

LTM GREEN ENERGIES (PTY) LTD



PROPOSED GROOTVLEI 600MW SOLAR PLANT, BATTERY ENERGY STORAGE SYSTEMS & GRID CONNECTION PROJECT, NEAR VENTERSDORP, JB MARKS LOCAL MUNICIPALITY, NORTH WEST PROVINCE

HERITAGE IMPACT ASSESSMENT

20 SEPTEMBER 2023

Submitted to : Nemaï Green Consulting



Prepared by:

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The heritage impact assessment report has been compiled considering the NEMA Appendix 6 requirements for specialist reports as indicated in the table below.

Requirements of Appendix 6 – GN R326 EIAs Regulations (2014, amended 2017)	Relevant section in report
1.(1) (a) (i) Details of the specialist who prepared the report	Section 1.1.3 of Report
(ii) The expertise of that person to compile a specialist report including a curriculum vita	Section 1.1.3 and of Report and Appendix 2
(b) A declaration that the person is independent in a form as may be specified by the competent authority	Page iii of the report
(c) An indication of the scope of, and the purpose for which, the report was prepared	Section 1.1
(cA) An indication of the quality and age of base data used for the specialist report	N/A
(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	Section 5
(d) The duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment	Section 6
(e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used	Section 7
(f) 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;	Section 5.2 and 5.4, Section 6
(g) An identification of any areas to be avoided, including buffers	Section 6, Section 12
(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;	Appendix 1
(i) A description of any assumptions made and any uncertainties or gaps in knowledge;	Section 3
(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	Sections 6, 8
(k) Any mitigation measures for inclusion in the EMPr	Sections 11, 12
(l) Any conditions for inclusion in the environmental authorisation	N/A
(m) Any monitoring requirements for inclusion in the EMPr or environmental authorisation	N/A
(n)(i) A reasoned opinion as to whether the proposed activity, activities or portions thereof should be authorised and	Section 12
(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, 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	Section 11, 12
(o) A description of any consultation process that was undertaken during the course of carrying out the study	Not applicable. A public consultation process will be handled as part of the EIAs and EMPr process.

Requirements of Appendix 6 – GN R326 EIAs Regulations (2014, amended 2017)	Relevant section in report
(p) A summary and copies if any comments that were received during any consultation process	Not applicable. To date no comments have been raised regarding heritage resources that require input from a specialist.
(q) Any other information requested by the competent authority.	Not applicable.
(2) Where a government notice 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.	Section 38(3) of the NHRA

Declaration of Independence

The report has been compiled by Nitai Consulting (Pty) Ltd, an appointed Heritage Specialist for Nema Green for the Proposed Grootvlei 600MW Solar Plant, Battery Energy Storage Systems & Grid Connection Project, Ventersdorp, JB Marks Local Municipality, North West Province. The views contained in this report are purely objective and no other interests are displayed during the decision-making processes discussed in the Heritage Impact Assessment Process.

I, Jennifer Kitto, declare that –

General declaration:

- I act as the independent heritage specialist for this project*
- I will perform the work relating to the project in an objective manner, even if this results in views and findings that are not favourable to the applicant*
- I declare that there are no circumstances that may compromise my objectivity in performing such work;*
- I have expertise in conducting heritage impact assessments, including knowledge of the National Heritage Resources Act, No 25 of 1999 (NHRA), associated Regulations and any guidelines that have relevance to the proposed activity;*
- I will comply with the NHRA, associated Regulations and all other applicable legislation, including the National Environmental Management Act, No 107 of 1998 (NEMA);*
- 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 project, whether such information is favourable 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 of a heritage specialist in terms of the NHRA and the constitutions of my affiliated professional bodies; and*
- I realise that a false declaration is an offence in terms of regulation 71 of the NEMA 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 NEMA Regulations;

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Executive Summary

LTM Green Energies (Pty) Ltd (the “Applicant”) has proposed the development of Grootvlei 600MW Solar Plant, Battery Energy Storage Systems (BESS) and Grid Connection Project north west of Ventersdorp within the JB Marks Local Municipality in the North West Province (the “Project”). The electricity generated by the Project will be transmitted through either Option 4 which consists of 2 x 132kV powerlines, approximately 14km kilometres (km) in length, from the new facility 33kV substation to new 400/132kV Main Transmission Substation (MTS) to Loop In-Loop Out (LILO) of the Pluto – Watershed 275kV power line; or Option 4 that comprises a single 2.8km 132 kV line from the new facility 33kV substation facility 33kV substation to the Makokskraal Substation.

In terms of the Grid Connection Capacity Assessment (GCCA) 2024, which is a report that presents the results of available generation connection capacity of all the transmission substations in all the supply areas in all the provinces of South Africa, the Project is located within the North West Supply Area. Based on the latest GCCA that was released by Eskom in March 2022, the GCCA confirms that the North West Supply Area currently has 4370MW generation connection capacity available. The Project Site is located approximately 14km from the Pluto – Watershed 275kV power line. The Applicant intends to bid for the current and future Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) bid windows and/or other renewable energy markets within SA

Methodology/ significance Assessment

The project area that will be impacted by the proposed Grootvlei Solar PV project contains some areas that are currently disturbed by cattle and game farming activities.

The impact significance of the project on graves and cemeteries is low as no definite grave sites were identified.

The impact significance of the proposed project on protected historical structures is low as two sites comprising historical structures (Groot 01 and Groot 04) were identified which are located within or adjacent to the general PV site area and/or powerline options.

The impact significance of the proposed project on archaeological resources is low as two sites containing a very low density scatter of stone tools (Groot 02, Groot 03) were identified within the general PV site area.

Mitigation Measures

The proposed Grootvlei Solar PV project could impact on heritage resources as four heritage resources were identified within or adjacent to the project footprint area: two historical structure sites (Groot

01, Groot 04) and two archaeological sites (Groot 02, Groot 03). However, the Alternative 2 layout has been adjusted to specifically avoid these heritage resources.

The recommendations below are provided to mitigate the potential impact of the proposed PV project on the identified heritage resources:

Historical Structures (Groot 01, Groot 04)

- A buffer of at least 20m (25m from the centre for the kraal) must be placed around both sites to ensure that during construction there is no indirect impact which could damage any structures
- The materials demarcating the buffer must be highly visible and made of durable material
- If any impact is anticipated, then a permit will be required for the alteration or destruction of any of the structures (from NW PHRA or SAHRA)

Archaeological material (Groot 02, Groot 03)

- A buffer of at least 30m must be placed around both sites to ensure that during construction there is no indirect impact which could damage any archaeological material
- The materials demarcating the buffer must be highly visible and made of durable material
- If any impact is anticipated, then a permit will be required for the destruction of the material (from SAHRA)

Palaeontological heritage

- A separate palaeontological study is being undertaken by a professional palaeontologist as the project area falls into an area where the underlying geology is mainly of Very High fossil sensitivity. The assessment would indicate if significant/sensitive fossils will be impacted by the proposed project and provide mitigation measures.

No fatal flaws were identified during this study, therefore, it is the considered opinion of the heritage specialist that the construction of the proposed Solar PV project within the footprint can proceed. There are no objections from a heritage perspective provided the recommendations and mitigation measures contained in this report and in the separate desktop palaeontological assessment are implemented. It should be noted that the original layout for the Grootvlei Solar PV footprint (Alternative 1) has been revised to exclude certain environmentally and heritage sensitive areas (Alternative 2). The Alternative 2 layout avoids the identified heritage resources that would be impacted by the Alternative 1 layout. Therefore, from a heritage perspective, Alternative 2 is the preferred layout. However, some of these heritage resources still could be subject to indirect impact, specifically during site clearance or construction activities, therefore the mitigation measures set out will still apply.

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List of Abbreviations

APHP	Association of Professional Heritage Practitioners
ASAPA	Association of Southern African Professional Archaeologists
BESS	Battery Energy Storage System
CRM	Cultural Resources Management
DALRRD	Department of Agriculture, Land Reform & Rural Development
DFFE	Department of Forestry, Fisheries and Environment
EA	Environmental Authorisation
EIA	Environmental Impact Assessment
EAP	Environmental Assessment Practitioner
EIA	Early Iron Age
EMPr	Environmental Management Programme
ESA	Early Stone Age
GIS	Geographic Information System
ha	Hectare
HIA	Heritage Impact Assessment
IAP	Interested and Affected Party
IAIAsa	International Association for Impact Assessment South Africa
km	Kilometre (1 000m)
LIA	Late Iron Age
kV	Kilo Volt
LSA	Later Stone Age
MSA	Middle Stone Age
MTS	Main Transmission Station
NEMA	National Environmental Management Act (No. 107 of 1998)
NHA	National Health Act, (No. 61 of 2003)
NHRA	National Heritage Resources Act (No 25 of 1999)
NHS	National Heritage Site
NW PHRA	North West Provincial Heritage Resources Authority
PHRA	Provincial Heritage Resources Authority
PV	Photo Voltaic
REIPPPP	Renewable Energy Independent Power Producer Procurement Programme
SAHRA	South African Heritage Resources Agency

1 INTRODUCTION

LTM Green Energies (Pty) Ltd (the “Applicant”) has proposed the development of Grootvlei 600MW Solar Plant, Battery Energy Storage Systems (BESS) and Grid Connection Project north west of Ventersdorp within the JB Marks Local Municipality in the North West Province (the “Project”). The electricity generated by the Project will be transmitted through either Option 4 which consists of 2 x 132kV powerlines, approximately 14km kilometres (km) in length, from the new facility 33kV substation to new 400/132kV Main Transmission Substation (MTS) to Loop In-Loop Out (LILO) of the Pluto – Watershed 275kV power line; or Option 4 that comprises a single 2.8km 132 kV line from the new facility 33kV substation facility 33kV substation to the Makokskraal Substation.

In terms of the Grid Connection Capacity Assessment (GCCA) 2024, which is a report that presents the results of available generation connection capacity of all the transmission substations in all the supply areas in all the provinces of South Africa, the Project is located within the North West Supply Area. Based on the latest GCCA that was released by Eskom in March 2022, the GCCA confirms that the North West Supply Area currently has 4370MW generation connection capacity available. The Project Site is located approximately 14km from the Pluto – Watershed 275kV power line. The Applicant intends to bid for the current and future Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) bid windows and/or other renewable energy markets within SA.

1.1 Scope & Terms of Reference for the HIA report

1.1.1 Summary of Key Issues & Triggers Identified During Scoping

In terms of the NHRA, the following proposed activities trigger the need for a Heritage Impact Assessment (HIA):

- Potential occurrence of heritage resources, graves and structures older than 60 years within the Project’s footprint.
- Proposed development that is more than 5000m²
- Proposed linear development that is longer than 300m
- Proposed development where an impact assessment is triggered in terms of NEMA.

1.1.2 Approach

- Undertake a Heritage Impact Assessment in accordance with the NHRA.
- Identify and map all heritage resources in the area affected, as defined in Section 2 of the NHRA, including archaeological sites on or near (within 100m of) the proposed developments.
- Assess the significance of such resources in terms of the heritage assessment criteria as set out in the regulations.
- Assess the impacts of the Project on such heritage resources.

- Prepare a heritage sensitivity map (GIS-based), based on the findings of the study.
- Identify heritage resources to be monitored.
- Comply with specific requirements and guidelines of NW PHRA and SAHRA.

1.1.3 Nominated Specialist Details

Organisation:	Nitai Consulting
Name:	Jennifer Kitto
Qualifications:	BA Archaeology and Social Anthropology; BA (Hons) Social Anthropology
No. of years' experience:	24
Affiliation (if applicable):	Association of Southern African Professional Archaeologists (ASAPA) - Technical member No.444 International Association for Impact Assessment (IAIAsa) – Member No. 7151

1.2 Project Description

LTM Green Energies (Pty) Ltd (the “Applicant”) has proposed the development of Grootvlei 600MW Solar Plant, Battery Energy Storage Systems (BESS) and Grid Connection Project north west of Ventersdorp within the JB Marks Local Municipality in the North West Province (the “Project”). The electricity generated by the Project will be transmitted through either Option 4 which consists of 2 x 132kV powerlines, approximately 14km kilometres (km) in length, from the new facility 33kV substation to new 400/132kV Main Transmission Substation (MTS) to Loop In-Loop Out (LILO) of the Pluto – Watershed 275kV power line; or Option 4 that comprises a single 2.8km 132 kV line from the new facility 33kV substation facility 33kV substation to the Makokskraal Substation.

2 LEGISLATION

The identification, evaluation and assessment of any cultural heritage site, artefact or find in the South African context is required and governed by various pieces of legislation, including the National Heritage Resources Act, 25 of 1999 (NHRA) and associated Regulations, National Environmental Management Act, Act 107 of 1998 (NEMA) and associated Regulations and, as well as the National Health Act, Act No. 61 of 2003 (NHA), specific Regulations governing human remains.

2.1 National Heritage Resources Act, No 25 of 1999 (NHRA)

The NHRA is the defines cultural heritage resources (section 3), provides protection to specific types of heritage resources (sections 34, 35, 36) and also requires an impact assessment of such resources for specific development activities (section 38(1)). Section 38(8) further allows for cooperation and integration of the management of such impact assessment between the national or provincial heritage authority (SAHRA or a PHRA) and the national environmental authority (DEFF).

In terms of section 38(1)(a) of the NHRA, the specific types of development activity that may require a Heritage Impact Assessment (HIA) include: the construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300 m in length. As the proposed Solar PV project footprint is larger than 5000m², and includes two powerline options that are both longer than 300m, this study falls under s38(8) and requires comment from the relevant heritage resources authority. (South African Heritage Resources Authority-SAHRA and/or the Free State Provincial Heritage Authority).

Sections 34-36 of the NHRA further stipulate the protections afforded to specific types of heritage resources, *i.e.* structures older than 60 years (s34); archaeological, palaeontological, meteorites (s35); graves and burial grounds (s36), as well as the mitigation process to be followed if these resources need to be disturbed. The construction of the solar PV project and powerline may result in impacts to any of these types of heritage resources.

2.2 National Environmental Management Act, Act 107 of 1998 (NEMA)

NEMA states that an integrated Environment Management Plan (EMP) should, (23 -2 (b)) "...identify, predict and evaluate the actual and potential impact on the environment, socio-economic conditions and cultural heritage". In addition, the NEMA and associated Regulations GNR 982 (Government Gazette 38282, 14 December 2014, amended 2017) state that, "the objective of an environmental impact assessment process is to, ... identify the location of the development footprint within the preferred site ... focussing on the geographical, physical, biological, social, economic, *cultural and heritage aspects* of the environment" (GNR 982, Appendix 3(2)(c), emphasis added).

The EIA Regulations, 2014 (as amended), published in GNR 982 of 2014 (Government Gazette 38282) promulgated under the (NEMA) contain specific requirements to be addressed in the different types or impact assessment reports (Regulations 19, 21 and 23) as well as requirements for Specialist Reports (Appendix 6).

2.3 The National Health Act, No. 61 of 2003 (NHA), Regulations 2013

In the case of graves and/or burial grounds that could be impacted by a proposed development, and which are identified through an impact assessment, specific Regulations relating to the Management of Human Remains (GNR 363 of 2013 in Government Gazette 36473) address the exhumation and reburial of human remains: Regulations 26, 27 and 28.

3 ASSUMPTIONS AND CONSTRAINTS

This assessment assumes that all the information provided by the Client and the Environmental Assessment Practitioner (EAP) regarding the project footprint (Including the powerline) is correct and current.

The project area traverses various properties separated by fences, and access was sometimes restricted by locked gates or extremely long and dense grass and other vegetation in some areas.

The large area of the PV Site project footprint and powerline options meant that it was not feasible to undertake a pedestrian survey of the whole area and the fieldwork therefore, comprised a combination of vehicle and pedestrian investigation. The extremely dense and long vegetation in several areas meant that archaeological and heritage visibility was low in those areas. Therefore, there is a possibility that some heritage resources were not identified, specifically, informal graves or burial sites.

4 PROJECT DESCRIPTION

4.1 Location

The Project is located approximately 20km to the northwest of Ventersdorp central business district (CBD) and falls within Ward 34 of the JB Marks Local Municipality, in the North West Province. The site can be accessed via the N14 (main access) and the R53 (gravel road). The property earmarked for the Solar Project covers a combined area of approximately 655 hectares (ha).

The location details of the affected properties are provided below (Alternative 1 and Alternative 2 layouts).

