HERITAGE IMPACT ASSESSMENT

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

Proposed development of the Mutsho Solar PV1, Limpopo Province

Prepared by CTS Heritage

CTS HERITAGE

For

Savannah Environmental

November 2022

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EXECUTIVE SUMMARY

1. Site Name:

Mutsho Solar PV1

2. Location:

Farm Vrienden 589 MS

3. Locality Plan:

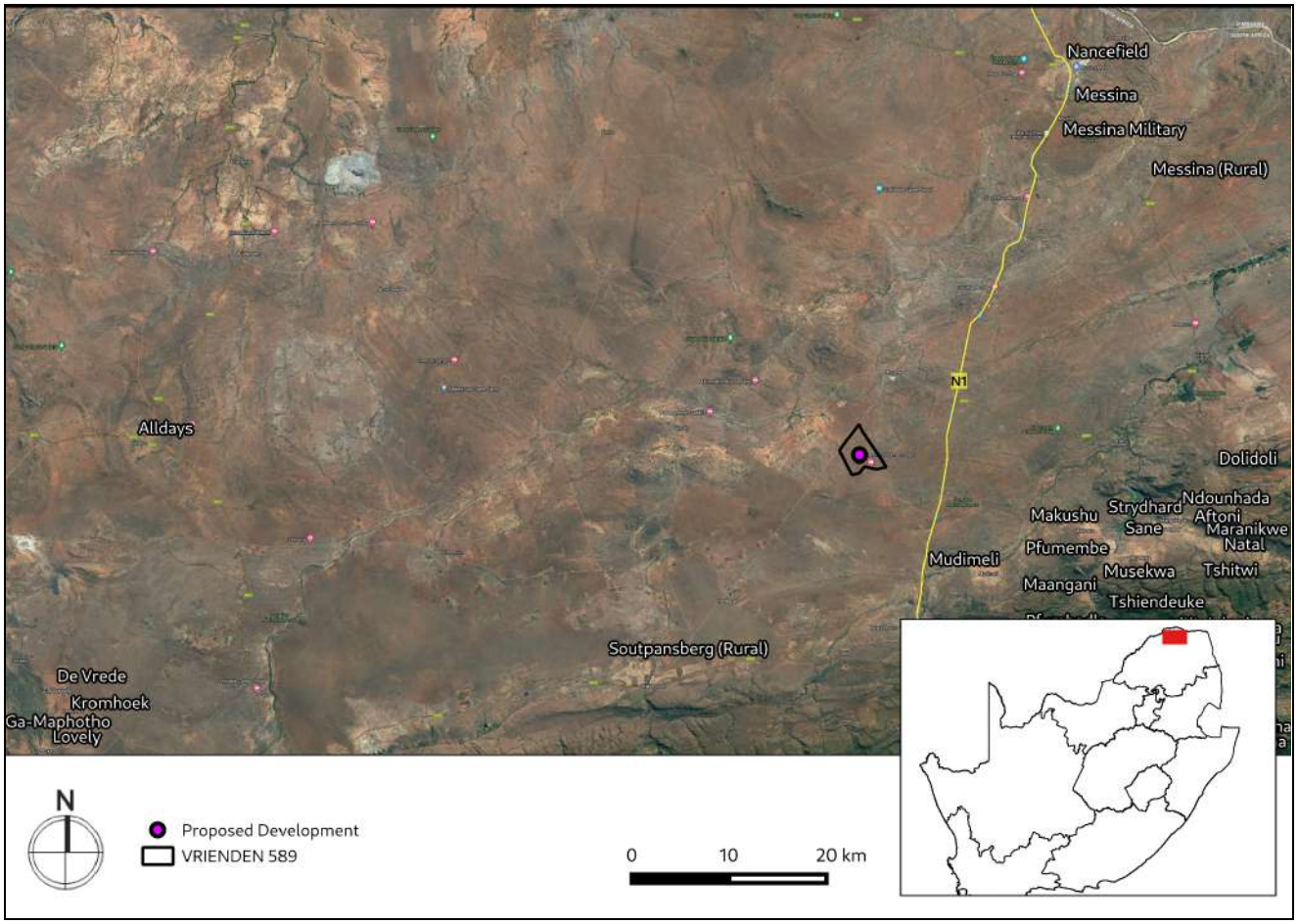

Figure A: Location of the proposed development area

4. Description of Proposed Development:

Mutsho Power (Pty) Ltd is proposing the construction and operation of a Photovoltaic (PV) Solar Energy Facility and associated infrastructure on the Farm Vrienden 589, located approximately 8km south-west of Mopane and 39km south-west of Musina, within the Musina Local Municipality and the Vhembe District Municipality in the Limpopo Province. The facility will have a contracted capacity of up to 100MW and will be known as Mutsho Solar

PV1. The project is planned as part of a cluster of Solar PV Facilities with a total capacity of up to 400MW, and will be connected to the electricity grid via a 132kV Collection Station and 132kV double circuit overhead power line to the Nzhelele Substation and an additional 132kV single circuit overhead power line to the Louis Trichardt Substation. The grid connection infrastructure is the subject of a separate Basic Assessment process.

5. Anticipated Impacts on Heritage Resources:

This and past heritage assessments of this property have identified limited heritage resources of cultural value. A previous assessment identified Farm Vriendin 589 as preferred for development with limited impacts to heritage resources anticipated as its overall heritage sensitivity is regarded as LOW overall. The most significant site identified in the vicinity of the development is Site V04. It is recommended that Site V04, the Baobab Room, must not be impacted by any activity and any proposed activity on this farm must adhere to a buffer area of 100m around this site. This site is located a significant distance from the area proposed for development.

The PIA notes that "The scarcity of fossil heritage at the proposed development footprint indicate that the impact of the (of the development) will be of a low significance in palaeontological terms... Thus, the construction and operation of the facility may be authorised as the whole extent of the development footprint is not considered sensitive in terms of palaeontological resources."

6. Recommendations:

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

- The recommendations in the VIA are implemented
- A 200m no-go buffer must be implemented around site V04
- A 100m no-go buffer must be implemented around site MOP115
- The attached Chance Fossil Finds Procedure must be implemented for the duration of construction activities
- Should any buried archaeological resources or human remains or burials be uncovered during the course of development activities, work must cease in the vicinity of these finds. The South African Heritage Resources Agency (SAHRA) must be contacted immediately in order to determine an appropriate way forward.

Details of Specialist who prepared the HIA

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

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

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

CTS HERITAGE

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APPENDICES

1. INTRODUCTION

1.1 Background Information on Project

Mutsho Power (Pty) Ltd is proposing the construction and operation of a Photovoltaic (PV) Solar Energy Facility and associated infrastructure on the Farm Vrienden 589, located approximately 8km south-west of Mopane and 39km south-west of Musina, within the Musina Local Municipality and the Vhembe District Municipality in the Limpopo Province. The facility will have a contracted capacity of up to 100MW and will be known as Mutsho Solar PV1. The project is planned as part of a cluster of Solar PV Facilities with a total capacity of up to 400MW, and will be connected to the electricity grid via a 132kV Collection Station and 132kV double circuit overhead power line to the Nzhelele Substation and an additional 132kV single circuit overhead power line to the Louis Trichardt Substation. The grid connection infrastructure is the subject of a separate Basic Assessment process.

A preferred project site with an extent of ~1237ha and a development area of ~277ha within the project site has been identified by Mutsho Power (Pty) Ltd as a technically suitable area for the development of the Mutsho Solar PV1 Facility.

Infrastructure associated with the Solar PV Facility, which will enable the facility to supply a contracted capacity of up to 100MW, will include:

- Solar PV array comprising PV modules and mounting structures.
- Inverters and transformers.
- Cabling between the panels.
- 33/132kV onsite facility substation, including associated equipment and infrastructure.
- Electrical and auxiliary equipment required at the Collection Station that serves the solar energy facility, including a switchyard/bay, control building, fences, etc.
- Cabling from the onsite substation to the Collection Station (either underground or overhead).
- Site offices, warehouses, and guardhouses.
- Water storage tanks at admin block for human consumption.
- Laydown areas.
- Internal gravel distribution roads.

The Solar PV Facility is proposed in response to the identified objectives of the national and provincial government and local and district municipalities to develop renewable energy facilities for power generation purposes. It is the developer's intention to bid the Mutsho Solar PV1 Facility under the Department of Mineral Resources and Energy's (DMRE's) Renewable Energy Independent Power Producer Procurement (REIPPP) Programme, or a similar programme, with the aim of evacuating the generated power into the national grid. This will aid in the diversification and stabilisation of the country's electricity supply, in line with the objectives of the

Integrated Resource Plan (IRP) with Mutsho Solar PV1 set to inject up to 100MW into the national grid.

1.2 Description of Property and Affected Environment

The area proposed for the new Mutsho Power Project is predominantly rural in nature with a number of coal mines located in the vicinity. The proposed development areas are located in the Lowveld. The area consists of savannah drylands as well as high rainfall areas. The nearby Soutpansberg has forests where the fauna and flora are abundant, and where a wide variety of animal as well as bird species can be found. The two farms both display evidence of agricultural activity and disturbance.

The area proposed for development falls within the summer rainfall region of South Africa, and has a mild, subtropical climate

The study area lies within a region of variable geology that includes sediments of the:

- Undifferentiated Karoo Basin; Tshipise and Tuli Sedimentary Basin and Solitude Formation; and
- the Malala drift Gneiss and Gumbu Group of the Beit Bridge Complex, Archaean Granite-Gneiss Basement.

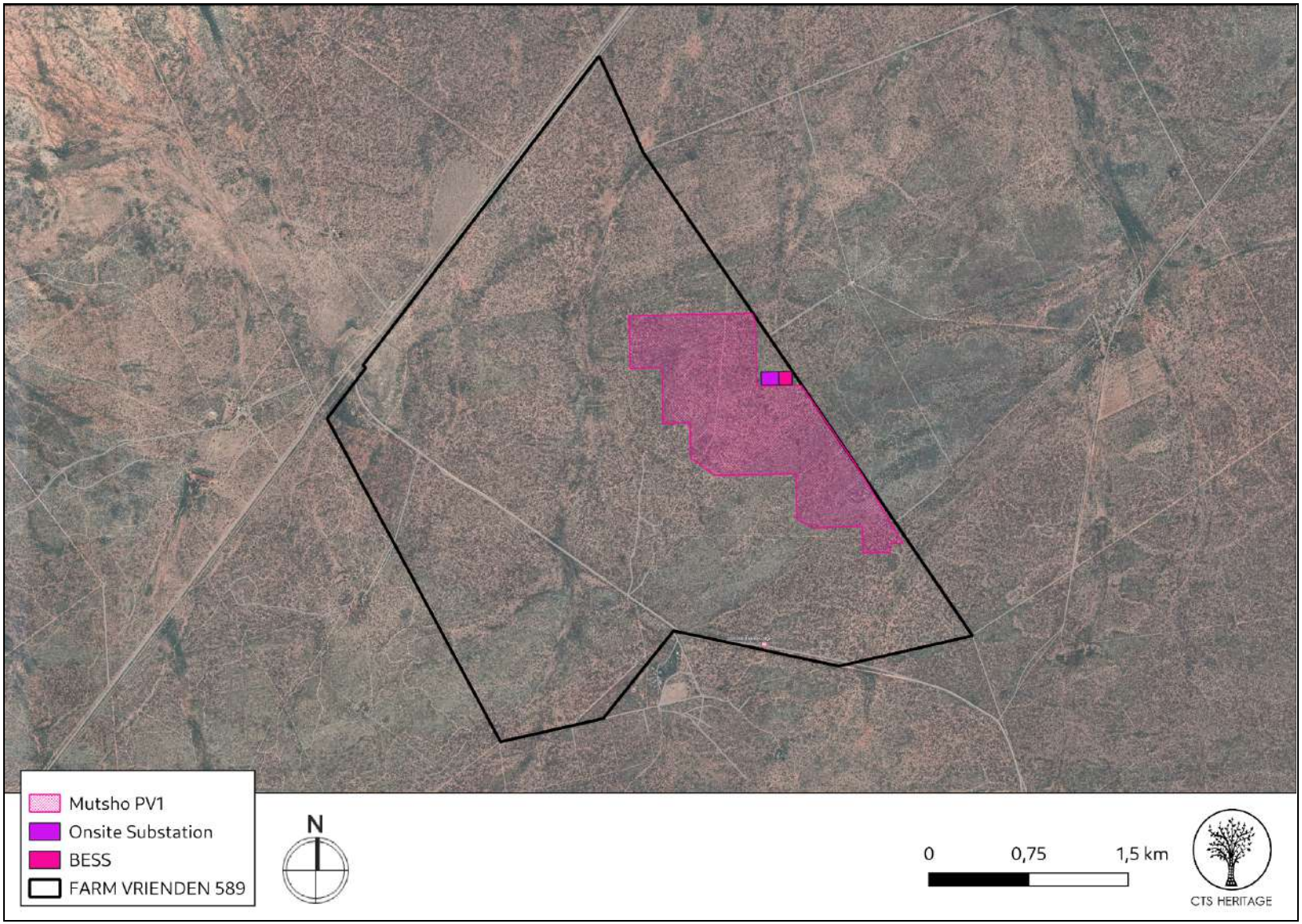

Figure 1.1: The proposed development layout of the Solar PV Facilities

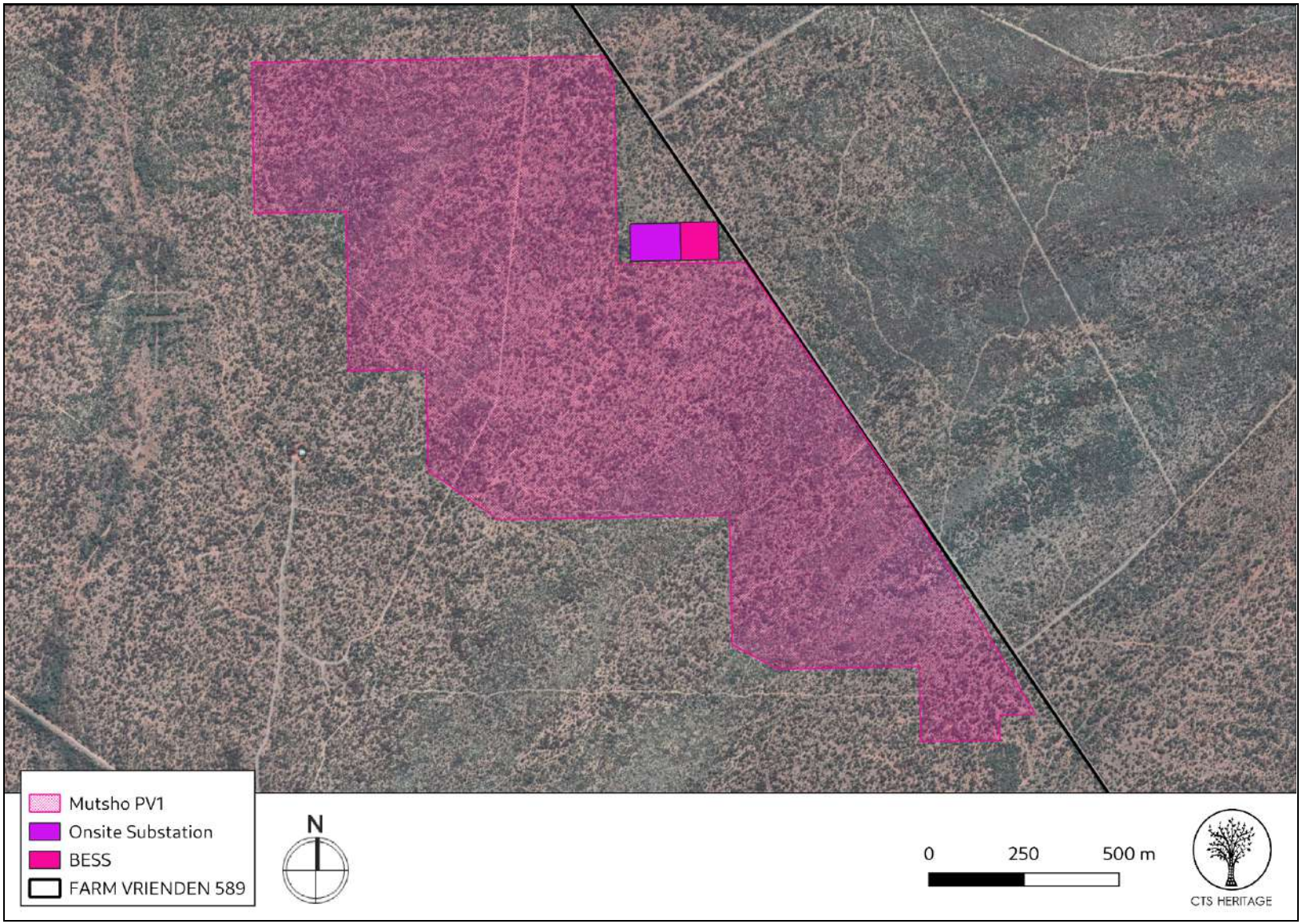

Figure 1.2: The proposed development layout of the Solar PV Facilities

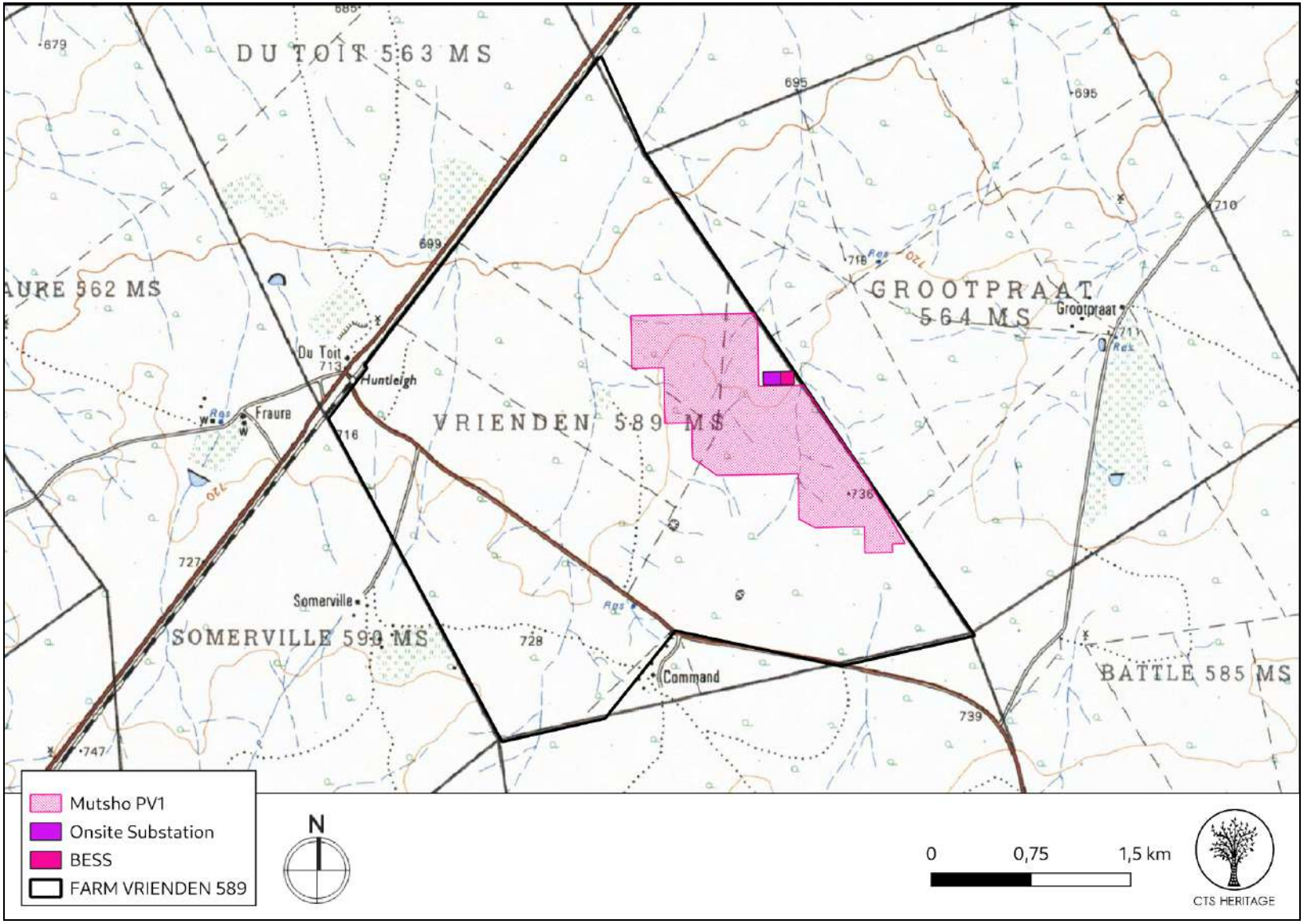

Figure 1.3: The proposed development layout of the PV Facilities on an extract of the 1:50 000 Topo Map

2. METHODOLOGY

2.1 Purpose of HIA

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

In 2017, CTS Heritage undertook a Heritage Impact Assessment process for the proposed Makhado Coal-Fired power station located on the same property. The heritage (archaeology and palaeontology) reports completed for the coal-fired power station in 2017 are used in support of this project and are included as Appendices 1 and 3. The findings of the 2017 reports are referred to here, and have been supplemented by further heritage work conducted in 2022.

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 in January 2017 for a previous, now abandoned, coal project (Appendix 1). A subsequent archaeological site survey was conducted in November 2022 for this project (Appendix 2).
- A palaeontologist conducted a field assessment of palaeontological resources likely to be disturbed by the proposed development in January 2017 for a previous, now abandoned, coal project (Appendix 3)
- 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 in terms of impacts to heritage (Section 5.3)

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

No significant limitations were experienced.

2.5 Savannah Impact Assessment Methodology

Direct, indirect and cumulative impacts of the issues identified through the Basic Assessment 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).

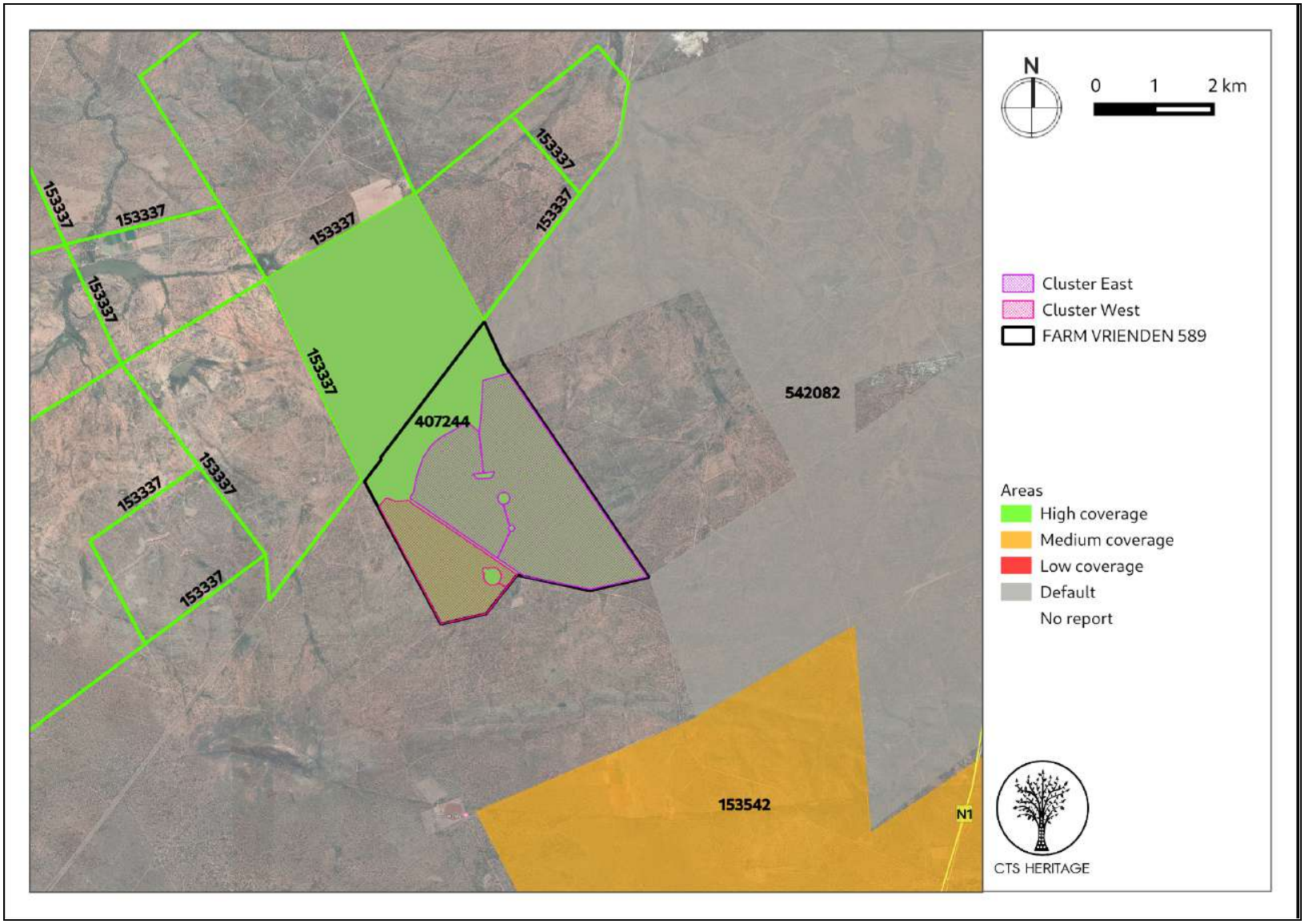

Figure 2: Spatialisation of heritage assessments conducted in proximity to the proposed development

3. HISTORY AND EVOLUTION OF THE SITE AND CONTEXT

3.1 Desktop Assessment

Background:

The area proposed for this development was previously assessed by CTS Heritage as part of the Heritage Impact Assessment for the Mutsho Power Project. The HIA for that project describes the area proposed for development as predominantly rural in nature with a number of coal mines located in the vicinity. The proposed development areas are located in the Lowveld. The area consists of savannah drylands as well as high rainfall areas. The nearby Soutpansberg has forests where the fauna and flora are abundant, and where a wide variety of animal as well as bird species can be found. The farm displays evidence of agricultural activity and disturbance.

Cultural landscape and the Built Environment

According to Silidi and Pikirayi (2013), "The coming of the Voortrekkers in the area and the introduction of commercial farming in the 19th and early 20th centuries has a strong archaeological footprint in the Mopane Project Area. We noted a prevalence of house remains associated with pioneer commercial farmers and shifting semi-permanent dwellings of farm workers. Several graves both with inscriptions and "anonymous" mostly associated with pioneer farmers or their workers were also recorded." No impacts to any historical farming infrastructure of houses are anticipated based on the information provided.

Broadly, the Project Area, which is approximately 70km from Mapungubwe, may be considered as part of the Greater Mapungubwe Cultural Landscape. Mapungubwe was once (between 900 and 1300 CE) the centre of gold and ivory trade with eastern African ports. It was South Africa's first kingdom, and developed into the subcontinent's largest realm, lasting for 400 years before it was abandoned in the 14th century. Its highly sophisticated people traded gold and ivory with China, India and Egypt. While the broader area of northern Limpopo can be considered to be part of the Greater Mapungubwe Cultural Landscape, the context of the area under assessment has been negatively impacted by the significant number of coal mines in the area. Furthermore, the proposed PV facilities are located sufficiently far from the N1 (8km) that no impact to the way that this area is experienced is expected.

Living Heritage

In the heritage impacts assessment completed on Farm Vrienden 589 in 2016, a unique example of living heritage was identified. The Baobab Room, Site V04, continues to be used today. The baobab, which has an entirely hollow trunk at ground level, has a number of windows that allow light into the shelter provided within the trunk. Pegs have been hammered into the external bark to facilitate access to inside the tree through one of these windows. There appears to be a deposit of unknown depth inside the trunk. For its unique value, this site has been graded

IIIA (SAHRIS ID 105147). This site falls well outside of the area proposed for the PV facilities and no impact is anticipated.

Archaeology

South Africa has an extensive stone age archaeological record including the Earlier Stone Age (approximately 2.5mya to 200 kya), Middle Stone Age (200 kya to 40 kya) and Later Stone Age (40 kya to 2000 years ago) deposits. These sites tend to present as scatters of stone age artefacts. Rarely, archaeologists may find a stone tool manufacture site with evidence of stone flake tools as well as the flaked pieces of stone. Later Iron Age sites, such as Mapungubwe, tend to present as the remnants of Iron Age settlements identified through distinct patterns of stone features that formed the foundations of iron age structures. Often, Early Iron Age sites are not visible on the surface, but are evidenced by material culture associated with the Early Iron Age such as pottery sherds, Iron slag and other material culture located beneath the land surface.

The area surrounding the farm proposed for this development is known for a variety of kinds of heritage resources including Stone Age and Iron Age archaeology, significant structures and living heritage sites such as significant baobab trees as well as burial grounds and graves. There are numerous informal burial grounds and graves located in this area, associated with farm workers or mine workers. Often these burial grounds are not fenced and have minimal surface markings denoting their presence. These informal burial grounds and graves have a significant role to play in terms of the cultural continuity of residents of the area and care must be taken to avoid any impact to sites such as this.

Previous surveys of this area (Silidi and Pikirayi, 2013 and CTS Heritage, 2016 and 2018) identified several heritage resources across this farm (Table 1), of these, five fall within the area proposed for development (highlighted in bold in the table below). As per Figure 3b, no impact to any of these heritage resources is anticipated from the layout provided for this assessment. Overall, the archaeological sensitivity of the farm Vrienden 589 is low based on the results of previous heritage field assessments conducted here (Silidi and Pikirayi, 2013 and CTS Heritage, 2016 and 2018). As such, based on the available information, it is unlikely that significant archaeological resources will be impacted by the proposed development.

