# HERITAGE IMPACT ASSESSMENT

**(REQUIRED UNDER SECTION 38(8) OF THE NHRA (No. 25 OF 1999)**

**FOR THE PROPOSED DWAALBOOM SOLAR 3 PHOTOVOLTAIC SOLAR ENERGY FACILITY AND ASSOCIATED INFRASTRUCTURE NEAR NORTHAM, LIMPOPO PROVINCE.**

**Type of development:**

Photovoltaic Solar Facility

**Client:**

Blue Crane Environmental (Pty) Ltd

**Applicant**:

Dwaalboom Solar 3 (Pty) Ltd

**Report Prepared by:**


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Project Reference:
Project number 23080
Report date:
31 July 2023

## APPROVAL PAGE

| | |
|---|---|
| **Project Name** | Dwaalboom Solar 3 |
| **Report Title** | Heritage Impact Assessment for the proposed Dwaalboom Solar 3 Photovoltaic Solar Energy Facility and Associated Infrastructure near Northam, Limpopo Province. |
| **Authority Reference Number** | TBC |
| **Report Status** | Draft Report |
| **Applicant Name** | Dwaalboom Solar 3 (Pty) Ltd |

| Responsibility | Name | Qualifications and Certifications | Date |
|---|---|---|---|
| **Fieldwork and reporting** | Jaco van der Walt - Archaeologist | MA Archaeology<br>ASAPA #159<br>APHP #114 | July 2023 |
| **Fieldwork** | Ruan van der Merwe - Archaeologist | BA Hons Archaeology | July 2023 |
| **Report writing and archaeological support** | Lara Kraljević - Archaeologist | MA Archaeology | July 2023 |

## DOCUMENT PROGRESS

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### Amendments on Document

| Date | Report Reference Number | Description of Amendment |
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| 24 August 2023 | 23080 | Technical amendment |
| | | |

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## REPORT OUTLINE

Appendix 6 of the GNR 326 EIA Regulations published on 7 April 2017 provides the requirements for specialist reports undertaken as part of the Environmental Authorisation process. In line with this, Table 1 provides an overview of Appendix 6 together with information on how these requirements have been met.

**Table 1. Specialist Report Requirements.**

| Requirement from Appendix 6 of GN 326 EIA Regulation 2017 | Chapter |
|---|---|
| (a) Details of -<br>(i) the specialist who prepared the report; and<br>(ii) the expertise of that specialist to compile a specialist report including a curriculum vitae. | Section a |
| (b) Declaration that the specialist is independent in a form as may be specified by the competent authority. | *Declaration of Independence* |
| (c) Indication of the scope of, and the purpose for which, the report was prepared. | Section 1 |
| (cA) An indication of the quality and age of base data used for the specialist report. | Section 3.4. |
| (cB) A description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change. | Section 9 |
| (d) Duration, Date and season of the site investigation and the relevance of the season to the outcome of the assessment. | Section 3.4 |
| (e) Description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used. | Section 3 |
| (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 site plan identifying site alternatives. | Section 8 and 9 |
| (g) Identification of any areas to be avoided, including buffers. | Section 8 and 9 |
| (h) Map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers. | Section 8 |
| (I) Description of any assumptions made and any uncertainties or gaps in knowledge. | Section 3.7 |
| (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 or activities. | Section 1.3 |
| (k) Mitigation measures for inclusion in the EMPr. | Section 9.1 and 9.5 |
| (l) Conditions for inclusion in the environmental authorisation. | Section 9.1 and 9.5 |
| (m) Monitoring requirements for inclusion in the EMPr or environmental authorisation. | Section 9. 4. |
| (n) Reasoned opinion -<br>(i) As to whether the proposed activity, activities or portions thereof should be authorised;<br>(iA) Regarding the acceptability of the proposed activity or activities; and<br>(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 9.2 |
| (o) Description of any consultation process that was undertaken during the course of preparing the specialist report. | Section 5 |
| (p) A summary and copies of any comments received during any consultation process and where applicable all responses thereto. | Refer to the EIA report |
| (q) Any other information requested by the competent authority. | No other information is requested at this time |

## Executive Summary

Dwaalboom Solar 3 (Pty) Ltd, is proposing the construction of a photovoltaic (PV) solar energy facility (known as the Dwaalboom Solar 3), which will form part of the Dwaalboom Solar Cluster Development, located on the Remaining Extent of the Farm Koedoesdoorn No. 414 approximately 3 km northeast of Northam in the Limpopo Province. The solar PV facility will comprise several arrays of PV panels and associated infrastructure and will have a contracted capacity of up to 180 MW. Dwaalboom Solar 3 (Pty) Ltd appointed Blue Crane Environmental (Pty) Ltd as the independent environmental assessment practitioner (EAP) to apply for Environmental Authorization for the Project. Blue Crane Environmental (Pty) Ltd, in turn, appointed Beyond Heritage to conduct a Heritage Impact Assessment (HIA) for the Project, and the study area was assessed through a desktop assessment and by a non-intrusive pedestrian field survey that was conducted for the Dwaalboom cluster. Key findings of the assessment include:

- The larger area, especially north of the Project is marked by extensive Later Iron Age stone wall settlement sites (e.g., van Schalkwyk 1994, van Schalkwyk et al 2003, van der Walt 2021, van Vollenhoven 2013, Huffman 2006a, Lavin 2021) that is situated at focal points on the landscape like hills and rivers;
- The Project area lacks any of the environmental focal points mentioned above. The topography is generally flat without building material for the Iron Age stonewalled settlements and defensive positions like saddles of hills etc. In terms of the Stone Age, the Project area also lacks raw material for manufacturing stone tools as well as shelters that would have been inhabited or water sources that would have been focal points during the Stone Age;
- The Project area is therefore considered to be of low heritage potential, this was confirmed during the field survey where finds were limited to an isolated scatter of MSA artefacts. The isolated scatter does not constitute a discreet archaeological site but attests to Stone Age use of the landscape;
- According to the South African Heritage Resource Authority (SAHRA) Paleontological sensitivity map, the study area is of insignificant sensitivity and no further studies are required for this aspect.

The impact on heritage resources is low, and the Project can be authorised provided that the recommendations in this report are adhered to and based on the SAHRA's approval.

**Recommendations:**

- Heritage walk-down of the final development footprint prior to construction;
- Monitoring of the Project area by the ECO during pre-construction and construction phases for heritage chance finds, if chance finds are encountered to implement the Chance Find Procedure for the Project as outlined in Section 9.2.

**Declaration of Independence**

| | |
|---|---|
| **Specialist Name** | Jaco van der Walt |
| **Declaration of Independence** | I declare, as a specialist appointed in terms of the National Environmental Management Act (Act No 107 of 1998) and the associated 2014 Environmental Impact Assessment (EIA) Regulations (as amended), that I:<br>• I act as an independent specialist in this application;<br>• I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;<br>• I declare that there are no circumstances that may compromise my objectivity in performing such work;<br>• I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;<br>• I will comply with the Act, Regulations and all other applicable legislation;<br>• I have no, and will not engage in, conflicting interests in the undertaking of the activity;<br>• 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;<br>• All the particulars furnished by me in this form are true and correct; and<br>• I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 49 A of the Act. |
| **Signature** |  |
| **Date** | 29/07/2023 |

**a) Expertise of the specialist**

Jaco van der Walt has been practising as a Cultural Resource Management (CRM) archaeologist for 15 years. Jaco is an accredited member of the Association of South African Professional Archaeologists (ASAPA) (#159) and APHP #114 and has conducted more than 500 impact assessments in Limpopo, Mpumalanga, North West, Free State, Gauteng, Kwa Zulu Natal (KZN) as well as the Northern and Eastern Cape Provinces in South Africa.

Jaco has worked on various international projects in Zimbabwe, Botswana, Mozambique, Lesotho, Democratic Republic of the Congo (DRC) Zambia, Guinea, Afghanistan, Nigeria and Tanzania. Through this, he has a sound understanding of the International Finance Corporations (IFC) Performance Standard requirements, with specific reference to Performance Standard 8 – Cultural Heritage

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## ABBREVIATIONS

| | |
|---|---|
| ASAPA | Association of South African Professional Archaeologists |
| BGG | Burial Ground and Graves |
| CFPs | Chance Find Procedures |
| CMP | Conservation Management Plan |
| CoGHSTA | Co-operative Governance, Human Settlements and Traditional Affairs |
| CRR | Comments and Response Report |
| CRM | Cultural Resource Management |
| DFFE | Department of Fisheries, Forestry and Environment, |
| EA | Environmental Authorisation |
| EAP | Environmental Assessment Practitioner |
| ECO | Environmental Control Officer |
| EIA | Environmental Impact Assessment* |
| EIA | Early Iron Age* |
| EAP | Environmental Assessment Practitioner |
| EMPr | Environmental Management Programme |
| ESA | Early Stone Age |
| ESIA | Environmental and Social Impact Assessment |
| GIS | Geographical Information System |
| GPS | Global Positioning System |
| GRP | Grave Relocation Plan |
| HIA | Heritage Impact Assessment |
| LIA | Late Iron Age |
| LSA | Late Stone Age |
| MEC | Member of the Executive Council |
| MIA | Middle Iron Age |
| MPRDA | Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) |
| MSA | Middle Stone Age |
| NCHM | National Cultural History Museum |
| NEMA | National Environmental Management Act, 1998 (Act No. 107 of 1998) |
| NHRA | National Heritage Resources Act, 1999 (Act No. 25 of 1999) |
| NID | Notification of Intent to Develop |
| NoK | Next-of-Kin |
| PRHA | Provincial Heritage Resource Agency |
| SADC | Southern African Development Community |
| SAHRA | South African Heritage Resources Agency |

**Although EIA refers to both Environmental Impact Assessment and the Early Iron Age both are internationally accepted abbreviations and must be read and interpreted in the context it is used.*

## GLOSSARY

| | |
|---|---|
| Archaeological site | Remains of human activity over 100 years old |
| Earlier Stone Age | ~ 2.6 million to 250 000 years ago |
| Middle Stone Age | ~ 250 000 to 40-25 000 years ago |
| Later Stone Age | ~ 40-25 000, to the historic period |
| The Iron Age | ~ AD 400 to 1840 |
| Historic | ~ AD 1840 to 1950 |
| Historic building | Over 60 years old |

# 1 Introduction

Blue Crane Environmental (Pty) Ltd appointed Beyond Heritage to conduct a Heritage Impact Assessment (HIA) for the construction of a photovoltaic (PV) solar energy facility (known as the Dwaalboom Solar 3) which forms part of the Dwaalboom Solar Cluster. The project is located on the Remaining Extent of the Farm Koedoesdoorn No. 414 approximately 3 km northeast of Northam in the Limpopo Province. The development area is situated within the Thabazimbi Local Municipality within the Waterberg District Municipality. The site is accessible either directly off R510 Regional Road or via an existing District Road, 3717 (along the Brits Road) located adjacent to the development area (Figures 1.1 to 1.3). The report forms part of the Environmental Impact Assessment (EIA) and Environmental Management Programme (EMPr) for the development.

