

HERITAGE IMPACT ASSESSMENT

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

PROPOSED MAYOGI SOLAR PHOTOVOLTAIC (PV) RENEWABLE ENERGY FACILITY NEAR KIRKWOOD, EASTERN CAPE

Prepared by CTS Heritage



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For
SIVEST

July 2023



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EXECUTIVE SUMMARY

1. Site Name:

Mayogi PV Solar Energy Facility

2. Location:

Adjacent to the R75 approximately 13km south-west of Kirkwood, Easter Cape Province.

3. Locality Plan:

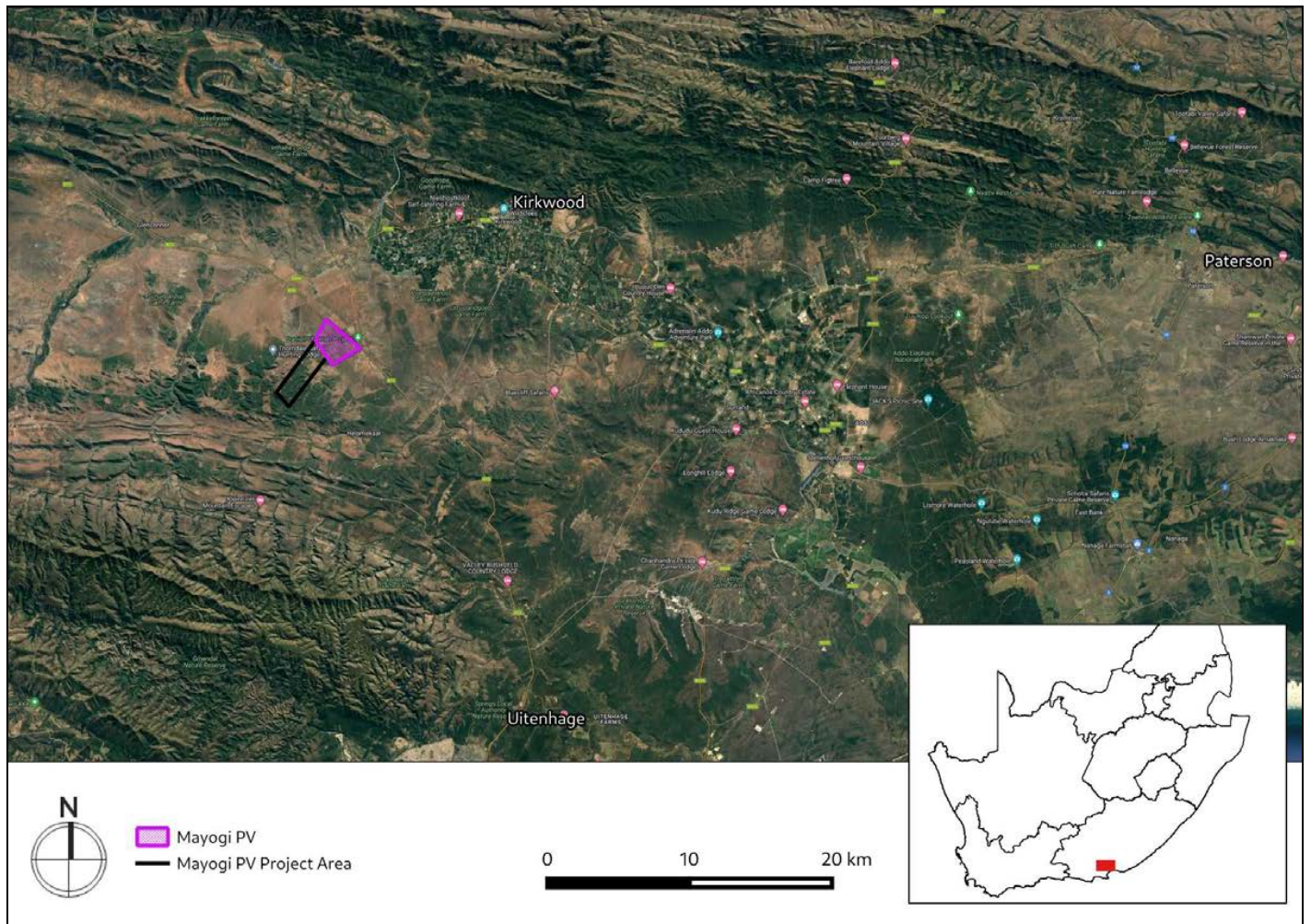


Figure A: Location of the proposed development area

4. Description of Proposed Development:

JUWI is proposing to develop 2 x PV facilities and associated infrastructure on Farm No. 692 adjacent to the R75 approximately 13km southwest of Kirkwood. The site is located in the Sundays River Valley Municipality in the Sarah Baartman District Municipality of the Eastern Cape.



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Farm No. 692 (hereafter referred to as the property) is located adjacent to the R75 approximately 13km south-west of Kirkwood, Eastern Cape Province. The Skilpad Substation is located within the property. The intention is to develop one or more PV facilities and associated infrastructure on the property, depending on site sensitivities. The associated infrastructure would include a BESS, site camp, substation and OHL, and O&M building. Based on the site visit and desktop analysis, the focus area for PV development is the northern section of the property.

5. Anticipated Impacts on Heritage Resources:

The previous heritage studies that have been conducted in the broader area have identified isolated and scattered artefacts of the Early, Middle and Later Stone Age (Binneman, 2010; NID 7159). The findings of this assessment corroborate the characterisation of the area made by other specialists.

The field survey identified a number of isolated artefacts, none of which are dense enough to be considered an archaeological site. None of the archaeological observations made have sufficient scientific value to warrant their retention and as such, have been graded as Not Conservation-Worthy. The recording of their presence in this report is considered sufficient.

A Medium Palaeontological Significance has been allocated to the Mayogi PV development. It is therefore considered that the proposed development will not lead to damaging impacts on the palaeontological resources of the area. The construction of the development may thus be permitted in its whole extent, as the development footprint is not considered sensitive in terms of palaeontological resources.

Based on the outcomes of this assessment, it is unlikely that the proposed development will negatively impact on significant archaeological, palaeontological or cultural heritage resources.

6. Recommendations:

Based on the outcomes of this report, it is not anticipated that the proposed development will negatively impact on significant heritage resources on condition that:

- The ECO for this project must be informed that the Kirkwood Formation of the Uitenhage Group has a Very High Palaeontological Sensitivity.
- If Palaeontological Heritage is uncovered during surface clearing and excavations the Chance find Protocol attached should be implemented immediately. Fossil discoveries ought to be protected and the ECO/site manager must report to South African Heritage Resources Agency (SAHRA) (Contact details: Eastern Cape Provincial Heritage Resources Authority (ECPHRA), 16 Commissioner Street, East London,



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5201, South Africa. Tel: 043 745 0888. Fax: 043 745 0889., email: info@ecphra.org.za; Web: <https://www.ecphra.org.za/>) so that mitigation (recording and collection) can be carried out.

- Before any fossil material can be collected from the development site the specialist involved would need to apply for a collection permit from SAHRA. Fossil material must be housed in an official collection (museum or university), while all reports and fieldwork should meet the minimum standards for palaeontological impact studies proposed by SAHRA (2012).
- Although all possible care has been taken to identify sites of cultural importance during the investigation of the study area, it is always possible that hidden or subsurface sites could be overlooked during the assessment. If any evidence of archaeological sites or remains (e.g. remnants of stone-made structures, indigenous ceramics, bones, stone artefacts, ostrich eggshell fragments, charcoal and ash concentrations), fossils, burials or other categories of heritage resources are found during the proposed development, work must cease in the vicinity of the find and ECPHRA must be alerted immediately to determine an appropriate way forward.



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Details of Specialist who prepared the HIA

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

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

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



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NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 (ACT NO. 107 OF 1998) AND ENVIRONMENTAL IMPACT REGULATIONS, 2014 (AS AMENDED) - REQUIREMENTS FOR SPECIALIST REPORTS (APPENDIX 6)

Regulation GNR 326 of 4 December 2014, as amended 7 April 2017, Appendix 6	Section of Report
<p>1. (1) A specialist report prepared in terms of these Regulations must contain-</p> <ol style="list-style-type: none"> 1. details of- 1. the specialist who prepared the report; and 2. the expertise of that specialist to compile a specialist report including a curriculum vitae; 	Page 4
<p>2. a declaration that the specialist is independent in a form as may be specified by the competent authority;</p>	Appendix 4
<p>3. an indication of the scope of, and the purpose for which, the report was prepared;</p>	Section 2
<p>(cA) an indication of the quality and age of base data used for the specialist report;</p>	Section 2
<p>(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;</p>	Section 5
<p>4. the date and season of the site investigation and the relevance of the season to the outcome of the assessment;</p>	Section 2
<p>5. a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;</p>	Section 2
<p>6. details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives;</p>	Section 5
<p>7. an identification of any areas to be avoided, including buffers;</p>	Section 5
<p>8. a map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;</p>	Section 5



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<p>9. a description of any assumptions made and any uncertainties or gaps in knowledge;</p>	<p>Section 2</p>
<p>10. a description of the findings and potential implications of such findings on the impact of the proposed activity, (including identified alternatives on the environment) or activities;</p>	<p>Section 5</p>
<p>11. any mitigation measures for inclusion in the EMPr;</p>	<p>Section 8</p>
<p>12. any conditions for inclusion in the environmental authorisation;</p>	<p>Section 8</p>
<p>13. any monitoring requirements for inclusion in the EMPr or environmental authorisation;</p>	<p>Section 8</p>
<p>14. a reasoned opinion-</p> <p>1. (as to) whether the proposed activity, activities or portions thereof should be authorised;</p> <p style="padding-left: 40px;">(iA) regarding the acceptability of the proposed activity or activities; and</p> <p>2. if the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan;</p>	<p>Section 7</p>
<p>15. a description of any consultation process that was undertaken during the course of preparing the specialist report;</p>	<p>Section 6</p>
<p>16. a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and</p>	<p>Section 6</p>
<p>17. any other information requested by the competent authority.</p>	<p>NA</p>
<p>2) Where a government notice <i>gazetted</i> by the Minister provides for any protocol or minimum information requirement to be applied to a specialist report, the requirements as indicated in such notice will apply.</p>	<p>Compliance with Section 38(3) of the NHRA</p>



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1. INTRODUCTION

1.1 Background Information on Project

JUWI is proposing to develop 2 x PV facilities and associated infrastructure on Farm No. 692 adjacent to the R75 approximately 13km southwest of Kirkwood. The site is located in the Sundays River Valley Municipality in the Sarah Baartman District Municipality of the Eastern Cape.

Farm No. 692 (hereafter referred to as the property) is located adjacent to the R75 approximately 13km south-west of Kirkwood, Easter Cape Province. The Skilpad Substation is located within the property. The intention is to develop one or more PV facilities and associated infrastructure on the property, depending on site sensitivities. The associated infrastructure would include a BESS, site camp, substation and OHL, and O&M building. Based on the site visit and desktop analysis, the focus area for PV development is the northern section of the property.

Table 1: Project Details

TECHNICAL DETAILS	
PV panels	<p>Structure height</p> <ul style="list-style-type: none"> ▪ Solar panels with a maximum height of 5m above the ground <p>Structure orientation Fixed tilt or tracking:</p> <ul style="list-style-type: none"> ▪ Fixed tilt: North-facing at a defined angle of tilt. ▪ Or panels will either be fixed to a single-axis horizontal tracking structure where the orientation of the panel varies according to the time of the day, as the sun moves from east to west; or tilted at a fixed angle equivalent to the latitude at which the site is located in order to capture the most sun. ▪ Crystalline silicon or thin film technology (To be determined at later stage) <p>Dimensions of Panel:</p> <ul style="list-style-type: none"> ▪ Width (in m) of PV panels: 2,278m ▪ Height (in m) of PV panels: 1,134m
Access roads	<ul style="list-style-type: none"> ▪ Width of internal roads: approximately 6 m with an additional 2 m drainage on each site if necessary. ▪ Existing roads will be utilised as far as reasonably possible. ▪ Site Access: existing access roads may need to be upgraded by approximately 450m x 6m.
On-site Substation	<ul style="list-style-type: none"> ▪ Two substations are proposed with a maximum capacity of 33/132kV. ▪ Maximum height of on-site substation: approximately 3-4 m ▪ The substation area is max. 1 ha including a building for switching, measurement and control units, a high voltage transformer and high voltage overhead-lines connecting the transformer to the 132 kV grid line that is close to the site. ▪ On site, there will be around 15-20 container-sized transformer stations (12192*2896*2438 mm; W*H*D) that step up the low voltage coming from the inverters to 33 kV medium voltage.



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<p>Construction camp</p>	<ul style="list-style-type: none"> ▪ 1 x Construction camp will be required per PV, ▪ Offices and other buildings with toilets including septic tank and infrastructure, will used during the construction phase. ▪ Around 10 40ft container, in total <0,1 ha
<p>Temporary construction laydown / staging area</p>	<ul style="list-style-type: none"> ▪ Temporary Laydown Area: up to approximately 2 ha. ▪ Locations: refer attached KMZ ▪ Footprint up to 0.1 ha (around 0.03- 0.08ha)
<p>On-site IPP Electrical infrastructure</p>	<ul style="list-style-type: none"> ▪ The proposed project will include one on-site IPP substation. ▪ Planned size: 2ha <ul style="list-style-type: none"> - 1ha for Substation - 1ha for battery storage ▪ Substation area: One building that will include: <ul style="list-style-type: none"> - Office/control room (~50m²); - MV switchgear room (~100m²) ▪ Substation yard will include: <ul style="list-style-type: none"> - High voltage transformer and high voltage overhead-lines connecting the transformer to the existing Eskom 132 kV grid line via an approximately 200m long underground cable. This area will include construction laydown area, construction camp facilities and storage area, in the beginning. ▪ Medium voltage cabling will link PV facility to grid connection infrastructure ▪ Internal underground lines of up to 33 kV (22kV or 33kV). ▪ <i>Cables will be laid underground wherever technically feasible, with overhead 33kV lines grouping PV areas to crossing valleys and ridges to get to the on-site substation.</i>
<p>Fencing</p>	<ul style="list-style-type: none"> ▪ Type: proposed galvanized metal mesh. ▪ Length: 16km ▪ Height: Up to 2m
<p>Proximity to grid connection</p>	<p>Skilpad substation is adjacent to the site.</p> <p><u>Starting point:</u></p> <ul style="list-style-type: none"> ▪ PV Panel Array - To produce up to 75MW each, the proposed facility will require numerous linked PV panels connected in series, which will form solar PV arrays that will comprise the PV facility. ▪ The PV array will be wired to central inverters. The inverter is a MPPT (Maximum Power Point Tracking) inverter that converts direct current (DC) electricity to alternating current (AC) electricity at grid frequency. <p><u>Connection to the grid:</u></p> <ul style="list-style-type: none"> ▪ Connecting the array to the electrical grid requires transformation of the voltage from LV voltage to 33kV to 132kV. The normal components and dimensions of a distribution rated electrical substation will be required. Output voltage from the inverter is LV AC and this is fed into step up transformers to 33kV. From the inverter transformer an RMU is used to connect to the onsite substation ▪ The onsite substation will be required on the site to step the voltage from 33kV up to 132kV. After which the power will be evacuated into the national grid. ▪ A switching substation (and associated infrastructure) will be positioned close to the Eskom substation ▪ The metering point will be at the point of connection from the IPP substation side into the Eskom Switching Station.



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	<ul style="list-style-type: none"> ▪ Please refer to the layout map for the position of the substation.
Boreholes and storage tanks (if applicable)	<ul style="list-style-type: none"> ▪ Water will be either extracted from the borehole within the property or purchased from the neighboring farm with access to the river. ▪ Water from the borehole is used to irrigate the land. Meaning good flow rate is available. ▪ 2,5/5/10 Kl storage tanks ▪ During construction and O&M – mostly above ground tanks; 2 or 3 with 5kl or 10kl volume, close to O&M buildings normally <p>For PV Farm:</p> <ul style="list-style-type: none"> ▪ Planned size project of 100- 150 MW PV (in total for both PVs) ▪ The plant will require an estimated amount per year ▪ During construction: 1.5 to 2 years. Estimated 40 Megalitres per year <ul style="list-style-type: none"> o Road construction and compaction o Concrete batching for PV mounting structures foundation o Dust suppressions of the internal roads o Provision of portable water for staff needs (if it can be used) ▪ During Operation and Maintenance: 15 to 25 years. Estimated 7 Megalitres per year <ul style="list-style-type: none"> o Dust suppression of the internal roads o PV panel washing o Office building use (eg. Toilets and washbasins)
Battery Energy Storage Systems	<ul style="list-style-type: none"> ▪ It will depend on future off takers requirements and the size may vary. ▪ Provision of 1ha footprint will be kept on plan ▪ Redox flow or solid state battery electrolytes -Lithium technology to be catered for.
Estimated number of employment opportunities generated by each PV project	<ul style="list-style-type: none"> ▪ Expected Work force: During construction and O&M, based on 80MW PV plant. ▪ Construction: 350 – 700 during the 1,5 to 2 years of construction. 60-70% could possibly be locals. This includes Skilled, semi-skilled and unskilled workers ▪ O&M: 25 - 30 people during the 15 to 25 years of operation. 4-5 skilled workers and 16 – 25 un/semi-skilled workers, depending on contracts. ▪ This “Mayogi PV” project will still evolve over time and size may shrink due to clients/contracts/environmental factors. And for interest – Wind farm of 20 turbines would also take 1,5 to 2,5 years to complete with 250 – 350 workers employed during construction.



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1.2 Description of Property and Affected Environment

The proposed Mayogi solar PV facility lies about 20km southwest of Kirkwood in the Eastern Cape on the southwestern side of the R75 road that continues onto Kariega (formerly Uitenhage) another 30km further south. The development area is generally flat to undulating in the northern section closest to the R75 while the property narrows into a wedge to the south and becomes hilly and thickly vegetated by Albany thicket (spekboom, Euphorbia, aloes etc). The northern area has been earmarked as the preferred location of the solar PV facilities and is currently used for game farming of buffalo, zebra, ostriches and various antelope species. The terrain and grazing of cattle and game in the northern portion has left this section far less vegetated than the southern end.

The farm is part of Steenbokvlakte that has since been subdivided into various smaller farms and commercial businesses such as the Mayogi Wildstal farmstall and Daniell Cheetah Project just opposite the study area on the northeastern side of the R75. The Skilpad substation is located in the northeastern corner of the study area. An existing cluster of about 12 wooden game lodge tourism accommodation units lies midway near the western boundary of the southern section of the property which is very much in keeping with the large number of game viewing and hunting lodges that are located in the general area between Kariega, Kirkwood and Addo Elephant National Park.



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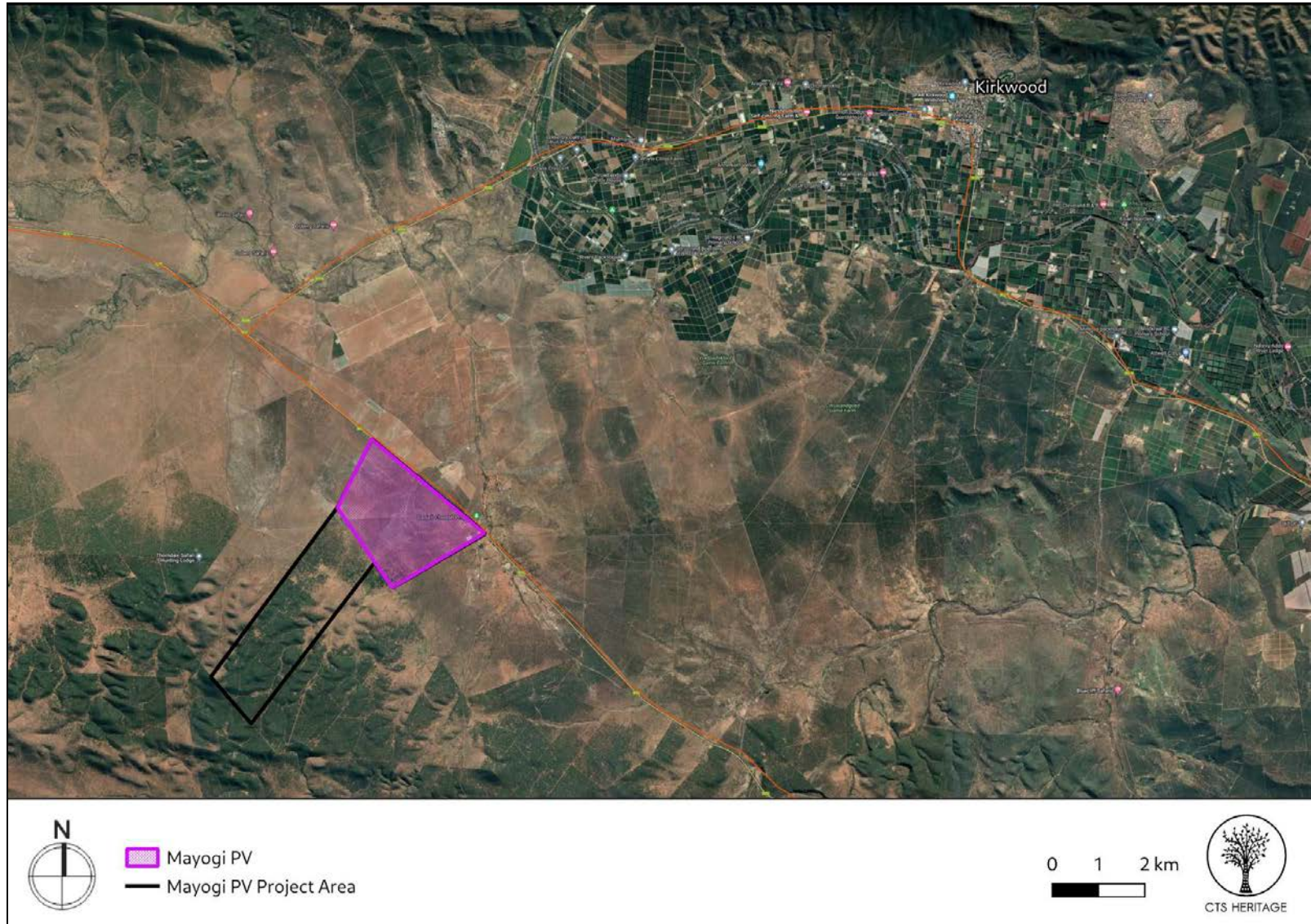


Figure 11: The proposed development layout of the Solar PV Facilities

Cedar Tower Services (Pty) Ltd t/a CTS Heritage
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Email info@ctsheritage.com Web <http://www.ctsheritage.com>



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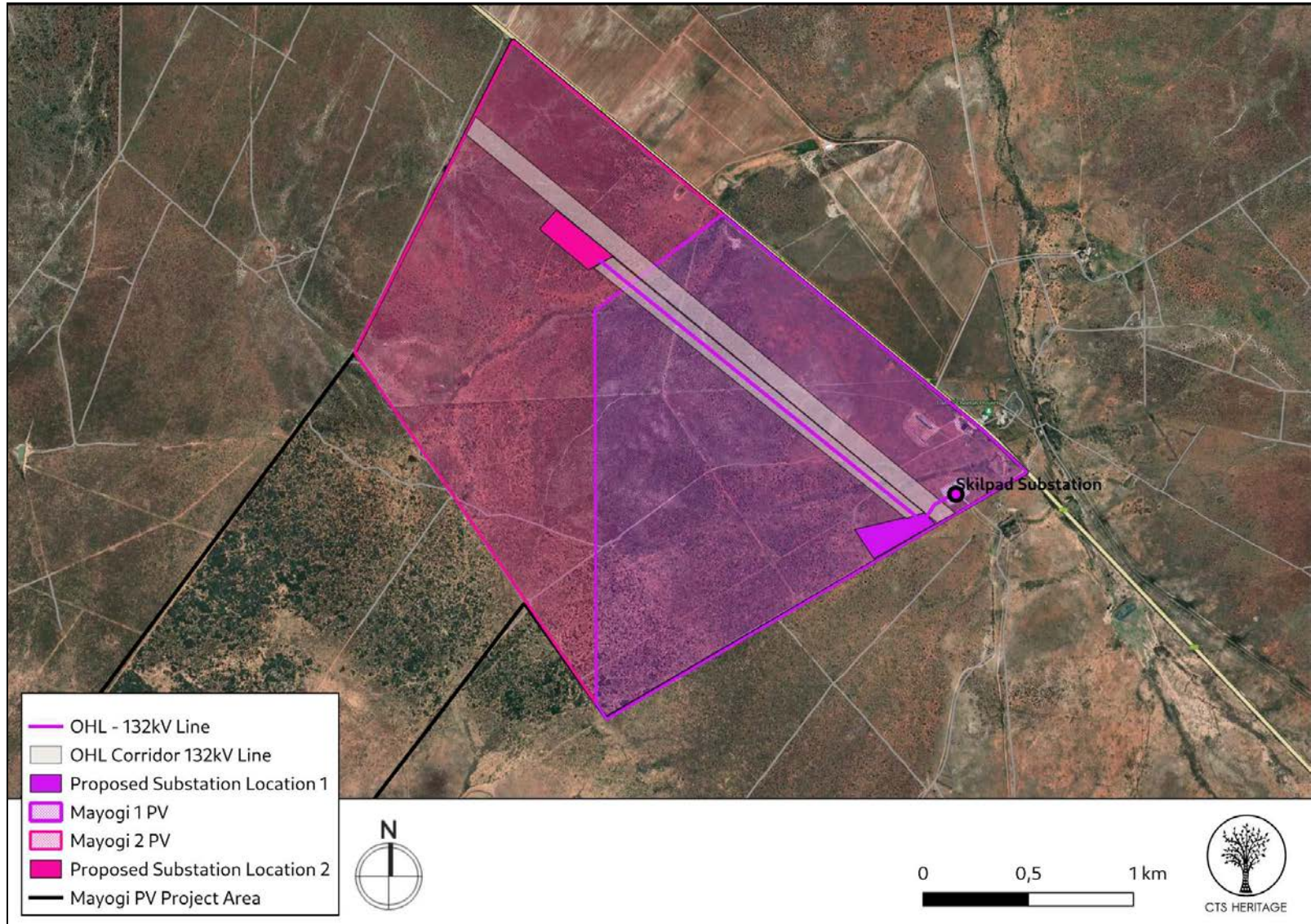


Figure 1.2: The proposed development layout of the Solar PV Facilities

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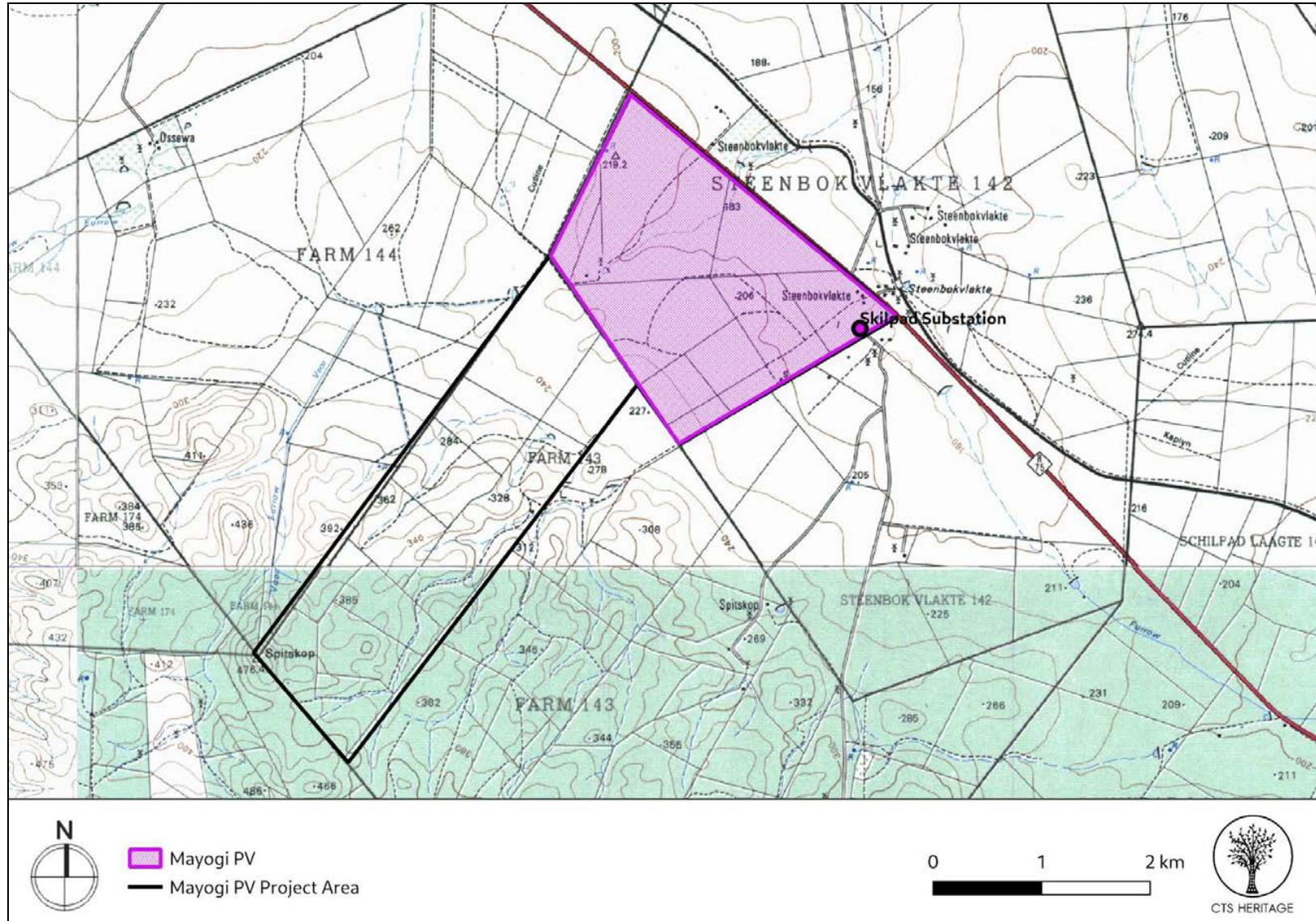


Figure 1.3: The proposed development layout of the PV Facilities on an extract of the 1:50 000 Topo Map

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2. METHODOLOGY

2.1 Purpose of HIA

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

2.2 Summary of steps followed

- A Desktop Study was conducted of relevant reports previously written (please see the reference list for the age and nature of the reports used)
- An archaeologist conducted an assessment of archaeological resources likely to be disturbed by the proposed development. The archaeologists conducted their site visit from 15 to 16 November 2022
- A palaeontologist conducted a field assessment of palaeontological resources likely to be disturbed by the proposed development on 20 January 2023.
- The identified resources were assessed to evaluate their heritage significance and impacts to these resources were assessed.
- Alternatives and mitigation options were discussed with the Environmental Assessment Practitioner

2.3 Assumptions and uncertainties

- The *significance* of the sites and artefacts is determined by means of their historical, social, aesthetic, technological and scientific value in relation to their uniqueness, condition of preservation and research potential. It must be kept in mind that the various aspects are not mutually exclusive, and that the evaluation of any site is done with reference to any number of these.
- It should be noted that archaeological and palaeontological deposits often occur below ground level. Should artefacts or skeletal material be revealed at the site during construction, such activities should be halted, and it would be required that the heritage consultants are notified for an investigation and evaluation of the find(s) to take place.

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

2.4 Constraints & Limitations

The northern zone was relatively easier to survey as the terrain is level to undulating with only grassland and patches of Albany thicket present. The southern section is hilly throughout and was very densely vegetated by Albany thicket. It was only possible to traverse this area using the existing farm tracks that crisscross the



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southern section while the northern area was covered on foot and by mountain bike. In sampling the archaeological sensitivity of the area it was clear that the flatter ground to the north held more material than the hilly ground to the south. However, should development take place in the southern area it is possible that archaeological material would be revealed by vegetation clearing. We therefore have a reasonable level of confidence in the heritage sensitivities present in the northern section of the study area with only a moderate degree of coverage in the southern section due to the impenetrable vegetation cover.

2.5 SIVEST Impact Assessment Methodology

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

2.5.1 Determination of Significance of Impacts

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

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

2.5.2 Impact Rating System

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

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

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



Rating System Used to Classify Impacts

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

Table 1: Rating of impacts criteria

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



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



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Significance = (Extent + probability + reversibility + irreplaceability + duration) x magnitude/intensity.