Table 1: Sites previously identified within the proposed development areas (Figure 3)

Site ID	Site no	Full Site Name	Site Type	Description	Grading	Mitigation
37464	MOP035	Mopane 035	Deposit	Next to medium size Mopane trees, there are makeshift fire places for curing of Mopane worms. Ash deposit is evidence of seasonal use.	Grade IIIc	50m Buffer
37563	MOP110	Mopane 110	Structures, Deposit	An open flat area with mixed vegetation including Mopane and hooked thorn. Square house foundation of calcite stones. An ash midden to the north of the site. It was reported that the Ramufhi family (farm workers) stayed there. They had moved away from farm more than 12 years ago.	Grade IIIc	50m Buffer
37564	MOP111	Mopane 111	Structures	Open flat area with mixed vegetation. Remains of stone buildings with mound suggesting earth plaster. Possibly associated with farm workers.	Grade IIIc	50m Buffer
37566	MOP113	Mopane 113	Structures	Open flat area of mixed vegetation including Mopane. Extensive evidence of farm occupation. Circular stone cairn 1m high x 2.5m diameter, cement floor, concrete blocks and cement bricks and plaster remains.	Grade IIIc	50m Buffer
37567	MOP114	Mopane 114	Structures	On the crest of a ridge with a view of the surrounding country. Mixed scrub vegetation including Mopane. School building for whites only. Partially collapsed square building, stones and cement plaster used. 4 rooms and a veranda facing E. Several cairns around the building and square brick structure on stone foundation.	Grade IIIa	100m no-go buffer
37568	**MOP115**	**Mopane 115**	**Structures**	**Modern gabled building situated in an open flat area. Baobab and garden trees/shrubs.**	**Grade IIIb**	**100m no-go buffer**
37455	MOP031	Mopane 031	Artefacts	Open site is mixed vegetation.	Grade IIIb	50m Buffer
37456	MOP032	Mopane 032	Structures	Fallen windmill, water tank and derelict dip tank.	Grade IIIc	NA
37459	MOP034	Mopane 034	Building	An open site, flat, on the side of the road and railway line. The remains of a brick building of which some walls are standing. The informant and elder brother born there in 1914 and 1937 respectively. The settlement thus dates back to before 1914.	Grade IIIa	100m no-go buffer
37466	MOP036	Mopane 036	Structures	Foundation remains of a square building, open site, aloes.	Grade IIIc	50m Buffer
37468	MOP037	Mopane 037	Building	Flat area several building of which the main house is a gabled building of face brick with a closed veranda facing west. Garden trees, plants and fruit trees. Young baobab. May date to the 1960s	Grade IIIb	100m no-go buffer
37565	**MOP112**	**Mopane 112**	**Burial Grounds & Graves**	**Open flat area with mixed vegetation. Rectangular stone settings, possibly 3 graves.**	**Grade IIIa**	**100m no-go buffer**
37458	MOP033	Mopane 033	Burial Grounds & Graves	Open area with mixed vegetation. Two graves enclosed by mesh wire. 2 graves Michael van der Walt B. 24 Mar 1922, D. 27 Feb 1941; Louis van der Walt B. 15 Jan 1935, D. 22 Dec 1940. The homestead was abandoned in 1963. Dressed graves with polished headstones.	Grade IIIa	100m no-go buffer

Palaeontology

The area proposed for development falls within the summer rainfall region of South Africa, and has a mild, subtropical climate. The study area lies within a region of variable geology that includes sediments of the:

- Undifferentiated Karoo Basin; Tshipise and Tuli Sedimentary Basin and Solitude Formation; and
- the Malala drift Gneiss and Gumbu Group of the Beit Bridge Complex, Archaean Granite-Gneiss Basement.

According to the SAHRIS Palaeosensitivity Map (Figure 4), the area proposed for development is located on sediments of moderate and zero palaeontological sensitivity. An area of very highly sensitive geology is identified to the north of the development area, however no impact to these palaeontologically sensitive deposits is anticipated based on the layout provided.

Fossil heritage could be present in the Undifferentiated Karoo as well as the Solitude Formation which has a high to very high Palaeontological Sensitivity. The Archaean Granite-Gneiss Basement, Beit Bridge Complex and Malala Drift Suite, Gumbu Group are metamorphic rocks which are unfossiliferous and with a very low palaeontological sensitivity. The north eastern part of the farm Vrienden 589 falls in the potentially fossiliferous Undifferentiated Karoo and the unfossiliferous Archaean Granite-Gneiss Basement, Beit Bridge Complex and Malala Drift Suite, Gumbu Group. According to the Palaeontological Impact Assessment completed in 2016, (Butler), the high sensitivity deposits include sandstones, siltstones and mudstones of the Karoo Supergroup, and Bosbokpoort, Fripp, Solitude, Klopperfontein, Madzaringwe and Mikambeni Formations. These various deposits are mostly fluvial, and are known to contain a wide variety of fossils including dinosaur remains, fossil plants and petrified wood. The low sensitivity deposits comprise gneisses, representing the Malala Drift Gneiss Suite, and metamorphic rocks of the Archean Gumbu Group, which are unfossiliferous, as well as red sandstones of an indeterminate origin. The palaeontological field assessment completed by Butler (2016) identified no significant palaeontological resources within the development footprint. Butler (2016) goes on to conclude that "a **low palaeontological sensitivity** is allocated to the development footprint."

Based on the results of Butler (2016) and the known palaeontological sensitivity of the underlying geology of the area, it is unlikely that the proposed development will negatively impact on significant palaeontological heritage.

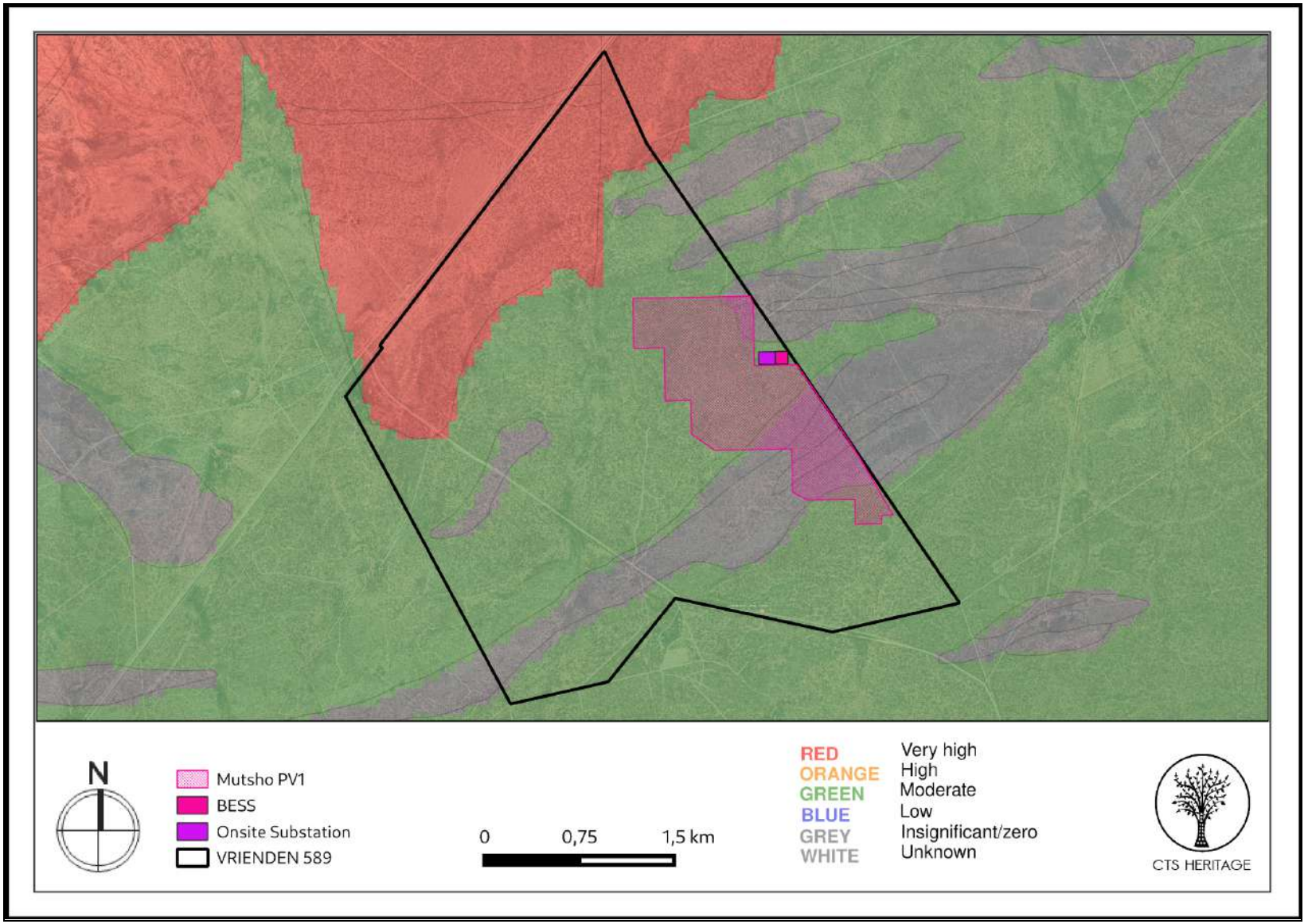

Figure 3: Palaeontological sensitivity of the proposed development area

4. IDENTIFICATION OF HERITAGE RESOURCES

4.1 Summary of findings of Specialist Reports

The most significant findings from this assessment include Site V04, the Baobab Room, graded IIIA on Farm Vrienden 589.

Living Heritage

The Baobab Room, Site V04, is an interesting example of living heritage that continues to be used today (Figure 8). The baobab, which has an entirely hollow trunk at ground level, has a number of windows that allow light into the shelter provided within the trunk (Figure 5.1). Pegs have been hammered into the external bark to facilitate access to inside the tree through one of these windows (Figure 5.2). There appears to be a deposit of unknown depth inside the trunk. It is proposed that this site is graded IIIA.

Archaeology

No archaeological sites of scientific value were identified within proximity of the area proposed for development in both the 2017 and 2022 site visits. Other surveys have identified structures that speak to the agricultural past of this area however none have particular significance. One burial ground was identified however this is located well away from the proposed development area.

Palaeontology

A field assessment identified no fossil remains within the footprint of the proposed development area (Appendix 2). The PIA notes that "The scarcity of fossil heritage at the proposed development footprint indicate that the impact of the (of the development) will be of a low significance in palaeontological terms… Thus, the construction and operation of the facility may be authorised as the whole extent of the development footprint is not considered sensitive in terms of palaeontological resources."

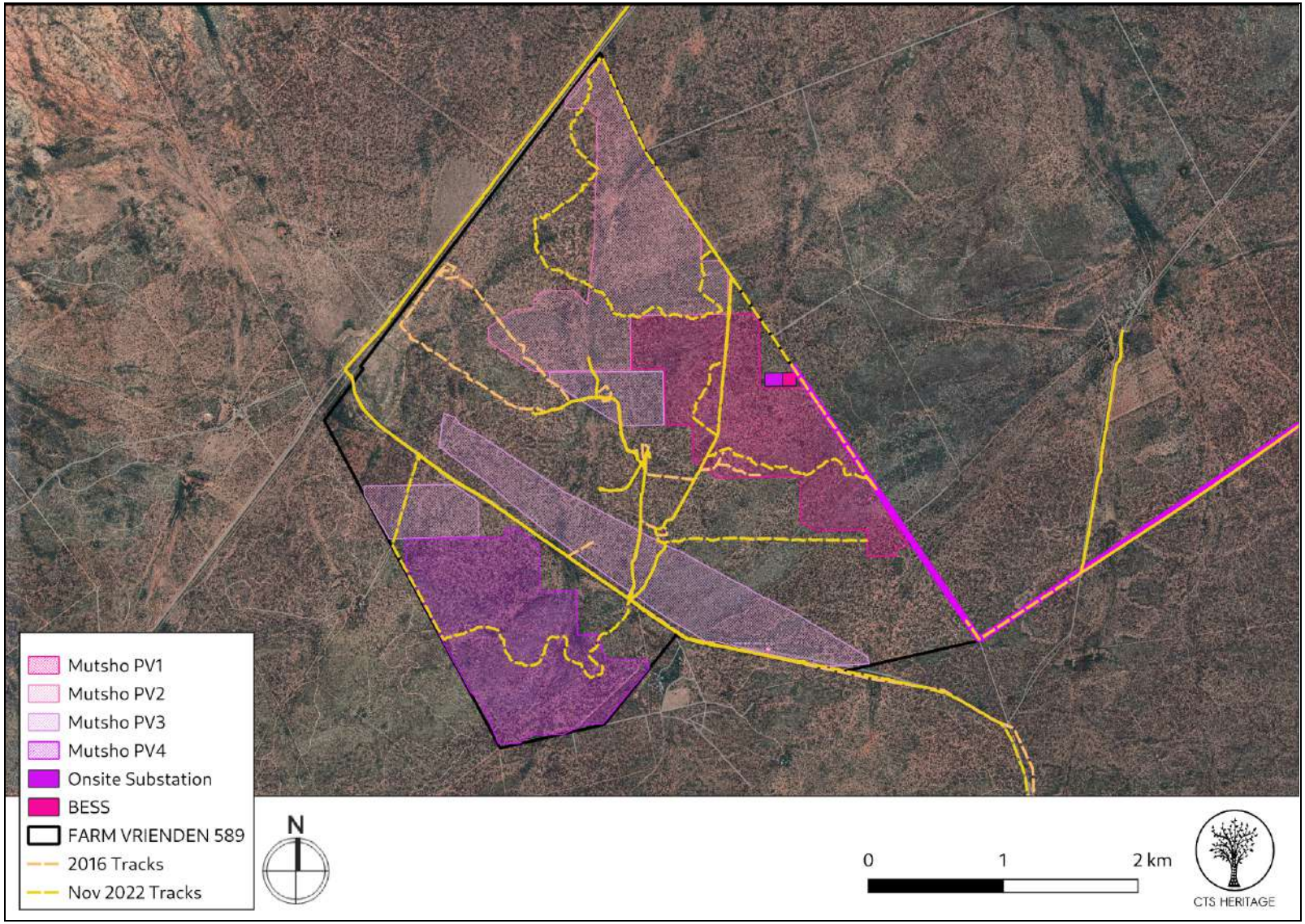

Figure 4. Previous HIAs Map. Tracks walked as part of the 2016 Heritage Impact Assessment process for this property and the track paths for the 2022 survey

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

Site ID	Site no	Full Site Name	Site Type	Description	Grading	Mitigation
105144	V01	Vrienden 1	Artefacts	Archaeological, 1 stone artefact	NCW	NA
105145	V02	Vrienden 2	Artefacts	Archaeological, 1 stone artefact	NCW	NA
105146	V03	Vrienden 3	Structures	Modern disused agricultural infrastructure	NCW	NA
105147	V04	Vrienden 4	Living Heritage	Living Heritage/Sacred sites, the "Baobab Room"	Grade IIIa	200m No Go Buffer
105149	V05	Vrienden 5	Artefacts	Archaeological, 1 stone artefact	NCW	NA
105150	V06	Vrienden 6	Structures	Ruin of agricultural infrastructure	NCW	NA
	V07	Vrienden 7	Artefacts	Single stone tool, quartzite chunk located on the side of the road	NCW	NA

4.3 Selected photographic record

Figure 5.1: Site V04, the "Baobab Room"

Figure 5.2: Inside the "Baobab Room" at V04 and pegs used to assist with entry

4.4 Mapping and spatialisation of heritage resources

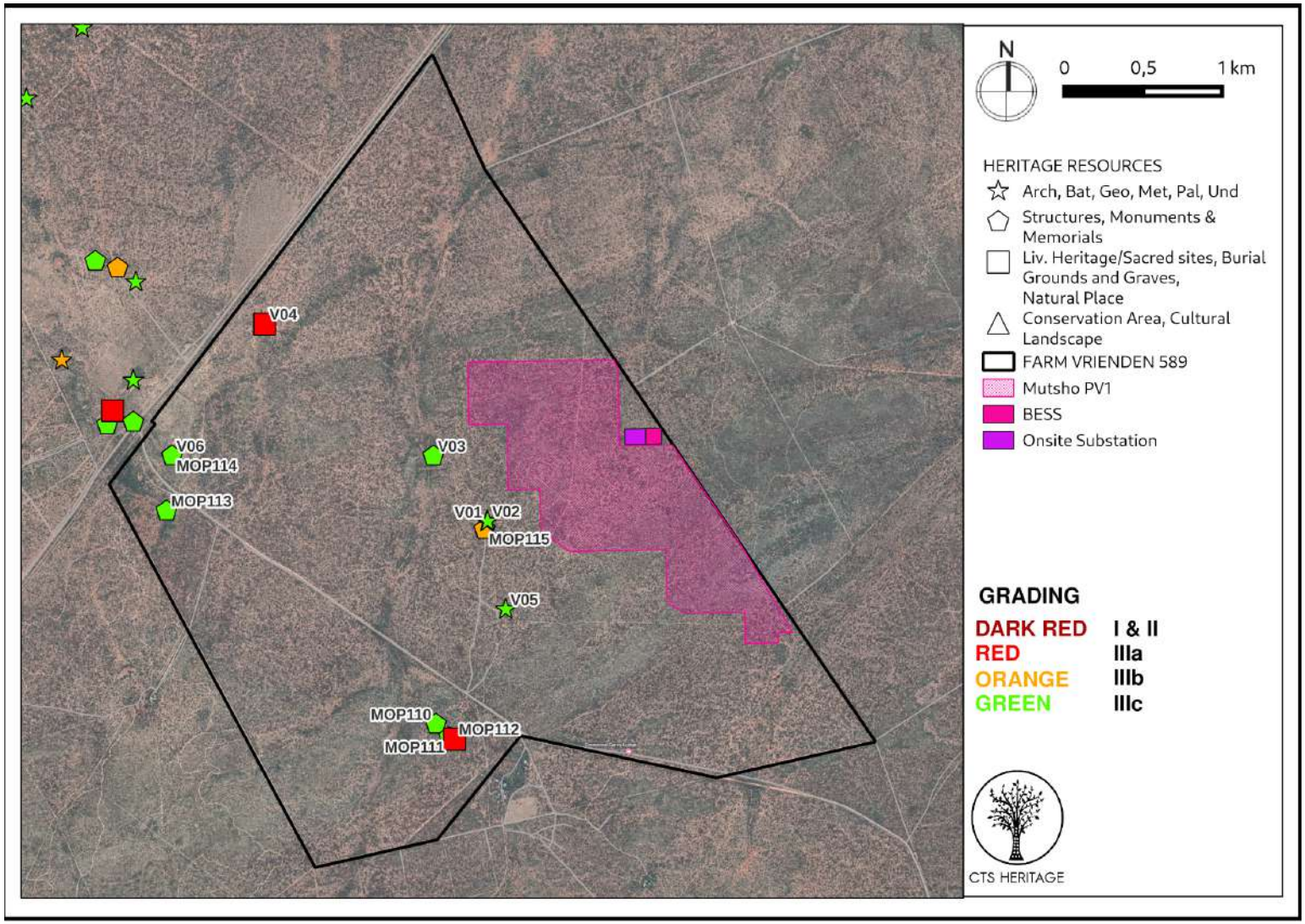

Figure 6.1: All significant heritage resources within proximity to the development area

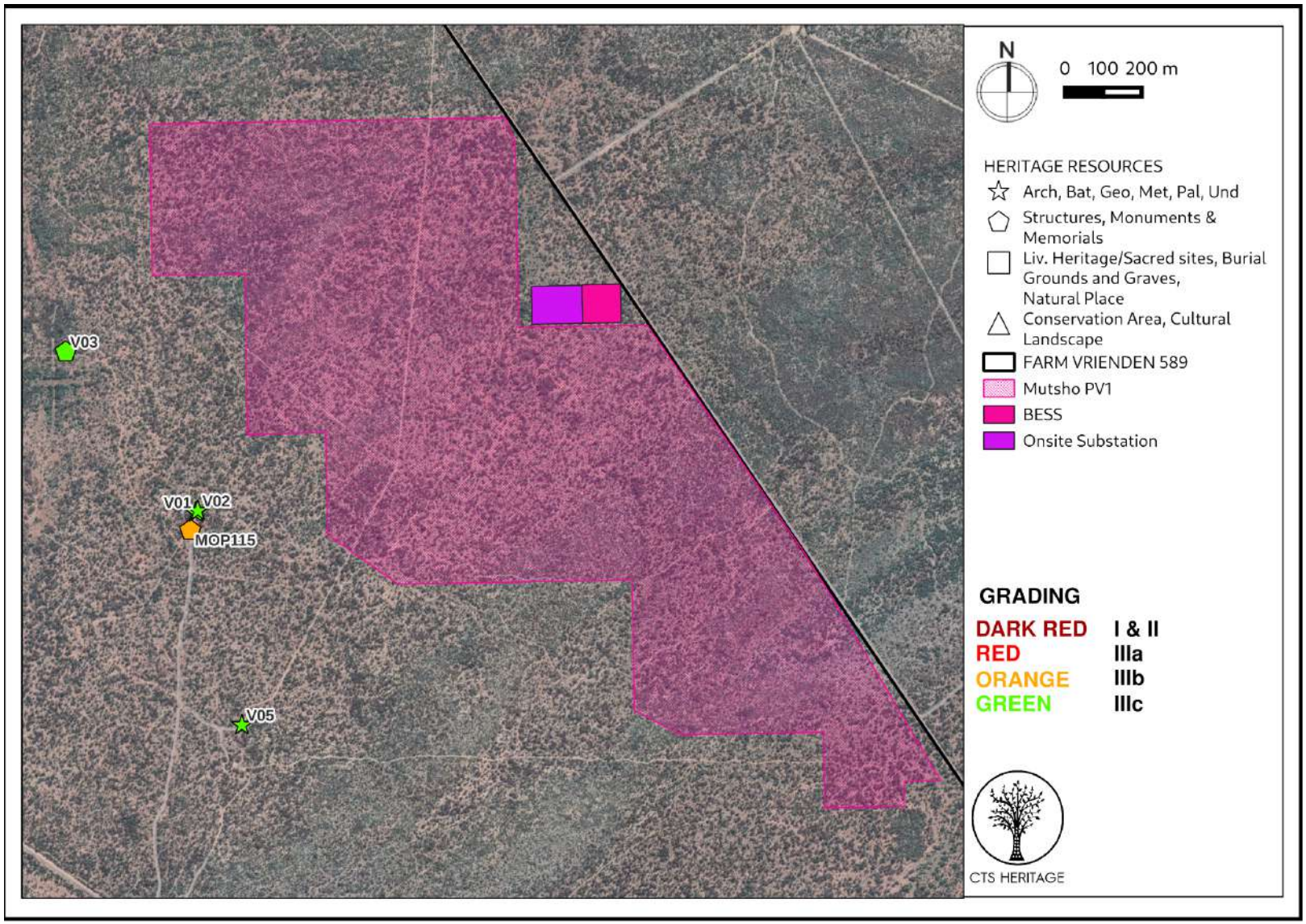

Figure 6.2: Map of heritage resources identified near to the PV development area

5. ASSESSMENT OF THE IMPACT OF THE DEVELOPMENT

5.1 Assessment of impact to Heritage Resources

5.1.1 Cultural Landscape and VIA

A VIA was completed for the proposed development, the results of which are summarised below.

Landscape character is defined as "a distinct, recognisable and consistent pattern of elements in the landscape that makes one landscape different from another". Landscape character has been defined using a desktop assessment using existing data sets and aerial photography as well as from knowledge of the area. The affected area has a strong rural character, interspersed with agriculture and industrial activities particularly mining, and settlement.

The affected landscape can be broadly divided into the following LCAs that are largely defined by landform.

- **Undulating Plains Landscape Character Area** which is comprised of the undulating plains to the north of the Soutpansberg and south of the Limpopo River. It is largely covered with semi-natural bushveld. The area is generally used for low intensity grazing. There also appears to be a significant eco-tourism secondary bias to the land use. The bushveld and in particular the taller shrubs and trees that extend above head height provide significant VAC screening for all but the closest elements. It is only likely that major elements will be obvious when the viewer is located in an elevated area above the natural vegetation or when a road alignment or a clearing enables vistas that extend further than the viewer's immediate vicinity. The development area falls entirely within this LCA.
- **Soutpansberg Landscape Character Area** which is comprised of the Soutpansberg mountain range to the south and east of the proposed site. The mountain slopes are vegetated but much of the valley floors are developed. The dominant element is the landform which provides a high degree of VAC within this LCA.
- **Limpopo Valley Ridgelines Landscape Character Area** which is comprised of the narrow ridgelines and koppies that run through the plain to the north and south of the proposed site. The ridgelines are generally covered with natural bushveld. This LCA provides a moderate degree of VAC. It will limit visibility of the development within the surrounding undulating plain. However people located on the ridgelines and Koppies may have a panoramic view over the plains below them.

The proposed development could negatively impact on the character of the Undulating Plain LCA which is largely a natural landscape which may be an important tourism resource. Due to the extent of forest and the gently undulating plain with rocky ridgelines the affected landscape has a relatively cohesive natural character that is valuable for local tourism activities.

Because of the density of vegetation this main impact relates to industrialisation of the rural landscape surrounding the proposed site. This will occur if views of the proposed solar array and associated infrastructure become visible and obvious from areas that are currently natural in character.

Given the VAC of the existing landscape, major impacts are likely to be limited to roads and homesteads in the immediate vicinity of the proposed development. There is also likely to be a small impact potentially extending to the limit of visibility of the tallest elements associated with the development.

The Visual Impact Assessment has confirmed that there are no major landscape and visual impacts that will preclude development. However there are a number of localised impacts that could be experienced by residents of a small number of homesteads and users of local unsurfaced roads. If these are addressed through the mitigation measures indicated, there is no reason from a landscape and visual impact perspective why this project should not be authorised.

The impacts described above have been assessed in the VIA completed for this project and included in the EIA.

5.1.2 Archaeology

None of the heritage resources identified fall within the area PV layout provided and as such, no direct impact to any heritage resources is anticipated.

The heritage resources that were identified fall within close proximity to the layout provided and as such, it is important that impact to the significant sites is avoided. It is recommended that the sensitive heritage areas identified in this report are avoided by any proposed development of new infrastructure.

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	**M (3)**	No archaeological heritage resources of significance were identified within the development footprint, however some were identified within the broader development area	**L (1)**	No archaeological heritage resources of significance were identified within the development footprint, however some were identified within the broader development area
DURATION	**H (5)**	Where an impact to a resource 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)**	Since only the possible fossils within the area would be microscopic blue-green algae in some stromatolites, the spatial scale will be localised within the site boundary.
PROBABILITY	**M (3)**	It is possible that significant heritage resources will be impacted if the layout provided is followed	**L (1)**	It is unlikely that significant heritage resources will be impacted if the layout provided is followed
SIGNIFICANCE	**L**	(3+5+1)x3=24	**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 200m no-go buffer must be implemented around site V04 - A 100m no-go buffer must be implemented around site MOP115 - 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.				

5.1.3 Palaeontology

The area proposed for development is underlain by sediments of zero and moderate palaeontological sensitivity. Previous site visits and walk throughs have confirmed that there were NO FOSSILS in the project footprint.

Table 3.2: Impacts of the proposed development of the PV facilities 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	**M (3)**	The area proposed for development is underlain by sediments of zero and moderate palaeontological sensitivity	**M (3)**	The area proposed for development is underlain by sediments of zero and moderate palaeontological sensitivity
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)**	Since the only possible fossils within the area would be microscopic blue-green algae in some stromatolites, the spatial scale will be localised within the site boundary.	**L (1)**	Since the only possible fossils within the area would be microscopic blue-green algae in some stromatolites, the spatial scale will be 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	**H**	(3+5+1)x1=9	**H**	(3+5+1)x1=9
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.				

5.2 Sustainable Social and Economic Benefit

According to information received from the developer, the anticipated socio-economic benefits that the proposed Mutsho Solar PV Facility will include but are not limited to:

- Generation of green, renewable energy (namely solar energy);
- Affected landowners generate income;
- Creation of employment during the construction and operational phases;
- Skills-development opportunities created during the operational phase;
- The identification of Socio-Economic needs within the local community and the curation of Socio-Economic Development Plans as outlined in the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) and other such renewable energy procurement programmes.

Based on this information, the anticipated socio-economic benefits to be derived from the project outweigh the identified impacts to heritage resources.

5.3 Proposed development alternatives

No alternatives were considered for this project. The entire property was considered for the PV projects and the client has placed the infrastructure appropriately to avoid sensitivities.

5.4 Cumulative Impacts

In terms of impacts to heritage resources, it is preferred that this kind of infrastructure development is concentrated in one location and is not sprawled across an otherwise agricultural landscape. The proposed development is therefore likely to result in a change to the sense of place of the area however this has been addressed 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 process and will be managed by the lead environmental consultants on the project.

7. CONCLUSION

This and past heritage assessments of this property have identified limited heritage resources of cultural value. A previous assessment identified Farm Vriendin 589 as preferred for development with limited impacts to heritage resources anticipated as its overall heritage sensitivity is regarded as LOW overall. The most significant site identified in the vicinity of the development is Site V04. It is recommended that Site V04, the Baobab Room, must not be impacted by any activity and any proposed activity on this farm must adhere to a buffer area of 100m around this site. This site is located a significant distance from the area proposed for development.

The PIA notes that "The scarcity of fossil heritage at the proposed development footprint indicate that the impact of the (of the development) will be of a low significance in palaeontological terms… Thus, the construction and operation of the facility may be authorised as the whole extent of the development footprint is not considered sensitive in terms of palaeontological resources."

In light of these findings, there is no objection to the proposed development on heritage grounds on condition that the recommendations outlined below are adhered to.

8. RECOMMENDATIONS

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

- The recommendations in the VIA are implemented
- A 200m no-go buffer must be implemented around site V04
- A 100m no-go buffer must be implemented around site MOP115
- The attached Chance Fossil Finds Procedure must be implemented for the duration of construction activities
- Should any buried archaeological resources or human remains or burials be uncovered during the course of development activities, work must cease in the vicinity of these finds. The South African Heritage Resources Agency (SAHRA) must be contacted immediately in order to determine an appropriate way forward.

9. REFERENCES

Heritage Impact Assessments				
Nid	**Report Type**	**Author/s**	**Date**	**Title**
153542	Heritage Impact Assessment Specialist Reports	Matodzi Silidi, Innocent Pikirayi	10/12/2013	The report is a Heritage Impact Assessment (HIA) for the Generaal Project area, Vhembe District, Limpopo Province
153337	Heritage Impact Assessment Specialist Reports	Matodzi Silidi, Innocent Pikirayi	04/10/2013	The attached report is a Heritage Impact Assessment (HIA) for the Mopane Project Area which describes potential adverse and positive effects of the proposed mining operations on heritage resources.
45126	HIA	Frans Roodt	01/10/2011	Eskom Power Line Paradise Substation to the Proposed Makhado Colliery
153337	HIA	Matodzi Silidi, Innocent Pikirayi	04/10/2013	Heritage Impact Assessment for the Proposed Greater Soutpansberg Mopane Project
153366	HIA	Matodzi Silidi, Innocent Pikirayi	18/11/2013	Heritage Impact Assessment for the Proposed Greater Soutpansberg Chapudi Project
291265	HIA	Frans Roodt	30/11/2015	Phase 1 Heritage Impact Assessment Report: the Duel 186 Mt Remaining Extent, Vhembe District Municipality, Limpopo

Smuts and Wiltshire (2017). HERITAGE IMPACT ASSESSMENT In terms of Section 38(8) of the NHRA for a PROPOSED NEW MUTSHO POWER PROJECT NEAR MAKHADO. Unpublished.

