HERITAGE IMPACT ASSESSMENT

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

Proposed Development of the Wag n Bietjie infrastructure associated with the authorised PV Facilities near De Aar

SAHRIS Ref:

Prepared by CTS Heritage

CTS HERITAGE

For

Savannah Environmental (Pty) Ltd

December 2021

CTS HERITAGE

EXECUTIVE SUMMARY

1. Site Name:

Wag n Bietjie MTS

2. Location:

Remaining extent of the Farm Wag ten Bittje, No 5, De Aar, Northern Cape Province

3. Locality Plan:

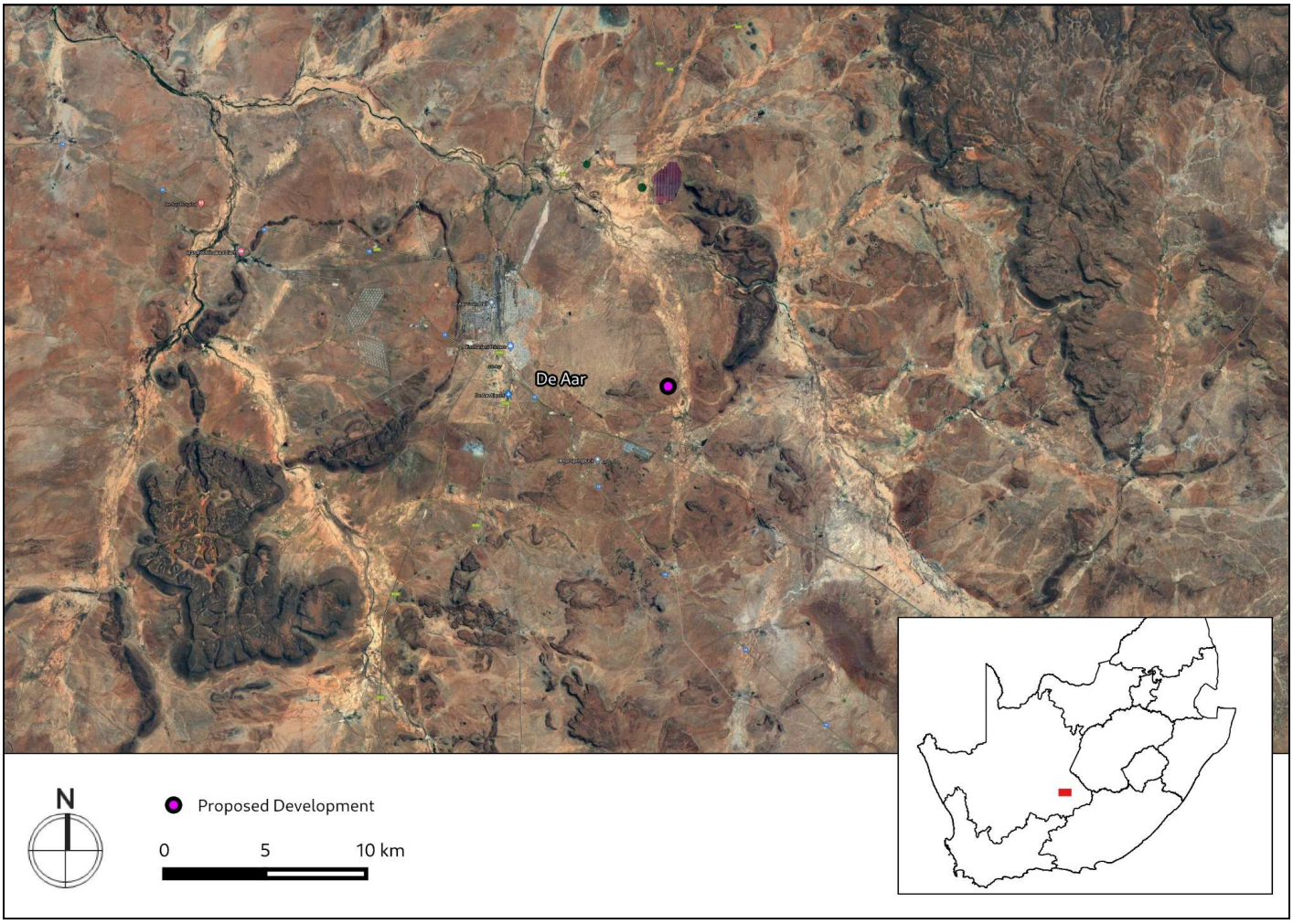


Figure 1: Location of the proposed study area

4. Description of Proposed Development:

Solar PV facilities on Wag ‘n Bietjie were previously approved but lapsed. Mulilo may apply for environmental authorisation for several solar PV facilities in the future. There is no EA approved grid connection infrastructure on the Wag ‘n Bietjie farm.

An EA application will be made for the following:

- A 400kV Main Transmission Substation (MTS)
- Loop in Loop Out (LILO) lines connecting the new MTS to an existing 400kV power line
- A power line that connects the Wag 'n Bietjie MTS and the Vetlaagte MTS
- A 200m corridor for the power line

5. Heritage Resources Identified in and near the study area:

Site No.	Site Name	Description	Density m²	Period	Co-ordinates		Grading	Mitigation
004	Wag n Bietjie 004	Still bay point, blades, hornfels, burnt bone, on top of dolerite outcrop with good views	5-10	MSA	-30.68097	24.11972	IIIC	30m no-go buffer
014	Wag n Bietjie 014	LSA and MSA site with mainly LSA hornfels flakes and pottery	30+	MSA, LSA	-30.68296	24.12708	IIIB	100m no go buffer

6. Anticipated Impacts on Heritage Resources:

Archaeology

The overall archaeological sensitivity of the development area with regard to the preservation of Early, Middle and Later Stone Age archaeology as well as Khoe and San heritage, early colonial settlement is regarded as very high. Despite this, the field assessment conducted for this project has demonstrated that the specific area proposed for development has low sensitivity for impacts to significant archaeological heritage.

Two archaeological sites of significance were identified in the field assessment, Site 004, graded IIIC and 014, graded IIIB. In order to ensure that the sites are not negatively impacted by the proposed development, it is recommended that a no-go development buffer of 30m is implemented around Site 004 and a no-go development buffer of 100m is implemented around Site 014. These sites and their respective buffers should be indicated on site development maps during the construction phase of the project. Furthermore, during the operational phase of the projects, relevant staff of the facility should be made aware of these sites and proper training provided regarding appropriate behaviour at archaeological sites.

Palaeontology

Based on experience, other reports and the lack of any significant previously recorded fossils from the area, it is unlikely that any fossils would be preserved in the Tierberg Formation or Adelaide Subgroup. Nonetheless, a Fossil Chance Find Protocol should be added to the EMPr.

7. Recommendations:

- Alternative 1 for the MTS is preferred from a heritage perspective

- A no-go development buffer of 30m is implemented around Site 004 and a no-go development buffer of 100m is implemented around Site 014. These sites and their respective buffers should be indicated on site development maps during the construction phase of the project. Furthermore, during the operational phase of the projects, relevant staff of the facility should be made aware of these sites and proper training provided regarding appropriate behaviour at archaeological sites.
- The attached Chance Fossil Finds Procedure is 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 on the Executive Committee of the Association of Professional Heritage Practitioners (APHP), and is also an active member of the International Committee on Monuments and Sites (ICOMOS) as well as the International Committee on Archaeological Heritage Management (ICAHM). In addition, Jenna has been a member of the Association of Southern African Professional Archaeologists (ASAPA) since 2009. Recently, Jenna has been responsible for conducting training in how to write Wikipedia articles for the Africa Centre's WikiAfrica project.

Since 2016, Jenna has drafted over 80 Heritage Impact Assessments throughout South Africa.

CTS HERITAGE

CONTENTS

APPENDICES

1. INTRODUCTION

1.1 Background Information on Project

Solar PV facilities on Wag ‘n Bietjie were previously approved but lapsed. Mulilo may apply for environmental authorisation for several solar PV facilities in the future. There is no EA approved grid connection infrastructure on the Wag ‘n Bietjie farm.

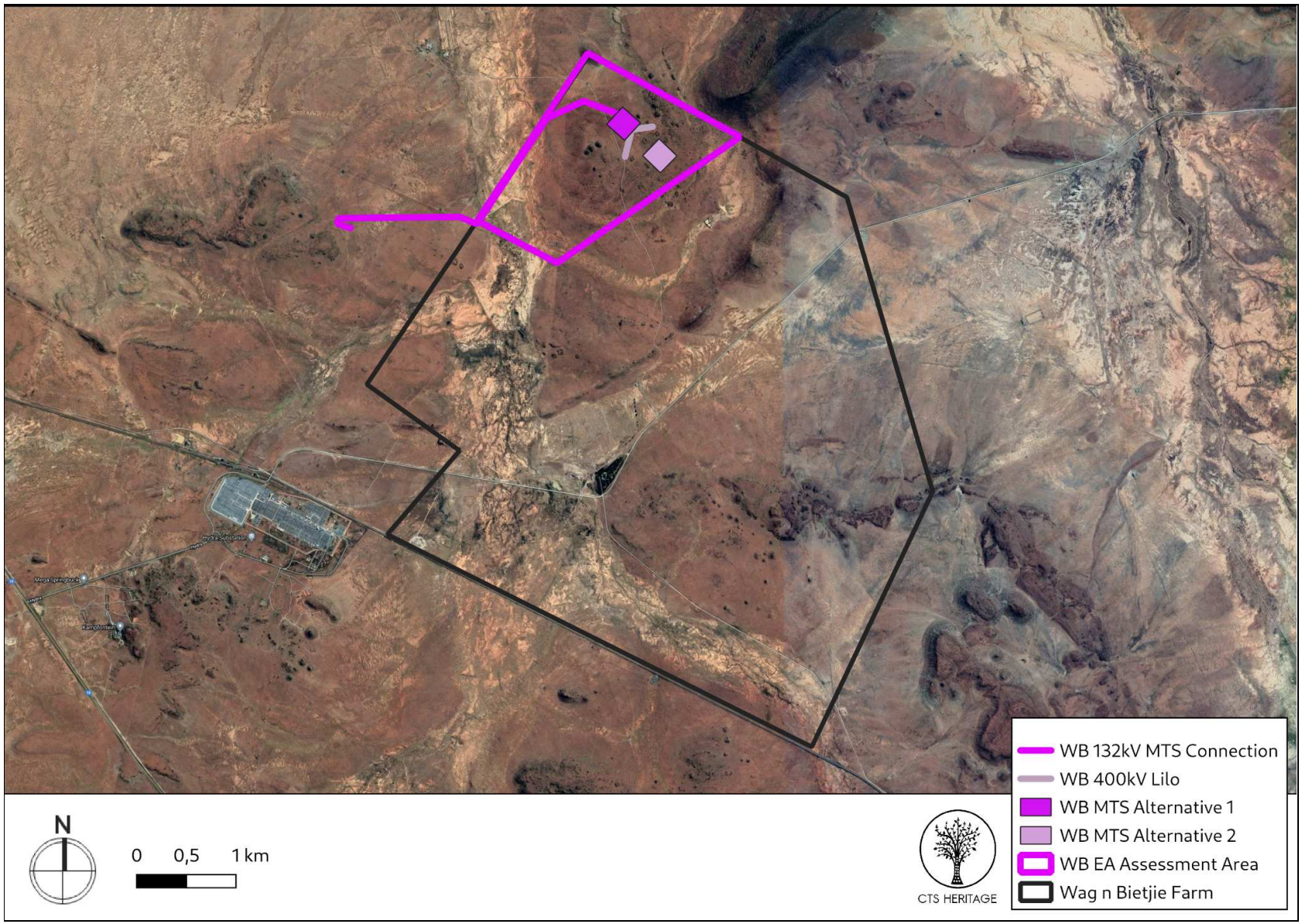
An EA application will be made for the following:

