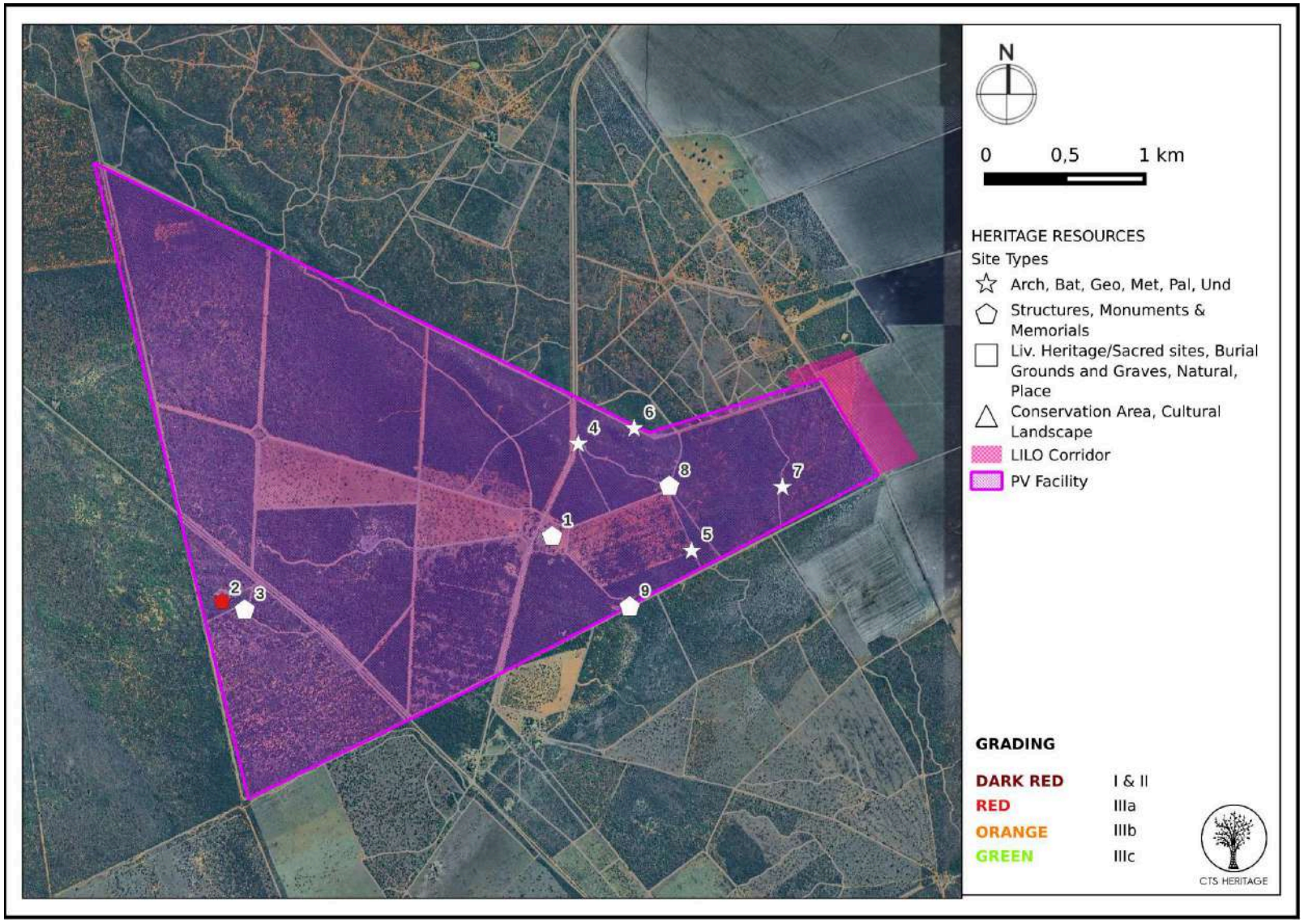

Figure 6: Map of all sites and observations noted within the development area

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4.3 Selected photographic record

(a full photographic record is available upon request)

Figure 7.1: Observation 001

Figure 7.2: Observation 002

Figure 7.3: Observation 003

Figure 7.4: Observations 004 and 005

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Figure 7.5: Observations 006 and 007

Figure 7.6: Observation 008

Figure 7.7: Observation 009

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5. ASSESSMENT OF THE IMPACT OF THE DEVELOPMENT

5.1 Assessment of Impact to Archaeological Resources

The field assessment for this project was successful in that a comprehensive understanding of the overall archaeological sensitivity of the area proposed for development was established. The field assessment recorded 4 observations reflecting superficial scatters of low density Middle and Later Stone Age artefacts (Observations 4, 5, 6 and 7). These archaeological observations have limited scientific value and their recording herein is considered to be sufficient. As such, these observations are considered to be Not Conservation-Worthy and are not considered further.

The other observations noted during the field assessment reflect evidence of the historic and ongoing agricultural use of the area. The Portugal farm werf (Observation 1) and its associated agricultural infrastructure (Observations 8 and 9) was noted. None of the structures identified have any discernible cultural value and as such are considered to be Not Conservation-Worthy from a heritage perspective.

While no burial grounds were identified during the field assessment, these can often be associated with historic farm werfs and as such, care must be taken during vegetation clearance to ensure that no marked or unmarked burials are impacted by the proposed development. Due to their high levels of local social and spiritual significance, burials are graded IIIA and a no development buffer of 100m is recommended around any identified burials to ensure their conservation.

The field assessment confirmed the location of the monument (Site 002) as noted in the desktop review. This monument records the names of a number of victims of armed conflict from 1899 until 1981. Due to the social significance of this monument, it is determined to have high local cultural value and is graded IIIA. It is recommended that a no development buffer of 100m is implemented around this site to ensure its conservation and in order to retain its sense of place.

On condition that the above mitigation measures are adhered to, no impact to significant heritage resources is anticipated as a result of this proposed development.