The aim of the study was to survey the proposed development footprint to understand the cultural layering of the area, and if heritage features are found, to assess their importance within local, provincial, and national context. It further served to assess the impact of the proposed Project on non-renewable heritage resources. The study will submit appropriate recommendations with regard to the responsible cultural resources management measures that might be required to assist the developer in managing the discovered heritage resources in a responsible manner. Recommendations are included to protect, preserve, and develop such resources within the framework provided by the National Heritage Resources Act of 1999 (Act No 25 of 1999) (NHRA).

The report outlines the approach and methodology utilized before and during the survey, which includes:

- Phase 1, review of relevant literature;
- Phase 2, the physical surveying of the area on foot and by vehicle;
- Phase 3, reporting the outcome of the study.

During the survey, an isolated MSA scatter was recorded in the study area. General site conditions and features in the study area were recorded by means of photographs, GPS locations and descriptions. Possible impacts were identified, and mitigation measures are proposed in this report.

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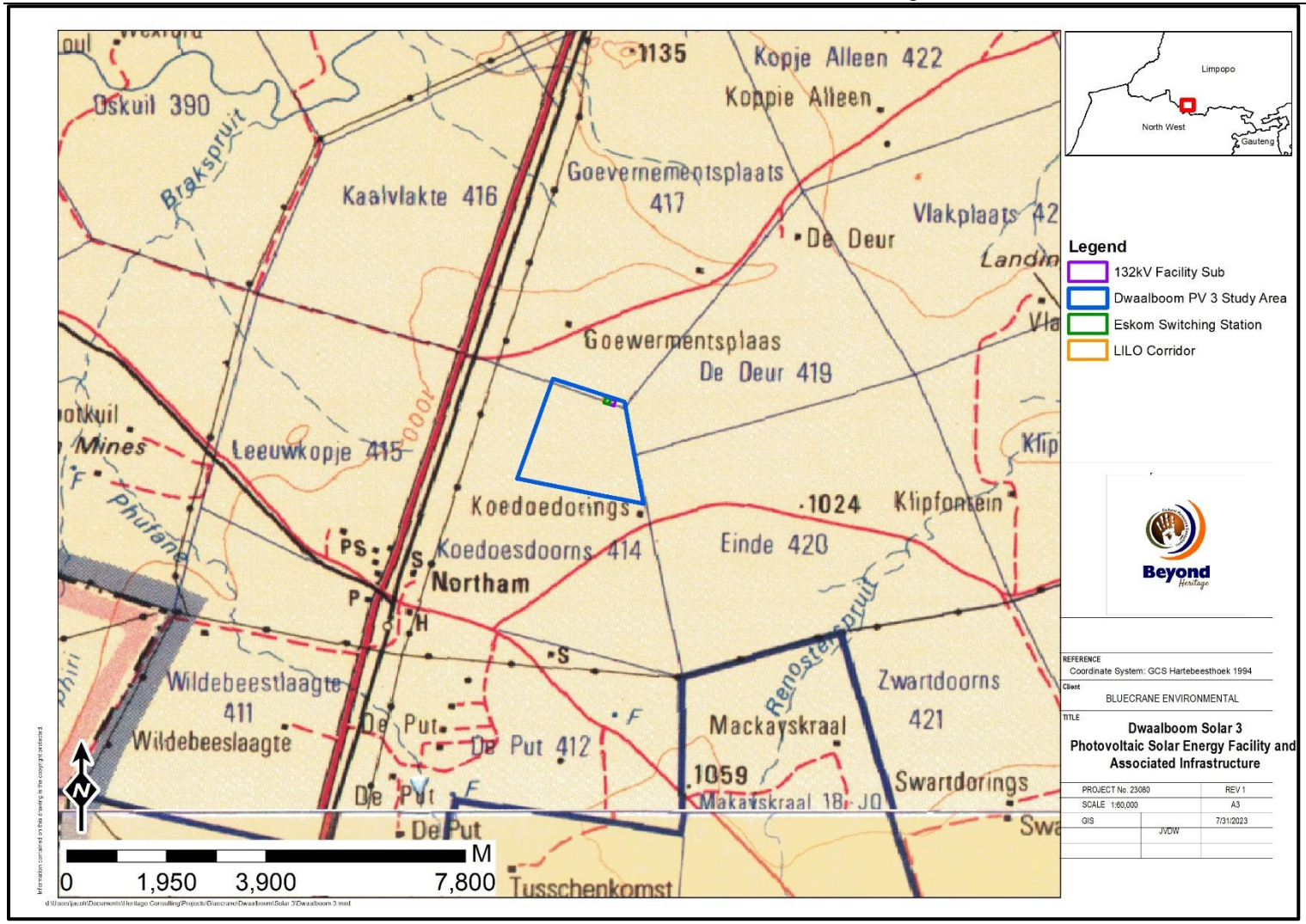


Figure 1.1. Regional setting of the Project (2427 1: 250 000 topographical map).

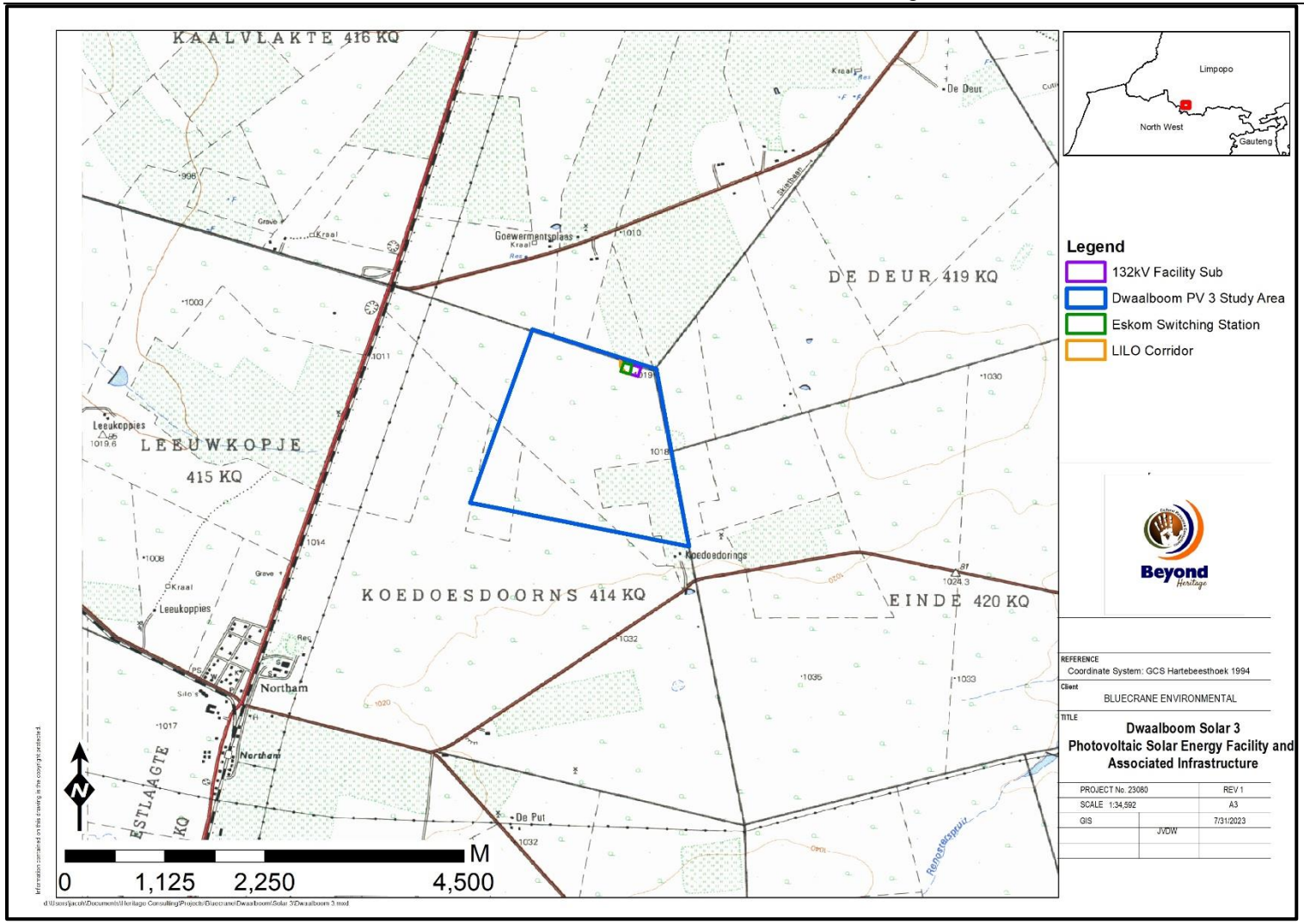


Figure 1.2. Local setting of the Project (2427 CD 1: 50 000 topographical map).