- A 400kV Main Transmission Substation (MTS)
- Loop in Loop Out (LILO) lines connecting the new MTS to an existing 400kV power line
- A power line that connects the Wag ‘n Bietjie MTS and the Vetlaagte MTS
- A 200m corridor for the power line

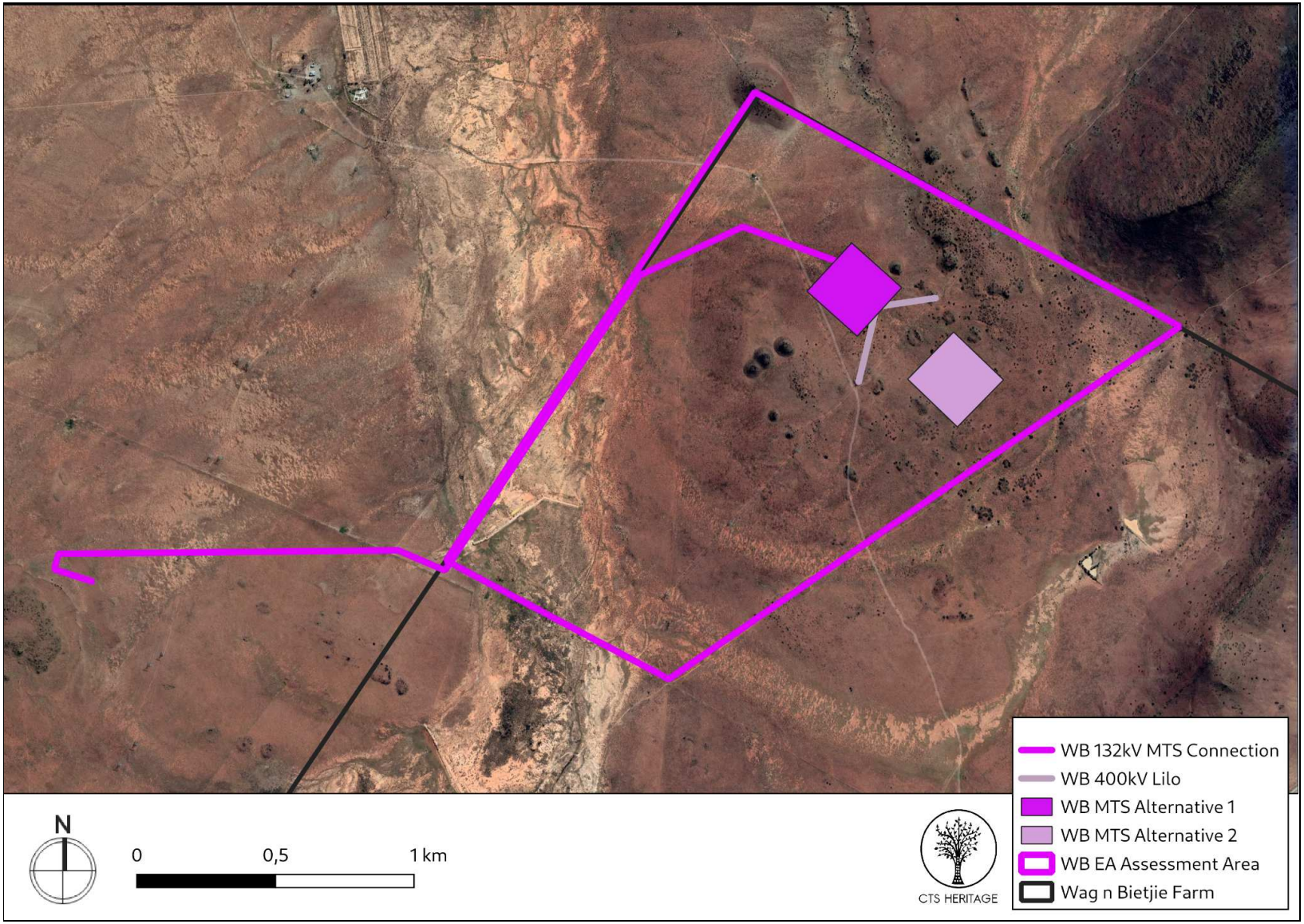
1.2 Description of Property and Affected Environment

The farm, Wagt en Bietje 5 (Wag ‘n Bietjie), lies 6 km east of the town of De Aar and about 2km north of the large Hydra substation. A number of renewable energy projects, particularly solar PV farms, have been proposed immediately surrounding this development and three completed solar farms lie north and northwest of Wag ‘n Bietjie such as De Aar Solar and Paarde Valley. A completed 144MW wind farm lies on the plateau north east of the development and can be seen from parts of Wag ‘n Bietjie. The Wag ‘n Bietjie project entails various solar PV panels and infrastructure. The powerline route runs along its northwestern border before breaking across into the middle of the study area near an existing jeep track. Most of Wag ‘n Bietjie is covered in vlaktes covered in grassland, especially in the north-south floodplain. The eastern half of has a number of dolerite koppies dotting the area with a larger koppie rising 200m higher above the area to the east. Large powerlines run right through the middle of the study area and down to the Hydra substation.

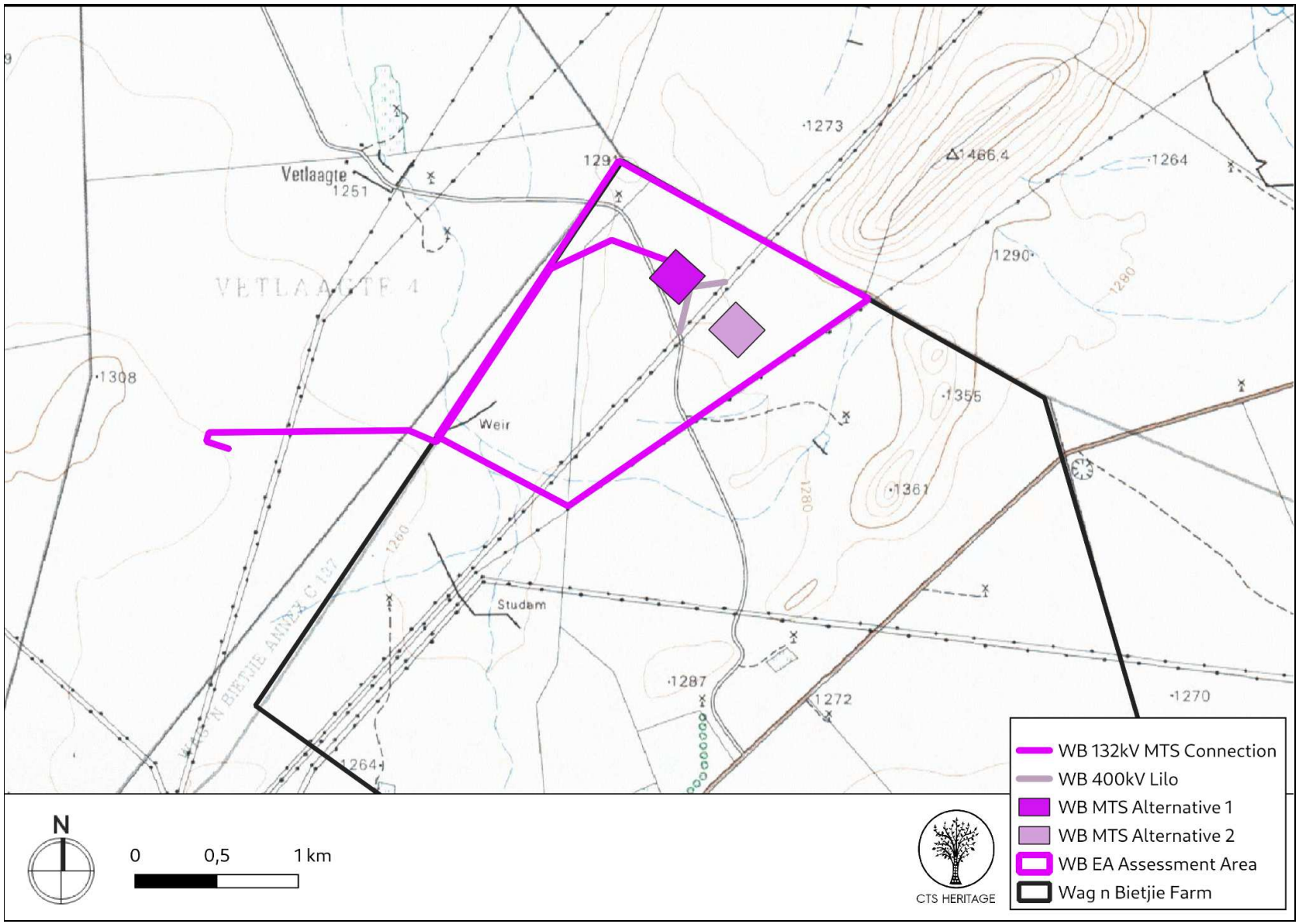
The farms are currently used for grazing by sheep and a few farm kraals, dams and windmills were observed. The vegetation is typical of the Karoo and the grassland was dense enough over much of the site to hamper visibility of archaeological material lying on the surface. A few (currently dry) farm dams were evident that appear to be in a state of disuse within the floodplain.