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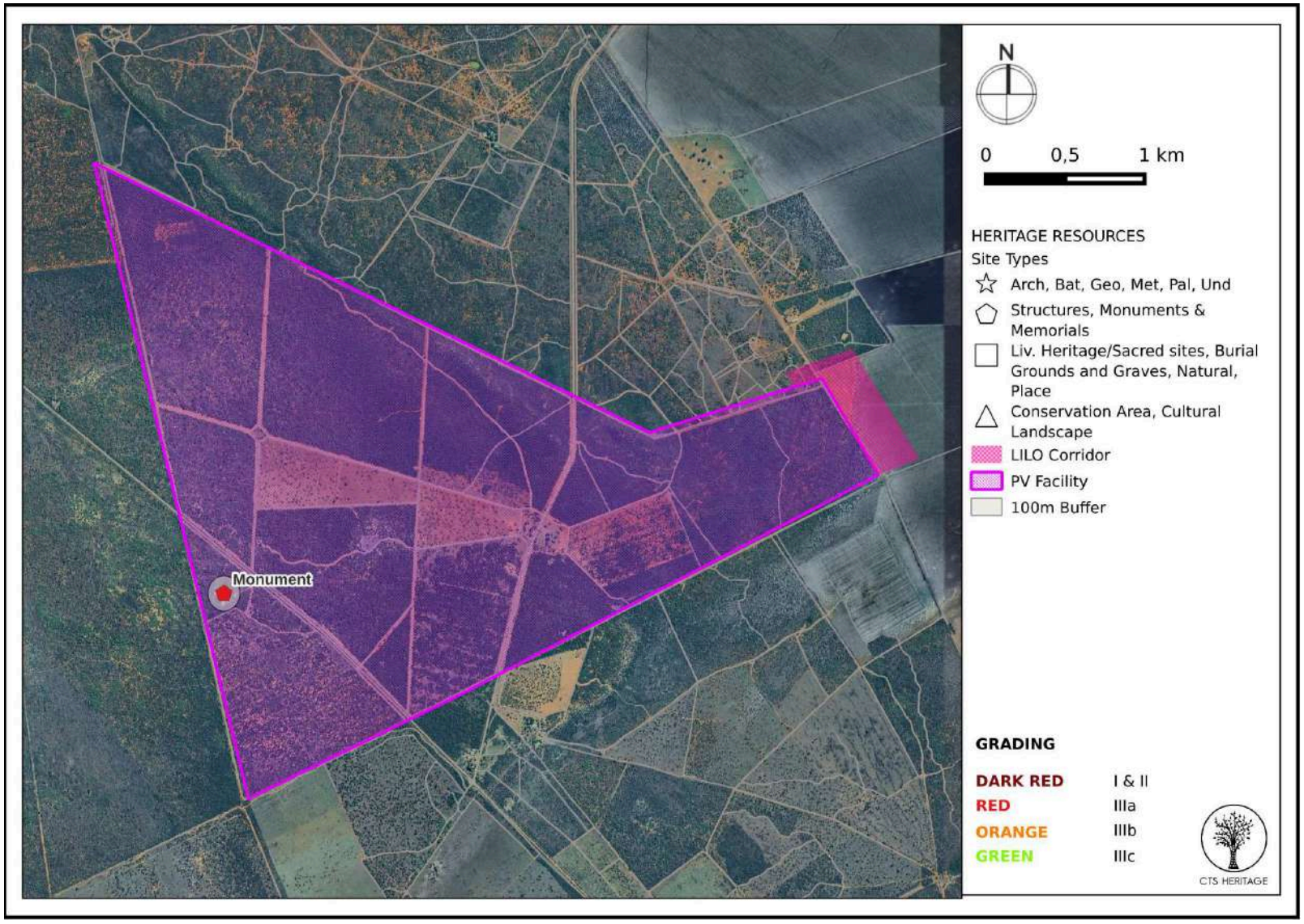

Figure 8.1: Map of all sites and observations noted within the development area as well as proposed mitigation measures

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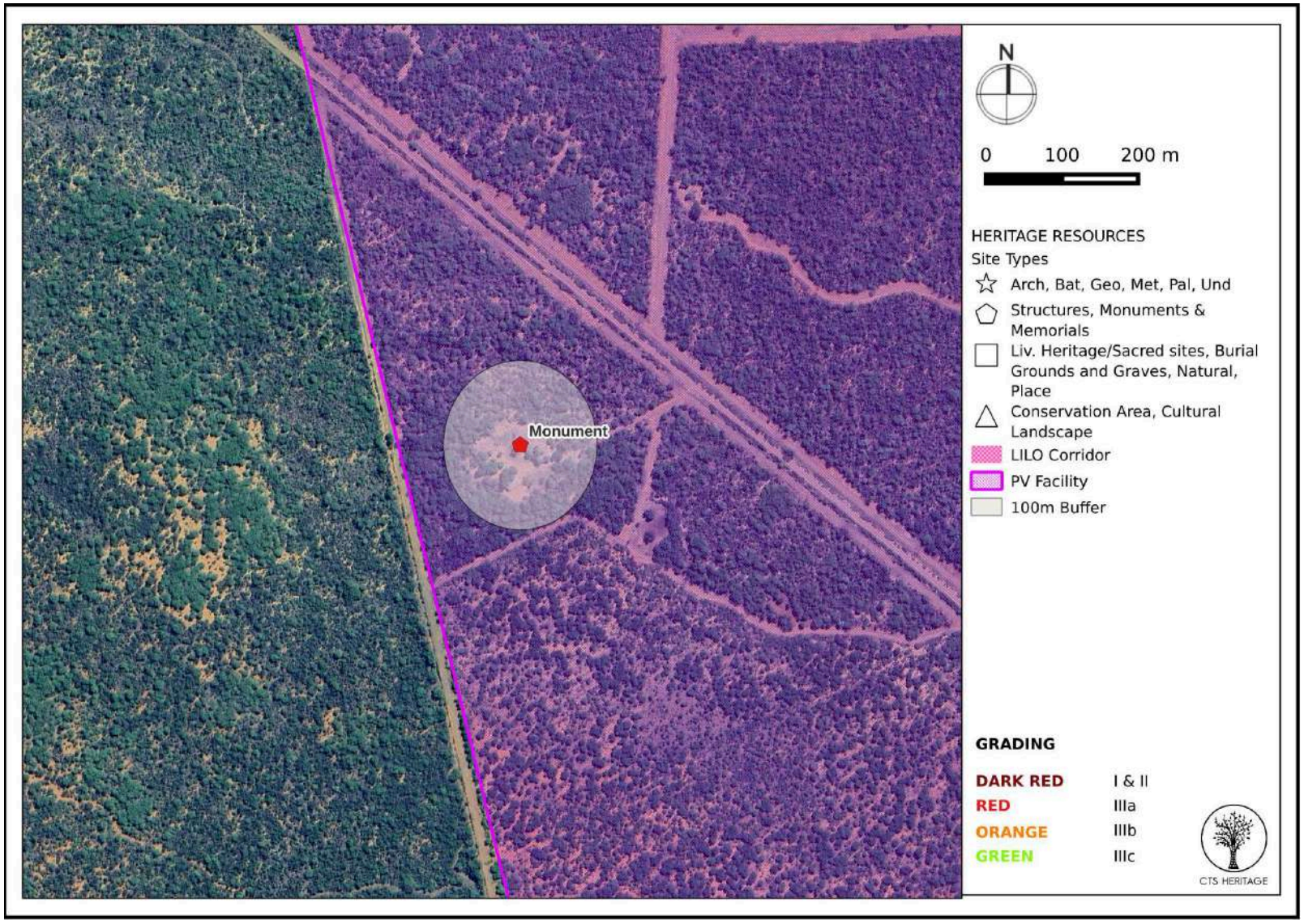