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APPENDICES

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APPENDIX 1: Archaeological Assessment (2017)

SPECIALIST ARCHAEOLOGICAL FIELD REPORT

Report on a site inspection conducted for the

PROPOSED NEW POWER STATION NEAR MAKHADO, LIMPOPO

Prepared by CTS Heritage

CTS HERITAGE

In Association with Savannah Environmental

February 2017

CTS HERITAGE

EXECUTIVE SUMMARY

Savannah Environmental has been tasked with conducting environmental assessments for a proposed new power station near Makhado in Limpopo Province. Three Farms have been identified as possible alternatives for the location of this proposed power station. These are Farm Vriendin 589, Farm Du Toit 563 and Farm Battle 585.

This report constitutes a fieldwork report and is not an HIA in terms of section 38(3) of the NHRA. It is anticipated that an HIA will be drafted once the final location of the proposed power station has been determined. The fieldwork took place from 23 January to 26 January 2017. The archaeological foot survey of Farm Vriendin 589 was conducted in the company of other specialists which somewhat limited the freedom of movement of the archaeologist. The foot survey of the Farm Du Toit 563, however, was unimpeded. Unfortunately, the archaeologist was unable to access the Farm Battle 585, however it is understood that the context of Farm Battle 585 is similar to that of Farm Vriendin 589.

The most significant findings from this assessment include Site V04, the Baobab Room, graded IIIA, and Sites D04 to D07 which appear to be a Middle Stone Age artefact manufacturing site. These sites extend and blend into one another forming one large site. The density of flakes and flaked pieces that occur within this larger site is very high, with the ground surface littered with Middle Stone Age artefacts and individual instances of manufacture.. It is proposed that this larger artefact manufacturing site be graded IIIA due to its high level of scientific cultural significance.

In summary, it is recommended that:

- Farm Battle 585 requires a detailed assessment to be conducted, however it is likely that the archaeological context of this farm is similar to that of Vriendin 589
- Site V04 must not be impacted by any proposed development. A buffer of 100m around this site must be implemented.
- Sites D04 to D07 likely represents one large MSA artefact manufacturing site and must not be impacted by any proposed development. A buffer of 100m around this large artefact manufacturing site must be implemented.
- The final location of the area proposed for development should be assessed in detail by an archaeologist.

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CONTENTS

1. INTRODUCTION

1.1 Background Information on Project

Savannah Environmental has been tasked with conducting environmental assessments for a proposed new power station near Makhado in Limpopo Province. Three Farms have been identified as possible alternatives for the location of this proposed power station. These are Farm Vriendin 589, Farm Du Toit 563 and Farm Battle 585.

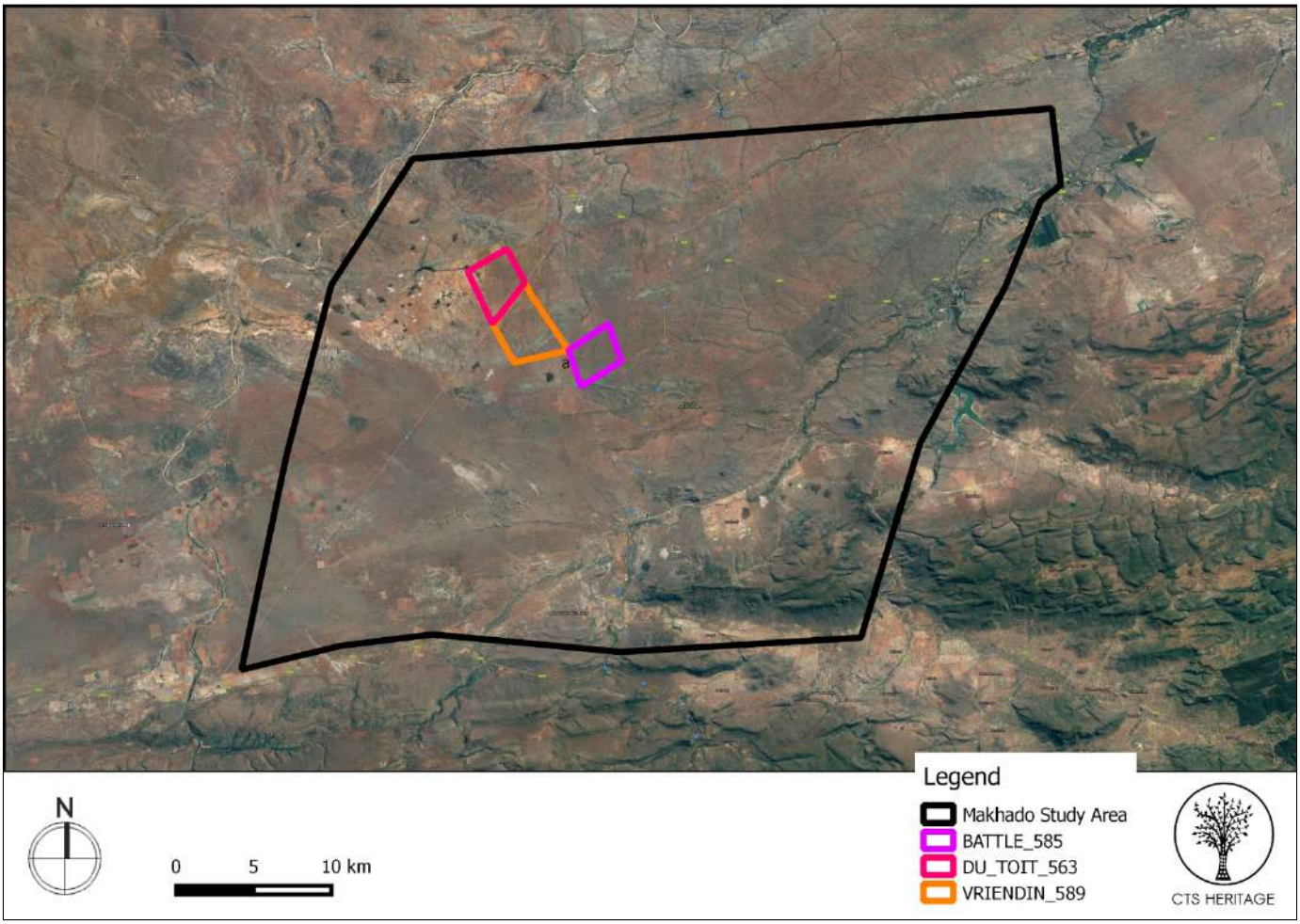

Figure 1: A portion of Farm 814/1 and a portion of remainder Farm 830 with the proposed development indicated

Prior to this field assessment, CTS Heritage conducted a desktop heritage screening assessment for the broad area under investigation (Annexure 1). The results of this assessment concluded that:

"The large screening study area consists of cultivated land, towns as well as infrastructure such as National roads and a nature reserve. CTS Heritage was requested to provide an overview of the known heritage resources within this area as well as the areas of likely heritage sensitivity to inform

the selection of project locality alternatives. The screening study area for this proposed new power station is rich in heritage resources including areas that have high to very high sensitivity for palaeontological resources. Any proposed development that impacts on these sensitive areas will require a full palaeontological assessment as well as a protocol for chance finds. In terms of archaeological resources, significant Stone Age and Iron Age resources are known from this area (see maps 3a to 3e above as well as Appendix 1). In the above maps, the areas which appear to be void of archaeological resources **have not yet been systematically surveyed** and as such, will require detailed field analysis as part of any additional heritage studies that will be completed for this project. This area is also known for its numerous informal burial grounds and graves. These are spaces that are sacred to the communities that live here and should be accorded the appropriate respect. It is important to note that any location selected within this larger screening area will likely require further heritage assessment in terms of likely impact to archaeological resources and informal burial grounds due to the sensitivity of the region."

Savannah Environmental requested a field assessment to determine the suitability of these three proposed farms for the location of the proposed Power Station.

1.2 Description of Property and affected Environment

The area proposed for the new Makhado Power Station is predominantly rural in nature with a number of coal mines located in the vicinity. The proposed development areas are located in the Lowveld. The area consists of savannah drylands as well as high rainfall areas. The nearby Soutpansberg has forests where the fauna and flora are abundant, and where a wide variety of animal as well as bird species can be found. The three farms each displayed evidence of agricultural activity and disturbance.

2. METHODOLOGY

2.1 Scope of Work

It is important to note that this report is not an HIA. The purpose of this Field Assessment Report is to identify any fatal flaws in terms of heritage in order to inform the decision-making process regarding the location of the proposed power station. Once the detail regarding the proposed development is finalised, this Field Assessment report will be used to inform a complete HIA in terms of section 38(3) of the NHRA.

2.2 Summary of steps followed

- The landowners were contacted for access to the property
- The sites were visited from Monday 23 to Thursday 26 January 2017

- The proposed quarry area was traversed on foot in transects and any identified archaeological or other heritage resources were recorded using a digital camera and a Garmin GPS

3. HISTORY AND EVOLUTION OF THE SITE AND CONTEXT

3.1 Definition of the property

The field assessment targeted three properties in the Makhado area in the Limpopo Province.

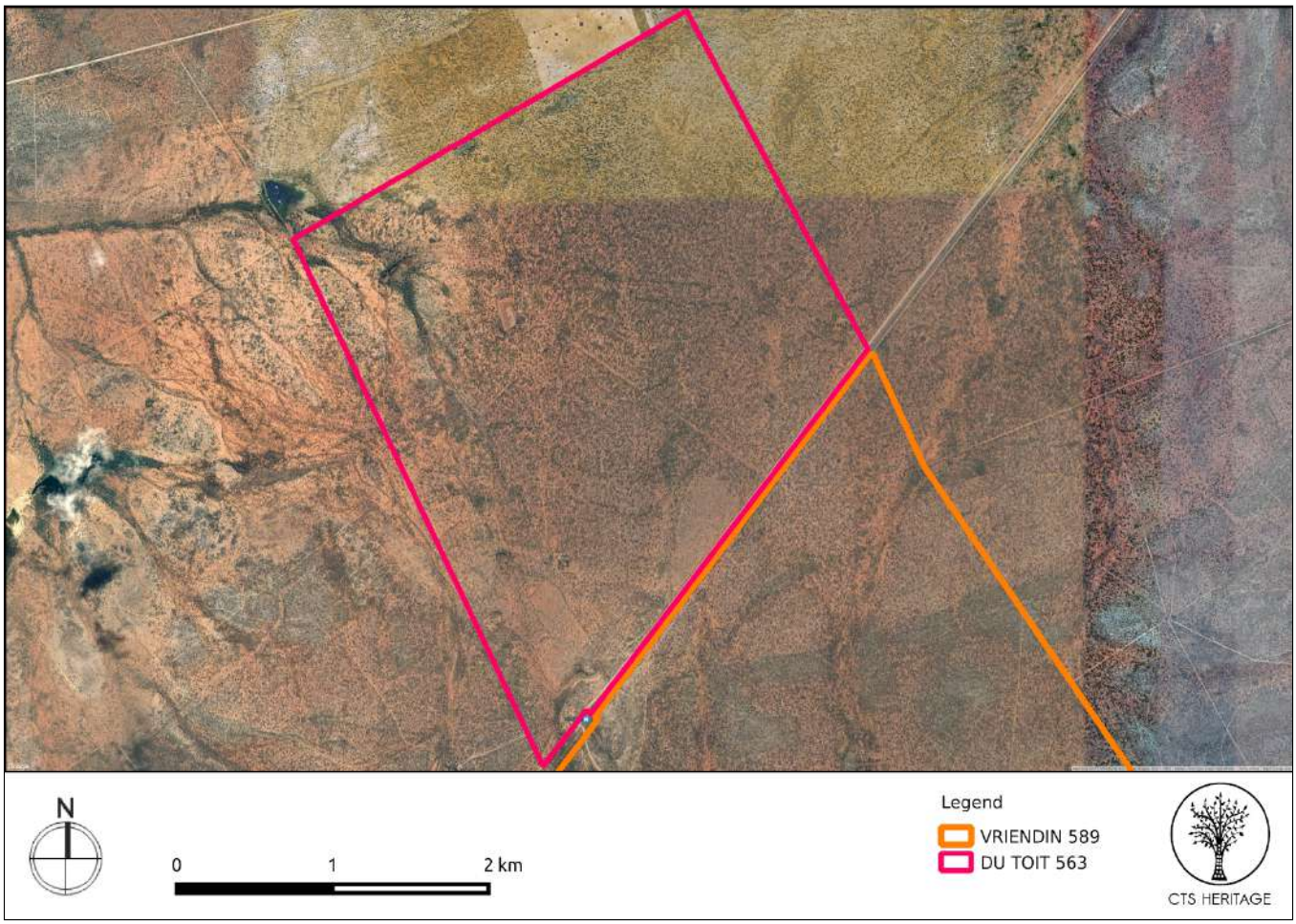

Figure 2: Aerial Image of proposed quarry area

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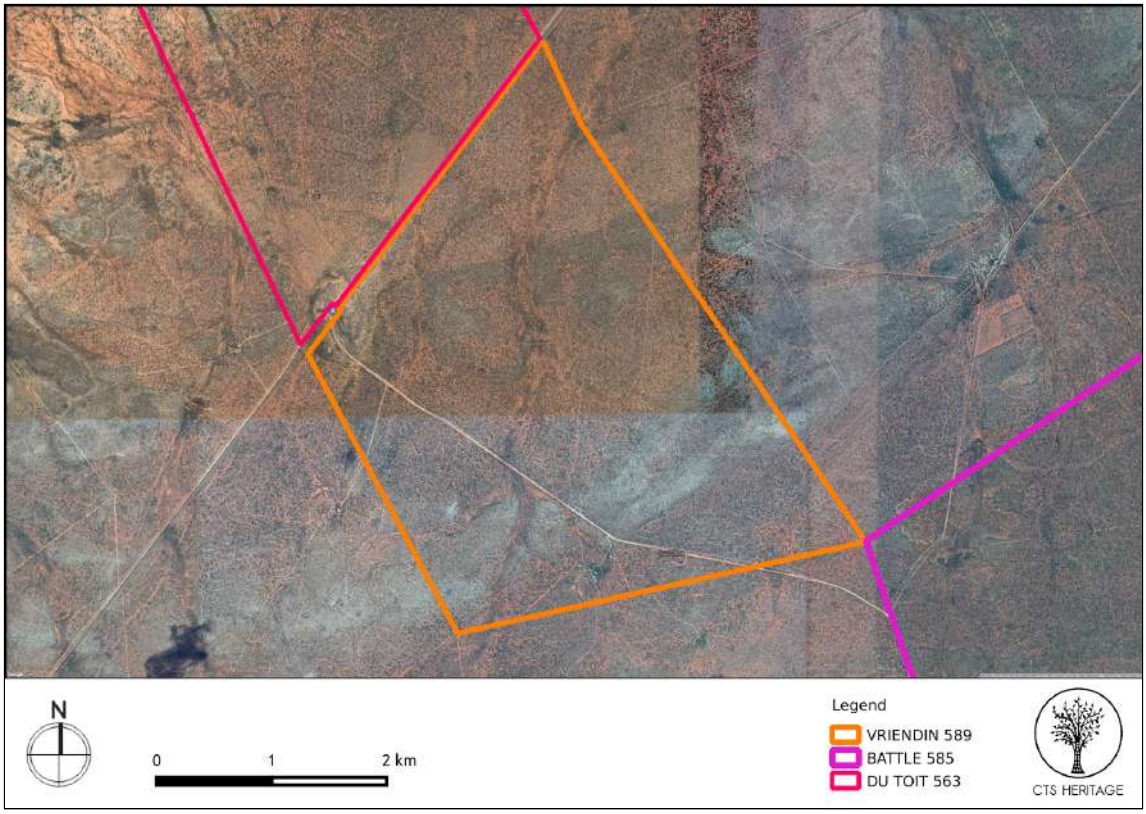

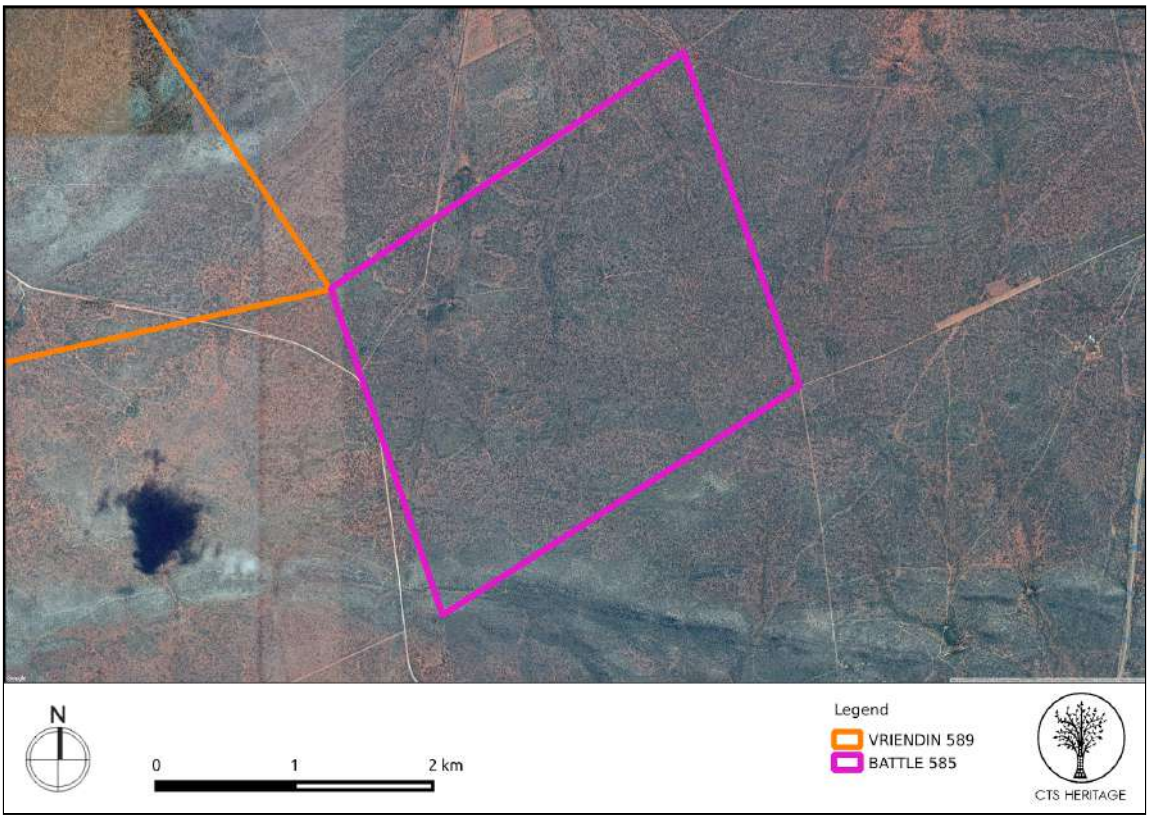

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3.2 Archaeological and Historical Background

The area surrounding the three farms assessed in this field report are known for a variety of kinds of heritage resources including Stone Age archaeology, Iron Age archaeology, significant structures and living heritage sites such as significant baobab trees as well as burial grounds and graves.

South Africa has an extensive stone age archaeological record including Earlier Stone Age (approximately 2.5mya to 200 kya), Middle Stone Age (200 kya to 40 kya) and Later Stone Age (40 kya to 2000 years ago) deposits. These sites tend to present as scatters of stone age artefacts. Rarely, archaeologists may find a stone tool manufacture site with evidence of stone flake tools as well as the flaked pieces of stone.

Later Iron Age sites, such as Mapungubwe, tend to present as the remnants of Iron Age settlements identified through distinct patterns of stone features that formed the foundations of iron age structures. Often, Early Iron Age sites are not visible on the surface, but are evidenced by material culture associated with the Early Iron Age such as pottery sherds, Iron slag and other material culture located beneath the land surface.

There are numerous informal burial grounds and graves located in this area, associated with farm workers or mine workers. Often these burial grounds are not fenced and have minimal surface markings denoting their presence. These informal burial grounds and graves have a significant role to play in terms of the cultural continuity of residents of the area and care must be taken to avoid any impact to sites such as this.

Table 1: Sites previously identified within the vicinity of the proposed power station

Site ID	Site No	Full Site Name	Site Type	Grading
37464	MOP035	Mopane 035	Deposit	Grade IIIc
37563	MOP110	Mopane 110	Structures, Deposit	Grade IIIc
37564	MOP111	Mopane 111	Structures	Grade IIIc
37566	MOP113	Mopane 113	Structures	Grade IIIc
37567	MOP114	Mopane 114	Structures	Grade IIIa
37568	MOP115	Mopane 115	Building	Grade IIIb
37455	MOP031	Mopane 031	Artefacts	Grade IIIb
37456	MOP032	Mopane 032	Structures	Grade IIIc

37459	MOP034	Mopane 034	Building	Grade IIIa
37466	MOP036	Mopane 036	Structures	Grade IIIc
37468	MOP037	Mopane 037	Building	Grade IIIb
37565	MOP112	Mopane 112	Burial Grounds & Graves	Grade IIIa
37458	MOP033	Mopane 033	Burial Grounds & Graves	Grade IIIa

Table 2: HIA's previously conducted in the vicinity of the proposed power station (Figure 5)

Nid	Report Type	Author/s	Date	Title
153337	HIA	Matodzi Silidi, Innocent Pikirayi	04/10/2013	The attached report is a Heritage Impact Assessment (HIA) for the Mopane Project Area which describes potential adverse and positive effects of the proposed mining operations on heritage resources. The Impact Assessment has been carried out in accordance

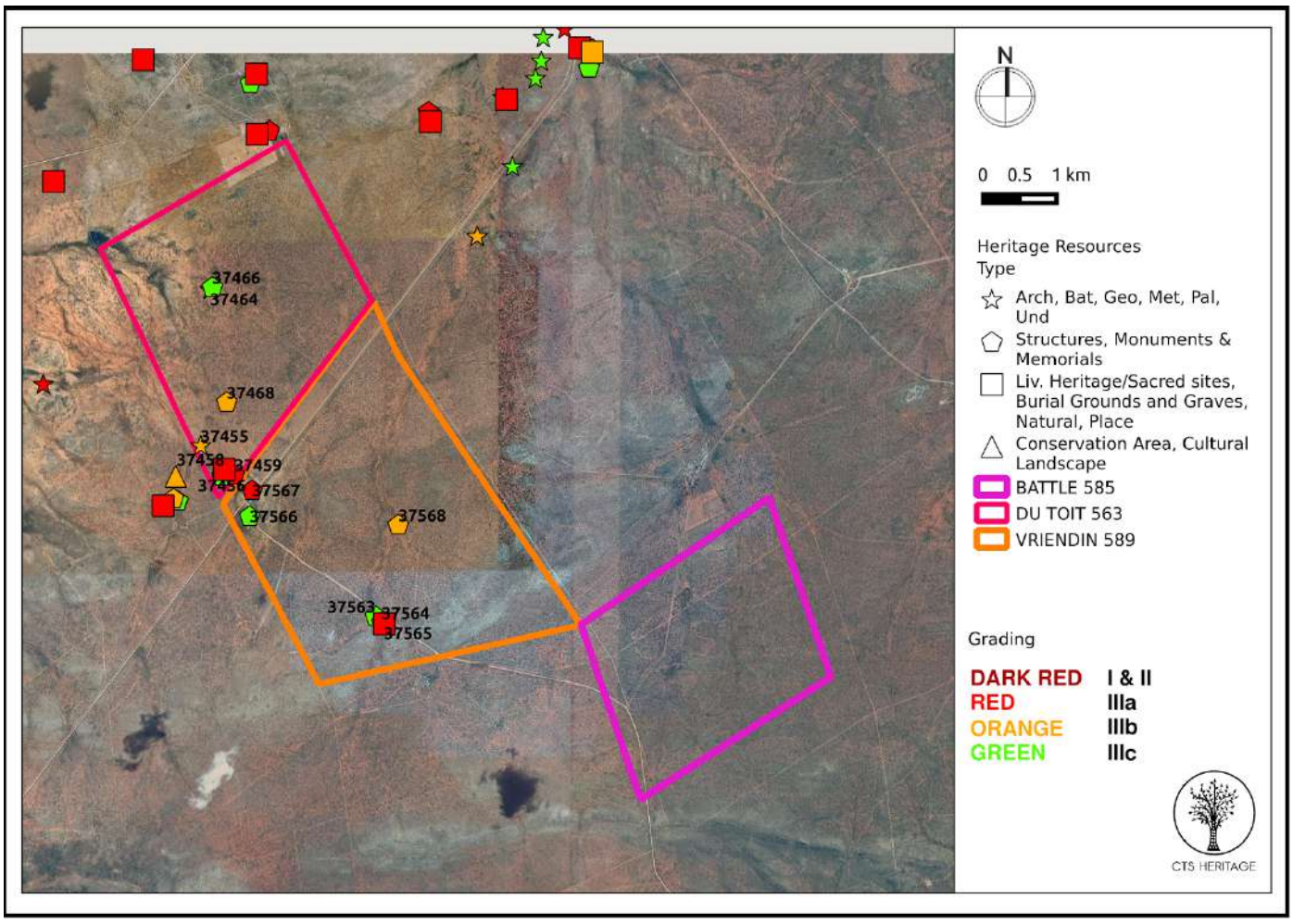


Figure 6: Spatialisation of known heritage resources in the vicinity of the proposed power station

4. DESCRIPTION OF HERITAGE RESOURCES

4.1 Details of Site Visits

The fieldwork took place from 23 January to 26 January 2017. The archaeological foot survey of Farm Vriendin 589 was conducted in the company of other specialists which somewhat limited the freedom of movement of the archaeologist. The foot survey of the Farm Du Toit 563, however, was unimpeded. Unfortunately, the archaeologist was unable to access the Farm Battle 585 as the gate was locked at the time agreed to for the site visit, however it is understood that the context of Farm Battle 585 is similar to that of Farm Vriendin 589.

On both surveyed farms, the visibility was good. A number of informal dam excavations and mole rat activity provided a window into sub-surface deposits.

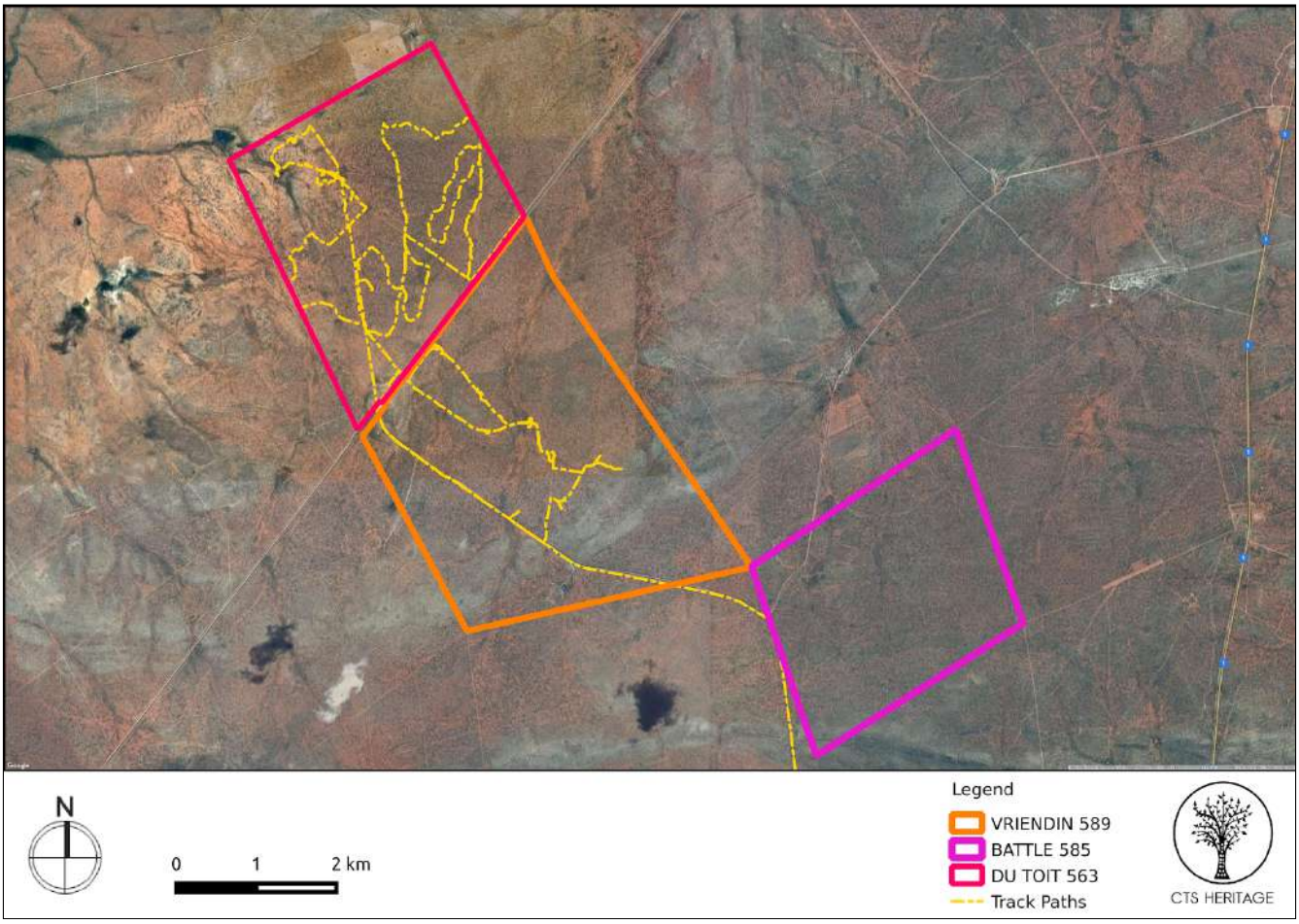


Figure 5: Map indicating the track paths walked by the archaeologist

A number of heritage resources of varied significance were identified by the archaeologist on Farms Vriendin 589 and Du Toit 563. These sites have been recorded on SAHRIS and are detailed in the table below.