Map 1a: The proposed development area



Map 1b: The proposed development area



Map 1c: Study Area reflected on the 1:50 000 Topo Map

2. METHODOLOGY

2.1 Purpose of HIA

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

2.2 Summary of steps followed

- A Desktop Study was conducted of relevant reports previously written (please see the reference list for the age and nature of the reports used) (Appendix 1)
- An archaeologist conducted an assessment of the broader study area in order to determine the archaeological resources likely to be disturbed by the proposed development. The archaeologist conducted his site visit on 9 November 2021 (Appendix 2)
- A Desktop Palaeontology Assessment was completed (December 2021, Appendix 3)
- The identified resources were assessed to evaluate their heritage significance and potential impacts to these resources were interrogated
- Alternatives and mitigation options were discussed with the Environmental Assessment Practitioner

2.3 Assumptions and uncertainties

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

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

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

2.4 Constraints & Limitations

The grassland areas could be quite densely covered in places spread throughout the site which certainly contributed to obscuring the archaeological material on the surface. However, enough patches of exposed and open ground were encountered throughout the study area and scatters of artefacts were easily recorded in these spots along with Stone Age material associated with occupation areas nearer to the dolerite outcrops. There were

therefore no major limitations or constraints to the survey carried out and we are confident that the assessment provided an accurate report on the archaeological sensitivity of the area.

3. HISTORY AND EVOLUTION OF THE SITE AND CONTEXT

3.1 Desktop Assessment

This application is for the proposed development of supplementary infrastructure associated with the Wag 'n Bietjie Solar Energy Facility located West of De Aar in the Northern cape. De Aar was originally established on the Farm "De Aar." The name means "the artery," a reference to its underground water supply. The Cape Government Railways were founded in 1872, and the route that the government chose for the line to connect the Kimberley diamond fields to Cape Town on the coast, ran directly through De Aar. Because of its central location, the government also selected the location for a junction between this first railway line, and the other Cape railway networks further east, in 1881. In 1899 two brothers who ran a trading store and hotel at the junction, Isaac and Wulf Friedlander, purchased the farm of De Aar. Following the Anglo Boer War, the Friedlander brothers surveyed the land for the establishment of a town. The municipality was created a year later in 1900.

The area proposed for development is located immediately adjacent to the approved Vetlaagte Solar Energy Facility (SAHRIS Case ID 192). The studies completed for the Vetlaagte Solar Energy Facility are referred to below in order to provide heritage context to the proposed development area. The heritage impact assessment (Kruger, 2012 SAHRIS ID 49745) and palaeontology assessment (Almond, 2012 SAHRIS ID 49843) are referred to extensively below.

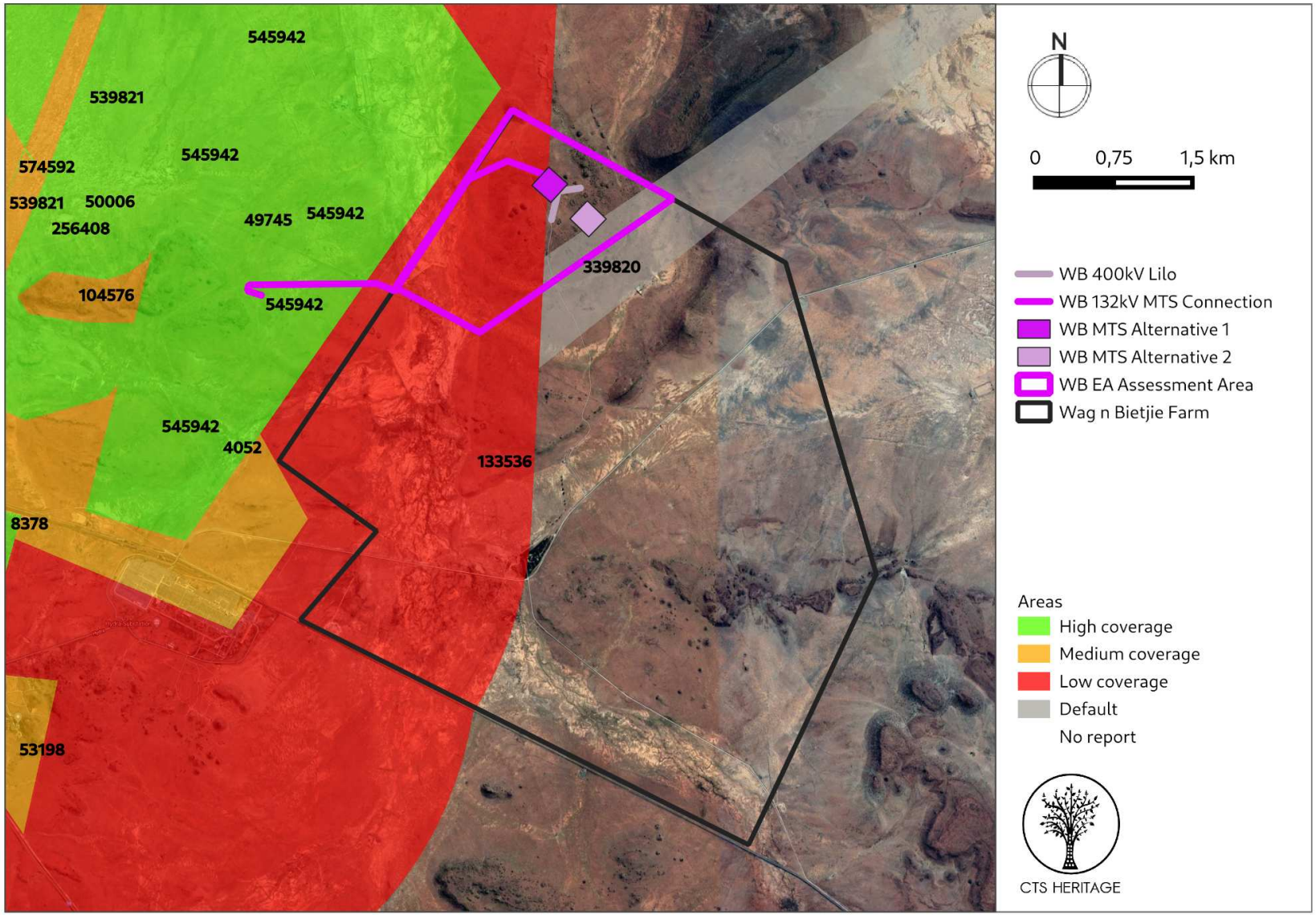
Kruger (2012) describes the development area as "characterised by flat undulating Karoo vegetation comprised out of relatively sparse scrub and grasses, with dolerite hills in the surrounding landscape. Large portions of the land is currently devoted to livestock farming but a number of solar energy facilities are to be constructed on farms around De Aar. Shallow soils covers a combination of calcrete, shale and dolerite substrates, and large sections in the landscape are exposed to sheet erosion, specifically along low lying areas and drainage lines. Dolerite and sandstone is present, while exotic rocks occur in the gravel of the Orange River bed and terraces. These provided suitable material for stone tool production during the Earlier, Middle and Later Stone Ages. "