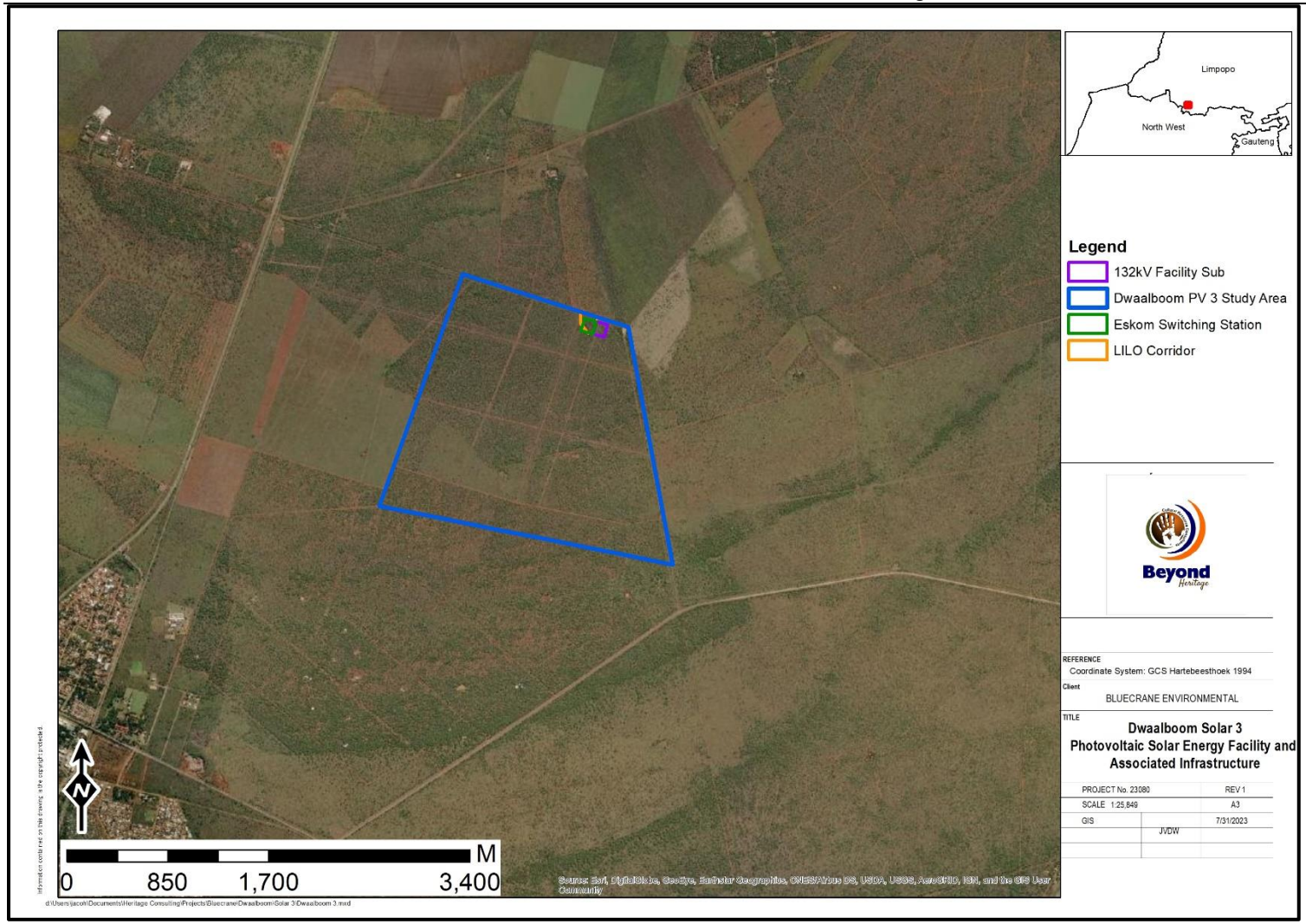


Figure 1.3. Aerial image of the Project area (*Google Earth 2023*).

## 1.1 Terms of Reference

The following Terms of Reference were adhered to in conducting this HIA.

**Field study**

Conduct a field study to: (a) survey the development footprint to understand the heritage character of the impact area; b) record GPS points of sites/areas identified as significant areas; c) determine the levels of significance of the various types of heritage resources affected by the proposed development.

**Reporting**

Report on the identification of anticipated and cumulative impacts the operational units of the proposed Project activity may have on the identified heritage resources for all 3 phases of the project, i.e., construction, operation and decommissioning phases. Consider alternatives, should any significant sites be impacted adversely by the proposed project. Ensure that all studies and results comply with the relevant legislation, SAHRA minimum standards and the code of ethics and guidelines of Association of South African Professional Archaeologists (ASAPA).

Recommendations are provided to assist the developer in managing the discovered heritage resources in a responsible manner, and to protect, preserve, and develop them within the framework provided by the National Heritage Resources Act of 1999 (Act No 25 of 1999).

## 1.2 Project Description

Project components and the location of Dwaalboom Solar 3 Project are outlined in Tables 2 and 3.

**Table 2: Project Description**

| | |
|---|---|
| **Magisterial District** | Thabazimbi Local Municipality within the Waterberg District Municipality |
| **Central co-ordinate of the development** | 24°55'55.71"S 27°17'6.56"E |
| **1:50 000 Topographic Map Number** | 2427 CD |

**Table 3: Infrastructure and project activities**

| | |
|---|---|
| **Type of development** | Photovoltaic (PV) Solar Facility |
| **Description of affected farm portions** | Solar PV Facility:<br>• The Remaining Extent of the Farm Koedoesdoorn No. 414<br><br>LILO Grid Connection:<br>• The Remaining Extent of the Farm Koedoesdoorn No. 414<br><br>Access Road:<br>• Access is proposed directly off the existing R510 Regional Road. Properties affected will be determined based on the TIA. |
| **Generation capacity** | Up to 180 MW |
| **Area of the PV Array** | To be confirmed once the development footprint is available. Will be located within the 355-ha development area. |
| **Structure orientation** | Monofacial or Bifacial PV panels will be utilised. The panels will either be fixed to a single- and/or double-axis horizontal tracking structure, or fixed-tilt structure, where the orientation of the panel varies according to the time of the day, as the sun moves from east to west or tilted at a fixed angle equivalent to the latitude at which the site is located in order to capture the most sun.<br><br>PV panels with single axis tracking is preferred over fixed-axis or double axis tracking systems due to the potential to achieve higher annual energy yields whilst minimising the balance of system (BOS) costs, resulting in the lowest levelized cost of energy (LCOE). The development of the PV facility will take into consideration during the final design phase the use of either tracker vs fixed-tilt mounting structures. Both options are considered feasible for the site. |
| **Structure Height** | • Panels up to 5.5 m<br>• Buildings up to 12 m<br>• Power line up to 32 m<br>• Fencing up to 3.5 m |

| | |
|---|---|
| **Area of the Battery Storage** | Within a 5 ha area or spread out within the facility next to the inverters. The infrastructure will be located within the development footprint.<br><br>Lithium-ion or other solid-state battery technology proposed for implementation. |
| **Capacity of the Battery Storage** | Unspecified. To be confirmed prior to construction activity. |
| **Area of the facility substation, switching station and collector substation** | • On-site Facility Substation: up to 1 ha<br>• Eskom Collector Switching Station: up to 1 ha |
| **Capacity of the facility substation, switching station and collector substation** | • On-site Facility Substation: 132 kV<br>• Eskom Collector Switching Station: 132 kV |
| **Grid connection** | Facility grid connection infrastructure, including:<br>○ 33 kV cabling between the project components and the facility substation;<br>○ A 132 kV facility substation;<br>○ A 132 kV Eskom collector switching station; and<br>○ Loop-in-Loop-out (LILO) overhead 132 kV power line between the back-to-back Facility Substation and Eskom collector switching station and the existing Spitskop–Mamba 132 kV power line. |
| **Laydown area dimensions** | Temporary laydown areas will occupy up to 5.5 hectares while 1 hectare will remain in place for the permanent laydown area as required for facility operation. |
| **Area occupied by buildings** | An area of up to 1.5 ha will be occupied by buildings which will include (but not limited to) a 33 kV switch room, a gate house, ablutions, workshops, storage and warehousing areas, site offices and a control centre. |
| **Width of internal roads** | Up to 8 m wide |
| **Length of internal roads** | Up to 40 km in total |

### 1.3 Alternatives

No alternative footprints were provided, but the area assessed allows for siting of the development to avoid impacts to heritage resources.

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## 2 Legislative Requirements

The HIA, as a specialist study to the EIA, is required under the following legislation:

- National Heritage Resources Act ((NHRA), Act No. 25 of 1999)
- National Environmental Management Act ((NEMA), Act No. 107 of 1998 - Section 23(2)(b))

A Phase 1 HIA is a pre-requisite for development in South Africa as prescribed by SAHRA and stipulated by legislation. The overall purpose of heritage specialist input is to:

- Identify any heritage resources, which may be affected;
- Assess the nature and degree of significance of such resources;
- Assess the negative and positive impact of the development on these resources; and
- Make recommendations for the appropriate heritage management (or avoidance) of these impacts.

The HIA should be submitted, as part of the impact assessment report or EMPr, to the Provincial Heritage Resource Agency (PHRA) - (Limpopo Heritage Resource Authority (LiRHA)) or to The South African Heritage Resources Agency (SAHRA). SAHRA will ultimately be responsible for the evaluation of Phase 1 HIA reports upon which review comments will be issued. 'Best practice' requires Phase 1 HIA reports and additional development information, as per the impact assessment report and/or EMPr, to be submitted in duplicate to SAHRA after completion of the study. SAHRA accepts Phase 1 HIA reports authored by professional archaeologists, accredited with ASAPA or with a proven ability to do archaeological work

SAHRA as a commenting authority under section 38(8) of the NHRA require all environmental documents, compiled in support of an EA application as defined by the National Environmental Management Act (NEMA) (Act No 107 of 1998) to be submitted to SAHRA for commenting. Environmental Impact Assessment (EIA) Regulations section 40 (1) and (2). The Environmental Impact Assessment (EIA) Regulations, Government Notice Regulation (GN) R.982 were published on 04 December 2014 and promulgated on 08 December 2014. Together with the EIA Regulations, the Minister also published GN R.983 (Listing Notice No. 1), GN R.984 (Listing Notice No. 2) and GN R.985 (Listing Notice No. 3) in terms of Sections 24(2) and 24D of the NEMA, as amended) Upon submission to SAHRA the project will be automatically given a case number as reference. As such the EIA report and its appendices must be submitted to the case as well as the EMPr, once it's completed by the Environmental Assessment Practitioner (EAP).

Minimum accreditation requirements include an Honours degree in archaeology or related discipline and 3 years post-university CRM experience (field supervisor level). Minimum standards for reports, site documentation and descriptions are set by ASAPA in collaboration with SAHRA. ASAPA is based in South Africa, representing professional archaeology in the SADC region. ASAPA is primarily involved in the overseeing of ethical practice and standards regarding the archaeological profession. Membership is based on proposal and secondment by other professional members.

Phase 1 HIAs are primarily concerned with the location and identification of heritage sites situated within a proposed development area. Identified sites should be assessed according to their significance (refer to Section 3.5). Relevant conservation or mitigation recommendations should be made. Recommendations are subject to evaluation by SAHRA.

Section 3 of the NHRA distinguishes nine criteria for places and objects to qualify as 'part of the national estate' if they have cultural significance or other special value. These criteria are:

- Its importance in/to the community, or pattern of South Africa's history;

- Its possession of uncommon, rare or endangered aspects of South Africa's natural or cultural heritage;
- Its potential to yield information that will contribute to an understanding of South Africa's natural or cultural heritage;
- Its importance in demonstrating the principal characteristics of a particular class of South Africa's natural or cultural places or objects;
- Its importance in exhibiting particular aesthetic characteristics valued by a community or cultural group;
- Its importance in demonstrating a high degree of creative or technical achievement at a particular period;
- Its strong or special association with a particular community or cultural group for social, cultural or spiritual reasons;
- Its strong or special association with the life or work of a person, group or organisation of importance in the history of South Africa;
- Sites of significance relating to the history of slavery in South Africa

Conservation or mitigation recommendations, as approved by SAHRA, are to be used as guidelines in the developer's decision-making process.