Figure 8.2: Map of all sites and observations noted within the development area as well as proposed mitigation measures

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6. CONCLUSION AND RECOMMENDATIONS

The survey proceeded without constraints or limitations, yet the project area was comprehensively surveyed for heritage resources. Some Later Stone Age archaeology of limited scientific value was identified, as were structures related to the historic farm occupation of this property. These resources include the remnants of an old farm werf and its associated farming infrastructure. None of these observations have any discernible cultural value and as such, these are considered to be Not Conservation-Worthy from a heritage perspective.

The field assessment confirmed the location of the monument (Site 002) as noted in the desktop review. This monument records the names of a number of victims of armed conflict from 1899 until 1981. Due to the social significance of this monument, it is determined to have high local cultural value and is graded IIIA. It is recommended that a no development buffer of 100m is implemented around this site to ensure its conservation and in order to retain its sense of place.

On condition that the above mitigation measures are adhered to, no impact to significant heritage resources is anticipated as a result of this proposed development.

Recommendations

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

- A no development buffer of 100m is implemented around the monument recorded as Site 2
- 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**
357856	Francois P Coetzee	10/01/2016	HIA Phase 1	Cultural Heritage Assessment for the Proposed Sebele Lodge Development, Ramotshere Moiloa Local Municipality, Ngaka Modiri Molema District Municipality, Madikwe Magisterial District, North West Province
5568	Johnny Van Schalkwyk	01/02/1997	AIA Phase 1	Kgatla Iron Age Site: Exhibition Proposal and Management Plan
5702	Johnny Van Schalkwyk	01/02/2003	AIA Phase 1	Arch Survey Mantserre-Kraalhoek-Mopyane Water Scheme, NW Province
6858	Johnny Van Schalkwyk	01/09/2008	AIA Phase 1	Heritage Impact Survey Report for the Proposed Green House Lodge, Madikwe Game Reserve, Thabazimbi Magisterial District, Limpopo Province
7677	Francois P Coetzee	01/11/2008	AIA Phase 1	Cultural Heritage Survey of PPC Dwaalboom
20893	Anton Pelser	23/03/2022	HIA Phase 1	A REPORT ON A PHASE 1 HERITAGE IMPACT ASSESSMENT FOR THE PROPOSED NEW TYRE STORAGE FACILITY AT PPC DWAALBOOM NORTHWEST OF NORTHAM, LIMPOPO PROVINCE
22834	Heidi Fourie	04/03/2021	PIA Phase 1	Palaeontological Impact Assessment: Desktop Study. Sturdee Energy PPC Dwaalboom Solar Project, Thabazimbi Local Municipality, Waterberg District Municipality, Limpopo Province
33248	Neels Kruger	03/07/2021	HIA Phase 1	HERITAGE IMPACT ASSESSMENT (HIA) ON PORTIONS OF THE FARMS SCHOONGEZICHT 238KP AND JAKHALSKRAAL 239KP FOR THE PROPOSED STURDEE ENERGY PPC DWAALBOOM SOLAR PROJECT, THABAZIMBI LOCAL MUNICIPALITY, LIMPOPO PROVINCE

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APPENDIX 2: Palaeontological Assessment (2025)

PALAEONTOLOGICAL SPECIALIST STUDY

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

Proposed Benya PV Facility

Prepared by

CTS HERITAGE

And

Ryan Nel

In Association with

Cape EAPrac

January 2024

EXECUTIVE SUMMARY

This Palaeontological Impact Assessment (PIA) was conducted for the proposed Benya PV Facility in Limpopo Province, South Africa, to evaluate the palaeontological sensitivity of the development area. The study was carried out to meet the requirements of Section 38(8) of the National Heritage Resources Act (NHRA, Act 25 of 1999) and assess the potential impact of the project on significant palaeontological heritage.

The development area is underlain by geological formations with varied fossil preservation potential. The Gaborone Granite Complex comprises Archean-aged granitic rocks, which have no fossil-bearing potential, resulting in negligible palaeontological sensitivity. Similarly, the Ventersdorp Supergroup (Klipriviersberg Group) consists of predominantly volcanic rocks, classified as having low sensitivity. In contrast, the Transvaal Supergroup (Malmani Subgroup) is notable for containing stromatolites and microfossils, indicating high palaeontological sensitivity; however, the likelihood of significant fossil discoveries being impacted by the development is minimal. Lastly, the Tertiary to Quaternary deposits may sporadically yield fossils, though these are typically of limited significance, contributing to the overall low sensitivity of the area.

The potential impact of the proposed development on palaeontological resources is assessed as low. Construction, operational, and decommissioning activities, including site clearing and infrastructure installation, are unlikely to disturb significant fossil material. This conclusion is supported by high-confidence desktop research, geological mapping, and prior palaeontological studies in the region.

To ensure the protection of potential palaeontological resources, it is recommended that a Chance Fossil Finds Procedure be implemented.

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CONTENTS

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1. INTRODUCTION

1.1 Background Information on Project

This report is drafted for the proposed development of the Benya PV facility and associated grid infrastructure in the Limpopo province.