Archaeology

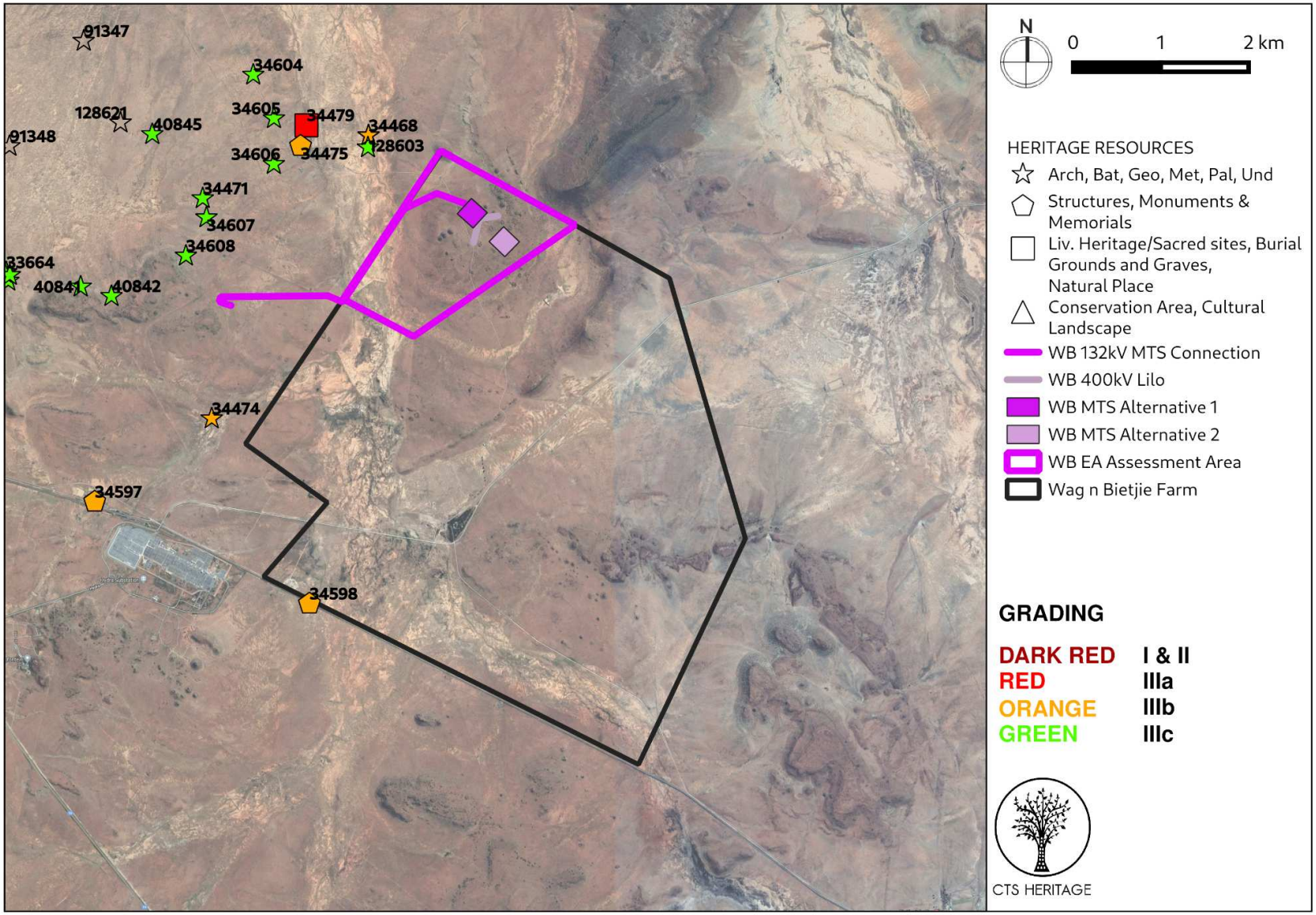
As part of the 2012 process for approval of the Vetlaagte Solar Energy Facility, Kruger conducted a detailed Heritage Impact Assessment of the area. According to Kruger (2012), "During the survey, widespread Middle Stone Age (MSA) material, including characteristic formal MSA stone tools such as points, blades and scrapers were documented in the survey area along a north-south oriented drainage on the (western) periphery of the property. The lithic remains occur in three large scatters and, almost without exception, in low lying areas along

non-perennial drainage lines and wetland areas where precipitation and groundwater have exposed the stone tools, originally deposited on a decomposed calcrete rock layer approximately 30cm sub surface. Preliminary examinations of some of the lithics indicated that a number of flakes displayed facetted platforms, characteristic of the MSA." Part of the study area for the Wag 'n Bietjie development assessed in this report is located within the drainage described above. It is therefore likely that the proposed development will impact on significant MSA archaeology.

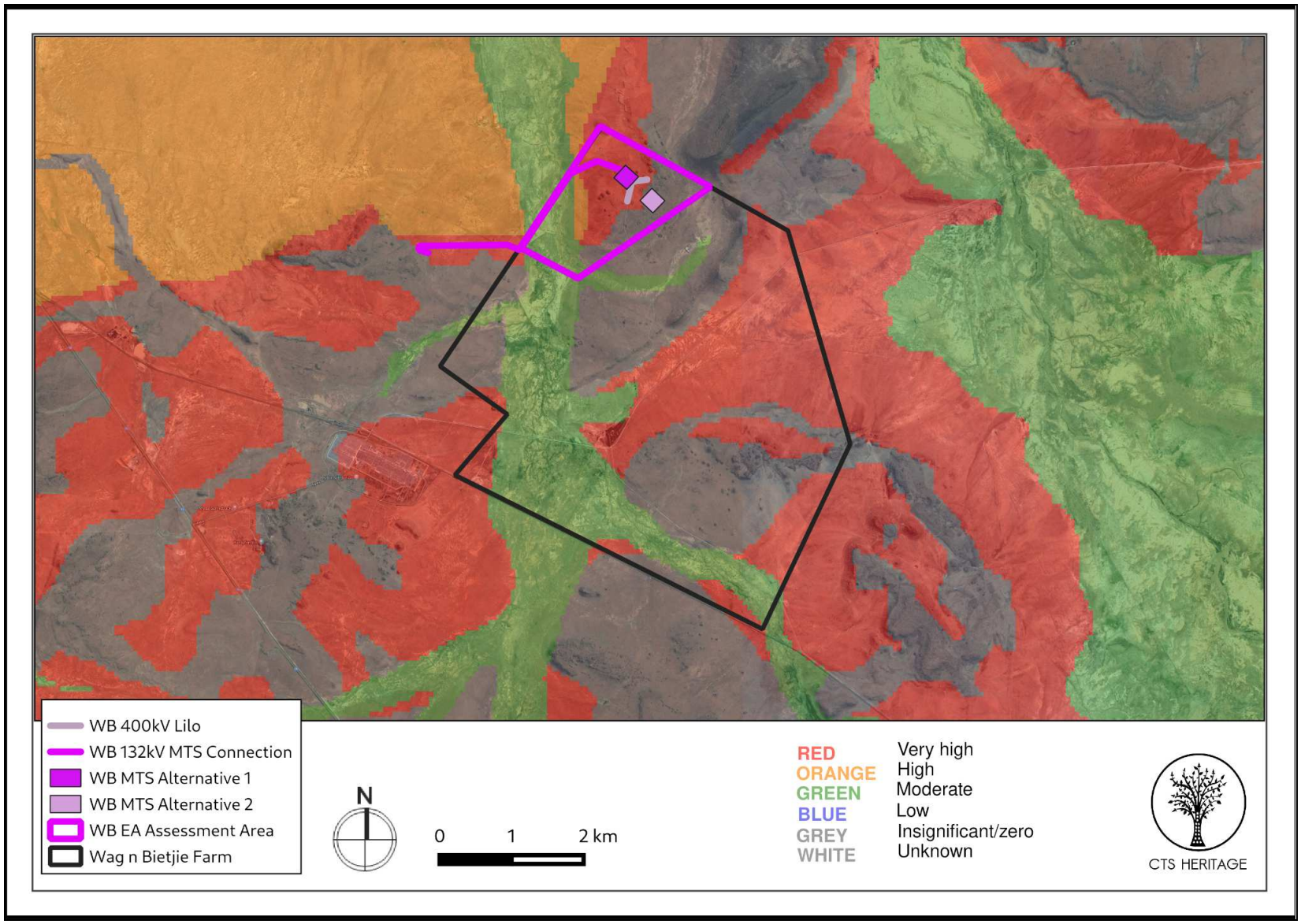
Kruger (2012) also documented historical period remains, "specifically the old Vetlaagte homestead with restored farmhouse, outbuildings, midden and labourers quarters, as well as a dilapidated dam wall constructed in the drainage line east of the farmstead are present on the property. The date of construction of the farm house is denoted by a year count ("1930") on the front gable of the structure. The entire farmstead is situated in an area excluded from the solar farm development. A small family graveyard, associated with the farmstead at Vetlaagte, also occurs in the exclusion zone about 100m north of the farm house." Similar heritage resources are likely to be located within the area proposed for development.



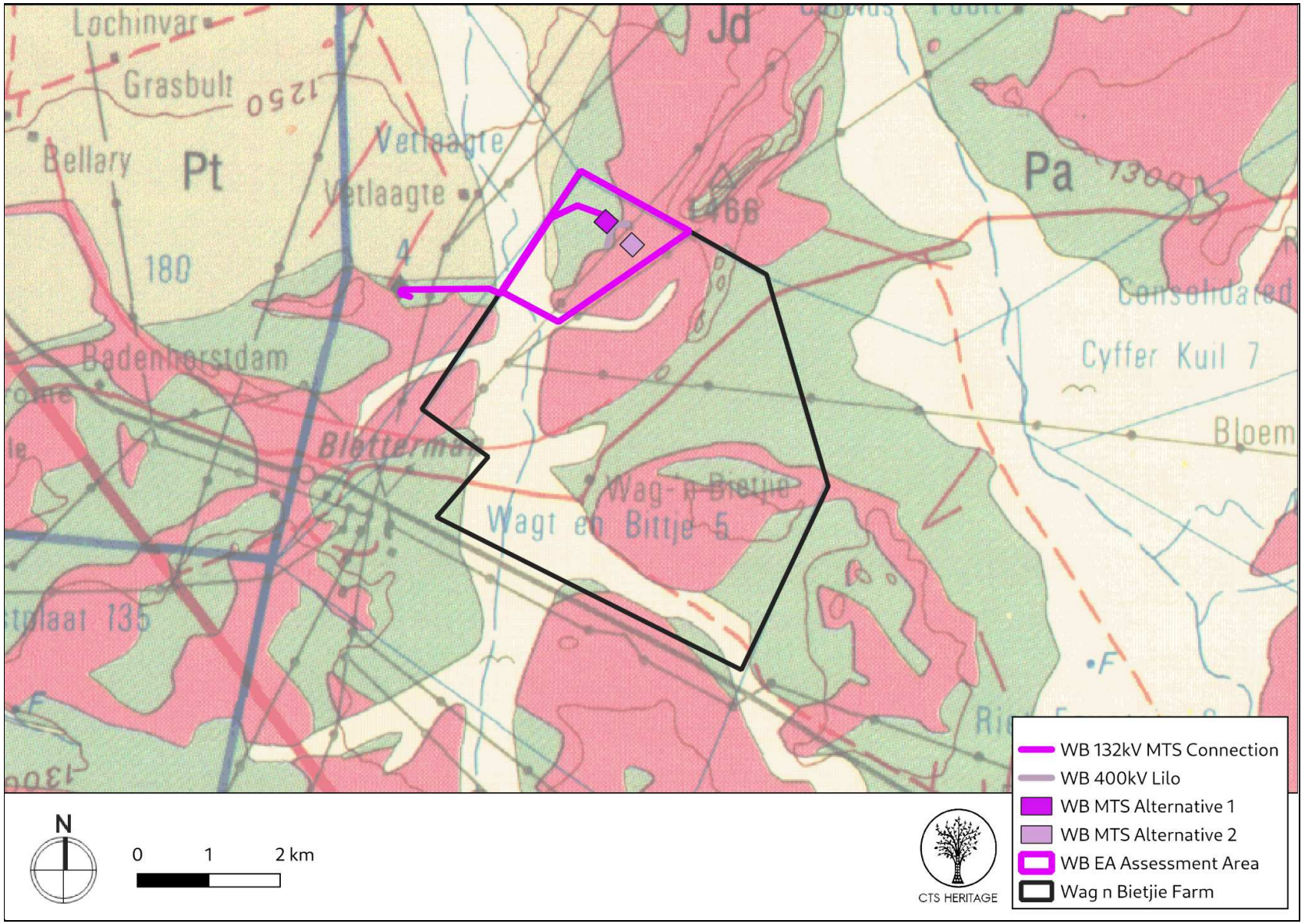
Map 2a: Spatialisation of heritage assessments conducted in proximity to the broader study area