- Solar Plant: Portion number 0 of the farm Grootvlei 161 IP
- New Main Transmission Substation: Portion number 1 of the Farm Houtkop 152
- Powerline Route Option 4: Portion number 1, Portion number 9, Portion number 11, Portion number 12 of the Farm Houtkop 152; Portion number 3, Portion number 4. Portion number 7 of the Farm Vogelstruispan 151; Portion number 0 of the Farm Lucky Find 158; and Portion number 0 of the farm Grootvlei 161 IP.
- Powerline Route Option 4: Portion number 0 of the farm Grootvlei 161, Portion RE of the Farm Beta 159 IP, Portion 0 of the Farm Boschkop.
-

Grootvlei Solar PV Project, Ventersdorp, North West Province

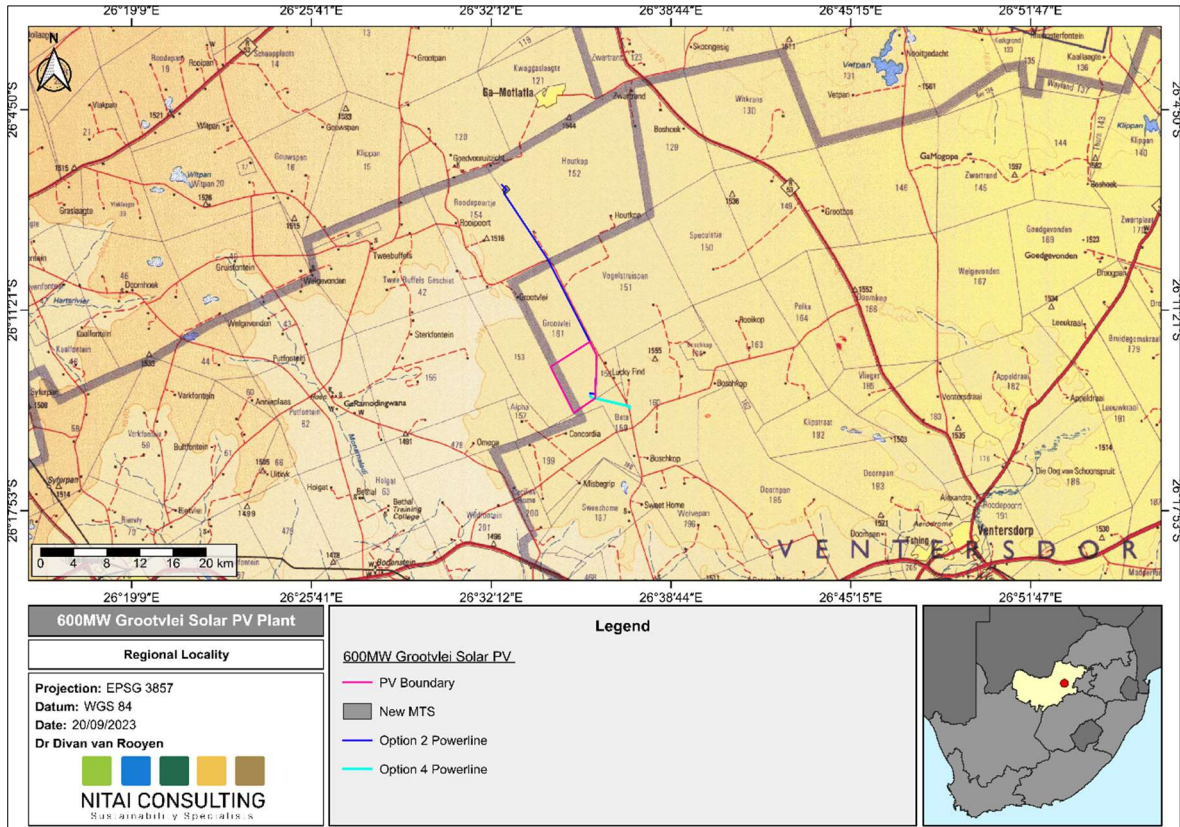


Figure 1: Grootvlei 600MW Solar PV Regional Locality northwest of Ventersdorp (Nitai 2023)

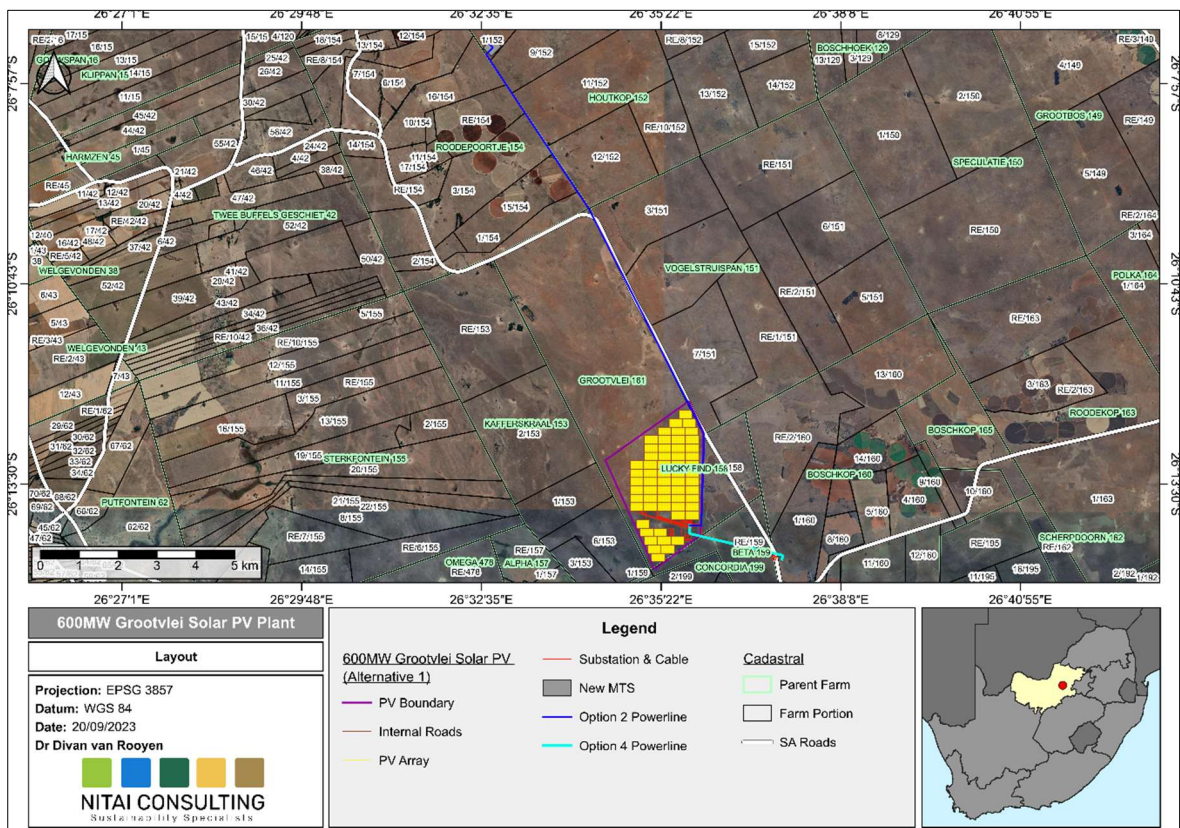


Figure 2: Grootvlei 600 MW Solar PV Project layout, Alternative 1 (Nitai 2023)

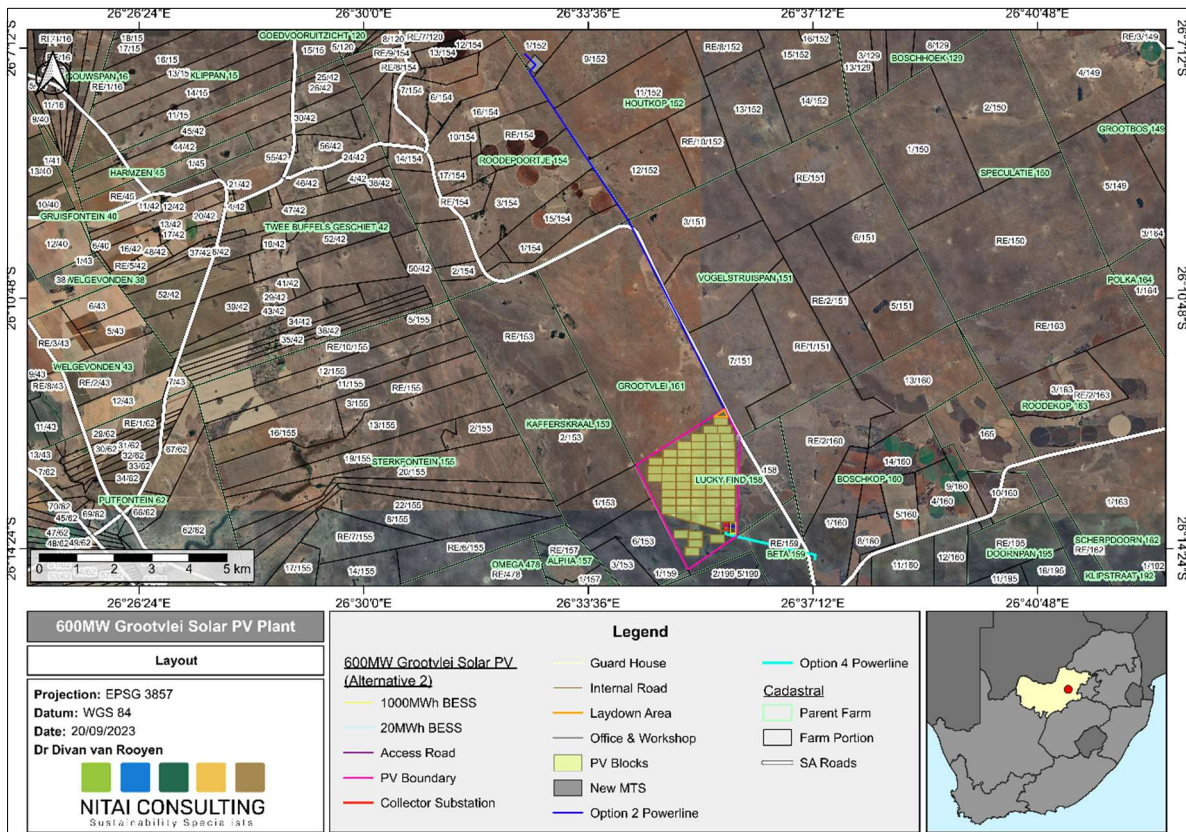


Figure 3: Grootvlei 600 MW Solar PV Project layout, Preferred Alternative 2 (Nitai 2023)

4.2 Project Technical Details

4.2.1 Solar Technology

Solar energy facilities operate by converting solar energy into a useful form (i.e. electricity). The use of solar energy for electricity generation is a non-consumptive use of a natural resource and consumes no fuel for continuing operation. Solar power produces an insignificant quantity of greenhouse gases over its lifecycle as compared to conventional coal-fired power stations. The operational phase of a solar facility does not produce carbon dioxide, sulphur dioxide, mercury, particulates, or any other type of air pollution, as fossil fuel power generation technologies do.

4.2.2 CSP Technology Overview

Concentrating Solar Plant (CSP) plants concentrate beams of light from the sun to heat a fluid and produce steam. The steam rotates a turbine connected to a generator, producing electricity to run a traditional power plant. There are four types of CSP technologies: parabolic troughs, power towers, dish/engine systems, and linear Fresnel reflectors. The parabolic trough system was the first CSP technology, thus it is the most developed and most replicated system.

4.2.2.1 Parabolic Trough Technology

Parabolic trough technology uses parabolic reflectors to concentrate the sun's rays into a receiver pipe along the reflector's focal line. The receiver heats a liquid which generates steam for power. This collector system rotates with the sun's movement to optimize solar energy generation. Refer to **Figure 4** for an example of parabolic trough panels.



Figure 4: Parabolic Trough Technology (www.e-education.psu.edu)

4.2.2.2 Power Tower Systems

Power tower system use flat mirrors to reflect the sun's rays onto a water-filled boiler atop a central tower (refer to **Figure 5**). The liquid is heated to a very high temperature and runs the turbine to create electricity.



Figure 5: Power Tower Technology (Planta Solar 10, Spain)

4.2.2.3 Dish/engine Systems

The dish/engine system is a concentrating solar power (CSP) technology that produces relatively small amounts of electricity compared to other CSP technologies typically in the range of 3 to 25 kilowatts. Dish/engine systems use parabolic reflectors to direct the sun's rays at a receiver placed at the reflector's focal point (refer to **Figure 6**). The liquid in the receiver is heated and runs a Stirling engine to create power.



Figure 6: Dish/Engine Technology www.e-education.psu.edu

4.2.2.4 Linear Fresnel Reflector Technology

Linear Fresnel Reflector technology works much like the parabolic trough system, except that it uses flat mirrors that reflect the sun onto water-filled pipes that generate steam (refer to **Figure 7**). This is a significant cost advantage because flat mirrors are much less expensive to produce than parabolic mirrors. Current advances in CSP allow these technologies to produce electricity several hours after sunset and on days with low intensity of solar radiation through heat accumulators and hybrid configurations.



Figure 7: Linear Fresnel Reflector Technology (social.csptoday.com)

4.3 Overview of Technical Details:

The technical details of the proposed Grootvlei 600MW Solar PV Plant are captured in **Table 1** below.

Table 1: Technical details of the proposed PV Plant

No.	Component	Description / Dimensions
1.	Height of PV panels	± 2.5m
2.	Area of PV Array	± 490 ha
3.	Number of inverters required	Approximately 240 x 2.5MW inverters
4.	Area occupied by inverter / transformer stations / substations	<ul style="list-style-type: none"> Area occupied by inverter stations = 0.35ha Area occupied by Operation and Maintenance infrastructure = ± 0.1 ha Area occupied by facility (step-up/Collector) substation = 0.2 ha Area occupied by the onsite substations = 0.1 ha
5.	Capacity of on-site substation	Up to a maximum of 600 MW, 6.6kV/275kV
6.	Area occupied by buildings and BESS	<ul style="list-style-type: none"> Area occupied by Operation & Maintenance infrastructure = ± 0.1 ha Area occupied by BESS = 0.35 ha
7.	Area occupied by both permanent and construction laydown areas	<ul style="list-style-type: none"> Construction areas = 0.25 ha Operation & Maintenance infrastructure = ± 0.1 ha Total combined = ± 0.35 ha
8.	Area occupied by buildings	1.5 ha
9.	Length of internal roads	± 15km
10.	Width of internal roads	<ul style="list-style-type: none"> Internal roads will have a 5m road width. Access road will have a 14m reserve and road width of 8m.
11.	Proximity to grid connection	<p>Grid Connection:</p> <ul style="list-style-type: none"> Route 1 which consists of 2 x 132kV powerlines, approximately 14km kilometres (km) in length, from the new facility 33kV substation to new 400/132kV Main Transmission Substation (MTS) to Loop In-Loop Out (LILO) of the Pluto – Watershed 275kV power line; and Route 2 that comprises of 2.8km 132 kV line from the new facility 33kV substation facility 33kV substation to the Makokskraal Substation.
12.	Height of fencing	Up to 3m
13.	Type of fencing	Type will vary around the site, welded mesh, palisade and electric fencing

4.4 Project Layout

The layout of the Solar Plant is shown in **Figure 3** (Alternative 1) and **Figure 3** (Alternative 2), above. The desirability of the earmarked site for the development of the proposed Solar Plant is due to the following key characteristics:

- Solar Irradiation: The feasibility of a solar facility is dependent on the direct solar irradiation levels.
- Topography: The suitability of the surface area is an important characteristic for the construction and operation of solar facilities. Most of the site has a low gradient slope and is suitable for this development.
- Grid capacity and connection: In terms of the Grid Connection Capacity Assessment (GCCA) 2024, which is a report presents the results of available generation connection capacity of all the transmission substations in all the supply areas in all the provinces of South Africa, the Project is located within the North West Supply Area. Based on the latest GCCA that was released by Eskom in March 2022, the GCCA confirms that the North West Supply Area currently has 4370MW generation connection capacity available. The Project Site is located approximately 14km from the LILO of the Pluto – Watershed 275kV power line and 2.8km from the Makokskraal Substation.
- Extent of site: The overall extent of the site is sufficient for the installation of the Solar Plant.
- Site access: The site can be accessed via an unnamed gravel road off the N14 and/or the R53

4.4.1 PV Technology Overview (Preferred)

PV technology produces direct current (DC) which is then converted to alternating current (AC) via power electronic inverters. The main technology categories are crystalline modules (mono or poly), thin film, and concentrated photovoltaics (CPV). **Figure 8** below, provides an overview of a typical Solar PV Power Plant.

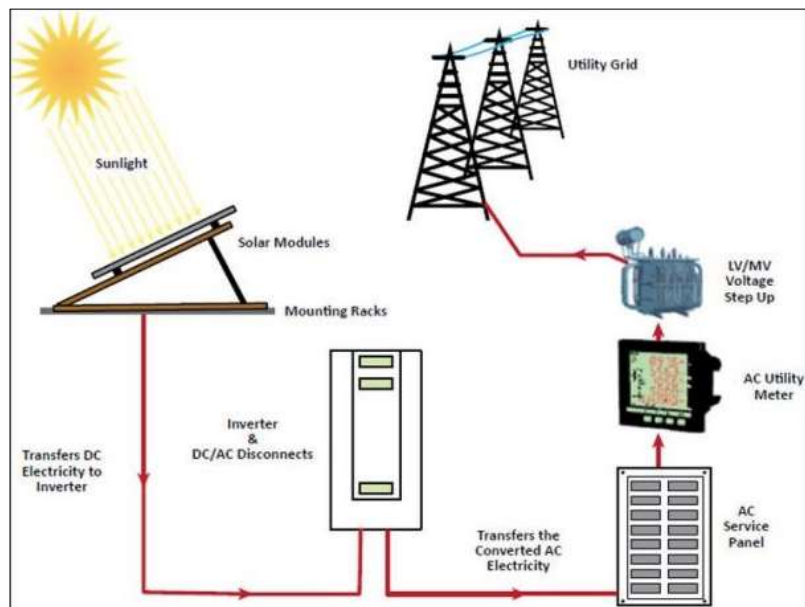


Figure 8: Overview of Solar PV Power Plant (International Finance Corporation, 2015. Utility-Scale Solar Photovoltaic Power Plan.)

5 STATUS QUO ANALYSIS

5.1 General Existing Condition of Receiving Environment

The Project is located approximately 20km to the north west of Ventersdorp's CBD. The areas affected by the proposed Project footprint are rural in nature. The Project's PV Site is vacant and was historically used for agricultural purposes. The Project's power line connection to the Eskom grid is located 2km from the Project area. Grazing is the dominant land use in the Project area. The terrain topography is mostly flat and covered with mixed grassland and other vegetation that varies from relatively short to long and dense. There are several natural outcrops of dolomite and chert and many piles of rocks from field clearing occur.