1.2 Description of Property and Affected Environment

The proposed development site is situated in the Limpopo Province, near its western border, about 17 km southwest of the South African-Botswana border. It lies southwest of Thabazimbi and south of Supingstad (Figure 1.1). The area is predominantly rural, comprising agricultural fields and undeveloped landscapes (Figures 1.1–1.3). Key access routes include the N4 highway near Supingstad and the R510 road connecting to Thabazimbi (Figure 1.1).

The site's topography is relatively flat, with an elevation around 960 meters above mean sea level (amsl) across most of the area. A higher elevation zone, peaking at approximately 1066 meters amsl, is located in the southwestern portion of the development area. There is a gradual decrease in elevation from the northwest towards the southeast and from the northeast towards the central site (obtained from the elevation profile on Google Earth).

The development footprint includes a photovoltaic (PV) facility and a LILO Corridor for power transmission (Figures 1.2 & 1.3). The PV facility, outlined in pink, occupies existing agricultural land. To the south of the development area lies Molatedi village. The surrounding region features a mix of cultivated fields and natural vegetation.

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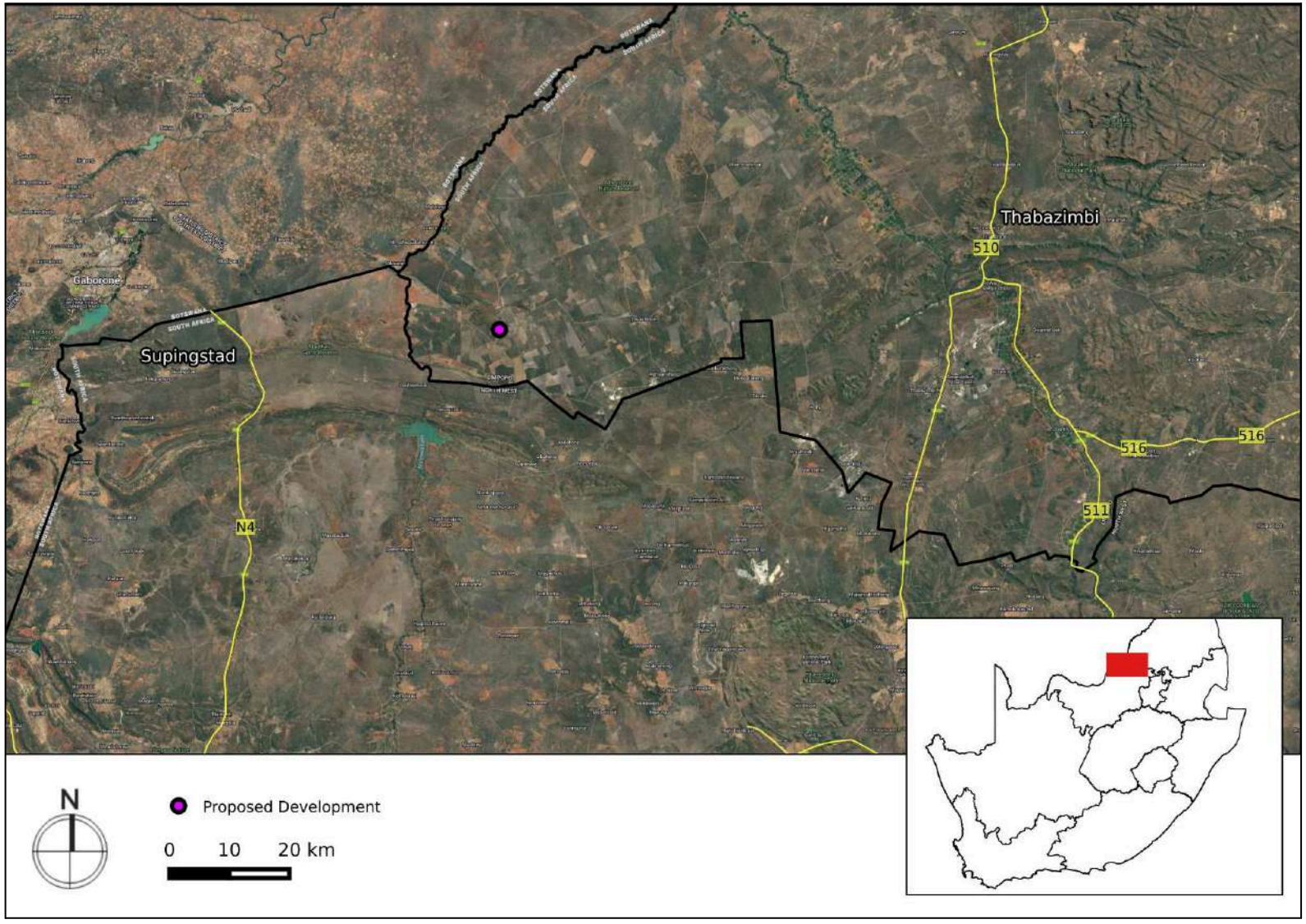