Table 3: Artefacts identified during the foot survey (NCW: Not Conservation-Worthy)

SAHRIS Site ID	Site Number	Site Name	Site Description	Grading
105144	V01	Vriendin 1	Archaeological, 1 stone artefact	NCW
105145	V02	Vriendin 2	Archaeological, 1 stone artefact	NCW
105146	V03	Vriendin 3	Modern disused agricultural infrastructure	NCW
105147	V04	Vriendin 4	Living Heritage/Sacred sites, the "Baobab Room"	Grade IIIa
105149	V05	Vriendin 5	Archaeological, 1 stone artefact	NCW
105150	V06	Vriendin 6	Ruin of agricultural infrastructure	NCW
105151	D01	Du Toit 1	Modern agricultural infrastructure	NCW
105152	D02	Du Toit 2	Archaeological, 1 potsherd	NCW
105153	D03	Du Toit 3	Archaeological, potsherd and some stone tools, low density	Grade IIIc
105154	D04	Du Toit 4	Archaeological, MSA stone tools identified emerging from 1x4m hole previously dug, Additional artefacts and raw material scattered on surface. High density	Grade IIIa
105155	D05	Du Toit 5	Archaeological, MSA stone tools raw material scattered on surface. High density	Grade IIIa
105156	D06	Du Toit 6	Archaeological, MSA stone tools raw material scattered on surface. Highest density	Grade IIIa
105157	D07	Du Toit 7	Archaeological, MSA stone tools raw material scattered on surface including hammerstone. High density	Grade IIIa
105159	D08	Du Toit 8	Archaeological, isolated artefacts. Low density	Grade IIIc
105160	D09	Du Toit 9	Archaeological, artefacts and ochre. Moderate density	Grade IIIc
105161	D10	Du Toit 10	Remains of modern disused agricultural infrastructure	NCW
105162	D11	Du Toit 11	Archaeological, small dam with sporadic artefacts in spoil heap	Grade IIIc
105163	D12	Du Toit 12	Archaeological, near to the boundary of Vriendin. Area cleared for powerline construction. Piece of iron slag identified.	NCW
105164	D13	Du Toit 13	Ruin of disused modern agricultural infrastructure	NCW

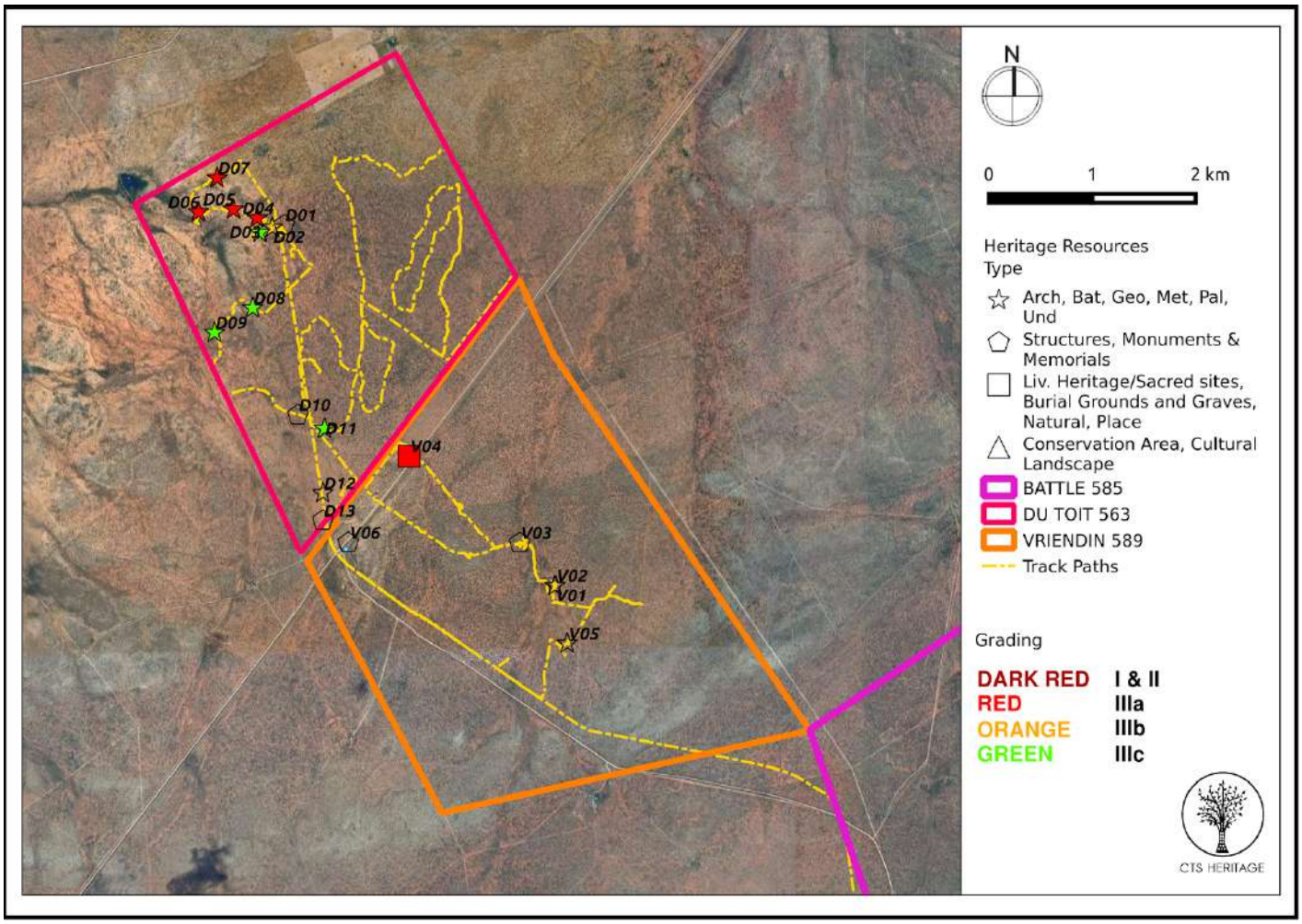


Figure 6: Map indicating location of heritage resources identified during the foot survey

4.2 Photographic Record

Figure 8: Site V04, the "Baobab Room"

Figure 9 and 10: Inside the "Baobab Room" at V04 and pegs used to assist with entry

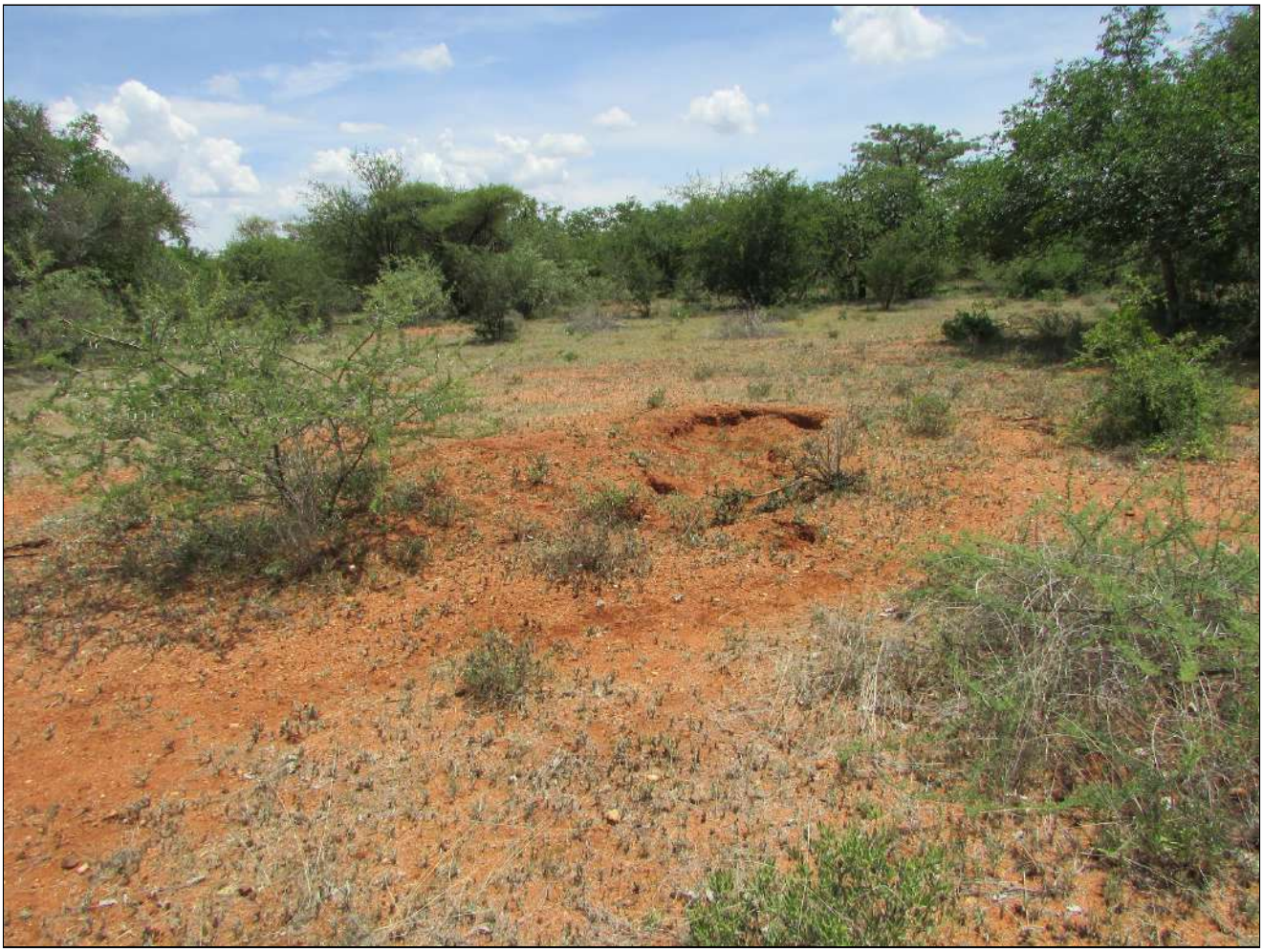
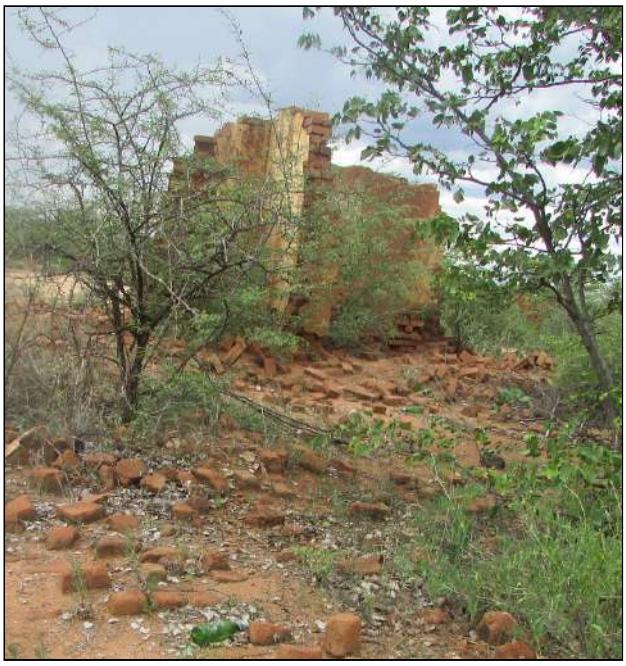


Figure 11: Site D04 with the 1x4m pit indicated

Figure 12: A selection of MSA artefacts from site D04

Figure 13: An example of the density of artefacts at Site D06

Figures 14: Ruin of agricultural infrastructure at V06



Figures 15 and 16: Examples of disused agricultural infrastructure on Farm Du Toit 563

4.3 Mapping and spatialisation of heritage resources

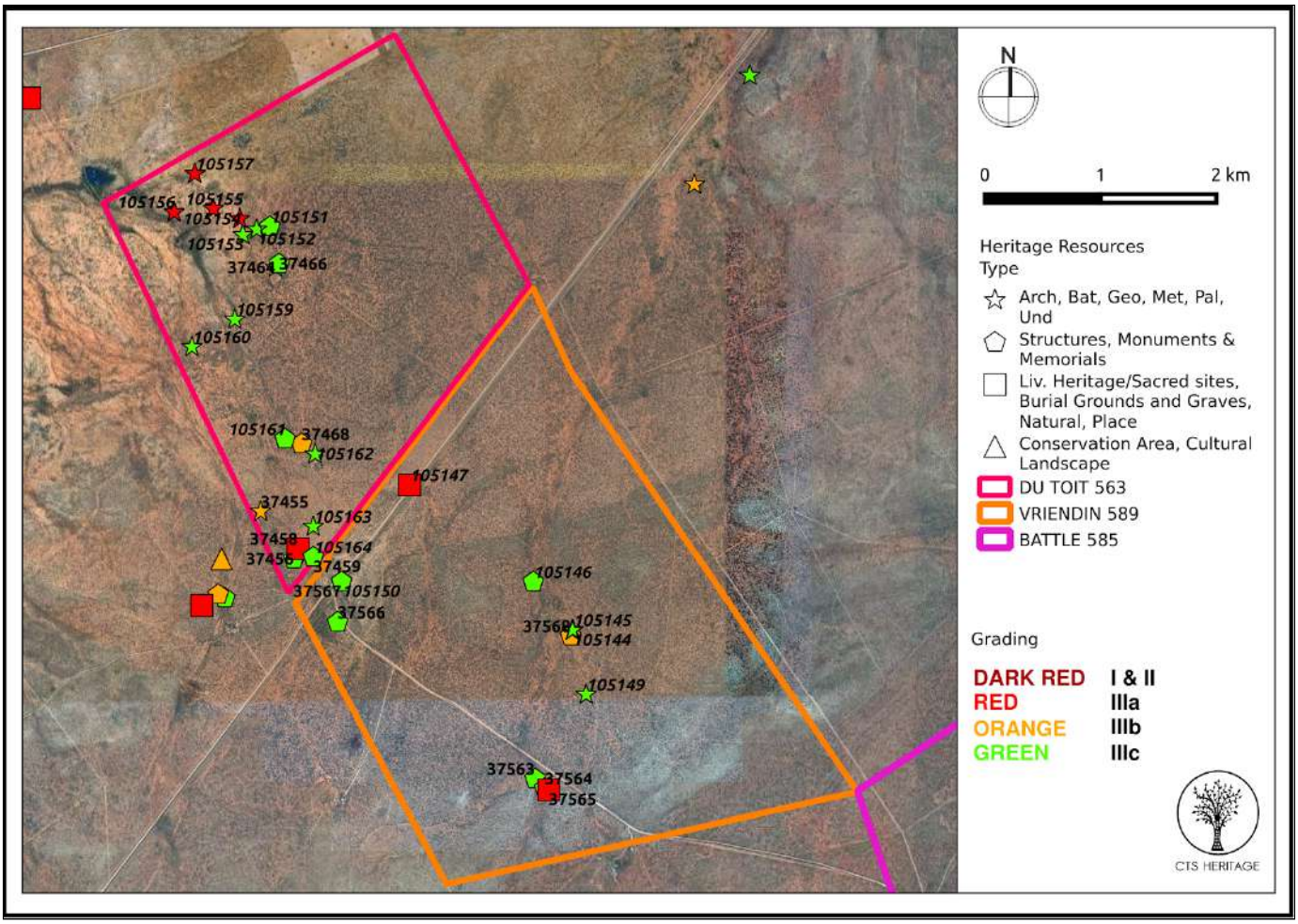


Figure 24: Spatial location of all heritage resources within the area under investigation

5. DISCUSSION OF FINDINGS AND SIGNIFICANCE

The most significant findings from this assessment include Site V04, the Baobab Room, graded IIIA, and Sites D04 to D07, which for the purposes of this report should be read as one site, also graded IIIA.

The Baobab Room, Site V04, is an interesting example of living heritage that continues to be used today. The baobab, which has an entirely hollow trunk at ground level, has a number of windows that allow light into the shelter provided within the trunk. Pegs have been hammered into the external bark to facilitate access inside the tree through one of these windows. There appears to be deposit of unknown depth inside the trunk. It is proposed that this site is graded IIIA.

Sites D04 to D07 appears to be a Middle Stone Age artefact manufacturing site. These sites extend and blend into one another, forming one large site. The density of flakes and flaked pieces that

occur within this larger site is very high, with the ground surface littered with Middle Stone Age artefacts and individual instances of manufacture. The highest density appears around site D06. Such open air Middle Stone Age sites are rare and provide a unique window into the origins of modern humans. It is proposed that this larger artefact manufacturing site be graded IIIA due to its high level of scientific cultural significance.

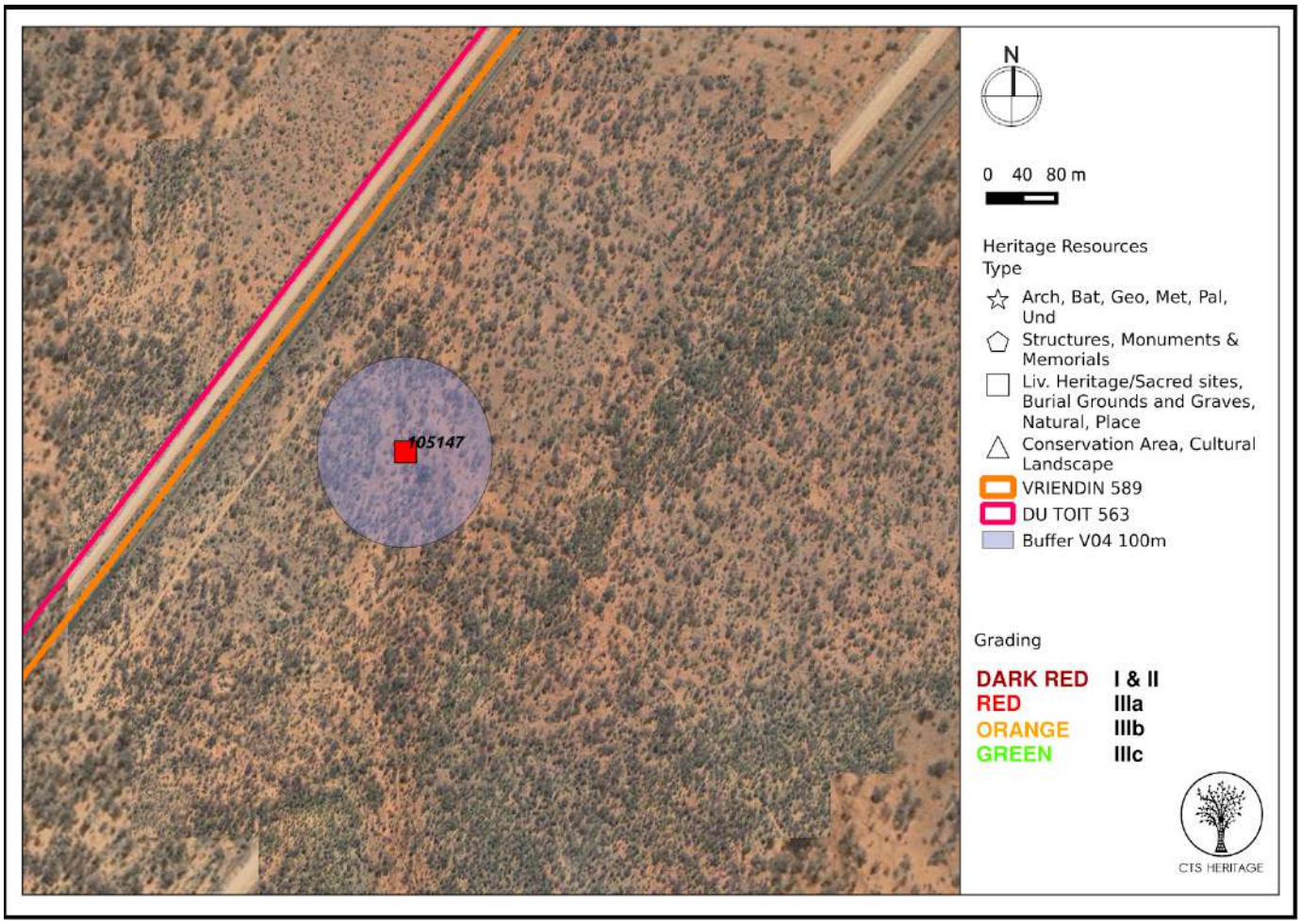


Figure 25: Site V04 with buffer zone of 100m indicated

6. CONCLUSION AND RECOMMENDATIONS

In light of the above findings, it is recommended that Farm Vriendin 589 is the preferred site for the proposed new power station from an archaeological perspective. It is likely that Farm Battle 585, although not assessed by the archaeologist, has a similar density and sensitivity to impacts to archaeology as Farm Vriendin 589. Site V04, the Baobab Room, must not be impacted by any proposed development and any proposed development on this farm must adhere to a buffer area of 100m around this site.

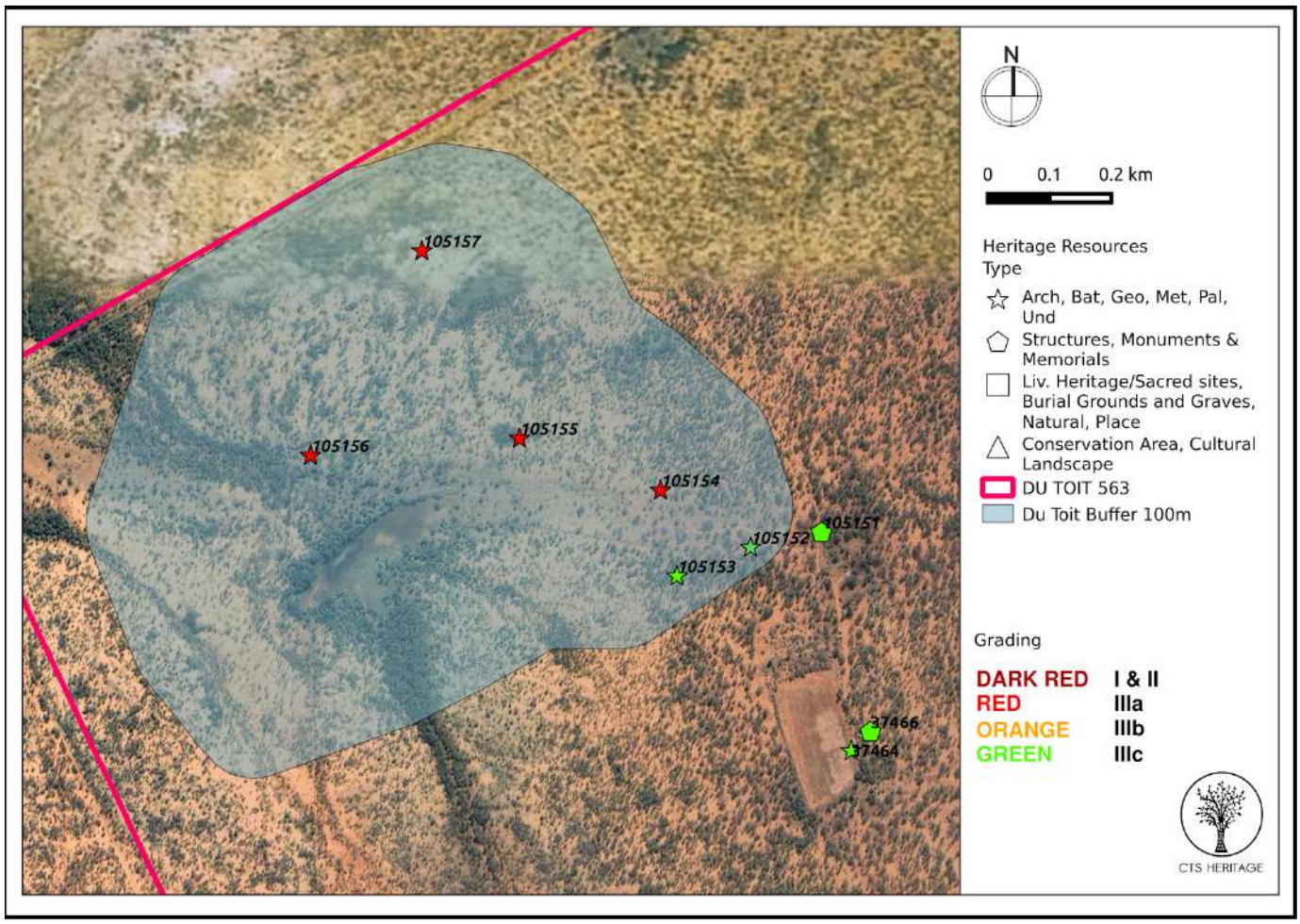


Figure 26: Sites D04 to D07 with buffer zone of 100m indicated

Farm Du Toit 563 has areas that are very significant in terms of archaeological resources, and areas that have less heritage significance. Sites D04 to D07 represent one large Middle Stone Age artefact manufacturing site that has high archaeological significance. This large, important site has valuable research potential and must be avoided by any proposed power station. Mitigation by excavation is not recommended as this would result in loss of significant archaeological information. The exact boundaries of the extent of this larger manufacturing site are not clearly determined and as such, a buffer of 100m around the visible extent of this large site be implemented should the Farm Du Toit 563 be selected as the preferred site for the proposed power station.

In summary:

- Farm Battle 585 requires a detailed assessment to be conducted, however it is likely that the archaeological context of this farm is similar to that of Vriendin 589

- Site V04 must not be impacted by any proposed development. A buffer of 100m around this site must be implemented.
- Sites D04 to D07 likely represents one large MSA artefact manufacturing site and must not be impacted by any proposed development. A buffer of 100m around this large artefact manufacturing site must be implemented.
- The final location of the area proposed for development should be assessed in detail by an archaeologist.

CTS HERITAGE

APPENDIX 2: Archaeology Field Notes and Photo Sheet 2022

FIELD NOTES

Phase 1 Archaeological/Heritage Impact Assessment

Site ID: MUTSHO SOLAR POWER PROJECT GRID CONNECTION, LIMPOPO

Phase 1 survey conducted				
CRM Archaeologist	Johan Smit		Date/s	02/11/2022 – 03/11/2022
Additional surveyors				
Type of survey	Pedestrian/Vehicular		Transects	
Technical equipment	GPS	Garmin handheld	Camera	Cell phone

PROJECT PARTICULARS

Technical information

Project description	
Project name	MUTSHO SOLAR POWER PROJECT GRID CONNECTION, LIMPOPO
Description	The proposed development includes a power line corridor and solar plant area
Developer	
Contact information	
Development type	
Landowner	
Various (Private, commercial and community)	

Contact information	
Consultants	
Environmental	
Heritage and archaeological	UBIQUE Heritage Consultants
Paleontological	
Property details	
Province	Limpopo Province
District municipality	Vhembe District Municipality
Local municipality	Musina Local Municipality
Topo-cadastral map	2229DB
Farm name	RE of Vrienden 589 MS Grootpraat 564 MS Farm 617 MS Groot Endaba 581 Ptn 2 Scott 567 MS RE of Steenbok 565 MS RE of Antrobus 566 MS RE of Somme 611 MS
Closest town	Musina
GPS Co-ordinates	22°40'25.10"S 29°49'45.30"E
Property size	
Development footprint size	1,254 ha
Land use	
Previous	Game farms and cattle grazing
Current	Game farms
Rezoning required	No
Sub-division of land	No

Development criteria in terms of Section 38(1) NHRA	Yes/No
Construction of a road, wall, power line, pipeline, canal or other linear forms of development or barrier exceeding 300m in length.	Yes
Construction of bridge or similar structure exceeding 50m in length.	No
Construction exceeding 5000m ².	Yes
Development involving three or more existing erven or subdivisions.	Yes
Development involving three or more erven or divisions that have been consolidated within the past five years.	No
Rezoning of site exceeding 10 000m ².	No
Any other development category, public open space, squares, parks, recreation grounds.	No

GENERAL ENVIRONMENT, INFRASTRUCTURE AND LANDSCAPE

Site description

Description of the general area affected by development	
Type of environment	
The area is typical of Musina Mopane Bushveld. The red sandy soils support moderately open savannas and some close shrub veld. The proposed 132kV line corridor is next to an existing power line and dirt road. The proposed Solar plant footprint is located in an area that primarily consists of medium to high trees with short grass. A few stone outcroppings are present in the surveyed areas. The surveyed area has several baobabs east of Huntleigh road, but no baobabs were observed on the western side. The western area has signs of cattle grazing.	
Terrain description	
Essentially flat with no distinct landmarks or features.	
Geology	
Loose red sand with metamorphic basalt and sandstone rock outcroppings	
Vegetation	
Open under footing with medium to high vegetation growth. Vegetation growth was primarily endemic. The presence of Sicle bush indicates periods of overgrazing in the past.	
Waterways/sources	
No natural water sources were documented: only artificially constructed dams.	
Site boundaries	
Farm boundary-fences demarcated site boundaries.	
Site Access	GPS Co-ordinates
The site was accessed from two locations, the first from the N1 (GPS Co-ordinate 1). The second was located on Huntleigh road at GPS Co-ordinate_2.	1: 22°40'5.88"S 29°54'50.16"E 2: 22°42'4.35"S 29°49'35.13"E
Disturbances	
Natural erosion	Dry water run-offs were observed, but no other erosion was found
Human-made	Artificial dams, dirt roads, abandoned game farm infrastructure and grazing by cattle were found.
Notes	
The human-made structures appear to be younger than 60 years of age.	