Figure 9: View over the northeast section of the footprint area, showing the mainly grassland cover



Figure 10: View showing one of the many stone piles scattered over the project footprint



Figure 11: View showing dolomite rock outcrop visible in the southeast section of the project footprint



Figure 12: View of water hole located inside the southern boundary of the project footprint



Figure 13: View of vlei/wetland around the waterhole in the southern section of the project footprint



Figure 14: View of the grass cover and several rock piles in the central section of the project footprint, looking east



Figure 15: View of the long and dense vegetation section around the northeast section of the project footprint

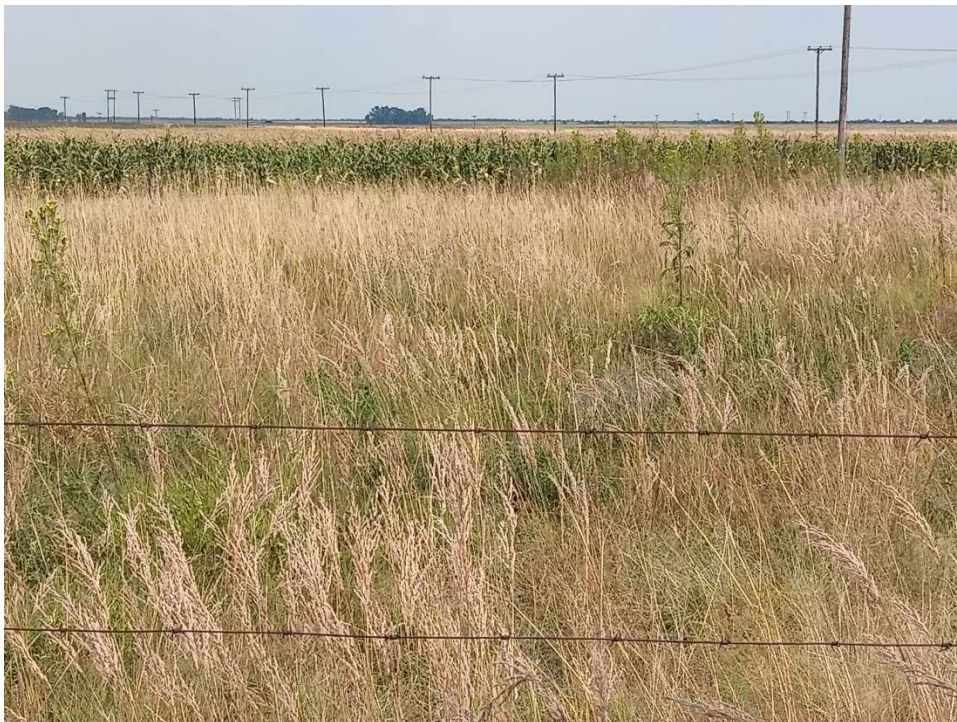


Figure 16: View from existing substation looking west over the route for the shorter powerline option (Alternative 1)



Figure 17: View from the road looking north over the route for the shorter powerline option (Alternative 1)



Figure 18: View over the northern section of the longer powerline route option (Alternative 2)



Figure 19: View looking south along the west-central section of the road reserve, longer powerline route option (Alternative 2)



Figure 20: View looking south along the southwest section of the road reserve, longer powerline route Option 2 (Alternative 2 layout)

5.2 Cultural-Heritage Receiving Environment

5.2.1 DFFE Environmental Screening Tool

The DFFE Environmental Screening Tool was accessed for information on the cultural-heritage sensitivity of the general region. Note that only the PV area and the proposed longer powerline (Option 2) are shown due to certain technical limitations within the DFFE Screening Tool. As the two alternative layouts are situated within the same general site footprint, these are also not shown.

This tool indicated that the Archaeological and Cultural Heritage Sensitivity of the general region is rated as Low (**Figure 21**). However, the Palaeontological Sensitivity of the underlying geology in this area is indicated as High (**Figure 22**).

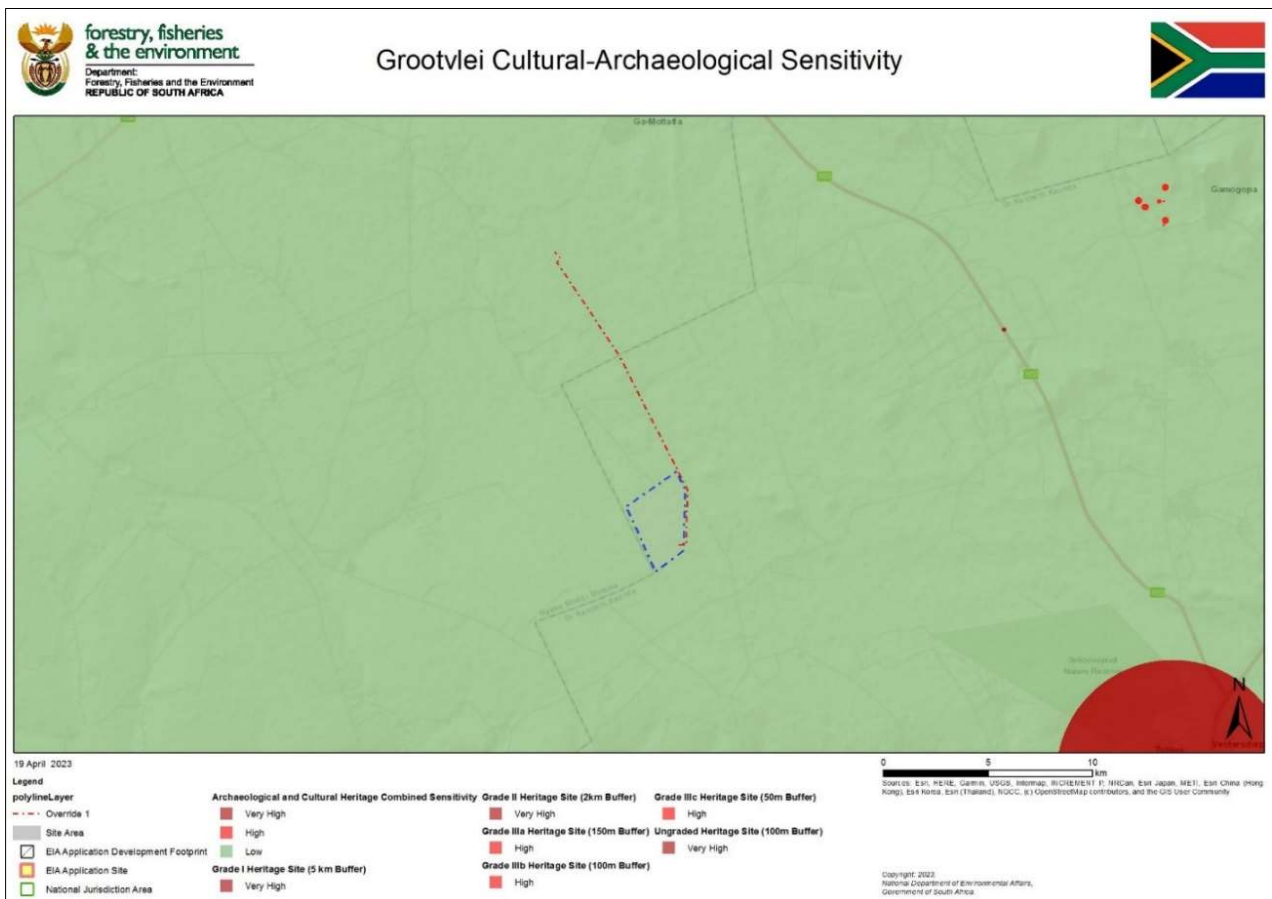


Figure 21: Archaeological Cultural Sensitivity map indicating that the project footprint is located within a region of low heritage sensitivity (DFFE Screening Tool).

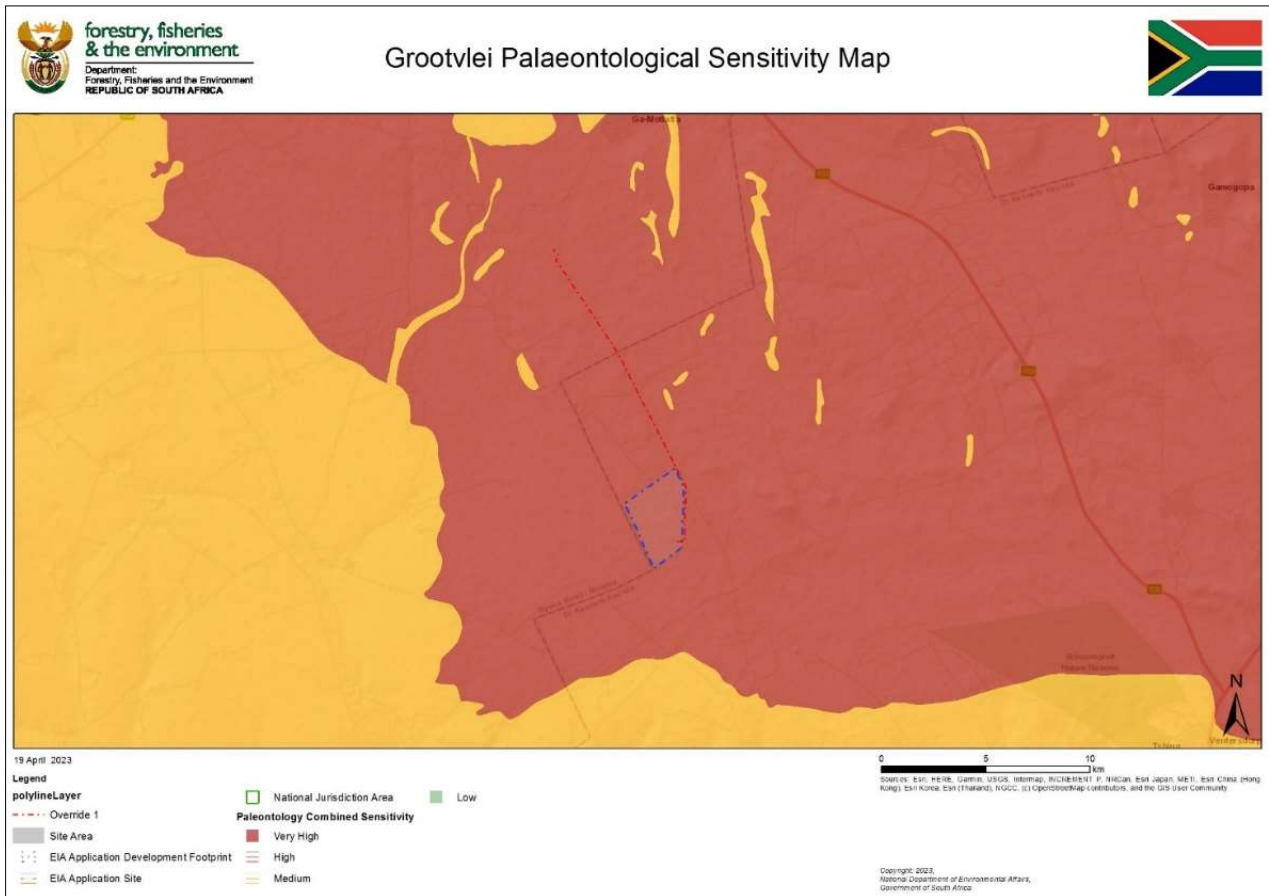


Figure 22: Palaeontological Sensitivity map indicating that the project footprint is located within a region of High sensitivity (DFFE Screening Tool).

5.2.2 Historical Background of Surrounding Region (archaeological and historical literature survey)

The archaeological history of the area can broadly be divided into a Stone Age, Iron Age and Historic or Colonial Period. An archaeological and historical overview of the general region is presented below.

The Stone Age

The Earlier Stone Age (ESA) is the oldest period of South Africa's archaeological history and comprises two technological phases. The earliest of these is known as Oldowan and is characterised by simple flakes and hammer stones. It dates to approximately 2 million years ago. The second technological phase is the Acheulian which includes more deliberately formed stone artefacts such as the cleaver and bifacial hand axe. The Acheulian dates to approximately 1.5 million years ago. No significant ESA sites are known from the area.

The Middle Stone Age (MSA) dates from around 250 000 to 40 000 years ago and is associated with flakes, points and blades manufactured by what is called the "prepared core" technique. This period is also associated with modern humans and the development of complex cognition (Wadley, 2013). No significant MSA sites are known in the region.

The Later Stone Age (LSA) is the third archaeological period is characterised by very small stone tools known as microliths, as well many rock art sites (paintings and engravings). LSA stone artefacts are more specialised, in that specific tools were created for specific purposes (Mitchell 2002) for example, scrapers and segments, and are sometimes made from bone. The LSA is further defined by evidence of ritual practices and complex societies (Deacon & Deacon 1999). This period is associated with hunter-gatherers (San) as well as early pastoralists (Khoekhoe) and lasted until the arrival of Iron Age and European communities (continuing in some areas for quite a long period). No significant sites from the LSA are known in the vicinity, however, two LSA sites have been recorded on the farm north-east of Ventersdorp (Birkholtz, 2008).

Rock engravings are known from the wider vicinity of the study area (Bergh, 1999; Lewis-Williams and Blundell 1998). The closest rock art site in the general area is Bosworth Farm located north-west of Klerksdorp. This is an extensive rock engraving site with over 400 San and Khoe herder rock engravings. The site is characterised by many depictions of human figures as well as animals (such as a charging rhinoceros, the large elephant, and ostrich dancing), and many geometric motifs. There are also many stone artefacts dating from over 1 million years ago (<https://nasmus.co.za/rock-art/>). The site is protected as a declared Provincial Heritage Site (SAHRIS database).

The Iron Age

The Iron Age period (AD 1600 – AD 1840) is associated with pre-colonial farming communities and includes both agricultural and pastoralist farming activities, metal working, cultural customs such as lobola and stone-walled settlements known as the 'Central Cattle Pattern' (Huffman, 2007).

The Early Iron Age (EIA) dates from roughly AD 200 - 900. The only well-known EIA sites in the greater North West province are Kruger Cave near Rustenburg and Broederstroom near Hartebeespoort Dam. Both sites date to approximately 460 AD (Mason 1974). No EIA sites are known within the region closer to the project area.

A Middle Iron Age (MIA) period has been defined by Huffman (2007) as occurring from AD 900 – 1300, however, no EIA sites are known within the region closer to the project area.

The Late Iron Age (LIA) period dates from around 1450 AD – 1650 AD and is distinguished by different ceramic styles (called facies) associated with specific settlement patterns (some characterised by stone walling). These ceramic styles have been defined by Tom Huffman for the regions within South Africa (2007). Four of these ceramic styles are known from the greater region around Ventersburg/Klerksdorp/Lichtenburg. The Ntsuanatsatsi facies of the Blackburn Branch of the Urewe Ceramic Tradition represents the earliest known period within this region (1450 AD – 1650 AD). The Ntsuanatsatsi facies of the Blackburn Branch of the Urewe Ceramic Tradition represents the earliest known Iron Age period within the surroundings of the study area. The decoration on the ceramics from this facies is characterised by a broad band of stamping in the neck, stamped. The decoration on these ceramics is defined by a broad band of stamping in the neck, stamped arcades on the shoulder and appliqué (Huffman, 2007). Huffman (2007) suggests that the Ntsuanatsatsi facies can be directly linked to the early Bafokeng, who were the first Mbo Nguni group to move from the area of present-day KwaZulu-Natal into the interior.

The second ceramic style from this region is known as the Olifantspoort facies of the Moloko Branch of the Urewe Ceramic Tradition. This facies is dated to between AD 1500 and AD 1700. The key features of the decoration defining this style include multiple bands of fine stamping or narrow incision separated by colour (Huffman, 2007). The type site for this facies is located on the farm Olifantspoort 328 JQ, which is situated closer to Rustenburg.

The Uitkomst facies of the Blackburn Branch of the Urewe Ceramic Tradition is the third style identified from the general region. This facies is dated to between AD 1650 and AD 1820. The decoration on these ceramics is defined by stamped arcades, appliqué of parallel incisions, stamping and cord impressions and is described by Huffman (2007) as a combination of both Ntsuanatsatsi (Nguni) and Olifantspoort (Sotho) styles. The type-site is Uitkomst Cave, situated in the Cradle of Humankind.

A fourth style called the Buispoort facies of the Moloko branch of the Urewe Ceramic is the latest phase (1700 AD – 1840 AD) occurring within the general region. The key features of decoration include rim notching, broadly incised chevrons and white bands, and the use of red ochre (Huffman, 2007). The Buispoort facies is associated with LIA so-called mega-sites such as Buffelshoek, Kaditshwene, Molokwane and Olifantspoort (Huffman, 2007). Various well-known sites from the end of the LIA period are located in the greater North-West Province, most of which are situated in the Zeerust-Marico area (Buispoort and Braklaagte, the Makgame megasite, and Kaditshwene). These sites date to between the 15th and 19th centuries and record the arrival and development of the early Moloko Sotho-Tswana speakers (Fourie 2016).

A study by Küsel (2011) notes that there are no known Iron Age sites in the immediate vicinity of Ventersdorp. However, Iron Age sites are known to occur in the Potchefstroom, Klerksdorp and Hartbeesfontein areas (Küsel 2011).

Historical/Colonial Period

Around 1836 the first Voortrekker parties started crossing the Vaal River and between 1839 – 1840, the first farms were established by the Voortrekkers in the general region of the study area. The district of Potchefstroom was established in 1839 (Bergh, 1999), and the project area fell into this district.

The town of Ventersdorp originated from the establishment of a parish of the Dutch Reformed Church on the farm Roodepoort in 1866. The town was established in 1887 and was named after the owner of the farm Roodepoort, Johannes Venter (Erasmus, 2014).

The South African War (1899 – 1902) was a war for independence of the Boer Republics of the Transvaal and Free State from Great Britain, but the victims and participants of the war were not restricted to only British or Boer citizens. On 11 June 1900 the town of Ventersdorp was occupied by the British Army. Subsequently, lines of blockhouses were built between Ventersdorp and the surrounding towns to restrict the movement of the Boer forces. Although there is evidence that troops of both the British and the Boer forces were present throughout the general region (van den Bergh, 2009), no information on battles or skirmishes from within the study area was found.

In 1924, the District of Ventersdorp was established separate from the District of Potchefstroom (Bergh 1999).

The region around Ventersdorp and Lichtenburg was mined for diamonds between 1920 to 1945. Alluvial diamonds were found on various farms in the Ventersdorp district in the period after c. 1920. Between 1925 and 1945 a large section of the black residents of the Ventersdorp district worked on the diamond mines. (Breutz, 1954; cited by Birkholtz 2021). In December 1924, a diamond of 3 carats was discovered near Lichtenburg and initial prospecting in 1925 produced a large enough number of diamonds for the area to be proclaimed as a “public diggings” in February 1926. By 1945 a total of 104 diggings were proclaimed on 13 farms in the area (Fourie 2016).