Figure 1.1: Close up satellite image indicating proposed location of study area

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Figure 1.2: Study Area

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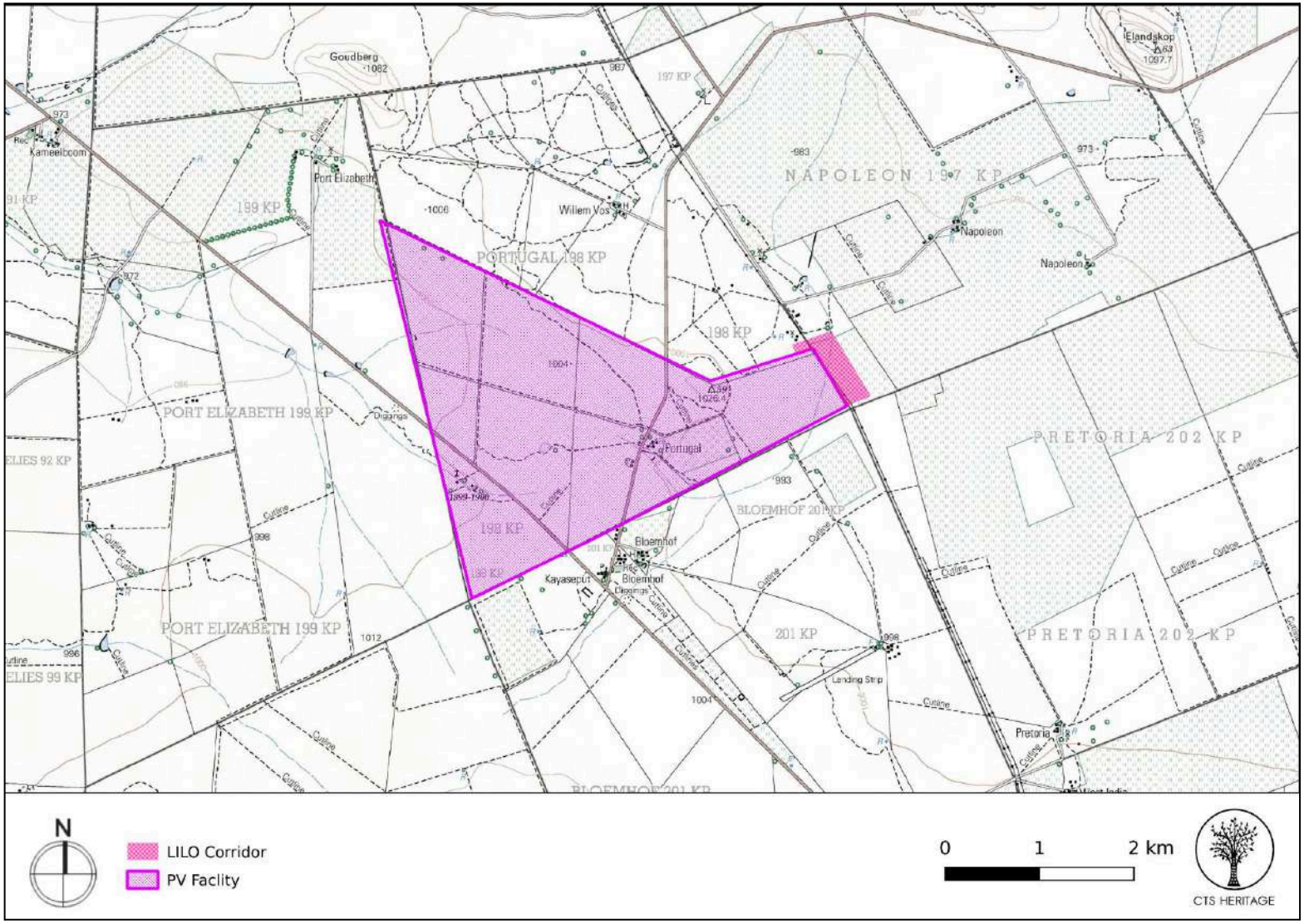

Figure 1.3: Study Area reflected on the 1:50 000 Topo Map

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2. METHODOLOGY

2.1 Purpose of Palaeontological Study

According to the SAHRIS Palaeosensitivity Map (Figure 2), the area proposed for development is underlain by rocks of zero to very high palaeontological sensitivity. The purpose of this palaeontological 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 palaeontological resources.

2.2 Summary of Steps Followed

- Primary research literature was consulted for detailed accounts of the geology and palaeontological representation across the study area. References of these primary research articles are provided.
- Geological maps (provided at various scales by CTS heritage and the South African Council for Geosciences) were consulted to identify represented geological contexts within the study area.
- Where possible, other PIAs were consulted to provide additional information on local geomorphological, geological and palaeontological contexts. These often provide valuable additional information to primary research publications and formal geological maps, which can lack resolution at a local scale and it is important that discussions regarding alternative stratigraphic attributions of exposed rocks are noted and considered.

2.3 Constraints and Limitations

- Constraints: The desktop component of a Palaeontological Impact Assessment (PIA) involves extrapolating fossil data from analogous rock units in other regions, as most areas in South Africa have limited palaeontological studies. This approach is constrained by several factors:
    - Comparable rock units outside the project site, such as riverbanks, gullies, and burrowing pits, can offer insights into the underlying strata but are not always accessible.
    - Many fossils are preserved in subsurface strata, often concealed by overlying deposits of soil, vegetation, or other surface materials. This obscures their presence and limits direct observation.
    - Data from distant exposures may be required, reducing the resolution of site-specific interpretations..
- Limitations: There are several factors limit the effectiveness of Palaeontological Impact Assessments, particularly during desktop studies:
    - The absence of a comprehensive South African fossil heritage database.
    - Varying accuracy levels in geological maps, affecting the reliability and precision of desktop studies.
    - Insufficient explanations accompanying geological maps and availability of published palaeontological materials.
    - Neglecting on-site walkovers during PIA desktop studies, can undermine the reliability and precision.
    - Limited palaeontological studies conducted in most regions of South Africa, leading to reliance on extrapolation from other locations.