The summation of the different criteria will produce a non-weighted value. By multiplying this value with the magnitude/intensity, the resultant value acquires a weighted characteristic which can be measured and assigned a significance rating.

Points	Impact Significance Rating	Description
5 to 23	Negative Low impact	The anticipated impact will have negligible negative effects and will require little to no mitigation.
5 to 23	Positive Low impact	The anticipated impact will have minor positive effects.
24 to 42	Negative Medium impact	The anticipated impact will have moderate negative effects and will require moderate mitigation measures.
24 to 42	Positive Medium impact	The anticipated impact will have moderate positive effects.
43 to 61	Negative High impact	The anticipated impact will have significant effects and will require significant mitigation measures to achieve an acceptable level of impact.
43 to 61	Positive High impact	The anticipated impact will have significant positive effects.
62 to 80	Negative Very high impact	The anticipated impact will have highly significant effects and are unlikely to be able to be mitigated adequately. These impacts could be considered "fatal flaws".
62 to 80	Positive Very high impact	The anticipated impact will have highly significant positive effects.



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3. HISTORY AND EVOLUTION OF THE SITE AND CONTEXT

3.1 Desktop Assessment

Background:

This application is for the proposed development of a PV facility and its grid collection on the south side of the R75 approximately 10km from Kirkwood and the Sunday's River Valley.

Cultural landscape and the Built Environment

At the beginning of the 19th century, the Sundays River formed the eastern border of the then Cape Colony. The broader area around Kirkwood was consequently the scene of many armed conflicts - Khoi against Xhosa, Khoi and Xhosa together against the Boers and British together and finally the Boers against the British during the Second Anglo-Boer War. Historic period remains are also found in the area, with early farmhouses, churches and several farm burial grounds having been noted, ranging from formal, enclosed graves to informal stone-packed burial mounds (Van Ryneveld 2016, NID 374575).

The Sundays River Valley irrigation scheme was started in the early 1920s, targeting British settlers on small holdings (10 morgen in size) along the banks of the Sundays River. A large dam was constructed on the Sundays River (Lake Mentz) to supply the area with water for irrigation, and a canal system was put in place to supply water to farms from Kirkwood, at the upper end of the valley, to Addo at the lower end.

Importantly, the ACO (2014) noted that the broader context within which this development occurs has high levels of cultural landscape significance. As noted in ACO (2014), "The construction of a major transmission line (Eskom's 765 kW Gamma-Grassridge) has been approved but not yet built. It will cross the western side of the study area through Soutpans Poort and is expected to be a major new visual intrusion. In terms of the assessment checklist published by Baumann, Winter, Aikman (2005) the landscape is largely intact as a natural landscape and intrusions within the last 60 years have been moderate. The aesthetic qualities can be described as being of generally scenic (not dramatic) significance while certain niche areas are highly significant - especially the landscapes on the northern side of the Klein Winterhoek ridge as well as the Perdepoort which contains some dramatic scenery with a distinct character." Furthermore, as the proposed development consists of an expansion of existing infrastructure, there is no "change of character" to the site and no negative impact to the cultural landscape is anticipated from the proposed amendment to the road alignment.



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Archaeology

As a source of freshwater, the Sundays River valley has likely been occupied continuously throughout history. According to Webley (2003 SAHRIS NID 4307), Early and Middle Stone Age scatters are found along the banks of the Sundays River. These scatters are found immediately below the topsoil, at a depth of no more than 30cm and appear to have been deposited through river action, and as such, are not *in situ*. The artefacts identified consist of flaked quartzite cobbles with cortex and quartzite flakes. Very few diagnostic flakes were identified. In her assessment of the number of borrow pits, van Ryneveld (2012, SAHRIS NID 49462) did not identify any archaeological resources within the two borrow pits located near the proposed development area. According to Gaigher (2013 SAHRIS NID 125198), “Excavations at sites such as Melkhoutboom and Vygeboom (inside Addo Park) have uncovered graves with rich grave goods indicating a complex belief system. The rock art too indicates the San occupants took part in trance before painting... Many of the shell middens in the Addo Park contain pottery, confirming the presence of the Khoekhoen in the area.” According to Gaigher (2013), “The majority of hunter-gatherer groups had been pushed out of the Zuurberg by the 1820’s and was forced to move further inland to escape European settlement on their lands.”

The previous heritage studies that have been conducted in the broader area have identified isolated and scattered artefacts of the Early, Middle and Later Stone Age (Binneman, 2010; NID 7159). Generally, archaeological artefacts in this region are found in road cuttings, tracks and paths as the dense vegetation of the area largely obscures their presence elsewhere. ESA material known from the area includes handaxes and cleavers that are usually found in river gravels, although *in situ* ESA tools have been found in spring deposits near Addo (Binneman 2016, NID 365749). MSA flake and blade tools are similarly usually found in secondary contexts, and may be found with associated fossil bone material (Binneman 2010). LSA sites, though present, are usually obscured by the dense vegetation in this region. When found, they are usually represented by limited numbers of stone tools and bone fragments, and organic preservation is generally poor (Binneman 2016). Cave sites in the nearby mountains, on the contrary, often contain well-preserved deposits and rock paintings. Khoe sites, dating to the past 2 000 years, also occur in the area, and their sites are marked by the presence of indigenous ceramics and domesticated animal bone. These groups were also responsible for the creation of large middens of freshwater mussels, sometimes associated with human burials, that can be found on the banks of the Sunday’s River (Binneman 2016). Burials and graves associated with pre-colonial as well as historic communities are also to be found in the area (Binneman 2013, NID 175196).

Historic period remains are also found in the area, with early farmhouses, churches and several farm burial grounds having been noted, ranging from formal, enclosed graves to informal stone-packed burial mounds (Van Ryneveld 2016, NID 374575).



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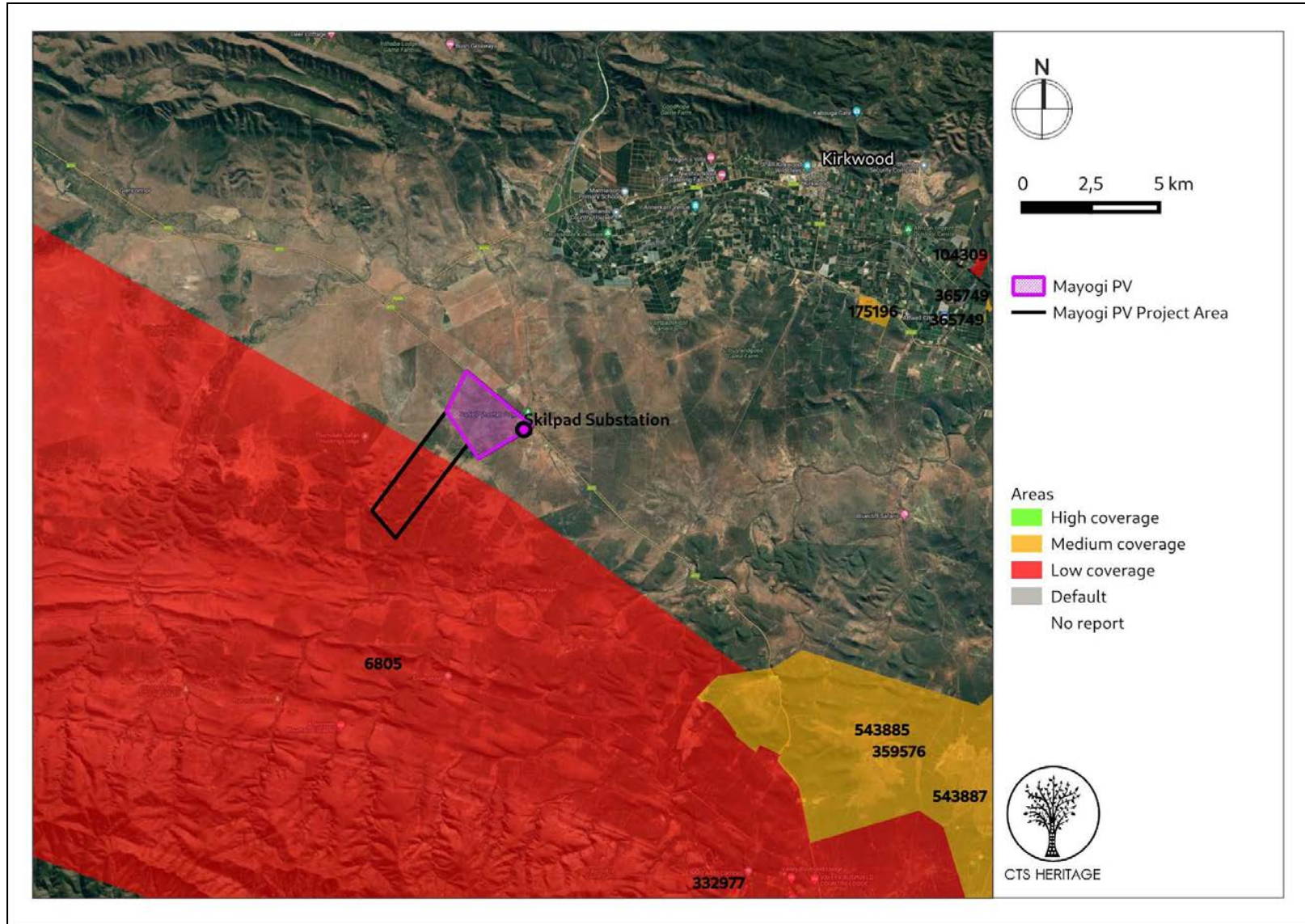


Figure 2.1: Spatialisation of heritage assessments conducted in proximity to the proposed development

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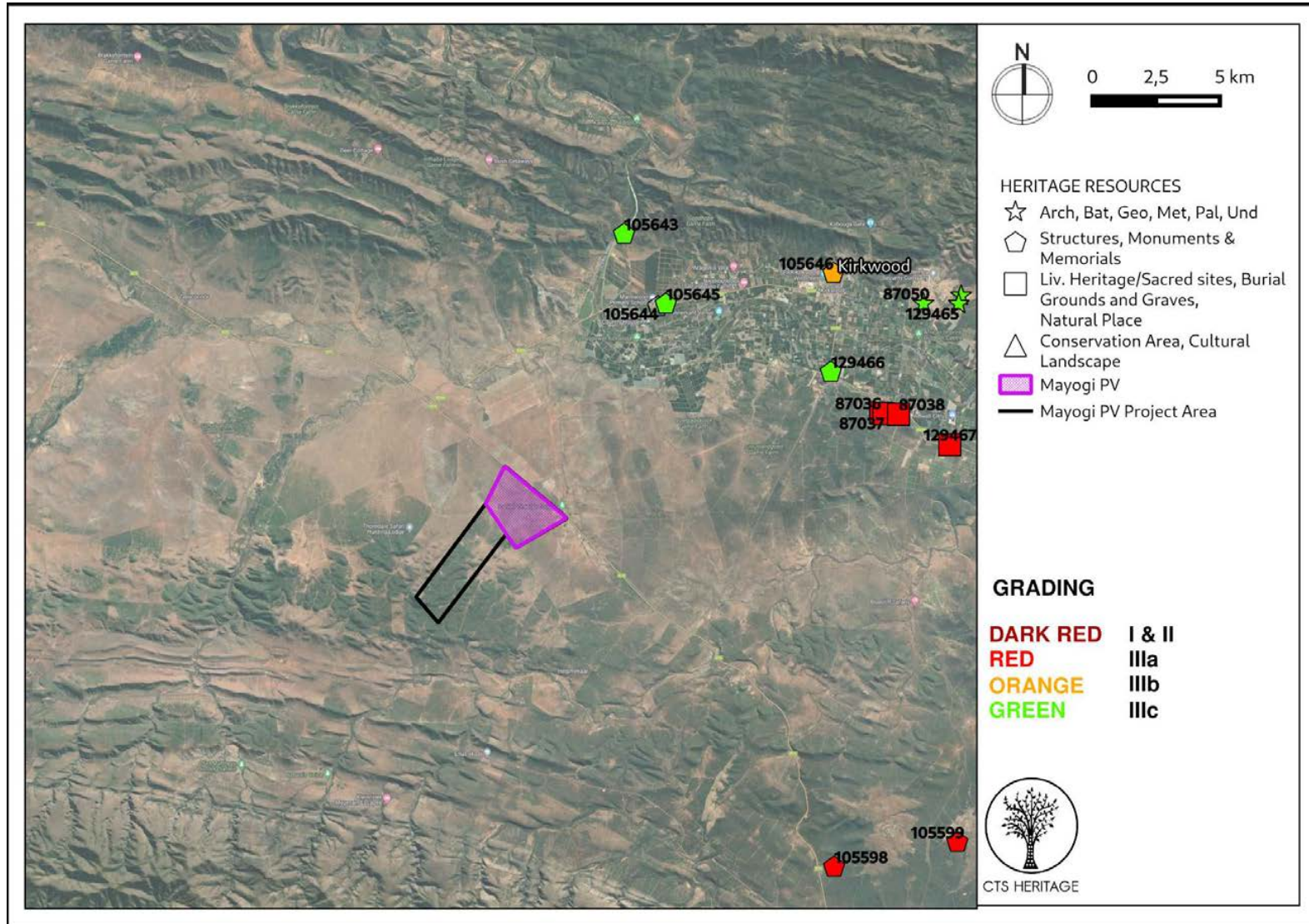


Figure 2.2: Spatialisation of known heritage resources in proximity to the proposed development



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Palaeontology

The area proposed for development is underlain by sediments of very high palaeontological sensitivity belonging to the Kirkwood Formation according to the Council of GeoScience Map 3324. According to Almond's assessment for a nearby development (2014), "During and following the break-up of Gondwana in Early Cretaceous times the Palaeozoic bedrocks in this region were deeply weathered and eroded to form a dissected palaeosurface across which meandering rivers deposited the pebbly channel sandstones and silty overbank mudrocks of the Kirkwood Formation (Uitenhage Group). The basal contact or unconformity between the Uitenhage and Bokkeveld Group rocks preserves the original high relief of the pre-Cretaceous landscape, with hills of Gamka Formation and younger Bokkeveld wackes projecting up through the lower Uitenhage Group fluvial succession. The Kirkwood continental sediments interfinger southwards, and are eventually overlain by fine-grained estuarine to marine shelf sediments of the Sundays River Formation (Uitenhage Group) reflecting gradual flooding of the margins of southern Africa in Early Cretaceous times."

Almond (2014) goes on to note that the "Early Cretaceous fluvial sediments of the Kirkwood Formation ("Wood Beds", Uitenhage Group) that underlie valleys and lower hill slopes in large parts of the... study area are generally very poorly exposed. However, where seen at surface they are often characterised by an abundance of petrified wood, including logs up to several metres long and half a metre across. Some of the fossil logs are only preserved as moulds but others retain fine details of the original woody tissue microstructure and are therefore of considerable palaeontological interest.



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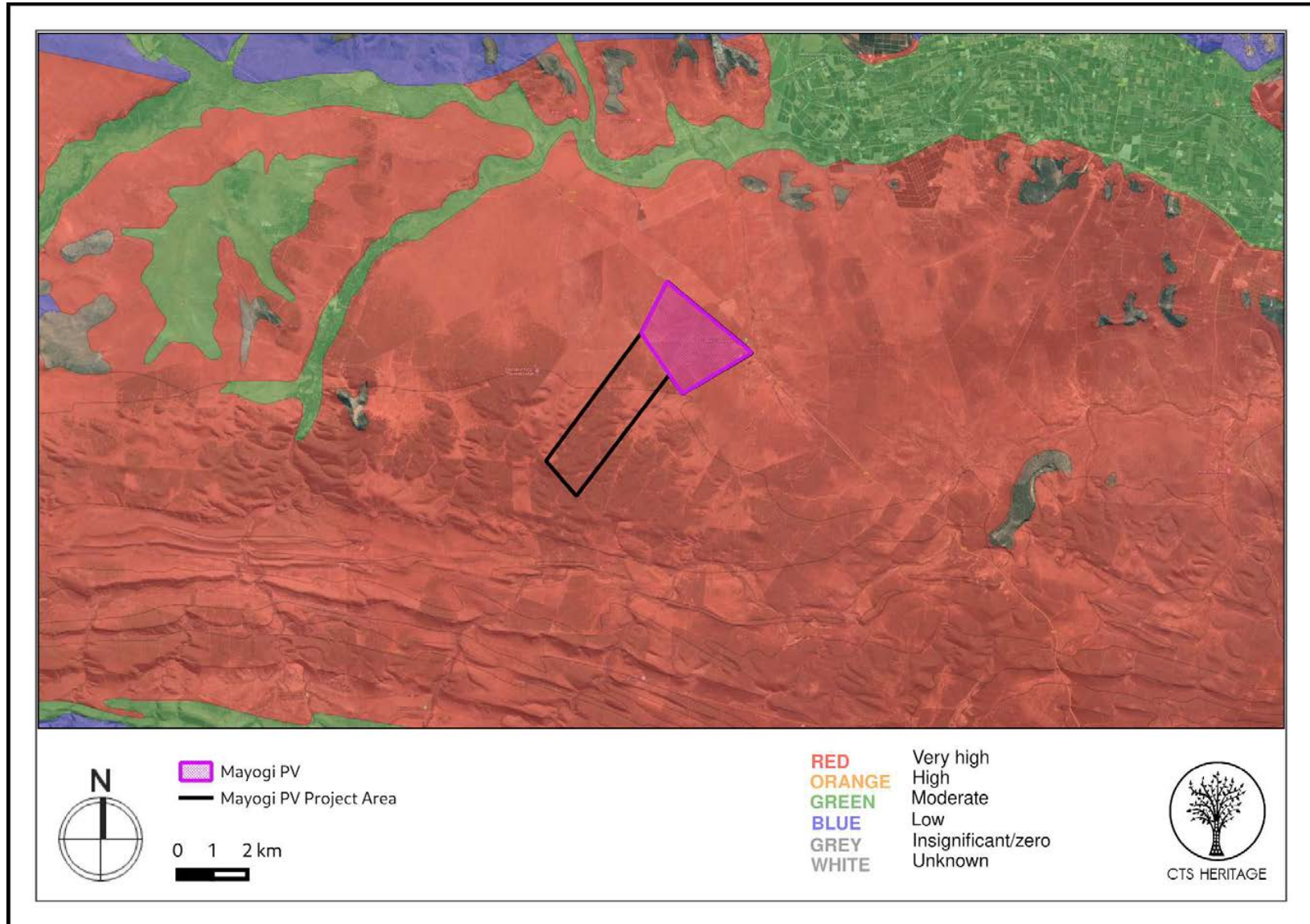


Figure 3.1: Palaeontological sensitivity of the proposed development area

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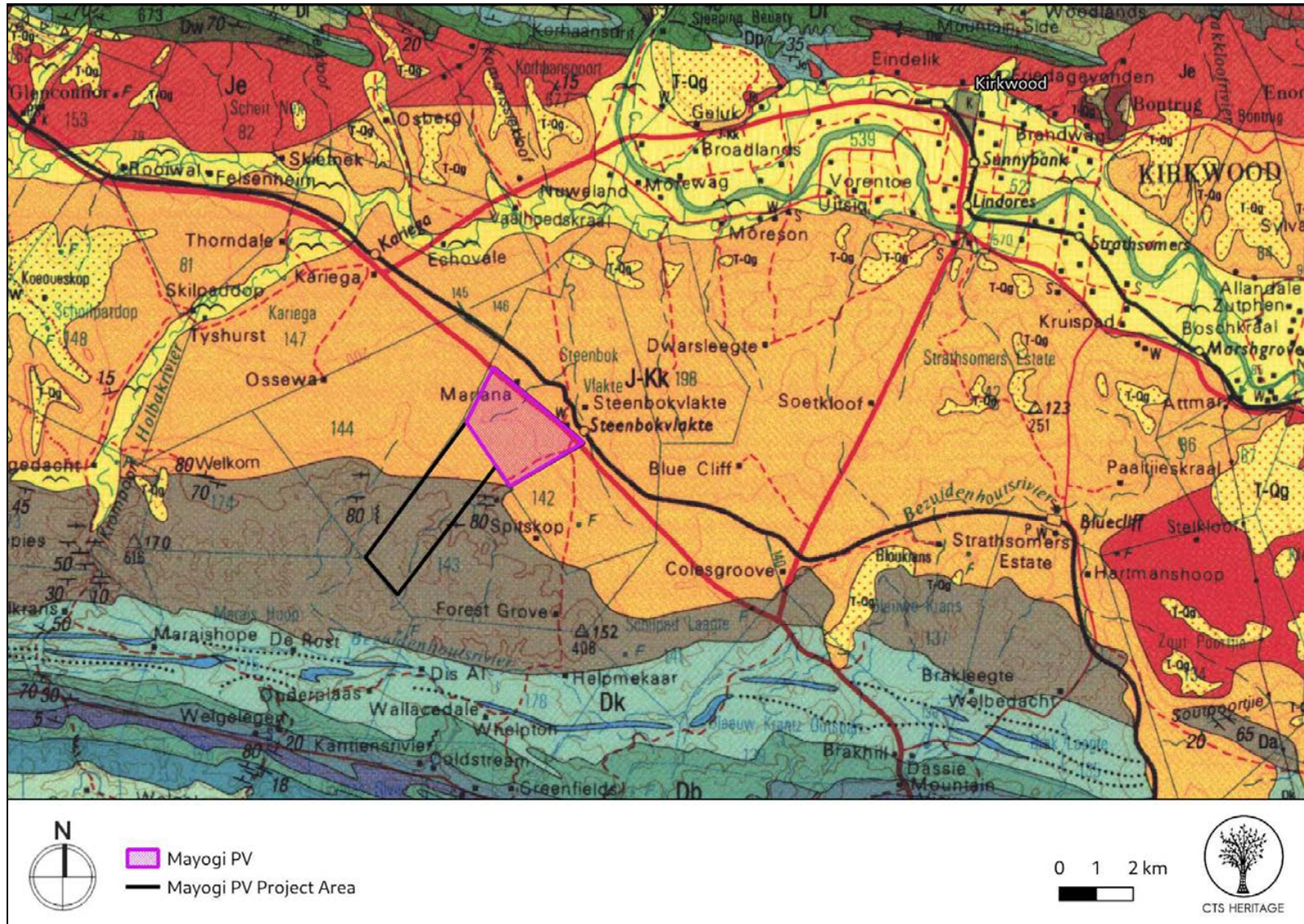


Figure 3.2: Extract from 1: 250 000 geological map 3324 Port Elizabeth (Council for Geoscience, Pretoria) showing that the area proposed for development is underlain by sediments of the Kirkwood Formation (J-Kk)

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4. IDENTIFICATION OF HERITAGE RESOURCES

4.1 Summary of findings of Specialist Reports

Archaeology (Appendix 1)

The archaeological survey resulted in nearly 60 observations and these were focussed in the northern area where the solar PV facilities have been proposed. Some Later Stone Age (LSA) material was found but the vast majority of sites consisted of quartzite flakes and cores dating to the MSA. A smaller contribution of siltstone flakes was also recorded but the extensive use of quartzite was indicative of the exploitation of sandstone gravels present in nearby streams and rivers. An early MSA component was also present and typical bifacial flakes and radial cores contributed to the assemblages. There were also some historical artefacts such as rusted metal, glass and ceramics closer to the R75 which are likely to be associated with the Steenbokvlakte farm and the migrant farming routes through this area from the 19th century onwards. There are no historic werfs or farm buildings in the study area and all of the modern built environment infrastructure relates to the game farming, water troughs and dams, the lodge chalets and the Skilpad substation. There are no natural shelters or overhangs on the property.

Palaeontology (Appendix 2)

The proposed Mayogi Solar PV Facility is underlain by Kirkwood Formation (Uitenhage Group). The PalaeoMap of the South African Heritage Resources Information System (SAHRIS) indicates that the Palaeontological Sensitivity of the Kirkwood Formation (Uitenhage Group) is Very High (Almond and Pether, 2009; Almond *et al.*, 2013). Recent updated Geology (Council of Geosciences) corresponds with the geological map and indicates that the proposed development is underlain by the Kirkwood Formation.

A site-specific field survey of the development footprint was conducted on foot and by motor vehicle on the weekend of 20 January 2023. No fossiliferous outcrop was detected in the proposed development area. A Medium Palaeontological Significance has been allocated to the Mayogi PV development.



4.2 Heritage Resources identified

No archaeological or palaeontological resources of significance were identified within the area proposed for development. All of the resources identified have been determined to be Not Conservation-Worthy (NCW).

Table 2: Observations noted during the field assessment

POINT ID	Description	Type	Period	Density/m2	Co-ordinates		Grading	Mitigation
001	Quartzite points, flakes	Artefacts	LSA+MSA	10 to 30	-33.47597	25.31221	NCW	NA
002	Quartzite cores, flakes	Artefacts	MSA	0 to 5	-33.47463	25.31136	NCW	NA
003	Quartzite points	Artefacts	MSA	0 to 5	-33.47347	25.30782	NCW	NA
004	Quartzite flake and core	Artefacts	MSA	0 to 5	-33.47382	25.3056	NCW	NA
005	Elongated quartzite flake, rusted metal sheet	Artefacts	Historic, MSA	0 to 5	-33.47558	25.30264	NCW	NA
006	Ruined concrete dam, troughs	Structure	Modern	n/a	-33.47636	25.30142	NCW	NA
007	Various quartzite flakes, cores	Artefacts	MSA	5 to 10	-33.47406	25.30045	NCW	NA
008	Quartzite blade, flake	Artefacts	MSA	0 to 5	-33.47203	25.30029	NCW	NA
009	Quartzite, flaked core, darker flakes	Artefacts	MSA	5 to 10	-33.47061	25.30273	NCW	NA
010	Quartzite cores	Artefacts	MSA	0 to 5	-33.46894	25.30414	NCW	NA
011	Quartzite flakes	Artefacts	MSA	0 to 5	-33.46723	25.30537	NCW	NA
012	Quartzite point, bulb of percussion	Artefacts	MSA	0 to 5	-33.46604	25.30661	NCW	NA
013	Early MSA biface, flakes, quartzite	Artefacts	MSA	0 to 5	-33.46599	25.30812	NCW	NA
014	Quartzite radial core and flake	Artefacts	MSA	0 to 5	-33.46829	25.30854	NCW	NA
015	Quartzite debitage and flakes	Artefacts	MSA	0 to 5	-33.46903	25.31008	NCW	NA
016	Retouched quartzite flakes	Artefacts	MSA	0 to 5	-33.47072	25.31259	NCW	NA
017	Quartzite flakes	Artefacts	MSA	0 to 5	-33.4718	25.31397	NCW	NA
018	Historical artefacts, metal, bottles, brick	Artefacts	Historic	10 to 30	-33.47217	25.31554	NCW	NA
019	Upper grindstone, flakes, quartzite	Artefacts	LSA	0 to 5	-33.47298	25.31661	NCW	NA
020	Siltstone core, quartzite flake	Artefacts	MSA	0 to 5	-33.4733	25.31729	NCW	NA
021	Quartzite flakes	Artefacts	MSA	0 to 5	-33.47404	25.31778	NCW	NA
022	Quartzite flakes, retouched, hammerstone, historical metal, ceramics	Artefacts	LSA+MS, Historical	10 to 30	-33.47479	25.31817	NCW	NA
023	Quartzite flakes	Artefacts	MSA	0 to 5	-33.47604	25.31837	NCW	NA
024	Quartzite core and flake	Artefacts	MSA	0 to 5	-33.47602	25.31624	NCW	NA
025	Quartzite flakes	Artefacts	MSA	0 to 5	-33.47609	25.31441	NCW	NA
026	Quartzite flakes	Artefacts	MSA	0 to 5	-33.489405	25.293547	NCW	NA
027	Quartzite flakes	Artefacts	MSA	0 to 5	-33.498727	25.277358	NCW	NA
028	Old wheeled iron farm plough	Artefacts	Historic	0 to 5	-33.502965	25.275434	NCW	NA
029	Concrete tank	Structure	Modern	n/a	-33.511626	25.271672	NCW	NA
030	Quartzite flake	Artefacts	MSA	0 to 5	-33.510269	25.280755	NCW	NA
031	Concrete trough	Structure	Modern	n/a	-33.497748	25.291091	NCW	NA
032	Quartzite blade	Artefacts	MSA	0 to 5	-33.495361	25.294862	NCW	NA
033	Quartzite point	Artefacts	MSA	0 to 5	-33.483476	25.299191	NCW	NA



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034	Pink quartzite flakes and flake blanks	Artefacts	MSA	0 to 5	-33.47818649	25.30098763	NCW	NA
035	Quartzite core and flake	Artefacts	MSA	0 to 5	-33.47799462	25.30333587	NCW	NA
036	Early MSA small biface, quartzite and shale point	Artefacts	MSA	0 to 5	-33.47907222	25.30576212	NCW	NA
037	Quartzite point and larger flake	Artefacts	MSA	0 to 5	-33.4785214	25.31042562	NCW	NA
038	Quartzite flakes	Artefacts	MSA	5 to 10	-33.47903567	25.31246128	NCW	NA
039	Retouched quartzite flakes	Artefacts	MSA	0 to 5	-33.47759222	25.31500224	NCW	NA
040	Quartzite blade	Artefacts	MSA	0 to 5	-33.47705648	25.32234359	NCW	NA
041	Various quartzite flakes, cores	Artefacts	MSA	5 to 10	-33.4786128	25.32444947	NCW	NA
042	Broken siltstone UG, quartzite flakes	Artefacts	MSA, LSA	0 to 5	-33.48102964	25.32515613	NCW	NA
043	Quartzite flakes	Artefacts	MSA	0 to 5	-33.48246666	25.32279181	NCW	NA
044	Quartzite point, siltstone UG	Artefacts	LSA	0 to 5	-33.48102714	25.32090993	NCW	NA
045	Quartzite flakes	Artefacts	MSA	0 to 5	-33.48056282	25.31672604	NCW	NA
046	Quartzite core	Artefacts	MSA	0 to 5	-33.4821102	25.3145424	NCW	NA
047	Quartzite flakes, points, some retouch	Artefacts	MSA	5 to 10	-33.48333597	25.31520455	NCW	NA
048	Quartzite core and points	Artefacts	MSA	0 to 5	-33.48590057	25.3157338	NCW	NA
049	Quartzite flakes	Artefacts	MSA	0 to 5	-33.48694118	25.31320892	NCW	NA
050	Quartzite flakes, some pink coloured points	Artefacts	MSA	0 to 5	-33.48728769	25.31237921	NCW	NA
051	Elongated quartzite flake, point	Artefacts	MSA	0 to 5	-33.48792469	25.31042083	NCW	NA
052	Fine grained quartzite flakes, one retouched for hafting	Artefacts	LSA, MSA	5 to 10	-33.48695203	25.30884719	NCW	NA
053	Quartzite flakes, light coloured	Artefacts	MSA	0 to 5	-33.48504005	25.3102136	NCW	NA
054	Quartzite cores, one radial, flakes	Artefacts	MSA	10 to 30	-33.48264821	25.311511	NCW	NA
055	Retouched quartzite flakes	Artefacts	MSA	0 to 5	-33.48128102	25.30970959	NCW	NA
056	Quartzite flakes	Artefacts	MSA	0 to 5	-33.48171341	25.3079207	NCW	NA
057	Quartzite points	Artefacts	LSA	0 to 5	-33.48319775	25.30602442	NCW	NA
058	Radial core and point, quartzite	Artefacts	MSA	0 to 5	-33.48456558	25.30524082	NCW	NA



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4.3 Mapping and spatialisation of heritage resources