The more recent history of the town of Ventersdorp includes an association with JB Marks, who was born there in 1903 and Eugene Terreblanche who was also born there in 1941. These two figures represent two opposite ends of the political spectrum. JB Marks is associated with the trade union movement, the South African Communist Party (he was elected chairman in 1962) and the ANC (he was the President of the Transvaal branch in 1950) (Verwey 1995). Terreblanche was one of the founders of the Afrikaner Weerstandsbeweging (AWB) which was violently opposed to the establishment of the first democratic government in South Africa. On 9 August 1991 there was a violent confrontation at Ventersdorp between AWB supporters and police guarding a National Party meeting addressed by President FW De Klerk. Three AWB members died and 58 people were injured. Five months later he and nine other AWB members were arrested on charges of public violence resulting from this incident (<https://www.sahistory.org.za/people/eugene-ney-terreblanche>).

5.2.3 Cartographic findings

An assessment of available historical topographical maps was undertaken to establish a historic layering for the study area. Overlays of the maps were made on Google Earth. These historic maps are valuable resources in identifying possible heritage sites and features located within the study area. It should be noted that the earliest edition of the map sheets for this area dates to the 1960s. As the first edition of this sheet dates to 1966, it was not considered necessary to examine the later edition map sheets. Any heritage resources that are 57 years or older would be depicted on the 1966 edition sheet.

The topographical maps were obtained from the Department of Agriculture, Land Reform and Rural Development (DALRRD) in Cape Town.

The following 1:50 000 map sheet was assessed for the Grootvlei 600MW Solar PV footprint: 2626BA Zwartrand Edition 1 1966. The map was surveyed in 1972 and drawn in 1974 by the Director-General Surveys of South Africa from aerial photographs taken in 1966.

As can be seen from **Figure 23** and **Figure 24**, below, the 1966 edition map depicts one heritage feature (Kraal) located within the Grootvlei 600MW project footprint, while three heritage features are depicted adjacent to the powerline options (structures with or without kraals). Note: as there is a negligible difference in the general site footprint between the Alternative 1 and Alternative 2 layouts, I have included both footprint outlines in the figures below.

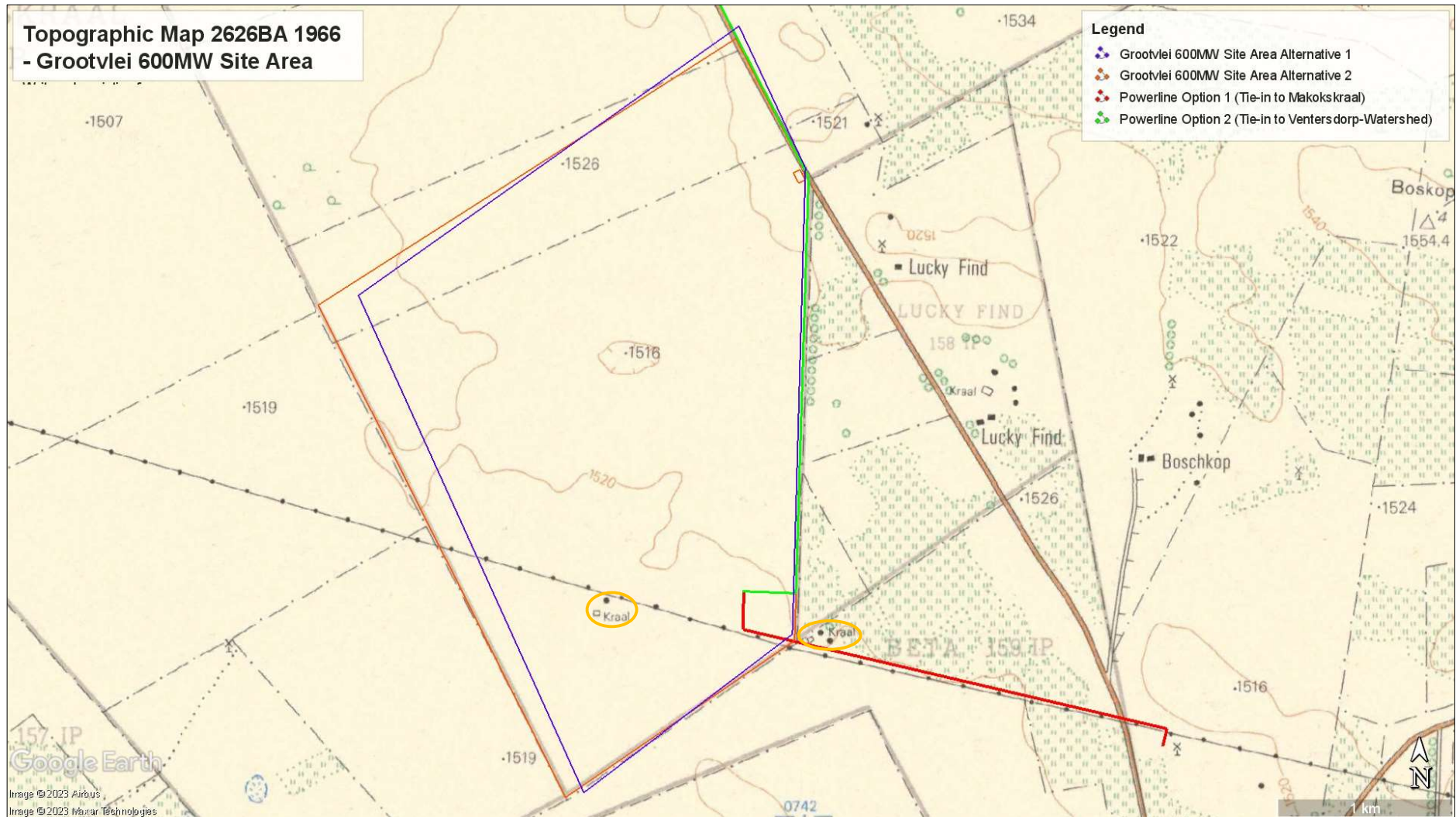


Figure 23: Enlarged view of Ed 1 topographic map sheets 2626BA 1966, depicting one heritage feature (Kraal) within the Solar PV footprint and one (Kraal and structures) close to the two powerlines (yellow circles)

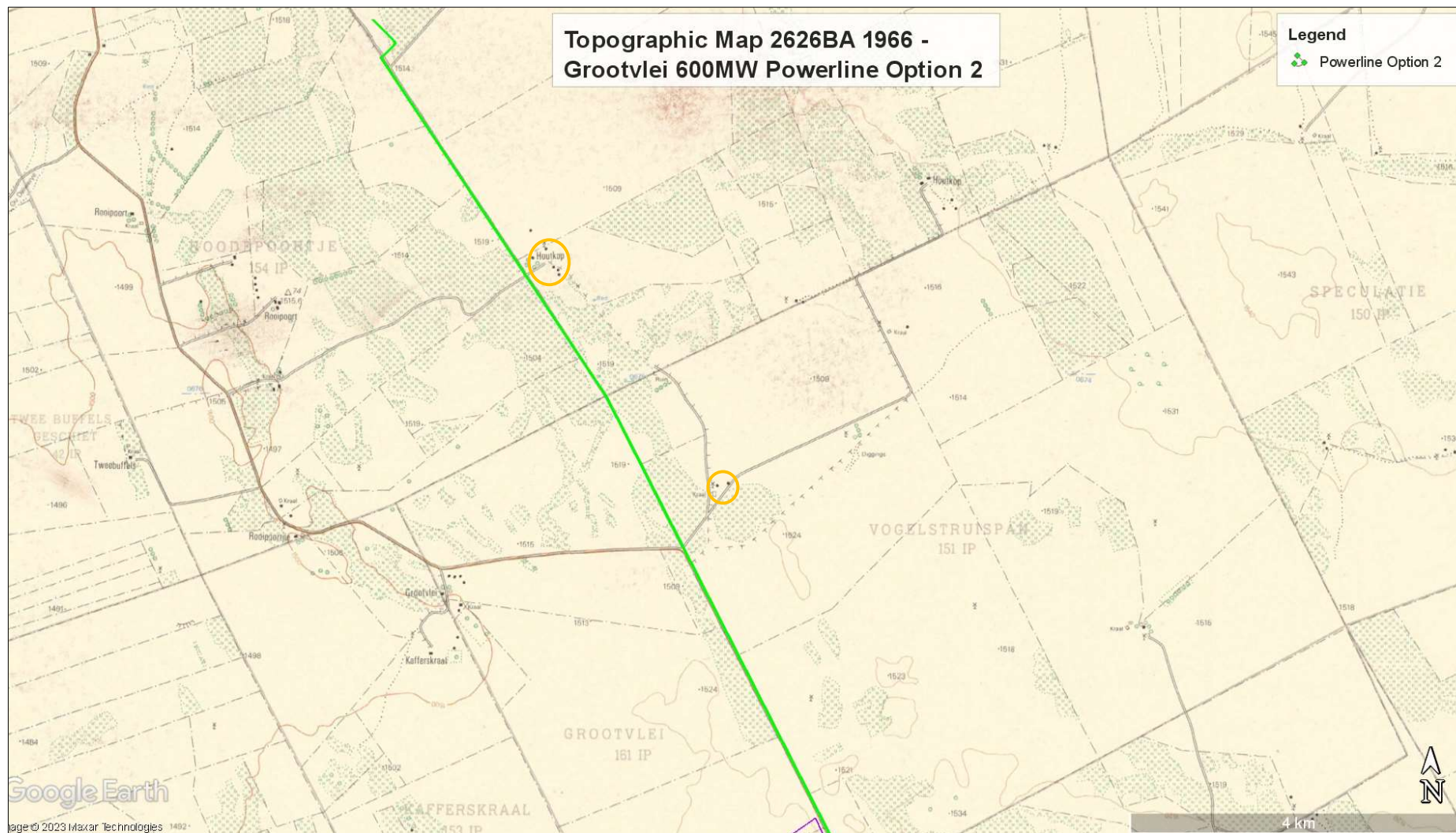


Figure 24: Enlarged view of Ed 1 topographic map sheets 2626BA 1966, depicting two farmsteads (yellow circles) adjacent to the powerline route Option 2 (green line)

5.3 Previous HIA reports in the area

A search on the South African Heritage Resources Information System (SAHRIS) has identified several Heritage Impact Assessments conducted in and around the study area. The project area of one of these reports covered the farms Houtkop and Kwaggaslaagte, which are located immediately north of the current project area (Mlilo 2017). Several remains of historical house foundations were recorded, including one traditional grave and a formal village cemetery. The project area for another of these reports covered several farms located immediately south of the current project area (Coetzee 2020).

Mlilo, T. 2017. *Phase 1 Archaeological Impact Assessment for the proposed Section 102 EMP Amendment for Mivami Agri- Mining Pty Ltd to include the Remaining Extent of Kwaggaslaagte 121 IP into the Prospecting Right for Dunbar 119 IP, and portion 9 of Houtkop 152 IP, in Ditsobotla Local Municipality of Ngaka Modiri Molema District Municipality, North West Province*. The proposed development consists of prospecting for diamonds and manganese and is located on the farm Kwaggaslaagte121 IP (Ga Motlatla Village). Twenty six (26) remains of historical house foundations were recorded adjacent to the prospecting area including one traditional grave. A formal village cemetery (with historical graves) was also recorded.

Coetzee, T. 2020. *Phase 1 Archaeological Impact Assessment & Desktop Study for Rivonet Mining & Exploration on Several Portions of the Farms Wolvenfontein 74 IQ, Syferfontein 81 IQ, Modderfontein 187 IP, Roodepoort 191 IP, Oatlands 79 IQ, Uitkyk 184 IP, Palmietfontein 189 IP, Koppieskraal 500 IP, Makokskraal 203 IP, Sweethome 197 IP and Doornpan 193 IP near Ventersdorp, North*. The farms Palmietfontein 189 IP, Koppieskraal 500 IP, Makokskraal 203 IP, Sweethome 197 IP and Doornpan 193 IP are located a short distance south to southeast of the current project area. However, only Palmietfontein 189 IP was subject to a field survey, while the other farms were assessed at a desktop level. Therefore, the only confirmed heritage resources were noted on Palmietfontein 189IP and included: 29 historical structure sites, which varied in terms of preservation; 4 cemeteries (containing between 25 to 45 graves each) and six modern buildings and structures.

Coetzee, F. 2022. *Cultural Heritage Impact Assessment: Phase 1 Investigation for the Proposed Construction of Several Layer, Rearing Houses and Broilers with Associated Activities and Supporting Infrastructure on Portion 2 of the Farm Rietfontein 210 IP, Portion 1 of the Farm Oatlands 79 IP and Portion 1 of the Farm Ventersdraai 183 IP, JB Marks Local Municipality, Dr Kenneth Kaunda District Municipality, North West Province*. Isolated finds comprising debitage and some broken formal Middle Stone Age tools were recorded, as well as two extant historical structures and two historical structure (foundation) remains.

Birkholtz, PD. 2008. *Phase 1 Heritage Impact Assessment Proposed Etruscan Diamonds (Pty) Ltd Development Situated On The Remaining Extent Of The Farm Nooitgedacht 131 Ip, Zwartrand 145 Ip And Hartbeeslaagte 146 Ip, Magisterial District Of Ventersdorp, North West Province*. A study for the proposed development of the Etruscan Diamonds mining extension on the remaining extent of the farms

Nooitgedacht 131 IP, Swartrand 145 IP and Hartbeeslaagte 146 IP. Eight sites were located, including two historic farm dwellings, four cemetery sites and two Later Stone Age sites

5.4 Palaeontological sensitivity

Note that this section was compiled by the author and not by a palaeontological specialist. A basic palaeontological sensitivity was determined using the SAHRIS database South African Fossil Sensitivity Map (<http://www.sahra.org.za/sahris/map/palaeo>). This map indicates that the project footprint falls within an area where the underlying geology has Very High fossil sensitivity (red) (see **Figure 25** below). Therefore, a separate palaeontological study is being undertaken by a professional palaeontologist.

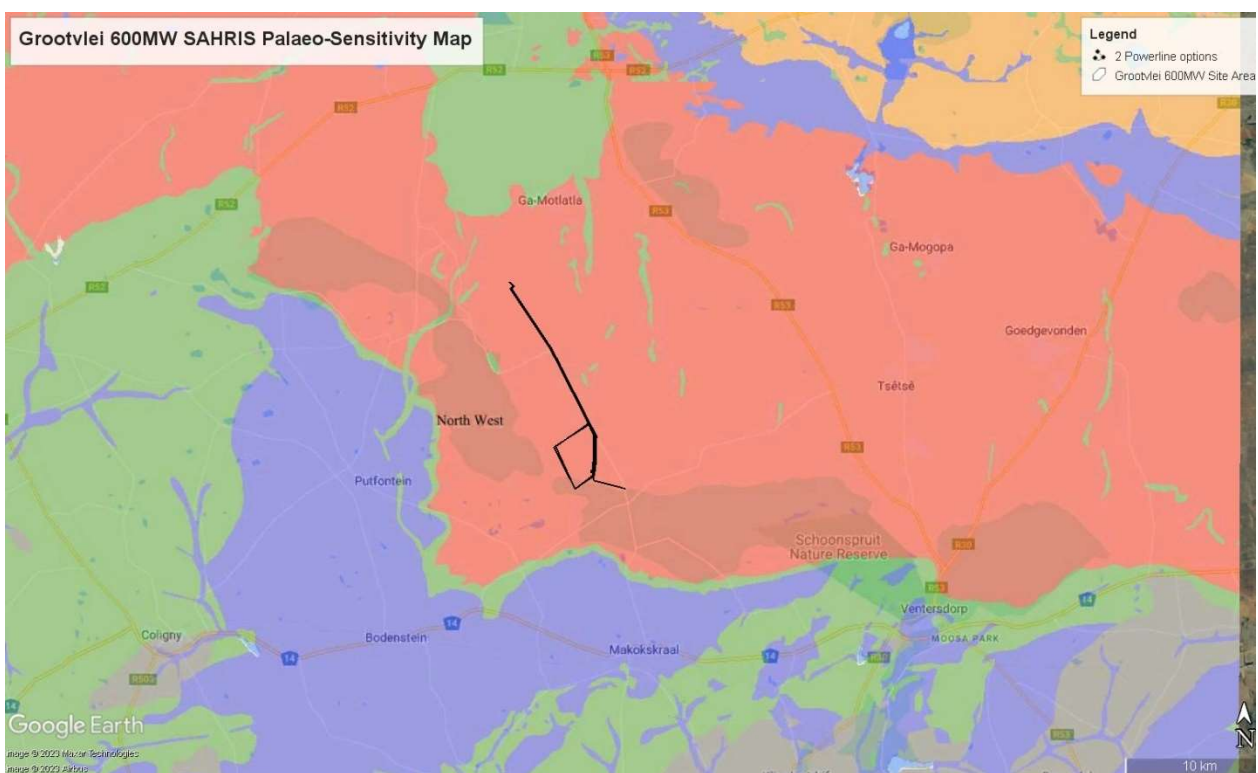


Figure 25: SAHRIS Palaeo sensitivity map overlain on the Grootvlei 600MW Solar PV project footprint (black polygon). The underlying geology is shown as of Very High fossil sensitivity (red).

Table 2: SAHRIS Fossil Map Palaeontological Sensitivity Ratings and Required Actions

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 to be requested.
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 becomes known, SAHRA will continue to populate the map.

5.5 Findings of the Historical Desktop Study

The general overview from the historical desktop study has shown that various archaeological and historical resources can be expected to occur in the project area. Furthermore, the examination of the earliest edition (1966) of the 1:50 000 topographical map, produced by overlying the map with satellite Imagery (Google Earth) has shown that four heritage features dating to c1966 are depicted either within or adjacent to the Solar project footprint and two powerline options.

The Site Survey fieldwork provided confirmation of the occurrence of heritage resources within and adjacent to the project area footprint.

6 SITE SURVEY/FIELDWORK RESULTS

The survey of the Grootvlei 600MW Solar project footprint took place over two separate days (22 March and 24 April 2023) by the author (heritage specialist) as part of a specialist team and the landowner accompanied us. A vehicle was used to access the project footprint area and the survey was conducted by both vehicle and on foot (at selected areas). The survey covered as much of the project footprint area as was feasibly accessible, given the long grass and dense vegetation covering several areas.

The author used a Global Positioning System (GPS) application to navigate access roads in the study area and for recording the tracklog of the survey and waypoints of the identified heritage resources. A Sony digital camera was used for photographic recording of identified heritage resources and general images of the project study area.