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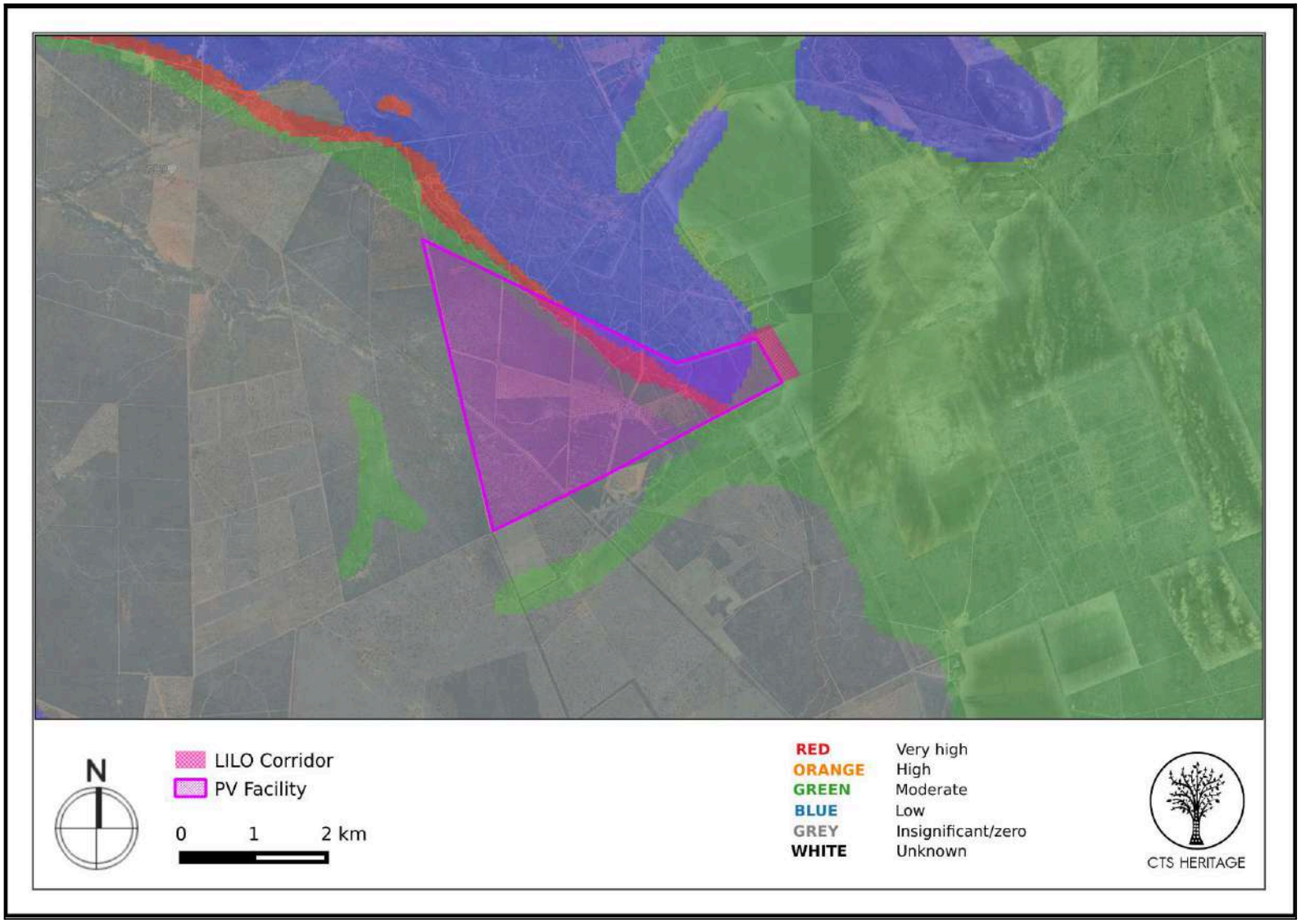

Figure 2: Palaeontological sensitivity of the development area from the SAHRIS PalaeoMap

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3. SITE SENSITIVITY

According to the SAHRIS Palaeosensitivity Map (Figure 2), the area proposed for the development is underlain by rocks that have Insignificant/zero palaeontological sensitivity, low, moderate and very high palaeontological sensitivity. The area proposed for development is underlain by quaternary sediments which have moderate sensitivity, Gaborone Granite, which have insignificant/zero palaeontological sensitivity. The area also contains rocks of the Klipriviersberg Group, Ventersdorp Supergroup which has a low palaeontological sensitivity. These are all very unlikely to preserve significant fossil heritage.

Rocks that may contain fossils form part of the Malmani Subgroup and the Transvaal Supergroup. The Malmani Subgroup contains a range of shallow marine to intertidal stromatolites (domes, columns etc), organic walled microfossils (Groenewald & Groenewald, 2014). The Malmani Subgroup is from the same geological group that has resulted in the preservation of fossil remains at the Cradle of Humankind in its Transvaal Dolomite outcrop area. More broadly, the Chuniespoort Group is known for its preservation of Stromatolitic carbonates (limestones/dolomites), minor secondary cherts and mudrocks including carbonaceous shales. The presence of any fossils from the Malmani Subgroup in the area has not yet been identified, and are unlikely to be present.

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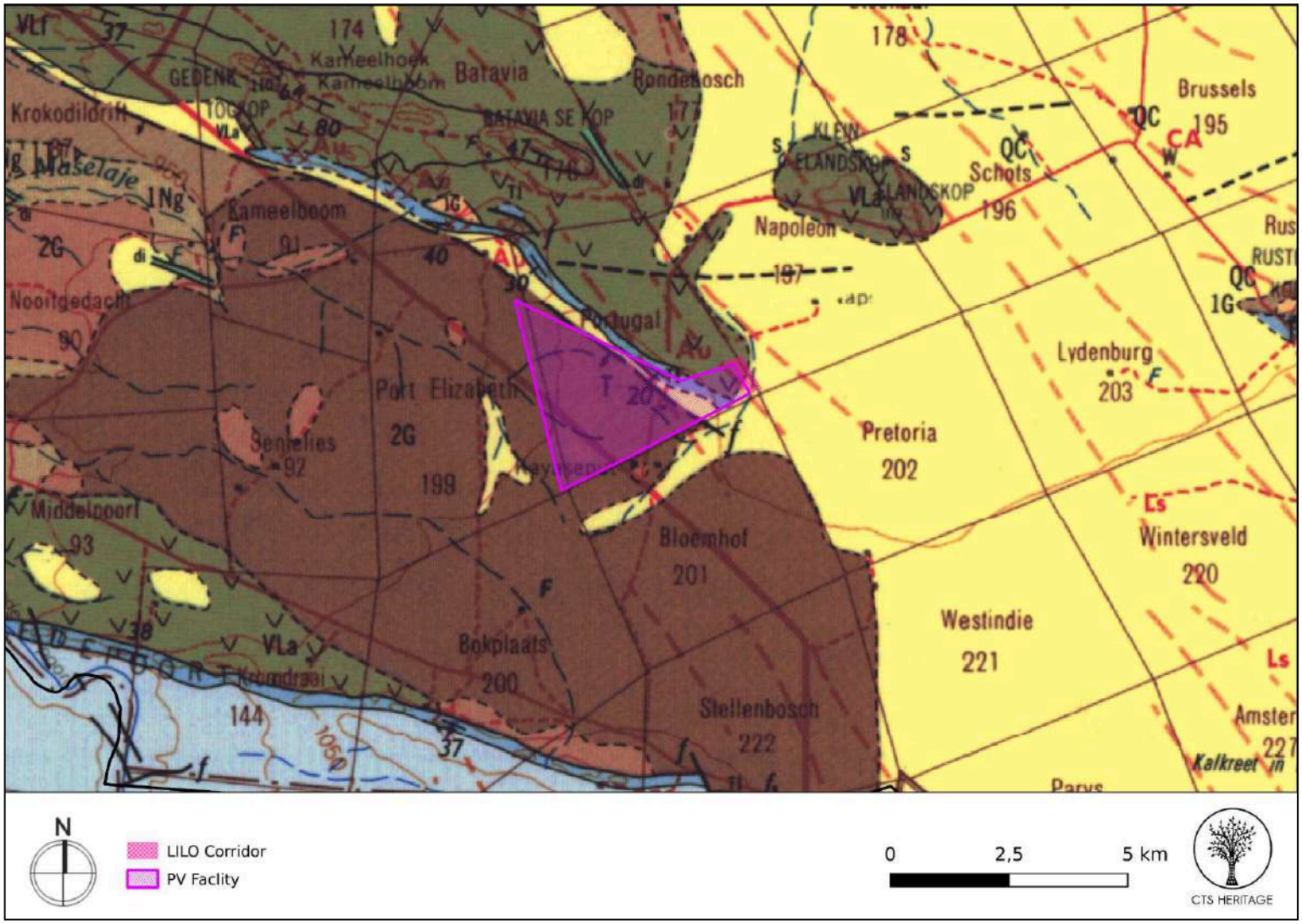