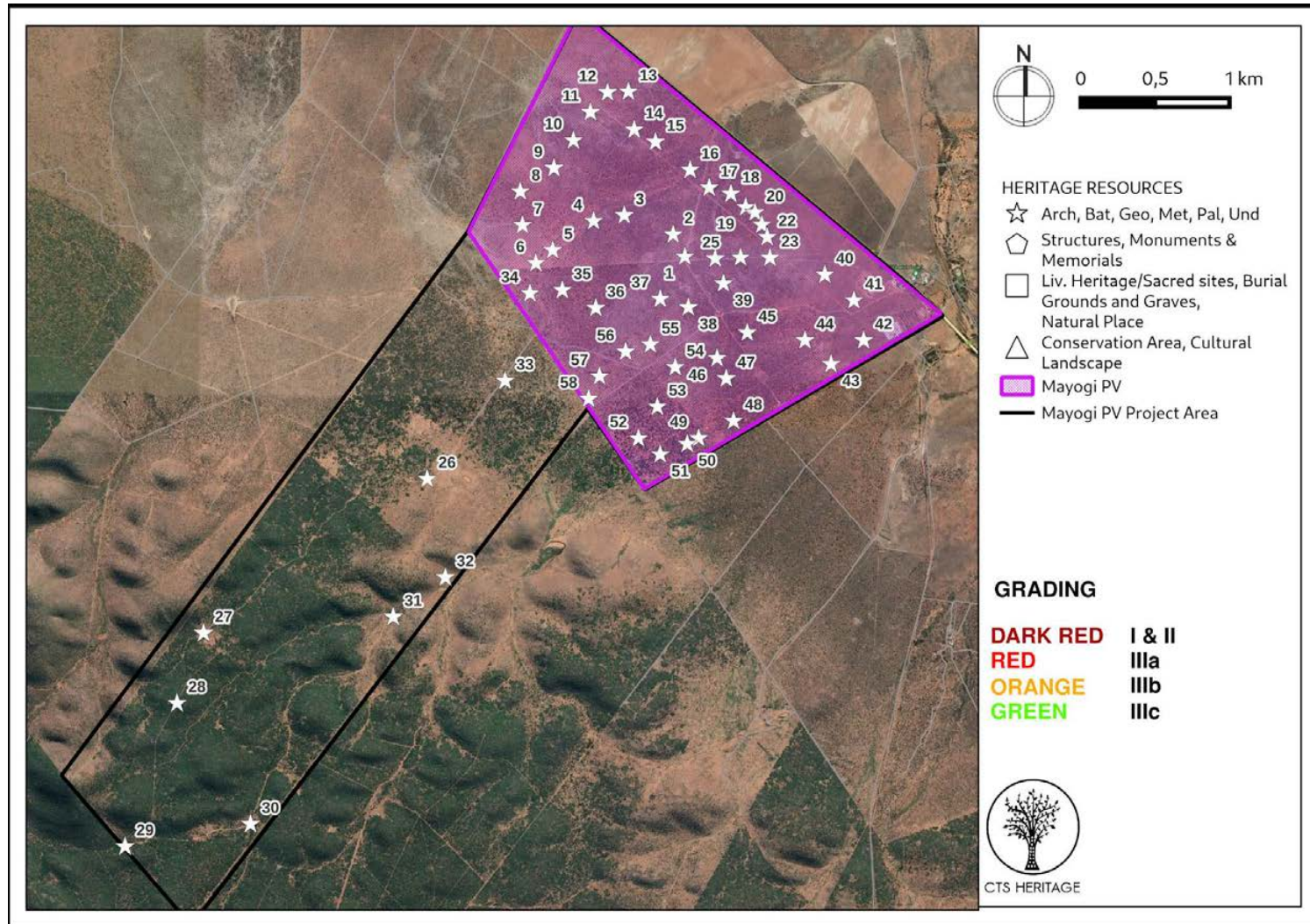


Figure 5.1: All heritage observations made within the development area



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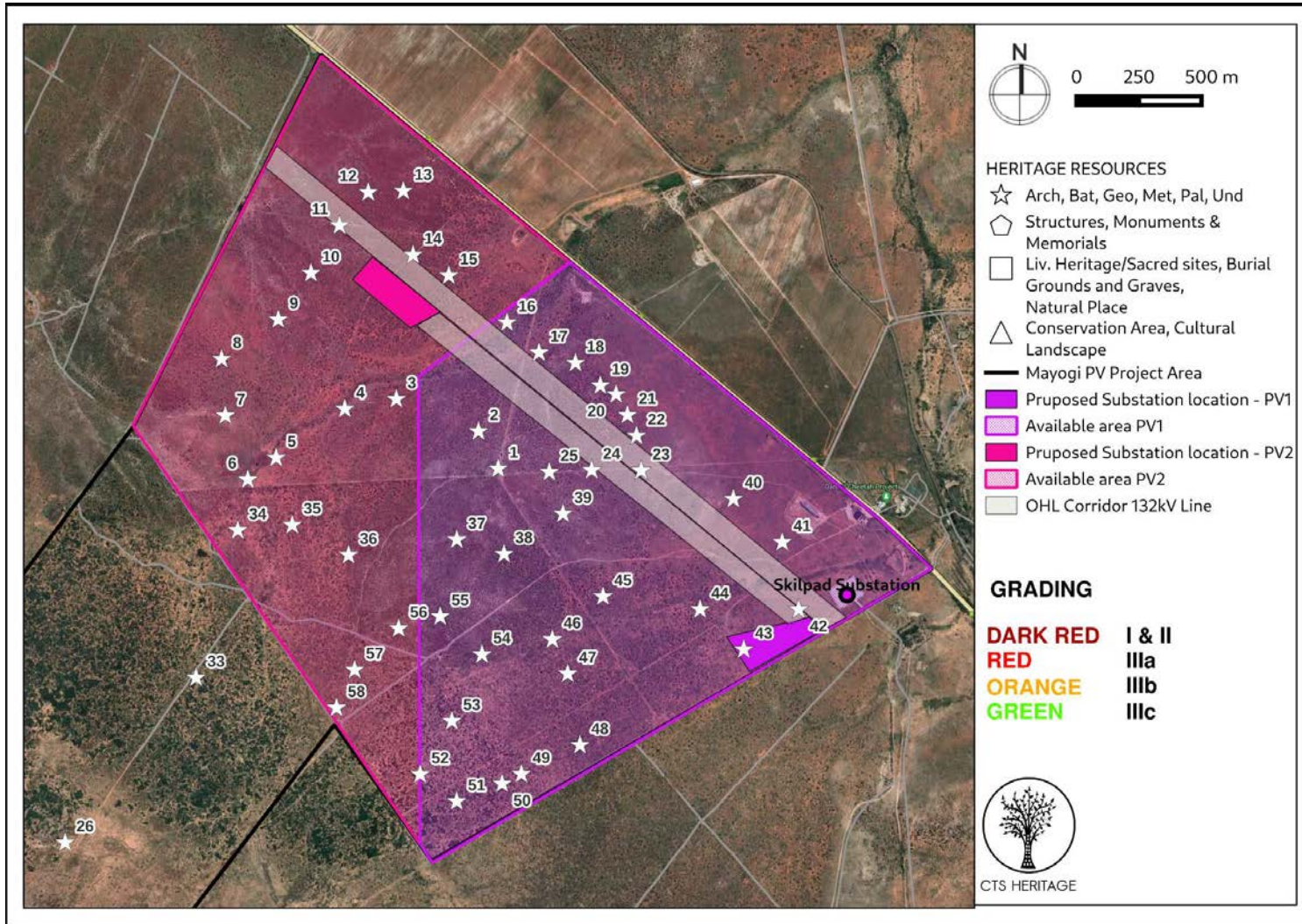


Figure 5.2: All heritage observations made within the development area



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5. ASSESSMENT OF THE IMPACT OF THE DEVELOPMENT

5.1 Assessment of impact to Heritage Resources

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

5.1.1 Cultural Landscape and VIA

To be included at the EIA Phase

5.1.2 Archaeology

No impact to significant archaeological or cultural heritage resources is anticipated.

5.1.3 Palaeontology

According to the PIA completed for this project (Butler, 2023), the loss of fossil heritage will have a negative impact. Only the site will be affected by the proposed development. The expected duration of the impact is assessed as potentially permanent to long term. In the absence of mitigation procedures, the damage or destruction of any palaeontological materials will be permanent. Impacts on palaeontological heritage during the construction phase could potentially occur. A negative medium Significance has been allocated to the proposed development.

A Medium Palaeontological Significance has been allocated to the Mayogi PV development. It is therefore considered that the proposed development will not lead to damaging impacts on the palaeontological resources of the area. The construction of the development may thus be permitted in its whole extent, as the development footprint is not considered sensitive in terms of palaeontological resources.

Table 5: Impacts Table

Mayogi 1 PV Facility																				
ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
Construction Phase																				
Impacts to archaeological heritage resources	Construction activities that take place near to archaeological resources may result in their destruction	1	2	4	3	4	3	42	(-)	Negative Medium	Should any previously unknown archaeological resources be impacted during construction, work must cease in the vicinity of the find and the relevant heritage authority must be contacted	1	1	4	1	4	1	11	(-)	Negative Low
Impacts to palaeontological resources	Construction activities that take place near to palaeontological resources may result in their destruction	1	2	4	3	4	3	42	(-)	Negative Medium	Implementation of the Chance Fossil Finds Procedure	1	1	4	1	4	1	11	(-)	Negative Low
Impacts to the cultural landscape	Construction activities that take place near to cultural landscape elements may result in their destruction	1	2	4	3	4	3	42	(-)	Negative Medium	Implementation of the recommendations included in the VIA	1	1	4	1	4	1	11	(-)	Negative Low
Operational Phase																				
Impacts to archaeological heritage resources	Operational activities that take place near to archaeological resources may result in their destruction	1	2	4	3	4	3	42	(-)	Negative Medium	Should any previously unknown archaeological resources be impacted during construction, work must cease in the vicinity of the find and the relevant heritage authority must be contacted	1	1	4	1	4	1	11	(-)	Negative Low
Impacts to palaeontological resources	Operational activities that take place near to palaeontological resources may result in their destruction	1	2	4	3	4	3	42	(-)	Negative Medium	Implementation of the Chance Fossil Finds Procedure	1	1	4	1	4	1	11	(-)	Negative Low
Impacts to the cultural landscape	Operational activities that take place near to cultural landscape elements may result in their destruction	1	2	4	3	4	3	42	(-)	Negative Medium	Implementation of the recommendations included in the VIA	1	1	4	1	4	1	11	(-)	Negative Low
Decommissioning Phase																				
Impacts to archaeological heritage resources	Decommissioning activities that take place near to archaeological resources may result in their destruction	1	2	4	3	4	3	42	(-)	Negative Medium	Should any previously unknown archaeological resources be impacted during construction, work must cease in the vicinity of the find and the relevant heritage authority must be contacted	1	1	4	1	4	1	11	(-)	Negative Low

Impacts to palaeontological resources	Decommissioning activities that take place near to palaeontological resources may result in their destruction	1	2	4	3	4	3	42	(-)	Negative Medium	Implementation of the Chance Fossil Finds Procedure	1	1	4	1	4	1	11	(-)	Negative Low
Impacts to the cultural landscape	Decommissioning activities that take place near to cultural landscape elements may result in their destruction	1	2	4	3	4	3	42	(-)	Negative Medium	Implementation of the recommendations included in the VIA	1	1	4	1	4	1	11	(-)	Negative Low
Cumulative																				
Impacts to archaeological heritage resources	Cumulative destruction of significant archaeological heritage	1	2	4	3	4	3	42	(-)	Negative Medium	Should any previously unknown archaeological resources be impacted during construction, work must cease in the vicinity of the find and the relevant heritage authority must be contacted	1	1	4	1	4	1	11	(-)	Negative Low
Impacts to palaeontological resources	Cumulative destruction of significant palaeontological heritage	1	2	4	3	4	3	42	(-)	Negative Medium	Implementation of the Chance Fossil Finds Procedure	1	1	4	1	4	1	11	(-)	Negative Low
Impacts to the cultural landscape	Cumulative impact to the cultural landscape	1	2	4	3	4	3	42	(-)	Negative Medium	Implementation of the recommendations included in the VIA	1	1	4	1	4	1	11	(-)	Negative Low

Table 5: Impacts Table

Magogi 2 PV Facility																				
ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
Construction Phase																				
Impacts to archaeological heritage resources	Construction activities that take place near to archaeological resources may result in their destruction	1	2	4	3	4	3	42	(-)	Negative Medium	Should any previously unknown archaeological resources be impacted during construction, work must cease in the vicinity of the find and the relevant heritage authority must be contacted	1	1	4	1	4	1	11	(-)	Negative Low
Impacts to palaeontological resources	Construction activities that take place near to palaeontological resources may result in their destruction	1	2	4	3	4	3	42	(-)	Negative Medium	Implementation of the Chance Fossil Finds Procedure	1	1	4	1	4	1	11	(-)	Negative Low
Impacts to the cultural landscape	Construction activities that take place near to cultural landscape elements may result in their destruction	1	2	4	3	4	3	42	(-)	Negative Medium	Implementation of the recommendations included in the VIA	1	1	4	1	4	1	11	(-)	Negative Low
Operational Phase																				
Impacts to archaeological heritage resources	Operational activities that take place near to archaeological resources may result in their destruction	1	2	4	3	4	3	42	(-)	Negative Medium	Should any previously unknown archaeological resources be impacted during construction, work must cease in the vicinity of the find and the relevant heritage authority must be contacted	1	1	4	1	4	1	11	(-)	Negative Low
Impacts to palaeontological resources	Operational activities that take place near to palaeontological resources may result in their destruction	1	2	4	3	4	3	42	(-)	Negative Medium	Implementation of the Chance Fossil Finds Procedure	1	1	4	1	4	1	11	(-)	Negative Low
Impacts to the cultural landscape	Operational activities that take place near to cultural landscape elements may result in their destruction	1	2	4	3	4	3	42	(-)	Negative Medium	Implementation of the recommendations included in the VIA	1	1	4	1	4	1	11	(-)	Negative Low
Decommissioning Phase																				
Impacts to archaeological heritage resources	Decommissioning activities that take place near to archaeological resources may result in their destruction	1	2	4	3	4	3	42	(-)	Negative Medium	Should any previously unknown archaeological resources be impacted during construction, work must cease in the vicinity of the find and the relevant heritage authority must be contacted	1	1	4	1	4	1	11	(-)	Negative Low

Impacts to palaeontological resources	Decommissioning activities that take place near to palaeontological resources may result in their destruction	1	2	4	3	4	3	42	(-)	Negative Medium	Implementation of the Chance Fossil Finds Procedure	1	1	4	1	4	1	11	(-)	Negative Low
Impacts to the cultural landscape	Decommissioning activities that take place near to cultural landscape elements may result in their destruction	1	2	4	3	4	3	42	(-)	Negative Medium	Implementation of the recommendations included in the VIA	1	1	4	1	4	1	11	(-)	Negative Low
Cumulative																				
Impacts to archaeological heritage resources	Cumulative destruction of significant archaeological heritage	1	2	4	3	4	3	42	(-)	Negative Medium	Should any previously unknown archaeological resources be impacted during construction, work must cease in the vicinity of the find and the relevant heritage authority must be contacted	1	1	4	1	4	1	11	(-)	Negative Low
Impacts to palaeontological resources	Cumulative destruction of significant palaeontological heritage	1	2	4	3	4	3	42	(-)	Negative Medium	Implementation of the Chance Fossil Finds Procedure	1	1	4	1	4	1	11	(-)	Negative Low
Impacts to the cultural landscape	Cumulative impact to the cultural landscape	1	2	4	3	4	3	42	(-)	Negative Medium	Implementation of the recommendations included in the VIA	1	1	4	1	4	1	11	(-)	Negative Low



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5.2 Sustainable Social and Economic Benefit

To be included at the EIA Phase

5.3 Proposed development alternatives

Location Alternatives

No other location alternatives are being considered. Renewable Energy development in South Africa is highly desirable from a social, environmental and development point of view and a solar energy installation is more suitable for the site due to the high solar resource.

Reason for the location chosen:

This site is preferred due to the suitable climate, conditions and topography.

Proximity to the substation on the property and knowledge of an upgrading to the 132kV power line is also available. Based on the above site-specific attributes, the study area is considered highly preferred in terms of the development of a solar PV facility. As such, no property / location alternatives have been considered

Need and Desirability

- Increased surety of supply
- Lesser dependence on fossil fuel generated power
- Growing demand for electricity fueled by economic growth, lack of generation capacity by Eskom etc.
- REIPP program opportunities
- Need for cleaner electricity/ CDM project etc.
- Employment opportunities etc.

Technology Alternatives

No other activity alternatives are being considered. Renewable Energy development in South Africa is highly desirable from a social, environmental and development point of view.

SEF Alternatives

Design and layout alternatives will be considered and assessed as part of the EIA. These include alternatives for the PV area, Substation locations and also for the construction / laydown area.

juwi has indicated proposed locations for 2 x substations and 2 x alternatives, BESS, O&M Building and Laydown area including OHL, however they have also requested that the specialist consider the full corridor provided on either side of the 132kv line.



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Proposed: 2 plant layout – including 2 substation and OHL possibilities.

Proposed: additional 2 substation location and OHL possibilities.

Area to survey – full corridor in case none of the 4 substation locations are suitable.

To note that the substation area/location will be approximately 4ha and contain the laydown area, Substation and O&M buildings and BESS area (either Redox flow or Lithium technology).

No-Go Alternative

The ‘no-go’ alternative is the option of not undertaking the proposed SEF projects. Hence, if the ‘no go’ option is implemented, there would be no development. This alternative would result in no environmental impacts from the proposed project on the site or surrounding local area. It provides the baseline against which other alternatives are compared and will be considered throughout the report.

As limited heritage impacts are anticipated, there are no preferred alternatives from a heritage perspective.

5.4 Site Verification Statement

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

- The cultural value of the broader area has some significance in terms of its sense of place and scenic qualities (Moderate)
- No significant archaeological resources were identified within the study area (Low)
- No highly significant palaeontological resources were identified within the development area however the sediments underlying the development area have very high palaeontological sensitivity (Moderate)

As per the findings of this assessment, and its supporting documentation, the outcome of the sensitivity verification disputes the results of the DFFE Screening Tool for Cultural Heritage and Palaeontology.

5.5 Cumulative Impacts

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



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context of all surrounding impacts. It is concerned with this project's contribution to the overall impact, within the context of the overall impact. But it is not simply the overall impact itself.

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

The Department of Forestry, Fisheries and the Environment (DFFE) requires compliance with a specified methodology for the assessment of cumulative impacts. The DFFE compliance for this project requires considering all renewable energy project applications within a 30 km radius.

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

Modern interventions into such landscapes, such as renewable energy development, constitute an additional layer onto the cultural landscape which must be acceptable in REDZ areas. The primary risk in terms of negative impact to the cultural landscape resulting from renewable energy development lies in the eradication of older layers that make up the cultural landscape. There are various ways that such impact can be mitigated.

The landscape within which the proposed project areas are located, is not worthy of formal protection as a heritage resource and has the capacity to accommodate such development from a heritage perspective.

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 or rural landscape. The proposed development therefore may result in unacceptable risk or loss, and it may result in a change to the sense of place of the area due to its location some distance from other approved renewable energy facilities in this area.



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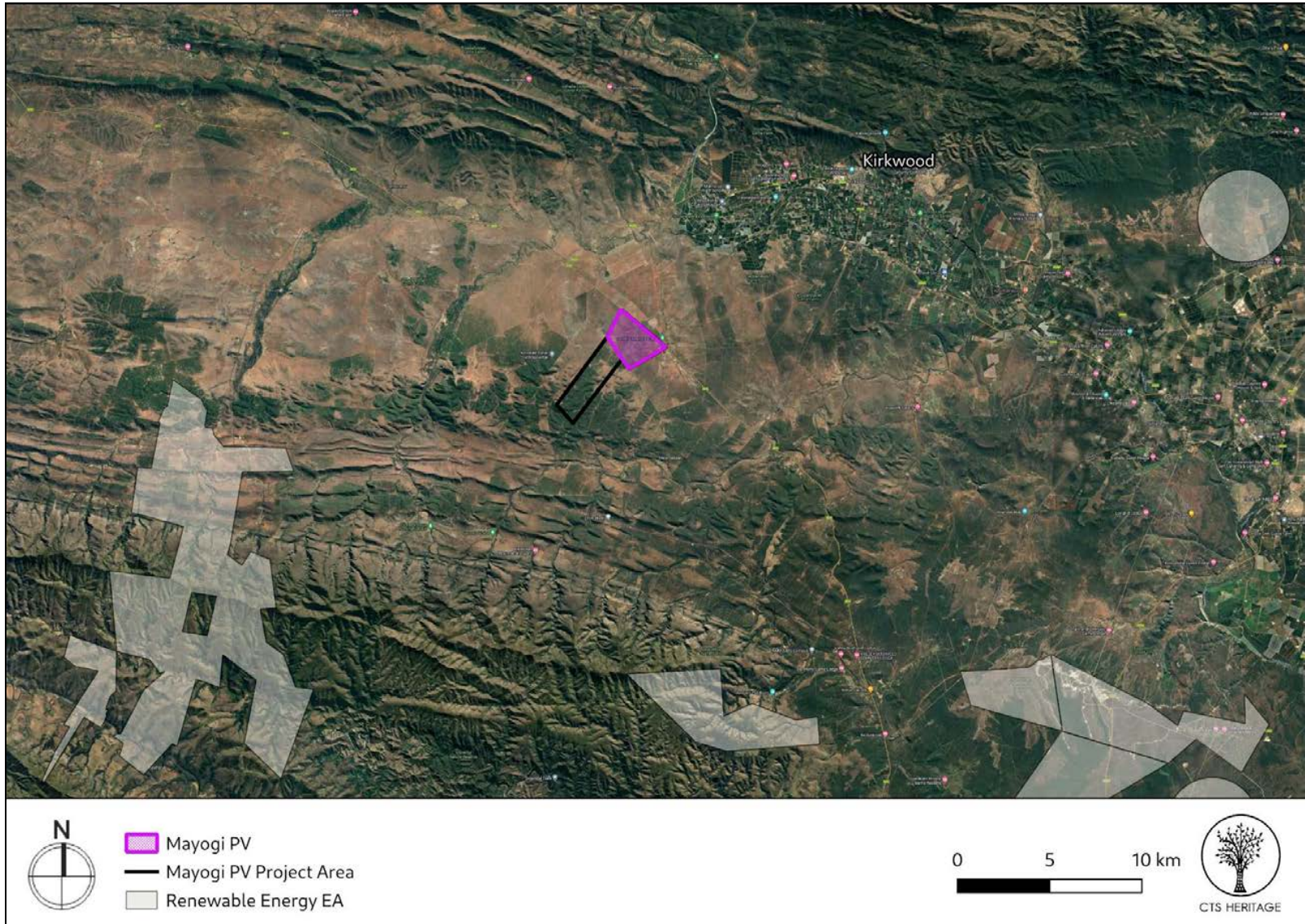


Figure 6: Approved REF projects within 20km of the proposed development area

Cedar Tower Services (Pty) Ltd t/a CTS Heritage
Bon Espirance, 238 Queens Road, Simons Town
Email info@ctsheritage.com Web <http://www.ctsheritage.com>



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6. RESULTS OF PUBLIC CONSULTATION

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

7. CONCLUSION

The previous heritage studies that have been conducted in the broader area have identified isolated and scattered artefacts of the Early, Middle and Later Stone Age (Binneman, 2010; NID 7159). The findings of this assessment corroborate the characterisation of the area made by other specialists.

The field survey identified a number of isolated artefacts, none of which are dense enough to be considered an archaeological site. None of the archaeological observations made have sufficient scientific value to warrant their retention and as such, have been graded as Not Conservation-Worthy. The recording of their presence in this report is considered sufficient.

A Medium Palaeontological Significance has been allocated to the Mayogi PV development. It is therefore considered that the proposed development will not lead to damaging impacts on the palaeontological resources of the area. The construction of the development may thus be permitted in its whole extent, as the development footprint is not considered sensitive in terms of palaeontological resources.

Based on the outcomes of this assessment, it is unlikely that the proposed development will negatively impact on significant archaeological, palaeontological or cultural heritage resources. There is no objection to the proposed development.

8. RECOMMENDATIONS

Based on the outcomes of this report, it is not anticipated that the proposed development will negatively impact on significant heritage resources on condition that:

- The ECO for this project must be informed that the Kirkwood Formation of the Uitenhage Group has a Very High Palaeontological Sensitivity.
- If Palaeontological Heritage is uncovered during surface clearing and excavations the Chance find Protocol attached should be implemented immediately. Fossil discoveries ought to be protected and the ECO/site manager must report to South African Heritage Resources Agency (SAHRA) (Contact details: Eastern Cape Provincial Heritage Resources Authority (ECPHRA), 16 Commissioner Street, East London, 5201, South Africa. Tel: 043 745 0888. Fax: 043 745 0889., email: info@ecphra.org.za; Web: <https://www.ecphra.org.za/>) so that mitigation (recording and collection) can be carried out.



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- Before any fossil material can be collected from the development site the specialist involved would need to apply for a collection permit from SAHRA. Fossil material must be housed in an official collection (museum or university), while all reports and fieldwork should meet the minimum standards for palaeontological impact studies proposed by SAHRA (2012).
- Although all possible care has been taken to identify sites of cultural importance during the investigation of the study area, it is always possible that hidden or subsurface sites could be overlooked during the assessment. If any evidence of archaeological sites or remains (e.g. remnants of stone-made structures, indigenous ceramics, bones, stone artefacts, ostrich eggshell fragments, charcoal and ash concentrations), fossils, burials or other categories of heritage resources are found during the proposed development, work must cease in the vicinity of the find and ECPHRA must be alerted immediately to determine an appropriate way forward.



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9. REFERENCES

Heritage Impact Assessments				
Nid	Report Type	Author/s	Date	Title
104309	AIA Phase 1	Johan Binneman	01/05/2012	A Phase 1 Archaeological Impact Assessment for the proposed expansion of the existing agricultural activities on Falcon Ridge, Portion 274 of Strathomers estate no. 42, Sundays River Valley Municipality, Eastern Cape Province.
125198	Heritage Impact Assessment Specialist Reports	Stephan Gaigher	01/07/2013	HERITAGE IMPACT ASSESSMENT FOR THE PROPOSED UPGRADING OF STORMWATER INFRASTRUCTURE IN VALENCIA, ADDO, SUNDAYS RIVER VALLEY MUNICIPALITY, EASTERN CAPE PROVINCE
136577	AIA Phase 1	Johan Binneman	05/09/2012	A PHASE 1 ARCHAEOLOGICAL IMPACT ASSESSMENT FOR THE PROPOSED EXPANSION OF THE EXISTING AGRICULTURAL ACTIVITIES ON RIVER BEND CITRUS FARM, REMAINDER OF FARM 82 WOLVE KOP, PORTION 1 OF FARM 77 WELLSHAVEN AND PORTION 3 OF FARM 77 HONEYVALE, NEAR ADDO, SUNDAYS RIVER VALLEY MUNICIPALITY, EASTERN CAPE PROVINCE
136577	AIA Phase 1	Johan Binneman	05/09/2012	A PHASE 1 ARCHAEOLOGICAL IMPACT ASSESSMENT FOR THE PROPOSED EXPANSION OF THE EXISTING AGRICULTURAL ACTIVITIES ON RIVER BEND CITRUS FARM, REMAINDER OF FARM 82 WOLVE KOP, PORTION 1 OF FARM 77 WELLSHAVEN AND PORTION 3 OF FARM 77 HONEYVALE, NEAR ADDO, SUNDAYS RIVER VALLEY MUNICIPALITY, EASTERN CAPE PROVINCE
136578	PIA Desktop	John E Almond	01/08/2012	PALAEONTOLOGICAL SPECIALIST STUDY: DESKTOP ASSESSMENT Expansion of River Bend Citrus Farm near Addo, Sundays River Valley Municipality, Eastern Cape
136578	PIA Desktop	John E Almond	01/08/2012	PALAEONTOLOGICAL SPECIALIST STUDY: DESKTOP ASSESSMENT Expansion of River Bend Citrus Farm near Addo, Sundays River Valley Municipality, Eastern Cape
174009	HIA Letter of Exemption	Johan Binneman	30/06/2014	LETTER OF RECOMMENDATION (WITH CONDITIONS) FOR THE EXEMPTION OF A FULL PHASE 1 ARCHAEOLOGICAL HERITAGE IMPACT ASSESSMENT FOR THE PROPOSED SACE RANGER PHOTOVOLTAIC (SOLAR) PLANT NEAR UITENHAGE, EASTERN CAPE PROVINCE
175196	HIA Phase 1	Johan Binneman	01/04/2013	A PHASE 1 ARCHAEOLOGICAL IMPACT ASSESSMENT FOR THE PROPOSED CLEARING OF LAND FOR AGRICULTURAL PURPOSES ON PANZI CITRUS FARM NEAR KIRKWOOD, DIVISION OF UITENHAGE, SUNDAYS RIVER VALLEY MUNICIPALITY, EASTERN CAPE PROVINCE
332977	Desktop	Mariagrazia	25/09/2015	CTS15_012 - Uitenhage Gasification Plant



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	Assessment	Galimberti, Kyla Bluff, Nicholas Wiltshire		
357420	Desktop Assessment	Mariagrazia Galimberti, Kyla Bluff, Nicholas Wiltshire	15/02/2016	Heritage Screener: CEN Hermitage Citrus and Storage Expansion Eastern Cape
357424	Desktop Assessment	Mariagrazia Galimberti, Kyla Bluff, Nicholas Wiltshire	15/02/2016	Heritage Screener: CEN Summerville Citrus and Storage Expansion Eastern Cape
357428	Desktop Assessment	Mariagrazia Galimberti, Kyla Bluff, Nicholas Wiltshire	25/02/2016	Heritage Screener: PPC Dubrody Citrus, Kirkwood
359574	HIA Phase 1	Karen Van Ryneveld	15/09/2014	Phase 1 Archaeological & Cultural Heritage Impact Assessment â€œ The Dassiesridge Wind Energy Facility (WEF), between Kirkwood and Uitenhage, Cacadu District, Eastern Cape, South Africa. 15 September 2014. Prepared by: Karen van Ryneveld (ArchaeoMaps). E-mail: kvanryneveld@gmail.com; Tel: 084 871 1064; Postal Address: Postnet Suite 239, Private Bag X3, Beacon Bay, 5205
359576	PIA Phase 1	John E. Almond	15/10/2014	PROPOSED DASSIESRIDGE WIND ENERGY FACILITY NEAR UITENHAGE, CACADU DISTRICT, EASTERN CAPE. By John E. Almond,
365749	AIA Phase 1	Johan Binneman	29/02/2016	PHASE 1 ARCHAEOLOGICAL IMPACT ASSESSMENTS FOR THE PROPOSED CLEARING OF VEGETATION IN THREE AREAS TO ESTABLISH CITRUS ORCHARDS ON THE FARM BOSCHKRAAL NEAR KIRKWOOD, SUNDAYâ€™S RIVER VALLEY LOCAL MUNICIPALITY EASTERN CAPE PROVINCE
4307	AIA Phase 1	Lita Webley	11/06/2003	Addo Elephant National Park: Upgrading of Existing Tourist Road Network and Construction of Southern Access Road near Colchester - Phase 1 Archaeological Impact Assessment
6805	AIA Phase 1	Len van Schalkwyk, Elizabeth Wahl	01/09/2007	Heritage Impact Assessment of Gamma Grassridge Power Line Corridors and Substation, Eastern, Western and Northern Cape Provinces, South Africa
7159	AIA Phase 1	Johan	23/11/2010	A PHASE 1 ARCHAEOLOGICAL IMPACT ASSESSMENT FOR THE PROPOSED



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		Binneman		EXPANSION OF AGRICULTURAL ACTIVITIES ON PORTION 20 OF FARM 84, LANDDROST VEEPLAATS, KIRKWOOD, SUNDAYS RIVER VALLEY MUNICIPALITY, EASTERN CAPE PROVINCE
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APPENDICES



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APPENDIX 1: Archaeological Assessment (2022)

ARCHAEOLOGICAL SPECIALIST STUDY

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

PROPOSED DEVELOPMENT OF THE MAYOGI PV FACILITY NEAR KIRKWOOD, EASTERN CAPE

Prepared by



CTS HERITAGE
Nicholas Wiltshire
And Jenna Lavin

In Association with

SiVEST

December 2022



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EXECUTIVE SUMMARY

Farm No. 692 (hereafter referred to as the property) is located adjacent to the R75 approximately 13km south-west of Kirkwood, Easter Cape Province. The Skilpad Substation is located within the property. The intention is to develop one or more PV facilities and associated infrastructure on the property, depending on site sensitivities. The associated infrastructure would include a BESS, site camp, substation and OHL, and O&M building. Based on the site visit and desktop analysis, the focus area for PV development is the northern section of the property.

The previous heritage studies that have been conducted in the broader area have identified isolated and scattered artefacts of the Early, Middle and Later Stone Age (Binneman, 2010; NID 7159). The findings of this assessment corroborate the characterisation of the area made by other specialists.

The field survey identified a number of isolated artefacts, none of which are dense enough to be considered an archaeological site. None of the archaeological observations made have sufficient scientific value to warrant their retention and as such, have been graded as Not Conservation-Worthy. The recording of their presence in this report is considered sufficient.

Based on the outcomes of this assessment, it is unlikely that the proposed development will negatively impact on significant archaeological or cultural heritage resources.