The survey aimed to find and identify archaeological and other heritage resources such as burial grounds and graves (BGG), archaeological material or sites, historic built environment and landscape features of cultural heritage significance. The inspection of the area that was surveyed identified five visible heritage resources within or close to the project footprint PV site area, shown in relation to both the Alternative 1 and Alternative 2 layouts (**Figure 39, Figure 40, Figure 41, Figure 42**).

Identified Heritage Sites

Site Name	Groot 01
GPS Coordinates	26°14'13.55"S; 26°36'4.54"E
Site Description	The site comprises three historical structures: a house, outbuilding and a kraal Estimated extent (from satellite images) = 1.71ha
Approximate Age	More than 60 years old. Structures and kraal are depicted at this location on the 1 st edition topographic map of 1966.
NHRA, No. 25	Section 34
Field Grading and Ratings	
Site context and description	The site comprises three historical structures: a house, outbuilding and a kraal. The structures are situated just outside the Solar Site Area (Alternative 1 and Alternative 2) on the farm Re/Beta 159 and could not be accessed due to a fence with no gate. The site is situated roughly 44m east of the Alternative 2 layout and 63m east of Alternative 1 layout. It is also situated roughly 26m north-east of the Powerline Option 4 route.
Site Density	3 structures
Uniqueness	Low
Heritage Significance	GP.C/IIIC - Low
Mitigation	The structures should be avoided and demarcated with a 20m buffer. If any alteration, damage or destruction is anticipated, a permit would be required from the NW PHRA. This would require Phase 2 mitigation, e.g. by photographic recording.



Figure 26: View of the three historical structures located at Groot 01. It was not possible to obtain a closer view due to fence and no gate.



Figure 27: Zoomed in view of the historical house and the stone kraal. The kraal is partially collapsed.

Site Name	Groot 02
GPS Coordinates	26°14'24.24"S; 26°35'35.13"E
Site Description	A single (possible) stone tool fragment was found at this location.
Approximate Age	Possible Middle Stone Age
NHRA, No. 25	Section 35
Field Grading and Ratings	
Site context and description	A single possible stone tool (fragment) was found at this location. The tool was found in a dolomite and chert outcrop area which is located just outside the solar panel area (Alternative 1) in the southern section of the Grootvlei Site Area. It is situated roughly 27m east of the closest solar panel block. Another find spot for stone tools was identified a short distance away (Groot 03) so these two sites may be associated.
Site Density	This was an isolated find.
Uniqueness	Low
Heritage Significance	GP.C/ IIIC – Low
Mitigation	As the site is likely to be associated with Site Groot 03, and as all archaeological material is protected by s35 of the NHRA, the site should be demarcated and avoided with a 30m buffer (together with Groot -03).



Figure 28: View of the stone tool fragment at Groot 02

Site Name	Groot 03
GPS Coordinates	26°14'23.64"S; 26°35'39.37"E
Site Description	The site comprises a find spot for several stone tools. Estimated extent 10m x 5m.
Approximate Age	Middle Stone Age
NHRA, No. 25	Section 35
Field Grading and Ratings	
Site context and description	The site comprises a find spot for four stone tools. Two were definite flakes and two were possible chunks/debitage. The tools were found in a rocky outcrop area which is located just outside the solar panel area (Alternative 1) in the southern section of the Grootvlei Site Area. It is situated roughly 80.60m south of the closest solar panel block. A single stone tool fragment (Groot 02) was identified a short distance away (+119m) so these two sites may be associated.
Site Density	Very low
Uniqueness	Low
Heritage Significance	GP.C/ IIIC – Low
Mitigation	All archaeological material is protected by sec 35. The site should be demarcated and avoided with a 30m buffer (together with Groot -02). If any impact is anticipated a permit for destruction will be required.



Figure 29: View of stone tool ventral surface



Figure 30: view of stone tool, dorsal surface showing bulb of percussion (red arrow)



Figure 31: View of stone tool ventral surface



Figure 32: view of stone tool, dorsal surface showing bulb of percussion

Site Name	Groot 04
GPS Coordinates	26°14'7.99"S; 26°35'17.71"E
Site Description	The site comprises a large historical stone kraal with an associated long trough. Estimated extent (from satellite images) = 1.15ha
Approximate Age	More than 60 years old. A kraal is depicted at this location on the topographic map first edition of 1966
NHRA, No. 25	Section 34
Field Grading and Ratings	
Site context and description	The site comprises an historical kraal constructed of stone and cement with an associated long trough. Two heaps of demolished building material (including historical bricks) were also noted to the south of the kraal. The site is located within the southern section of the Solar Site Area, a short distance away from the solar panel area for both Alternative 1 and Alternative 2 layouts. The kraal is situated slightly closer to the solar panel area for Alternative 2 layout (roughly between 6-14.52m north).
Site Density	2 historical structures and associated building rubble.
Uniqueness	Low
Heritage Significance	GP.C/ IIIC – Low
Mitigation	The structures should be avoided and demarcated with a 25m buffer (from the centre of the kraal). If any impact resulting in alteration, damage or destruction is anticipated, a permit would be required from the NW PHRA. This could require Phase 2 mitigation, e.g. by photographic recording.



Figure 33: View of historical stone kraal at Groot 04, showing entrance



Figure 34: View of historical stone kraal, showing cattle race at one corner



Figure 35: Closer view of the existing cattle race



Figure 36: View of the of the long trough associated with the kraal



Figure 37: Close-up view of interior of the trough showing plaster and paint

Site Name	Groot 05
GPS Coordinates	26°14'32.14"S; 26°37'12.90"E
Site Description	The site is a small building associated with the electrical substation existing at this location.
Approximate Age	Less than 60 years old. No structure is depicted at this location on the topographic maps until 2006.
NHRA, No. 25	N/A
Field Grading and Ratings	
Site context and description	The site is a small building associated with the electrical substation existing at this location
Site Density	N/A
Uniqueness	Low
Heritage Significance	N/A / NCW
Mitigation	No mitigation is required.



Figure 38: Building at Eskom substation



Figure 39: Grootvlei 600MW site Area and Powerline Options, showing identified heritage resources (Alternative 1 Layout)

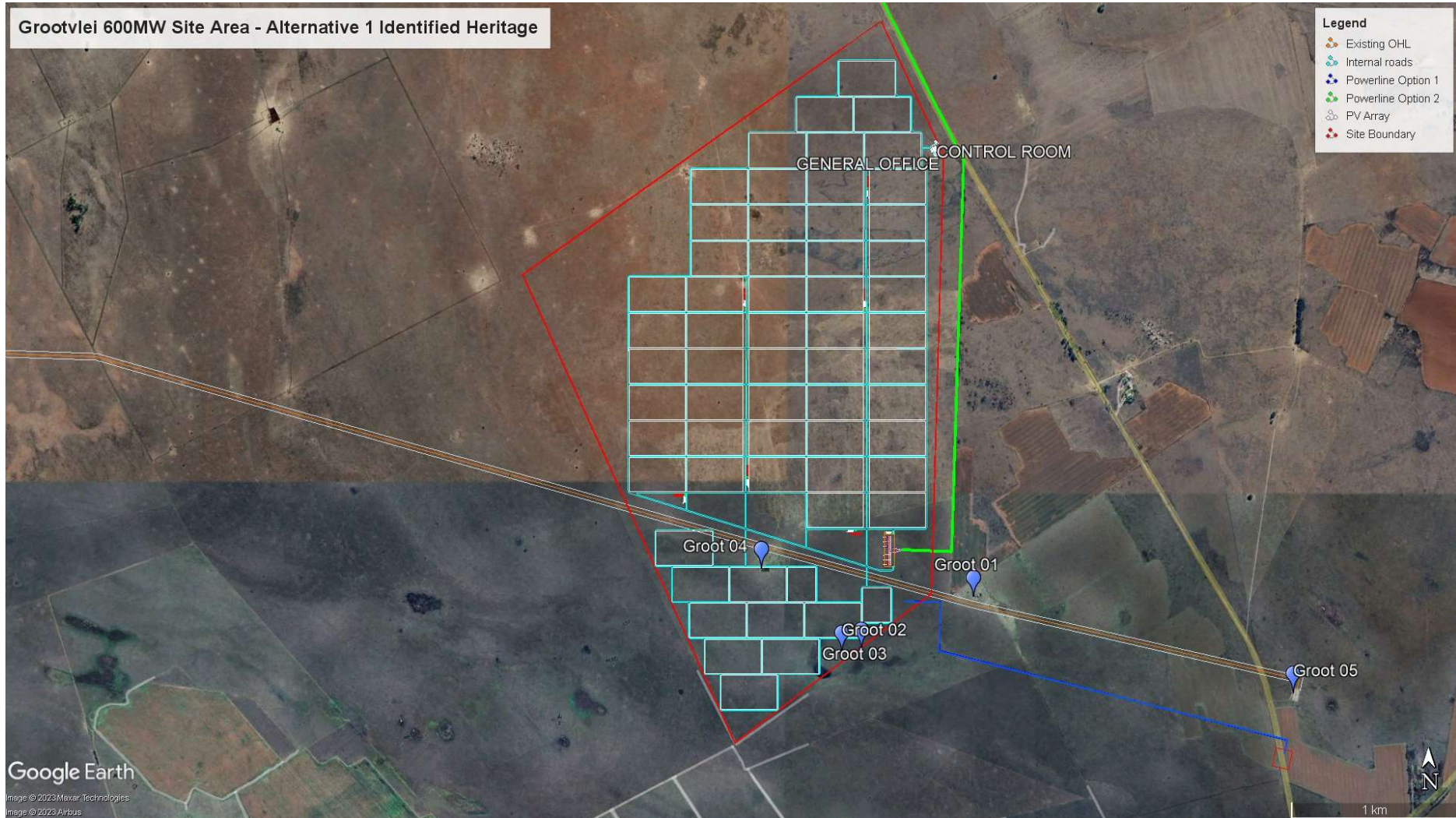


Figure 40: Enlarged view of Grootvlei 600MW Site Area and Powerline Options, showing identified heritage resources (enlarged Alternative 1 layout)

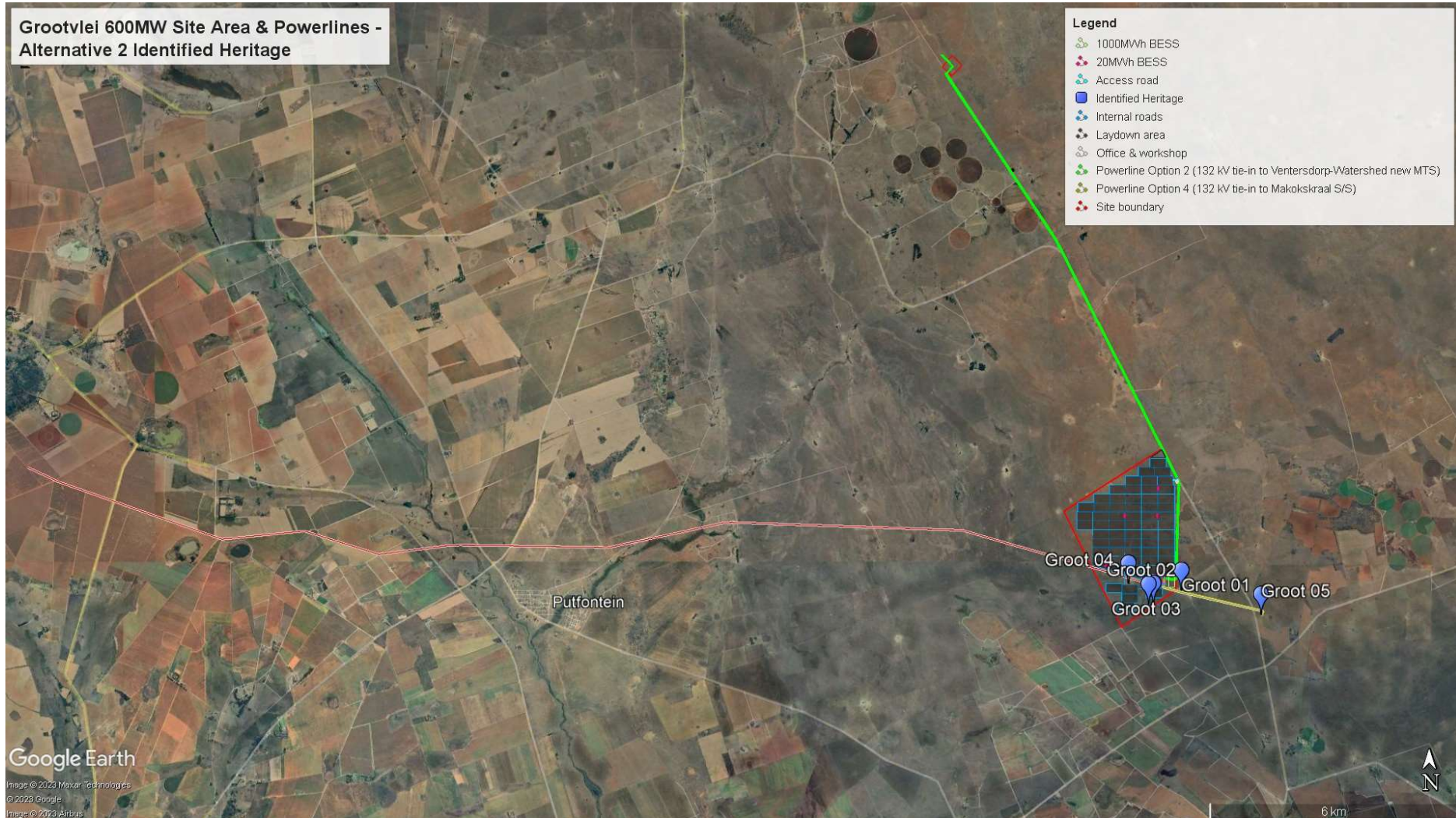


Figure 41: Grootvlei 600MW site Area and Powerline Options, showing identified heritage resources (Alternative 2 Layout)

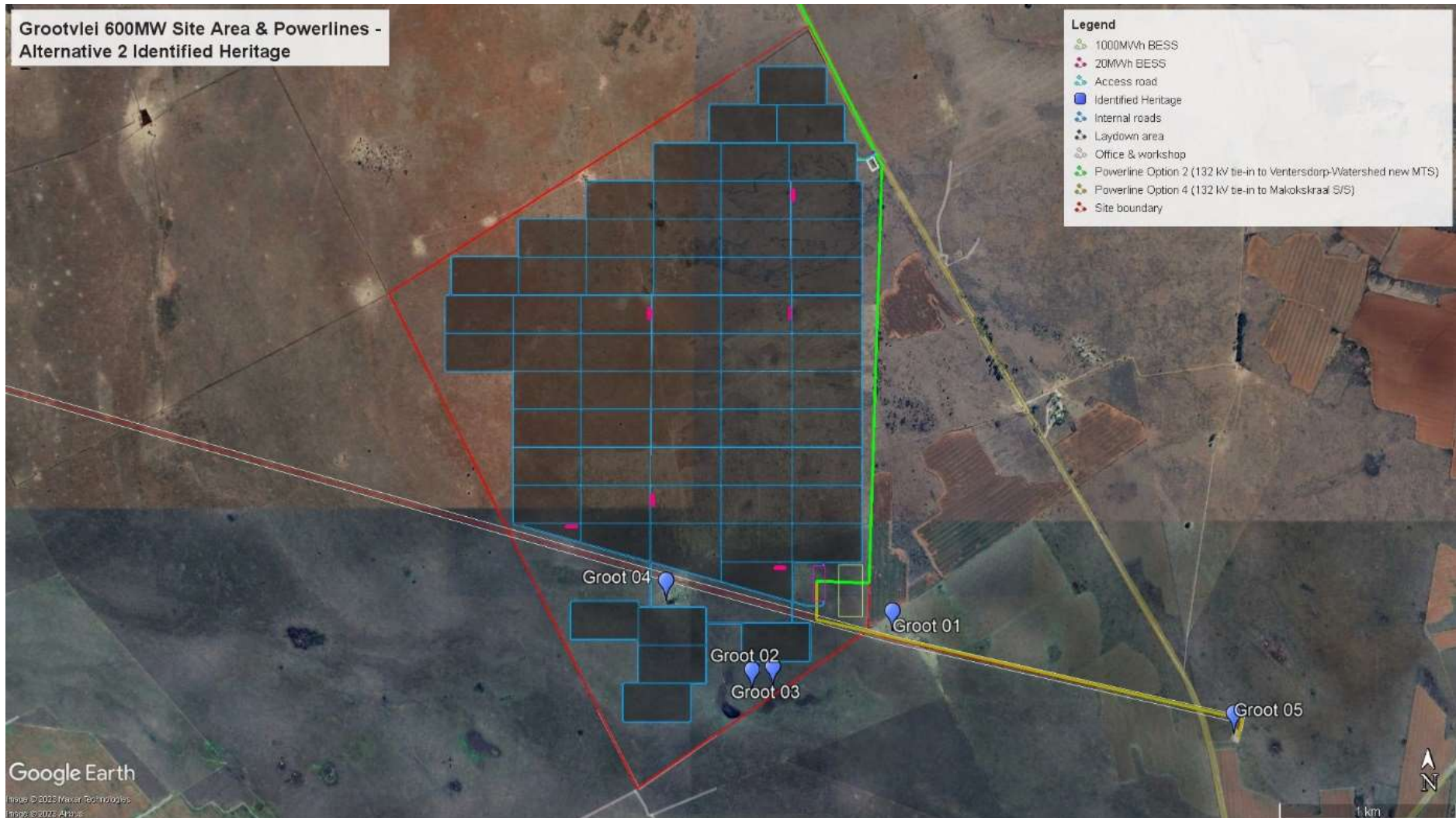


Figure 42: Grootvlei 600MW site Area and Powerline Options, showing identified heritage resources (enlarged Alternative 2 Layout)