Phase 2 archaeological projects are primarily based on salvage/mitigation excavations preceding development destruction or impact on a site. Phase 2 excavations can only be conducted with a permit, issued by SAHRA to the appointed archaeologist. Permit conditions are prescribed by SAHRA and includes (as minimum requirements) reporting back strategies to SAHRA and deposition of excavated material at an accredited repository.

In the event of a site conservation option being preferred by the developer, a site management plan, prepared by a professional archaeologist and approved by SAHRA, will suffice as minimum requirement. After mitigation of a site, a destruction permit must be applied for with SAHRA by the applicant before development may proceed.

Human remains older than 60 years are protected by the National Heritage Resources Act, with reference to Section 36 and GNR 548 as well as the SAHRA BGG Policy 2020. Graves older than 60 years, but younger than 100 years fall under Section 36 of Act 25 of 1999 of the National Heritage Resources Act (NHRA), as well as the National Health Act of 2003 and are the jurisdiction of SAHRA. The procedure for Consultation Regarding Burial Grounds and Graves (Section 36[5]) of Act 25 of 1999) is applicable to graves older than 60 years that are situated outside a formal cemetery administrated by a local authority. Graves in this age category, located inside a formal cemetery administrated by a local authority, require the same authorisation as set out for graves younger than 60 years, in addition to SAHRA authorisation. If the grave is not situated inside a formal cemetery, but is to be relocated to one, permission from the local authority is required and all regulations, laws and by-laws, set by the cemetery authority, must be adhered to.

Human remains that are less than 60 years old are protected under Section 2(1) of the Removal of Graves and Dead Bodies Ordinance (Ordinance No. 7 of 1925) re-instituted by Proclamation 109 of 17 June 1994 and implemented by CoGHSTA as well as the National Health Act 2003 and are the jurisdiction of the National Department of Health and the relevant Provincial Department of Health and must be submitted for final approval to the office of the relevant Provincial Premier. Authorisation for exhumation and reinternment must also be obtained from the relevant local or regional council where the grave is situated, as well as the relevant local or regional council to where the grave is being relocated. All local and regional provisions, laws and by-laws must also be adhered to. To handle and transport human remains, the institution conducting the relocation should be authorised under the National Health Act of 2003

# 3 METHODOLOGY

## 3.1 Literature Review and background study

A brief survey of available literature was conducted to extract data and information on the area in question to provide general heritage context into which the development would be set. This literature search included published material, unpublished commercial reports and online material, including reports sourced from the South African Heritage Resources Information System (SAHRIS). Findings are included in Section 6.1 and 6.2.

## 3.2 Genealogical Society and Google Earth Monuments

Google Earth and 1:50 000 topographic maps of the area were utilised to identify possible places of heritage sensitivity might be located; these locations were marked and visited during the fieldwork phase. The database of the Genealogical Society of South Africa (GSSA) was consulted to collect data on any known graves in the area. Results are included in Section 6.3.

## 3.3 Public Consultation and Stakeholder Engagement:

Stakeholder engagement is a key component of any EIA process, it involves stakeholders interested in, or affected by the proposed development. Stakeholders are provided with an opportunity to raise issues of concern (for the purposes of this report only heritage related issues will be included). The aim of the public consultation process undertaken by the EAP was to capture and address any issues raised by community members and other stakeholders. Results are included in Section 5 and the final EIA report.

### 3.4 Site Investigation

The aim of the site visit was to:

a) survey the proposed Project area to understand the heritage character of the area and to record, photograph and describe sites of archaeological, historical or cultural interest;

b) record GPS points of sites/areas identified as significant areas;

c) determine the levels of significance of the various types of heritage resources recorded in the Project area.

**Table 4: Site Investigation Details**

| | **Site Investigation** |
|---|---|
| Date | 10 – 14 July 2023 |
| Season | Winter – The time of year and season had a limited effect on the results of the survey since the study area is marked by dense grass cover after the rainy season that limited archaeological visibility. The Project area was however sufficiently covered to understand the heritage character of the area (Figure 3.1). |

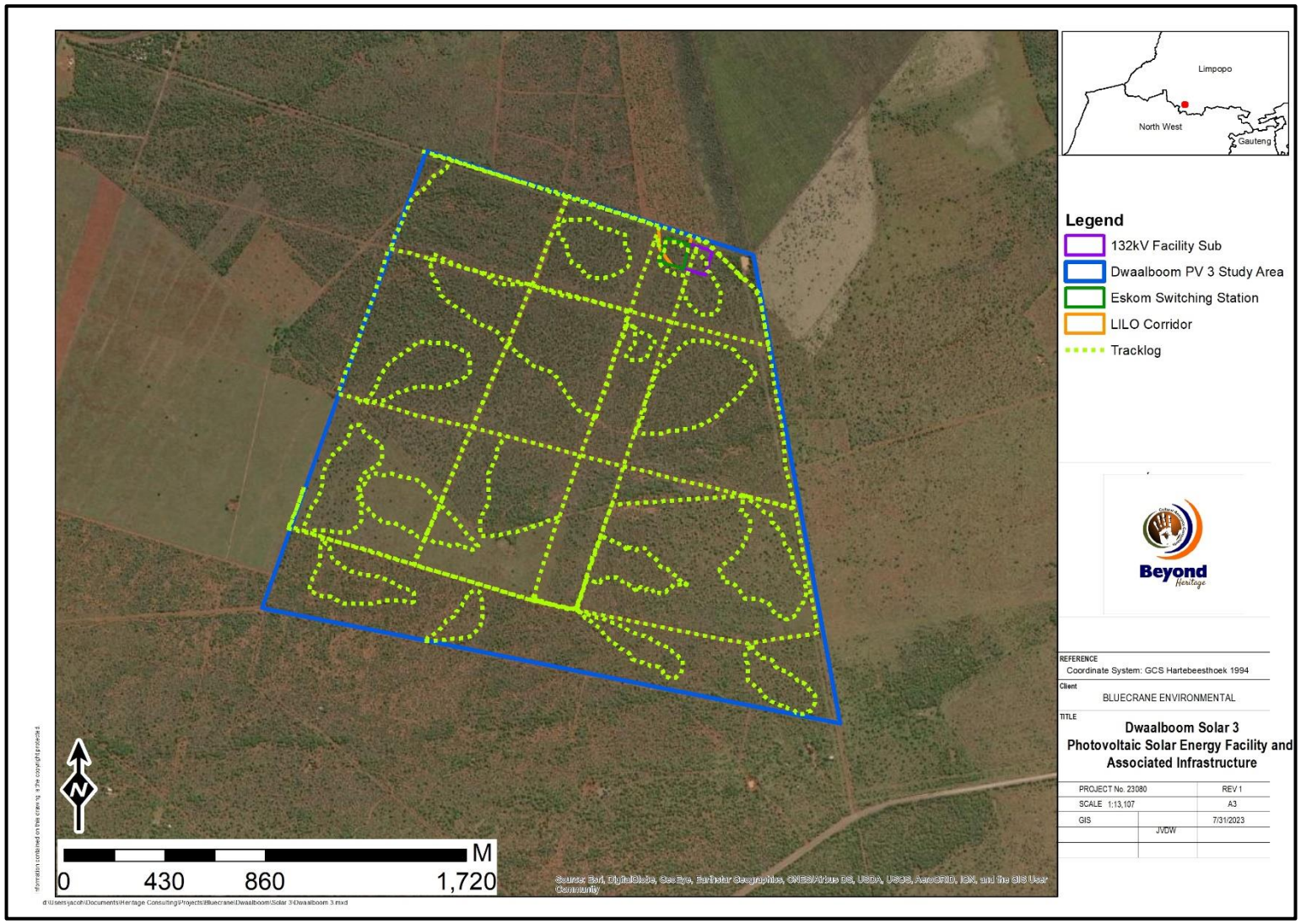



Figure 3.1. Tracklog of the survey path in green.

### 3.5 Site Significance and Field Rating

The presence and distribution of heritage resources define a 'heritage landscape'. In this landscape, every site is relevant. In addition, because heritage resources are non-renewable, heritage surveys need to investigate an entire Project area, or a representative sample, depending on the nature of the project. In the case of the proposed Project the local extent of its impact necessitates a representative sample and only the footprint of the areas demarcated for development were surveyed. In all initial investigations, however, the specialists are responsible only for the identification of resources visible on the surface. This section describes the evaluation criteria used for determining the significance of archaeological and heritage sites. The following criteria were used to establish site significance with cognisance of Section 3 of the NHRA:

- The unique nature of a site;
- The integrity of the archaeological/cultural heritage deposits;
- The wider historic, archaeological and geographic context of the site;
- The location of the site in relation to other similar sites or features;
- The depth of the archaeological deposit (when it can be determined/is known);
- The preservation condition of the sites; and
- Potential to answer present research questions.

In addition to this criteria, Field Ratings to Heritage Resources is assigned based on the guidelines provided by the SAHRA Minimum Standards for Heritage Specialist Studies in terms of Section 38 of the National Heritage Resources Act (No. 25 of 1999) (2016). The Field-Rating of a feature is a product of the Cultural Significance and Integrity of the feature. Where Cultural Significance is based on the rating from criteria in section 3 of the NHRA and the integrity of the resource is discussed in terms of preservation issues, weathering, erosion etc.

Field Ratings for the resources(s) are included to comply with section 7(2) and 38(3)b of the NHRA, as detailed and described below and in Table 5:

a. **Proposed Field Rating I National Resource**: This resource is considered to be of Field Rating **I** (mention must be made of any relevant international ranking), a protected buffer zone must be proposed/noted (if not in place already), these resources must be maintained *in situ* and a CMP must be recommended for the *in situ* conservation of the site;

b. **Proposed Field Rating II**: This resource is considered to be of Field Rating **II**, a protected buffer zone must be considered, these resources must be maintained *in situ* and a CMP must be recommended for the *in-situ* conservation of the resource;

**Proposed Field Rating IIIA Local Resource**: The resource must be retained as part of the heritage register (High significance) and so mitigation as part of the development process is not advised, a protected buffer zone must be considered, these resources must be maintained *in situ* and a CMP must be recommended for the *in-situ* conservation of the resource;

d. **Proposed Field Rating IIIB Local Resource**: This resource could be mitigated and (partly) retained as part of the heritage register (High/Medium significance), Mitigation of these resources must be subject to a formal permit application process lodged with the relevant heritage resources authority;

e. **Proposed Field Rating IIIC Local Resource**: These are resources that have been assigned a Low-Medium/Low field rating which, once adequately described, may be granted authorisation for destruction outside of the formal permitting process at the discretion of the relevant heritage authority, (*with regard to section 38(8) cases, this will be subject to the granting of the Environmental Authorisation*).