Figure 3. Geology Map. Extract from the CGS 2426 Thabazimbi Geology Map indicating that the grid is underlain by 2G - Gaborone Granite Complex, QC - Quaternary Sands, VLa - Ventersdorp Supergroup and T1 - Malmani Subgroup of the Transvaal Supergroup

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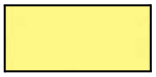
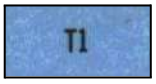
Table 1: Geological Summary Table

Geological unit	Age	Lithology	Symbol on Figure 3	Fossil Heritage (Groenewald & Groenewald, 2014)	Palaeontological sensitivity	Recommended Mitigation
Tertiary to Quaternary	Tertiary to Quaternary	Black soil, red soil, ferricrete (Qrf), surface conglomerate or breccia and fanglomerate (QR), calcrete, surface limestone (Qc).		Very wide range of possible fossil remains, though these are often sparse, such as: mammalian bones and teeth, tortoise remains, ostrich eggshells, non-marine mollusc shells, ostracods, diatoms and other microfossil groups, trace fossils (e.g. calcretised termitaria, rhizoliths, burrows, vertebrate tracks), freshwater stromatolites, plant material such as peats, foliage, wood, pollens. Fossil leaves and palynomorphs within calc tufa	Moderate	Chance Fossil Finds Procedure
Transvaal Supergroup, Malmani Subgroup	Vaalian	Stromatolitic carbonates (limestones / dolomites), minor secondary cherts, mudrocks including carbonaceous shales		Range of shallow marine to intertidal stromatolites (domes, columns etc), organic walled microfossils	Very High	Chance Fossil Finds Procedure.
Ventersdorp Supergroup, Klipriviersberg Group	Randian	Andesitic lava with acid lava, quartzite.		Lacustrine stromatolites are recorded within the upper Ventersdorp Supergroup (Platberg Group) in the Free State but this younger succession is not mapped in Limpopo	Low	None
Gaborone Granite Complex	Archean complex	Granite, aplogranite, rapakivi granite, foliated granite, quartz porphyry, quartz felsite.		None	Zero	None

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4. IDENTIFICATION OF HERITAGE RESOURCES

4.1 Underlying geology of development area

The geology in the proposed development area is shown on the 1:250 000 scale, Thabazimbi, 2426 Geological map (Council for Geoscience, Pretoria) (Figure 3). The area is underlain by rocks from the Archean-aged Gaborone Granite Complex (2G), comprising granite, aplogranite, rapakivi granite, foliated granite, quartz porphyry, and quartz felsite. The Ventersdorp Supergroup rocks are characterized by andesitic lava with acid lava and quartzite (VLa), and the Transvaal Supergroup, Malmani Subgroup, consisting of quartzite, grit, conglomerate, and shale (T1). The youngest deposits are of Tertiary to Quaternary age, comprising black soil, red soil, ferricrete, surface conglomerate or breccia, calcrete, and surface limestone (Qc). Faulting and brittle deformation are also prominent structural features in the area.

Gaborone Granite Suite

The Gaborone-Kanye igneous terrane covers approximately 36000 km² in the northwestern Kaapvaal Craton, spanning the North West and Limpopo Provinces of South Africa and extending into Botswana (Johnson et al., 2006). This terrane encompasses the Gaborone Granite Suite, a plutonic complex composed of A-type rapakivi granite, leucogranite, microgranite, porphyritic monzogranite, and minor gabbro-anorthosite (Sibiya, 1988; Moore et al., 1993). Additionally, it features a volcanic sequence of pyroclastics and flow-banded rhyolite known as the Kanye Formation. In South Africa, only a small section of this complex surfaces beneath the Transvaal Supergroup north of Mafikeng (Johnson et al., 2006).

Ventersdorp Supergroup

The Ventersdorp Supergroup covers an elliptical area of approximately 300 000 km², that extends along a northeast axis from the Britstown District of the Northern Cape Province to Derdepoort in the North West Province (Johnson et al., 2006). There is only a small outcrop present in the Limpopo Province. The Ventersdorp Supergroup formed during the later part of the Archaean Eon. This period was marked by extensive volcanic and sedimentary activity within localized basins on the Kaapvaal Craton. These basins likely formed during tectonic events, possibly related to the collision between the Kaapvaal and Zimbabwe Cratons (Johnson et al., 2006; Groenewald & Groenewald, 2014). The Ventersdorp Supergroup has been subdivided into the Klipriviersberg and Platberg Groups. The Platberg Group comprises the sedimentary rocks of the Bothaville Formation and the Allanridge Formation (Johnson et al., 2006). The current development area falls within the Klipriviersberg Group (see Figure 4 in Johnson et al., 2006, pg. 191).

Klipriviersberg Group

The Klipriviersberg Group represents flood basaltic lava covering 100 000 km², with an average thickness of 1500 to 2000 m (Johnson et al., 2006).

Transvaal Supergroup

The siliciclastic and carbonate rocks present in the current development area are assigned to the Chuniespoort Group of the Transvaal Basin, Malmani Subgroup. It should be noted that the subclassification of the Malmani Subgroup in the current project area is uncertain.