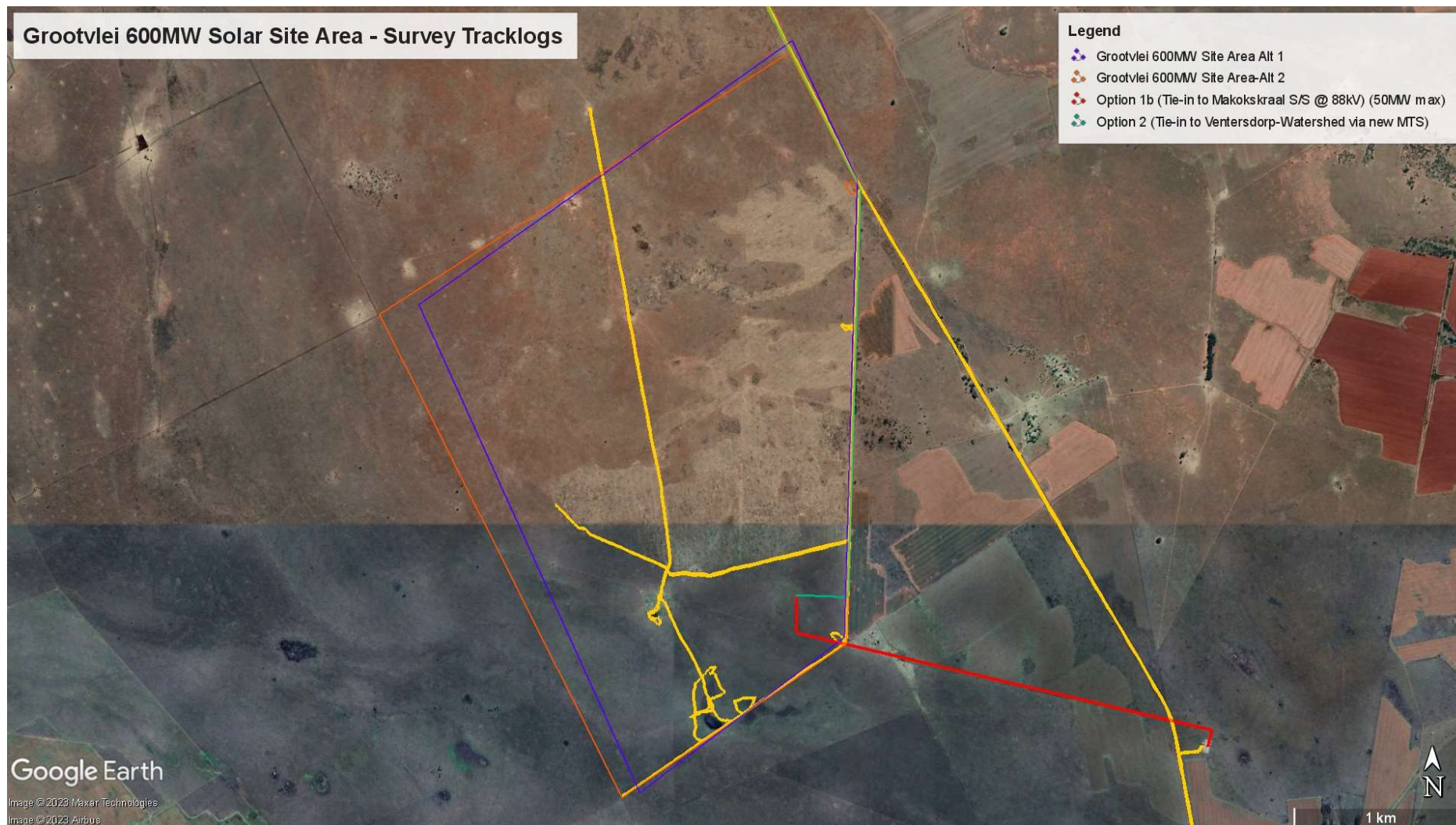


Figure 43: Site Survey Tracklog overlaid on the Grootvlei 600MW Solar site area.

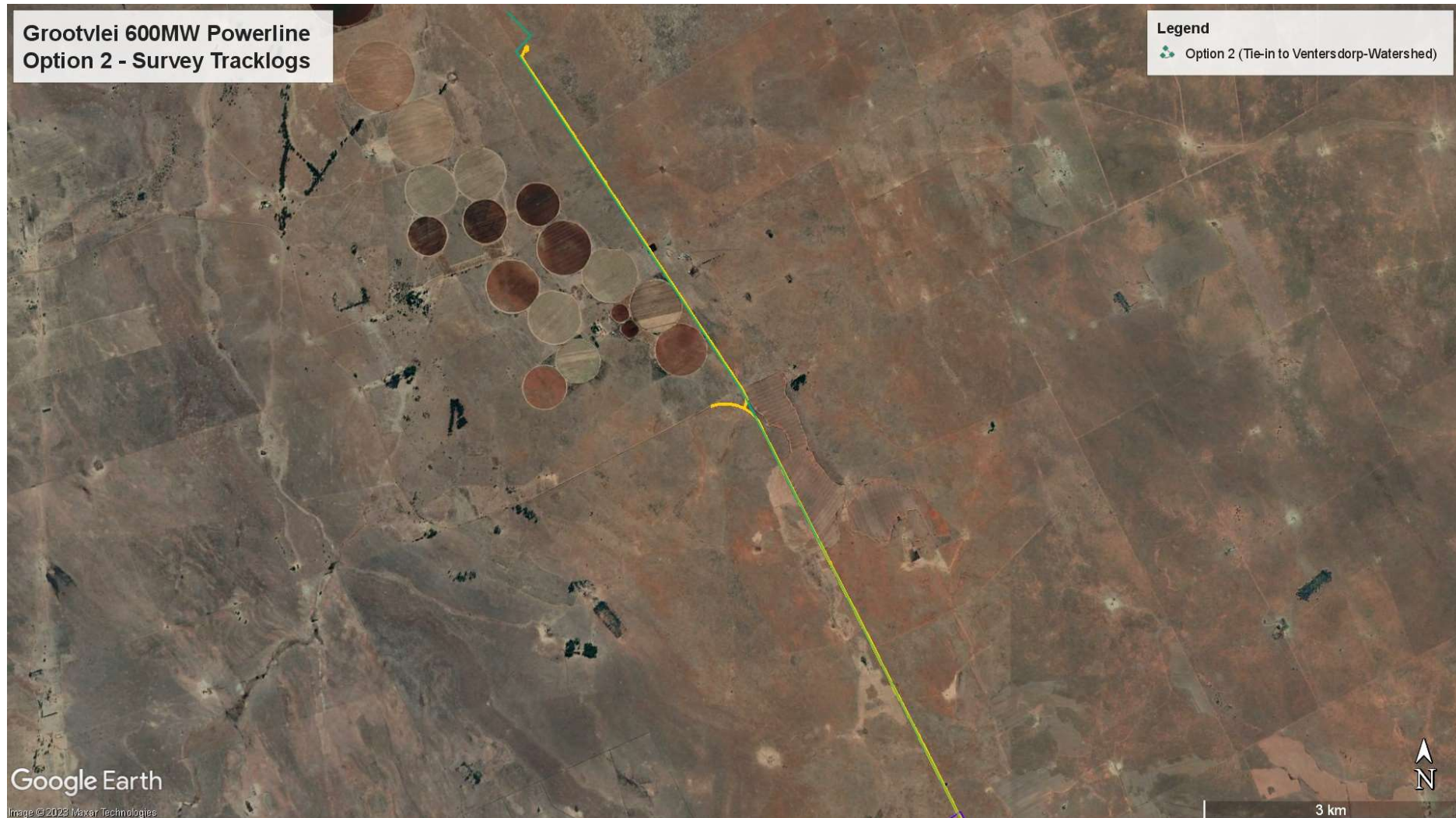


Figure 44: Site Survey Tracklog overlaid on the Grootvlei 600MW Powerline Option 2 Route

7 SITE SENSITIVITY VERIFICATION

The Historical Desktop study showed that four heritage features dating to c1966 are depicted either within or adjacent to the Solar project PV Site area footprint and two powerline options. The results from the fieldwork survey identified five visible heritage resources within or close to the project footprint which included two sites comprising historical structures and two archaeological sites comprising a very low density scatter of stone tools. This confirmed the sensitivity from the initial Site screening results that the Archaeological Cultural Heritage sensitivity is low for both the Alternative 1 and Alternative 2 layouts.

The palaeontological sensitivity verification will be discussed in the separate palaeontological report.

8 SIGNIFICANCE ASSESSMENT

Methodology for Assessing Heritage Site Significance

The applicable maps, tables and figures are included, as stipulated in NHRA and NEMA. The HIA process consists of three steps:

Literature Review

The desktop literature review provided information on the Heritage Background of the general region and project area. This included investigating published sources as well as past HIA studies conducted for the project area and surrounding region. An examination of historical 1:50 000 topographical maps and/or archival maps (if available) was also undertaken. The relevant early editions of the 2727CD topographical map sheets were obtained from the Department of Rural Development & Land Reform, Cape Town.

Literature resources accessed are listed in Table 3.

Table 3: Literature sources accessed

Source	Information
Background Information Document – Nema Green	Project location and description details
Published sources and Past HIAs	Historical and archaeological background on Carletonville and surrounding region
Directorate: National Geo-spatial Information of the Department of Rural Development & Land Reform, Cape Town	Historical topographic maps, 1:50 000 2626BA Zwartrand Edition 1 1966

Field Survey

A physical Site Inspection or Field Survey was conducted, predominantly by vehicle with selected areas traversed on foot, through the project area by an experienced heritage specialist. This focussed on identifying and documenting heritage resources situated within and immediately adjacent to the proposed project area footprint, such as graves, historical structures or remains and archaeological sites or material.

HIA Report

The final step involved the recording and documentation of the identified heritage resources, the assessment of such resources in terms of heritage significance and impact assessment criteria, producing a heritage sensitivity map and compiling the heritage impact assessment report with constructive recommendations for mitigation, if required.

Impacts on these sites by the development will be evaluated as follows:

Site Significance

Site significance classification standards use is based on the heritage classification of s3 in the NHRA and developed for implementation keeping in mind the grading system approved by SAHRA for archaeological impact assessments. The update classification and rating system as developed by Heritage Western Cape (2021) is implemented in this report.

Site significance classification standards prescribed by the Heritage Western Cape Guideline (2016), were used for the purpose of this report (**Table 4** and **Table 5**).

Table 4: Rating system for archaeological resources

Grading	Description of Resource	Examples of Possible Management Strategies	Heritage Significance
I	Heritage resources with qualities so exceptional that they are of special national significance. Current examples: Langebaanweg (West Coast Fossil Park), Cradle of Humankind	May be declared as a National Heritage Site managed by SAHRA. Specific mitigation and scientific investigation can be permitted in certain circumstances with sufficient motivation.	Highest Significance
II	Heritage resources with special qualities which make them significant, but do not fulfil the criteria for Grade I status. Current examples: Blombos, Paternoster Midden.	May be declared as a Provincial Heritage Site managed by Provincial Heritage Authority. Specific mitigation and scientific investigation can be permitted in certain circumstances with sufficient motivation.	Exceptionally High Significance
III	Heritage resources that contribute to the environmental quality or cultural significance of a larger area and fulfils one of the criteria set out in section 3(3) of the Act but that does		

Grading	Description of Resource	Examples of Possible Management Strategies	Heritage Significance
	not fulfil the criteria for Grade II status. Grade III sites may be formally protected by placement on the Heritage Register.		
IIIA	Such a resource must be an excellent example of its kind or must be sufficiently rare. Current examples: Varschedrift; Peers Cave; Brobartia Road Midden at Bettys Bay	Resource must be retained. Specific mitigation and scientific investigation can be permitted in certain circumstances with sufficient motivation.	High Significance
IIIB	Such a resource might have similar significances to those of a Grade III A resource, but to a lesser degree.	Resource must be retained where possible where not possible it must be fully investigated and/or mitigated.	Medium Significance
IIIC	Such a resource is of contributing significance.	Resource must be satisfactorily studied before impact. If the recording already done (such as in an HIA or permit application) is not sufficient, further recording or even mitigation may be required.	Low Significance
NCW	A resource that, after appropriate investigation, has been determined to not have enough heritage significance to be retained as part of the National Estate.	No further actions under the NHRA are required. This must be motivated by the applicant or the consultant and approved by the authority.	No research potential or other cultural significance

Table 5: Rating system for built environment resources

Grading	Description of Resource	Examples of Possible Management Strategies	Heritage Significance
I	Heritage resources with qualities so exceptional that they are of special national significance. Current examples: Robben Island	May be declared as a National Heritage Site managed by SAHRA.	Highest Significance
II	Heritage resources with special qualities which make them significant in the context of a province or region, but do not fulfil the criteria for Grade I status.	May be declared as a Provincial Heritage Site managed by Provincial Heritage Authority.	Exceptionally High Significance

Grading	Description of Resource	Examples of Possible Management Strategies	Heritage Significance
	Current examples: St George's Cathedral, Community House		
II	Such a resource contributes to the environmental quality or cultural significance of a larger area and fulfils one of the criteria set out in section 3(3) of the Act but that does not fulfil the criteria for Grade II status. Grade III sites may be formally protected by placement on the Heritage Register.		
IIIA	Such a resource must be an excellent example of its kind or must be sufficiently rare. These are heritage resources which are significant in the context of an area.	This grading is applied to buildings and sites that have sufficient intrinsic significance to be regarded as local heritage resources; and are significant enough to warrant that any alteration, both internal and external, is regulated. Such buildings and sites may be representative, being excellent examples of their kind, or may be rare. In either case, they should receive maximum protection at local level.	High Significance
IIIB	Such a resource might have similar significances to those of a Grade III A resource, but to a lesser degree. These are heritage resources which are significant in the context of a townscape, neighbourhood, settlement or community.	Like Grade IIIA buildings and sites, such buildings and sites may be representative, being excellent examples of their kind, or may be rare, but less so than Grade IIIA examples. They would receive less stringent protection than Grade IIIA buildings and sites at local level.	Medium Significance
IIIC	Such a resource is of contributing significance to the environs These are heritage resources which are significant in the context of a streetscape or direct neighbourhood.	This grading is applied to buildings and/or sites whose significance is contextual, i.e., in large part due to its contribution to the character or significance of the environs. These buildings and sites should, as a consequence, only be regulated if the significance of the	Low Significance

Grading	Description of Resource	Examples of Possible Management Strategies	Heritage Significance
		environs is sufficient to warrant protective measures, regardless of whether the site falls within a Conservation or Heritage Area. Internal alterations should not necessarily be regulated.	
NCW	A resource that, after appropriate investigation, has been determined to not have enough heritage significance to be retained as part of the National Estate.	No further actions under the NHRA are required. This must be motivated by the applicant and approved by the authority. Section 34 can even be lifted by the PHRA for structures in this category if they are older than 60 years.	Not Conservation worthy – no research potential or other cultural significance

Table 6: Site significance classification standards as prescribed by SAHRA.

FIELD RATING	GRADE	SIGNIFICANCE	RECOMMENDED MITIGATION
National Significance (NS)	Grade 1	Very High - of National Significance	Conservation; National Site nomination
Provincial Significance (PS)	Grade 2	Very High – of Provincial Significance	Conservation; Provincial Site nomination
Local Significance (LS)	Grade 3A	High Significance	Conservation; Mitigation not advised
Local Significance (LS)	Grade 3B	High Significance	Mitigation (Part of site should be retained)
Generally Protected A (GP.A)		High / Medium Significance	Mitigation before destruction
Generally Protected B (GP.B)		Medium Significance	Recording before destruction
Generally Protected C (GP.A)		Low Significance	Destruction

9 IDENTIFICATION OF IMPACTS

9.1 Impacts and Mitigation Framework

All impacts are analysed in the section to follow with regard to their nature, extent, magnitude, duration, probability and significance.

ISO 14001-2004 defines impacts as “any change to the environment, whether adverse or beneficial, wholly or partially resulting from an organization’s environmental aspects”.

When considering an assessment of the impacts and their mitigation, the following definitions as per Table 7 apply.

Table 7: Impact and Mitigation Quantification Framework

Nature	The project could have a positive, negative or neutral impact on the environment.
Extent	<p>Local – extend to the site and its immediate surroundings.</p> <p>Regional – impact on the region but within the province.</p> <p>National – impact on an interprovincial scale.</p> <p>International – impact outside of South Africa.</p>
Magnitude	<p>Degree to which impact may cause irreplaceable loss of resources:</p> <p>Low – natural and socio-economic functions and processes are not affected or minimally affected.</p> <p>Medium – affected environment is notably altered; natural and socio-economic functions and processes continue albeit in a modified way.</p> <p>High – natural or socio-economic functions or processes could be substantially affected or altered to the extent that they could temporarily or permanently cease.</p>
Duration	<p>Short term – 0-5 years.</p> <p>Medium term – 5-11 years.</p> <p>Long term – impact ceases after the operational life cycle of the activity either because of natural processes or by human intervention.</p> <p>Permanent – mitigation either by natural process or by human intervention will not occur in such a way or in such a time span that the impact can be considered transient.</p>
Probability	<p>Almost certain – the event is expected to occur in most circumstances.</p> <p>Likely – the event will probably occur in most circumstances.</p> <p>Moderate – the event should occur at some time.</p> <p>Unlikely – the event could occur at some time.</p> <p>Rare/Remote – the event may occur only in exceptional circumstances.</p>
Significance	<p>Provides an overall impression of an impact’s importance, and the degree to which it can be mitigated. The range for significance ratings is as follows-</p> <p>0 – Impact will not affect the environment. No mitigation necessary.</p> <p>1 – No impact after mitigation.</p> <p>2 – Residual impact after mitigation.</p> <p>3 – Impact cannot be mitigated.</p>

Mitigation	Information on the impacts together with literature from socio-economic science journals, case studies and field work will be used to provide mitigation recommendations to ensure that any negative impacts are decreased and positive benefits are enhanced.
Monitoring	Monitoring usually involves developing and implementing a monitoring programme to identify deviations from the proposed action and to manage any negative impacts. The recommended mitigation measures will also include monitoring measures.

Table 8: Impact Methodology Table

Nature				
Negative		Neutral		Positive
-1		0		+1
Extent				
Local	Regional		National	International
1	2		3	4
Magnitude				
Low		Medium		High
1		2		3
Duration				
Short Term (0-5yrs)		Medium Term (5-11yrs)		Long Term
1		2		3
Probability				
Rare/Remote	Unlikely	Moderate	Likely	Almost Certain
1	2	3	4	5
Significance				
No Impact/None	No Impact After Mitigation/Low	Residual Impact After Mitigation/Medium	Impact Cannot be Mitigated/High	
0	1	2	3	

9.2 Identification of Activities and Aspects

An “Activity” is defined as a distinct process or risks undertaken by an organisation for which a responsibility can be assigned. Activities also include facilities or pieces of infrastructure that are possessed by an organisation (International Organization for Standardization, 2011).