**Table 5. Field Rating and Cultural Significance**

| Field Rating | Integrity | No information yield, completely degraded | - Degraded to the extent that little meaning can be derived | Preserved to some extent | Well preserved | Excellent preservation |
|---|---|---|---|---|---|---|
| Cultural Significance | Negligible | IIIC Local Resource | IIIC Local Resource | IIIC Local Resource | IIIC Local Resource | IIIC Local Resource |
| | Low | IIIC Local Resource | IIIC Local Resource | IIIC Local Resource | IIIC Local Resource | IIIC Local Resource |
| | Low – Medium | IIIC Local Resource | IIIC Local Resource | IIIC Local Resource | IIIC Local Resource | IIIC Local Resource |
| | Medium | **Rating IIIB Local Resource** | **Rating IIIB Local Resource** | Rating IIIB Local Resource | Rating IIIB Local Resource | Rating IIIB Local Resource |
| | Medium High | **Rating IIIB Local Resource** | **Rating IIIB Local Resource** | Rating IIIB Local Resource | Rating IIIB Local Resource | Rating IIIB Local Resource |
| | High | **Rating IIIB Local Resource** | **Rating IIIB Local Resource** | **IIIA Local Resource** | **IIIA Local Resource** | **IIIA Local Resource** |

### 3.6 Impact Assessment Methodology

The Impact Assessment Methodology was provided by Blue Crane Environmental (Pty) Ltd.

The environmental impact assessment aims to identify the various possible environmental impacts that could result from the proposed activity. Different impacts need to be evaluated in terms of its significance and in doing so highlight the most critical issues to be addressed. Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. The total number of points scored for each impact indicates the level of significance of the impact.

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

- planning
- construction
- operation
- decommissioning

| **NATURE** | | |
|---|---|---|
| Include a brief description of the impact of the environmental parameter being assessed in the context of the project. This criterion includes a brief written statement of the environmental aspect being impacted by a particular action or activity. | | |
| **GEOGRAPHICAL EXTENT** | | |
| This is defined as the area over which the impact will be experienced. | | |
| 1 | Site | The impact will only affect the site. |
| 2 | Local/district | Will affect the local area or district. |

| | | |
|---|---|---|
| 3 | Province/region | Will affect the entire province or region. |
| 4 | International and National | Will affect the entire country. |
| **PROBABILITY** | | |
| This describes the chance of occurrence of an impact. | | |
| 1 | Unlikely | The chance of the impact occurring is extremely low (Less than a 25% chance of occurrence). |
| 2 | Possible | The impact may occur (Between a 25% to 50% chance of occurrence). |
| 3 | Probable | The impact will likely occur (Between a 50% to 75% chance of occurrence). |
| 4 | Definite | Impact will certainly occur (Greater than a 75% chance of occurrence). |
| **DURATION** | | |
| This describes the duration of the impacts. Duration indicates the lifetime of the impact as a result of the proposed activity. | | |
| 1 | Short term | The impact will either disappear with mitigation or will be mitigated through natural processes in a span shorter than the construction phase (0 – 1 years), or the impact will last for the period of a relatively short construction period and a limited recovery time after construction, thereafter it will be entirely negated (0 – 2 years). |
| 2 | Medium term | The impact will continue or last for some time after the construction phase but will be mitigated by direct human action or by natural processes thereafter (2 – 10 years). |
| 3 | Long term | The impact and its effects will continue or last for the entire operational life of the development but will be mitigated by direct human action or by natural processes thereafter (10 – 30 years). |
| 4 | Permanent | The only class of impact that will be non-transitory. Mitigation either by man or natural process will not occur in such a way or such a time span that the impact can be considered indefinite. |
| **INTENSITY/ MAGNITUDE** | | |
| Describes the severity of an impact. | | |
| 1 | Low | Impact affects the quality, use and integrity of the system/component in a way that is barely perceptible. |
| 2 | Medium | Impact alters the quality, use and integrity of the system/component but system/component still continues to function in a moderately modified way and maintains general integrity (some impact on integrity). |

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

Significance is determined through a synthesis of impact characteristics. Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. The calculation of the significance of an impact uses the following formula: (Extent + probability + reversibility + irreplaceability + duration + cumulative effect) x magnitude/intensity.

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

| Points | Impact significance rating | Description |
|---|---|---|
| 6 to 28 | Negative low impact | The anticipated impact will have negligible negative effects and will require little to no mitigation. |
| 6 to 28 | Positive low impact | The anticipated impact will have minor positive effects. |
| 29 to 50 | Negative medium impact | The anticipated impact will have moderate negative effects and will require moderate mitigation measures. |
| 29 to 50 | Positive medium impact | The anticipated impact will have moderate positive effects. |
| 51 to 73 | Negative high impact | The anticipated impact will have significant effects and will require significant mitigation measures to achieve an acceptable level of impact. |
| 51 to 73 | Positive high impact | The anticipated impact will have significant positive effects. |
| 74 to 96 | Negative very high impact | The anticipated impact will have highly significant effects and are unlikely to be able to be mitigated adequately. These impacts could be considered "fatal flaws". |
| 74 to 96 | Positive very high impact | The anticipated impact will have highly significant positive effects. |

### 3.7 Assumptions and limitations of the study

- The authors acknowledge that the brief literature review is not exhaustive of the literature of the area.
- Due to the nature of heritage resources and pedestrian surveys, the possibility exists that some features or artefacts may not have been discovered/recorded and the possible occurrence of graves and other cultural material cannot be excluded. This limitation is successfully mitigated with the implementation of a Chance Find Procedure (CFP) and monitoring of the study area by the Environmental Control Officer (ECO).
- This report only deals with the footprint area of the proposed development and consisted of non-intrusive surface surveys.
- This study did not assess the impact on medicinal plants and intangible heritage as it is assumed that these components will be highlighted through the public consultation process if relevant. This process is facilitated by the EAP and if not done this can be considered a significant limitation and as a potential Project risk. It is possible that new information could come to light in future, which might change the results of this Impact Assessment.

## 4 Description of Socio-Economic Environment

According to StatsSA "*There are 85 234 people residing in the municipality, of which 84,3% are black African, 14,4% are white, with other population groups making up the remaining 1,3%.*

*Amongst those aged 20 years and above, 26,1% have completed matric, 8,2% have some form of higher education, and 8,8% have no form of schooling.*

*The unemployment rate (20,6%) and the youth unemployment rate (26,9%) is the lowest in the district. The mining industry is a major source of employment. Agricultural activities include Cattle, Poultry and Game while mining activities include Iron and Platinum."*

## 5 Results of Public Consultation and Stakeholder Engagement:

In line with the NHRA, stakeholder engagement is a key component of any EA process, it involves stakeholders interested in, or affected by the proposed development. At the time of writing no heritage concerns have been raised. EIA site notices were placed near the main entrance of the Project area. The farm owner was also consulted by the survey team regarding any potential historical structures, graves or other sites of heritage significance.

# 6 Contextualising the study area

## 6.1 Archaeological Background

### 6.1.1 Stone Age

The Stone Age of southern Africa starts when hominins (ancestral to modern-day humans) first started to produce crude tools made with stone. The Earlier Stone Age (2 million - 200 000 years ago) is associated with hominins such as *Homo habilis* and *Homo erectus* (Dusseldorp et al. 2013). Early Stone Age sites have been identified near the Rooiberg Hill as well as the Blaauwberg Stone Age Terrain which shows evidence of early hominid occupation within the wider region of the study area (Bergh 1999). ESA associated stone tools near Rooiberg have been identified as Acheulean handaxes which date back to around 1.5 million years ago (Wadley et al 2016). The area was also occupied during the Middle Stone Age with lithics associated with that period being found there, showing a series of early human occupations within the region.

Middle Stone Age artefacts represents archaic and modern humans that occupied the landscape between 300 000 to 40 000 before present. A series of Middle Stone Age sites have been discovered in the area between Rustenburg and Thabazimbi (Van Schalkwyk 1994). MSA lithics mark the beginning of the flake and blade industries being made and utilised. Areas associated with MSA sites have been seen to show an occupation hiatus of a few thousand years before the occupation of Later Stone Age hunter-gatherers in the 11$^{th}$ and 12 centuries (van der Ryst 1998).

Later Stone Age occupational sequences reflect San and Khoisan communities from 40 000 years ago until recently (Dusseldorp et al. 2013). Hunter gatherer rock art sites have been found within the greater region of the landscape, such as a nearby cave which was found to have LSA associated rock art (Huffman 2004). Late Stone Age sites in the region have been identified to be situated around large rocky outcrops (van Schalkwyk et al 1994). Further north of the region, many LSA rock art sites have been found in the Waterberg region (Van der Ryst 1998). The occupation of hunter gatherers of the Later Stone Age was contemporaneous with the influx of Early Iron Age communities settling into the region.

### 6.1.2 Iron Age

The archaeology of farming communities of southern Africa encompasses three phases. The Early Iron Age (200-900 CE) represents the arrival of Bantu-speaking farmers in southern Africa. Living in sedentary settlements often located next to rivers, these farmers cultivated sorghum, beans, cowpeas, and kept livestock. The Middle Iron Age (900-1300 CE) is mostly confined to the Limpopo Valley in southern Africa with Mapungubwe Hill probably representing the earliest ‘state’ in this region (Huffman 2007). In areas north of Northam, *Happy Rest* and *Mzonjani* facies of the EIA have been identified. *Mzonjani* facies ceramics of the Urewe tradition is dated to around AD 450 to AD 750 (Huffman 2007: 127). *Happy Rest* facies ceramics of the Kalundu tradition is dated to around AD 500 to 750 (Huffman 2007: 219). Although both *Happy Rest* and *Mzonjani* ceramics are more prominently found in northern Limpopo, the presence thereof in the lower region of the Limpopo province could indicate movement of the associated communities across the landscape or interaction and information exchange of stylistic features.