Map 2b: Spatialisation of heritage resources known in proximity to the broader study area



Map 3a: Palaeontological sensitivity of the area surrounding the broader study area



Map 3b: Geology Map. Extracted from the Council for GeoSciences Map 3024 for Colesburg indicating that the development area is underlain by Jd: Jurassic Dolerite, Pt (lighter green): Tierberg Formation of the Ecca Group and Pa (darker green): Adelaide Subgroup of the Beaufort Group

3.2 Palaeontology

According to the SAHRIS Palaeosensitivity Map (Figure 4a), the area proposed for development is underlain by sediments of moderate. high and very high paleontological sensitivity. According to the extract from the Council for GeoSciences Map 3024 for Colesburg, the development area is underlain by Jurassic Dolerite, the Tierberg Formation of the Ecca Group and the Adelaide Subgroup of the Beaufort Group as well as Quaternary sands associated with the drainage lines.

As part of the process completed in 2012 for the approved neighbouring Vetlaagte Solar Energy Facility, Almond completed a field-based palaeontological assessment. Almond (2012) found that "The potentially fossiliferous sediments of the Late Palaeozoic Karoo Supergroup (Ecca and Lower Beaufort Groups) that underlie the study area are almost entirely mantled in a thick layer of superficial deposits of probable Pleistocene to Recent age. These include various soils, gravels and – at least in some areas - a well-developed calcrete hardpan. The upper Ecca Group bedrocks in the northern portion of the study area contain locally abundant fossil wood (of palaeontological interest for dating and palaeoenvironmental studies), as well as low diversity non-marine trace fossil assemblages typical of the Waterford Formation, rather than the Tierberg Formation as mapped. No vertebrate fossils and only scattered woody plant impressions of the Permian Glossopteris Flora were observed within the Lower Beaufort Group rocks that are very poorly exposed in the southern portion of the Vetlaagte study area. Trace fossils, silicified wood and rare vertebrate remains (therapsids, parareptiles) of the Middle Permian Pristerognathus Assemblage Zone have recently been recorded from this succession in the De Aar region (Almond 2010b). Extensive dolerite sills and dykes of the Early Jurassic Karoo Dolerite Suite intruding the Karoo Supergroup sediments are entirely unfossiliferous, as are rare intrusive kimberlite pipe rocks of Cretaceous age. The diverse superficial deposits within the three study areas (e.g. soils, gravels, alluvium, calcrete hardpans) are of low palaeontological sensitivity as a whole . Abundant fragments of reworked fossil wood material of Ecca provenance occur widely within subsurface and surface gravels overlying the Ecca Group outcrop area."

Almond (2012) concludes that "The construction of new access roads and transmission lines in this region are likewise considered to be of low significance as far as fossil heritage is concerned… In view of the overall low significance of the proposed development on palaeontological heritage resources, it is concluded that no further palaeontological heritage studies or specialist mitigation are required for these small PV projects, pending the exposure of any substantial fossil remains (e.g. vertebrate bones and teeth, large blocks of petrified wood) during the construction phase."

4. IDENTIFICATION OF HERITAGE RESOURCES

4.1 Summary of findings of Specialist Reports

Archaeology

Over 25 archaeological observations were made on Wag 'n Bietjie. Hornfels dominated the assemblages with smaller components of CCS and siltstones. While the vast majority of the scatters were made during the Middle Stone Age, there was also a relatively clear Later Stone Age presence in the study area. Many examples of blade forms were found which are typical of the Still Bay period (>70 000 years BP) and the neighbouring Vetlaagte farm was also surveyed whilst conducting an HIA for a similar solar PV facility there. Relatively dense Later Stone Age sites were found on the far eastern end of Wag 'n Bietjie and these date within the last 2000 years due to the presence of pottery in these sites. The increasing density of material as one moved eastwards was probably due to the shortening distance from the Brakrivier which runs around Caroluspoort (4km northeast of Wag 'n Bietjie). This is the closest source of reliable water in the area.

Two sites warranted protection with an interesting scatter of Still Bay tools on top of a dolerite outcrop with excellent views of the surrounding area. It is highly unlikely this area will be developed and it is recommended that infrastructure is not placed on this outcrop. Another site was found warranting a IIIB rating with pottery, bone and an extensive stone tool assemblage amongst the dolerite outcrops on the eastern end of the property. Again, this site has been demarcated as sensitive and the project team has been advised to avoid this area when finalising the layouts. A minimum buffer of 100m is recommended from this site (Wag n Bietjie 014). The rest of the observations are typical of the area and are ubiquitously distributed in low densities of less than 5 artefacts per observation. Kruger's previous survey on ground overlapping with this study area found similar material but we feel the gradings attributed to these (IIIC) are better downgraded to NCW now that we have greater coverage contextualising these finds and that they are widespread. Much of the archaeological material will be well conserved within a series of areas that can't be developed for the solar PV arrays while the flat, grassy vlaktes that are idea for the solar PV are also the areas with the lowest archaeological sensitivity.

Palaeontology

According to the SAHRIS Palaeosensitivity Map, the area proposed for development is underlain by sediments of moderate, high and very high paleontological sensitivity. According to the Desktop PIA completed for this project, "Moderately sensitive sediments are the Quaternary sands, high sensitivity sediments are the Tierberg Formation shales and the very highly sensitive rocks are the Adelaide Subgroup mudstones and sandstones. The dolerite has no fossils. The formations will be considered chronologically from oldest to youngest.

The Tierberg Formation does not have a significant vertebrate fauna but may preserve fossil leaves of the *Glossopteris* flora and fragments of silicified wood (Plumstead, 1969; Johnson et al., 2006). According to the site visit reported by Almond (2012) for the Tierberg Formation on Farm Vetlaagte, there were some fragments of plant fossils and wood that he considered of minimal importance and the PV facility was approved by SAHRA. Therefore, the same can be said for the narrow exposure of the Tierberg Formation in the Wag 'n Bietjie Assessment area..

The Adelaide Subgroup is very highly sensitive as it has a variety of vertebrate fossils in some areas. According to the recent Biostratigraphy for South Africa (Smith et al., 2020), De Aar is in the Eodicynodon and the Tapinocephalus Assemblage Zones, i.e. in the lower part of the Adelaide Subgroup, of the Abrahamskraal Formation. Index fossils would have to be found to support this. The northern part of Farm Wag 'n Bietjie lies on the Adelaide Subgroup. According to Almond (2012), trace fossils, silicified wood and rare vertebrate remains (therapsids, parareptiles) of the Middle Permian Pristerognathus Assemblage Zone have recently been recorded from this succession in the De Aar region. Note that the Pristerognathus Assemblage Zone (Rubidge et al., 1995) is now called the Endothion Assemblage Zone (Smith et al., 2020). Almond did not consider this stratum to be very highly sensitive. The Wag 'n Bietjie assessment area including the 132 kV line, LILO and MTS, are on the Adelaide Subgroup rocks.

Quaternary alluvium, especially when associated with valleys and river or stream channels, would only have transported robust and fragmentary fossils. These are of minimal palaeontological significance as they are out of primary context, and the fragments are difficult to identify. The south western part of the Wag n' Bietjie assessment area and the 132 kV line are on this alluvium.