Environmental recording

Way point	Photo number	Description	Location
Site-specific points of interest/ natural significance			
002	03 - 12	Abandoned hunting lodge (modern). A large Baobab tree is located at the site	**22°41'29.20"S 29°49'39.73"E**
003	13	View of vegetation growth	**22°41'37.55"S 29°49'27.28"E**
004	14 - 15	Cement platform for water tank and dam	**22°41'15.33"S 29°49'27.34"E**
005	16 - 17	One of the large baobabs in the area	**22°41'19.75"S 29°49'10.54"E**
006	18 - 22	View of N1 where the proposed power line crosses, and located gate stoping survey team from entering	**22°40'5.88"S 29°54'50.16"E**
007	42	View the southeastern corner of the proposed solar plant site with land sloping down.	**22°41'37.94"S 29°50'39.09"E**
008	44 - 46	View of vegetation growth in the general area	**22°41'34.50"S 29°50'34.19"E**
009	47 - 48	View of vegetation growth in the general area	**22°41'29.62"S 29°50'2.81"E**
010	49	A game watering hole, modern	**22°41'28.31"S 29°49'59.85"E**
011	50 - 55	General vegetation growth in and around the area	**22°40'7.43"S 29°49'21.46"E**
012	56 - 60	General vegetation growth in and around the area	**22°40'38.90"S 29°49'10.36"E**
013	63 - 64	General view of vegetation growth in and around the area	**22°42'7.45"S 29°49'34.33"E**
014	65 - 66	General view of vegetation growth in and around the area	**22°42'12.10"S 29°49'29.73"E**
015	67	General view of vegetation growth in and around the area	**22°42'18.06"S 29°49'18.39"E**

016	68 - 70	View of power line and dirt road along the border of the surveyed area	**22°42'8.03"S 29°48'43.43"E**
017	71 - 73	View of dirt road cutting through the surveyed area	**22°41'42.43"S 29°48'36.18"E**
018	74	View of Huntleigh road cutting through the centre of the surveyed area	**22°41'48.66"S 29°49'10.88"E**
019	30 - 31	View of fence at the end of the power line corridor	**22°42'13.54"S 29°51'6.11"E42**
020	32 - 37	View of the power line corridor along the existing dirt road	**22°41'23.29"S 29°52'27.93"E**
021	38 - 41	View of the power line corridor along the existing dirt road	**22°40'13.83"S 29°54'16.52"E**
022	75 - 76	View of the gate at Farm Scott 567 RE567 locked	**22°38'50.74"S 29°56'27.64"E**
023	77	View of the gate at Farm Antrobus 566 RE/566 locked,	**22°38'37.06"S 29°55'52.83"E**

HERITAGE RESOURCES RECORDING

Stone Age Resources Identified

Point ID & Site #	Photo #	Description		Period	Location	Field rating/ Significance/ Recommended Mitigation
001	01-02	Type lithic/s	Chunk	MSA	**22°40'25.10"S 29°49'45.30"E**	NWC Low significance No Mitigation Required
		Raw material	quartzite			
		N in m².	Single stone tool			
		Context	Surface find on the side of dirt road			
		Additional	No other stone tools were found			

HERITAGE RESOURCES RECORDING

Historical Period Resources Identified

Point ID & Site #	Photo #	Description		Period	Location	Field rating/ Significance/ Recommended Mitigation
		Type of feature	No historical period resources were recorded			
		Material				
		N in m².				
		Context				
		Additional				

HERITAGE RESOURCES RECORDING

Iron Age/ Agri-pastoral Early Farming Communities Resources Identified

Point ID & Site #	Photo #	Description		Period	Location	Field rating/ Significance/ Recommended Mitigation
		Type of feature	No Iron Age resources were recorded			
		Material				
		N in m².				
		Context				
		Additional				

HERITAGE RESOURCES RECORDING

Graves Identified

Point ID & Site #	Photo #	Description		Period	Location	Field rating/ Significance/ Recommended Mitigation
		Grave markers	No graves were recorded within the surveyed area			
		Inscription				
		Graves' Orientation				
		Dimensions				

		/ Extent				
		Additional				

HERITAGE RESOURCES RECORDING

Intangible Heritage Resources/ Cultural Landscape Identified

Point ID & Site #	Photo #	Description		Period	Location	Field rating/ Significance/ Recommended Mitigation
		Nature	No Intangible heritage was recorded apart from the Boabab trees			
		Cultural evidence				
		Access				
		Affected community				
		Additional				

IDENTIFIED HERITAGE RESOURCES DISCUSSION

Specialist comments

Stone Age finds
Only a single stone large stone flake or chunk was found on a dirt road. It is without any archaeological context and is Not Conservation Worthy. So not considered a site. See Photo 01
Iron Age/ Agri-pastoralist Early Farming communities finds
None was found during the survey
Historical finds
None was found during the survey
Identified graves
None was found during the survey
Intangible Heritage/ Cultural Landscape
None was found during the survey
Other

IDENTIFIED HERITAGE RESOURCES MITIGATION

Specialist recommendations

Stone Age finds
No mitigation or further action is required.
Iron Age/ Agri-pastoralist Early Farming communities finds
None
Historical finds
None
Identified graves
None
Intangible Heritage/ Cultural Landscape
None
Other

ADDITIONAL NOTES AND RESOURCES

Attached Field Data

Filename	File type	Description
Mutsho Project photos	RAR folder, jpg	77 photos of project jpg
Mutsho Track	Gpx/kml	Tracks van Mutsho project, 02/11/22-03/11/22
Mutsho waypoints	Gpx/kml	Waypoint with only heritage resources
Mutsho waypoints 2	Gpx/kmz	Waypoints with photo points
Additional Notes		

The stone tool was an isolated occurrence and is not considered a site. It could, therefore, merely be mentioned in the background study that a stone tool was present.

Declaration of independence:

I, Johan Smit, hereby confirm my independence as a heritage specialist and declare that:

- I am suitably qualified and accredited to act as an independent specialist in this application;
- I do not have any vested interests (either business, financial, personal or other) in the proposed development project other than remuneration for the heritage assessment and heritage management services performed;
- The work was conducted objectively and ethically, in accordance with a professional code of conduct and within the framework of South African heritage legislation.

Signed:
Date: 2022-11-04
Johan Smit
Heritage Consultants

UBIQUE


Vrienden 07 - Single quartzite chunk


Abandoned hunting lodge (modern). A large Baobab tree is located at the site


Abandoned hunting lodge (modern). A large Baobab tree is located at the site

Dense vegetation growth

Cement water tank (NCW) and large baobab

Existing grid connection along the border of the development area


Contextual images of the development site

View of the power line corridor along the existing dirt road


View of the power line corridor along the existing dirt road

CTS HERITAGE

APPENDIX 3: Palaeontological Impact Assessment 2017

PALAEONTOLOGICAL IMPACT ASSESSMENT OF THE PROPOSED DEVELOPMENT OF THE NEW MUTSHO COAL-FIRED POWER PLANT AND ASSOCIATED INFRASTRUCTURE NEAR MAKHADO, LIMPOPO PROVINCE

Prepared for:
Savannah Environmental (Pty) Ltd
PO Box 148
Sunninghill
Johannesburg
2157

Prepared by

BANZAI ENVIRONMENTAL (PTY) LTD

EXECUTIVE SUMMARY

The Mutsho Power Company proposes the development of a new coal-fired power plant and associated infrastructure on the farm Du Toit 563 and Vrienden 589 near Makhado, in the Limpopo Province. Three alternatives layouts for the development are proposed. According to the National Heritage Resources Act (Act No 25 of 1999, section 38), a palaeontological impact assessment is key to detect the presence of fossil material within the proposed development and it is thus necessary to evaluate the impact of the construction and operation of the development site on the palaeontological resources.

The proposed footprint is underlain by sediments of the

- Undifferentiated Karoo Basin; Tshipise and Tuli Sedimentary Basin and Solitude Formation;
- and Malala drift Gneiss and Gumbu Group of the Beit Bridge Complex, Archaean Granite-Gneiss Basement.

According to the geology of the development footprint, fossil heritage could be present in the Undifferentiated Karoo which has a very high Palaeontological Sensitivity as well as the Solitude Formation with a high Palaeontological Sensitivity. The Archaean Granite-Gneiss Basement, Beit Bridge Complex and Malala Drift Suite, Gumbu Group is metamorphic rocks which is unfossiliferous and has a very low palaeontological sensitivity. The farm Du Toit 563 is entirely underlain by the Undifferentiated Karoo and the Solitude Formation. The north eastern part of the farm Vrienden 589 falls in the potentially fossiliferous Undifferentiated Karoo and the unfossiliferous Archaean Granite-Gneiss Basement, Beit Bridge Complex and Malala Drift Suite, Gumbu Group. During a field survey (including all three proposed layouts) of the development footprint, no fossiliferous outcrops were found. For this reason, a **low palaeontological sensitivity** is allocated to the development footprint. Irrespective of the uncommon occurrence of fossils a solitary fossil may be of scientific value as many fossil taxa are known from a single fossil. The recording of fossils will expand our knowledge of the Palaeontological Heritage of the development area.

The scarcity of fossil heritage at the proposed development footprint indicate that the impact of the Makhado Coal-fired power plant and associated infrastructure will be of a low significance in palaeontological terms. It is therefore considered that the construction and operation of the Makhado Coal-fired power plant and associated infrastructure (including all three layout plans) is deemed appropriate and feasible and will not lead to detrimental impacts on the palaeontological resources of the area. Thus, the construction and operation of the facility may be authorised as the whole extent of the development footprint is not considered sensitive in terms of palaeontological resources.

In the event that fossil remains are uncovered during any phase of construction, either on the surface or unearthed by new excavations and vegetation clearance, the ECO in charge of these developments ought to be alerted immediately. These discoveries ought to be protected (if possible *in situ*) and the ECO must report to SAHRA so that

appropriate mitigation (*e.g.* recording, collection) can be carry out by a professional paleontologist.

Preceding any collection of fossil material, the specialist would need to apply for a collection permit from SAHRA. Fossil material must be curated in an accredited collection (museum or university collection), while all fieldwork and reports should meet the minimum standards for palaeontological impact studies proposed by SAHRA.

CONTENTS

1 INTRODUCTION

Savannah Environmental (Pty) Ltd has been appointed as the independent Environmental Consultants by Mutsho Power Company (Pty) Ltd for the undertaking of an integrated Environmental Impact Assessment (EIA) process to obtain Environmental Authorization and a Waste Management License (WML) for the proposed Mutsho Power Project located on a site near Makhado in the Limpopo Province.

Three alternatives for the Mutsho Power Project were proposed. The preferred layout is presented in Fig. 2 where the entire development is located on the farm Vrienden 589 with the RDB Buffer located on the southern side of the Farm Du Toit 563. With this option the ash dump is situated south of the main road on the farm Vrienden 589. The second option is presented in Fig. 3. With this option the ash dump are present on both farms, on either side of the road. On the third and least preferred option the entire layout is yet again on the farm Vrienden 589 and is presented in Fig. 4. With this option the ash dump has been moved towards the center of the development.

The proposed power station is planned to form part of the Department of Energy's (DoE's) Coal Baseload Independent Power Producer (IPP) Procurement Programme (CBIPPPP). The project will have a generation capacity of up to 660MW (export capacity below 600MW in line with DoE requirements), and will make use either Pulverised Coal (PC) or Circulating Fluidised Bed (CFB) technology.

Project Description

Information provided by Savannah

The project will consists of the following key components and associated infrastructure:

- Power island comprising of:
    - Pulverised Coal (PC) with Flue Gas Desulphurisation scrubbing / clean-up; or Circulating Fluidised Bed (CFB) boiler technology.
    - Electrostatic Precipitator (ESP) / Bag filtration systems and Flue / smoke stacks.
    - Direct or indirect air-cooling systems.
    - Balance of plant components (incl. steam turbine and generator etc.).
- Coal and Limestone / Lime Rail Spur and-or Road offloading Systems.
- Upgrading or establishment of a rail siding.
- Coal crusher (for CFB); or coal milling plant (for PC).
- Strategic and Working Coal stockpiles.
- Limestone or Lime (hydrated or de-hydrated) storage and handling area (for use with CFBC or PFC technology).
- Ammonia storage and handling area (for use in flue gas clean-up with PC technology).
- Ash dump (dry-ashing has been assumed for the plant in order to reduce the project's water requirements, which is in alignment with the recommendations of the National Development Plan (NDP) and Integrated Energy Plan (IEP)).

- Water infrastructure. This may include:
  - Raw water storage dams.
- Water supply pipelines and booster stations.
  - Pollution control dam/s.
  - Water treatment plant (WTP).
  - Wastewater treatment plant (WWTP).
  - Storm water management systems.
- HV Yard and substation components with HV overhead transmission lines connecting to the Eskom infrastructure.
- Control room, office / administration, workshop, storage and logistics buildings.
- Upgrading of external roads and establishment of internal access roads.
- Security fencing and lighting.

Coal source / supply: Coal mined at the Makhado Mine will be delivered to the power station by means of a new 22km railway loop, proposed for development between the Makhado Mine and the existing Huntleigh railway siding (assessed independently as part of another project). The present Huntleigh siding is adjoined by both properties under investigation. The proposed railway loop, and not the Makhado Mine is therefore considered as the fuel source receiving location. Coal will then be transported from the railway siding via overland coal conveyor to the coal stockpile located onsite. All other raw materials will either be transported to site via rail or road transport.

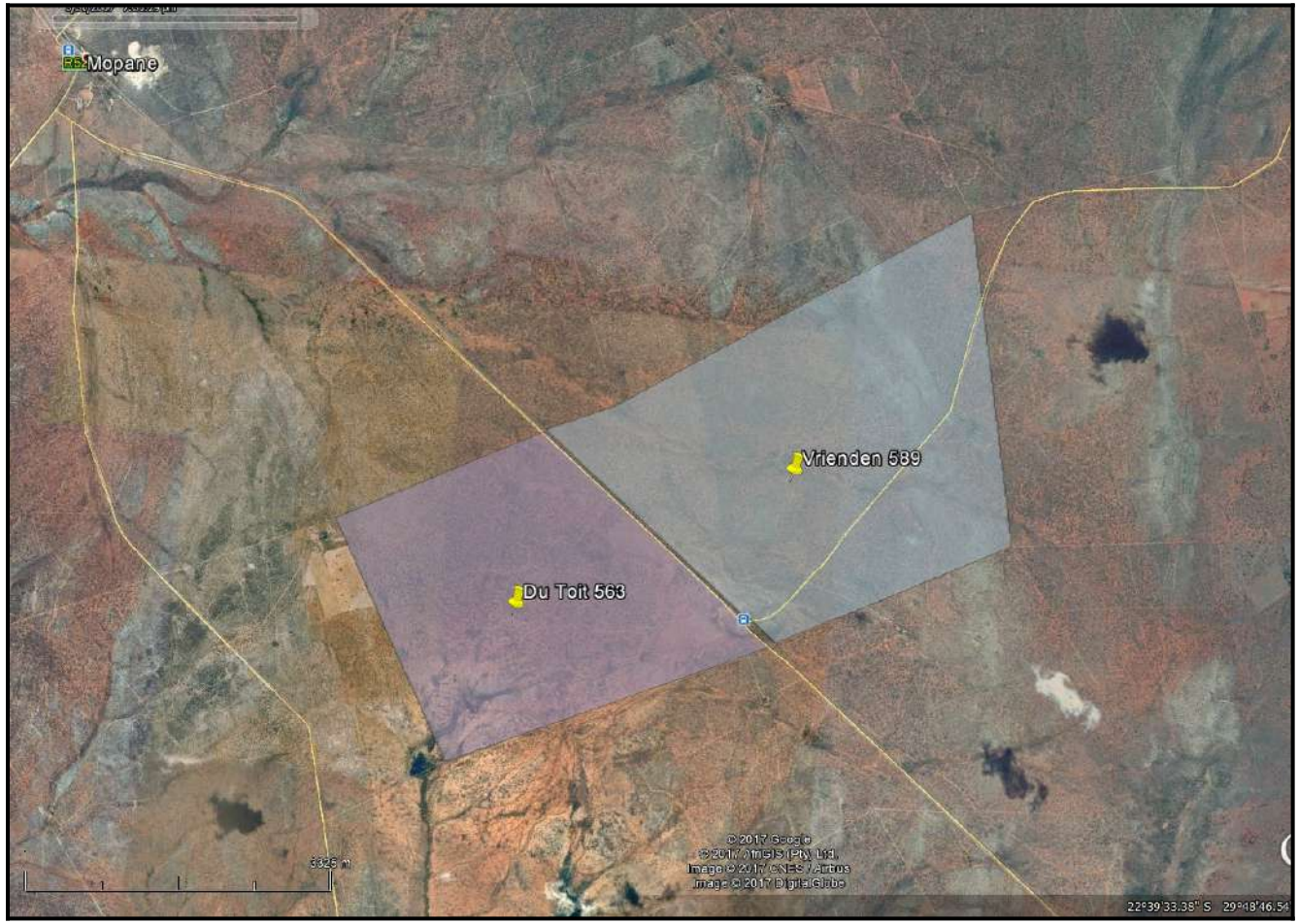
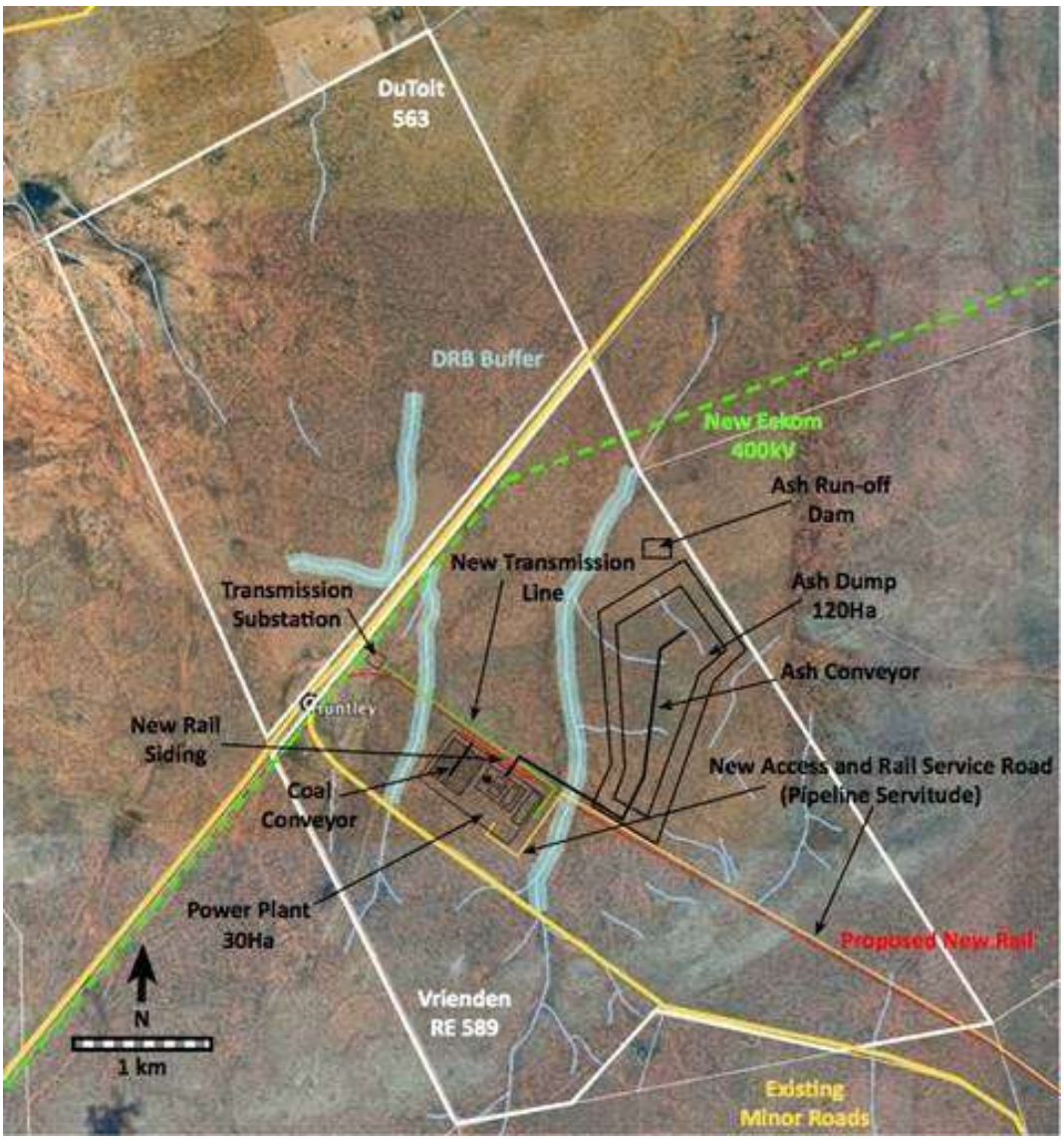


Figure 1: Google Earth Image (2017) of the location of the proposed Mutsho Power Project and associated infrastructure located on the farm Du Toit 563 and Vriendin 589, near Makhado, Limpopo Province. Scale bar represents 3325 m.

Figure 2. Location of the preferred option of the Mutsho Power Project and associated infrastructure located on the farm Du Toit 563 and Vrienden 589, near Makhado, Limpopo Province.


DuToit
563
DRB Buffer
New Eskom
400kV
Ash Run-off
Dam
New Transmission
Line
Transmission
Substation
Ash Dump
120Ha
Ash Conveyor
Tuntley
New Rail
Siding
New Access and Rail Service Road
(Pipeline Servitude)
Coal
Conveyor
Power Plant
30Ha
Proposed New Rail
N
1 km
Vrienden
RE 589
Existing
Minor Roads

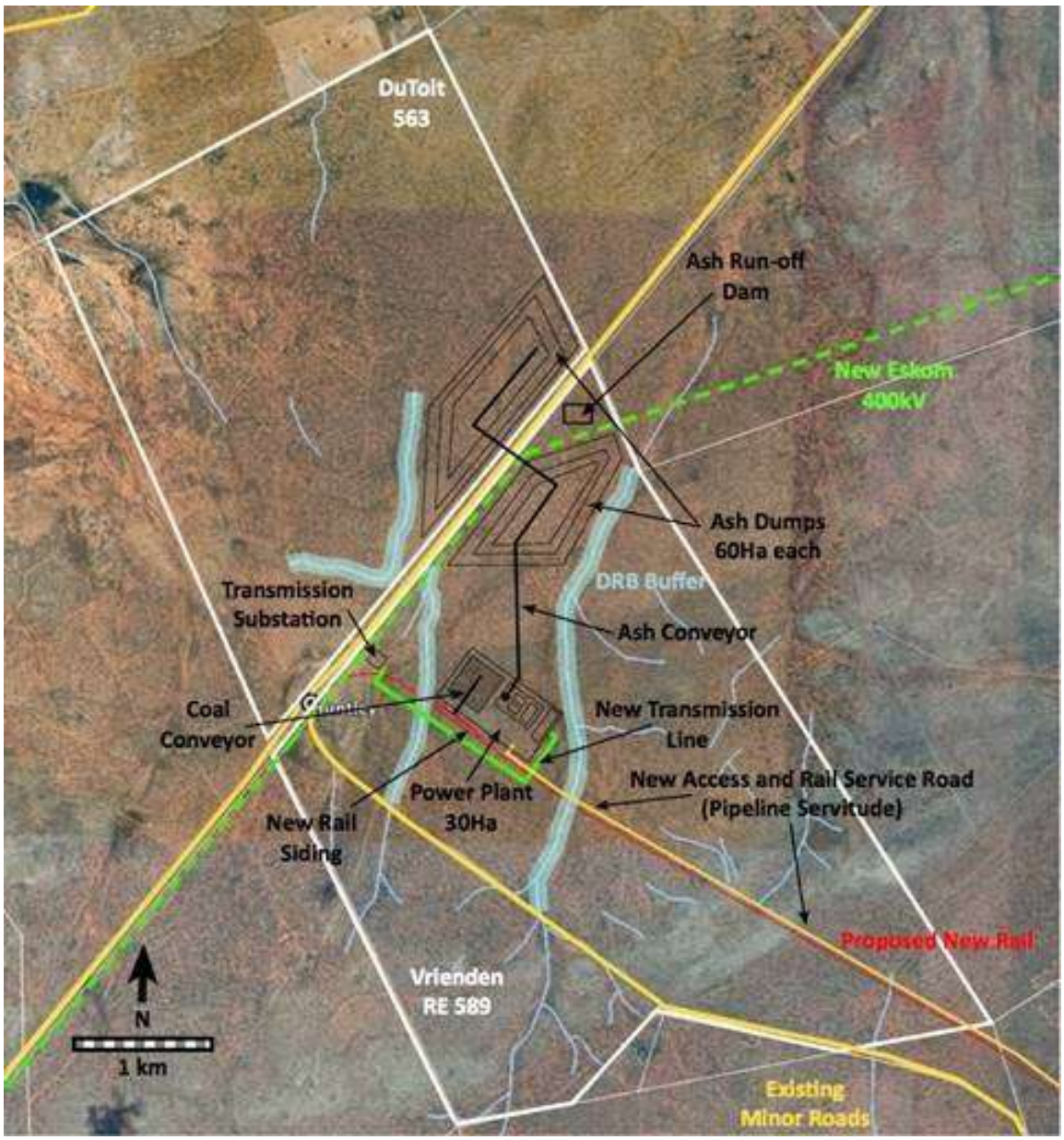


Figure 3. Location of the proposed preferred alternative of the Mutsho Power Project and associated infrastructure located on the farm Du Toit 563 and Vriendin 589, near Makhado, Limpopo Province.

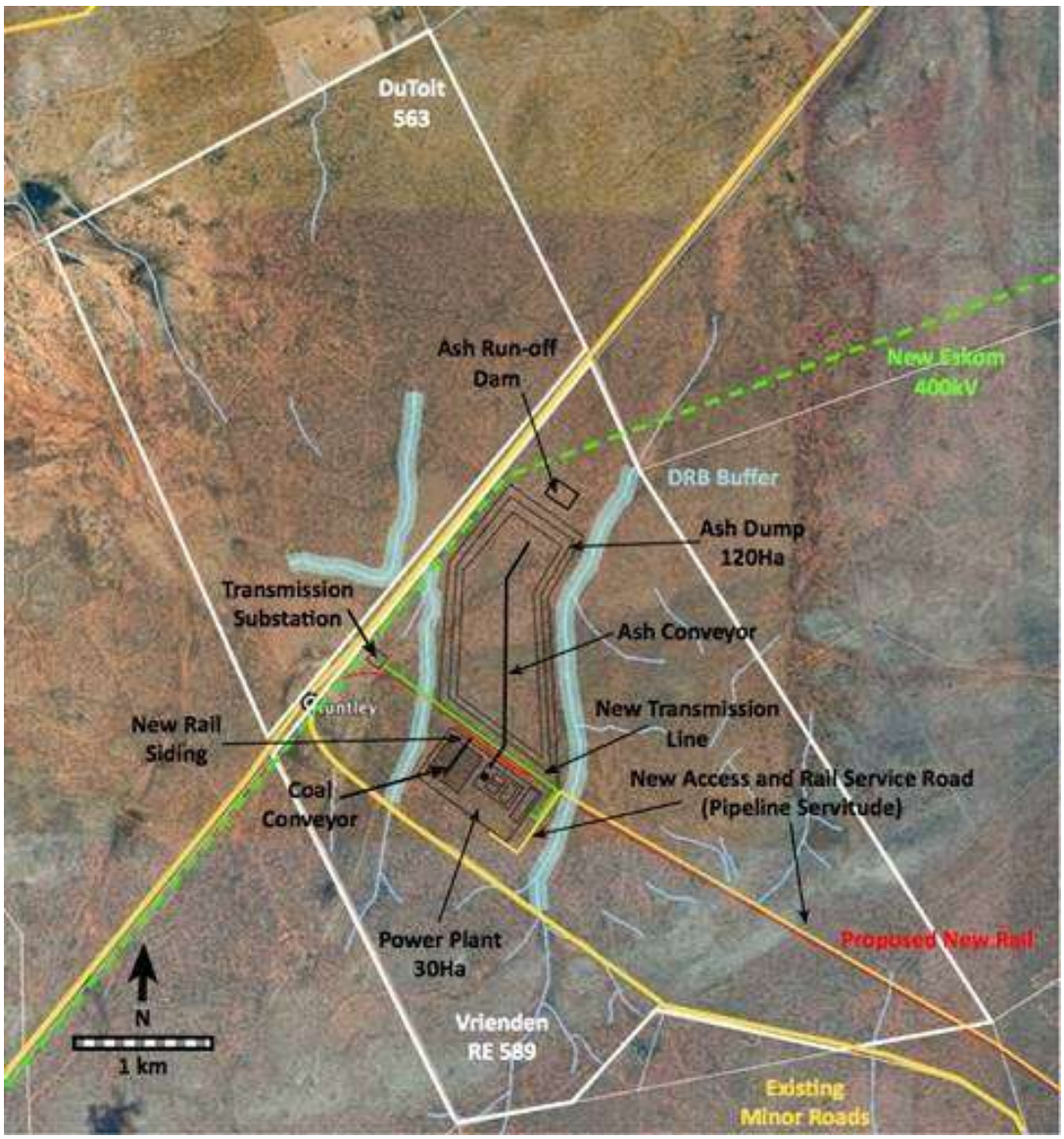


Figure 4. Location of the proposed preferred alternative of the Mutsho Power Project and associated infrastructure located on the farm Du Toit 563 and Vriendin 589, near Makhado, Limpopo Province.

2 LEGISLATION

NATIONAL HERITAGE RESOURCES ACT (ACT 25 OF 1999)

Cultural Heritage in South Africa, includes all heritage resources, is protected by the National Heritage Resources Act (Act 25 of 1999). Heritage resources as defined in Section 3 of the Act include **"all objects recovered from the soil or waters of South Africa, including archaeological and palaeontological objects and material, meteorites and rare geological specimens**". Palaeontological heritage is unique and non-renewable and is protected by the above mentioned Act. Palaeontological resources may not be unearthed, moved, broken or destroyed by any development without prior assessment and without a permit from the relevant heritage resources authority.

This Palaeontological Environmental Impact Assessment forms part of the Heritage Impact Assessment (HIA) and adhere to the conditions of the Act. According to **Section 38**, an HIA is required to assess any potential impacts to palaeontological heritage within the development footprint.

ACCORDING TO SECTION 35 OF THE NATIONAL HERITAGE RESOURCES ACT 1999, DEALING WITH ARCHAEOLOGY, PALAEONTOLOGY AND METEORITES:

35. (1) Subject to the provisions of section 8, the protection of archaeological and palaeontological sites and material and meteorites is the responsibility of a provincial heritage resources authority: Provided that the protection of any wreck in the territorial waters and the maritime cultural zone shall be the responsibility of SAHRA.
(2) Subject to the provisions of subsection (8) *(a)*, all archaeological objects, palaeontological material and meteorites are the property of the State. The responsible heritage authority must, on behalf of the State, at its discretion ensure that such objects are lodged with a museum or other public institution that has a collection policy acceptable to the heritage resources authority and may in so doing establish such terms and conditions as it sees fit for the conservation of such objects.
(3) Any person who discovers archaeological or palaeontological objects or material or a meteorite in the course of development or agricultural activity must immediately report the find to the responsible heritage resources authority, or to the nearest local authority offices or museum, which must immediately notify such heritage resources authority.
(4) No person may, without a permit issued by the responsible heritage resources authority—
(a) Destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or palaeontological site or any meteorite;
(b) Destroy, damage, excavate, remove from its original position, collect or own any archaeological or palaeontological material or object or any meteorite;
(c) trade in, sell for private gain, export or attempt to export from the Republic any category of archaeological or palaeontological material or object, or any meteorite; or
(d) Bring onto or use at an archaeological or palaeontological site any excavation equipment or any equipment which assist in the detection or recovery of metals or archaeological and palaeontological material or objects, or use such equipment for the recovery of meteorites.
(5) When the responsible heritage resources authority has reasonable cause to believe that any activity or development which will destroy, damage or alter any archaeological or palaeontological site is under way, and where no application for a permit has been submitted and no heritage resources management procedure in terms of section 38 has been followed, it may—
(a) Serve on the owner or occupier of the site or on the person undertaking such development an order for the development to cease immediately for such period as is specified in the order;
(b) Carry out an investigation for the purpose of obtaining information on whether or not an archaeological or palaeontological site exists and whether mitigation is necessary;
(c) if mitigation is deemed by the heritage resources authority to be necessary, assist the person on whom the order has been served under paragraph *(a)* to apply for a permit as required in subsection (4); and *(d)* recover the costs of such investigation from the owner

or occupier of the land on which it is believed an archaeological or palaeontological site is located or from the person proposing to undertake the development if no application for a permit is received within two weeks of the order being served.
(6) The responsible heritage resources authority may, after consultation with the owner of the land on which an archaeological or palaeontological site or a meteorite is situated, serve a notice on the owner or any other controlling authority, to prevent activities within a specified distance from such site or meteorite.
(7) *(a)* Within a period of two years from the commencement of this Act, any person in possession of any archaeological or palaeontological material or object or any meteorite which was acquired other than in terms of a permit issued in terms of this Act, equivalent provincial legislation or the National Monuments Act, 1969 (Act No. 28 of 1969), must lodge with the responsible heritage resources authority lists of such objects and other information prescribed by that authority. Any such object which is not listed within the prescribed period shall be deemed to have been recovered after the date on which this Act came into effect. *(b)* Paragraph *(a)* does not apply to any public museum or university. *(c)* The responsible authority may at its discretion, by notice in the *Gazette* or the *Provincial Gazette*, as the case may be, exempt any institution from the requirements of paragraph *(a)* subject to such conditions as may be specified in the notice, and may by similar notice withdraw or amend such exemption.
(8) An object or collection listed under subsection (7) — *(a)* Remains in the ownership of the possessor for the duration of his or her lifetime, and SAHRA must be notified who the successor is; and *(b)* must be regularly monitored in accordance with regulations by the responsible heritage authority.