Recommendations

Based on the outcomes of this report, it is not anticipated that the proposed development will negatively impact on significant archaeological heritage on condition that:

- Although all possible care has been taken to identify sites of cultural importance during the investigation of the study area, it is always possible that hidden or subsurface sites could be overlooked during the assessment. If any evidence of archaeological sites or remains (e.g. remnants of stone-made structures, indigenous ceramics, bones, stone artefacts, ostrich eggshell fragments, charcoal and ash concentrations), fossils, burials or other categories of heritage resources are found during the proposed development, work must cease in the vicinity of the find and SAHRA must be alerted immediately to determine an appropriate way forward.



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1. INTRODUCTION

1.1 Background Information on Project

Farm No. 692 (hereafter referred to as the property) is located adjacent to the R75 approximately 13km south-west of Kirkwood, Easter Cape Province. The Skilpad Substation is located within the property. The intention is to develop one or more PV facilities and associated infrastructure on the property, depending on site sensitivities. The associated infrastructure would include a BESS, site camp, substation and OHL, and O&M building. Based on the site visit and desktop analysis, the focus area for PV development is the northern section of the property.

1.2 Description of Property and Affected Environment

The proposed Mayogi solar PV facility lies about 20km southwest of Kirkwood in the Eastern Cape on the southwestern side of the R75 road that continues onto Kariega (formerly Uitenhage) another 30km further south. The development area is generally flat to undulating in the northern section closest to the R75 while the property narrows into a wedge to the south and becomes hilly and thickly vegetated by Albany thicket (spekboom, Euphorbia, aloes etc). The northern area has been earmarked as the preferred location of the solar PV facilities and is currently used for game farming of buffalo, zebra, ostriches and various antelope species. The terrain and grazing of cattle and game in the northern portion has left this section far less vegetated than the southern end.

The farm is part of Steenbokvlakte that has since been subdivided into various smaller farms and commercial businesses such as the Mayogi Wildstal farmstall and Daniell Cheetah Project just opposite the study area on the northeastern side of the R75. The Skilpad substation is located in the northeastern corner of the study area. An existing cluster of about 12 wooden game lodge tourism accommodation units lies midway near the western boundary of the southern section of the property which is very much in keeping with the large number of game viewing and hunting lodges that are located in the general area between Kariega, Kirkwood and Addo Elephant National Park.



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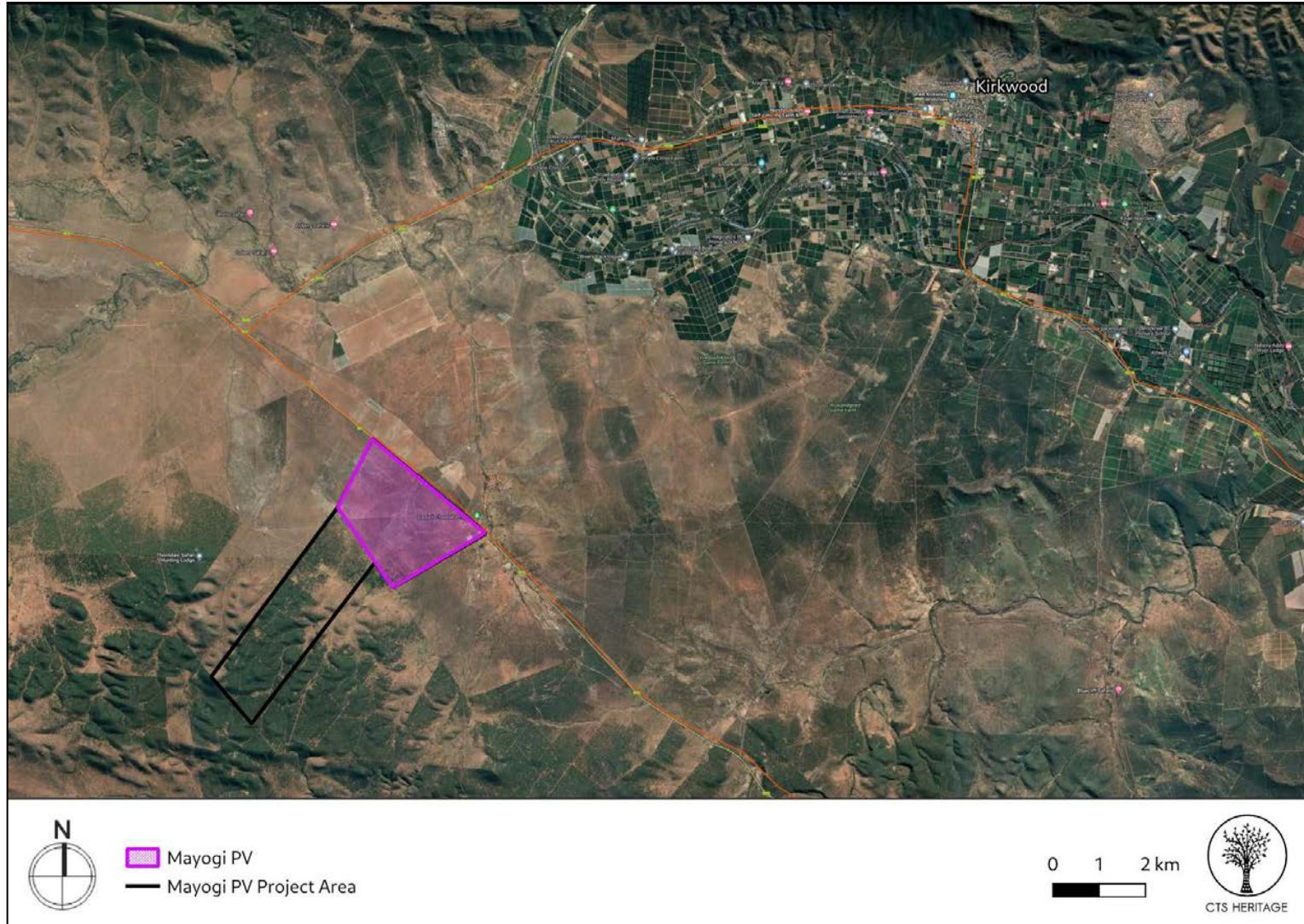


Figure 1.1: Satellite image indicating proposed location of development



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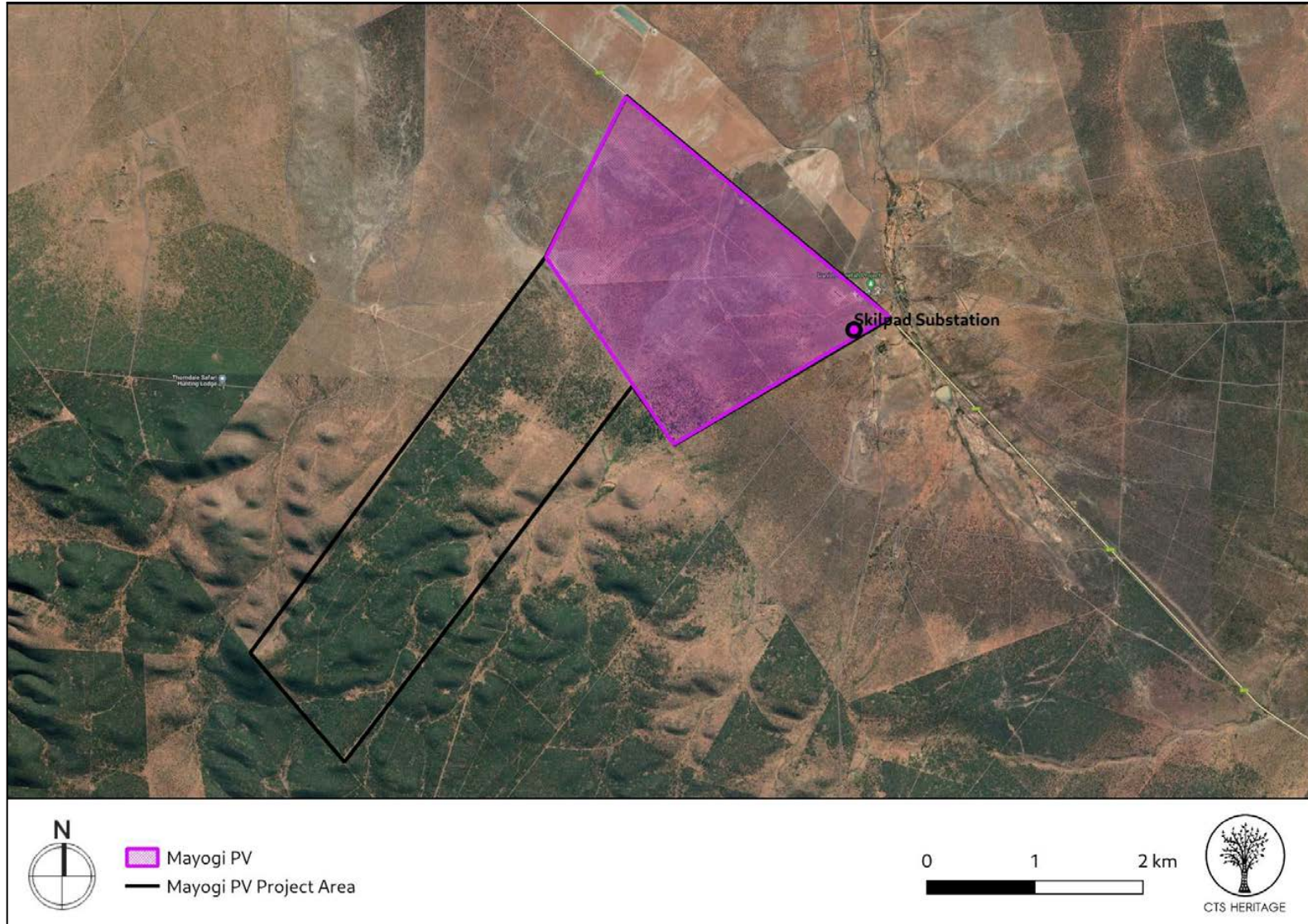


Figure 1.2: Satellite image indicating proposed location of development



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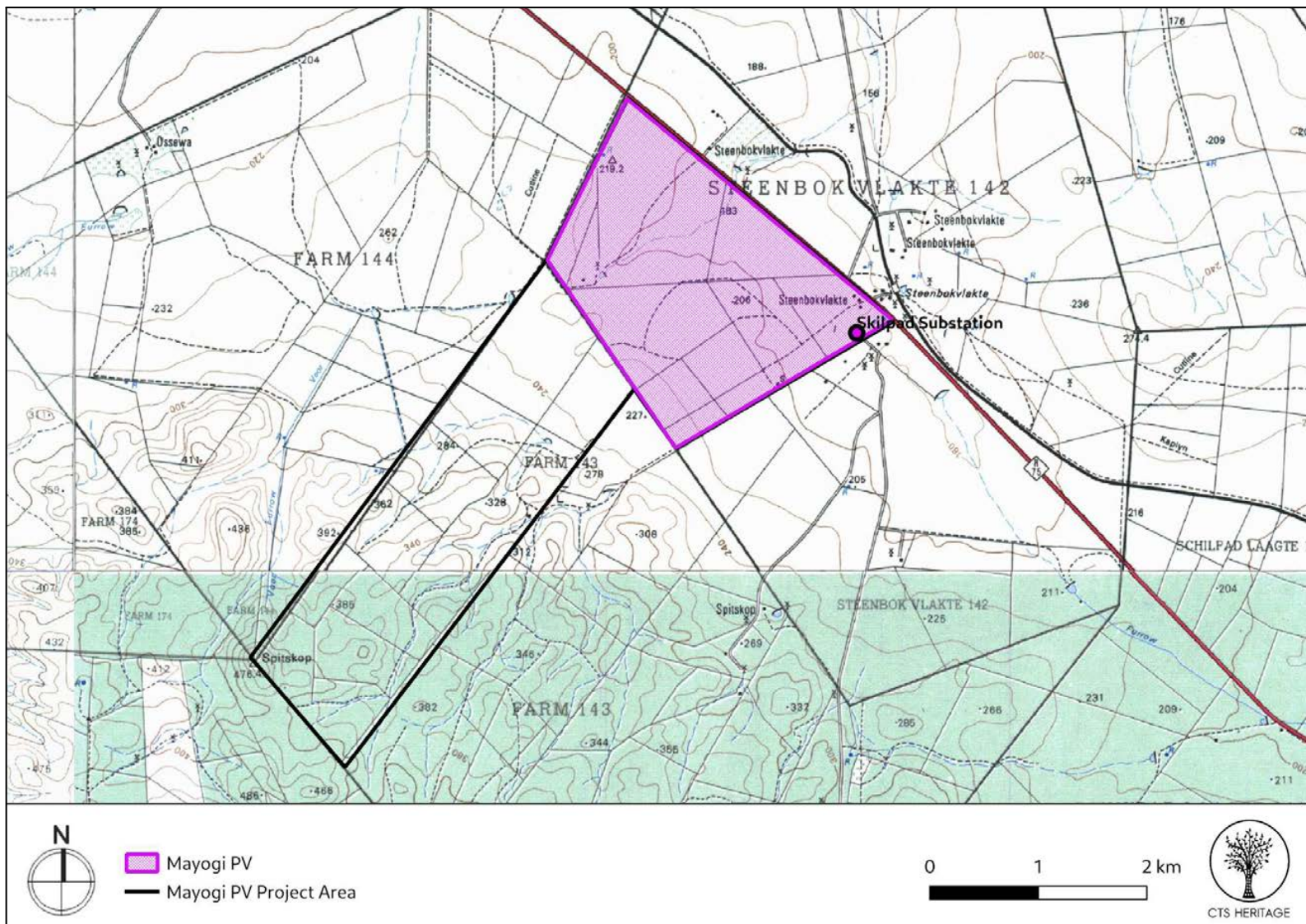


Figure 1.3: Proposed project boundary - Topo Map



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2. METHODOLOGY

2.1 Purpose of Archaeological Study

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

2.2 Summary of steps followed

- An archaeologist conducted a survey of the site and its environs from 15 to 16 November 2022 to determine what archaeological resources are likely to be impacted by the proposed development.
- The area proposed for development was assessed on foot, photographs of the context and finds were taken, and tracks were recorded using a GPS.
- The identified resources were assessed to evaluate their heritage significance in terms of the grading system outlined in section 3 of the NHRA (Act 25 of 1999).
- Alternatives and mitigation options were discussed with the Environmental Assessment Practitioner.

2.3 Constraints & Limitations

The northern zone was relatively easier to survey as the terrain is level to undulating with only grassland and patches of Albany thicket present. The southern section is hilly throughout and was very densely vegetated by Albany thicket. It was only possible to traverse this area using the existing farm tracks that crisscross the southern section while the northern area was covered on foot and by mountain bike. In sampling the archaeological sensitivity of the area it was clear that the flatter ground to the north held more material than the hilly ground to the south. However, should development take place in the southern area it is possible that archaeological material would be revealed by vegetation clearing. We therefore have a reasonable level of confidence in the heritage sensitivities present in the northern section of the study area with only a moderate degree of coverage in the southern section due to the impenetrable vegetation cover.



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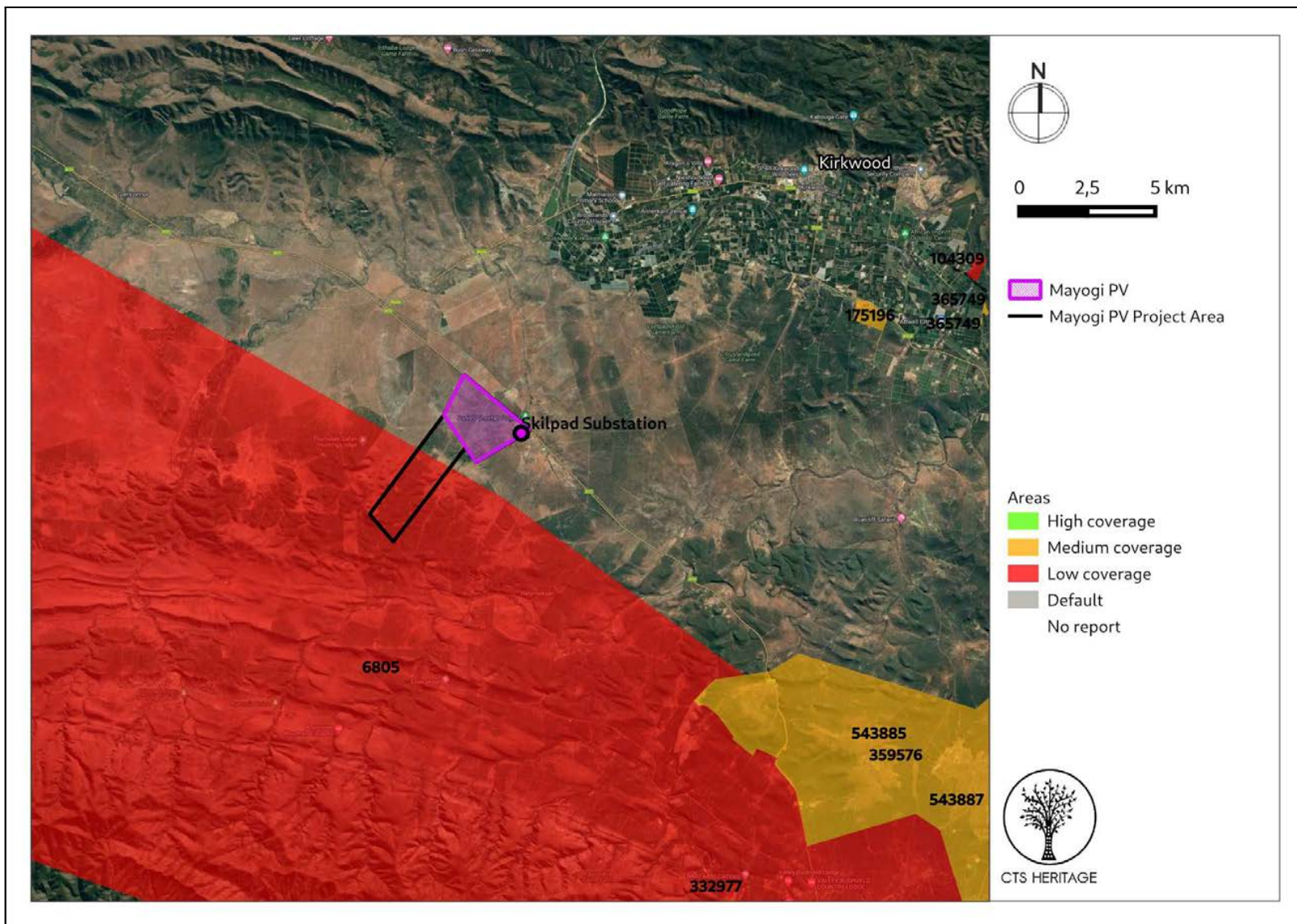


Figure 2: Close up satellite image indicating proposed location of development in relation to heritage studies previously conducted



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3. HISTORY AND EVOLUTION OF THE SITE AND CONTEXT

Background:

This application is for the proposed development of a PV facility and its grid collection on the south side of the R75 approximately 10km from Kirkwood and the Sunday's River Valley.

Cultural landscape and the Built Environment

At the beginning of the 19th century, the Sundays River formed the eastern border of the then Cape Colony. The broader area around Kirkwood was consequently the scene of many armed conflicts - Khoi against Xhosa, Khoi and Xhosa together against the Boers and British together and finally the Boers against the British during the Second Anglo-Boer War. Historic period remains are also found in the area, with early farmhouses, churches and several farm burial grounds having been noted, ranging from formal, enclosed graves to informal stone-packed burial mounds (Van Ryneveld 2016, NID 374575).

The Sundays River Valley irrigation scheme was started in the early 1920s, targeting British settlers on small holdings (10 morgen in size) along the banks of the Sundays River. A large dam was constructed on the Sundays River (Lake Mentz) to supply the area with water for irrigation, and a canal system was put in place to supply water to farms from Kirkwood, at the upper end of the valley, to Addo at the lower end.

Importantly, the ACO (2014) noted that the broader context within which this development occurs has high levels of cultural landscape significance. As noted in ACO (2014), "The construction of a major transmission line (Eskom's 765 kW Gamma-Grassridge) has been approved but not yet built. It will cross the western side of the study area through Soutpans Poort and is expected to be a major new visual intrusion. In terms of the assessment checklist published by Baumann, Winter, Aikman (2005) the landscape is largely intact as a natural landscape and intrusions within the last 60 years have been moderate. The aesthetic qualities can be described as being of generally scenic (not dramatic) significance while certain niche areas are highly significant – especially the landscapes on the northern side of the Klein Winterhoek ridge as well as the Perdepoort which contains some dramatic scenery with a distinct character." Furthermore, as the proposed development consists of an expansion of existing infrastructure, there is no "change of character" to the site and no negative impact to the cultural landscape is anticipated from the proposed amendment to the road alignment.

Archaeology

As a source of freshwater, the Sundays River valley has likely been occupied continuously throughout history. According to Webley (2003 SAHRIS NID 4307), Early and Middle Stone Age scatters are found along the banks of the Sundays River. These scatters are found immediately below the topsoil, at a depth of no more than 30cm and appear to have been deposited through river action, and as such, are not *in situ*. The artefacts identified consist of flaked quartzite cobbles with cortex and quartzite flakes. Very few diagnostic flakes were identified. In her assessment of the number of borrow pits, van Ryneveld (2012, SAHRIS NID 49462) did not identify any archaeological resources within the two



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borrow pits located near the proposed development area. According to Gaigher (2013 SAHRIS NID 125198), “Excavations at sites such as Melkhoutboom and Vygeboom (inside Addo Park) have uncovered graves with rich grave goods indicating a complex belief system. The rock art too indicates the San occupants took part in trance before painting... Many of the shell middens in the Addo Park contain pottery, confirming the presence of the Khoekhoen in the area.” According to Gaigher (2013), “The majority of hunter-gatherer groups had been pushed out of the Zuurberg by the 1820’s and was forced to move further inland to escape European settlement on their lands.”

The previous heritage studies that have been conducted in the broader area have identified isolated and scattered artefacts of the Early, Middle and Later Stone Age (Binneman, 2010; NID 7159). Generally, archaeological artefacts in this region are found in road cuttings, tracks and paths as the dense vegetation of the area largely obscures their presence elsewhere. ESA material known from the area includes handaxes and cleavers that are usually found in river gravels, although *in situ* ESA tools have been found in spring deposits near Addo (Binneman 2016, NID 365749). MSA flake and blade tools are similarly usually found in secondary contexts, and may be found with associated fossil bone material (Binneman 2010). LSA sites, though present, are usually obscured by the dense vegetation in this region. When found, they are usually represented by limited numbers of stone tools and bone fragments, and organic preservation is generally poor (Binneman 2016). Cave sites in the nearby mountains, on the contrary, often contain well-preserved deposits and rock paintings. Khoe sites, dating to the past 2 000 years, also occur in the area, and their sites are marked by the presence of indigenous ceramics and domesticated animal bone. These groups were also responsible for the creation of large middens of freshwater mussels, sometimes associated with human burials, that can be found on the banks of the Sunday’s River (Binneman 2016). Burials and graves associated with pre-colonial as well as historic communities are also to be found in the area (Binneman 2013, NID 175196).

Historic period remains are also found in the area, with early farmhouses, churches and several farm burial grounds having been noted, ranging from formal, enclosed graves to informal stone-packed burial mounds (Van Ryneveld 2016, NID 374575).



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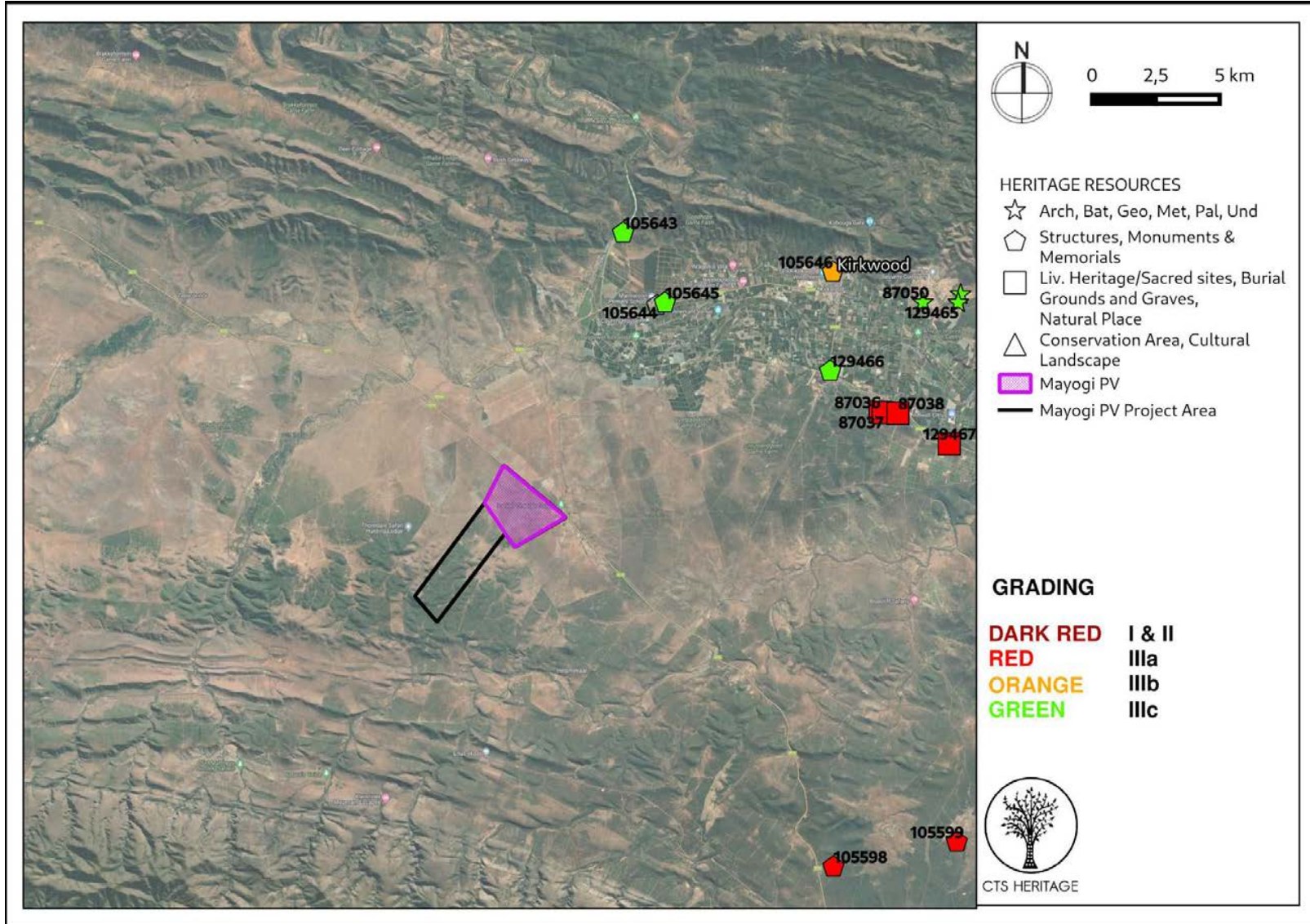


Figure 3. Heritage Resources Map. Heritage Resources previously identified in and near the study area, with SAHRIS Site IDs indicated



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4. IDENTIFICATION OF HERITAGE RESOURCES

4.1 Field Assessment

The archaeological survey resulted in nearly 60 observations and these were focussed in the northern area where the solar PV facilities have been proposed. Some Later Stone Age (LSA) material was found but the vast majority of sites consisted of quartzite flakes and cores dating to the MSA. A smaller contribution of siltstone flakes was also recorded but the extensive use of quartzite was indicative of the exploitation of sandstone gravels present in nearby streams and rivers. An early MSA component was also present and typical bifacial flakes and radial cores contributed to the assemblages. There were also some historical artefacts such as rusted metal, glass and ceramics closer to the R75 which are likely to be associated with the Steenbokvlakte farm and the migrant farming routes through this area from the 19th century onwards. There are no historic werfs or farm buildings in the study area and all of the modern built environment infrastructure relates to the game farming, water troughs and dams, the lodge chalets and the Skilpad substation. There are no natural shelters or overhangs on the property.