The Late Iron Age (1300-1840s CE) marks the arrival and spread of ancestral Eastern Bantu-speaking Nguni and Sotho-Tswana communities into southern Africa. The location of Late Iron Age settlements is usually on or near hilltops for defensive purposes. The Late Iron Age as an archaeological period ended by 1840 CE, when the Mfecane caused major socio-political disruptions in southern Africa (Huffman 2007). The fertile soil of the area as well as deposits of iron ores and red ochre allowed for a landscape which was suitable for occupation by the Sotho Tswana of the Late Iron Age. Further north, the area show signs of ancient mine workings for iron and ochre (Huffman 2006a). LIA sites associated with *Madikwe* and *Olifanspoort* facies have been found in the area and date to between AD 1500 and 1700. According to Huffman (2007), the *Rooiberg* ceramic facies of the Urewe tradition is localised to the immediate region and has been dated to around AD 1650 to 1750. LIA sites which have been found in the region are found

with stone walling and ceramic scatters. In and around the town of Northam, early Tswana ancestors who occupied the area from the beginning of the 19th century include the Kwena, Po, and the Kgatla.

Between 1827 and 1832, the Khumalo Ndebele of Mzilikazi established his settlement in the Magaliesberg Mountains before moving to Marico River around 1832 and established a new capital at Motsenyateng (Bergh 1999). This unsettled many Sotho and Tswana groups of the area who then fled during the Difaquane to the east and to the south (Bergh 1999). The groups who fled would later return to their previously occupied lands. Around 1870, the Kwena baPhalane settled back on the farm Schilpadnest 385 KQ which they had ownership of (Breutz 1953).

### 6.1.3 Historical Period

The Historical period of the area can be traced back to the 1830s to 1840s when Voortrekkers crossed over the Vaal River and began establishing farms within the region (Bergh 1999). Remains of historical farmhouses can still be seen within the region. This marked the first interaction with the Agropastoralists already settled in the region. Voortrekkers allocated land for the Bafokeng people near current Rustenburg but later evicted them of their allocated farms (Bergh 2005). This along with enforced labour by the Voortrekkers caused tensions to rise.

In 1919, prospector J.H Williams noticed the iron rich mountains of the area, thereafter he obtained the rights to large sections of the iron ore deposits. In 1930, Iscor then obtained rights to the iron ores and began mining iron in the area the following year. Mining activities led to the establishment of the present-day town of Thabazimbi to support infrastructural needs of the growing mining community. As Northam was the nearest town with a train station, ox-wagon were used to transport ore to the station to then get transported elsewhere. The need for a safe way to cross the Crocodile River resulted in the development of a concrete slab in the river to allow for the safe passage for ox-wagons. The crossing, called the Helpmekaar Drift can still be seen today. In 1934, a railway line was established from Northam to Thabazimbi which further enhanced mining activities (Bergh 1999).

In 1924, Andries Lombard showed a platinum ore sample to geologist Hans Merensky which had been found near Lydenburg (Machens 2009). It was then discovered that the area was rich in platinum ores with a large platinum reef found in the area which resulted in the subsequent development of platinum mines.

Northam was laid out on the farm Leeukoppie by E.H. Fulls and was proclaimed a town in 1946. The farm had belonged to H. Herd, a British soldier who was given the farm after the end of the Anglo-Boer War. Many farms were allocated to many British soldiers after the end of the war.

## 6.2 Literature Review (SAHRIS)

Several Cultural Resource Management (CRM) surveys are on record for the area e.g., Hutten (2010), van der Walt (2018; 2018; 2021), van Vollenhoven (2013; 2016), Pelser (2021; 2022; 2023), van Schalkwyk (1994), van Schalkwyk et al (2003), Lavin (2021) and Huffman (2006). The relevant results of these studies are briefly discussed below and outlined in Table 6.

A survey conducted for proposed Vanadium and Palladium SPP developments (Pelser 2022), 5km southeast of the Dwaalboom Solar Cluster identified two grave sites, one site consists of 4 to 5 stone-packed graves with no headstones, and the second burial site has a grave with a headstone dating to 1919 and a gravestone of two dogs belonging to a previous farm resident. Two separate homesteads and old farm dams which likely date to the Historical period were also found. Ruins of a farmworker's homestead was also identified but hollow bricks used to construct the house indicated that the homestead was of the recent past. Other finds of the recent past include another farmstead, a bush camp, an old quarry which was used for gravel for road construction,

On the Farm Nooitgedacht 11 JQ, approximately 11km southwest of Dwaalboom Solar 2, three burial sites, remains of a house, and a Historical farmhouse were identified (van Vollenhoven 2016). The three burial sites consisted of two graves, three graves, and fives graves. The Historical farmhouse was documented as being in good condition and could potentially be associated with two of the burial sites.

A largescale survey that covered a large area further north towards Amandelbult were conducted by the National Cultural History Museum (van Schalkwyk et al 2003). Stone tools dating to the Middle Stone Age and Late Stone Age were found to be scattered across the area as isolated finds. Multiple Late Iron Age stonewalled sites were also identified along with associated artefacts. Three Historical sites were also found. **None** of these sites previously recorded are present within the Dwaalboom Solar 3 Project area.

Further north, The National Cultural History Museum (NCHM) conducted archaeological mitigation of an LIA site on the farm Elandsfontein 386 KQ (Van Schalkwyk 2004). The mitigation included the survey and mapping of sites in and around the Madeleine Robinson Nature Reserve of the Amandelbult Platinum Mine as part of the proposed extension of the mine's operations into the area. From their survey, several stone walled sites conforming to the Central Cattle Pattern (CCP) were identified along the base and between the saddles of the hills. Sites contained central kraals, smaller livestock enclosures, lower grindstones and ceramic scatters. These sites form part of a larger settlement complex dating to the LIA. The LIA dates to AD 1300 – 1840 (Huffman 2007). Mitigation was also conducted by Van der Walt (2021) of Iron Age sites at the Northam Zondereinde Shaft 3 and a ceramic analysis determined that the artifacts on site could possibly be related to the Rooiberg ceramic facies.

Mitigation of the Rhino Andalusite Mine by Archaeological Resources Management (ARM) (Huffman 2006b) resulted in excavation and recording of several Early and Late Iron Age sites. Specifically, the *Happy Rest* and *Mzonjani facies* (EIA) and the *Icon* and *Madikwe* facies of the Moloko group (LIA) have been identified. Additionally, ancient mine workings for ochre have been identified. A Survey for the Cronimet Underground Mine and Process Plant (van der Walt & du Piesanie 2009) recorded 37 sites ranging from historic dwellings, graves, MSA and Iron Age sites.

All of the Iron Age sites described above are concentrated along focal points on the landscape like hills or water sources. If any such features occur in the study area, they could be of heritage potential.

**Table 6. Selected studies consulted for this project.**

| Author | Year | Project | Findings |
|---|---|---|---|
| Hutten, M. | 2010 | Heritage Impact Assessment for the Proposed De Put Residential Township Development south of Northam, Limpopo Province. | No sites were identified. |
| Van der Walt, J | 2018 | Heritage Impact Assessment Northam Ext 20 | No sites were identified. |
| Van der Walt, J. | 2019 | Heritage Impact Assessment Northam Shaft 3, Limpopo Province | Ceramics, stone tools, upper grinder |
| Van der Walt, J. | 2021 | Archaeological mitigation report Northam Zondereinde Shaft 3, Limpopo Province | Iron Age sites |
| Van Vollenhoven, A.C. | 2013 | A Report on a Cultural Heritage Impact Assessment for the Proposed Photovoltaic Power Plant and EMP Amendment for the Northam Platinum Zondereinde Mine Close to Northam, Northwest Province. | Grave sites, Iron Age sites |
| Van Vollenhoven, A.C. | 2016 | Heritage Impact Assessment Input for Environmental Impact Assessment report undertaken in terms of the National Environmental Management Act 107 of 1998.for the Bakgatla VTM Mine Farm Nooitgedacht No. 11 JQ, Northam, Limpopo Province. | Multiple graves, a graveyard, house remains, historical farmhouse. |
| Pelser, A.J. | 2021 | Phase 1 HIA Report as part of the Basic Assessment and Environmental Management Programme Amendment Process for the Proposed Siyanda-Bakgatla Platinum Mine New Opencast Pit. | No sites were identified. |
| Pelser, A.J. | 2022 | Report on a Phase 1 Heritage Assessment for the Proposed Vanadium & Palladium SPP Development on Various Farms and Farm Portions near Northam, Limpopo Province. | Graves, Historical homesteads, Historical farm dams, recent past homesteads, a bush camp, quarry. |
| Pelser, A.J. | 2023 | Report on a Phase 1 Heritage Assessment for the Proposed Palladium SPP Development on Various Farms and Farm Portions near Northam, in the Waterberg District Municipality Thabazimbi Local Municipality of the Limpopo Province. | Remains of a cement/concrete dam. |
| Van Schalkwyk, J.A. | 1994 | A Survey of Archaeological and Cultural Historical Resources in the Amandelbult Mining Lease Area. | Multiple Iron Age sites, cemeteries, farm labourer dwellings. |
| Van Schalkwyk, J.A., Teichert, F., Pelser, A. | 2003 | A Survey of Archaeological Sites for the Amandelbult Platinum Mine Seismic Exploration Program | MSA and LSA scatters, Iron Age sites, Historical sites. |
| Lavin, J. | 2021 | Heritage Impact Assessment in terms of Section 38(8) of the NHRA for the Proposed development of the Northam PV facility near Thabazimbi, North West Province. | Iron Age sites |
| Huffman, T.N. | 2006a | Archaeological Assessment for the Rhino Andalusite Mine. | Iron Age sites |

### 6.3 Google Earth and the Genealogical Society of South Africa (Graves and Burial Sites)

Google Earth and 1:50 000 maps of the area were utilised to identify possible places where archaeological and historical sites might be located. The database of the Genealogical Society of South Africa indicated no known grave sites within the study area.

# 7 Heritage Baseline

## 7.1 Description of the Physical Environment

The vegetation type and landscape features of the area form part of the Dwaalboom Thornveld. It is described as plains with layer of scattered, low to medium high, deciduous microphyllous trees and shrubs with a few broad-leaved tree species, and an almost continuous herbaceous layer dominated by grass species. *Acacia tortilis* and *A. nilotica* dominate on the medium clays (at least 21% clay in the upper soil horizon but high in the lower horizons). On particularly heavy clays (>55% clay in all horizons) most other woody plants are excluded and the diminutive *A. tenuispina* dominates at a height of less than 1 m above ground. On the sandy clay loam soils (with not more than 35% clay in the upper horizon but high in the lower horizons) *A. erubescens* is the most prominent tree (Mucina & Rutherford, 2006).