HERITAGE RESOURCES MANAGEMENT

38. (1) Subject on the provisions of subsections (7), (8) and (9), any person who intends to undertake a development categorised as (a) the construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300 m in length; (b) the construction of a bridge or similar structure exceeding 50 m in length; (c) any development or other activity which will change the character of a site— (i) exceeding 5 000 m^2 in extent; or (ii) involving three or more existing erven or subdivisions thereof; or (iii) involving three or more erven or divisions thereof which have been consolidated within the past five years; or (iv) the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority (d) the re-zoning of a site exceeding 10 000 m^2 in extent; (e) or any other category of development provided for in regulations by SAHRA or a Provincial heritage resources authority.

3 OBJECTIVE

The **objective of a Palaeontological Impact Assessment is to determine the impact of the development on potential palaeontological material** at the site.

According to the “SAHRA APM Guidelines: Minimum Standards for the Archaeological and Palaeontological Components of Impact Assessment Reports” the aims of the palaeontological impact assessment are: 1) to identify the palaeontological importance of

the exposed and subsurface rock formations in the development footprint 2) to evaluate the palaeontological importance of the formations 3) to determine the impact of the development on fossil heritage; and 4) to recommend how the developer ought to protect or mitigate damage to fossil heritage.

When a palaeontological desktop study is compiled, the potentially fossiliferous rocks (i.e. groups, formations, etc.) present within the study area are established from 1:250 000 geological maps. The topography of the development area is identified using 1:50 000 topography maps as well as Google Earth Images of the development area. Fossil heritage within each rock section is obtained from previous palaeontological impact studies in the same region, the PalaeoMap from SAHRIS; and databases of various institutions (identifying fossils found in locations specifically in areas close to the development area). The palaeontological importance of each rock unit of the development area is then calculated. The possible impact of the proposed development footprint on local fossil heritage is established on the following criteria: 1) the palaeontological importance of the rocks and 2) the type and scale of the development footprint and 3) quantity of bedrock excavated.

In the event that rocks of moderate to high palaeontological sensitivity are present within the study area, a field-based assessment by a professional palaeontologist is required. Based on both the desktop data and field examination of the sedimentary rock exposures, the impact significance of the planned development is measured with recommendations for any further studies or mitigation. In general destructive impacts on palaeontological heritage only occur during construction. The excavations will transform the current topography and may destruct or permanently seal-in fossils at or below the ground surface. Fossil Heritage will then no longer be accessible for scientific research.

Mitigation comprises the sampling, collection and recording of fossils and may precede construction or, more ideally, occur during construction when potentially fossiliferous bedrock is exposed. Preceding the excavation of any fossil heritage a permit from SAHRA must be obtained and the material will have to be housed in a permitted institution. When mitigation is applied correctly, a positive impact is possible because our knowledge of local palaeontological heritage may be increased.

4 GEOLOGICAL AND PALAEONTOLOGICAL HISTORY

The proposed footprint is underlain by sediments of the

- Undifferentiated Karoo Basin; Tshipise and Tuli Sedimentary Basin and Solitude Formation;
- and Malala drift Gneiss and Gumbu Group of the Beit Bridge Complex, Archaean Granite-Gneiss Basement (Fig.5).

Fossil heritage could be present in the Undifferentiated Karoo as well as the Solitude Formation which has a high to very high Palaeontological Sensitivity. The Archaean Granite-Gneiss Basement, Beit Bridge Complex and Malala Drift Suite, Gumbu Group is metamorphic rocks which is unfossiliferous and with a very low palaeontological sensitivity.

The farm Du Toit 563 is entirely underlain by the Undifferentiated Karoo and the Solitude Formation. The north eastern part of the farm Vrienden 589 falls in the potentially fossiliferous Undifferentiated Karoo and the unfossiliferous Archaean Granite-Gneiss Basement, Beit Bridge Complex and Malala Drift Suite, Gumbu Group (Fig.5).

Palaeontological Sensitivity Almond et al (2008) and Groenewald et al., (2014)	**Group**	**Group/ Formation**	**Lithology**	**Period**	**Fossils /Exposures**
High to very high Palaeontological sensitivity/vulnerability	Undifferentiated Karoo		Sandstone conglomerate shale, mudstone and **coal deposits**	Permian-Triassic	Very poor levels of surface exposure (most data obtained from borehole cores
High to very high Palaeontological sensitivity/vulnerability	Karoo	Solitude	Reddish and grey mudrocks, sandstones and minor coals, meandering fluvial setting	Upper part possibly = Elliot Lower part probably = Molteno	Coal floras including *Dicroidium* in basal Solitude succession. Dinosaur remains supposedly
Very Low Palaeontological	Archaean Granite-	Malala Drift Suite Beit	Leucogneiss with	Early to Late	No fossils

sensitivity/vulnerability grey	Gneiss Basement	Bridge Complex	metaquartzite, hornblende granitoid gneiss, amphibolite, metapelite and calc-silicate rocks	Archaean (3.6–2.4 Ga) (Swazian / Randian)	recorded
Very Low Palaeontological sensitivity/vulnerability grey	Archaean Granite-Gneiss Basement	Beit Bridge Complex; Gumbu Group	Calc-silicate rocks and marble, together with leucogneisses and subordinate pink hornblende granitoid gneiss, metaquartzite and amphibolite	Early to Late Archaean (3.6–2.4 Ga) (Swazian / Randian)	No fossils recorded

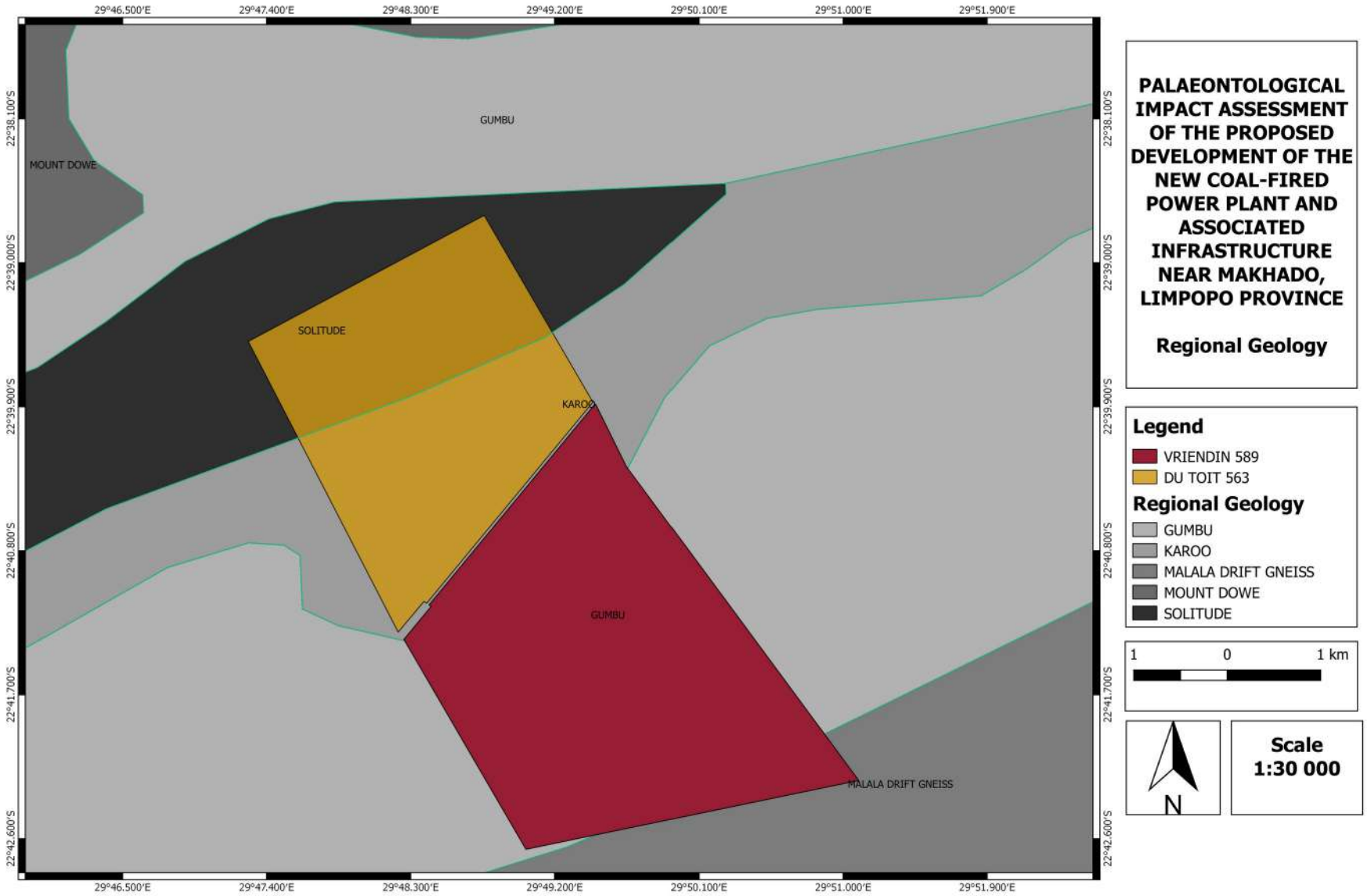


Figure 5: The surface geology of the proposed Mutsho Power Project and associated infrastructure located on the farm Du Toit 563 and Vriendin 589, near Makhado, Limpopo Province. The site is completely underlain by the Undifferentiated Karoo Basin and Solitude Formation, as well as the Malala drift Gneiss, and Gumbu Group, Beit

5 GEOGRAPHICAL LOCATION OF THE SITE

The Mutsho Power Company intends to development a new coal-fired power plant and associated infrastructure on the farms Du Toit 563 and Vriendin 589, site near Makhado, in the Limpopo Province. A minimum footprint of roughly 600ha is necessary for the planned power station and associated infrastructure. The form of technology preferred for implementation would eventually influence the final project design and development footprint (thus, the area of land necessary for development). While the physical power generation components (Power Island), require only in the region of 50 ha, supporting areas for the establishment of coal and other raw material stockpiles, and an ash dump over life of plant, enlarge the development footprint considerably.

6 METHODS

As part of the Palaeontological Impact Assessment, a field-survey of the development footprint was conducted in January 2018 to assess the potential risk to palaeontological material (fossil and trace fossils) in the proposed footprint of the development. A physical field-survey was conducted on foot and by vehicle within the proposed development footprint. The results of the field-survey, the author's experience, aerial photos (using Google Earth, 2018), topographical and geological maps were used to assess the proposed development footprint. No consultations were undertaken for this Impact Assessment.

6.1 Assumptions and limitations

The accurateness of Palaeontological Desktop Impact Assessments is reduced by old fossil databases that does not always include relevant locality or geological formations. The geology in various remote areas of South Africa may be less accurate because it is based entirely on aerial photographs. The accuracy of the sheet explanations for geological maps is inadequate as the focus was never intended to be on palaeontological material.

The entire South Africa have not been studied palaeontologically. Similar Assemblage Zones but in different areas, might provide information on the presence of fossil heritage in an unmapped area. Desktop studies of similar geological formations generally assume that unexposed fossil heritage is present within the development area. Thus, the accuracy of the Palaeontological Impact Assessment will be improved by a field-survey.

7 FIELD OBSERVATIONS

The following photographs were taken on a site visit to the new Mutsho coal-fired power plant and associated infrastructure on the farms Du Toit 563 and Vriendin 589, near Makhado, in the Limpopo Province in January 2018.

Figure 3. Flat topography of the farm Du Toit 563. Die Farm is completely underlain by the Undifferentiated Karoo as well as the Solitude Formation. During the field survey no fossiliferous outcrops were found.

Figure 4. Flat topography of the farm Du Toit 563. Die Farm is completely underlain by the Undifferentiated Karoo as well as the Solitude Formation. During the field survey no fossiliferous outcrops were found.

Figure 5. Flat topography of the farm Vriendin 589. Die Farm is underlain by a small portion of the by the Undifferentiated Karoo Basin, Solitude Formation in the north and the Malala drift Gneiss, and Gumbu Group, Beit Bridge towards the south. During the field survey no fossiliferous outcrops were found.

8 ASSESSMENT OF IMPACTS

A scoping assessment of the impact significance of the proposed 600 MW new coal-fired power plant and associated infrastructure on the farm Du Toit 563 and Vriendin 589 near Makhado, in the Limpopo Province on local fossil heritage is presented here:

8.1 Nature of the impact

Infrastructure associated with the new coal-fired power plant **includes:** (Information supplied by Savannah):

- Power island comprising of:
  - Pulverised Coal (PC) with Flue Gas Desulphurisation scrubbing / clean-up; or Circulating Fluidised Bed (CFB) boiler technology.
  - Electrostatic Precipitator (ESP) / Bag filtration systems and Flue / smoke stacks.
  - Direct or indirect air-cooling systems.
  - Balance of plant components (incl. steam turbine and generator etc.).
- Coal and Limestone / Lime Rail Spur and-or Road offloading Systems.
- Upgrading or establishment of a rail siding.
- Coal crusher (for CFB); or coal milling plant (for PC).
- Strategic and Working Coal stockpiles.
- Limestone or Lime (hydrated or de-hydrated) storage and handling area (for use with CFBC or PFC technology).
- Ammonia storage and handling area (for use in flue gas clean-up with PC technology).
- Ash dump (dry-ashing has been assumed for the plant in order to reduce the project's water requirements, which is in alignment with the recommendations of the National Development Plan (NDP) and Integrated Energy Plan (IEP)).
- Water infrastructure. This may include:
  - Raw water storage dams.
- Water supply pipelines and booster stations.
  - Pollution control dam/s.
  - Water treatment plant (WTP).
  - Wastewater treatment plant (WWTP).
  - Storm water management systems.
- HV Yard and substation components with HV overhead transmission lines connecting to the Eskom infrastructure.
- Control room, office / administration, workshop, storage and logistics buildings.
- Upgrading of external roads and establishment of internal access roads.
- Security fencing and lighting.

The excavations and site clearance of vegetation will consist of significant excavations into the uppermost sediment cover as well as into the underlying bedrock. These excavations will transform the present topography and may disrupt, destroy or permanently close-in fossils that are then unavailable for research.

8.2 Geographical extent of impact

The impact on fossil materials and thus palaeontological heritage will be restricted to the construction phase when new excavations into fresh bedrock take place. The extent of the area of potential impact is thus limited to the project site and thus categorised as **local**.

8.3 Duration of impact

The expected duration of the impact is assessed as potentially permanent to long term. In the absence of mitigation procedures (should fossil material be present within the affected area) the damage or destruction of any palaeontological materials will be **permanent.**

8.4 Sensitive areas

The site is underlain by the Undifferentiated Karoo Basin; Tshipise and Tuli Sedimentary Basin and Solitude Formation; and Malala drift Gneiss and Gumbu Group of the Beit Bridge Complex, Archaean Granite-Gneiss Basement (Fig.2). The Archaean Granite-Gneiss Basement is metamorphic in origin and thus unfossiliferous while the Undifferentiated Karoo Basin and Solitude Formation has a high to very high palaeontological Sensitivity.

8.5 Potential significance of the impact

If the project progress without care to the chance of fossils being present at the proposed site with the resultant damage and destruction of any affected fossils will be **permanent and irreversible**. Thus, any fossils occurring within the study area are potentially scientifically and culturally significant and any negative impact on them would be of **high significance**.

8.6 Severity / benefit scale

The development of the proposed development footprint and associated infrastructure is **beneficial** on not only a local level, but regional and national levels as well. The facility will provide a long term benefit to the community in terms of creating jobs and would thus provide an economical boost to the area.

A potential **secondary advantage** of the construction of the project would be that the excavations may uncover fossils and would have remained unknown to science.

8.7 STATUS

Probability of the impact occurring

There is a possibility that fossil heritage will be recorded in the study area. Probable significant impacts on palaeontological heritage during the construction phase are **high**, but the intensity of the impact on fossil heritage is rated as **medium**.

Intensity

The intensity of the impact on fossil heritage is rated as **medium.**

9 DAMAGE MITIGATION, REVERSAL AND POTENTIAL IRREVERSIBLE LOSS

9.1 Mitigation

In the event that fossil material does exist within the area proposed for the development any negative impact upon it could be mitigated by recording, and sampling of well-preserved fossils by a professional palaeontologist. This should precede vegetation clearance but *before* the ground is levelled for construction. A collecting permit from SAHRA is required before any fossil heritage may be excavated and the material must be housed in an accredited institution.

9.2 Degree to which the impact can be mitigated

The site is underlain by the Undifferentiated Karoo Basin; Tshipise and Tuli Sedimentary Basin and Solitude Formation; and Malala drift Gneiss and Gumbu Group of the Beit Bridge Complex, Archaean Granite-Gneiss Basement.). The Archaean Granite-Gneiss Basement is metamorphic in origin and thus unfossiliferous while the Undifferentiated Karoo Basin and Solitude Formation has a high to very high palaeontological Sensitivity. Suggested mitigation of the unavoidable damage and destruction of fossil heritage within the proposed site would involve the recording, and sampling of well-preserved fossils within the development footprint by a professional palaeontologist. This should precede vegetation clearance but *before* the ground is levelled for construction. Yet, the significance of the impact following the mitigation will remain low.

9.3 Degree of irreversible loss

Impacts on fossil heritage are generally irreversible. Well-documented records and other palaeontological studies of any fossils uncovered during construction would signify a positive impact from a scientific view. The possibility of a negative impact on the palaeontological heritage of the area can be reduced by the implementation of suitable mitigation procedures. With proper mitigation the benefit scale for the project will lie within the beneficial category.

9.4 Degree to which the impact may cause irreplaceable loss of resources

It is thus **possible** that extraordinary fossil material is present on the development area. By taking a cautionary approach, an insignificant loss of fossil resources is expected.

9.5 Cumulative impacts

The cumulative effect of the development is low as there is no other similar developments in the area.

10 ASSESSMENT OF IMPACTS

10.1 Assessment Methodology

Direct, indirect and cumulative impacts of the impacts identified above will be assessed according to the following standard methodology:

- 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 very short duration (0 - 1 years) – assigned a score of 1;
    - The lifetime of the impact will be of 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; or
    - Permanent – assigned a score of 5.
- The **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 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 of 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 syntheses of the characteristics described above and can be assessed as low, medium or high; and
- The **status**, which is described as 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); and
- > 60 points: High (i.e. where the impact must have an influence on the decision process to develop in the area).

Nature: ***T***he excavations and clearing of vegetation during the construction

phase will consist of digging into the superficial sediment cover as well as underlying deeper bedrock. These excavations will change the existing topography and may possibly disturb, destroy or permanently close-in fossils at or below the ground surface. These fossils will then be lost for research.

Impacts on Palaeontological Heritage are likely to happen only within the construction phase. No impacts are expected to occur during the operation phase.

	Without mitigation	**With mitigation**
Extent	Local(1)	Local(1)
Duration	Long term/permanent (5)	Long term/permanent (5)
Magnitude	Minor (2)	Minor (1)
Probability	Improbable (1)	Improbable (1)
Significance	**Low (8)**	**Low (7)**
Status (positive or negative)	Negative	Neutral
Reversibility	Irreversible	Irreversible
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	Yes

Mitigation: Not necessary

The site is underlain by the Undifferentiated Karoo Basin; Tshipise and Tuli Sedimentary Basin and Solitude Formation; and Malala drift Gneiss and Gumbu Group of the Beit Bridge Complex, Archaean Granite-Gneiss Basement.). The Archaean Granite-Gneiss Basement is metamorphic in origin and thus unfossiliferous while the Undifferentiated Karoo Basin and Solitude Formation has a high to very high palaeontological Sensitivity. The lack of appropriate exposure at the proposed development footprint (including all three alternative sites) indicates that the impact of the development is of low significance in palaeontological terms.

Residual Risk:

Not applicable.

12 ASSESSMENT OF CUMULATIVE IMPACTS

Nature: Cumulative impacts on fossil remains preserved at or beneath the ground surface.

	Cumulative Contribution of Proposed Project	**Cumulative Impact without Proposed Project**
Extent	Local (1)	Low (1)
Duration	Permanent (5)	Permanent (5)

Magnitude	Minor (2)	Minor (2)
Probability	Improbable (2)	Improbable (1)
Significance	**Low (16)**	**Low (8)**
Status (positive/negative)	Positive	Positive
Reversibility	Low	Low
Loss of resources?	No	No
Can impacts be mitigated?	Yes	Unknown
Confidence in findings: High.		
Mitigation: Not necessary The site is underlain by the Undifferentiated Karoo Basin; Tshipise and Tuli Sedimentary Basin and Solitude Formation; and Malala drift Gneiss and Gumbu Group of the Beit Bridge Complex, Archaean Granite-Gneiss Basement). The Archaean Granite-Gneiss Basement is metamorphic in origin and thus unfossiliferous while the Undifferentiated Karoo Basin and Solitude Formation has a high to very high palaeontological Sensitivity. The lack of appropriate exposure at the proposed development footprint (including all three alternative sites) indicates that the impact of the development is of low significance in palaeontological terms.		

13 RECOMMENDATIONS CONCERNING FOSSIL HERITAGE MANAGEMENT DURING THE CONSTRUCTION PHASE

OBJECTIVE: Prevent the loss of Palaeontological Heritage	
Project component/s	Damaging impacts on palaeontological heritage occur during the **construction** phase which will modify the existing topography. The proposed development of the 600 MW new coal-fired power plant and associated infrastructure on the farm Du Toit 563 and Vriendin 589 near Makhado, in the Limpopo Province include: • Power island comprising of: o Pulverised Coal (PC) with Flue Gas Desulphurisation scrubbing / clean-up; or Circulating Fluidised Bed (CFB) boiler technology. o Electrostatic Precipitator (ESP) / Bag filtration systems and Flue / smoke stacks. o Direct or indirect air-cooling systems. o Balance of plant components (incl. steam turbine and generator etc.). • Coal and Limestone / Lime Rail Spur and-or Road offloading Systems. • Upgrading or establishment of a rail siding.

	• Coal crusher (for CFB); or coal milling plant (for PC). • Strategic and Working Coal stockpiles. • Limestone or Lime (hydrated or de-hydrated) storage and handling area (for use with CFBC or PFC technology). • Ammonia storage and handling area (for use in flue gas clean-up with PC technology). • Ash dump (dry-ashing has been assumed for the plant in order to reduce the project's water requirements, which is in alignment with the recommendations of the National Development Plan (NDP) and Integrated Energy Plan (IEP)). • Water infrastructure. This may include: o Raw water storage dams. • Water supply pipelines and booster stations. o Pollution control dam/s. o Water treatment plant (WTP). o Wastewater treatment plant (WWTP). o Storm water management systems. • HV Yard and substation components with HV overhead transmission lines connecting to the Eskom infrastructure. • Control room, office / administration, workshop, storage and logistics buildings. • Upgrading of external roads and establishment of internal access roads. • Security fencing and lighting.		
Potential Impact	Destruct, destroy or permanently close-in fossils at or below the ground surface that are then no longer available for research		
Activity/risk source	• Activities associated with the construction of the 600 MW new coal-fired power plant and associated infrastructure		
Mitigation: Target/Objective	Protection of identified fossils uncovered during the construction phase.		
Mitigation: Action/control		**Responsibility**	**Timeframe**
		ECO	Construction phase

11 FINDINGS AND RECOMMENDATIONS

The Mutsho Power Company proposes the development of a new coal-fired power plant and associated infrastructure on the farm Du Toit 563 and Vrienden 589 near Makhado, in the Limpopo Province. According to the National Heritage Resources Act (Act No 25 of 1999, section 38), a palaeontological impact assessment is key to detect the presence of fossil material within the proposed development and it is thus necessary to evaluate the impact of the construction and operation of the development site on the palaeontological resources.

The proposed footprint is underlain by sediments of the

- Undifferentiated Karoo Basin; Tshipise and Tuli Sedimentary Basin and Solitude Formation;
- and Malala drift Gneiss and Gumbu Group of the Beit Bridge Complex, Archaean Granite-Gneiss Basement.

Three alternatives for the Mutsho Power Project were proposed. According to the geology of the development footprint, fossil heritage could be present in the Undifferentiated Karoo which has a very high Palaeontological Sensitivity as well as the Solitude Formation with a high Palaeontological Sensitivity The Archaean Granite-Gneiss Basement, Beit Bridge Complex and Malala Drift Suite, Gumbu Group is metamorphic rocks which is unfossiliferous and has a very low palaeontological sensitivity. The farm Du Toit 563 is entirely underlain by the Undifferentiated Karoo and the Solitude Formation. The north eastern part of the farm Vrienden 589 falls in the potentially fossiliferous Undifferentiated Karoo and the unfossiliferous Archaean Granite-Gneiss Basement, Beit Bridge Complex and Malala Drift Suite, Gumbu Group. During a field survey (including all three proposed layouts) of the development footprint, no fossiliferous outcrops were found. For this reason, a **low palaeontological sensitivity** is allocated to the development footprint. Irrespective of the uncommon occurrence of fossils a solitary fossil may be of scientific value as many fossil taxa are known from a single fossil. The recording of fossils will expand our knowledge of the Palaeontological Heritage of the development area.

The scarcity of fossil heritage at the proposed development footprint indicate that the impact of the Makhado Coal-fired power plant and associated infrastructure will be of a low significance in palaeontological terms. It is therefore considered that the construction and operation of the Makhado Coal-fired power plant and associated infrastructure (including all three layout plans) is deemed appropriate and feasible and will not lead to detrimental impacts on the palaeontological resources of the area. Thus, the construction and operation of the facility may be authorised as the whole extent of the development footprint is not considered sensitive in terms of palaeontological resources.

In the event that fossil remains are discovered during any phase of construction, either on the surface or unearthed by fresh excavations, the ECO in charge of these developments ought to be alerted immediately. These discoveries ought to be protected (preferably *in situ*) and the ECO must report to SAHRA so that appropriate mitigation (*e.g.* recording, collection) can be carry out by a professional paleontologist.

Preceding any collection of fossil material, the specialist would need to apply for a collection permit from SAHRA. Fossil material must be curated in an approved collection which comprises a museum or university collection, while all fieldwork and reports should meet the minimum standards for palaeontological impact studies proposed by SAHRA.

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13 QUALIFICATIONS AND EXPERIENCE OF THE AUTHOR

The author (Elize Butler) has an MSc in Palaeontology from the University of the Free State, Bloemfontein, South Africa. She has been working in Palaeontology for more than twenty three years. She has been conducting Palaeontological Impact Assessments since 2014.

14 DECLARATION OF INDEPENDENCE

I Elize Butler, declare that I am an independent consultant and have no business, financial, personal or other interest in the proposed project, application or appeal in respect of which I was appointed other than fair remuneration for work performed in connection with the activity, application or appeal. There are no circumstances that compromise my objectivity in this work.