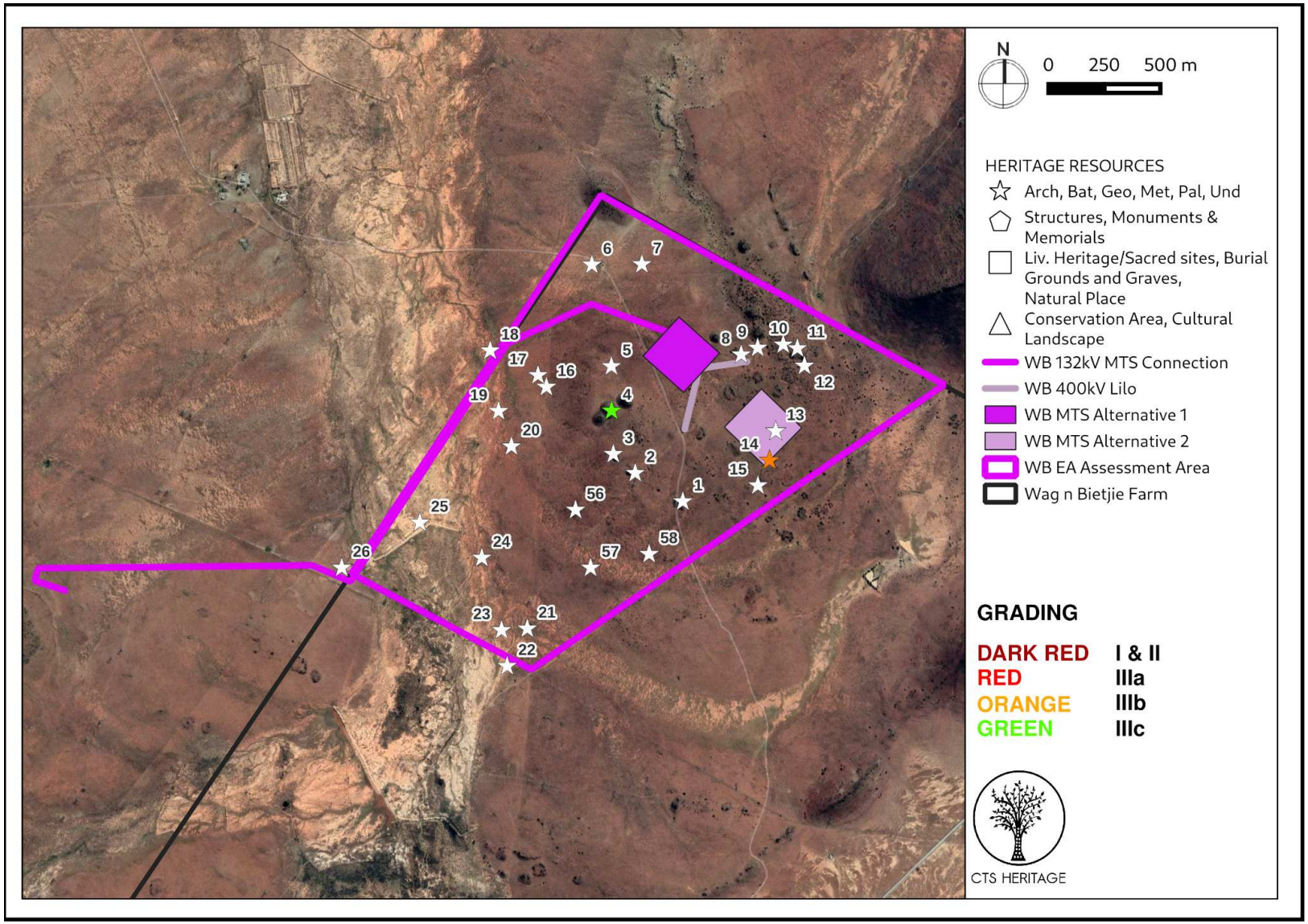
Almond did not consider the impact on fossils by the proposed developments to be high, and the literature does not contradict him. In addition, fossils are more easily seen where there is a rocky outcrop and not on flat land. Nonetheless, a Fossil Chance find Protocol should be followed.

4.2 Heritage Resources identified

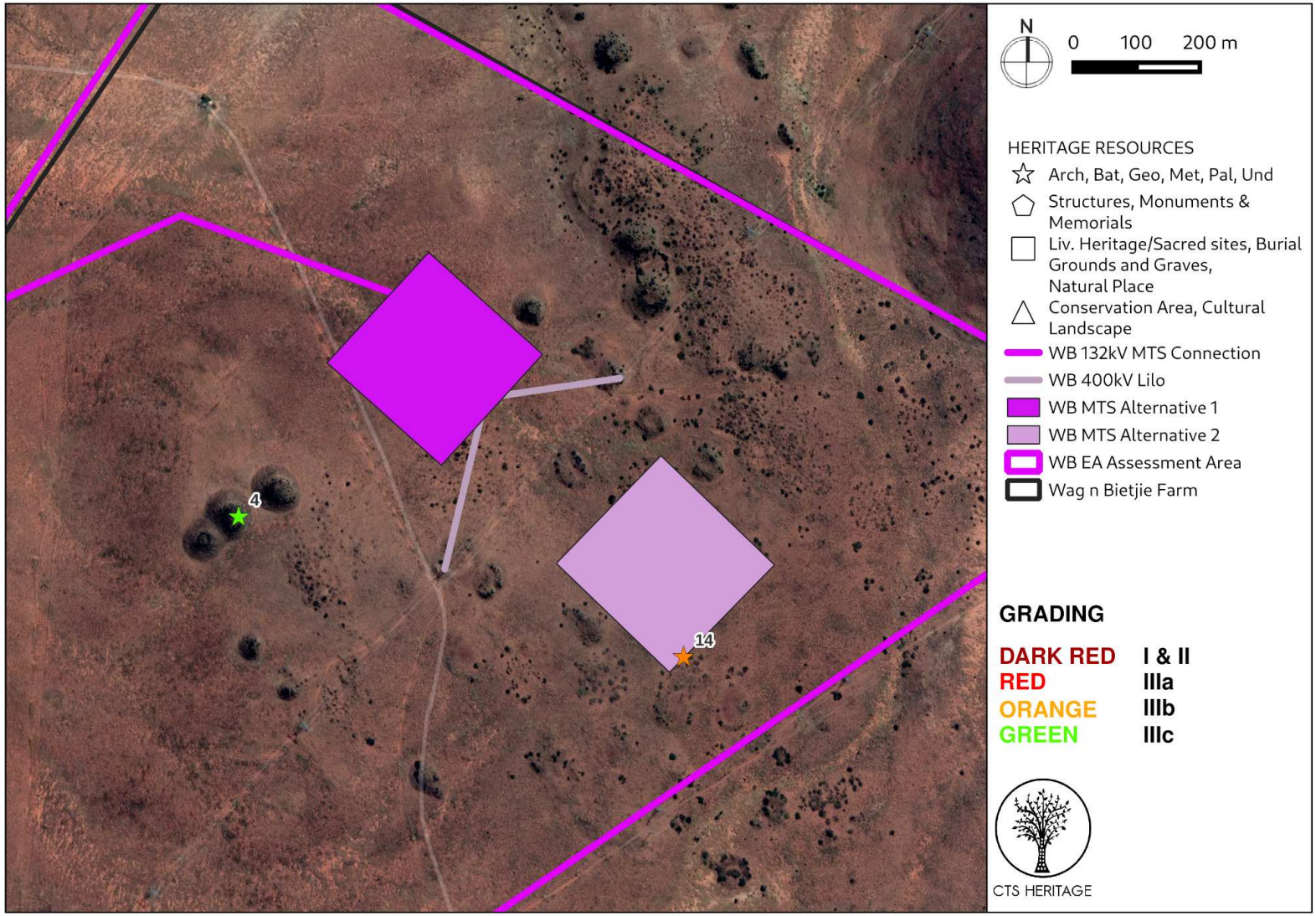
Table 1: Heritage resources of significance identified in the assessment area (see Appendix 2 for a full list)

Site No.	Site Name	Description	Density m²	Period	Co-ordinates		Grading	Mitigation
004	Wag n Bietjie 004	Still bay point, blades, hornfels, burnt bone, on top of dolerite outcrop with good views	5-10	MSA	-30.68097	24.11972	IIIC	30m no-go buffer
014	Wag n Bietjie 014	LSA and MSA site with mainly LSA hornfels flakes and pottery	30+	MSA, LSA	-30.68296	24.12708	IIIB	100m no go buffer

4.3 Mapping and spatialisation of heritage resources



Map 4: Map of heritage resources identified during the field assessment, relative to the proposed development (see Appendix 2 for a full sites list)



Map 4a: Map of heritage resources identified during the field assessment, relative to the proposed development

5. ASSESSMENT OF THE IMPACT OF THE DEVELOPMENT

5.1 Assessment of impact to Heritage Resources

No impacts to heritage resources are anticipated for the Design and Pre-Construction Phase, and the Post-Construction and Operational Phase. The only anticipated impacts are likely during the construction phase.

Archaeology

The results of the archaeological field assessment conducted largely aligns with the findings of previous archaeological assessments completed in the vicinity of the proposed development. The archaeological resources identified within the development area are dominated by Later and Middle Stone Age flakes, which corresponds with similar findings of others (Kruger, 2012). The majority of the archaeological resources identified within the area proposed for the development in this field assessment have been determined to be not conservation-worthy. As such, these resources have been sufficiently recorded and there is no objection to the proposed development in these locations from an archaeological perspective.

Two archaeological sites of significance were identified in the field assessment, Site 004, graded IIIC and 014, graded IIIB. In order to ensure that the sites are not negatively impacted by the proposed development, it is recommended that a no-go development buffer of 30m is implemented around Site 004 and a no-go development buffer of 100m is implemented around Site 014. These sites and their respective buffers should be indicated on site development maps during the construction phase of the project. Furthermore, during the operational phase of the projects, relevant staff of the facility should be made aware of these sites and proper training provided regarding appropriate behaviour at archaeological sites.

Other than LSA and MSA artefacts that have been described above, the archaeological field assessment completed in November 2021 identified no structures or other kinds of heritage resources located within the areas proposed for development.

Palaeontology

Based on the geology of the area and the palaeontological record as we know it, it can be assumed that the formation and layout of the dolomites, sandstones, shales and sands are typical for the country and some do contain fossil plant, insect, invertebrate and vertebrate material. The sands of the Quaternary period would not preserve fossils. Almond (2010) found no fossils of significance during his site visit to Vetlaagte, and the Wag ‘n Bietjie farm has the same lithology. It is unknown what lies below the surface.

Based on the nature of the project, surface activities may impact upon the fossil heritage if preserved in the development footprint. The geological structures suggest that the rocks are the correct type and age to contain

fossils. A Fossil Chance Find Protocol has been added to this report. Taking account of the defined criteria, the potential impact to fossil heritage resources is low.

Table 2: Heritage resources identified in the study area

Structure and location	Palaeosensitivity	Action required
Wag 'n Bietjie Assessment – N and central, 132 kV line MTS, LILO	Adelaide sG Very high	FCFP - bones
Wag 'n Bietjie Assessment - west	Quaternary alluvium Moderate	FCFP – any fragments
Switching station	Jurassic dolerite	No action

In Summary:

Project 1: A 400kV Main Transmission Substation (MTS)

No impacts to heritage resources anticipated on condition that the Chance Fossil Finds Procedure is implemented

Project 2: Loop in Loop Out (LILO) lines connecting the new MTS to an existing 400kV power line

No impacts to heritage resources anticipated on condition that the Chance Fossil Finds Procedure is implemented

Project 3: A power line that connect the Wag 'n Bietjie MTS and the Vetlaagte MTS with 200m corridor

No impacts to heritage resources anticipated on condition that the Chance Fossil Finds Procedure is implemented

Table 3.1: Impacts of the proposed development to archaeological resources

Impact Description: It is possible that significant archaeological resources may be impacted by the proposed development

Cumulative Impact Description: Destruction or negative impact to significant archaeological heritage

Mitigation:

- Alternative 1 is preferred
- A no-go development buffer of 30m is implemented around Site 004 and a no-go development buffer of 100m is implemented around Site 014. These sites and their respective buffers should be indicated on site development maps during the construction phase of the project. Furthermore, during the operational phase of the projects, relevant staff of the facility should be made aware of these sites and proper training provided regarding appropriate behaviour at archaeological sites.