Figure 4.1: Existing structures located in the south east of the property



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Figure 4.2: Skilpad substation and existing structures in the south east of the property



Figure 4.3: Existing grid infrastructure within the development area



Figure 4.4: Existing grid infrastructure within the development area



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Figure 4.5: Contextual Images



Figure 4.6: Contextual images



Figure 4.7: Contextual images



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Figure 4.8: Contextual images



Figure 4.9: Contextual images



Figure 4.10: Contextual images



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Figure 4.11: Contextual images



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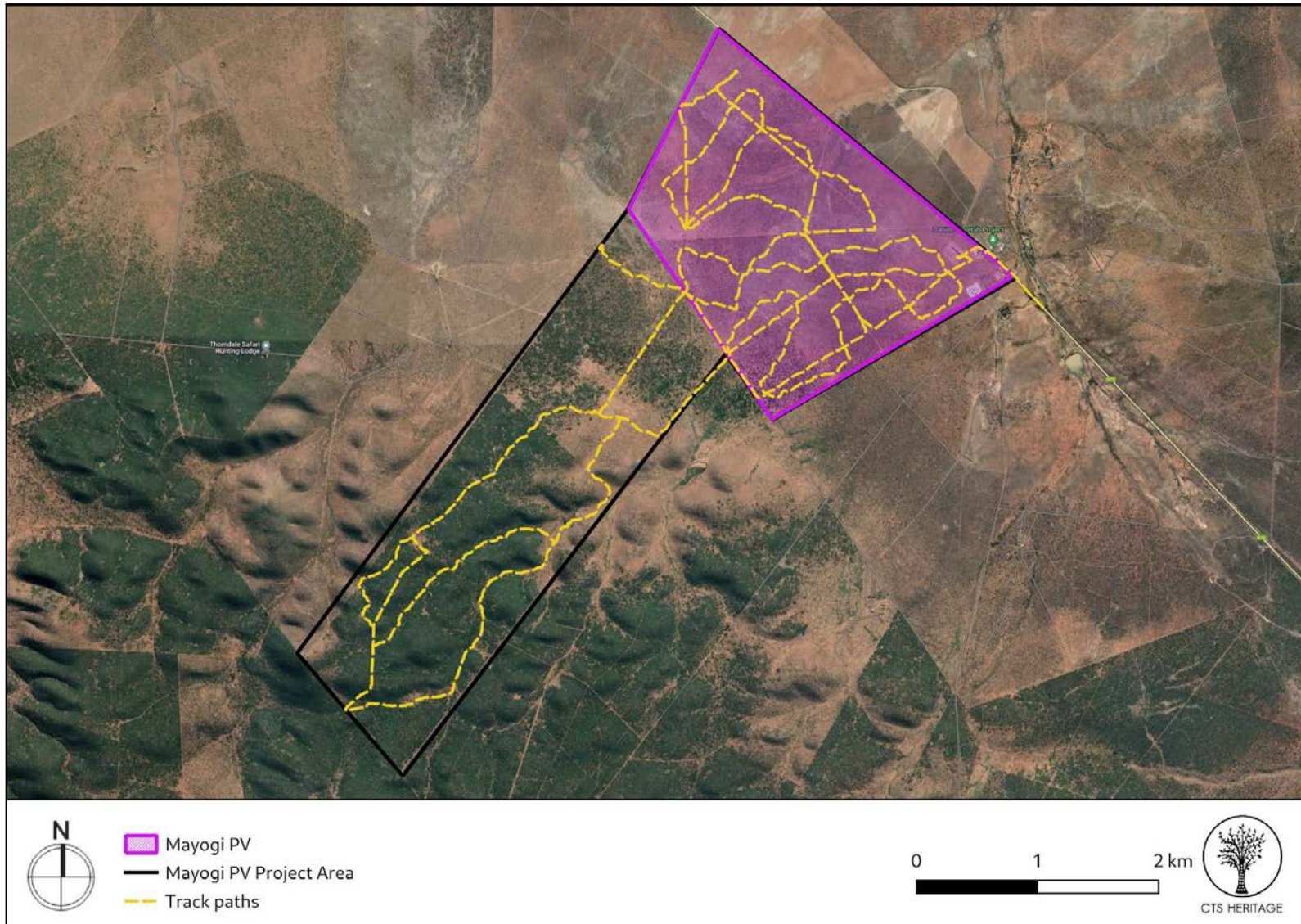


Figure 5: Trackpaths indicating the path walked by the specialist



4.2 Archaeological Resources identified

Table 1: Observations noted during the field assessment

POINT ID	Description	Type	Period	Density/m2	Co-ordinates		Grading	Mitigation
001	Quartzite points, flakes	Artefacts	LSA+MSA	10 to 30	-33.47597	25.31221	NCW	NA
002	Quartzite cores, flakes	Artefacts	MSA	0 to 5	-33.47463	25.31136	NCW	NA
003	Quartzite points	Artefacts	MSA	0 to 5	-33.47347	25.30782	NCW	NA
004	Quartzite flake and core	Artefacts	MSA	0 to 5	-33.47382	25.3056	NCW	NA
005	Elongated quartzite flake, rusted metal sheet	Artefacts	Historic, MSA	0 to 5	-33.47558	25.30264	NCW	NA
006	Ruined concrete dam, troughs	Structure	Modern	n/a	-33.47636	25.30142	NCW	NA
007	Various quartzite flakes, cores	Artefacts	MSA	5 to 10	-33.47406	25.30045	NCW	NA
008	Quartzite blade, flake	Artefacts	MSA	0 to 5	-33.47203	25.30029	NCW	NA
009	Quartzite, flaked core, darker flakes	Artefacts	MSA	5 to 10	-33.47061	25.30273	NCW	NA
010	Quartzite cores	Artefacts	MSA	0 to 5	-33.46894	25.30414	NCW	NA
011	Quartzite flakes	Artefacts	MSA	0 to 5	-33.46723	25.30537	NCW	NA
012	Quartzite point, bulb of percussion	Artefacts	MSA	0 to 5	-33.46604	25.30661	NCW	NA
013	Early MSA biface, flakes, quartzite	Artefacts	MSA	0 to 5	-33.46599	25.30812	NCW	NA
014	Quartzite radial core and flake	Artefacts	MSA	0 to 5	-33.46829	25.30854	NCW	NA
015	Quartzite debitage and flakes	Artefacts	MSA	0 to 5	-33.46903	25.31008	NCW	NA
016	Retouched quartzite flakes	Artefacts	MSA	0 to 5	-33.47072	25.31259	NCW	NA
017	Quartzite flakes	Artefacts	MSA	0 to 5	-33.4718	25.31397	NCW	NA
018	Historical artefacts, metal, bottles, brick	Artefacts	Historic	10 to 30	-33.47217	25.31554	NCW	NA
019	Upper grindstone, flakes, quartzite	Artefacts	LSA	0 to 5	-33.47298	25.31661	NCW	NA
020	Siltstone core, quartzite flake	Artefacts	MSA	0 to 5	-33.4733	25.31729	NCW	NA
021	Quartzite flakes	Artefacts	MSA	0 to 5	-33.47404	25.31778	NCW	NA
022	Quartzite flakes, retouched, hammerstone, historical metal, ceramics	Artefacts	LSA+MS, Historical	10 to 30	-33.47479	25.31817	NCW	NA
023	Quartzite flakes	Artefacts	MSA	0 to 5	-33.47604	25.31837	NCW	NA
024	Quartzite core and flake	Artefacts	MSA	0 to 5	-33.47602	25.31624	NCW	NA
025	Quartzite flakes	Artefacts	MSA	0 to 5	-33.47609	25.31441	NCW	NA
026	Quartzite flakes	Artefacts	MSA	0 to 5	-33.489405	25.293547	NCW	NA
027	Quartzite flakes	Artefacts	MSA	0 to 5	-33.498727	25.277358	NCW	NA
028	Old wheeled iron farm plough	Artefacts	Historic	0 to 5	-33.502965	25.275434	NCW	NA
029	Concrete tank	Structure	Modern	n/a	-33.511626	25.271672	NCW	NA
030	Quartzite flake	Artefacts	MSA	0 to 5	-33.510269	25.280755	NCW	NA
031	Concrete trough	Structure	Modern	n/a	-33.497748	25.291091	NCW	NA
032	Quartzite blade	Artefacts	MSA	0 to 5	-33.495361	25.294862	NCW	NA
033	Quartzite point	Artefacts	MSA	0 to 5	-33.483476	25.299191	NCW	NA
034	Pink quartzite flakes and flake blanks	Artefacts	MSA	0 to 5	-33.47818649	25.30098763	NCW	NA
035	Quartzite core and flake	Artefacts	MSA	0 to 5	-33.47799462	25.30333587	NCW	NA
036	Early MSA small biface, quartzite and shale point	Artefacts	MSA	0 to 5	-33.47907222	25.30576212	NCW	NA
037	Quartzite point and larger flake	Artefacts	MSA	0 to 5	-33.4785214	25.31042562	NCW	NA
038	Quartzite flakes	Artefacts	MSA	5 to 10	-33.47903567	25.31246128	NCW	NA
039	Retouched quartzite flakes	Artefacts	MSA	0 to 5	-33.47759222	25.31500224	NCW	NA



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040	Quartzite blade	Artefacts	MSA	0 to 5	-33.47705648	25.32234359	NCW	NA
041	Various quartzite flakes, cores	Artefacts	MSA	5 to 10	-33.4786128	25.32444947	NCW	NA
042	Broken siltstone UG, quartzite flakes	Artefacts	MSA, LSA	0 to 5	-33.48102964	25.32515613	NCW	NA
043	Quartzite flakes	Artefacts	MSA	0 to 5	-33.48246666	25.32279181	NCW	NA
044	Quartzite point, siltstone UG	Artefacts	LSA	0 to 5	-33.48102714	25.32090993	NCW	NA
045	Quartzite flakes	Artefacts	MSA	0 to 5	-33.48056282	25.31672604	NCW	NA
046	Quartzite core	Artefacts	MSA	0 to 5	-33.4821102	25.3145424	NCW	NA
047	Quartzite flakes, points, some retouch	Artefacts	MSA	5 to 10	-33.48333597	25.31520455	NCW	NA
048	Quartzite core and points	Artefacts	MSA	0 to 5	-33.48590057	25.3157338	NCW	NA
049	Quartzite flakes	Artefacts	MSA	0 to 5	-33.48694118	25.31320892	NCW	NA
050	Quartzite flakes, some pink coloured points	Artefacts	MSA	0 to 5	-33.48728769	25.31237921	NCW	NA
051	Elongated quartzite flake, point	Artefacts	MSA	0 to 5	-33.48792469	25.31042083	NCW	NA
052	Fine grained quartzite flakes, one retouched for hafting	Artefacts	LSA, MSA	5 to 10	-33.48695203	25.30884719	NCW	NA
053	Quartzite flakes, light coloured	Artefacts	MSA	0 to 5	-33.48504005	25.3102136	NCW	NA
054	Quartzite cores, one radial, flakes	Artefacts	MSA	10 to 30	-33.48264821	25.311511	NCW	NA
055	Retouched quartzite flakes	Artefacts	MSA	0 to 5	-33.48128102	25.30970959	NCW	NA
056	Quartzite flakes	Artefacts	MSA	0 to 5	-33.48171341	25.3079207	NCW	NA
057	Quartzite points	Artefacts	LSA	0 to 5	-33.48319775	25.30602442	NCW	NA
058	Radial core and point, quartzite	Artefacts	MSA	0 to 5	-33.48456558	25.30524082	NCW	NA



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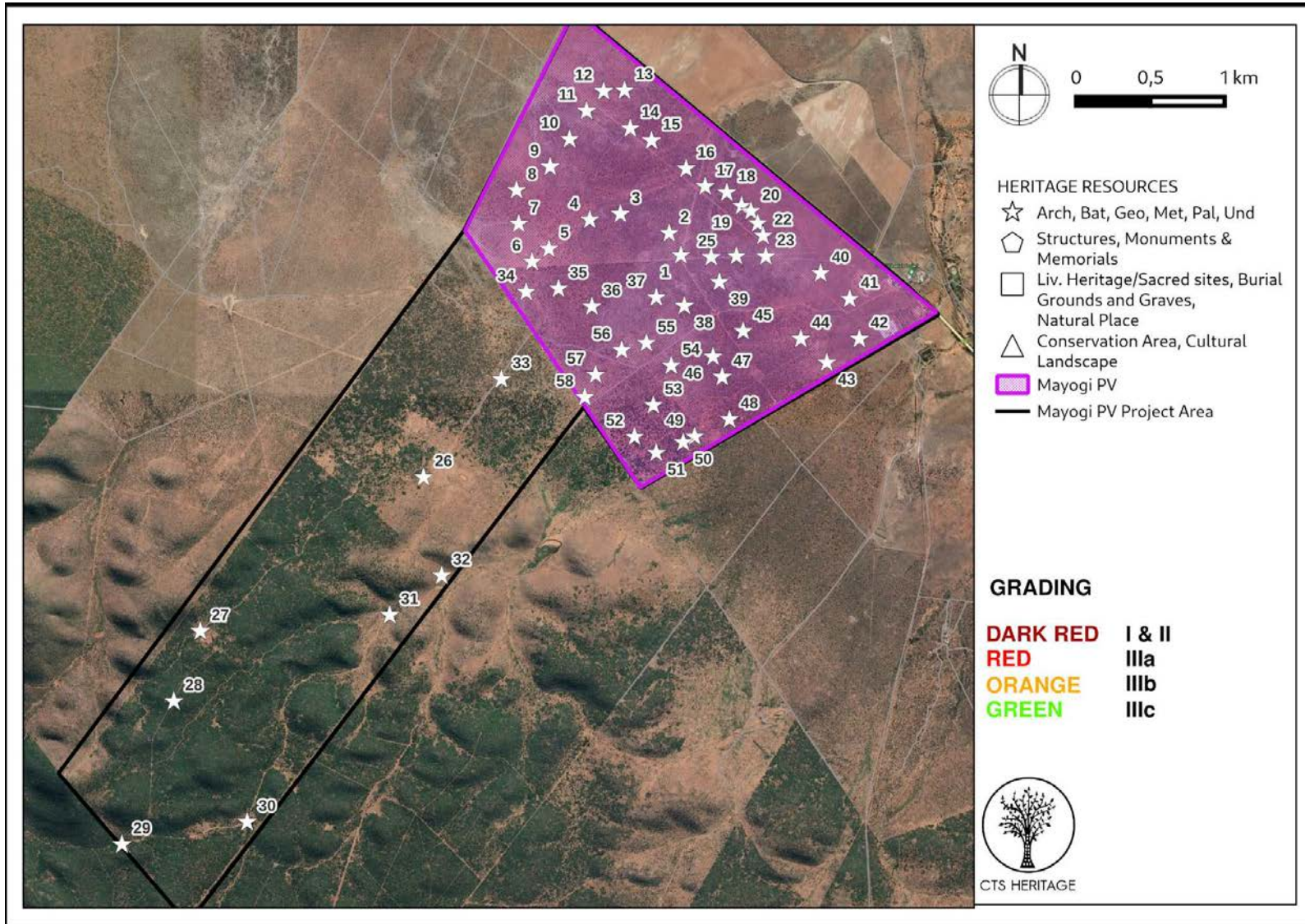


Figure 6: Map of heritage resources identified during the field assessment relative to the proposed development footprint



4.3 Selected photographic record

(a full photographic record is available upon request)



Figure 7.1: Observation 001 and 002



Figure 7.2: Observation 003 and 004



Figure 7.3: Observation 006 and 007



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Figure 7.4: Observation 009



Figure 7.5 Observation 011 and 013



Figure 7.6 Observation 014 and 017



Figure 7.7 Observation 020 and 023



Figure 7.8 Observation 027 and 030



Figure 7.9: Observation 034 and 037



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Figure 7.10: Observation 040 and 043



Figure 7.11: Observation 046 and 050



Figure 7.12: Observation 053 and 058



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5. ASSESSMENT OF THE IMPACT OF THE DEVELOPMENT

5.1 Assessment of impact to Archaeological Resources

No impact to significant archaeological or cultural heritage resources is anticipated.

6. CONCLUSION AND RECOMMENDATIONS

The previous heritage studies that have been conducted in the broader area have identified isolated and scattered artefacts of the Early, Middle and Later Stone Age (Binneman, 2010; NID 7159). The findings of this assessment corroborate the characterisation of the area made by other specialists.

The field survey identified a number of isolated artefacts, none of which are dense enough to be considered an archaeological site. None of the archaeological observations made have sufficient scientific value to warrant their retention and as such, have been graded as Not Conservation-Worthy. The recording of their presence in this report is considered sufficient.

Based on the outcomes of this assessment, it is unlikely that the proposed development will negatively impact on significant archaeological or cultural heritage resources.

Recommendations

Based on the outcomes of this report, it is not anticipated that the proposed development will negatively impact on significant archaeological heritage on condition that:

- Although all possible care has been taken to identify sites of cultural importance during the investigation of the study area, it is always possible that hidden or subsurface sites could be overlooked during the assessment. If any evidence of archaeological sites or remains (e.g. remnants of stone-made structures, indigenous ceramics, bones, stone artefacts, ostrich eggshell fragments, charcoal and ash concentrations), fossils, burials or other categories of heritage resources are found during the proposed development, work must cease in the vicinity of the find and SAHRA must be alerted immediately to determine an appropriate way forward.



7. REFERENCES

Heritage Impact Assessments				
Nid	Report Type	Author/s	Date	Title
104309	AIA Phase 1	Johan Binneman	01/05/2012	A Phase 1 Archaeological Impact Assessment for the proposed expansion of the existing agricultural activities on Falcon Ridge, Portion 274 of Strathomers estate no. 42, Sundays River Valley Municipality, Eastern Cape Province.
125198	Heritage Impact Assessment Specialist Reports	Stephan Gaigher	01/07/2013	HERITAGE IMPACT ASSESSMENT FOR THE PROPOSED UPGRADING OF STORMWATER INFRASTRUCTURE IN VALENCIA, ADDO, SUNDAYS RIVER VALLEYMUNICIPALITY, EASTERN CAPE PROVINCE
136577	AIA Phase 1	Johan Binneman	05/09/2012	A PHASE 1 ARCHAEOLOGICAL IMPACT ASSESSMENT FOR THE PROPOSED EXPANSION OF THE EXISTING AGRICULTURAL ACTIVITIES ON RIVER BEND CITRUS FARM, REMAINDER OF FARM 82 WOLVE KOP, PORTION 1 OF FARM 77 WELLSHAVEN AND PORTION 3 OF FARM 77 HONEYVALE, NEAR ADDO, SUNDAYS RIVER VALLEY MUNICIPALITY, EASTERN CAPE PROVINCE
136577	AIA Phase 1	Johan Binneman	05/09/2012	A PHASE 1 ARCHAEOLOGICAL IMPACT ASSESSMENT FOR THE PROPOSED EXPANSION OF THE EXISTING AGRICULTURAL ACTIVITIES ON RIVER BEND CITRUS FARM, REMAINDER OF FARM 82 WOLVE KOP, PORTION 1 OF FARM 77 WELLSHAVEN AND PORTION 3 OF FARM 77 HONEYVALE, NEAR ADDO, SUNDAYS RIVER VALLEY MUNICIPALITY, EASTERN CAPE PROVINCE
136578	PIA Desktop	John E Almond	01/08/2012	PALAEONTOLOGICAL SPECIALIST STUDY: DESKTOP ASSESSMENT Expansion of River Bend Citrus Farm near Addo, Sundays River Valley Municipality, Eastern Cape
136578	PIA Desktop	John E Almond	01/08/2012	PALAEONTOLOGICAL SPECIALIST STUDY: DESKTOP ASSESSMENT Expansion of River Bend Citrus Farm near Addo, Sundays River Valley Municipality, Eastern Cape
174009	HIA Letter of Exemption	Johan Binneman	30/06/2014	LETTER OF RECOMMENDATION (WITH CONDITIONS) FOR THE EXEMPTION OF A FULL PHASE 1 ARCHAEOLOGICAL HERITAGE IMPACT ASSESSMENT FOR THE PROPOSED SACE RANGER PHOTOVOLTAIC (SOLAR) PLANT NEAR UITENHAGE, EASTERN CAPE PROVINCE
175196	HIA Phase 1	Johan Binneman	01/04/2013	A PHASE 1 ARCHAEOLOGICAL IMPACT ASSESSMENT FOR THE PROPOSED CLEARING OF LAND FOR AGRICULTURAL PURPOSES ON PANZI CITRUS FARM NEAR KIRKWOOD, DIVISION OF UITENHAGE, SUNDAYS RIVER VALLEY MUNICIPALITY, EASTERN CAPE PROVINCE
332977	Desktop Assessment	Mariagrazia Galimberti, Kyla Bluff, Nicholas Wiltshire	25/09/2015	CTS15_012 - Uitenhage Gasification Plant
357420	Desktop	Mariagrazia	15/02/2016	Heritage Screener: CEN Hermitage Citrus and Storage Expansion Eastern



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	Assessment	Galimberti, Kyla Bluff, Nicholas Wiltshire		Cape
357424	Desktop Assessment	Mariagrazia Galimberti, Kyla Bluff, Nicholas Wiltshire	15/02/2016	Heritage Screener: CEN Summerville Citrus and Storage Expansion Eastern Cape
357428	Desktop Assessment	Mariagrazia Galimberti, Kyla Bluff, Nicholas Wiltshire	25/02/2016	Heritage Screener: PPC Dubrody Citrus, Kirkwood
359574	HIA Phase 1	Karen Van Ryneveld	15/09/2014	Phase 1 Archaeological & Cultural Heritage Impact Assessment â€œ The Dassiesridge Wind Energy Facility (WEF), between Kirkwood and Uitenhage, Cacadu District, Eastern Cape, South Africa. 15 September 2014. Prepared by: Karen van Ryneveld (ArchaeoMaps). E-mail: kvanryneveld@gmail.com; Tel: 084 871 1064; Postal Address: Postnet Suite 239, Private Bag X3, Beacon Bay, 5205
359576	PIA Phase 1	John E. Almond	15/10/2014	PROPOSED DASSIESRIDGE WIND ENERGY FACILITY NEAR UITENHAGE, CACADU DISTRICT, EASTERN CAPE. By John E. Almond,
365749	AIA Phase 1	Johan Binneman	29/02/2016	PHASE 1 ARCHAEOLOGICAL IMPACT ASSESSMENTS FOR THE PROPOSED CLEARING OF VEGETATION IN THREE AREAS TO ESTABLISH CITRUS ORCHARDS ON THE FARM BOSCHKRAAL NEAR KIRKWOOD, SUNDAYâ€™S RIVER VALLEY LOCAL MUNICIPALITY EASTERN CAPE PROVINCE
4307	AIA Phase 1	Lita Webley	11/06/2003	Addo Elephant National Park: Upgrading of Existing Tourist Road Network and Construction of Southern Access Road near Colchester - Phase 1 Archaeological Impact Assessment
6805	AIA Phase 1	Len van Schalkwyk, Elizabeth Wahl	01/09/2007	Heritage Impact Assessment of Gamma Grassridge Power Line Corridors and Substation, Eastern, Western and Northern Cape Provinces, South Africa
7159	AIA Phase 1	Johan Binneman	23/11/2010	A PHASE 1 ARCHAEOLOGICAL IMPACT ASSESSMENT FOR THE PROPOSED EXPANSION OF AGRICULTURAL ACTIVITIES ON PORTION 20 OF FARM 84, LANDDROST VEEPLAATS, KIRKWOOD, SUNDAYS RIVER VALLEY MUNICIPALITY, EASTERN CAPE PROVINCE



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APPENDIX 2: Palaeontological Assessment (2022)



PALAEONTOLOGICAL IMPACT ASSESSMENT

PROPOSED MAYOGI PHOTOVOLTAIC ENERGY FACILITY NEAR KIRKWOOD IN THE EASTERN CAPE PROVINCE

2022

COMPILED for: CTS HERITAGE



Declaration of Independence

I, Elize Butler, declare that –

General declaration:

- I act as the independent palaeontological specialist in this application
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favorable to the applicant
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting palaeontological impact assessments, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I will take into account, to the extent possible, the matters listed in section 38 of the NHRA when preparing the application and any report relating to the application;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- I will ensure that information containing all relevant facts in respect of the application is distributed or made available to interested and affected parties and the public and that participation by interested and affected parties is facilitated in such a manner that all interested and affected parties will be provided with a reasonable opportunity to participate and to provide comments on documents that are produced to support the application;
- I will provide the competent authority with access to all information at my disposal regarding the application, whether such information is favorable to the applicant or not
- All the particulars furnished by me in this form are true and correct;
- I will perform all other obligations as expected a palaeontological specialist in terms of the Act and the constitutions of my affiliated professional bodies; and



- I realize that a false declaration is an offense in terms of regulation 71 of the Regulations and is punishable in terms of section 24F of the NEMA.

Disclosure of Vested Interest

I do not have and will not have any vested interest (either business, financial, personal or other) in the proposed activity proceeding other than remuneration for work performed in terms of the Regulations.

PALAEONTOLOGICAL CONSULTANT:

Banzai Environmental (Pty) Ltd

CONTACT PERSON:

Elize Butler

Tel: +27 844478759

Email: elizebutler002@gmail.com

SIGNATURE:



This Palaeontological Impact Assessment (PIA) report has been compiled considering the National Environmental Management Act 1998 (NEMA) and Environmental Impact Regulations 2014 as amended, requirements for specialist reports, Appendix 6, as indicated in the table below.

Table 1: Checklist for Specialist studies conformance with Appendix 6 of the EIA Regulations of 2014 (as amended)

Requirements of Appendix 6 – GN R326 EIA Regulations of 7 April 2017	The relevant section in the report	Comment where not applicable.
1.(1) (a) (i) Details of the specialist who prepared the report	Page ii and Section 2 of Report – Contact details and company and Appendix A	-
(ii) The expertise of that person to compile a specialist report including a curriculum vita	Section 2 – refer to Appendix A	-
(b) A declaration that the person is independent in a form as may be specified by the competent authority	Page ii of the report	-
(c) An indication of the scope of, and the purpose for which, the report was prepared	Section 4 – Objective	-
(cA) An indication of the quality and age of base data used for the specialist report	Section 5 – Geological and Palaeontological history	-
(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	Section 10	-
(d) The duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment	Section 1;9 & 11	
(e) a description of the methodology adopted in preparing the report or carrying out the specialised	Section 7 Approach and	-



process inclusive of equipment and modelling used	Methodology	
(f) details of an assessment of the specifically identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives;	Section 1; & 11	
(g) An identification of any areas to be avoided, including buffers	Section 1 & 11	
(h) A map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	Section 5 – Geological and Palaeontological history	
(i) A description of any assumptions made and any uncertainties or gaps in knowledge;	Section 7.1 – Assumptions and Limitation	-
(j) A description of the findings and potential implications of such findings on the impact of the proposed activity, including identified alternatives, on the environment	Section 1 and 11	
(k) Any mitigation measures for inclusion in the EMPr	Section 12	
(l) Any conditions for inclusion in the environmental authorisation	Section 12	
(m) Any monitoring requirements for inclusion in the EMPr or environmental authorisation	Section 12	
(n)(i) A reasoned opinion as to whether the proposed activity, activities or portions thereof should be authorised and	Section 1 & 11	
(n)(iA) A reasoned opinion regarding the acceptability of the proposed activity or activities; and		
(n)(ii) If the opinion is that the proposed activity,	Section 1 and 11	-



activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMP, and where applicable, the closure plan		
(o) A description of any consultation process that was undertaken during the course of carrying out the study	N/A	Not applicable. A public consultation process was handled as part of the Environmental Impact Assessment (EIA) and Environmental Management Plan (EMP) process.
(p) A summary and copies of any comments that were received during any consultation process	N/A	Not applicable. To date, no comments regarding heritage resources that require input from a specialist have been raised.
(q) Any other information requested by the competent authority.	N/A	Not applicable.
(2) Where a government notice by the Minister provides for any protocol or minimum information requirement to	Section 3 compliance with	



be applied to a specialist report, the requirements as indicated in such notice will apply.	SAHRA guidelines	
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EXECUTIVE SUMMARY

Banzai Environmental was appointed by CTS Heritage to conduct the Palaeontological Impact Assessment (PIA) to assess the Mayogi Solar Photovoltaic (PV) Renewable Energy Facility near Kirkwood in the Sundays River Valley (Eastern Cape Province). In accordance with the National Environmental Management Act 107 of 1998 (NEMA) and to comply with the National Heritage Resources Act (No 25 of 1999, section 38) (NHRA), this PIA is necessary to confirm if fossil material could potentially be present in the planned development area, to evaluate the potential impact of the proposed development on the Palaeontological Heritage and to mitigate possible damage to fossil resources.

The proposed Mayogi Solar PV Facility is underlain by Kirkwood Formation (Uitenhage Group). The PalaeoMap of the South African Heritage Resources Information System (SAHRIS) indicates that the Palaeontological Sensitivity of the Kirkwood Formation (Uitenhage Group) is Very High (Almond and Pether, 2009; Almond *et al.*, 2013). Recent updated Geology (Council of Geosciences) corresponds with the geological map and indicates that the proposed development is underlain by the Kirkwood Formation.

A site-specific field survey of the development footprint was conducted on foot and by motor vehicle on the weekend of 20 January 2023. No fossiliferous outcrop was detected in the proposed development area. A Medium Palaeontological Significance has been allocated to the Mayogi PV development. It is therefore considered that the proposed development will not lead to damaging impacts on the palaeontological resources of the area. The construction of the development may thus be permitted in its whole extent, as the development footprint is not considered sensitive in terms of palaeontological resources.

Recommendations:

- The ECO for this project must be informed that the Kirkwood Formation of the Uitenhage Group has a **Very High Palaeontological Sensitivity**.
- If Palaeontological Heritage is uncovered during surface clearing and excavations the **Chance find Protocol** attached should be implemented immediately. Fossil discoveries ought to be protected and the ECO/site manager must report to South African Heritage Resources Agency (SAHRA) (Contact details: Eastern Cape Provincial Heritage Resources Authority (ECPHRA), 16 Commissioner Street, East London, 5201, South Africa. Tel: 043 745 0888. Fax: 043 745 0889., email: info@ecphra.org.za; Web: <https://www.ecphra.org.za/>) so that mitigation (recording and collection) can be carried out.
- Before any fossil material can be collected from the development site the specialist involved would need to apply for a collection permit from SAHRA. Fossil material must be housed in an official collection (museum or university), while all reports and fieldwork



should meet the minimum standards for palaeontological impact studies proposed by SAHRA (2012).

- These recommendations should be incorporated into the Environmental Management Plan for the Mayogi Solar PV Facility.

Impact Summary

Environmental parameter	Issues	Rating prior to mitigation	Average	Rating post mitigation	Average
Planning Phase Mayogi Solar PV Facility	No Impact	0	No Impact	0	No Impact
Construction Stage Mayogi Solar PV Facility Loss of fossil heritage	Destroy or permanently seal-in fossils at or below the surface that are then no longer available for scientific study	45	Negative Medium impact	30	Negative Medium impact
Operational Phase Mayogi Solar PV Facility	No Impact	0	No Impact	0	No Impact
Decommissioning Phase Mayogi Solar PV Facility	No Impact	0	No Impact	0	No Impact

It is therefore considered that the proposed Mayogi Solar PV Facility is deemed appropriate and will not lead to detrimental impacts on the palaeontological reserves of the area. From a Palaeontological point of view the construction of the Mayogi development may be authorised in its whole extent.



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Appendix A: CV



1 INTRODUCTION

SIVEST Environmental has been appointed to commence with the required EIA / BA Processes for the construction of the Mayogi Solar PV Facility (Sarah Baartman Local Municipality, Dr Beyers Naude District Municipality) in the Sundays River Valley near Kirkwood in the Eastern Cape Province. CTS Heritage has been subcontracted to conduct the Archaeological Impact Assessment (AIA) and Banzai Environmental the Palaeontological Impact Assessment (PIA).

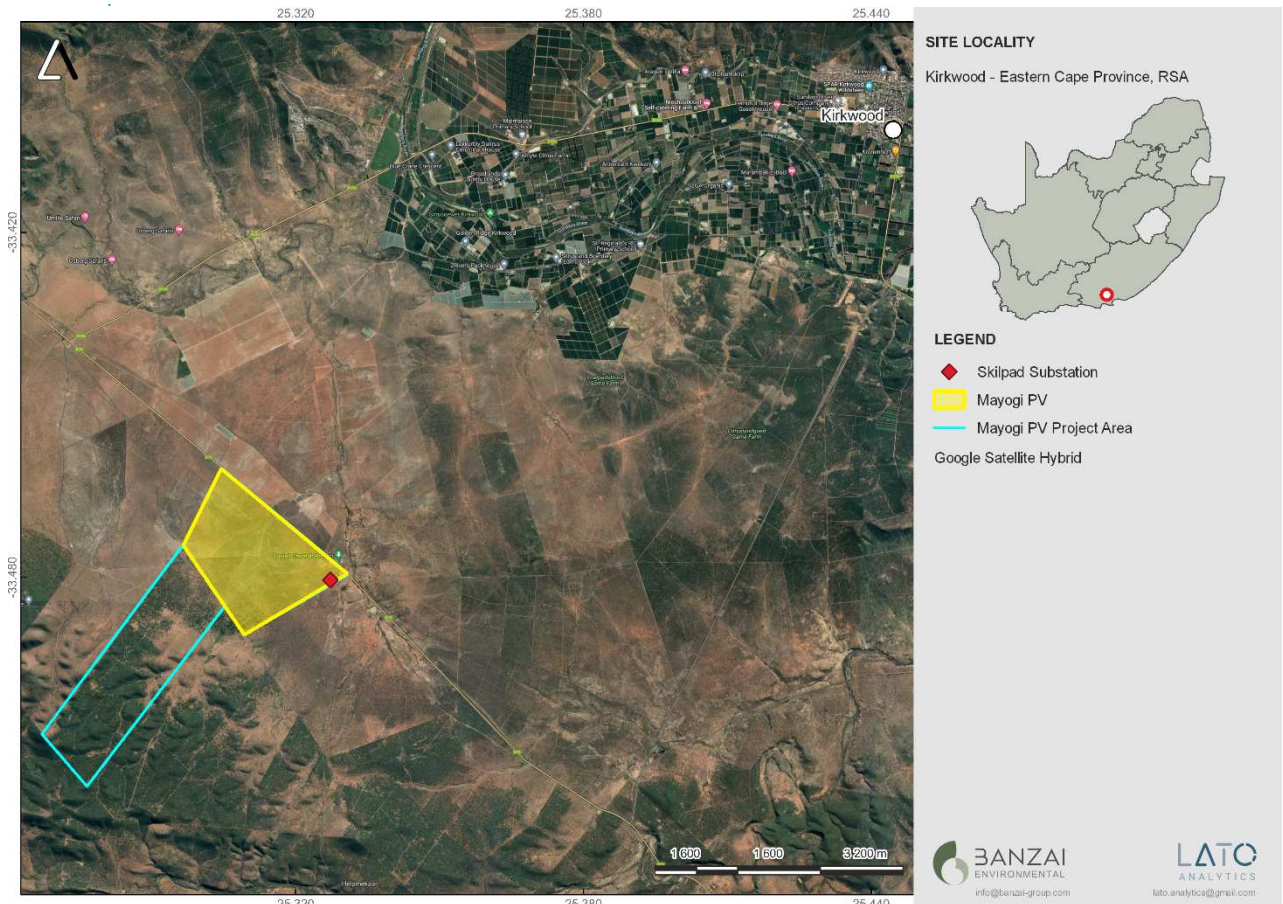


Figure 1: Regional locality of the proposed Mayogi Solar PV Renewable Energy Facility near Kirkwood in the Eastern Cape Province.