An aspect is defined as elements of an organisation’s activities or products or services that can interact with the environment.

In order to capture the impacts associated with the proposed infrastructure, an activity – aspect – impact table was created refer to 9 below.

Table 9: Activity, Aspects and Impacts of the Project

Activity	Aspect	Potential Impact – Positive	Potential Impact – Negative
Site clearance/ construction camp			Damage to existing historical structures or unidentified graves
Construction		Positive - if historical structures are reused	Damage to existing historical structures
Operation		Positive – if historical structures are reused	Damage to existing historical structures

9.3 Impact and Mitigation Assessment

The project area that will be impacted by the proposed Grootvlei Solar PV project contains some areas that are currently disturbed by grazing activities as well as past agricultural activity including extensive field clearance.

The impact significance of the project on graves and cemeteries is low as no definite grave sites were identified.

The impact significance of the proposed project on protected historical structures is medium as two sites comprising historical structures were identified within the general site footprint: a small historical farmstead (Groot-01), and a site comprising an historical stone kraal with associated large trough (Groot -04). Since both of these sites are depicted on the 1966 topographic map it is very likely that these structure remains older than 60 years of age and therefore the sites are protected by s34 of the NHRA.

The impact significance of the project on archaeological sites or material is low as two sites containing stone tools were identified (Groot 02, Groot 03) but these are of low significance as isolated finds or extremely low density scatters.

9.4 Impacts During the Planning, Construction and Operation Phases

As a result of the analysis above, **Error! Reference source not found.** the following impact/mitigation tables have been generated.

Table 10: Heritage Resources – Historical Structure remains Mitigation Table

Environmental Feature	Heritage resources – historical structure remains (Groot 01, Groot 04)
Project life-cycle	Planning, Construction and Operation
Potential Impact	Proposed Management Objectives / Mitigation Measures
Possible damage to or destruction of historical structure remains	<ul style="list-style-type: none"> A buffer of at least 20m (25m from the centre for the kraal) must be placed around both sites to ensure that during construction there is no indirect impact which could damage any structures

		<ul style="list-style-type: none"> The materials demarcating the buffer must be highly visible and made of durable material If any impact is anticipated, then a permit will be required for the alteration or destruction of any of the structures (from NW PHRA or SAHRA) 				
Possible damage to or destruction of unidentified historical structure remains		<ul style="list-style-type: none"> If any changes are made to the final design footprint prior to construction, monitoring of the site clearance activities must be undertaken by a heritage specialist to identify any additional historical structure remains 				
Alternative 1	Nature	Extent	Magnitude	Duration	Probability	Significance
Before Mitigation	Negative	Local	Medium	Permanent	Moderate	2
After Mitigation	Positive	Local	Low	Long- term	Unlikely	1
Significance of Impact and Preferred Alternatives	The location of Groot 04 is within the PV area of the project footprint (Alternative 1) and the Option 4 powerline lies just on the 20m buffer for Groot 01. The structures at both sites are protected under s34 of the NHRA.					
Alternative 2	Nature	Extent	Magnitude	Duration	Probability	Significance
Before Mitigation	Negative	Local	Medium	Permanent	Moderate	2
After Mitigation	Positive	Local	Low	Long- term	Unlikely	1
Significance of Impact and Preferred Alternatives	The location of Groot 04 is just outside (14m north) of an internal road of the project layout (Alternative 2) but would be within a 25m buffer taken from the centre of the kraal. The Option 4 powerline lies close to the 20m buffer for Groot 01. The structures at both sites are protected under s34 of the NHRA.					

Table 11: Heritage Resources – Archaeological Material Mitigation Table

Environmental Feature	Heritage resources – archaeological material (Groot 02, Groot 03)					
Project life-cycle	Planning, Construction and Operation					
Potential Impact	Proposed Management Objectives / Mitigation Measures					
Possible damage to or destruction of historical structure remains	<ul style="list-style-type: none"> A buffer of at least 30m must be placed around both sites to ensure that during construction there is no indirect impact which could damage any archaeological material The materials demarcating the 30m buffer must be highly visible and made of durable material If any impact is anticipated, then a permit will be required for the destruction of the material (from SAHRA) 					
Possible damage to or destruction of unidentified archaeological material	<ul style="list-style-type: none"> If any changes are made to the final design footprint prior to construction, monitoring of the site clearance activities must be undertaken by an archaeologist to identify any additional archaeological material 					
Alternative 1	Nature	Extent	Magnitude	Duration	Probability	Significance
Before Mitigation	Negative	Local	Medium	Permanent	Moderate	2

After Mitigation	Negative	Local	Low	Long- term	Unlikely	1
Significance of Impact and Preferred Alternatives	The location of these two sites is just outside (23m east) of the PV area of the project footprint (Alternative 1). The material is protected under s35 of the NHRA. If any impact is anticipated, then a permit will be required to destroy the material.					
Alternative 2	Nature	Extent	Magnitude	Duration	Probability	Significance
Before Mitigation	Negative	Local	Medium	Permanent	Unlikely	1
After Mitigation	Negative	Local	Low	Long- term	Unlikely	1
Significance of Impact and Preferred Alternatives	The location of these two sites is well outside (140-159m south) of the PV area of the project footprint (Alternative 2). The material is protected under s35 of the NHRA. If any impact is anticipated, then a permit will be required to destroy the material.					

9.5 Cumulative impacts

The project area and surrounding region has been affected by impacts of activities occurring in the past, current activities and proposed future developments. These will be discussed below.

Past impacts: The past HIA reports recovered from the SAHRIS database indicated that the Grootvlei Solar PV project footprint and surrounding region has been affected by several development and other activities that would have disturbed the heritage resources which occur in the area. These include: agricultural activities within the project area including a proposed poultry farm and several prospecting or mining rights application for various farms situated immediately north and west of the project area.

Current impacts: the immediate area of the Grootvlei Solar PV footprint is affected by cattle and game farming activities.

The baseline impacts for the project area are considered low for Heritage resources, and additional project impacts (if no mitigation measures are implemented) will not increase the significance of the existing baseline impacts, where the cumulative unmitigated impact will probably be of a low-moderate significance. The impact is going to happen and will be long-term in nature, therefore the impact risk class will be Low to Moderate. However, with the implementation of the recommended management and mitigation measures this risk class can be minimized to a Low rating.

10 ALTERNATIVES

10.1 Introduction

Alternatives are the different ways in which the Project can be executed to ultimately achieve its objectives. Examples could include carrying out a different type of action, choosing an alternative location or adopting a different technology or design for a project.

10.2 Site Alternatives

No site alternatives are proposed for this Project. Favourable location factors for the PV Site include suitable solar irradiation levels, short distance to grid connection point, flat topography, suitable site access and availability of land.

10.3 Layout / Design Alternatives

In terms of the impact on the identified heritage resources, the original layout for the Grootvlei Solar PV footprint (Alternative 1) has been revised to exclude certain environmentally sensitive areas (Alternative 2). The Alternative 2 layout avoids the identified heritage resources that would be directly impacted by the Alternative 1 layout. Therefore, from a heritage perspective, Alternative 2 is the preferred layout. However, some of these heritage resources still could be subject to indirect impact, specifically during site clearance or construction activities, therefore the mitigation measures set out above and below will still apply.

10.4 No-Go Option

As standard practice and to satisfy regulatory requirements, the option of not proceeding with the Project is included in the evaluation of the alternatives.

The no-go alternative can be regarded as the baseline scenario against which the impacts of the Project are evaluated. This implies that the current status and conditions associated with the proposed Project footprint will be used as the benchmark against which to assess the possible changes (impacts) associated with the Project.

In contrast, should the proposed Project not go ahead, any potentially significant environmental issues would be irrelevant, and the status quo of the local receiving environment would not be affected by the project-related activities. The objectives of the Project, including the benefits (such as the exploitation of SA's renewable energy resources, potential economic development and related job creation, and increased security of electricity supply), will not materialise.

The no-go alternative will be assessed during the EIA Phase, taking into consideration the findings of the specialist studies and the outcomes of public participation (amongst others).

11 STATEMENT OF IMPACT SIGNIFICANCE

The project area that will be impacted by the proposed Grootvlei Solar PV project contains some areas that are currently disturbed by cattle and game farming activities.

The impact significance of the project on graves and cemeteries is low as no definite grave sites were identified.

The impact significance of the proposed project on protected historical structures is medium as two sites comprising historical structures were identified within the general site footprint: a small historical farmstead (Groot 01), and a site comprising an historical stone kraal with associated large trough (Groot 04). Since both of these sites are depicted on the 1966 topographic map it is very likely that these structure remains older than 60 years of age and therefore the sites are protected by s34 of the NHRA.

The impact significance of the project on archaeological sites or material is low as two sites containing stone tools were identified (Groot 02, Groot 03) but these are of low significance as isolated finds or extremely low density scatters.

12 HERITAGE MANAGEMENT GUIDELINES

12.1 General Management Guidelines

The following General Heritage Management Guidelines are recommended:

1. It is advisable that an information section on cultural resources be included in the SHEQ training given to contractors involved in surface earthmoving activities. These sections must include basic information on:
 - a. Heritage;
 - b. Graves;
 - c. Archaeological finds; and
 - d. Historical Structures.
2. This module must be tailor made to include all possible finds that could be expected in that area of construction. Possible finds include:
 - a. Open air Stone tool scatters, disturbed during vegetation clearing.
 - b. Unidentified informal graves
 - c. Palaeontological deposits.

3. In the event that a possible find is discovered during construction, all activities must be halted in the area of the discovery and a qualified archaeologist contacted.
4. The archaeologist needs to evaluate the finds on site and make recommendations towards possible mitigation measures.
5. If mitigation is necessary, an application for a rescue permit must be lodged with SAHRA.
6. After mitigation, an application must be lodged with SAHRA for a destruction permit. This application must be supported by the mitigation report generated during the rescue excavation. Only after the permit is issued may such a site be destroyed.
7. If during the initial survey sites of cultural significance are discovered, it will be necessary to develop a management plan for the preservation, documentation or destruction of such a site. Such a program must include an archaeological/palaeontological monitoring programme, timeframe and agreed upon schedule of actions between the company and the archaeologist.
8. In the event that human remains are uncovered, or previously unknown graves are discovered, a qualified archaeologist needs to be contacted and an evaluation of the finds made.
9. If the remains are to be exhumed and relocated, the relocation procedures as accepted by SAHRA need to be followed. This includes an extensive social consultation process.

13 RECOMMENDATIONS AND CONCLUSION

The proposed Grootvlei Solar PV project could impact on heritage resources as four heritage resources were identified within or adjacent to the project footprint area: two historical structure sites (Groot 01, Groot 04) and two archaeological sites (Groot 02, Groot 03). However, the Alternative 2 layout has been adjusted to specifically avoid these heritage resources.

The recommendations below are provided to mitigate the potential impact of the proposed PV project on the four identified heritage resources:

Historical Structures (Groot 01, Groot 04)

- A buffer of at least 20m (25m from the centre for the kraal) must be placed around both sites to ensure that during construction there is no indirect impact which could damage any structures
- The materials demarcating the buffer must be highly visible and made of durable material
- If any impact is anticipated, then a permit will be required for the alteration or destruction of any of the structures (from NW PHRA or SAHRA)

Archaeological material (Groot 02, Groot 03)

- A buffer of at least 30m must be placed around both sites to ensure that during construction there is no indirect impact which could damage any archaeological material

- The materials demarcating the buffer must be highly visible and made of durable material
- If any impact is anticipated, then a permit will be required for the destruction of the material (from SAHRA)

Palaeontological heritage

- A separate palaeontological study is being undertaken by a professional palaeontologist as the project area falls into an area where the underlying geology is mainly of Very High fossil sensitivity. The assessment would indicate if significant/sensitive fossils will be impacted by the proposed project and provide mitigation measures.

No fatal flaws were identified during this study, therefore, it is the considered opinion of the heritage specialist that the construction of the proposed Solar PV project within the footprint can proceed. There are no objections from a heritage perspective provided the recommendations and mitigation measures contained in this report and in the separate desktop palaeontological assessment are implemented. It should be noted that the original layout for the Grootvlei Solar PV footprint (Alternative 1) has been revised to exclude certain environmentally sensitive areas (Alternative 2). The Alternative 2 layout avoids the identified heritage resources that would be impacted by the Alternative 1 layout. Therefore, from a heritage perspective, Alternative 2 is the preferred layout. However, some of these heritage resources still could be subject to indirect impact, specifically during site clearance or construction activities, therefore the mitigation measures set out above will still apply.

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IP, Koppieskraal 500 IP, Makokskraal 203 IP, Sweethome 197 IP and Doornpan 193 IP near Ventersdorp, North West Province

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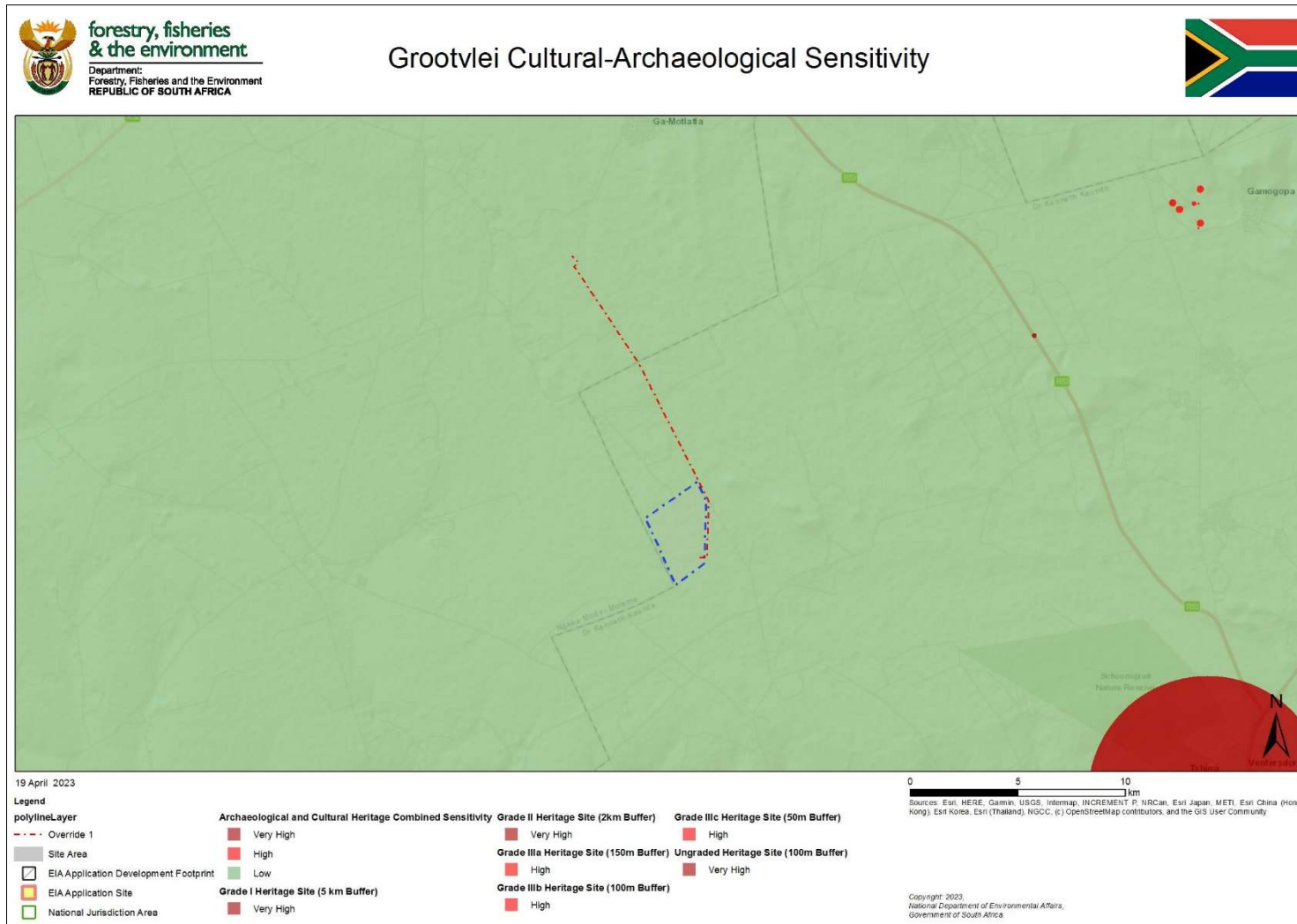
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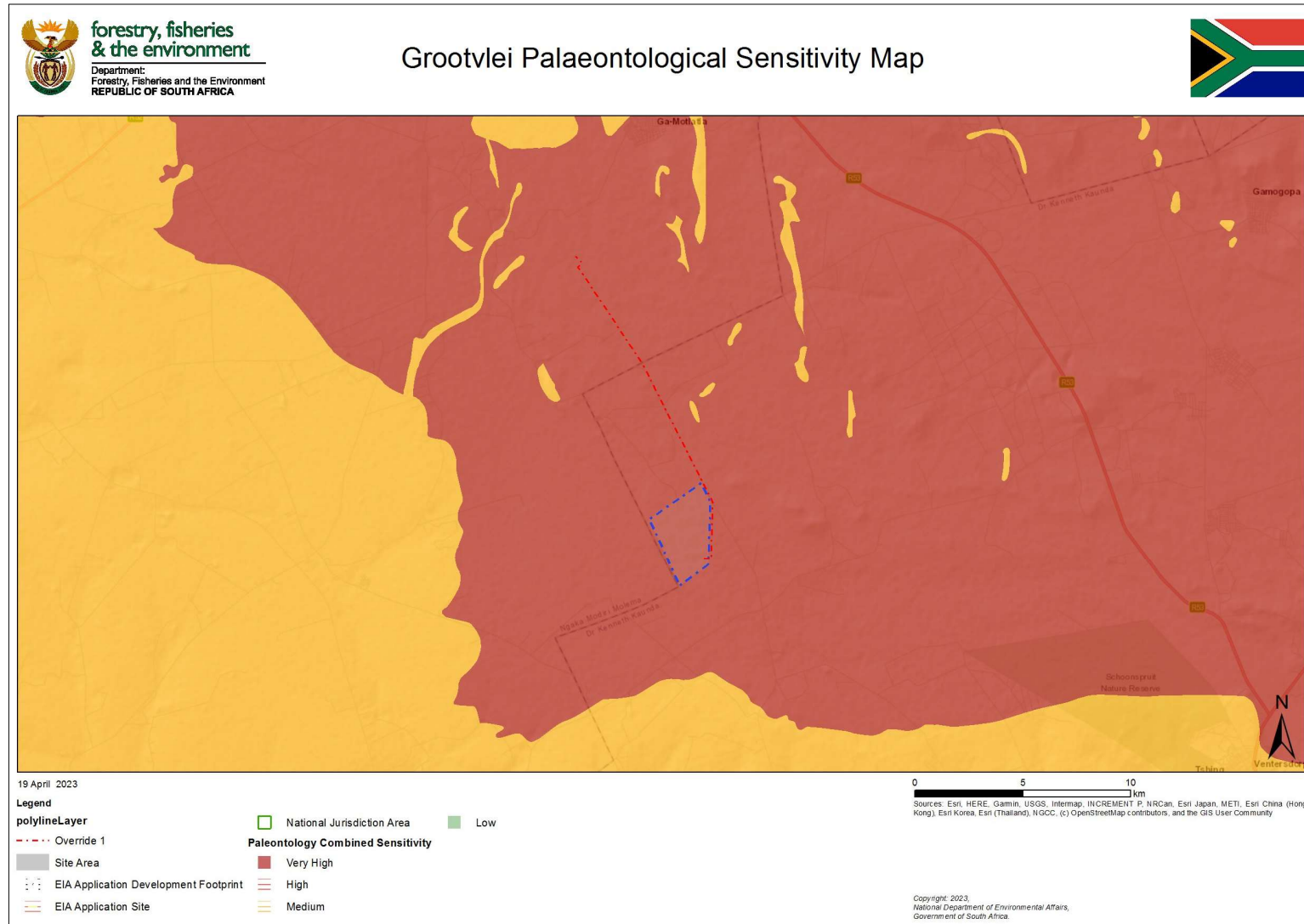
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APPENDIX 1: HERITAGE SENSITIVITY MAP/S