Impact Assessment

Name of Impact	Extent	Duration	Probability	Reversibility of impact	Significance without mitigation	Significance after mitigation
26 archaeological sites of low scientific significance were identified within the area proposed for development. Two heritage resources of significance were identified and may be impacted.	Limited to the development footprint	Where manifest, the impact will be permanent	It is possible that significant archaeological resources will be impacted	Any impacts to heritage resources that do occur are irreversible	Moderate	Low

Impact on Irreplaceable Resources (*after* mitigation) - No

Should Alternative 2 be implemented, and should the location of Alternative 2 not be adjustable, a specialist archaeologist must be contracted at the cost of the developer to apply for a permit from SAHRA for the scientific excavation of Site 014. The excavation and analysis of the material from this site must be completed to scientific standards at the cost of the developer.

Cumulative impact rating (*after* mitigation) - Low

Table 3.2: Impacts of the proposed development to palaeontological resources

Impact Description: It is possible that significant palaeontological resources may be impacted by the proposed development

Cumulative Impact Description: Destruction or negative impact to significant palaeontological heritage

Mitigation:

- The attached Chance Fossil Finds procedure must be implemented during the course of construction activities

Impact Assessment

Name of Impact	Extent	Duration	Probability	Reversibility of impact	Significance without mitigation	Significance after mitigation
According to the SAHRIS Palaeosensitivity Map, the area proposed for development is underlain by sediments that have high and very high palaeontological sensitivity.	Limited to the development footprint	Where manifest, the impact will be permanent	It is possible that significant fossil resources will be impacted	Any impacts to heritage resources that do occur are irreversible	Moderate	Low

Impact on Irreplaceable Resources (*after* mitigation) - No

Cumulative impact rating (*after* mitigation) - Low

5.2 Sustainable Social and Economic Benefit

This proposed development is intended to support the approved Wag n Bietjie PV Facilities and as such, the findings of the SIA conducted for the PV Facilities in 2011 is relevant here. The SIA (2011) indicates that the development of the proposed PV facility will create employment and business opportunities for locals during both the construction and operational phase of the project. The mitigation measures listed in the report should be implemented in order to enhance these positive impacts. In addition, the proposed establishment of a number of solar energy facilities near De Aar will create socio-economic opportunities for the town, which, in turn, will result in a positive social benefit. These benefits will assist to offset the negative impacts on the town of De Aar associated with the reduction in rail traffic in South Africa over the last 10-15 years. The significance of this impact is rated as High Positive.

ACED Renewables De Aar, in consultation with the Emthanjeni Municipality, has established a Community Trust that is linked to other proposed solar energy projects in the area. The revenue for the trust would be derived from the income generated from the sale of energy. The Community Trust is linked to funding and supporting projects and initiatives identified in the Emthanjeni IDP. The proposed development also represents an investment in clean, renewable energy infrastructure, which, given the challenges created by climate change, represents a positive social benefit for society as a whole. The establishment of the proposed PV facility is therefore supported by the findings of the SIA.

As such, the identified socio-economic benefits to be derived from this project outweigh the anticipated negative impacts to heritage resources identified in this report.

5.3 Proposed development alternatives

According to the developer, Alternative 2 is not the preferred alternative for the following reasons:

- Rocky outcrops on the footprint area will limit micro-siting adjustments
- Limited space for line routes to connect from Pixley Park projects on the East side of the MTS

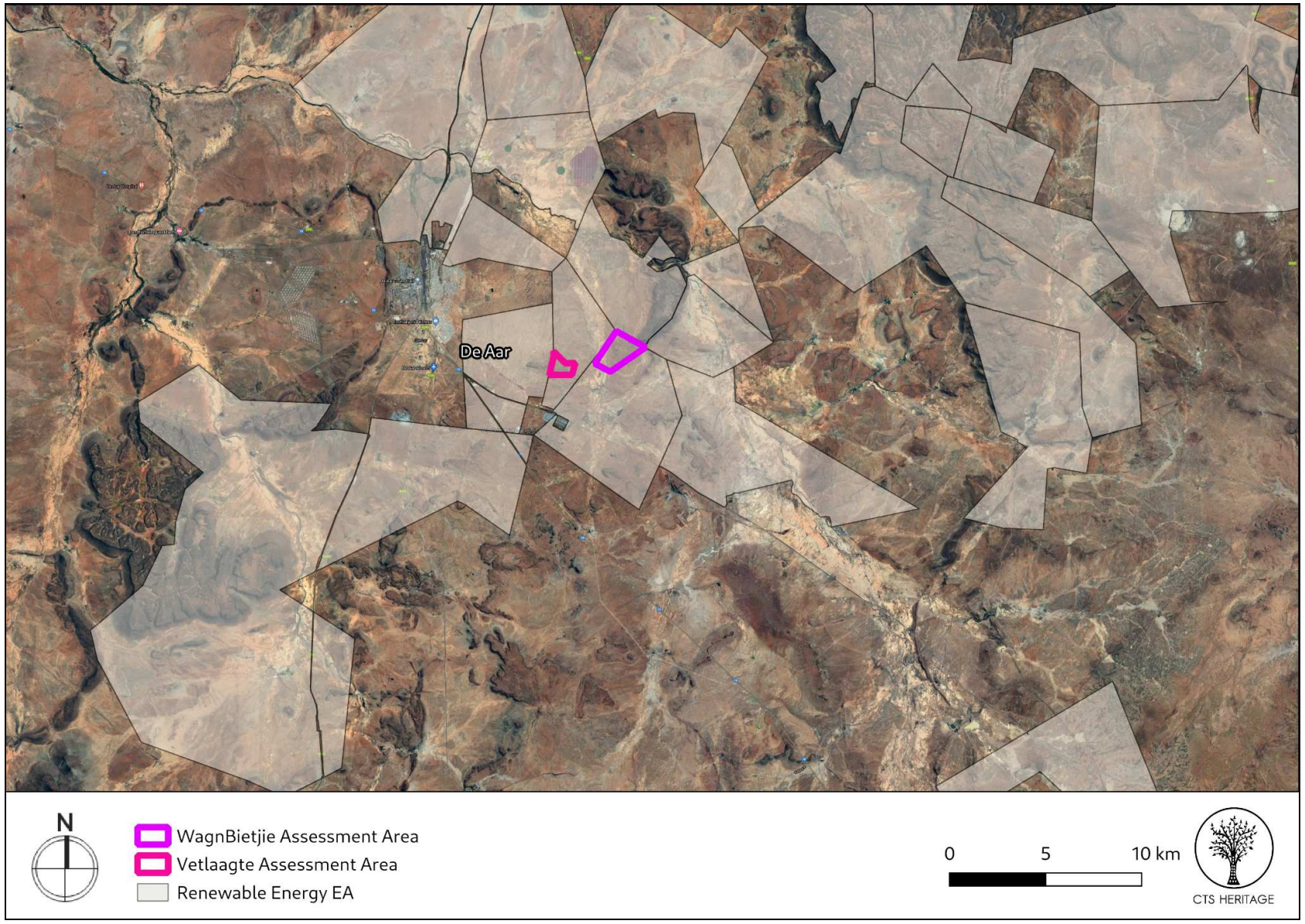
Furthermore, Alternative 2 is located within the recommended no-go area around Site 014 and as such, Alternative 2 is not preferred from a heritage perspective.

Should Alternative 2 be implemented, and should the location of Alternative 2 not be adjustable, a specialist archaeologist must be contracted at the cost of the developer to apply for a permit from SAHRA for the scientific excavation of Site 014. The excavation and analysis of the material from this site must be completed to scientific standards at the cost of the developer.

There are no alternative power line routes. The route of the line where it connects to the Vetlaagte MTS will however be determined by the position of the Vetlaagte MTS.

5.4 Cumulative Impacts

The proposed infrastructure is located within a belt of approved renewable energy facilities (Map 5) located outside of De Aar. Furthermore, there are already 7 approved PV facilities located on the property and its immediate neighbour. 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 culturally significant landscape. The proposed development is therefore unlikely to result in unacceptable risk or loss, nor will the proposed development result in a complete change to the sense of place of the area or result in an unacceptable increase in impact due to its location as one of many renewable energy facilities in this area.



Map 5: Map indicating the location of authorised renewable energy facilities in proximity to the proposed development

6. RESULTS OF PUBLIC CONSULTATION

The public consultation process will be undertaken by the EAP during the EIA. No heritage-related comments have been received to-date. SAHRA is required to comment on this HIA and make recommendations prior to the granting of the Environmental Authorisation.

7. CONCLUSION

The overall archaeological sensitivity of the development area with regard to the preservation of Early, Middle and Later Stone Age archaeology as well as Khoe and San heritage, early colonial settlement is regarded as very high. Despite this, the field assessment conducted for this project has demonstrated that the specific area proposed for development has low sensitivity for impacts to significant archaeological heritage.