The Project area of ~355 ha located on the Remaining Extent of the Farm Koedoesdoorn No. 414 approximately 3 km northeast of Northam in the Limpopo Province. The topography of the Project area is generally flat covered in a dense layer of grass with scattered trees. In some areas the vegetation is so dense it limited accessibility. The site is mantled by a thick sandy horizon with no rocky outcrops. Existing infrastructure includes various gravel roads along the boundaries of the Project area that is mainly used for hunting and grazing of cattle. General site conditions are indicated in (Figure 7.1 to 7.4).

Figure 7.1. General view of the proposed Project area showing the vegetation cover characteristic of the area.

Figure 7.2. General view of vegetation in the study area.

Figure 7.3. Image showing the thick grass cover that covers the majority of the project area.

Figure 7.4. Wooded vegetation in the study area.

## 7.2 Heritage Resources

Although the larger region has well documented LIA sites, the Project area is generally flat and does not have any hills or topographical focal points that would have attracted human settlement in antiquity. Areas that are more favourable for Iron Age settlements are found to the north along hills and along the rivers like the Bierspruit (van Schalkwyk 1994, van der Walt 2009; 2014, 2016 and 2019, Pistorius 2020). Stones sourced from the hills and rocky outcrops provide building material for the stonewalled settlements as well as lookouts and defensive positions on the elevated areas. In terms of the Stone Age the Project area also lacks raw material for manufacturing stone tools and shelters that would have been inhabited or water sources that would have been focal points during the Stone Age. The Project area is therefore considered to be of low heritage potential, this was confirmed during the field survey where finds were limited to a isolated MSA scatter at DB001 (-24.9412758, 27.3054069). The Stone Age artefacts attest to movement across the landscape in antiquity but does not represent a habitation or manufacturing site. The artefacts are out of context and scattered too sparsely to be of significance apart from mentioning them in this report. General site conditions are indicated in Figure 7.5 – 7. 7.

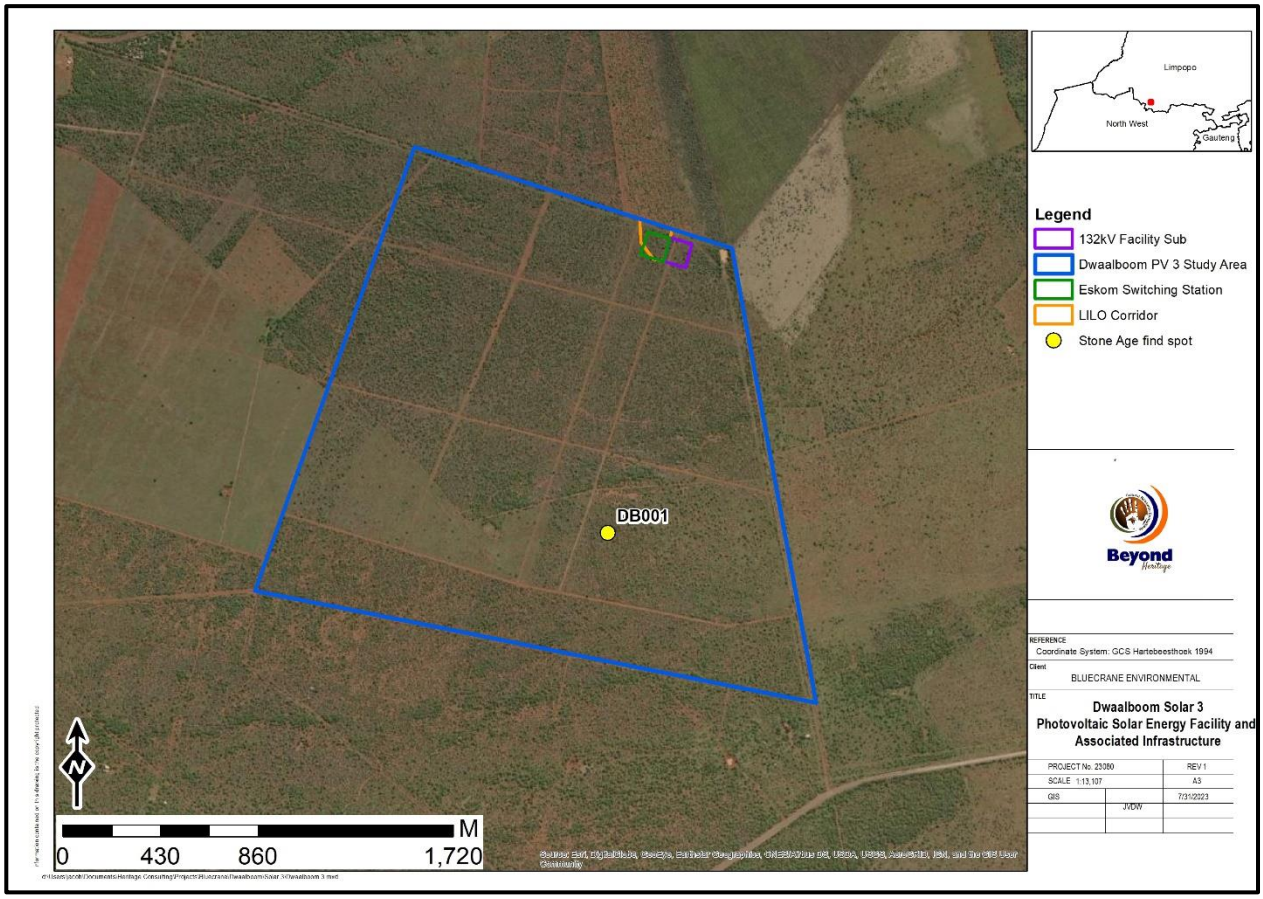



Figure 7.5: Location of DB001 relation to the study area.

Figure 7.6. Artefacts at DB001.

Figure 7.7. General site conditions where DB001 was identified.

### 7.3 Cultural Landscape

The Project area is in a rural setting characterised by mining activities and farming from historical times with an extensive archaeological layering dating from the Stone Age to Iron Age. These archaeological sites are focussed on and around elevated areas and along rivers that provide focal points in the landscape. The Project area itself is used for farming of game and cattle with no focal points that would have been favoured for settlement in antiquity (Figure 7.8 to 7.10).

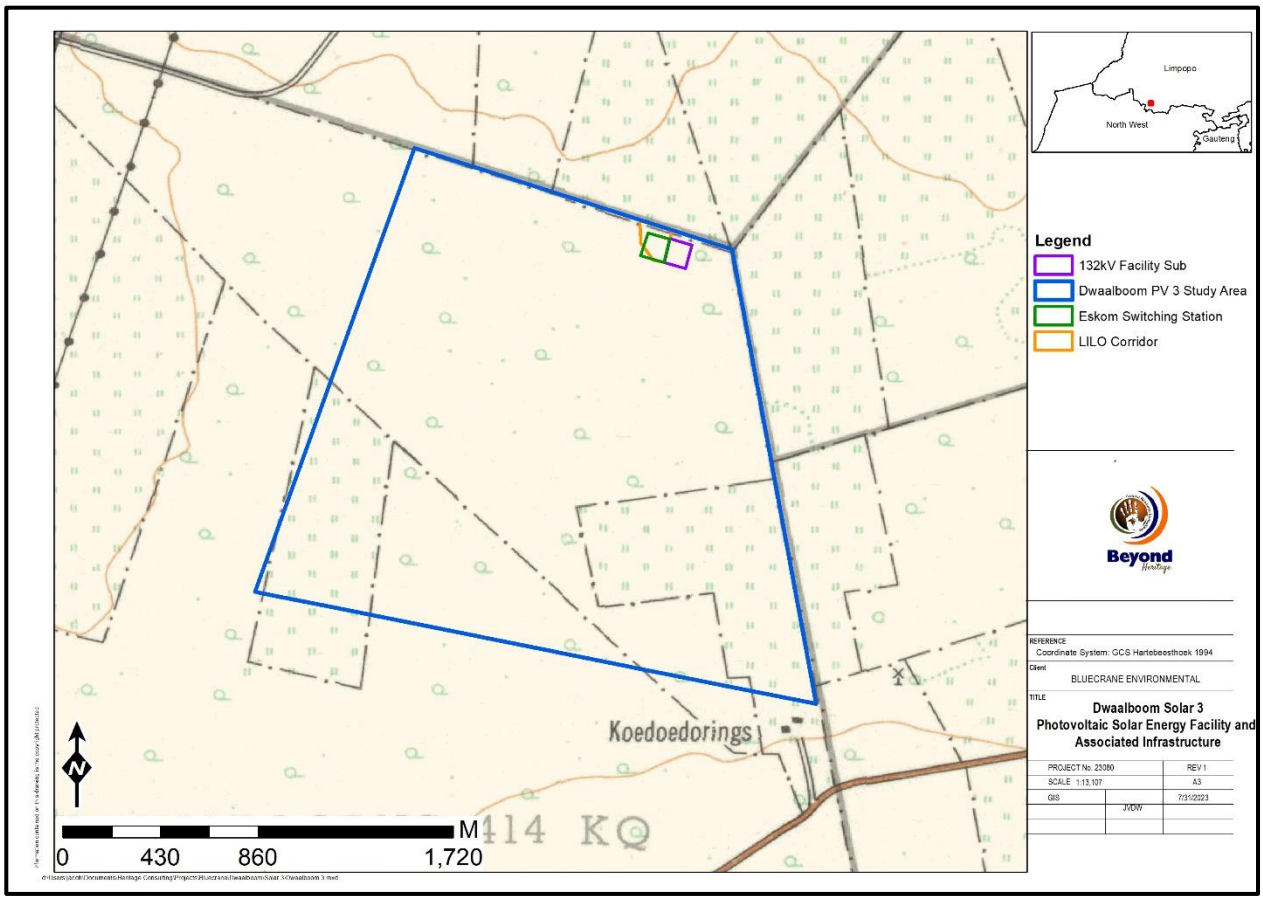



Figure 7.8. Extract of the 1963 Topographic map (1: 50 000) indicating small areas of cultivation.