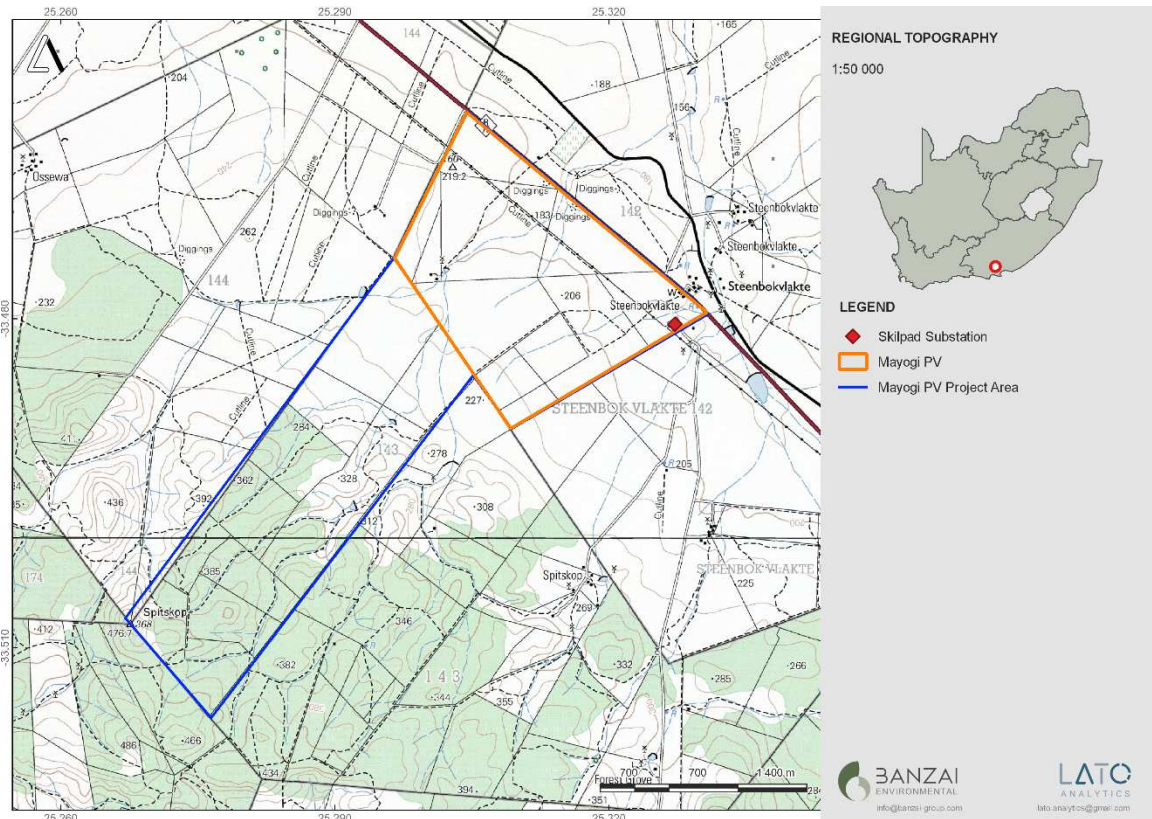


Figure 2: Locality map of the proposed Mayogi Solar PV Renewable Energy Facility near Kirkwood in the Eastern Cape Province.

2 QUALIFICATIONS AND EXPERIENCE OF THE AUTHOR

This study has been conducted by Mrs Elize Butler. She has conducted approximately 400 palaeontological impact assessments for developments in the Free State, KwaZulu-Natal, Eastern, Central, and Northern Cape, Northwest, Gauteng, Limpopo, and Mpumalanga. She has an MSc (*cum laude*) in Zoology (specializing in Palaeontology) from the University of the Free State, South Africa and has been working in Palaeontology for more than twenty-eight years. She has experience in locating, collecting, and curating fossils. She has been a member of the Palaeontological Society of South Africa (PSSA) since 2006 and has been conducting PIAs since 2014.

3. LEGISLATION

National Heritage Resources 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) (NHRA). 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”**.



The identification, evaluation and assessment of any cultural heritage site, artefact or finds in the South African context is required and governed by the following legislation:

- National Environmental Management Act (NEMA) Act 107 of 1998
- National Heritage Resources Act (NHRA) Act 25 of 1999
- Minerals and Petroleum Resources Development Act (MPRDA) Act 28 of 2002
- Notice 648 of the Government Gazette 45421- general requirements for undertaking an initial site sensitivity verification where no specific assessment protocol has been identified.

The next section in each Act is directly applicable to the identification, assessment, and evaluation of cultural heritage resources.

GNR 982 (Government Gazette 38282, 14 December 2014) promulgated under the National Environmental Management Act (NEMA) Act 107 of 1998

- Basic Assessment Report (BAR) – Regulations 19 and 23
- Environmental Impacts Assessment (EIA) – Regulation 23
- Environmental Scoping Report (ESR) – Regulation 21
- Environmental Management Programme (EMPr) – Regulations 19 and 23

National Heritage Resources Act (NHRA) Act 25 of 1999

- Protection of Heritage Resources – Sections 34 to 36
- Heritage Resources Management – Section 38

MPRDA Regulations of 2014

Environmental reports to be compiled for application of mining right – Regulation 48

- Contents of scoping report – Regulation 49
- Contents of environmental impact assessment report – Regulation 50
- Environmental management programme – Regulation 51
- Environmental management plan – Regulation 52

The NEMA (No 107 of 1998) states that an integrated EMP should (23:2 (b)) “...*identify, predict and evaluate the actual and potential impact on the environment, socio-economic conditions and cultural heritage*”.

In agreement with legislative requirements, EIA rating standards as well as SAHRA policies the following comprehensive and legally compatible PIA report have been compiled.

Palaeontological heritage is exceptional and non-renewable and is protected by the NHRA. Palaeontological resources and may not be unearthed, broken moved, or destroyed by any development without prior assessment and without a permit from the relevant heritage resources authority as per section 35 of the NHRA.

This Palaeontological Impact assessment forms part of the Heritage Impact Assessment (HIA) and adhere to the conditions of the Act. According to **Section 38 (1)**, an HIA is required to assess any potential impacts to palaeontological heritage within the development footprint where:

- the construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300 m in length.
- the construction of a bridge or similar structure exceeding 50 m in length.



- any development or other activity which will change the character of a site—
- (Exceeding 5 000 m² in extent; or
- involving three or more existing erven or subdivisions thereof; or
- involving three or more erven or divisions thereof which have been consolidated within the past five years; or
- the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority
- the re-zoning of a site exceeding 10 000 m² in extent.
- or any other category of development provided for in regulations by SAHRA or a Provincial heritage resources authority.

4. OBJECTIVE

The objective of a Palaeontological Impact Assessment (PIA) 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 PIA are: 1) to **identify** the palaeontological status of the exposed as well as rock formations just below the surface in the development footprint 2) to estimate the **palaeontological importance** of the formations 3) to determine the **impact** on fossil heritage; and 4) to recommend how the developer ought to protect or mitigate damage to fossil heritage.

The terms of reference of a PIA are as follows:

General Requirements:

- Adherence to the content requirements for specialist reports in accordance with Appendix 6 of the EIA Regulations 2014, as amended;
- Adherence to all applicable best practice recommendations, appropriate legislation and authority requirements;
- Submit a comprehensive overview of all appropriate legislation, guidelines;
- Description of the proposed project and provide information regarding the developer and consultant who commissioned the study,
- Description and location of the proposed development and provide geological and topographical maps
- Provide palaeontological and geological history of the affected area.
- Identification of sensitive areas to be avoided (providing shapefiles/kmls) in the proposed development;
- Evaluation of the significance of the planned development during the Pre-construction, Construction, Operation, Decommissioning Phases and Cumulative impacts. Potential impacts should be rated in terms of the direct, indirect and cumulative:
 - a. **Direct impacts** are impacts that are caused directly by the activity and generally occur at the same time and at the place of the activity.



- b. **Indirect impacts** of an activity are indirect or induced changes that may occur as a result of the activity.
- c. **Cumulative impacts** are impacting that result from the incremental impact of the proposed activity on a common resource when added to the impacts of other past, present or reasonably foreseeable future activities.
 - Fair assessment of alternatives (infrastructure alternatives have been provided):
 - Recommend mitigation measures to minimise the impact of the proposed development; and
 - Implications of specialist findings for the proposed development (such as permits, licenses etc).

5. GEOLOGICAL AND PALAEOONTOLOGICAL HISTORY

The geology of the proposed Mayogi PV near Kirkwood in the Eastern Cape Province is depicted on the 1: 250 000 Port Elizabeth 3324 (1979) Geological Map (Council for Geosciences, Pretoria) (**Figure 3, Table 2**). The proposed Mayogi PV development is underlain by the Kirkwood Formation (J-Kk, orange) of the Uitenhage Group. The PalaeoMap (**Figure 4, Table 3**) of the South African Heritage Resources Information System (SAHRIS) indicates that the Palaeontological Sensitivity of the Kirkwood Formation is Very High. (Almond and Pether, 2009; Almond *et al.*, 2013, Groenewald *et al* 2014. Recent updated Geology (Council of Geosciences Pretoria) (**Figure 5**) corresponds with the geological map and indicates that the proposed development is underlain by the Kirkwood Formation of the Uitenhage Group.

The Uitenhage Group consists of three formations namely the Enon (oldest), Kirkwood, and Sundays River Formation (youngest) (Torien and Hill, 1989). The Sundays River Formation is of Early Cretaceous age [approximately 136 Ma million years old (Ma)] (Valanginian-Hauterivian). This succession is up to 2km thick and consists of siltstones, thin-bedded grey sandstones, and finer-grained mudrocks that are often very fossiliferous (Shone 2006). Mc Millan (2003) described the depositional settings as estuarine through littoral (shoreline) to marine outer shelf. This formation can be distinguished from the underlying Kirkwood Formation by the

- the presence of prominent-weathering calcareous sandstones,
- absence of reddish-hued mudrocks, and
- the consistent occurrence of fossil marine shells.

The occurrence of fossilised marine shells is mostly associated with the calcareous, thin, sandstone beds, many of which are storm deposits (tempestites).

It appears that the Formations of the **Uitenhage Group** represent diverse depositional environments within a generally contemporaneous fluvial system, but the boundaries of the formations are not always clear. The oldest Enon Formation occasionally consist of remarkable boulder conglomerates that is characteristic of a high energy depositional environment (in both alluvial fans and braided rivers). The **Kirkwood Formation** (J-Kk) overlies the Enon formation, but the



contact is not always clear. The Kirkwood formation characterises the palaeosols and flood-plain deposits generally correlated with meandering river systems, as well as lacustrine, and probably coastal, settings. This formation is easily weathered and generally consists of sandstone and silty mudstones. Multi-coloured reddish brown, pinkish or greenish grey palaeosols are typical of this formation. The sandstones may be pale grey, yellowish or whitish in colour. The Kirkwood grades into the Sundays River Formation (Ks), which is the youngest formation of the Uitenhage Group and is represented by estuarine or shallow marine deposits. These deposits include rich marine invertebrate fauna (echinoderms and molluscs), vertebrates (plesiosaurs), microfossils (including foraminiferans and ostracods), as well as trace fossils.

The first fossils recovered from the Kirkwood Formation dates to 1845 with the discovery of fragmentary bones (partial skull with teeth) now identified as the stegosaur *Paranthodon africanus* (Atherstone, 1857; Galton and Coombs, 1981). Almost all vertebrate fossils recovered from the Kirkwood Formation are very fragmentary, and commonly only consists of isolated teeth and bones. The Kirkwood Formation is well-known for its Late Jurassic/ Early Cretaceous dinosaurs as well as diplodocid, stegasaurid, dicraeosaurid, and brachiosaurid forms, as well as coelosaur theropods and little iguanodontids. Other animal fossils include crocodiles, frogs, sphenodontid and other lizards, small mammals, and fish as well as turtles (McLachlan and McMillan 1976; Ross et al, 1999; de Klerk et al, 1998; de Klerk et al., 2000; McPhee et al., 2016). Invertebrate fossils is abundantly found in this formation and in the Kirkwood area estuarine and freshwater molluscs are found as well as crustaceans (conchostracans and ostracods) and oysters (McLachlan and McMillan 1976; MacRae 1999). Fossil plants near Kirkwood (especially along the Bezuidenhouts River) are the most well-represented in South Africa for this period (Anderson & Anderson, 1985; Bamford, 1986; MacRae, 1999; Muir et al., 2015). Studies conducted by Muir *et al* (2015) found an abundance of logs, as well as fossil charcoal on the Bezuidenhout River locality. Lignite and plant impression as well as amber, has been recovered. Plant impressions are seldom visible at the surface and are only found through the breaking of siltstones or mudrocks along bedding planes. Within the finer-grained siltstones and mudrocks plants such as Bennettitaleans, conifers, cycads, ferns and liverworts, are exposed by breaking the surrounding matrix. The Bezuidenhouts Riverbanks are especially well-known for its well-preserved plant impressions in blue-grey siltstones.

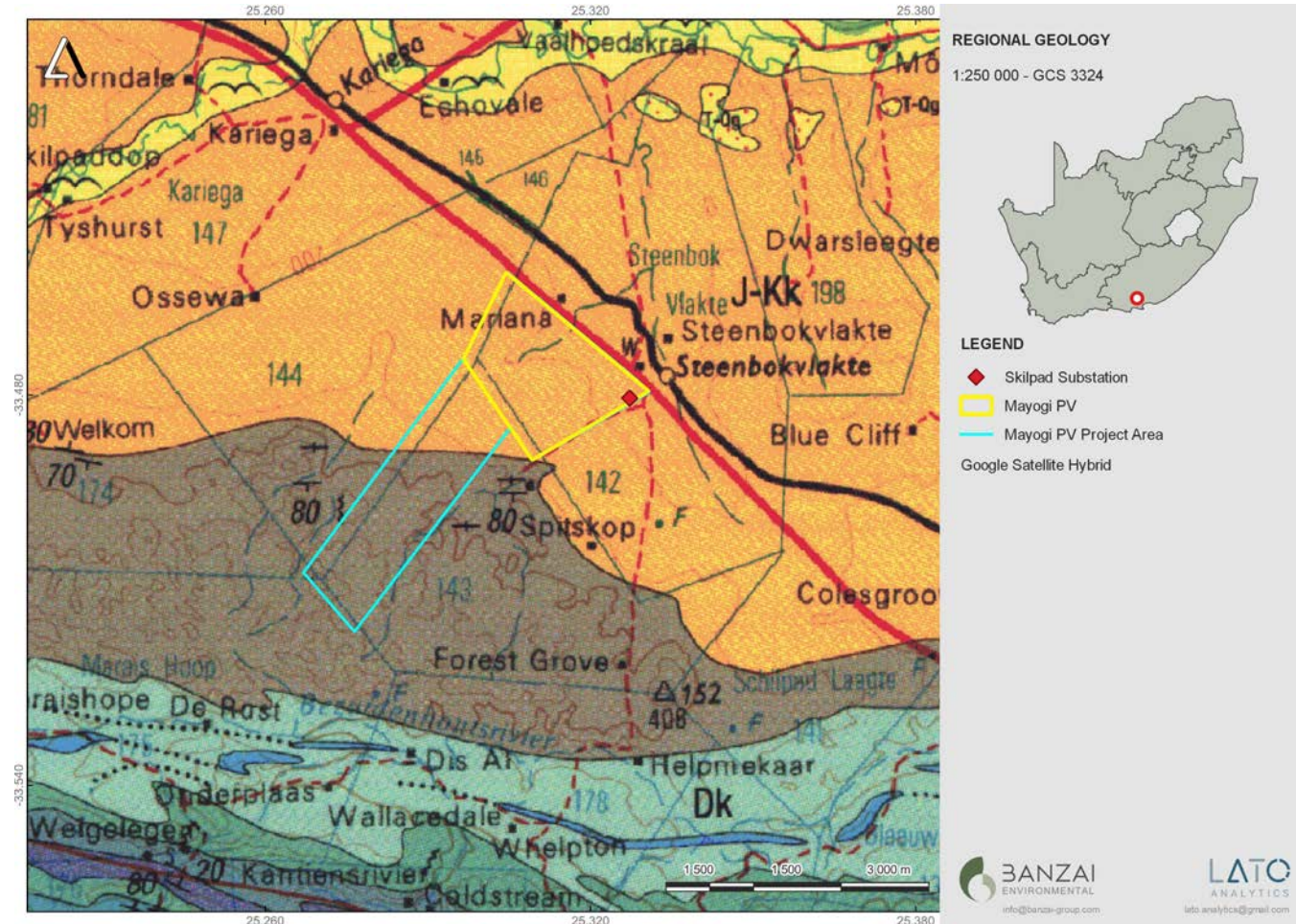


Figure 3: Extract of the 1:250 000 Port Elizabeth 3324 (1979) Geological Map (Council for Geosciences, Pretoria) indicating the proposed Mayogi PV development near Kirkwood in the Eastern Cape.

The proposed development is underlain by Kirkwood Formation (Uitenhage Group)



Table 2: Legend to the 1:250 000 Port Elizabeth 3324 (1979) Geological Map (Council for Geosciences, Pretoria).

Relevant sediments are indicated in a red square

KRYT CRETACEOUS	Sondagsrivier Sundays River	Ks	Groenerige grys moddersteen, sandsteen Greenish-grey mudstone, sandstone			
			UITENHAGE	Kirkwood	J-Kk	Rooierige en groenerige moddersteen, sandsteen Reddish and greenish mudstone, sandstone
						Enon
JURA						

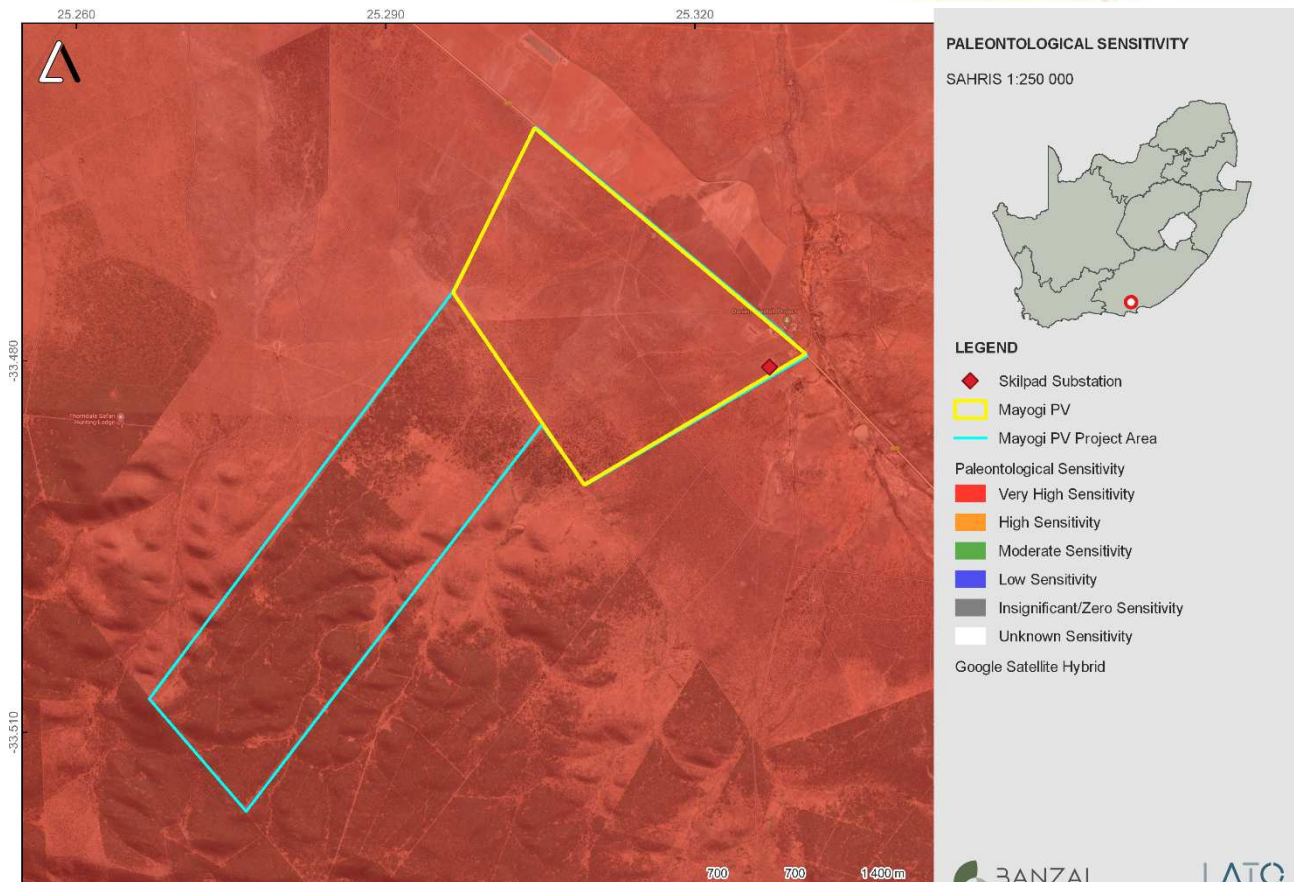




Table 3: Palaeontological Sensitivity according to the SAHRIS PalaeoMap (Almond et al, 2013; SAHRIS website.

Colour	Sensitivity	Required Action
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	LOW	No palaeontological studies are required however a protocol for finds is required
GREY	INSIGNIFICANT/ZERO	No palaeontological studies are required
WHITE/CLEAR	UNKNOWN	These areas will require a minimum of a desktop study. As more information comes to light, SAHRA will continue to populate the map.

The SAHRIS Palaeosensitivity map (**Figure 4**) indicates that the proposed development is underlain by sediments with a Very High (red) Palaeontological Sensitivity.

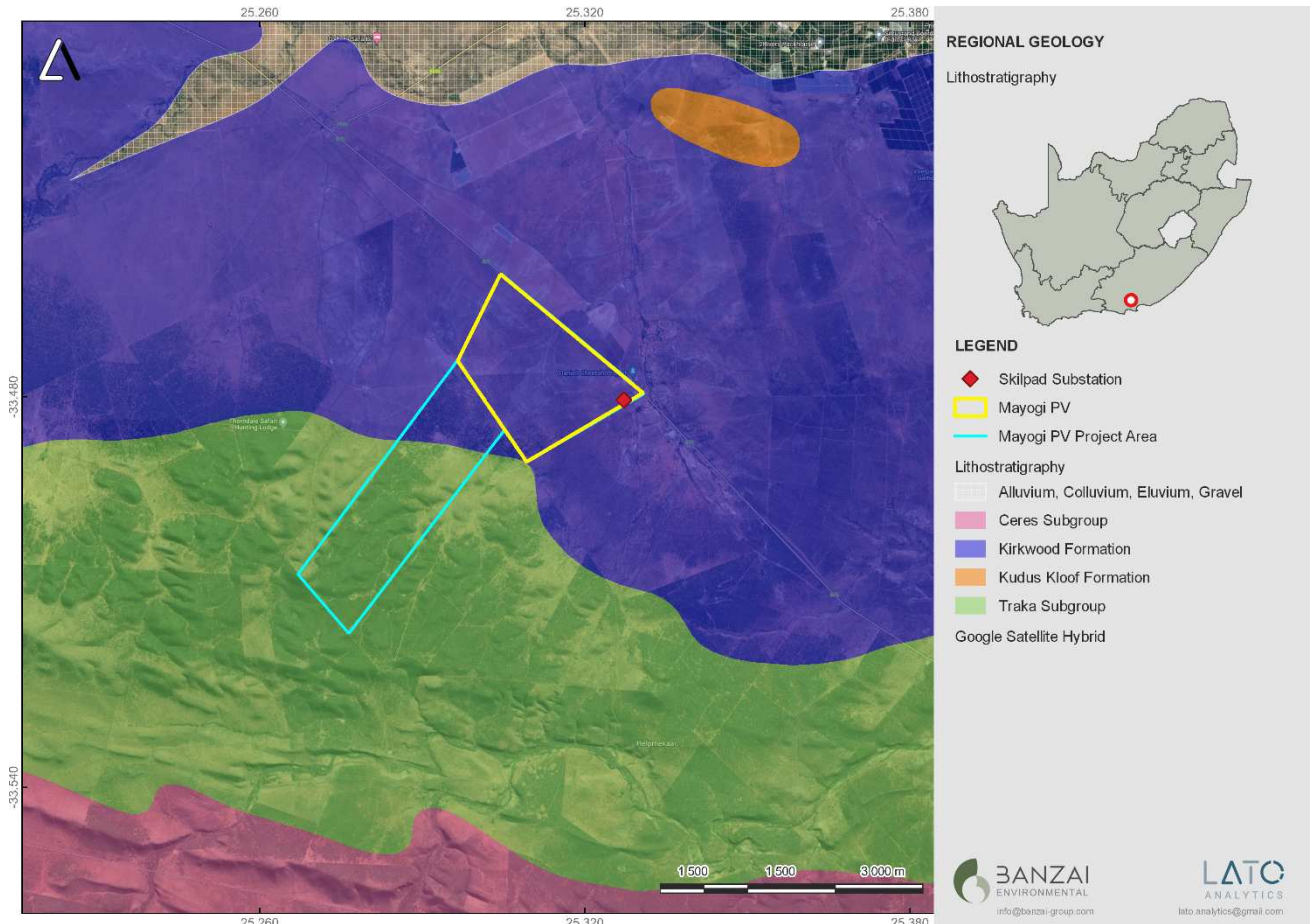


Figure 5: Updated Geology (Council of Geosciences, Pretoria) of the proposed Mayogi Solar Facility indicates that development is underlain by the Kirkwood Formation of the Uitenhage Group. The rest of the farm is underlain by the Traka Subgroup.

6. GEOGRAPHICAL LOCATION OF THE SITE

The proposed Mayogi PV Facility is located on the R75, about 20km south-west of Kirkwood in the Eastern Cape Province (Figure 1-2).

7. METHODS

The aim of a desktop study is to evaluate the possible risk to palaeontological heritage in the proposed development. This includes all trace fossils as well as all fossils in the proposed footprint. All possible information is consulted to compile a desktop study, and this includes the following: all Palaeontological Impact Assessment reports in the same area; aerial photos and Google Earth images, topographical as well as geological maps.

7.1 Assumptions and Limitations



The focal point of geological maps is the geology of the area and the sheet explanations of the Geological Maps were not meant to focus on palaeontological heritage. Many inaccessible regions of South Africa have never been reviewed by palaeontologists and data is generally based on aerial photographs alone. Locality and geological information of museums and universities databases have not been kept up to date or data collected in the past have not always been accurately documented.

Comparable Assemblage Zones in other areas is also used to provide information on the existence of fossils in an area which has not documented in the past. When using similar Assemblage Zones and geological formations for Desktop studies it is generally **assumed** that exposed fossil heritage is present within the footprint. A field-assessment was conducted to improve the accuracy of the desktop assessment.

8. ADDITIONAL INFORMATION CONSULTED

In compiling this report the following sources were consulted:

- Geological map 1:100 000, Geology of the Republic of South Africa (Visser 1984)
- A Google Earth map with polygons of the proposed development was obtained from SiVEST.
- 1:250 000 Port Elizabeth (1979) Geological Map (Council for Geosciences, Pretoria)
- Updated geological shape files (Council for Geosciences, Pretoria)

9. SITE VISIT

A site-specific field survey of the development footprint was conducted on foot and by motor vehicle on the weekend of the weekend of 20 January 2023. No fossiliferous outcrops were identified during the site visit.





Figure 7: Scattered Calcrete deposits throughout the development.



Figure 8:Area mantled by red soil of the Kirkwood formation.

10. ASSESSMENT METHODOLOGY

10.1 Method of Environmental Assessment

The environmental assessment aims to identify the various possible environmental impacts that could result from the proposed activity. Different impacts need to be evaluated in terms of their significance and in doing so highlight the most critical issues to be addressed.

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

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

10.2 Impact Rating System

Impact assessment must take account of the nature, scale, and duration of impacts on the environment whether such impacts are positive or negative. Each impact is also assessed according to the project phases:

- planning



- construction
- operation
- decommissioning

Where necessary, the proposal for mitigation or optimisation of an impact should be detailed. A brief discussion of the impact and the rationale behind the assessment of its significance should also be included. The rating system is applied to the potential impacts on the receiving environment and includes an objective evaluation of the mitigation of the impact. In assessing the significance of each impact, the following criteria is used:

Table 4: The rating system

NATURE		
The Nature of the Impact is the possible destruction of fossil heritage		
GEOGRAPHICAL EXTENT		
This is defined as the area over which the impact will be experienced.		
1	Site	The impact will only affect the site.
2	Local/district	Will affect the local area or district.
3	Province/region	Will affect the entire province or region.
4	International and National	Will affect the entire country.
PROBABILITY		
This describes the chance of occurrence of an impact.		
1	Unlikely	The chance of the impact occurring is extremely low (Less than a 25% chance of occurrence).
2	Possible	The impact may occur (Between a 25% to 50% chance of occurrence).
3	Probable	The impact will likely occur (Between a 50% to 75% chance of occurrence).
4	Definite	Impact will certainly occur (Greater than a 75% chance of occurrence).
DURATION		
This describes the duration of the impacts. Duration indicates the lifetime of the impact as a result		



of the proposed activity.		
1	Short term	The impact will either disappear with mitigation or will be mitigated through natural processes in a span shorter than the construction phase (0 – 1 years), or the impact will last for the period of a relatively short construction period and a limited recovery time after construction, thereafter it will be entirely negated (0 – 2 years).
2	Medium term	The impact will continue or last for some time after the construction phase but will be mitigated by direct human action or by natural processes thereafter (2 – 10 years).
3	Long term	The impact and its effects will continue or last for the entire operational life of the development, but will be mitigated by direct human action or by natural processes thereafter (10 – 30 years).
4	Permanent	The only class of impact that will be non-transitory. Mitigation either by man or natural process will not occur in such a way or such a time span that the impact can be considered indefinite.
INTENSITY/ MAGNITUDE		
Describes the severity of an impact.		
1	Low	Impact affects the quality, use and integrity of the system/component in a way that is barely perceptible.
2	Medium	Impact alters the quality, use and integrity of the system/component but system/component still continues to function in a moderately modified way and maintains general integrity (some impact on integrity).
3	High	Impact affects the continued viability of the system/component and the quality, use, integrity and functionality of the system or component is severely impaired and may temporarily cease. High costs of rehabilitation and remediation.
4	Very high	Impact affects the continued viability of the system/component and the quality, use, integrity and



		functionality of the system or component permanently ceases and is irreversibly impaired. Rehabilitation and remediation often impossible. If possible rehabilitation and remediation often unfeasible due to extremely high costs of rehabilitation and remediation.
REVERSIBILITY		
This describes the degree to which an impact can be successfully reversed upon completion of the proposed activity.		
1	Completely reversible	The impact is reversible with implementation of minor mitigation measures.
2	Partly reversible	The impact is partly reversible but more intense mitigation measures are required.
3	Barely reversible	The impact is unlikely to be reversed even with intense mitigation measures.
4	Irreversible	The impact is irreversible and no mitigation measures exist.
IRREPLACEABLE LOSS OF RESOURCES		
This describes the degree to which resources will be irreplaceably lost as a result of a proposed activity.		
1	No loss of resource	The impact will not result in the loss of any resources.
2	Marginal loss of resource	The impact will result in marginal loss of resources.
3	Significant loss of resources	The impact will result in significant loss of resources.
4	Complete loss of resources	The impact is result in a complete loss of all resources.
CUMULATIVE EFFECT		
This describes the cumulative effect of the impacts. A cumulative impact is an effect which in itself may not be significant but may become significant if added to other existing or potential impacts emanating from other similar or diverse activities as a result of the project activity in question.		
1	Negligible cumulative impact	The impact would result in negligible to no cumulative effects.
2	Low cumulative impact	The impact would result in insignificant cumulative effects.



3	Medium cumulative impact	The impact would result in minor cumulative effects.
4	High cumulative impact	The impact would result in significant cumulative effects
SIGNIFICANCE		
<p>Significance is determined through a synthesis of impact characteristics. Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. The calculation of the significance of an impact uses the following formula:</p> <p>[(Extent (1) + probability (4) + reversibility (4) + irreplaceability (4) + duration (4) + cumulative effect (1)] x magnitude/intensity (2).</p> <p>The summation of the different criteria will produce a non-weighted value. By multiplying this value with the magnitude/intensity, the resultant value acquires a weighted characteristic which can be measured and assigned a significance rating.</p>		
Points	Impact significance rating	Description
6 to 28	Negative low impact	The anticipated impact will have negligible negative effects and will require little to no mitigation.
6 to 28	Positive low impact	The anticipated impact will have minor positive effects.
29 to 50	Negative medium impact	The anticipated impact will have moderate negative effects and will require moderate mitigation measures.
29 to 50	Positive medium impact	The anticipated impact will have moderate positive effects.
51 to 73	Negative high impact	The anticipated impact will have significant effects and will require significant mitigation measures to achieve an acceptable level of impact.
51 to 73	Positive high impact	The anticipated impact will have significant positive effects.
74 to 96	Negative very high impact	The anticipated impact will have highly significant effects and are unlikely to be able to be mitigated adequately. These impacts could be considered "fatal flaws".
74 to 96	Positive very high impact	The anticipated impact will have highly significant positive



(Extent + probability + reversibility + irreplaceability + duration + cumulative effect) x magnitude/intensity

<i>Table 5: Summary of Impacts.</i>							
<i>Impacts</i>	<i>Extent</i>	<i>Duration</i>	<i>Magnitude</i>	<i>Reversibility</i>	<i>Irreplaceable loss</i>	<i>Cumulative effect</i>	<i>Impact</i>
<i>Pre-mitigation</i>	1	4	3	4	4	2	45
<i>Post mitigation</i>	1	4	2	4	4	2	30

Loss of fossil heritage will be a negative impact. Only the site will be affected by the proposed development. The expected duration of the impact is assessed as potentially permanent to long term. In the absence of mitigation procedures, the damage or destruction of any palaeontological materials will be permanent. Impacts on palaeontological heritage during the construction phase could potentially occur. A negative medium Significance has been allocated to the proposed development.