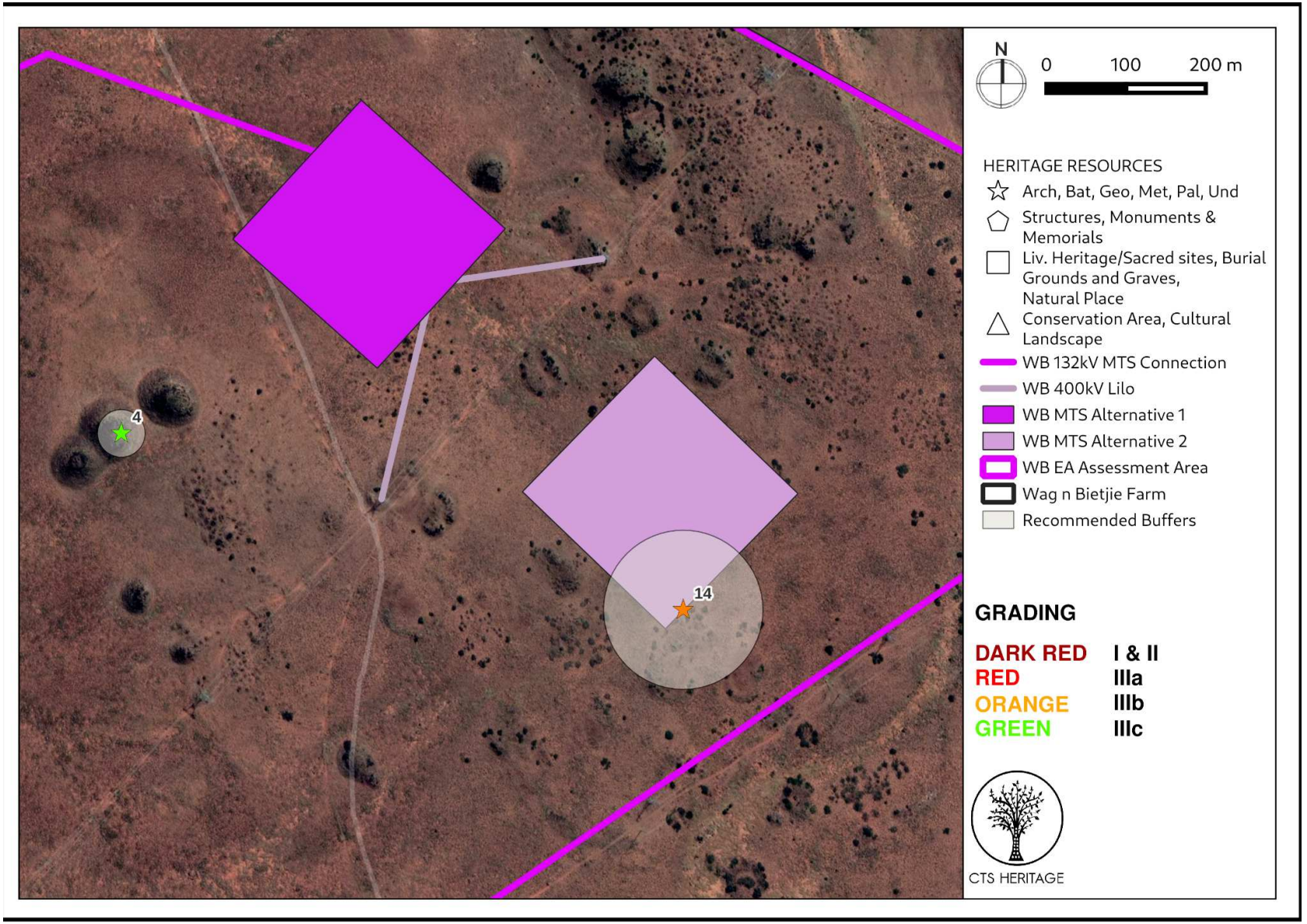
Two archaeological sites of significance were identified in the field assessment, Site 004, graded IIIC and 014, graded IIIB. In order to ensure that the sites are not negatively impacted by the proposed development, it is recommended that a no-go development buffer of 30m is implemented around Site 004 and a no-go development buffer of 100m is implemented around Site 014. These sites and their respective buffers should be indicated on site development maps during the construction phase of the project. Furthermore, during the operational phase of the projects, relevant staff of the facility should be made aware of these sites and proper training provided regarding appropriate behaviour at archaeological sites.

Based on experience, other reports and the lack of any significant previously recorded fossils from the area, it is unlikely that any fossils would be preserved in the Tierberg Formation or Adelaide Subgroup. Nonetheless, a Fossil Chance Find Protocol should be added to the EMPr.

8. RECOMMENDATIONS

There is no objection to the proposed development in terms of impacts to heritage resources on condition that:

- Alternative 1 for the MTS is preferred from a heritage perspective
- A no-go development buffer of 30m is implemented around Site 004 and a no-go development buffer of 100m is implemented around Site 014. These sites and their respective buffers should be indicated on site development maps during the construction phase of the project. Furthermore, during the operational phase of the projects, relevant staff of the facility should be made aware of these sites and proper training provided regarding appropriate behaviour at archaeological sites.
- The attached Chance Fossil Finds Procedure is 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.



Map 6: Recommended Buffers

9. REFERENCES

Heritage Impact Assessments				
NID	**Author(s)**	**Date**	**Type**	**Title**
104574	Heritage Scoping	Wouter Fourie	10/10/2012	Heritage Scoping Report for the Proposed Wind Farm Facility for Renosterberg Wind Energy Company (RWEC) near Petrusville, Northern Cape Province
104576	Heritage Scoping	Wouter Fourie	10/10/2012	Heritage Scoping Report for the Proposed Solar PV Facility for Renosterberg Wind Energy Company (RWEC) near Petrusville, Northern Cape Province
104804	PIA Desktop	John E Almond	01/09/2012	Palaeontological specialist assessment: desktop study PROPOSED RENOSTERBERG SOLAR PV AND WIND ENERGY FACILITIES NEAR DE AAR, NORTHERN CAPE PROVINCE
133138	HIA Phase 1	Jayson Orton, Lita Webley	09/07/2013	HERITAGE IMPACT ASSESSMENT FOR MULTIPLE PROPOSED SOLAR ENERGY FACILITIES
133536	Palaeontological Specialist Reports	John E Almond	01/07/2013	PALAEONTOLOGICAL SPECIALIST STUDY
133536	Palaeontological Specialist Reports	John E Almond	01/07/2013	PALAEONTOLOGICAL SPECIALIST STUDY
163982	Palaeontological Specialist Reports		31/08/2013	Palaeontological specialist assessment: combined desktop and field study: Proposed development PV Solar Facility near De Aar, Northern CApe Province
163994		Wouter Fourie	03/08/2013	Proposed PV Facility: Heritage Impact Report
177599	AIA Phase 1	Jonathan Kaplan	01/04/2010	ARCHAEOLOGICAL IMPACT ASSESSMENT PROPOSED PHOTOVOLTAIC POWER GENERATION FACILITY IN DE AAR NORTHERN CAPE
177600	Site Inspection Report	Will Archer, Jonathan Kaplan	01/05/2012	Reconnaissance and plan for further mitigation: sites impacted on by proposed photovoltaic power generation facility in De Aar Northern Cape
256408	Palaeontological Specialist Reports	John E Almond	16/07/2013	Palaeontological Specialist Study: Combined Desktop and Field-based Assessments - Proposed Photovoltaic (Solar) Energy Facilities on Badenhorst Dam Farm near De Aar, Northern Cape

256413	Heritage Impact Assessment Specialist Reports	Jayson Orton	09/07/2013	Heritage Impact Assessment for Multiple Proposed Solar Energy Facilities on De Aar 180/1 (Badenhorst Dam Farm), De Aar, Northern Cape
339820	Heritage Impact Assessment Specialist Reports	Lita Webley, Jayson Orton	01/12/2011	Proposed De Aar Wind Energy Facility on the North and South Plateau, Northern Cape Province
339824	Heritage Impact Assessment Specialist Reports	Lita Webley, David Halkett	01/06/2015	Addendum: Proposed Wind Energy Facility situated on the Eastern plateau (South) near De Aar, Northern Cape Province.
4052	HIA Phase 1	Albert van Jaarsveld	01/03/2006	Hydra-Perseus and Beta-Perseus 765 kV Transmission Power Lines Environmental Impact Assessment. Impact on Cultural Heritage Resources
49745	AIA Phase 1	Neels Kruger	01/03/2012	ARCHAEOLOGICAL IMPACT ASSESSMENT (AIA) OF DEMARCATED SURFACE AREAS ON THE OF THE FARM VETLAAGTE 4, DE AAR, NORTHERN CAPE PROVINCE
49843	PIA Phase 1	John E Almond	01/05/2012	PALAEONTOLOGICAL SPECIALIST STUDY: COMBINED DESKTOP AND FIELD-BASED ASSESSMENTS Proposed solar power generation facilities on the remaining extent of the farm Vetlaagte No. 4, De Aar, Northern Cape Province
50006	HIA Phase 1	Jayson Orton	20/02/2012	HERITAGE IMPACT ASSESSMENT FOR THREE SOLAR ENERGY FACILITIES AT DE AAR, WESTERN CAPE
53198	HIA Phase 1	Elize Becker	20/04/2012	Phase 2 Heritage Impact Assessment De Aar Solar One Photovoltaic Power Project Heritage Impact Assessment Phase 2
53200	Heritage Scoping	Elize Becker	18/01/2012	HERITAGE IMPACT ASSESSMENT SCOPING REPORT Prepared for De Aar Solar One Photovoltaic Power Plant, Nothern Cape
58989	PIA Desktop	James Brink	10/08/2012	A Palaeontological Desktop Study of the Area to be Affected by the Proposed Photovoltaic Power Project on Portion 3 of Farm Hartebeestplaats 135
8378	HIA Phase 1	Jayson Orton	29/02/2012	HIA for three solar energy facilties at the De Aar, Northern Cape (Paarde Valley, Badenhorst Dam Farm and Annex Du Plessis Dam Farm)
89361	HIA Phase 1	Neels Kruger	01/03/2012	ENNEX DEVELOPMENTS: PROPOSED ESTABLISHMENT OF A SOLAR ENERGY FACILITY NEAR DE AAR, NORTHERN CAPE PROVINCE Phase 1 Archaeological Impact Assessment Report

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APPENDICES

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APPENDIX 1: Heritage Screening Assessment (2021)

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APPENDIX 2: Archaeological Assessment (2021)

APPENDIX 3: Palaeontological Assessment (2016)

APPENDIX 4: Chance Fossil Finds Procedure