CTS HERITAGE

APPENDIX 4: Heritage Screening Assessment 2022

CTS HERITAGE

HERITAGE SCREENER

CTS Reference Number:	**CTS21_216**
SAHRA Case No.	**TBA**
Client:	**Savannah**
Date:	**May 2022**
Title:	**Desktop Heritage Screening Assessment - Cluster East PVs**

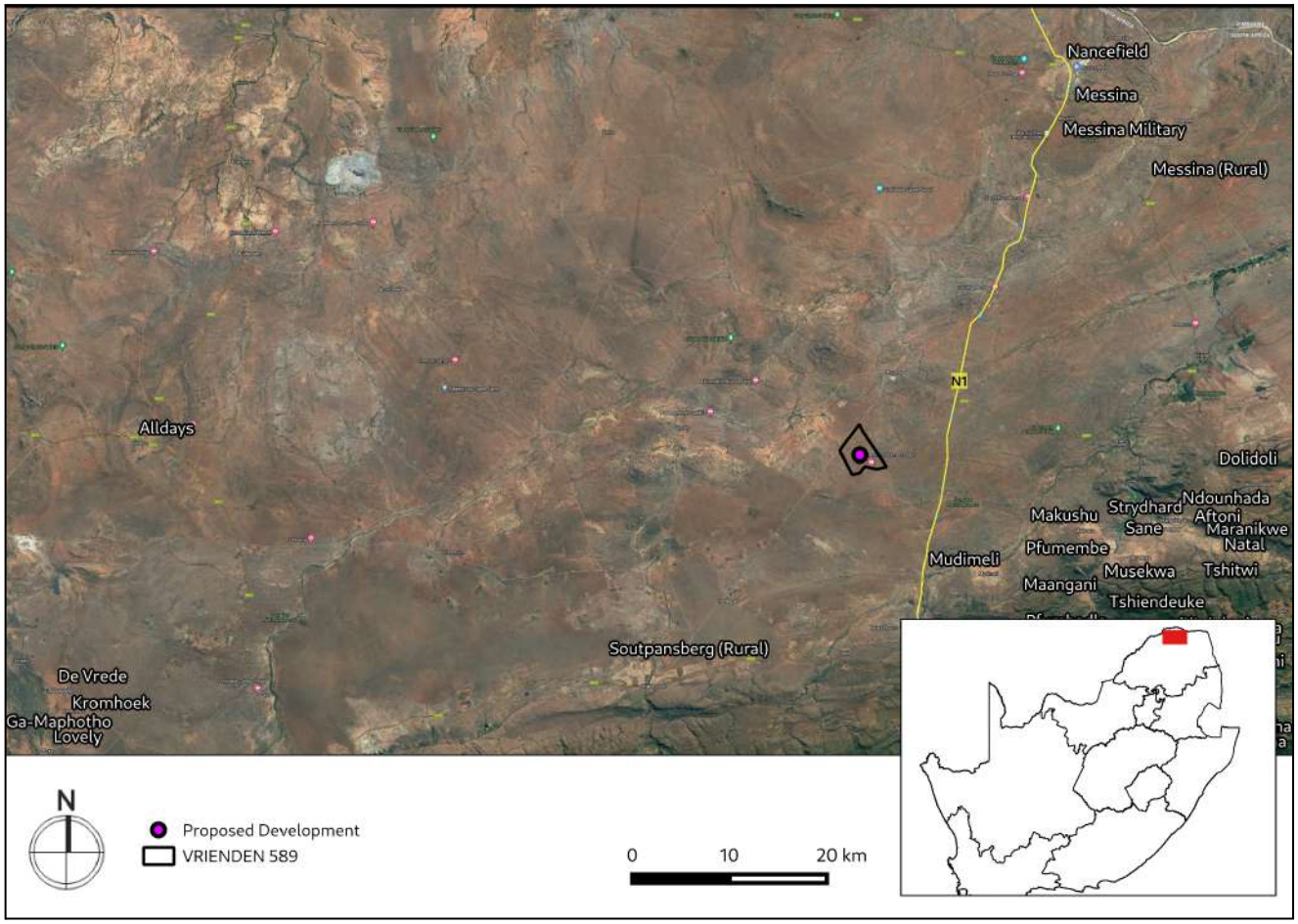

Figure 1a. Satellite map indicating the location of the proposed development in the Limpopo Province

Recommendation:	**RECOMMENDATION** **It is unlikely that the proposed development will impact on significant archaeological and palaeontological heritage. However an HIA is required to assess impacts to these identified heritage resources and to provide appropriate mitigation measures to prevent negative impact..**

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CTS HERITAGE

1. Proposed Development Summary

TBA

2. Application References

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

3. Property Information

Latitude / Longitude	22°41'38.84"S 29°49'54.85"E
Erf number / Farm number	Farm Vrienden 589 MS
Local Municipality	Makhado
District Municipality	Vhembe
Province	Limpopo Province
Current Use	Agriculture
Current Zoning	Agriculture

4. Nature of the Proposed Development

Total Surface Area	730.45ha
Depth of excavation (m)	TBA
Height of development (m)	TBA

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5. Category of Development

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

6. Additional Infrastructure Required for this Development

» Solar PV array comprising PV panels and mounting structures.
» Inverters and transformers.
» Cabling between the project components.
» 33/132kV onsite facility (IPP Portion), including associated equipment and infrastructure – one onsite substation for all four (4) Solar PV Facilities.
» Battery Energy Storage System (BESS) – one for all four (4) Solar PV Facilities.
» Site offices, warehouses, and guardhouses.
» Water storage tanks at admin block for human consumption.
» Laydown areas.
» Internal gravel distribution roads.

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

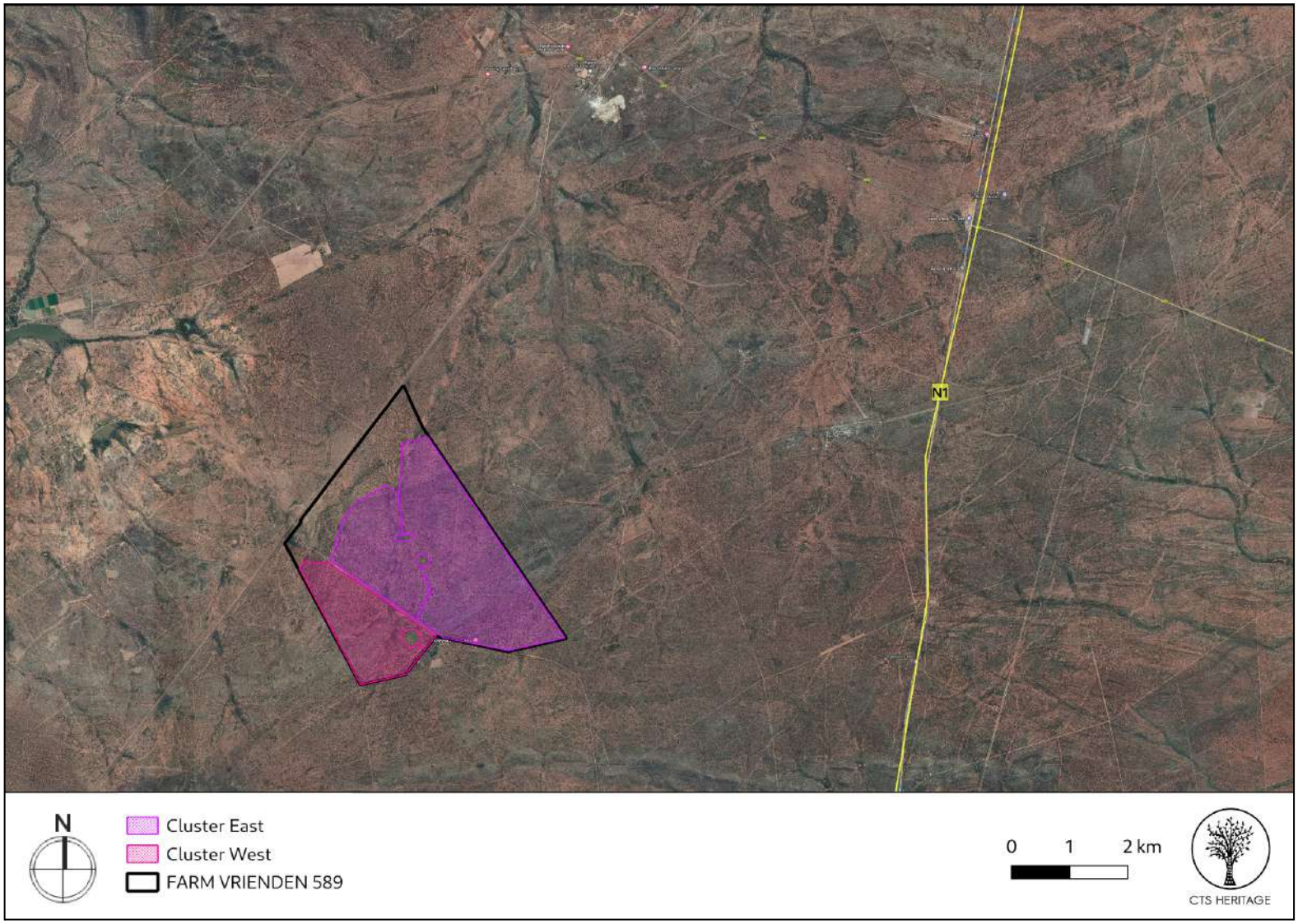

Figure 1b Overview Map. Satellite image (2019) indicating the proposed study area

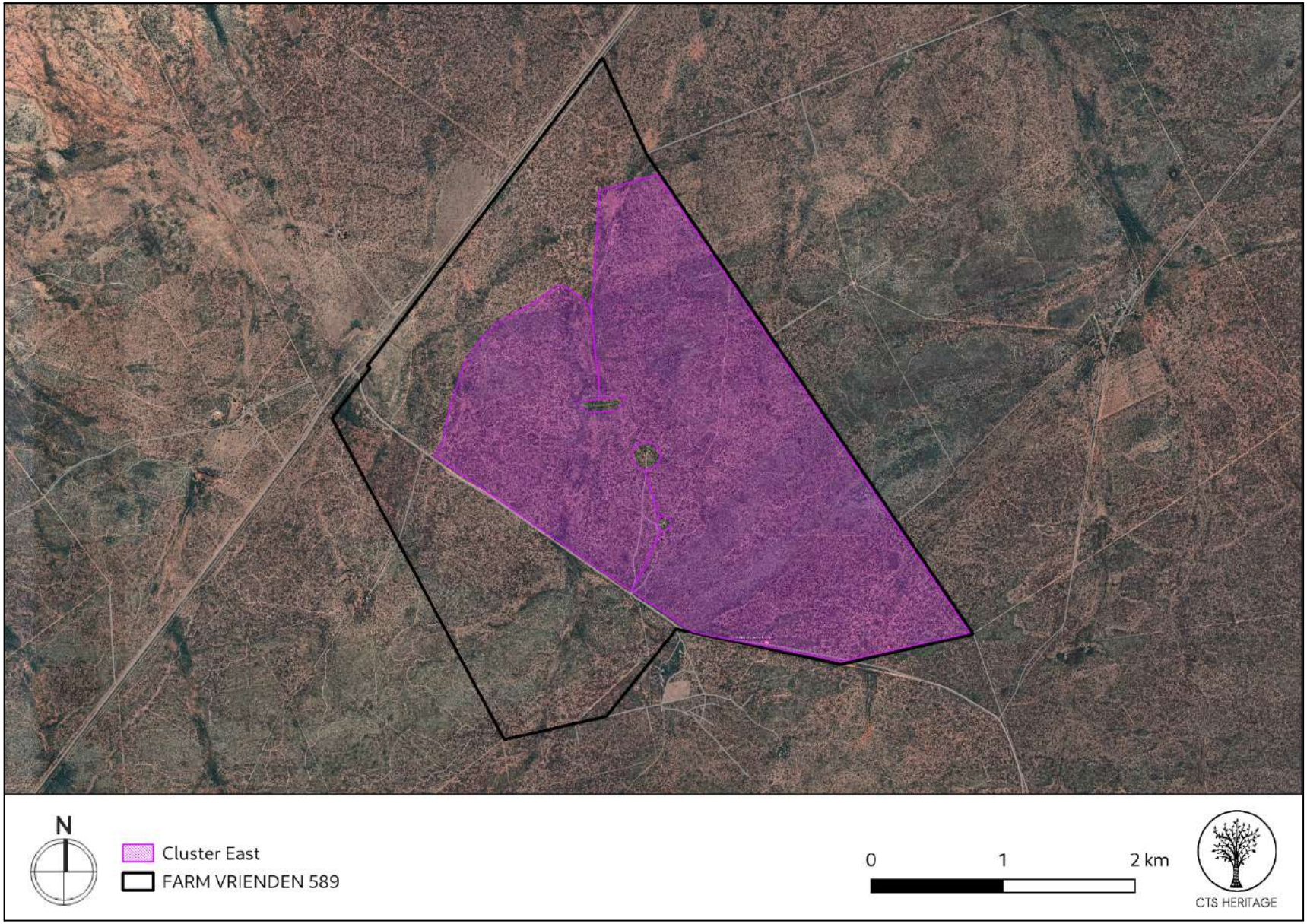

Figure 1c. Overview Map. Satellite image (2019) indicating the proposed study area at closer range.

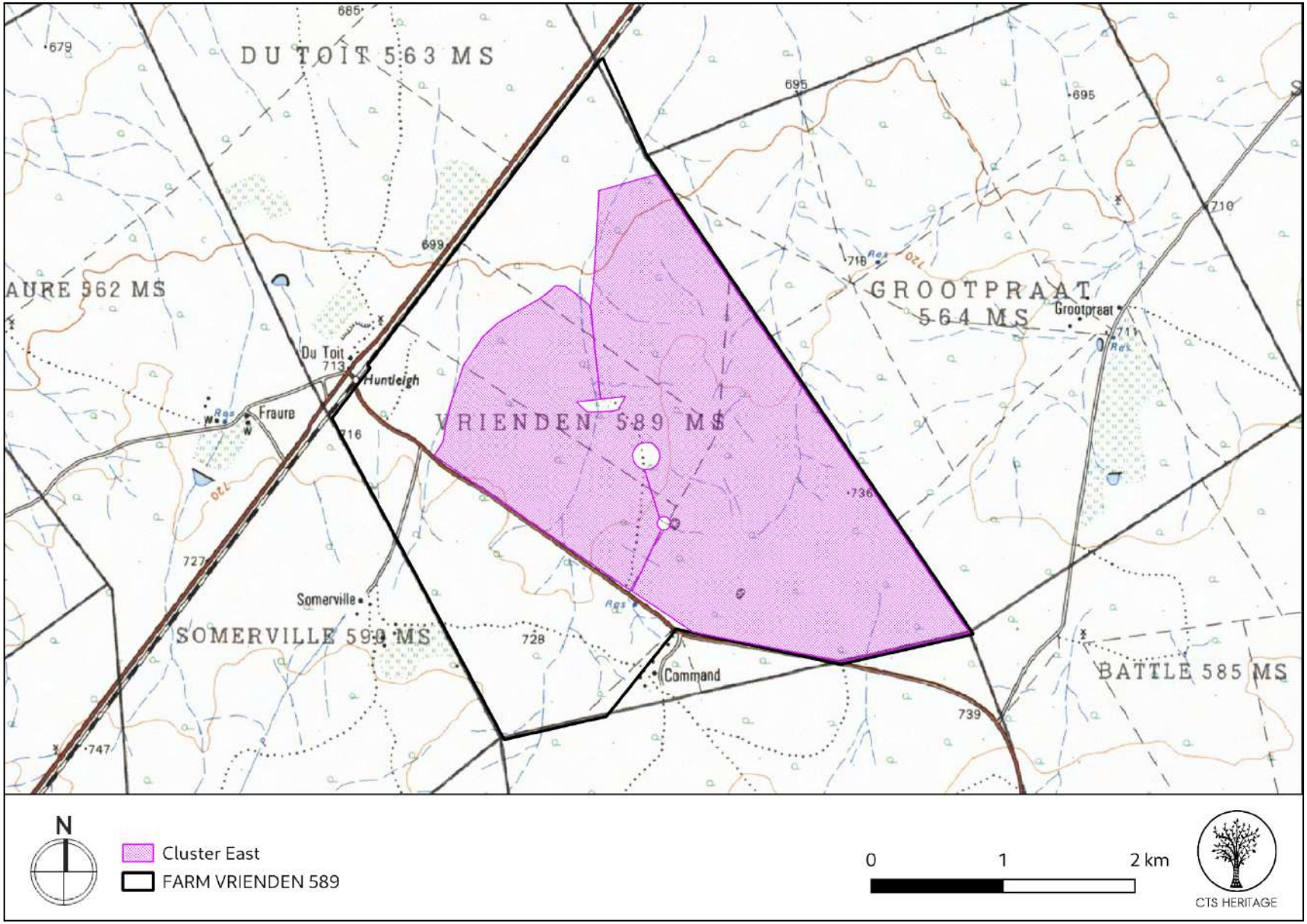

Figure 1d. Overview Map. 1:50 000 Topo Map indicating the proposed study area at closer range.

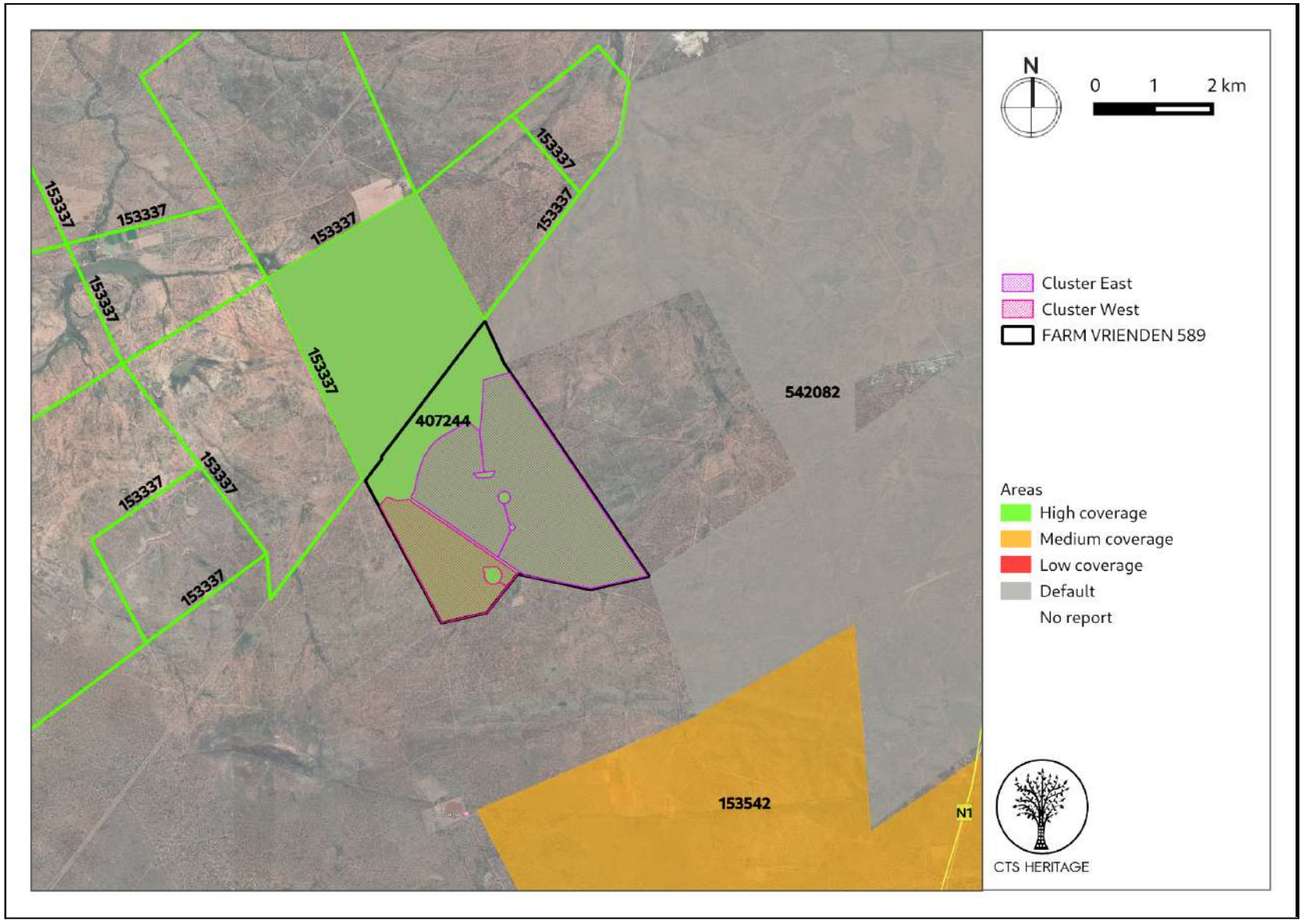

Figure 2. Previous HIAs Map. Previous Heritage Impact Assessments surrounding the proposed study area within 10km, with SAHRIS NIDS indicated. Please see Appendix 2 for a full reference list.

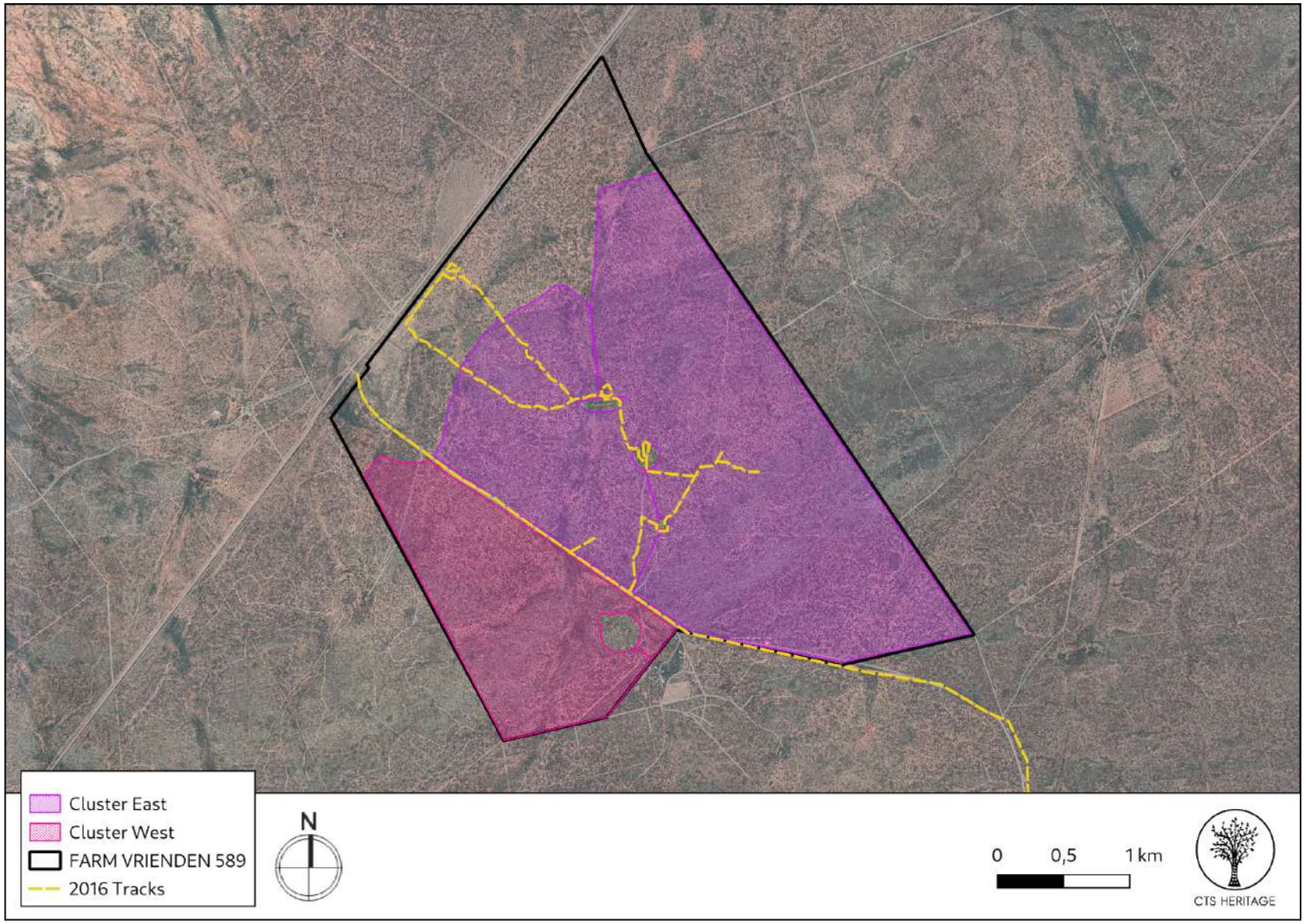

Figure 2a. Previous HIAs Map. Tracks walked as part of the 2016 Heritage Impact Assessment process for this property

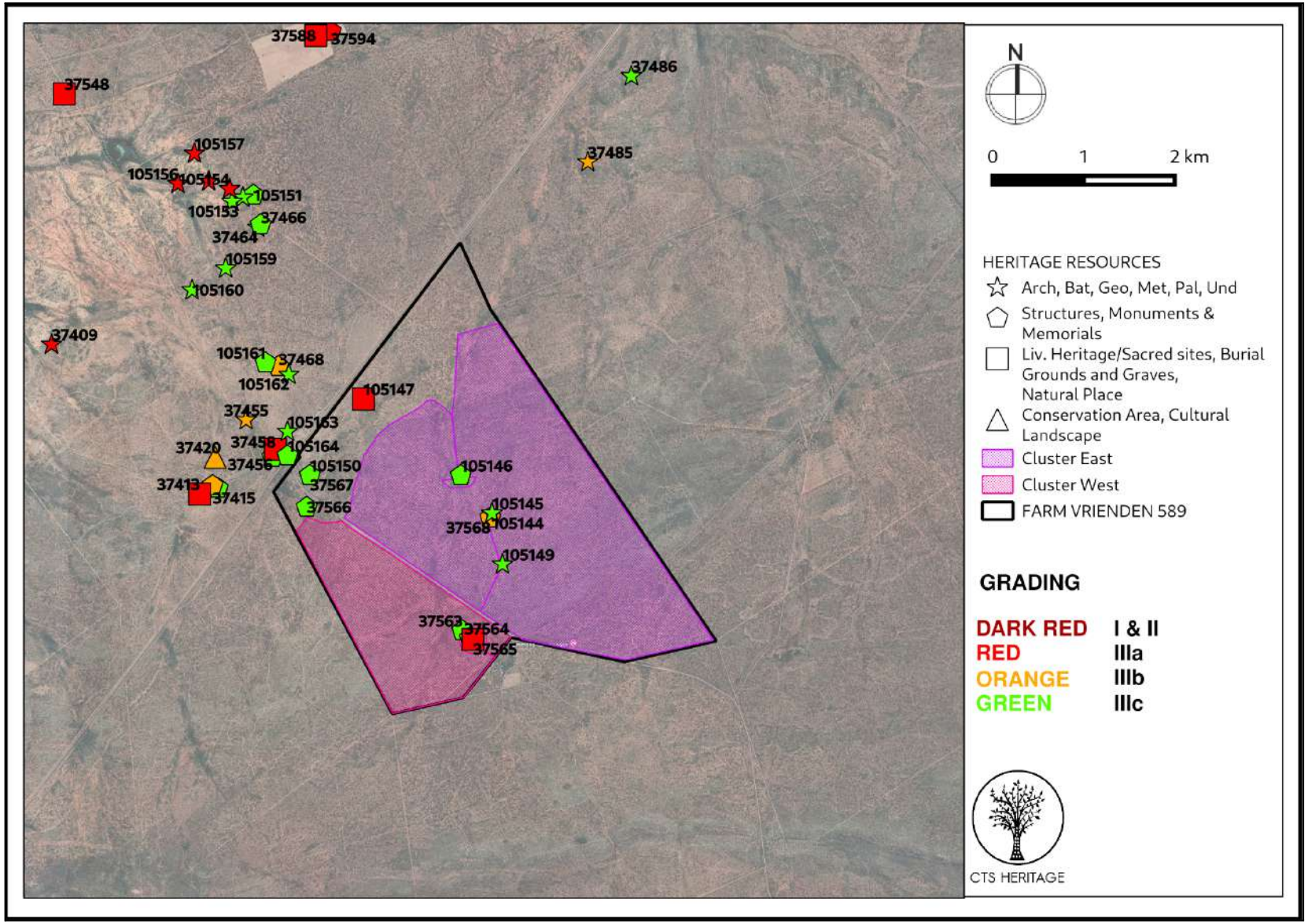

Figure 3. Heritage Resources Map. Heritage Resources previously identified in and near the study area, with SAHRIS Site IDs indicated. Please See Appendix 4 for a full description of heritage resource types.