1. Cultural Heritage Sensitivity map from DFFE screening tool

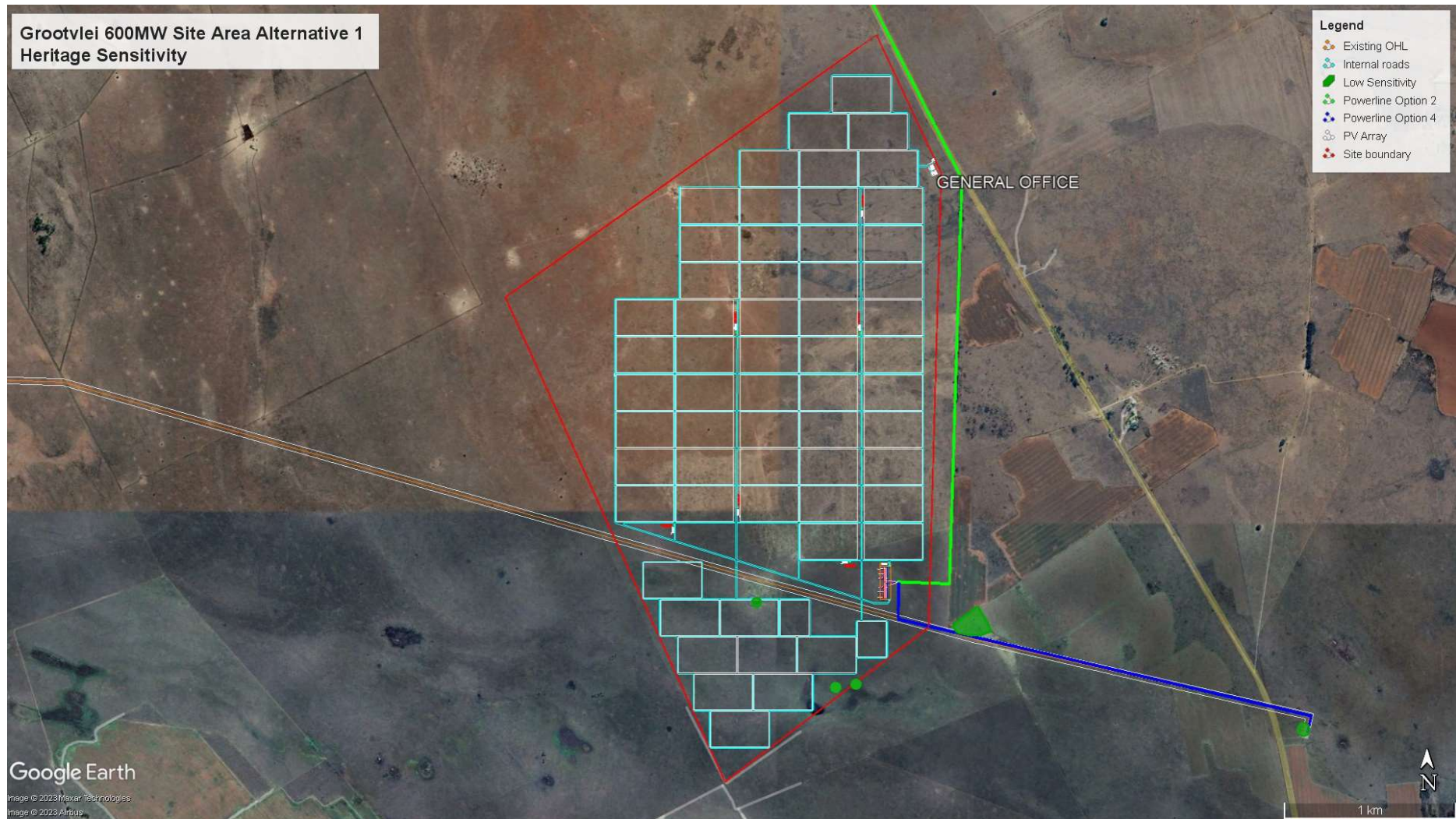


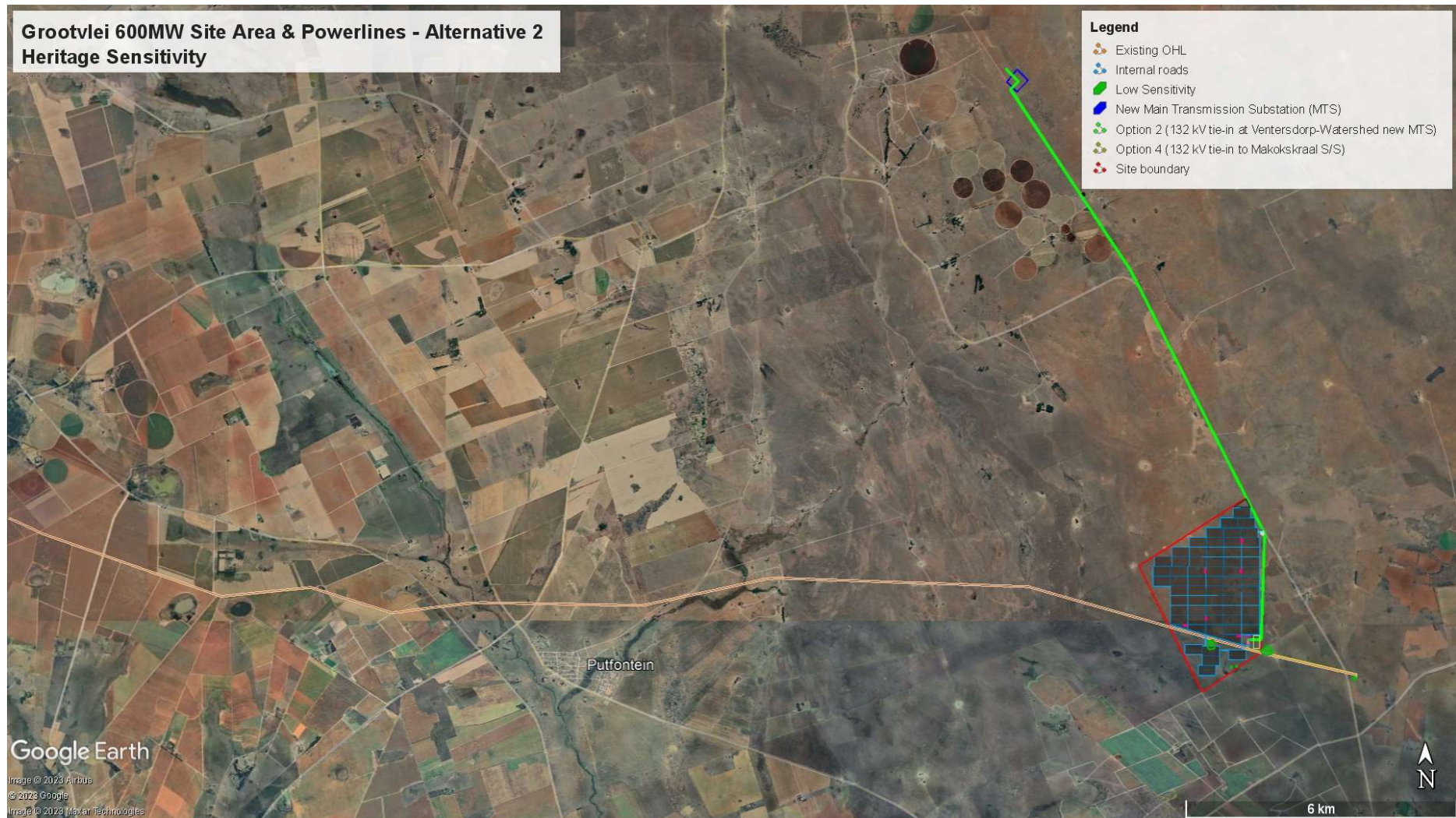
2. Palaeontological Sensitivity map from DFFE screening tool

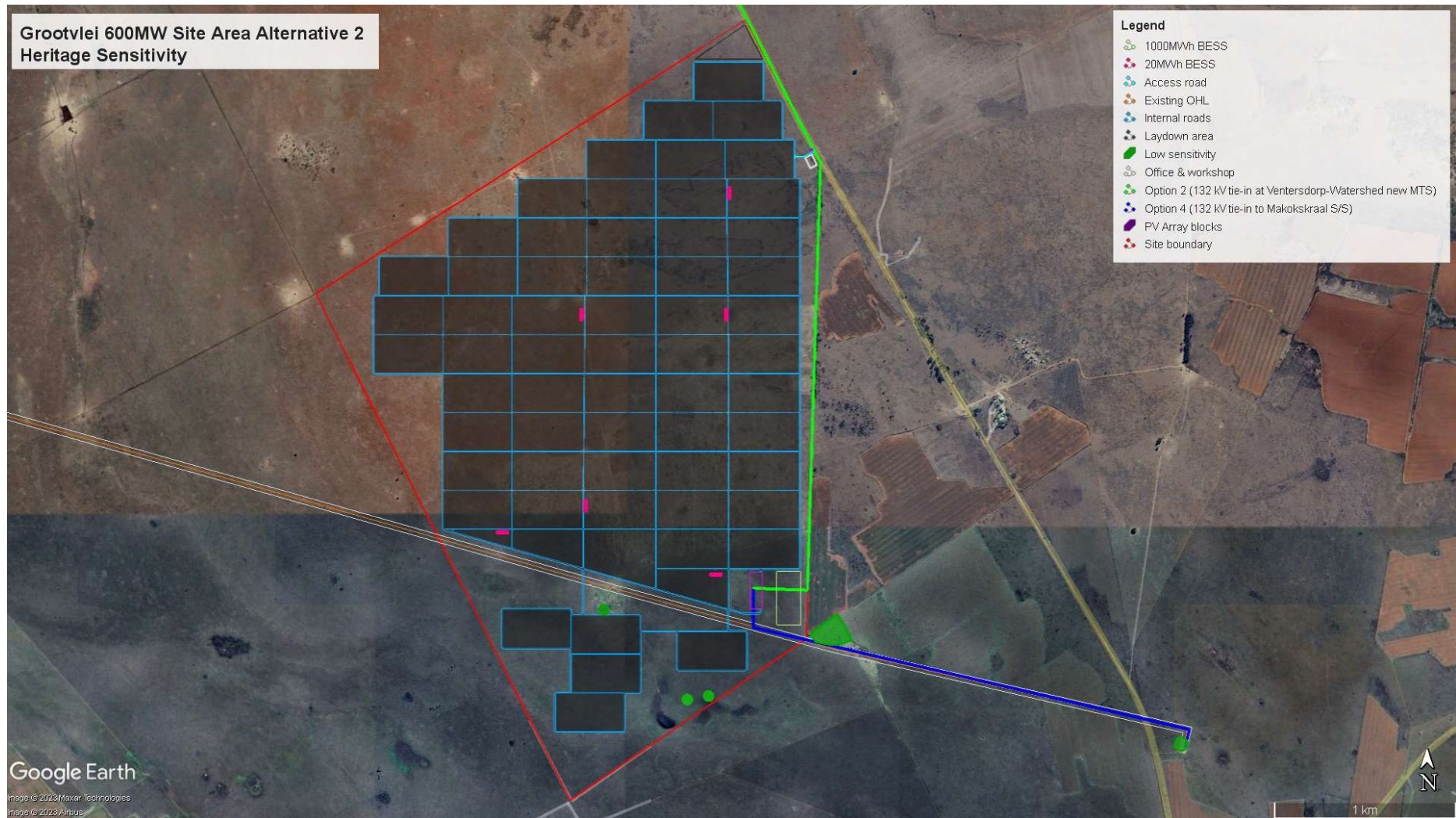


3. Heritage Sensitivity Maps based on the Site Inspection / Field survey









APPENDIX 2: CURRICULUM VITAE OF HERITAGE SPECIALIST

1 Personal Particulars

Profession:	Heritage Specialist
Date of Birth:	11 September 1966
Name of Firm:	Nitai Consulting
Name of Staff:	Jennifer Kitto
Nationality:	RSA
Membership of Professional Societies	Association of Southern African Professional Archaeologists (444); International Association for Impact Assessment South Africa (7151)

2 Education:

BA Hons Social Anthropology, WITS, South Africa, 1994

BA. Archaeology and Social Anthropology, WITS, South Africa, 1993

Higher National Diploma, Practical Archaeology, Dorset Institute for Higher Education (now Bournemouth University), UK, 1989

3 Employment Record:

2022 – Present Heritage Specialist, Nitai Consulting

Conduct Heritage Impact Assessments;

2012 – 2021 Heritage Specialist, PGS Heritage (Pty) Ltd

Conduct Heritage Impact Assessments

Compile Desktop Historical Research

Compile Heritage Audit and Management Plans

Compile and submit permit applications to National and Provincial Heritage Authorities for Section 34 building alterations and demolitions (under National Heritage Resources Act, 25 of 1999)

Compile and submit permit applications to Provincial and Municipal Health Authorities for Section 36 relocations of graves and burial grounds (under National Heritage Resources Act, 25 of 1999 and National Health Act, No 61 of 2003)

2008 – 2011 *Cultural Heritage Officer (National), Burial Grounds and Graves Unit: South African Heritage Resources Agency (SAHRA)*

Review and assessing permit applications for relocation of historical graves and burial grounds

1998 – 2008 *Cultural Heritage Officer (Provincial), Provincial Office – Gauteng: SAHRA*

Review and comment on heritage and archaeological impact reports

Research for the nomination and grading process for related to the declaration of specific heritage resources as National Heritage Sites

Monitoring of certain archaeological and built environment National Heritage Sites (e.g. The Cradle of Humankind World Heritage Site)

4 Selected Consultancies

4.1 GDID East Corridor, OHS Implementation, Tambo Memorial Regional Hospital (as sub-contractor to PGS Heritage (Pty) Ltd

2022 Independent Heritage Specialist. Compile Historical Archival Report of Tambo Hospital Boksburg, Gauteng for PGS Heritage (Pty) Ltd, Finalise HIA Report and submit HIA report to Gauteng Provincial Heritage Resources Authority

4.2 GDID East Corridor, OHS Implementation, Tembisa Regional Hospital (as sub-contractor to PGS Heritage (Pty) Ltd

2022 Independent Heritage Specialist. Compile Historical Archival Report of Tembisa Hospital, Ekurhuleni, Gauteng for PGS Heritage (Pty) Ltd, Finalise HIA Report and submit HIA report to Gauteng Provincial Heritage Resources Authority.

4.3 Kroonstad Cluster Solar PV Facilities

2022/2023 Heritage Specialist, Development of three Solar PV facilities west of Kroonstad, Free State Province, South Africa, Undertake Heritage Impact Assessment of all heritage resources associated with the three solar PV facilities

4.4 Rustenburg Solar PV Facilities

2022/2023 Heritage Specialist, Development of three Solar PV facilities near Rasimone, Rustenburg, North West Province, South Africa, Undertake Heritage Impact Assessment of all heritage resources associated with the three solar PV facilities

4.5 Seelo Solar PV Cluster

2022/2023 Heritage Specialist, Development of three Solar PV facilities near Carletonville, North West Province, South Africa, Undertake Heritage Impact Assessment all heritage resources associated with the three solar PV facilities

4.6 Decommissioning of Komati Power Station

2023, Heritage Specialist, Proposed Decommissioning of the Komati Power Station, Middelburg, Mpumalanga, Undertake Heritage Impact Assessment of all heritage structures within the power station

4.7 Carbon Capture Utilisation & Storage Pilot Project

2023 Heritage Specialist, Proposed pilot project for the capture and storage of CO₂, in Mpumalanga, comprising a 3D seismic survey and test drilling for the purpose of geological characterisation of the project area. Undertake Heritage Impact Assessment all heritage resources associated with the CCUS Pilot Project.

5 Languages:

English - excellent speaking, reading, and writing

Afrikaans –fair speaking, reading and writing