11. FINDINGS AND RECOMMENDATIONS

The proposed Mayogi Solar PV Facility is underlain by Kirkwood Formation (Uitenhage Group). The PalaeoMap of the South African Heritage Resources Information System (SAHRIS) indicates that the Palaeontological Sensitivity of the Kirkwood Formation (Uitenhage Group) is Very High (Almond and Pether, 2009; Almond *et al.*, 2013). Recent updated Geology (Council of Geosciences) corresponds with the geological map and indicates that the proposed development is underlain by the Kirkwood Formation.

A site-specific field survey of the development footprint was conducted on foot and by motor vehicle on the weekend of 20 January 2023. No fossiliferous outcrop was detected in the proposed development area. A Medium Palaeontological Significance has been allocated to the Mayogi PV development. It is therefore considered that the proposed development will not lead to damaging impacts on the palaeontological resources of the area. The construction of the development may thus be permitted in its whole extent, as the development footprint is not considered sensitive in terms of palaeontological resources.

Recommendations:

- The ECO for this project must be informed that the Kirkwood Formation of the Uitenhage Group has a **Very High Palaeontological Sensitivity**.
- If Palaeontological Heritage is uncovered during surface clearing and excavations the **Chance find Protocol** attached should be implemented immediately. Fossil discoveries ought to be protected and



the ECO/site manager must report to South African Heritage Resources Agency (SAHRA) (Contact details: Eastern Cape Provincial Heritage Resources Authority (ECPHRA), 16 Commissioner Street, East London, 5201, South Africa. Tel: 043 745 0888. Fax: 043 745 0889., email: info@ecphra.org.za; Web: <https://www.ecphra.org.za/>) so that mitigation (recording and collection) can be carried out.

- Before any fossil material can be collected from the development site the specialist involved would need to apply for a collection permit from SAHRA. Fossil material must be housed in an official collection (museum or university), while all reports and fieldwork should meet the minimum standards for palaeontological impact studies proposed by SAHRA (2012).
- These recommendations should be incorporated into the Environmental Management Plan for the Mayogi Solar PV Facility.

CHANCE FINDS PROTOCOL

The following procedure will only be followed if fossils are uncovered during the excavation phase of the development.

Legislation

Cultural Heritage in South Africa (includes all heritage resources) is protected by the **National Heritage Resources Act (Act No 25 of 1999) (NHRA)**. According to Section 3 of the Act, all Heritage resources 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 NHRA and are the property of the State. It is thus the responsibility of the State to manage and conserve fossils on behalf of the citizens of South Africa. Palaeontological resources may not be excavated, broken, moved, or destroyed by any development without prior assessment and without a permit from the relevant heritage resources authority as per section 35 of the NHRA.

A fossil is the naturally preserved remains (or traces thereof) of plants or animals embedded in rock. These organisms lived millions of years ago. Fossils are extremely rare and irreplaceable. By studying fossils, it is possible to determine the environmental conditions that existed in a specific geographical area millions of years ago.

This informational document is intended for workmen and foremen on construction sites. It describes the actions to be taken when mining or construction activities accidentally uncovers fossil material.

It is the responsibility of the Environmental Site Officer (ESO) or site manager of the project to train the workmen and foremen in the procedure to follow when a fossil is accidentally uncovered. In the absence of the ESO, a member of the staff must be appointed to be responsible for the proper implementation of the chance find protocol as not to compromise the conservation of fossil material.



Chance Find Procedure

- If a chance find is made the person responsible for the find must immediately **stop working** and all work that could impact that finding must cease in the immediate vicinity of the find.
- The person who made the find must immediately **report** the find to his/her direct supervisor which in turn must report the find to his/her manager and the ESO or site manager. The ESO or site manager must report the find to the relevant Heritage Agency (South African Heritage Research Agency, SAHRA). (Contact details: SAHRA, 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South Africa.
- Tel: 021 462 4502. Fax: +27 (0)21 462 4509. Web: www.sahra.org.za. The information to the Heritage Agency must include photographs of the find, from various angles, as well as the GPS co-ordinates.
- A preliminary report must be submitted to the Heritage Agency within **24 hours** of the find and must include the following: 1) date of the find; 2) a description of the discovery and a 3) description of the fossil and its context (depth and position of the fossil), GPS co-ordinates.
- Photographs (the more the better) of the discovery must be of high quality, in focus, accompanied by a scale. It is also important to have photographs of the vertical section (side) where the fossil was found.
- Upon receipt of the preliminary report, the Heritage Agency will inform the ESO (or site manager) whether a rescue excavation or rescue collection by a palaeontologist is necessary.
- The site must be secured to protect it from any further damage. **No attempt** should be made to remove material from their environment. The exposed finds must be stabilized and covered by a plastic sheet or sand bags. The Heritage agency will also be able to advise on the most suitable method of protection of the find.
- If the fossil cannot be stabilized the fossil may be collected with extreme care by the ESO. Fossils finds must be stored in tissue paper and in an appropriate box while due care must be taken to remove all fossil material from the rescue site.
- Once the Heritage Agency has issued the written authorization, the developer may continue with the development on the affected area.

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APPENDIX A

CURRICULUM VITAE

ELIZE BUTLER

PROFESSION: Palaeontologist

YEARS' EXPERIENCE: 30 years in Palaeontology

EDUCATION: B.Sc Botany and Zoology, 1988
University of the Orange Free State

B. Sc (Hons) Zoology, 1991
University of the Orange Free State

Management Course, 1991
University of the Orange Free State

M. Sc. *Cum laude* (Zoology), 2009
University of the Free State

Dissertation title: The postcranial skeleton of the Early Triassic non-mammalian Cynodont *Galesaurus planiceps*: implications for biology and lifestyle

MEMBERSHIP

Palaeontological Society of South Africa (PSSA) 2006-currently

EMPLOYMENT HISTORY

Part time Laboratory assistant Department of Zoology & Entomology University of the Free State Zoology 1989-1992

Part time laboratory assistant Department of Virology University of the Free State Zoology 1992

Research Assistant National Museum, Bloemfontein 1993 – 1997

Principal Research Assistant and Collection Manager National Museum, Bloemfontein 1998–2022

TECHNICAL REPORTS



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- Butler, E. 2018. Palaeontological Desktop Assessment for the proposed electricity expansion project and Sekgame Switching Station at the Sishen Mine, Northern Cape Province. Bloemfontein.
- Butler, E. 2018. Palaeontological field assessment of the proposed construction of the Zonnebloem Switching Station (132/22kV) and two loop-in loop-out power lines (132kV) in the Mpumalanga Province. Bloemfontein.
- Butler, E. 2018. Palaeontological Field Assessment for the proposed re-alignment and de-commissioning of the Firham-Platrand 88kv Powerline, near Standerton, Lekwa Local Municipality, Mpumalanga province. Bloemfontein.
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- Butler, E. 2022. Palaeontological Desktop Assessment to assess the proposed SERE Solar Photovoltaic Plant Phase 1A and associated infrastructure in the Western Cape Province.
- Butler, E. 2022. Palaeontological Impact Assessment for the proposed development of a 10 MW Solar Photovoltaic (PV) Plant and associated grid connection infrastructure on Portion 9 of the Farm Little Chelsea 10, Eastern Cape Province.
- Butler, E. 2022. Palaeontological Desktop Assessment to assess the proposed Dominion 1 Solar Park, located on the Remaining Extent of Portion 18 of Farm 425, near Klerksdorp within the North-West Province.
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- Butler, E., 2022. Palaeontological Impact Assessment to assess the Delta Solar Power Plant on the remaining extent of the farm Kareefontein No. 340, Dr Ruth Segomotsi Mompati District Municipality, Lekwa-Teemane Local Municipality near Bloemhof in the North West Province
- Butler, E., 2022. Palaeontological Impact Assessment to assess the Sonneblom Solar Power Plant (SPP) on Portion 1 of the farm Blydschap No. 504 within the Mangaung Metropolitan Municipality, southeast of Bloemfontein in the Free State.
- Butler, E., 2022. Palaeontological Impact Assessment for the proposed Naos Solar PV One Project near Viljoenskroon in the Free State.
- Butler, E., 2022. Palaeontological Impact Assessment for the proposed Naos Solar PV Two Project near Viljoenskroon in the Free State.
- Butler, E., 2022. Palaeontological Impact Assessment for the proposed Naos Solar PV Two Project near Viljoenskroon in the Free State



- Butler. E., 2022. Palaeontological Impact Assessment for the Ngwedi Solar Power near Viljoenskroon in the Free State.
- Butler. E., 2022. Palaeontological Impact Assessment for the Noko Solar Power Plant and power line near Orkney in the North West.
- Butler. E., 2022. Palaeontological Impact Assessment for the Proposed Power Line as part of the Paleso Solar Power Plant near Viljoenskroon in the Free State
- Butler. E., 2022. Palaeontological Impact Assessment for the Thakadu Solar Plant which near Viljoenskroon in the Free State
- Butler. E., 2022. Palaeontological Impact Assessment of the Kentani, Braklaagte, Klipfontein, Klipfontein 2, Leliehoek and Sonobloem PV Facilities located near Dealsville in the Free State Province
- Butler. E., 2022. Palaeontological Impact Assessment for the proposed Harvard 1 Solar Photovoltaic (PV) facility on Portion 5 of Farm Spes Bona no 2355, Mangaung Metropolitan Municipality in the Free State.
- Butler. E., 2022. Palaeontological Impact Assessment for proposed Harvard 2 Solar Photovoltaic (PV) facility on Portion 8 of Farm Spes Bona No 2355, Mangaung Metropolitan Municipality in the Free State.
- Butler. E., 2022. Palaeontological Impact Assessment for the proposed Doornrivier Solar 1, southwest of Matjhabeng (formerly Virginia) in the Free State
- Butler. E., 2022. Palaeontological Desktop Assessment for the proposed Leeuwbosch PV solar photovoltaic (PV) plant and associated infrastructure on Portion 37 of the Farm Leeuwbosch No. 44 near Leeudoringstad within the Maquassi Hills Local Municipality in the Dr Kenneth Kaunda District



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APPENDIX 3: Heritage Screening Assessment

HERITAGE SCREENER

CTS Reference Number:	CTS22_247
SAHRIS Reference:	
Client:	SiVEST
Date:	November 2022
Title:	Mayogi 1 and 2 PV

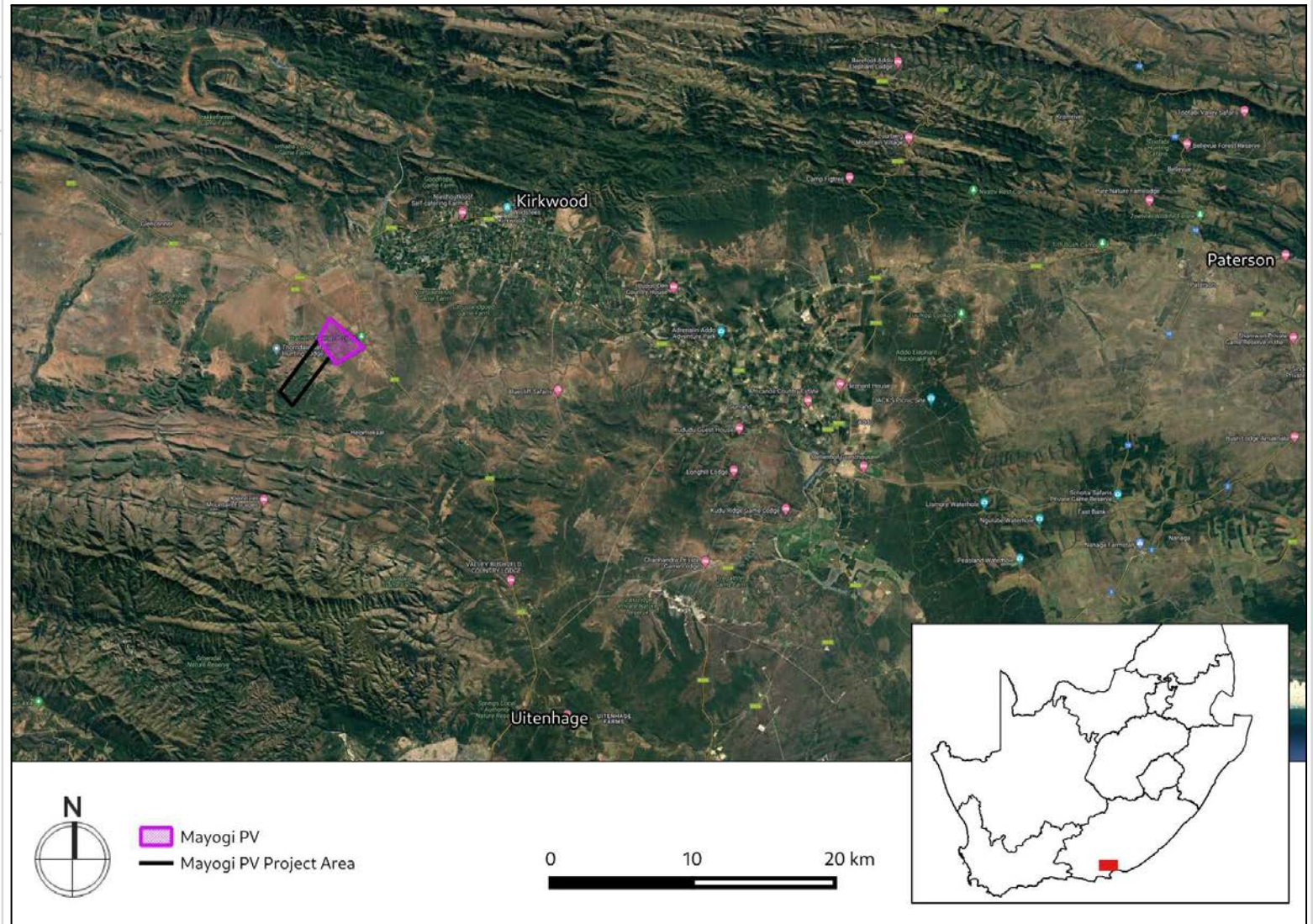


Figure 1a. Satellite map indicating the location of the proposed development in the Eastern Cape



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1. Proposed Development Summary

Farm No. 692 (hereafter referred to as the property) is located adjacent to the R75 approximately 13km south-west of Kirkwood, Eastern Cape Province. The Skilpad Substation is located within the property. The intention is to develop one or more PV facilities and associated infrastructure on the property, depending on site sensitivities. The associated infrastructure would include a BESS, site camp, substation and OHL, and O&M building. Based on the site visit and desktop analysis, the focus area for PV development is the northern section of the property.

2. Application References

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

3. Property Information

Latitude / Longitude	33°28'52.30"S 25°18'54.04"E
Erf number / Farm number	Farm 692
Local Municipality	Sarah Baartman District
District Municipality	Dr Beyers Naude Municipality
Current Use	Agriculture
Current Zoning	Agriculture

4. Nature of the Proposed Development

Total Length of Road	
Depth of excavation (m)	
Height of development (m)	

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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

NA

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

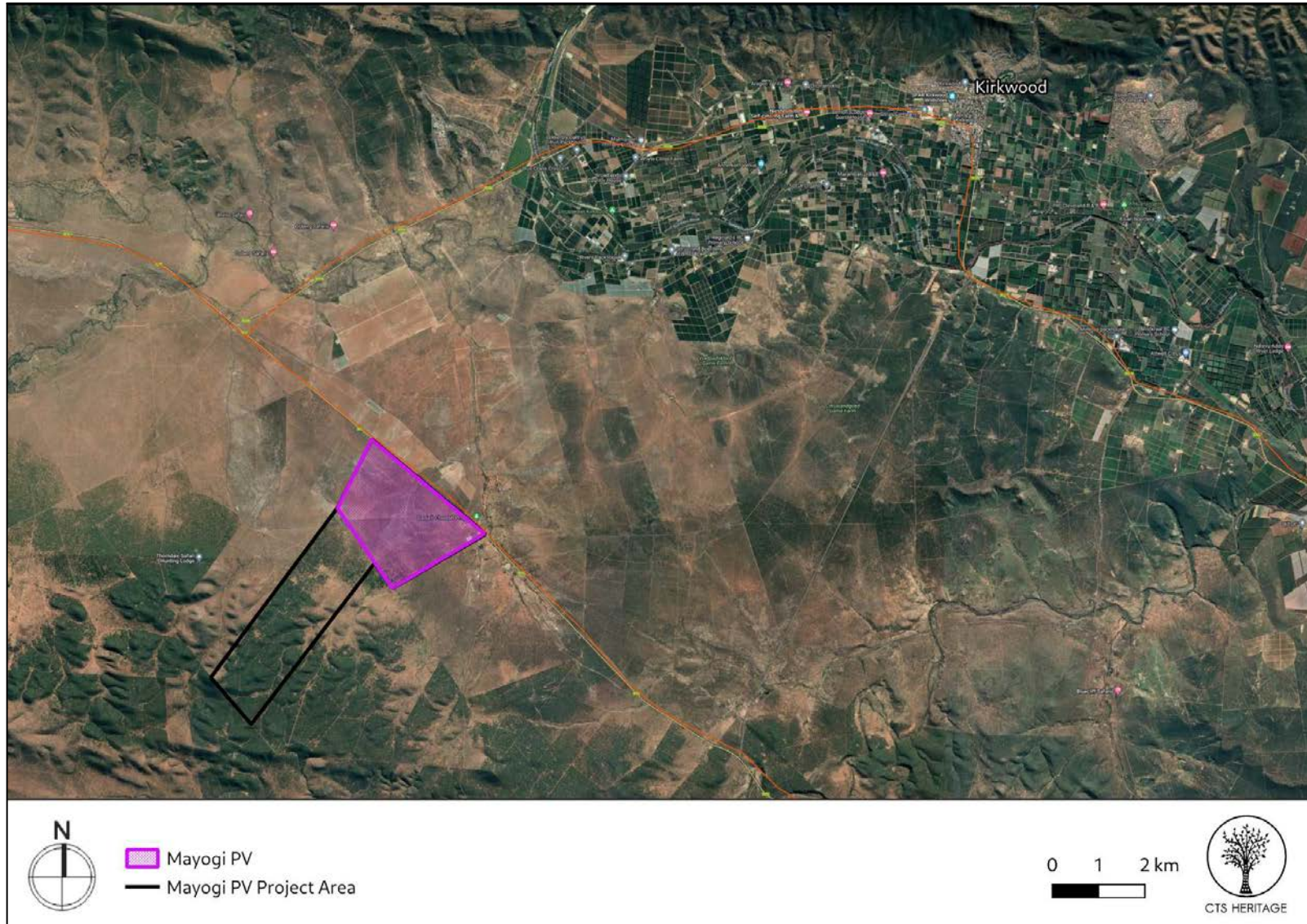


Figure 1b. Overview Map. Satellite image (2022) indicating the proposed development area relative to Kirkwood

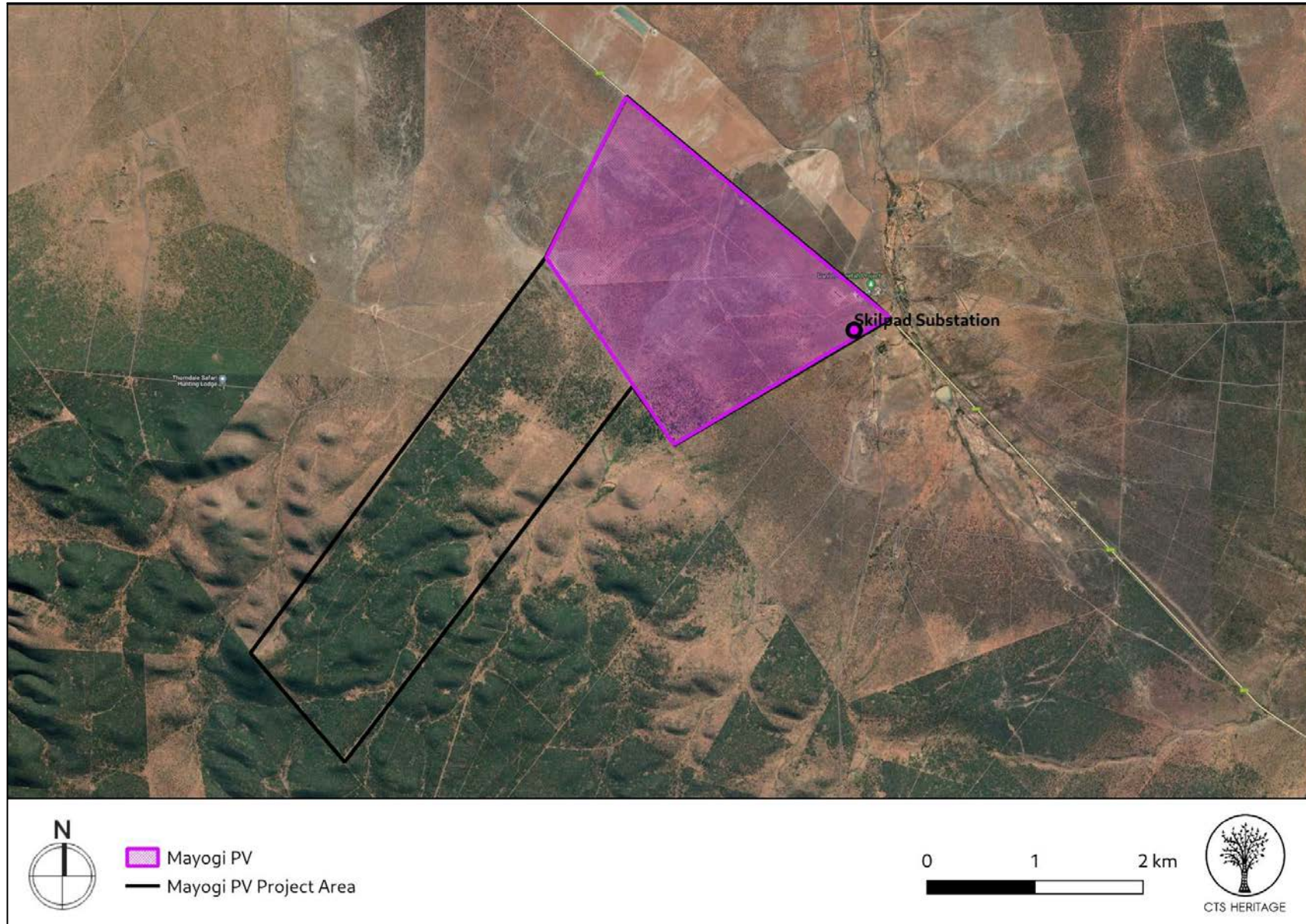


Figure 1c. Overview Map. Satellite image (2022) indicating the proposed development area



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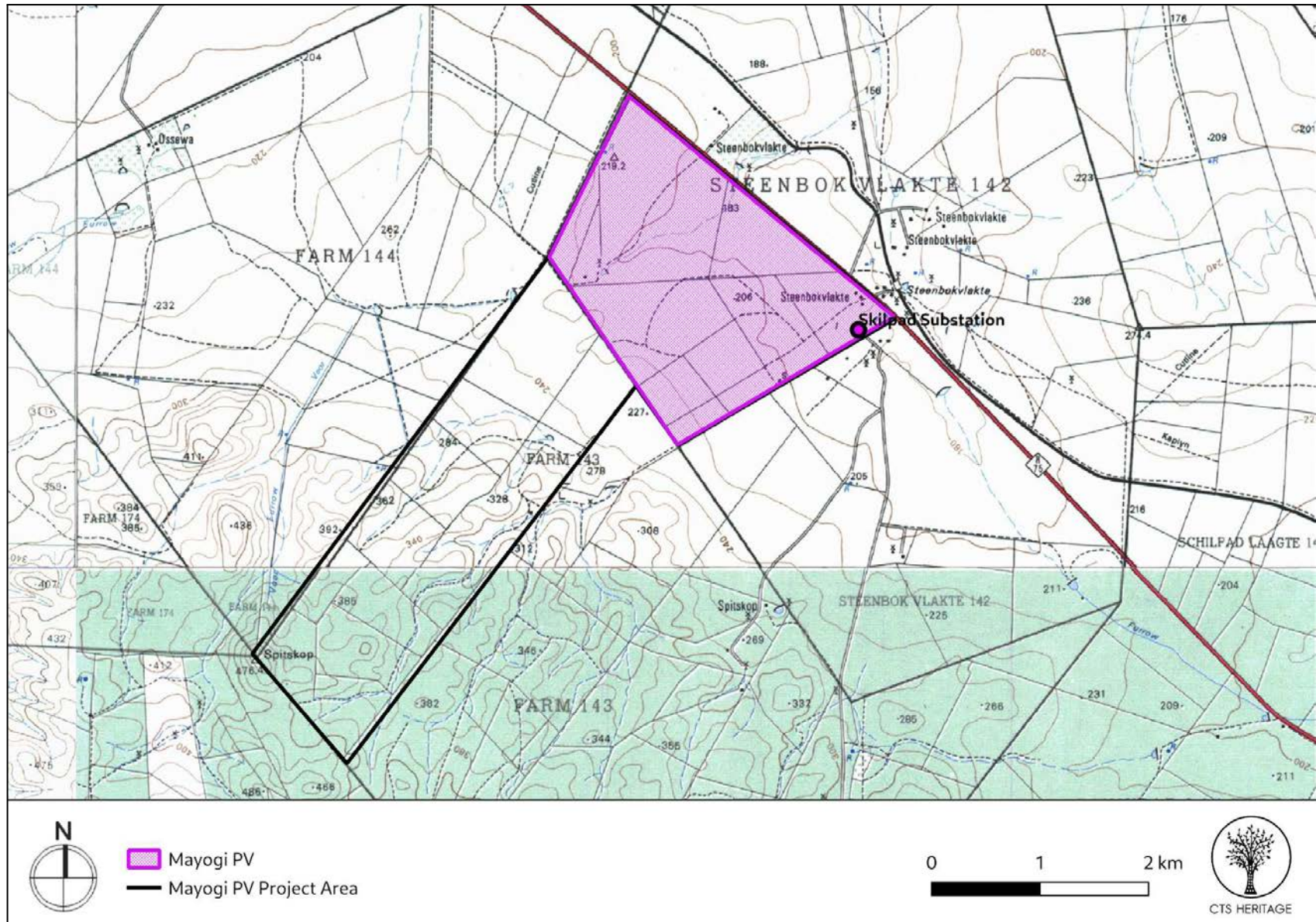


Figure 1d. Overview Map. Extract from 1:50 000 Topo

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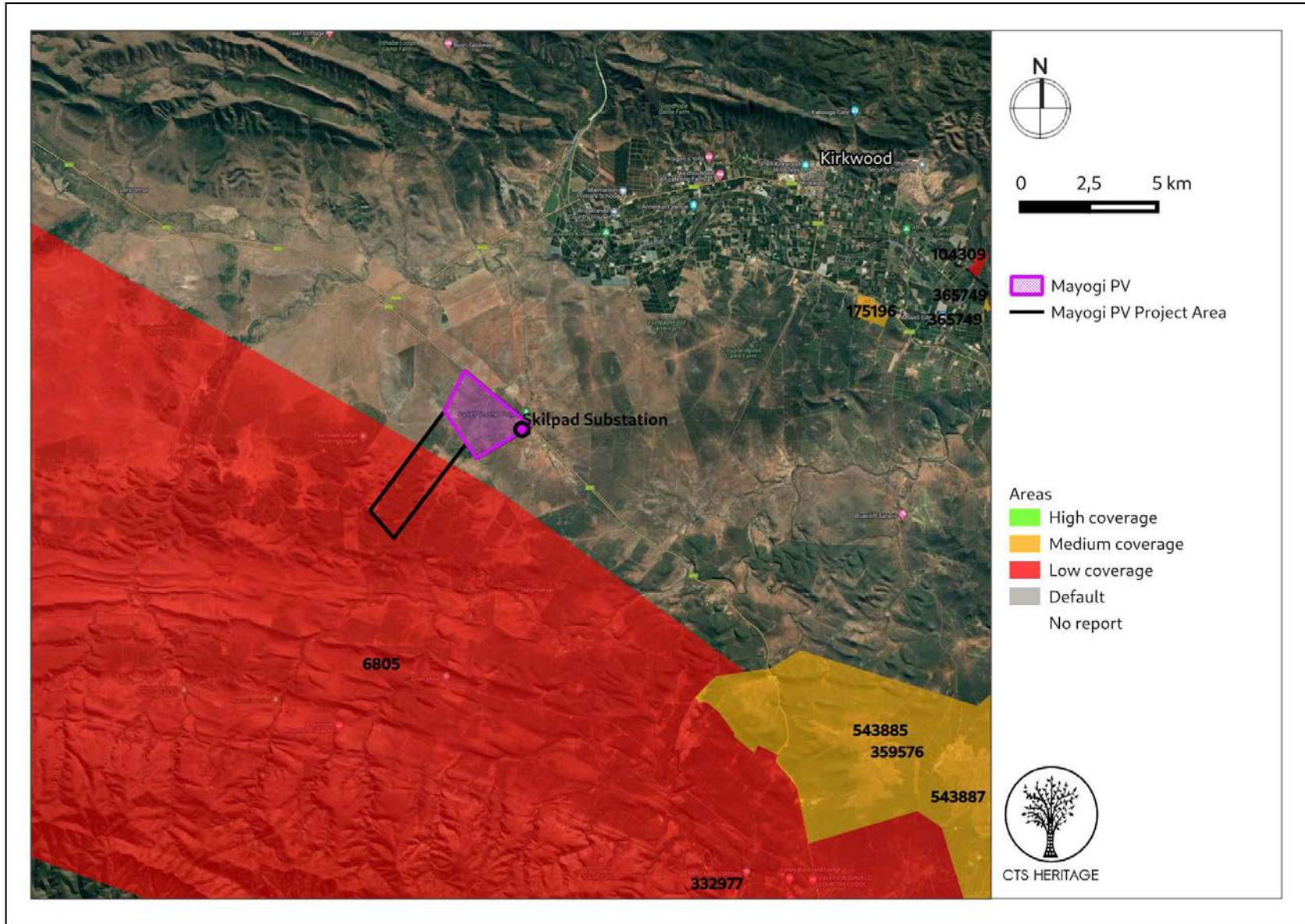


Figure 2. Previous HIAs Map. Previous Heritage Impact Assessments covering the proposed development area with SAHRIS NIDS indicated. Please see Appendix 2 for a full reference list.