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Malmani Subgroup

The Malmani Subgroup consists of a 2000-meter-thick succession, subdivided into five formations based on chert content, stromatolite morphology, interbedded shales, and erosional surfaces (Button, 1973b; Eriksson and Truswell, 1974). For the purposes of this report, the individual formations will not be discussed further.

Tertiary-Quaternary deposits

The Tertiary to the Quaternary period deposits consist of black soil and red soil, accompanied by ferricrete, which is a hardened layer of soil rich in iron oxides. Surface conglomerates or breccias, which are coarse-grained clastic rocks composed of angular fragments, are also found, along with fanglomerates, which are sediments deposited by streams at the base of mountain ranges. Calcrete, a hardened deposit of calcium carbonate, is present alongside surface limestone.

4.2 Palaeontological Sensitivity of the Development Area

The palaeontological sensitivity of the proposed development area (Figure 2), corresponds to the geological units as mapped on the 1:250000 Thabazimbi Geological Map (2426, Council for Geoscience, Pretoria), comprising Archean-age rocks from the Gaborone Granite Complex, the Ventersdorp Supergroup, the Transvaal Supergroup (Malmani Subgroup), and Tertiary-Quaternary deposits. The palaeontological sensitivity of these formations therefore also varies significantly due to differences in their geological and depositional contexts.

Gaborone Granite Complex

The plutonic complex is characterized by granitic rocks, including rapakivi granite, leucogranite, and quartz porphyry, as well as volcanic sequences from the Kanye Formation. Due to their igneous origin, these rocks lack any fossil-bearing potential, resulting in an **insignificant/zero** palaeontological sensitivity as indicated on the SAHRIS palaeosensitivity map (Figure 2).

Ventersdorp Supergroup (Klipriviersberg Group)

The Ventersdorp Supergroup comprises predominantly andesitic and basaltic lavas. These rocks, being of volcanic origin, do not typically preserve fossils, and the SAHRIS palaeosensitivity map classifies this unit as having **low** palaeontological sensitivity.

Transvaal Supergroup (Malmani Subgroup)

The Malmani Subgroup consists of a thick succession of carbonate and siliciclastic rocks. These deposits are known for containing shallow marine and intertidal stromatolites, as well as organic-walled microfossils (Groenewald & Groenewald, 2014). This unit is classified as having **high** palaeontological sensitivity according to the SAHRIS palaeosensitivity map, however the likelihood of fossil discovery being affected by the proposed development is **low**.

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Tertiary-Quaternary Deposits

These deposits include black and red soils, ferricrete, surface conglomerate, breccia, calcrete, and limestone. While some of these units may occasionally preserve fossils, their palaeontological sensitivity is generally regarded as **low.** The potential for yielding fossils of scientific importance in the project area is limited.

Only the Malmani Subgroup and the Tertiary-Quaternary sediments hold potential for fossil preservation, with the latter unlikely to yield fossils of significance. Based on these factors, the overall palaeontological sensitivity of the project area can be classified as **low** for this development.

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5. ASSESSMENT OF THE IMPACT OF THE DEVELOPMENT

5.1 Assessment of impact to Palaeontological Resources

The palaeontological sensitivity of the area proposed for the Benya PV Facility, located in the Limpopo Province, is assessed as **Low** overall, with low (negative) potential impacts on palaeontological heritage resources. This evaluation encompasses all phases of the project, including the construction, operational, and decommissioning stages, along with associated infrastructure such as photovoltaic panels, the LILO corridor, internal and external access roads, substations, and temporary construction yards. While minor disruptions to the subsurface may occur during construction, the likelihood of encountering significant fossil material remains low. Confidence in this assessment is high.

The proposed development area is underlain by geological formations of varying palaeontological significance. The Ventersdorp Supergroup (Klipriviersberg Group) and the Gaborone Granite Complex, which form the primary geological units of the site, are predominantly volcanic and granitic in origin, respectively, and thus have low to negligible fossil preservation potential. However, the Malmani Subgroup of the Transvaal Supergroup, present in some portions of the site, contains carbonate rocks known for preserving stromatolitic structures and microfossils, warranting a classification of high palaeontological sensitivity in these specific contexts. Tertiary to Quaternary deposits, consisting of black and red soils, ferricrete, calcrete, and surface conglomerates, may occasionally yield fossil remains, though the likelihood of significant discoveries is minimal.

Previous palaeontological investigations in the region, such as those conducted by Groenewald and Groenewald (2014), have documented a limited occurrence of fossils within similar geological contexts. Stromatolites and organic-walled microfossils recorded in the Malmani Subgroup highlight the potential for scientific discovery but are unlikely to be impacted significantly by the proposed development. Furthermore, the cumulative impact of alternative energy developments in the region remains low, given the largely unfossiliferous nature of the broader geological formations.

**Stromatolites - fossilized microbial structures - hold scientific value as they provide evidence for stratigraphic and biostratigraphic correlation, aiding in the higher resolution correlation of geological strata across different regions. These structures also provide insights into palaeoenvironmental settings. The scientific significance of stromatolites is further emphasised when discovered in poorly studied areas. Their presence in such contexts can substantially enhance understanding of the region's geological history.*

6. CONCLUSION AND RECOMMENDATIONS

The palaeontological sensitivity of the proposed Benya PV Facility development area in the Limpopo Province is assessed as low. The geological units underlying the site, including the Ventersdorp Supergroup (Klipriviersberg Group) and the Gaborone Granite Complex, possess negligible fossil preservation potential due to their volcanic and granitic origins. While the Malmani Subgroup of the Transvaal Supergroup has a high potential for fossil preservation, particularly stromatolites and organic-walled microfossils, the likelihood of significant fossil finds being affected by this development is minimal. Similarly, Tertiary to Quaternary deposits may sporadically yield fossils of limited significance, further supporting the low-impact assessment.

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The construction, operational, and decommissioning phases are unlikely to disturb palaeontological resources significantly. This assessment is made with a high degree of confidence based on desktop studies, previous regional research, and the geological context of the development area.

Recommendations:

The attached Chance Fossil Finds Procedure is recommended for implementation within the deposits of the Malmani Subgroup (T1). This procedure should be in place to handle any unexpected fossil discoveries during construction..

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Appendix 1: Chance Fossil Finds Procedure

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