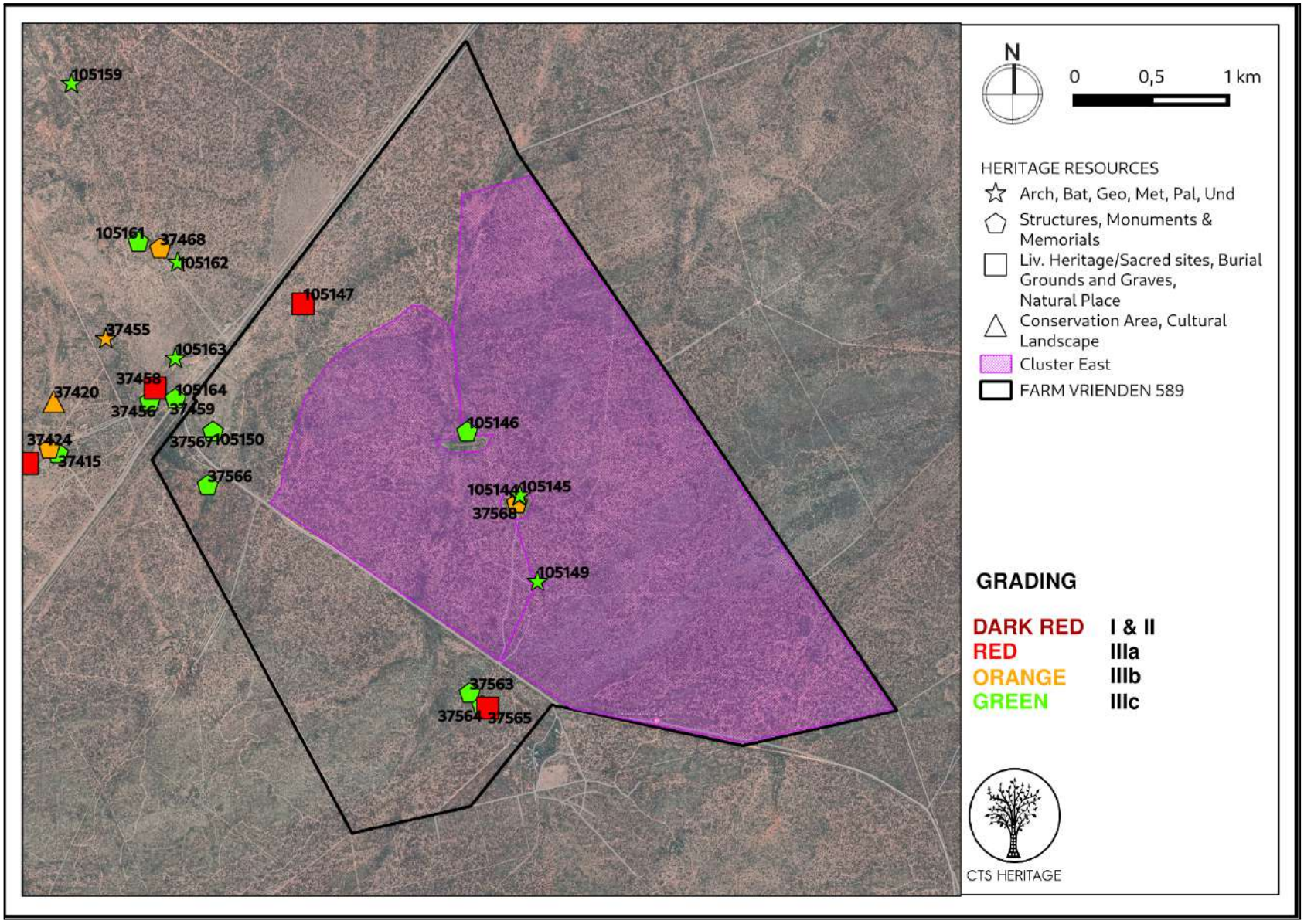

Figure 3a. Heritage Resources Map. Inset A

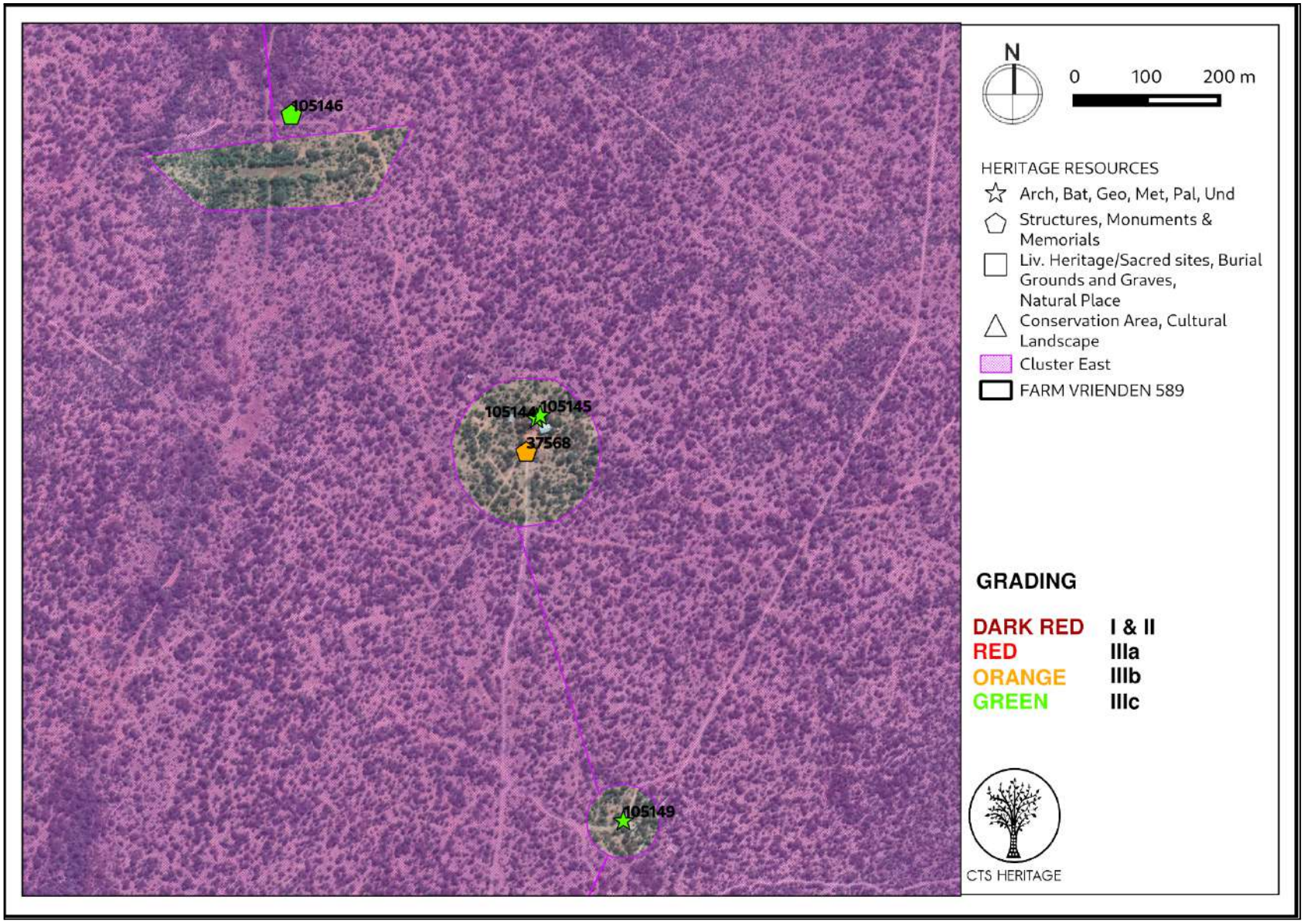

Figure 3b. Heritage Resources Map. Inset B

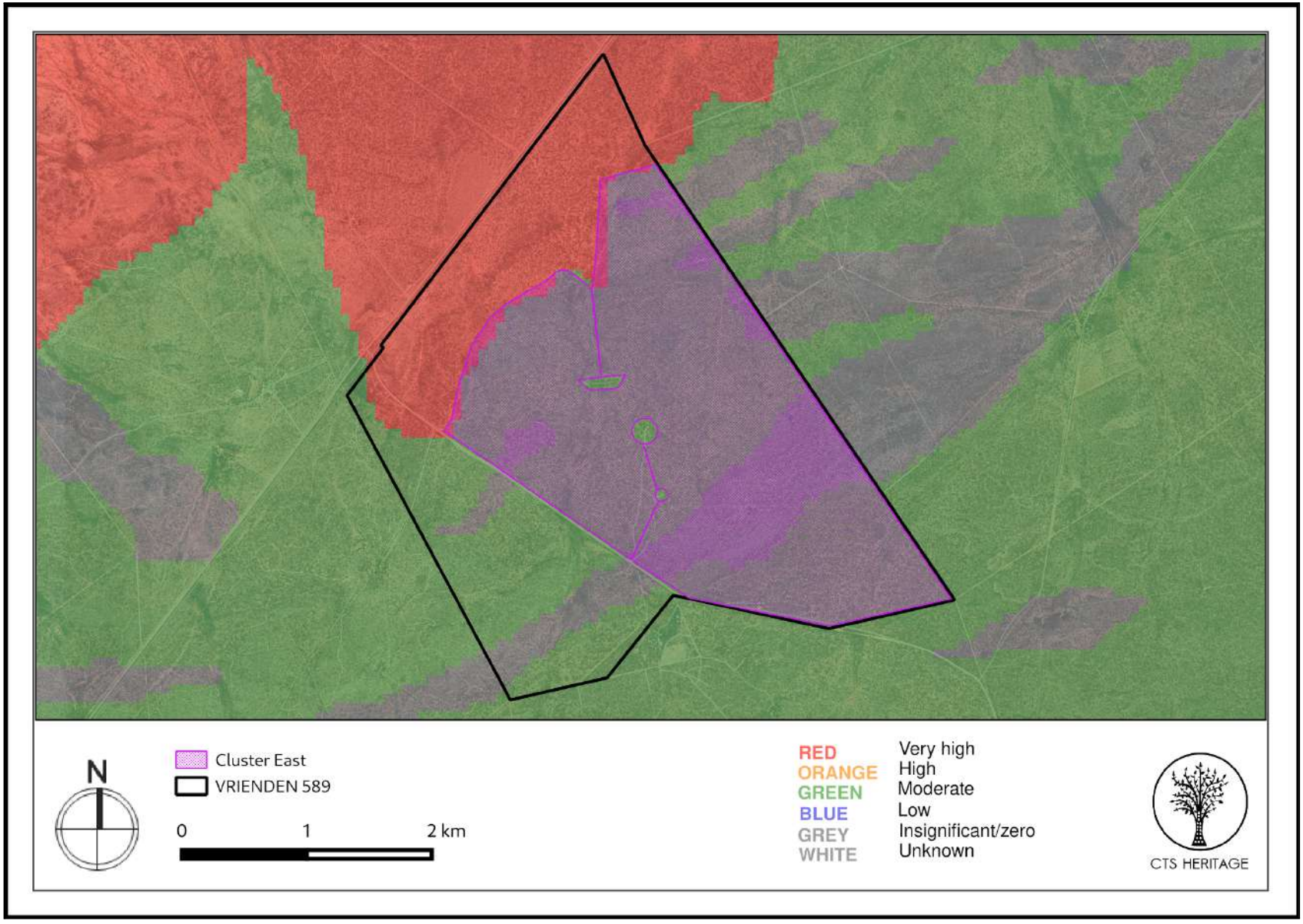

Figure 4. Palaeosensitivity Map. Indicating varied fossil sensitivity underlying the study area. Please See Appendix 3 for a full guide to the legend.

Figure 5. Contextual Image. Flat topography of the farm Vriendin 589 (Butler, 2016)

8. Heritage statement and character of the area

Background
The area proposed for the new Cluster East PV Development was previously assessed by CTS Heritage as part of the Heritage Impact Assessment for the Mutsho Power Project. The HIA for that project describes the area proposed for development as predominantly rural in nature with a number of coal mines located in the vicinity. The proposed development areas are located in the Lowveld. The area consists of savannah drylands as well as high rainfall areas. The nearby Soutpansberg has forests where the fauna and flora are abundant, and where a wide variety of animal as well as bird species can be found. The farm displays evidence of agricultural activity and disturbance.

Cultural landscape and the Built Environment
According to Silidi and Pikirayi (2013), "The coming of the Voortrekkers in the area and the introduction of commercial farming in the 19th and early 20th centuries has a strong archaeological footprint in the Mopane Project Area. We noted a prevalence of house remains associated with pioneer commercial farmers and shifting semi-permanent dwellings of farm workers. Several graves both with inscriptions and "anonymous" mostly associated with pioneer farmers or their workers were also recorded." No impacts to any historical farming infrastructure of houses are anticipated based on the information provided.

Broadly, the Project Area, which is approximately 70km from Mapungubwe, may be considered as part of the Greater Mapungubwe Cultural Landscape. Mapungubwe was once (between 900 and 1300 CE) the centre of gold and ivory trade with eastern African ports. It was South Africa's first kingdom, and developed into the subcontinent's largest realm, lasting for 400 years before it was abandoned in the 14th century. Its highly sophisticated people traded gold and ivory with China, India and Egypt. While the broader area of northern Limpopo can be considered to be part of the Greater Mapungubwe Cultural Landscape, the context of the area under assessment has been negatively impacted by the significant number of coal mines in the area. Furthermore, the proposed PV facilities are located sufficiently far from the N1 (8km) that no impact to the way that this area is experienced is expected.

Living Heritage
In the heritage impacts assessment completed on Farm Vrienden 589 in 2016, a unique example of living heritage was identified. The Baobab Room, Site V04, continues to be used today. The baobab, which has an entirely hollow trunk at ground level, has a number of windows that allow light into the shelter provided within the trunk. Pegs have been hammered into the external bark to facilitate access to inside the tree through one of these windows. There appears to be a deposit of unknown depth inside the trunk. For its unique value, this site has been graded IIIA (SAHRIS ID 105147). This site falls well outside of the area proposed for the PV facilities and no impact is anticipated.

Archaeology
South Africa has an extensive stone age archaeological record including the Earlier Stone Age (approximately 2.5mya to 200 kya), Middle Stone Age (200 kya to 40 kya) and Later Stone Age (40 kya to 2000 years ago) deposits. These sites tend to present as scatters of stone age artefacts. Rarely, archaeologists may find a stone tool manufacture site with evidence of stone flake tools as well as the flaked pieces of stone. Later Iron Age sites, such as Mapungubwe, tend to present as the remnants of Iron Age settlements identified through distinct patterns of stone features that formed the foundations of iron age structures. Often, Early Iron Age sites are not visible on the surface, but are evidenced by material culture associated with the Early Iron Age such as pottery sherds, Iron slag and other material culture located beneath the land surface.

The area surrounding the farm proposed for this development is known for a variety of kinds of heritage resources including Stone Age and Iron Age archaeology, significant structures and living heritage sites such as significant baobab trees as well as burial grounds and graves. There are numerous informal burial grounds and graves located in this area, associated with farm workers or mine workers. Often these burial grounds are not fenced and have minimal surface markings denoting their presence. These informal burial grounds and graves have a significant role to play in terms of the cultural continuity of residents of the area and care must be taken to avoid any impact to sites such as this.

Previous surveys of this area (Silidi and Pikirayi, 2013 and CTS Heritage, 2016 and 2018) identified several heritage resources across this farm (Table 1), of these, five fall within the area proposed for development (highlighted in bold in the table below). As per Figure 3b, no impact to any of these heritage resources is anticipated from the layout provided for this assessment. Overall, the archaeological sensitivity of the farm Vrienden 589 is low based on the results of previous heritage field assessments conducted here (Silidi and Pikirayi, 2013 and CTS Heritage, 2016 and 2018). As such, based on the available information, it is unlikely that significant archaeological resources will be impacted by the proposed development.

Table 1: Sites previously identified within the proposed development areas (Figure 3)

Site ID	Site no	Full Site Name	Site Type	Description	Grading	Mitigation
37464	MOP035	Mopane 035	Deposit	Next to medium size Mopane trees, there are makeshift fire places for curing of Mopane worms. Ash deposit is evidence of seasonal use.	Grade IIIc	50m Buffer
37563	MOP110	Mopane 110	Structures, Deposit	An open flat area with mixed vegetation including Mopane and hooked thorn. Square house foundation of calcite stones. An ash midden to the north of the site. It was reported that the Ramufhi family (farm workers) stayed there. They had moved away from farm more than 12 years ago.	Grade IIIc	50m Buffer
37564	MOP111	Mopane 111	Structures	Open flat area with mixed vegetation. Remains of stone buildings with mound suggesting earth plaster. Possibly associated with farm workers.	Grade IIIc	50m Buffer
37566	MOP113	Mopane 113	Structures	Open flat area of mixed vegetation including Mopane. Extensive evidence of farm occupation. Circular stone cairn 1m high x 2.5m diameter, cement floor, concrete blocks and cement bricks and plaster remains.	Grade IIIc	50m Buffer
37567	MOP114	Mopane 114	Structures	On the crest of a ridge with a view of the surrounding country. Mixed scrub vegetation including Mopane. School building for whites only. Partially collapsed square building, stones and cement plaster used. 4 rooms and a veranda facing E. Several cairns around the building and square brick structure on stone foundation.	Grade IIIa	100m no-go buffer
37568	**MOP115**	**Mopane 115**	**Structures**	**Modern gabled building situated in an open flat area. Baobab and garden trees/shrubs.**	**Grade IIIb**	**100m no-go buffer**

37455	MOP031	Mopane 031	Artefacts	Open site is mixed vegetation.	Grade IIIb	50m Buffer
37456	MOP032	Mopane 032	Structures	Fallen windmill, water tank and derelict dip tank.	Grade IIIc	NA
37459	MOP034	Mopane 034	Building	An open site, flat, on the side of the road and railway line. The remains of a brick building of which some walls are standing. The informant and elder brother born there in 1914 and 1937 respectively. The settlement thus dates back to before 1914.	Grade IIIa	100m no-go buffer
37466	MOP036	Mopane 036	Structures	Foundation remains of a square building, open site, aloes.	Grade IIIc	50m Buffer
37468	MOP037	Mopane 037	Building	Flat area several building of which the main house is a gabled building of face brick with a closed veranda facing west. Garden trees, plants and fruit trees. Young baobab. May date to the 1960s	Grade IIIb	100m no-go buffer
37565	MOP112	Mopane 112	Burial Grounds & Graves	Open flat area with mixed vegetation. Rectangular stone settings, possibly 3 graves.	Grade IIIa	100m no-go buffer
37458	MOP033	Mopane 033	Burial Grounds & Graves	Open area with mixed vegetation. Two graves enclosed by mesh wire. 2 graves Michael van der Walt B. 24 Mar 1922, D. 27 Feb 1941; Louis van der Walt B. 15 Jan 1935, D. 22 Dec 1940. The homestead was abandoned in 1963. Dressed graves with polished headstones.	Grade IIIa	100m no-go buffer
105144	**V01**	**Vrienden 1**	**Artefacts**	**Archaeological, 1 stone artefact**	**NCW**	**NA**
105145	**V02**	**Vrienden 2**	**Artefacts**	**Archaeological, 1 stone artefact**	**NCW**	**NA**
105146	**V03**	**Vrienden 3**	**Structures**	**Modern disused agricultural infrastructure**	**NCW**	**NA**
105147	V04	Vrienden 4	Living Heritage	Living Heritage/Sacred sites, the “Baobab Room”	Grade IIIa	200m No Go Buffer
105149	**V05**	**Vrienden 5**	**Artefacts**	**Archaeological, 1 stone artefact**	**NCW**	**NA**
105150	V06	Vrienden 6	Structures	Ruin of agricultural infrastructure	NCW	NA

Palaeontology

The area proposed for development falls within the summer rainfall region of South Africa, and has a mild, subtropical climate. The study area lies within a region of variable geology that includes sediments of the:

- Undifferentiated Karoo Basin; Tshipise and Tuli Sedimentary Basin and Solitude Formation; and
- the Malala drift Gneiss and Gumbu Group of the Beit Bridge Complex, Archaean Granite-Gneiss Basement.

According to the SAHRIS Palaeosensitivity Map (Figure 4), the area proposed for development is located on sediments of moderate and zero palaeontological sensitivity. An area of very highly sensitive geology is identified to the north of the development area, however no impact to these palaeontologically sensitive deposits is anticipated based on the layout provided.

Fossil heritage could be present in the Undifferentiated Karoo as well as the Solitude Formation which has a high to very high Palaeontological Sensitivity. The Archaean Granite-Gneiss Basement, Beit Bridge Complex and Malala Drift Suite, Gumbu Group are metamorphic rocks which are unfossiliferous and with a very low palaeontological sensitivity. The north eastern part of the farm Vrienden 589 falls in the potentially fossiliferous Undifferentiated Karoo and the unfossiliferous Archaean Granite-Gneiss Basement, Beit Bridge Complex and Malala Drift Suite, Gumbu Group. According to the Palaeontological Impact Assessment completed in 2016, (Butler), the high sensitivity deposits include sandstones, siltstones and mudstones of the Karoo Supergroup, and Bosbokpoort, Fripp, Solitude, Klopperfontein, Madzaringwe and Mikambeni Formations. These various deposits are mostly fluvial, and are known to contain a wide variety of fossils including dinosaur remains, fossil plants and petrified wood. The low sensitivity deposits comprise gneisses, representing the Malala Drift Gneiss Suite, and metamorphic rocks of the Archean Gumbu Group, which are unfossiliferous, as well as red sandstones of an indeterminate origin. The palaeontological field assessment completed by Butler (2016) identified no significant palaeontological resources within the development footprint. Butler (2016) goes on to conclude that "a **low palaeontological sensitivity** is allocated to the development footprint."

Based on the results of Butler (2016) and the known palaeontological sensitivity of the underlying geology of the area, it is unlikely that the proposed development will negatively impact on significant palaeontological heritage.

RECOMMENDATION

It is unlikely that the proposed development will impact on significant archaeological and palaeontological heritage. However, an HIA is required to assess impacts to these identified heritage resources and to provide appropriate mitigation measures to prevent negative impacts.

9. Scoping Assessment Impact Table

Impact

- Impact to archaeological and built environment resources
- Impact to palaeontological resources
- Impact to Cultural Landscape
- Cumulative Impact

Desktop Sensitivity Analysis of the Site

- Impact to significant archaeological resources such as Stone Age artefact scatters, remnants of Iron Age settlements, burial grounds and graves, historical artefacts, historical structures and rock art engravings through destruction during the development phase and disturbance during the operational phase is possible.
- Impacts to palaeontological resources are unlikely.
- There is the potential for the cumulative impact of proposed solar energy facilities to negatively impact the cultural landscape due to a change in the landscape character from rural and mining to semi-industrial, however, due to the density of mining activities in the area, the impact on the experience of the cultural landscape is not foreseen to be significant.

Issue	Nature of Impact	Extent of Impact	No-Go Areas
Impact to significant heritage resources through destruction during the development phase and disturbance during the operational phase.	Destruction of significant heritage resources	Local scale with broader impacts to scientific knowledge	See Table 1 above

Gaps in knowledge & recommendations for further study

The heritage resources in the area proposed for development are not yet sufficiently recorded

Based on the available information, including the scale and nature of the proposed development, it is unlikely that the proposed development will impact on significant archaeological and palaeontological heritage. However, an HIA is required to assess impacts to these identified heritage resources and to provide appropriate mitigation measures to prevent negative impact.

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APPENDIX 1: List of heritage resources in proximity to the development area

Site ID	Site no	Full Site Name	Site Type	Grading
37464	MOP035	Mopane 035	Deposit	Grade IIIc
37546	MOP095	Mopane 095	Stone walling	Grade IIIa
37547	MOP096	Mopane 096	Artefacts	Grade IIIc
37548	MOP097	Mopane 097	Burial Grounds & Graves, Artefacts	Grade IIIa
37549	MOP098	Mopane 098	Building	Grade IIIb
37563	**MOP110**	**Mopane 110**	**Structures, Deposit**	**Grade IIIc**
37564	**MOP111**	**Mopane 111**	**Structures**	**Grade IIIc**
37566	MOP113	Mopane 113	Structures	Grade IIIc
37567	MOP114	Mopane 114	Structures	Grade IIIa
37568	**MOP115**	**Mopane 115**	**Building**	**Grade IIIb**
37455	MOP031	Mopane 031	Artefacts	Grade IIIb
37456	MOP032	Mopane 032	Structures	Grade IIIc
37459	MOP034	Mopane 034	Building	Grade IIIa
37466	MOP036	Mopane 036	Structures	Grade IIIc
37468	MOP037	Mopane 037	Building	Grade IIIb
37485	MOP048	Mopane 048	Archaeological	Grade IIIb
37486	MOP049	Mopane 049	Archaeological	Grade IIIc

37662	MOP141	Mopane 141	Archaeological	Grade IIIa
37663	MOP142	Mopane 142	Archaeological	Grade IIIa
37664	MOP143	Mopane 143	Artefacts	Grade IIIa
37665	MOP144	Mopane 144	Artefacts	Grade IIIc
37666	MOP145	Mopane 145	Archaeological	Grade IIIc
37667	MOP146	Mopane 146	Archaeological	Grade IIIc
37668	MOP147	Mopane 147	Archaeological, Artefacts	Grade IIIc
37669	MOP148	Mopane 148	Archaeological, Artefacts	Grade IIIc
37670	MOP149	Mopane 149	Archaeological, Artefacts	Grade IIIc
37679	MOP155	Mopane 155	Archaeological	Grade IIIc
37681	MOP156	Mopane 156	Archaeological	Grade IIIa
37409	MOP001	Mopane 001	Artefacts	Grade IIIa
37415	MOP003	Mopane 003	Building	Grade IIIc
37420	MOP004	Mopane 004	Cultural Landscape	Grade IIIb
37422	MOP005	Mopane 005	Cultural Landscape	Grade IIIb
37424	MOP006	Mopane 006	Building	Grade IIIb
37545	MOP094	Mopane 094	Burial Grounds & Graves	Grade IIIa
37565	**MOP112**	**Mopane 112**	**Burial Grounds & Graves**	**Grade IIIa**
37458	MOP033	Mopane 033	Burial Grounds & Graves	Grade IIIa

37413	MOP002	Mopane 002	Burial Grounds & Graves	Grade IIIa
105144	**V01**	**Vriendin 1**	**Archaeological, Artefacts**	**Grade IIIc**
105145	**V02**	**Vriendin 2**	**Archaeological, Artefacts**	**Grade IIIc**
105146	**V03**	**Vriendin 3**	**Structures**	**Grade IIIc**
105147	V04	Vriendin 4	Living Heritage/Sacred sites	Grade IIIa
105149	**V05**	**Vriendin 5**	**Artefacts, Archaeological**	**Grade IIIc**
105150	V06	Vriendin 6	Structures	Grade IIIc
105151	D01	Du Toit 1	Structures	Grade IIIc
105152	D02	Du Toit 2	Archaeological, Artefacts	Grade IIIc
105153	D03	Du Toit 3	Artefacts, Archaeological	Grade IIIc
105154	D04	Du Toit 4	Archaeological, Artefacts	Grade IIIa
105155	D05	Du Toit 5	Artefacts, Archaeological	Grade IIIa
105156	D06	Du Toit 6	Artefacts, Archaeological	Grade IIIa
105157	D07	Du Toit 7	Archaeological, Artefacts	Grade IIIa
105159	D08	Du Toit 8	Artefacts, Archaeological	Grade IIIc
105160	D09	Du Toit 9	Artefacts, Archaeological	Grade IIIc
105161	D10	Du Toit 10	Structures	Grade IIIc
105162	D11	Du Toit 11	Artefacts, Archaeological	Grade IIIc
105163	D12	Du Toit 12	Artefacts, Archaeological	Grade IIIc

105164	D13	Du Toit 13	Structures	Grade IIIc
26785	9/2/240/0005	Verdun Ruins, Verdun, Messina District	Stone walling	Grade II

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APPENDIX 2: Reference List

Heritage Impact Assessments				
Nid	**Report Type**	**Author/s**	**Date**	**Title**
153542	Heritage Impact Assessment Specialist Reports	Matodzi Silidi, Innocent Pikirayi	10/12/2013	The report is a Heritage Impact Assessment (HIA) for the Generaal Project area, Vhembe District, Limpopo Province
153337	Heritage Impact Assessment Specialist Reports	Matodzi Silidi, Innocent Pikirayi	04/10/2013	The attached report is a Heritage Impact Assessment (HIA) for the Mopane Project Area which describes potential adverse and positive effects of the proposed mining operations on heritage resources.
45126	HIA	Frans Roodt	01/10/2011	Eskom Power Line Paradise Substation to the Proposed Makhado Colliery
153337	HIA	Matodzi Silidi, Innocent Pikirayi	04/10/2013	Heritage Impact Assessment for the Proposed Greater Soutpansberg Mopane Project
153366	HIA	Matodzi Silidi, Innocent Pikirayi	18/11/2013	Heritage Impact Assessment for the Proposed Greater Soutpansberg Chapudi Project
291265	HIA	Frans Roodt	30/11/2015	Phase 1 Heritage Impact Assessment Report: the Duel 186 Mt Remaining Extent, Vhembe District Municipality, Limpopo

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APPENDIX 3 - Keys/Guides

Key/Guide to Acronyms

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

Full guide to Palaeosensitivity Map legend

	RED:	VERY HIGH - field assessment and protocol for finds is required
	ORANGE/YELLOW:	HIGH - desktop study is required and based on the outcome of the desktop study, a field assessment is likely
	GREEN:	MODERATE - desktop study is required
	BLUE/PURPLE:	LOW - no palaeontological studies are required however a protocol for chance finds is required

	GREY:	INSIGNIFICANT/ZERO - no palaeontological studies are required
	WHITE/CLEAR:	UNKNOWN - these areas will require a minimum of a desktop study.

APPENDIX 4 - Methodology

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

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

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

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

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

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

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

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

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

DETERMINATION OF THE PALAEONTOLOGICAL SENSITIVITY

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

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

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DETERMINATION OF THE COVERAGE RATING ASCRIBED TO A REPORT POLYGON

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

Low coverage will be used for:

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

Medium coverage will be used for

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

High coverage will be used for

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

RECOMMENDATION GUIDE

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

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

This recommendation is made when:

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

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

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

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

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

Note:

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

CTS HERITAGE

APPENDIX 5: Chance Fossil Finds Procedure

CTS HERITAGE

CHANCE FINDS OF PALAEONTOLOGICAL MATERIAL

(Adopted from the HWC Chance Fossils Finds Procedure: June 2016)

Introduction

This document is aimed to inform workmen and foremen working on a construction and/or mining site. It describes the procedure to follow in instances of accidental discovery of palaeontological material (please see attached poster with descriptions of palaeontological material) during construction/mining activities. This protocol does not apply to resources already identified under an assessment undertaken under s. 38 of the National Heritage Resources Act (no 25 of 1999).

Fossils are rare and irreplaceable. Fossils tell us about the environmental conditions that existed in a specific geographical area millions of years ago. As heritage resources that inform us of the history of a place, fossils are public property that the State is required to manage and conserve on behalf of all the citizens of South Africa. Fossils are therefore protected by the National Heritage Resources Act and are the property of the State. Ideally, a qualified person should be responsible for the recovery of fossils noticed during construction/mining to ensure that all relevant contextual information is recorded.

Heritage Authorities often rely on workmen and foremen to report finds, and thereby contribute to our knowledge of South Africa's past and contribute to its conservation for future generations.

Training

Workmen and foremen need to be trained in the procedure to follow in instances of accidental discovery of fossil material, in a similar way to the Health and Safety protocol. A brief introduction to the process to follow in the event of possible accidental discovery of fossils should be conducted by the designated Environmental Control Officer (ECO) for the project, or the foreman or site agent in the absence of the ECO It is recommended that copies of the attached poster and procedure are printed out and displayed at the site office so that workmen may familiarise themselves with them and are thereby prepared in the event that accidental discovery of fossil material takes place.

Actions to be taken

One person in the staff must be identified and appointed as responsible for the implementation of the attached protocol in instances of accidental fossil discovery and must report to the ECO or site agent. If the ECO or site agent is not present on site, then the responsible person on site should follow the protocol correctly in order to not jeopardize the conservation and well-being of the fossil material.

Once a workman notices possible fossil material, he/she should report this to the ECO or site agent.Procedure to follow if it is likely that the material identified is a fossil:

- The ECO or site agent must ensure that all work ceases immediately in the vicinity of the area where the fossil or fossils have been found;
- The ECO or site agent must inform SAHRA of the find immediately. This information must include photographs of the findings and GPS co-ordinates;
- The ECO or site agent must compile a Preliminary Report and fill in the attached Fossil Discoveries: Preliminary Record Form within 24 hours without removing the fossil from its original position. The Preliminary Report records basic information about the find including:
    - The date
    - A description of the discovery
    - A description of the fossil and its context (e.g. position and depth of find)
    - Where and how the find has been stored
    - Photographs to accompany the preliminary report (the more the better):
        - A scale must be used
        - Photos of location from several angles
        - Photos of vertical section should be provided
        - Digital images of hole showing vertical section (side);
        - Digital images of fossil or fossils.

Upon receipt of this Preliminary Report, SAHRA will inform the ECO or site agent whether or not a rescue excavation or rescue collection by a palaeontologist is necessary.

- Exposed finds must be stabilised where they are unstable and the site capped, e.g. with a plastic sheet or sand bags. This protection should allow for the later excavation of the finds with due scientific care and diligence. SAHRA can advise on the most appropriate method for stabilisation.
- If the find cannot be stabilised, the fossil may be collect with extreme care by the ECO or the site agent and put aside and protected until SAHRA advises on further action. Finds collected in this way must be safely and securely stored in tissue paper and an appropriate box. Care must be taken to remove the all fossil material and any breakage of fossil material must be avoided at all costs.

No work may continue in the vicinity of the find until SAHRA has indicated, in writing, that it is appropriate to proceed.

CTS HERITAGE

FOSSIL DISCOVERIES: PRELIMINARY RECORDING FORM		
Name of project:		
Name of fossil location:		
Date of discovery:		
Description of situation in which the fossil was found:		
Description of context in which the fossil was found:		
Description and condition of fossil identified:		
GPS coordinates:	*Lat:*	*Long:*
If no co-ordinates available then please describe the location:		
Time of discovery:		
Depth of find in hole		
Photographs (tick as appropriate and indicate number of the photograph)	*Digital image of vertical section (side)*	
	Fossil from different angles	
	Wider context of the find	
Temporary storage (where it is located and how it is conserved)		
Person identifying the fossil Name:		
Contact:		
Recorder Name:		
Contact:		
Photographer Name:		
Contact:		

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