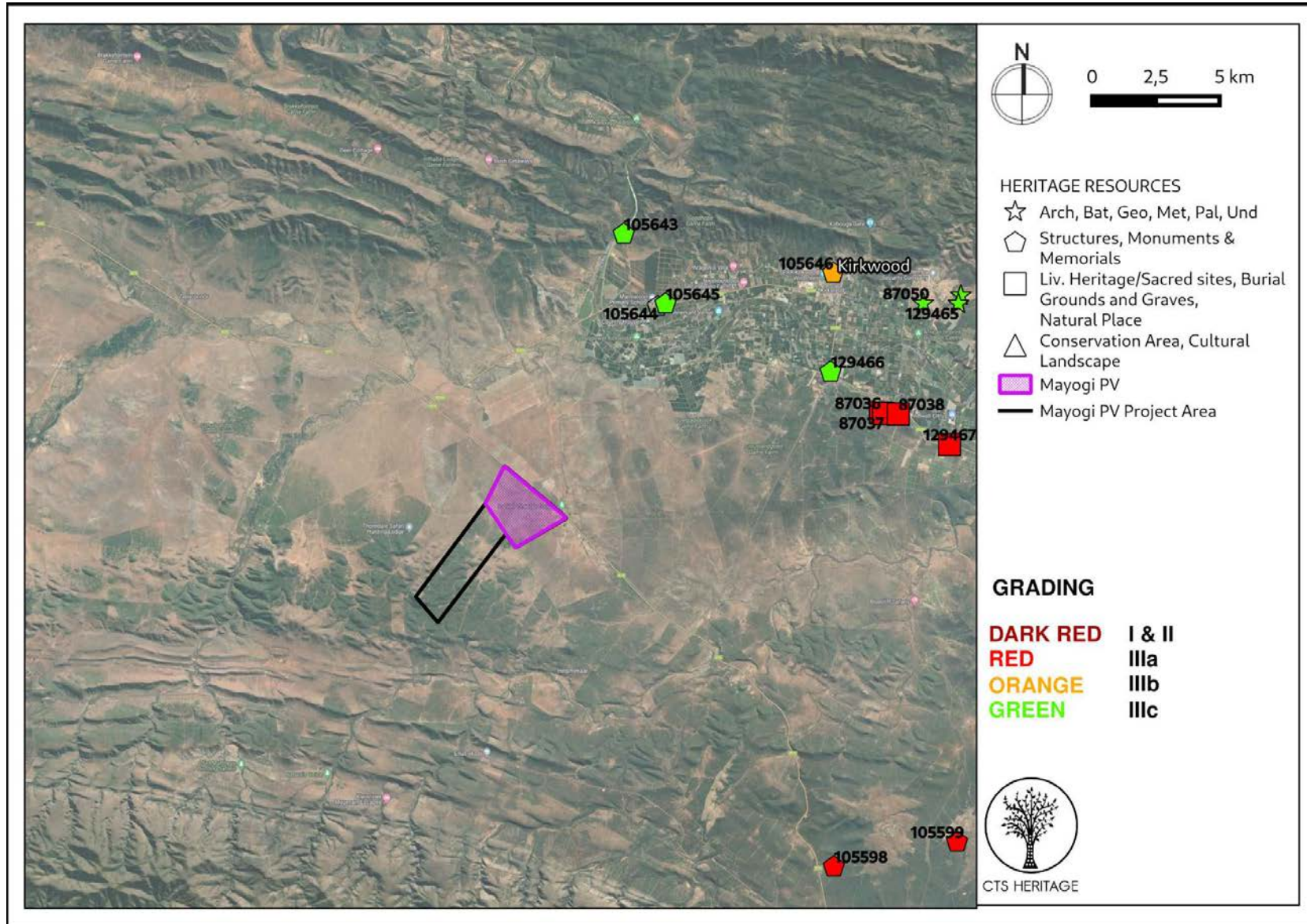


Figure 3. Heritage Resources Map. Heritage Resources previously identified within the study area, with SAHRIS Site IDs indicated in the insets below. Please See Appendix 4 for full description of heritage resource types.



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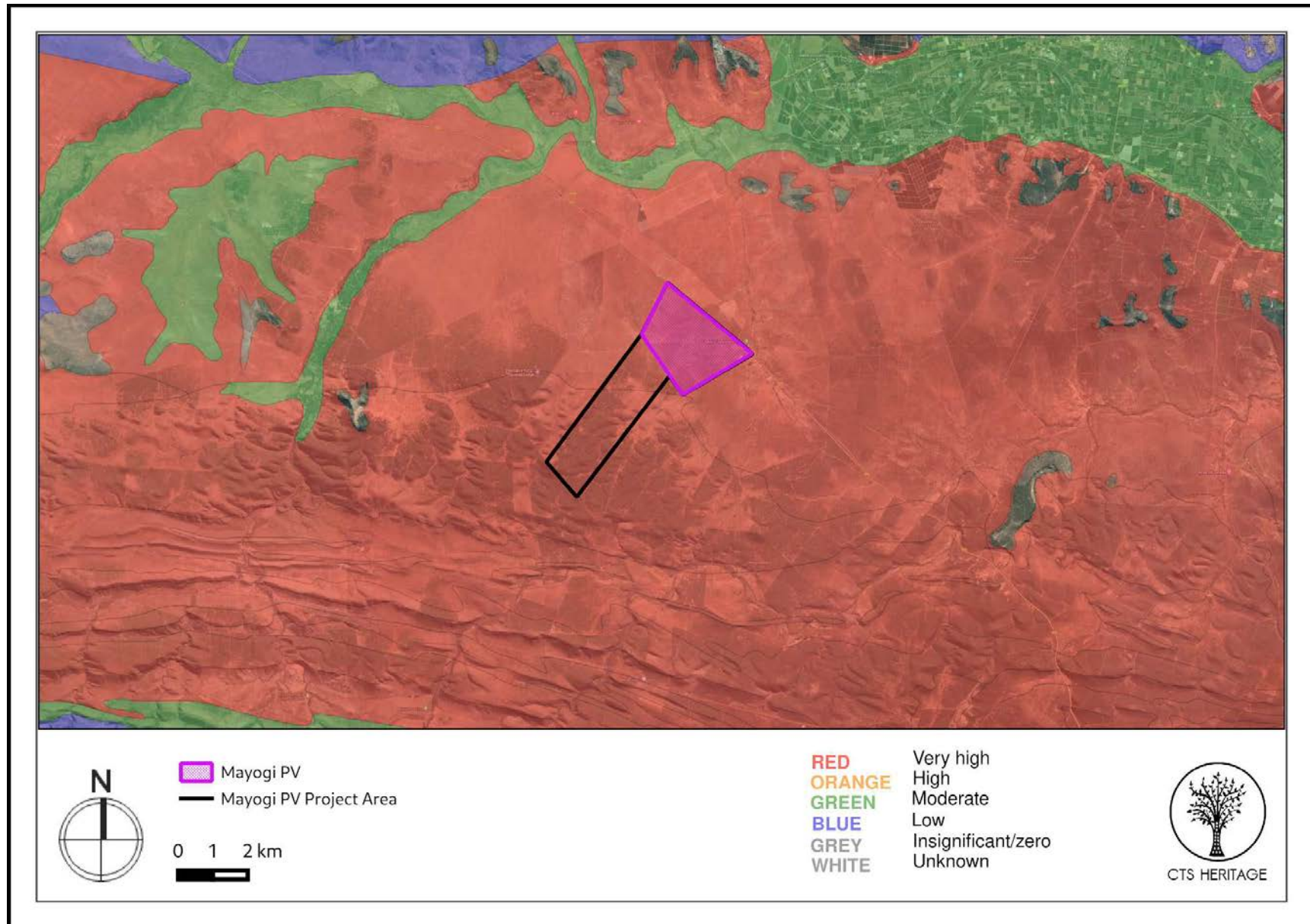


Figure 4a. Palaeosensitivity Map. Indicating fossil sensitivity underlying the study area. Please See Appendix 3 for a full guide to the legend.

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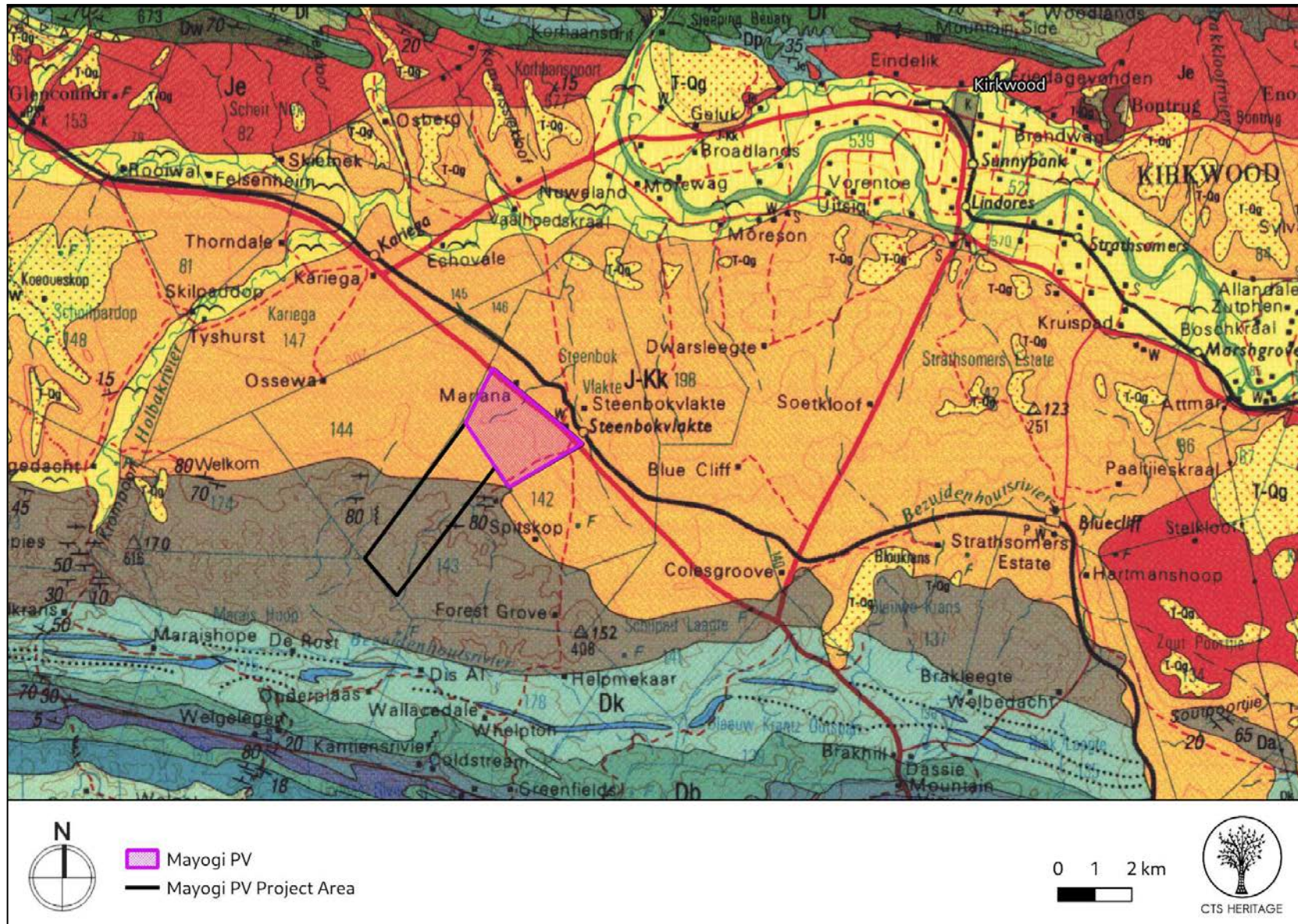


Figure 4b. Geology Map. Extract from 1: 250 000 geological map 3324 Port Elizabeth (Council for Geoscience, Pretoria) showing that the area proposed for development is underlain by sediments of the Kirkwood Formation (J-Kk)

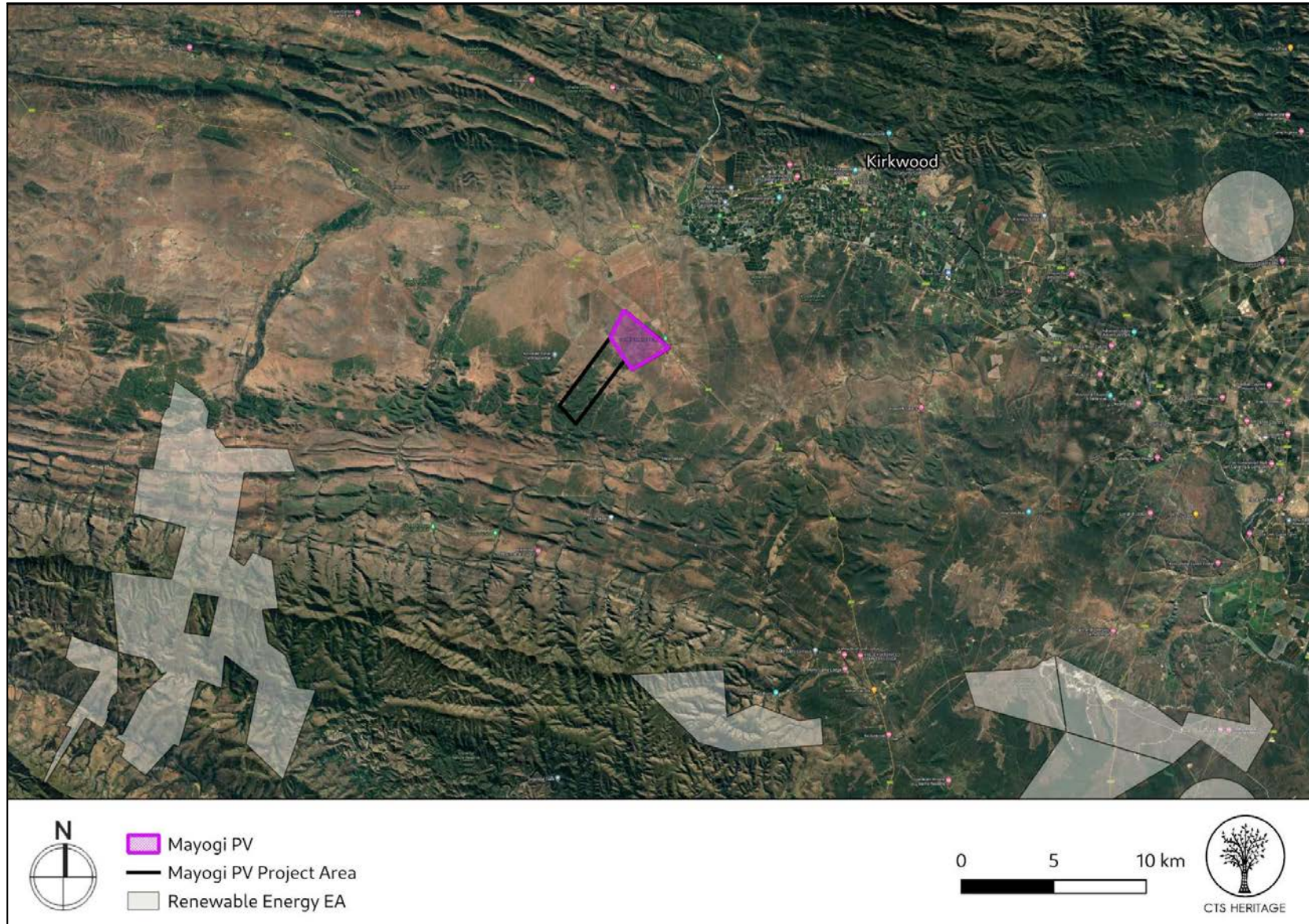


Figure 5. Cumulative Impact Map. Indicating other Renewable Energy Facilities that have been granted Environmental Authorisation (EA). Each project will have associated road and OHL infrastructure.



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Figure 6.1. Google Street View. Overlooking the area proposed for the road infrastructure

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Figure 6.2 Google Street View. Overlooking the area proposed for the road infrastructure

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8. Heritage Assessment

This application is for the proposed development of a PV facility and its grid collection on the south side of the R75 approximately 10km from Kirkwood and the Sunday's River Valley.

Built Environment and the Cultural Landscape

At the beginning of the 19th century, the Sundays River formed the eastern border of the then Cape Colony. The broader area around Kirkwood was consequently the scene of many armed conflicts - Khoi against Xhosa, Khoi and Xhosa together against the Boers and British together and finally the Boers against the British during the Second Anglo-Boer War. Historic period remains are also found in the area, with early farmhouses, churches and several farm burial grounds having been noted, ranging from formal, enclosed graves to informal stone-packed burial mounds (Van Ryneveld 2016, NID 374575).

The Sundays River Valley irrigation scheme was started in the early 1920s, targeting British settlers on small holdings (10 morgen in size) along the banks of the Sundays River. A large dam was constructed on the Sundays River (Lake Mentz) to supply the area with water for irrigation, and a canal system was put in place to supply water to farms from Kirkwood, at the upper end of the valley, to Addo at the lower end.

Importantly, the ACO (2014) noted that the broader context within which this development occurs has high levels of cultural landscape significance. As noted in ACO (2014), "The construction of a major transmission line (Eskom's 765 kW Gamma-Grassridge) has been approved but not yet built. It will cross the western side of the study area through Soutpans Poort and is expected to be a major new visual intrusion. In terms of the assessment checklist published by Baumann, Winter, Aikman (2005) the landscape is largely intact as a natural landscape and intrusions within the last 60 years have been moderate. The aesthetic qualities can be described as being of generally scenic (not dramatic) significance while certain niche areas are highly significant – especially the landscapes on the northern side of the Klein Winterhoek ridge as well as the Perdepoort which contains some dramatic scenery with a distinct character." Furthermore, as the proposed development consists of an expansion of existing infrastructure, there is no "change of character" to the site and no negative impact to the cultural landscape is anticipated from the proposed amendment to the road alignment.

Archaeology

As a source of freshwater, the Sundays River valley has likely been occupied continuously throughout history. According to Webley (2003 SAHRIS NID 4307), Early and Middle Stone Age scatters are found along the banks of the Sundays River. These scatters are found immediately below the topsoil, at a depth of no more than 30cm and appear to have been deposited through river action, and as such, are not *in situ*. The artefacts identified consist of flaked quartzite cobbles with cortex and quartzite flakes. Very few diagnostic flakes were identified. In her assessment of the number of borrow pits, van Ryneveld (2012, SAHRIS NID 49462) did not identify any archaeological resources within the two borrow pits located near the proposed development area. According to Gaigher (2013 SAHRIS NID 125198), "Excavations at sites such as Melkhoutboom and Vygeboom (inside Addo Park) have uncovered graves with rich grave goods indicating a complex belief system. The rock art too indicates the San occupants took part in trance before painting... Many of the shell middens in the Addo Park contain pottery, confirming the presence of the Khoekhoen in the area." According to Gaigher (2013), "The majority of hunter-gatherer groups had been pushed out of the Zuurberg by the 1820's and was forced to move further inland to escape European settlement on their lands."

The previous heritage studies that have been conducted in the broader area have identified isolated and scattered artefacts of the Early, Middle and Later Stone Age (Binneman, 2010; NID 7159). Generally, archaeological artefacts in this region are found in road cuttings, tracks and paths as the dense vegetation of the area largely obscures their presence elsewhere. ESA material known from the area includes handaxes and cleavers that are usually found in river gravels, although *in situ* ESA tools have been found in spring deposits near Addo (Binneman 2016, NID 365749). MSA flake and blade tools are similarly usually found in secondary contexts, and may be found with associated fossil bone material (Binneman 2010). LSA sites, though present, are usually obscured by the dense vegetation in this region. When found, they are usually represented by limited numbers of stone tools and bone fragments, and organic preservation is generally poor (Binneman 2016). Cave sites in the nearby mountains, on the contrary, often contain well-preserved deposits and rock paintings. Khoe sites, dating to the past 2 000 years, also occur in the area, and their sites are marked by the presence of indigenous ceramics and domesticated animal bone. These

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groups were also responsible for the creation of large middens of freshwater mussels, sometimes associated with human burials, that can be found on the banks of the Sunday's River (Binneman 2016). Burials and graves associated with pre-colonial as well as historic communities are also to be found in the area (Binneman 2013, NID 175196).

Historic period remains are also found in the area, with early farmhouses, churches and several farm burial grounds having been noted, ranging from formal, enclosed graves to informal stone-packed burial mounds (Van Ryneveld 2016, NID 374575).

Palaeontology

The area proposed for development is underlain by sediments of very high palaeontological sensitivity belonging to the Kirkwood Formation according to the Council of GeoScience Map 3324. According to Almond's assessment for a nearby development (2014), "During and following the break-up of Gondwana in Early Cretaceous times the Palaeozoic bedrocks in this region were deeply weathered and eroded to form a dissected palaeosurface across which meandering rivers deposited the pebbly channel sandstones and silty overbank mudrocks of the Kirkwood Formation (Uitenhage Group). The basal contact or unconformity between the Uitenhage and Bokkeveld Group rocks preserves the original high relief of the pre-Cretaceous landscape, with hills of Gamka Formation and younger Bokkeveld wackes projecting up through the lower Uitenhage Group fluvial succession. The Kirkwood continental sediments interfinger southwards, and are eventually overlain by fine-grained estuarine to marine shelf sediments of the Sundays River Formation (Uitenhage Group) reflecting gradual flooding of the margins of southern Africa in Early Cretaceous times."

Almond (2014) goes on to note that the "Early Cretaceous fluvial sediments of the Kirkwood Formation ("Wood Beds", Uitenhage Group) that underlie valleys and lower hill slopes in large parts of the... study area are generally very poorly exposed. However, where seen at surface they are often characterised by an abundance of petrified wood, including logs up to several metres long and half a metre across. Some of the fossil logs are only preserved as moulds but others retain fine details of the original woody tissue microstructure and are therefore of considerable palaeontological interest."

RECOMMENDATION: Based on the information available, it is likely that the proposed development will impact on significant heritage resources. It is therefore recommended that ECPHRA request a full HIA that satisfies the requirements of section 38(3) of the NHRA for this project.

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APPENDIX 1

List of heritage resources within the development area

Site ID	Site no	Full Site Name	Site Type	Grading
87036	PCT001	Panzi Citrus 001	Burial Grounds & Graves	Grade IIIa
87037	PCT002	Panzi Citrus 002	Burial Grounds & Graves	Grade IIIa
87038	PCT003	Panzi Citrus 003	Burial Grounds & Graves	Grade IIIa
32281	Atmar-001	Atmar	Archaeological	Grade IIIb
87050	ADD005	Addo 005	Artefacts	Grade IIIc
105598	DR-S1	Dassiesridge Site 1	Structures	Grade IIIa
105599	DR-S2	Dassiesridge Site 2	Structures	Grade IIIa
105643	KBWS1	Kirkwood Bulk Water Supply Farmstead 1	Building	Grade IIIc
105644	KBWS2	Kirkwood Bulk Water Bridge	Bridge	Ungraded
105645	KBWS3	Kirkwood Bulk Water Supply Farmstead 2	Building	Grade IIIc
105646	KBWS4	Kirkwood Bulk Water Supply Church	Building	Grade IIIb
129464	KIRKAD001	BP7-2	Artefacts	Grade IIIc
129465	KIRKAD002	BP7-1	Artefacts	Grade IIIc
129466	KIRKAD003	Kirkwood to Addo 003	Bridge	Grade IIIc
129467	KIRKAD004	Kirkwood to Addo 004	Burial Grounds & Graves	Grade IIIa

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APPENDIX 2

Reference List with relevant AIAs and PIAs

Heritage Impact Assessments				
Nid	Report Type	Author/s	Date	Title
104309	AIA Phase 1	Johan Binneman	01/05/2012	A Phase 1 Archaeological Impact Assessment for the proposed expansion of the existing agricultural activities on Falcon Ridge, Portion 274 of Strathomers estate no. 42, Sundays River Valley Municipality, Eastern Cape Province.
125198	Heritage Impact Assessment Specialist Reports	Stephan Gaigher	01/07/2013	HERITAGE IMPACT ASSESSMENT FOR THE PROPOSED UPGRADING OF STORMWATER INFRASTRUCTURE IN VALENCIA, ADDO, SUNDAYS RIVER VALLEY MUNICIPALITY, EASTERN CAPE PROVINCE
136577	AIA Phase 1	Johan Binneman	05/09/2012	A PHASE 1 ARCHAEOLOGICAL IMPACT ASSESSMENT FOR THE PROPOSED EXPANSION OF THE EXISTING AGRICULTURAL ACTIVITIES ON RIVER BEND CITRUS FARM, REMAINDER OF FARM 82 WOLVE KOP, PORTION 1 OF FARM 77 WELLSHAVEN AND PORTION 3 OF FARM 77 HONEYVALE, NEAR ADDO, SUNDAYS RIVER VALLEY MUNICIPALITY, EASTERN CAPE PROVINCE
136577	AIA Phase 1	Johan Binneman	05/09/2012	A PHASE 1 ARCHAEOLOGICAL IMPACT ASSESSMENT FOR THE PROPOSED EXPANSION OF THE EXISTING AGRICULTURAL ACTIVITIES ON RIVER BEND CITRUS FARM, REMAINDER OF FARM 82 WOLVE KOP, PORTION 1 OF FARM 77 WELLSHAVEN AND PORTION 3 OF FARM 77 HONEYVALE, NEAR ADDO, SUNDAYS RIVER VALLEY MUNICIPALITY, EASTERN CAPE PROVINCE
136578	PIA Desktop	John E Almond	01/08/2012	PALAEONTOLOGICAL SPECIALIST STUDY: DESKTOP ASSESSMENT Expansion of River Bend Citrus Farm near Addo, Sundays River Valley Municipality, Eastern Cape
136578	PIA Desktop	John E Almond	01/08/2012	PALAEONTOLOGICAL SPECIALIST STUDY: DESKTOP ASSESSMENT Expansion of River Bend Citrus Farm near Addo, Sundays River Valley Municipality, Eastern Cape
174009	HIA Letter of Exemption	Johan Binneman	30/06/2014	LETTER OF RECOMMENDATION (WITH CONDITIONS) FOR THE EXEMPTION OF A FULL PHASE 1 ARCHAEOLOGICAL HERITAGE IMPACT ASSESSMENT FOR THE PROPOSED SACE RANGER PHOTOVOLTAIC (SOLAR) PLANT NEAR UITENHAGE, EASTERN CAPE PROVINCE
175196	HIA Phase 1	Johan	01/04/2013	A PHASE 1 ARCHAEOLOGICAL IMPACT ASSESSMENT FOR THE PROPOSED CLEARING OF LAND FOR

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		Binneman		AGRICULTURAL PURPOSES ON PANZI CITRUS FARM NEAR KIRKWOOD, DIVISION OF UITENHAGE, SUNDAYS RIVER VALLEY MUNICIPALITY, EASTERN CAPE PROVINCE
332977	Desktop Assessment	Mariagrazia Galimberti, Kyla Bluff, Nicholas Wiltshire	25/09/2015	CTS15_012 - Uitenhage Gasification Plant
357420	Desktop Assessment	Mariagrazia Galimberti, Kyla Bluff, Nicholas Wiltshire	15/02/2016	Heritage Screener: CEN Hermitage Citrus and Storage Expansion Eastern Cape
357424	Desktop Assessment	Mariagrazia Galimberti, Kyla Bluff, Nicholas Wiltshire	15/02/2016	Heritage Screener: CEN Summerville Citrus and Storage Expansion Eastern Cape
357428	Desktop Assessment	Mariagrazia Galimberti, Kyla Bluff, Nicholas Wiltshire	25/02/2016	Heritage Screener: PPC Dubrody Citrus, Kirkwood
359574	HIA Phase 1	Karen Van Ryneveld	15/09/2014	Phase 1 Archaeological & Cultural Heritage Impact Assessment â€œ The Dassiesridge Wind Energy Facility (WEF), between Kirkwood and Uitenhage, Cacadu District, Eastern Cape, South Africa. 15 September 2014. Prepared by: Karen van Ryneveld (ArchaeoMaps). E-mail: kvanryneveld@gmail.com; Tel: 084 871 1064; Postal Address: Postnet Suite 239, Private Bag X3, Beacon Bay, 5205
359576	PIA Phase 1	John E. Almond	15/10/2014	PROPOSED DASSIESRIDGE WIND ENERGY FACILITY NEAR UITENHAGE, CACADU DISTRICT, EASTERN CAPE. By John E. Almond,

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365749	AIA Phase 1	Johan Binneman	29/02/2016	PHASE 1 ARCHAEOLOGICAL IMPACT ASSESSMENTS FOR THE PROPOSED CLEARING OF VEGETATION IN THREE AREAS TO ESTABLISH CITRUS ORCHARDS ON THE FARM BOSCHKRAAL NEAR KIRKWOOD, SUNDAY'S RIVER VALLEY LOCAL MUNICIPALITY EASTERN CAPE PROVINCE
4307	AIA Phase 1	Lita Webley	11/06/2003	Addo Elephant National Park: Upgrading of Existing Tourist Road Network and Construction of Southern Access Road near Colchester - Phase 1 Archaeological Impact Assessment
6805	AIA Phase 1	Len van Schalkwyk, Elizabeth Wahl	01/09/2007	Heritage Impact Assessment of Gamma Grassridge Power Line Corridors and Substation, Eastern, Western and Northern Cape Provinces, South Africa
7159	AIA Phase 1	Johan Binneman	23/11/2010	A PHASE 1 ARCHAEOLOGICAL IMPACT ASSESSMENT FOR THE PROPOSED EXPANSION OF AGRICULTURAL ACTIVITIES ON PORTION 20 OF FARM 84, LANDDROST VEEPLAATS, KIRKWOOD, SUNDAYS RIVER VALLEY MUNICIPALITY, EASTERN CAPE PROVINCE

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APPENDIX 3 - Keys/Guides

Key/Guide to Acronyms

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

Full guide to Palaeosensitivity Map legend

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

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APPENDIX 4 - Methodology

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

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

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

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

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

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

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

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

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

DETERMINATION OF THE PALAEOLOGICAL SENSITIVITY

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

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

DETERMINATION OF THE COVERAGE RATING ASCRIBED TO A REPORT POLYGON

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

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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



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

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

Note:

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

APPENDIX 5 -Summary of Specialist Expertise

Jenna Lavin, an archaeologist with an MSc in Archaeology and Palaeoenvironments, and currently completing an MPhil in Conservation Management, heads up the heritage division of the organisation, 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 100 Heritage Impact Assessments throughout South Africa.

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APPENDIX 4: Specialist Declaration



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APPENDIX 5: Site Sensitivity Verification

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

1 INTRODUCTION

JUWI is proposing to develop 2 x PV facilities and associated infrastructure on Farm No. 692 adjacent to the R75 approximately 13km southwest of Kirkwood. The site is located in the Sundays River Valley Municipality in the Sarah Baartman District Municipality of the Eastern Cape.

Farm No. 692 (hereafter referred to as the property) is located adjacent to the R75 approximately 13km south-west of Kirkwood, Easter Cape Province. The Skilpad Substation is located within the property. The intention is to develop one or more PV facilities and associated infrastructure on the property, depending on site sensitivities. The associated infrastructure would include a BESS, site camp, substation and OHL, and O&M building. Based on the site visit and desktop analysis, the focus area for PV development is the northern section of the property.

In accordance with Appendix 6 of the National Environmental Management Act (Act 107 of 1998, as amended) (NEMA) Environmental Impact Assessment (EIA) Regulations of 2014, a site sensitivity verification has been undertaken in order to confirm the current land use and environmental sensitivity of the proposed project area as identified by the National Web-Based Environmental Screening Tool (Screening Tool).

According to the DFFE Screening Tool analysis, the development area has Very High levels of sensitivity for impacts to palaeontological heritage and Low levels of sensitivity for impacts to archaeological and cultural heritage resources.

2 SITE SENSITIVITY VERIFICATION

- A Desktop Study was conducted of relevant reports previously written (please see the reference list for the age and nature of the reports used)
- An archaeologist conducted an assessment of archaeological resources likely to be disturbed by the proposed development. The archaeologists conducted their site visit from 15 to 16 November 2022
- A palaeontologist conducted a field assessment of palaeontological resources likely to be disturbed by the proposed development on 20 January 2023.
- The identified resources were assessed to evaluate their heritage significance and impacts to these resources were assessed.

- Alternatives and mitigation options were discussed with the Environmental Assessment Practitioner

3 OUTCOME OF SITE SENSITIVITY VERIFICATION

The previous heritage studies that have been conducted in the broader area have identified isolated and scattered artefacts of the Early, Middle and Later Stone Age (Binneman, 2010; NID 7159). The findings of this assessment corroborate the characterisation of the area made by other specialists. The field survey identified a number of isolated artefacts, none of which are dense enough to be considered an archaeological site. None of the archaeological observations made have sufficient scientific value to warrant their retention and as such, have been graded as Not Conservation-Worthy. The recording of their presence in this report is considered sufficient. A Low archaeological significance is allocated to this area.

A Medium Palaeontological Significance has been allocated to the Mayogi PV development. It is therefore considered that the proposed development will not lead to damaging impacts on the palaeontological resources of the area. The construction of the development may thus be permitted in its whole extent, as the development footprint is not considered sensitive in terms of palaeontological resources.

Based on the outcomes of this assessment, it is unlikely that the proposed development will negatively impact on significant archaeological, palaeontological or cultural heritage resources. There is no objection to the proposed development.

4 NATIONAL ENVIRONMENTAL SCREENING TOOL

The results of this assessment in terms of site sensitivity are summarised below:

- The cultural value of the broader area has some significance in terms of its sense of place and scenic qualities (Moderate)
- No significant archaeological resources were identified within the study area (Low)
- No highly significant palaeontological resources were identified within the development area however the sediments underlying the development area have very high palaeontological sensitivity (Moderate)

As per the findings of this assessment, and its supporting documentation, the outcome of the sensitivity verification disputes the results of the DFFE Screening Tool for Cultural Heritage and Palaeontology.

5 CONCLUSION

The site sensitivities identified in the specialist study have been verified.