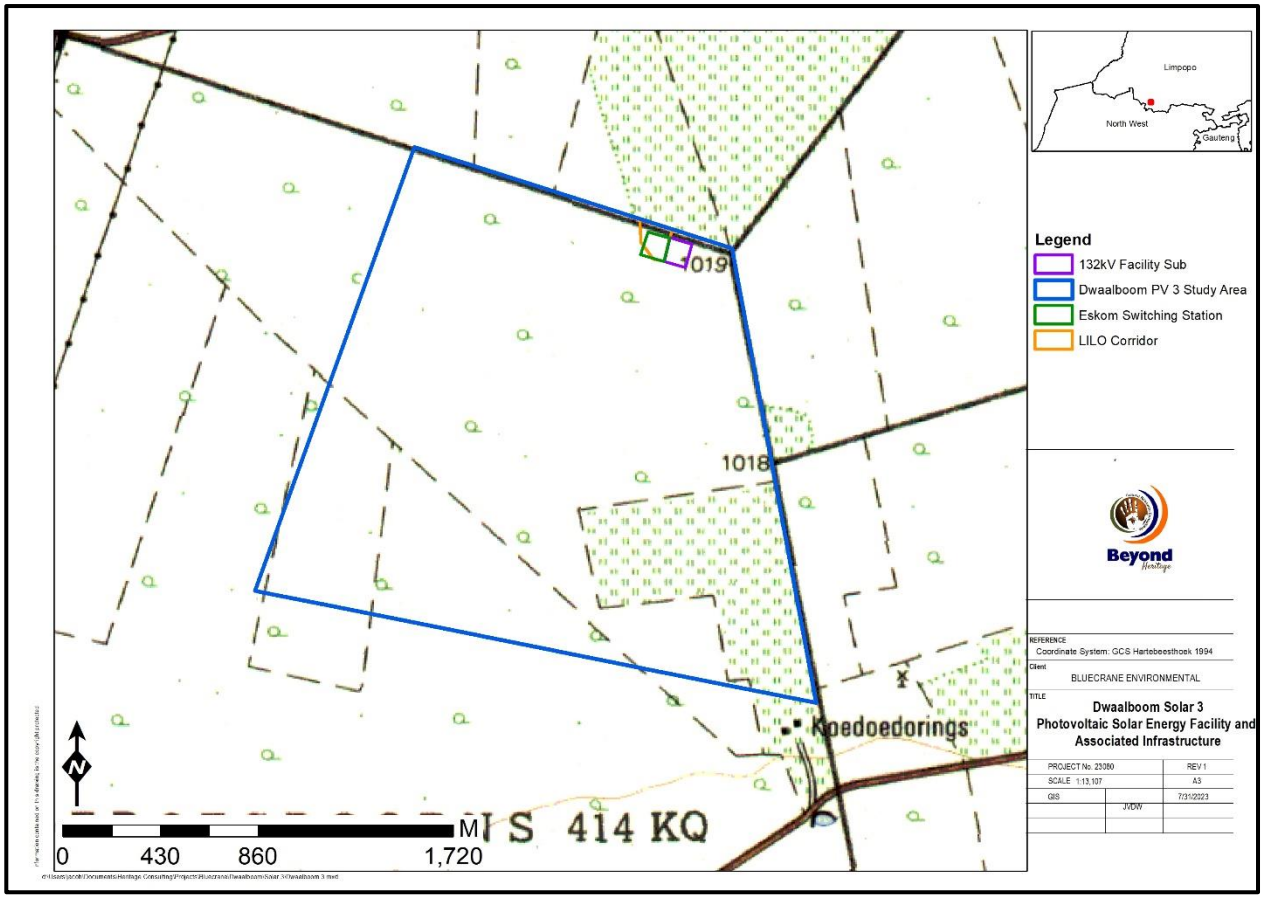



Figure 7.9. Extract of the 1980 Topographic map (1: 50 000) showing some cultivation in the study area.

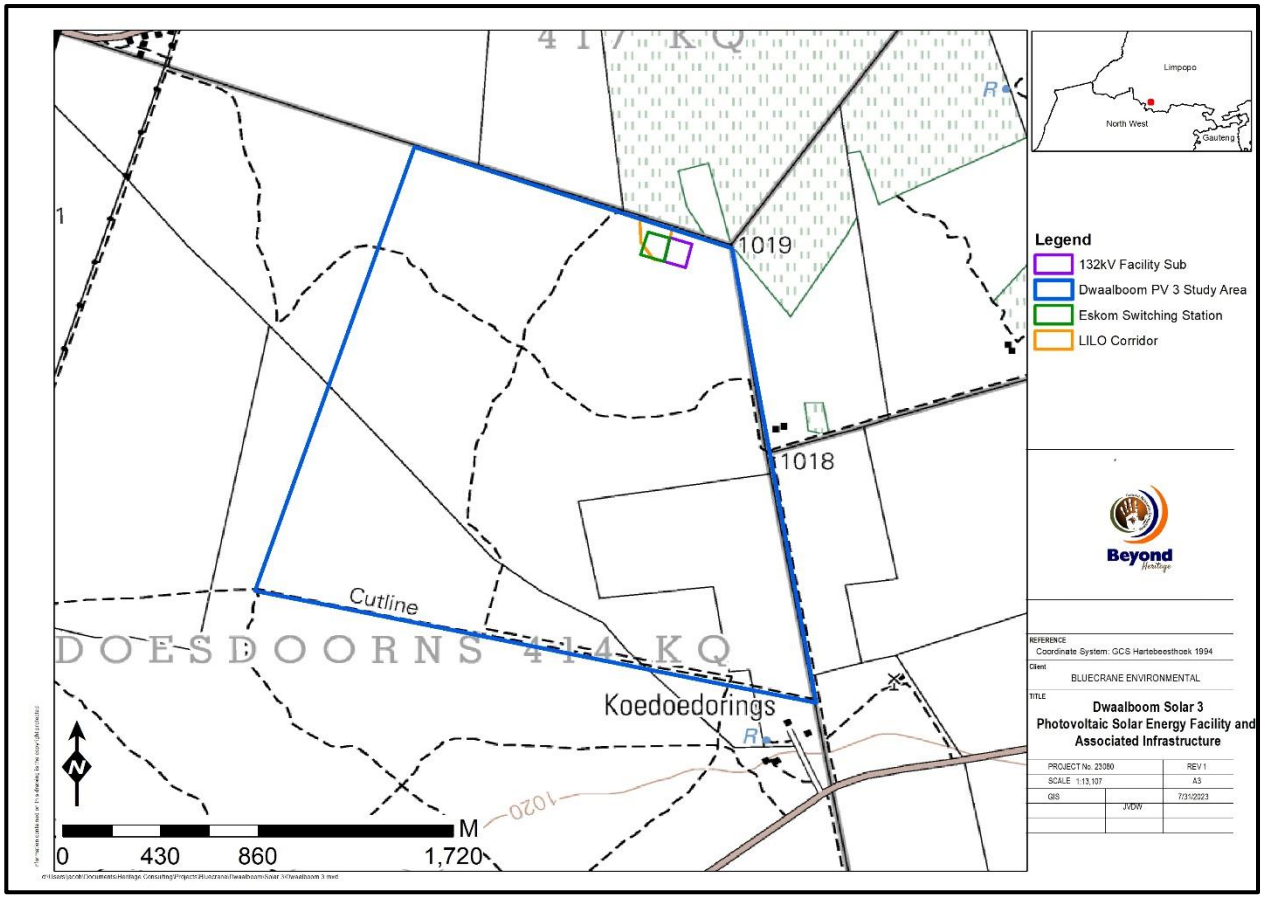
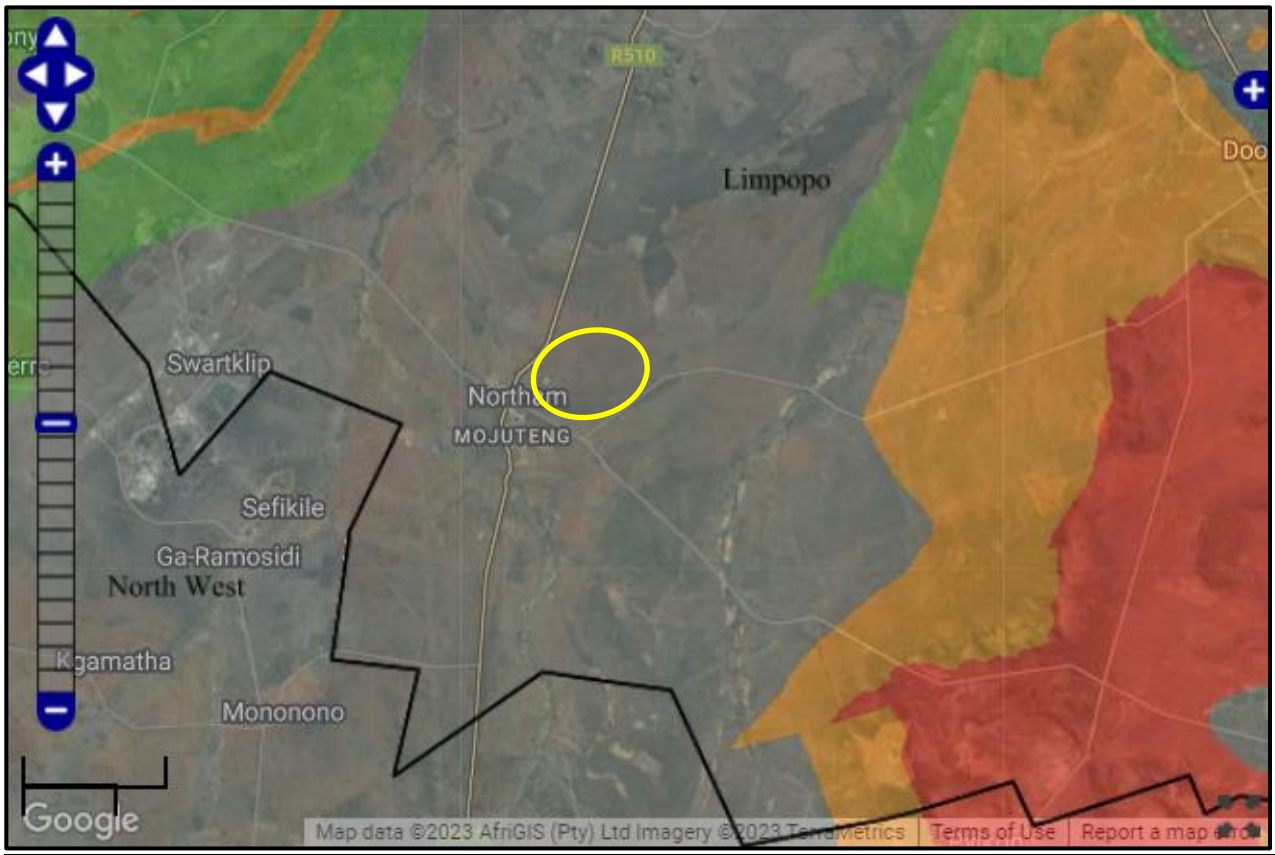



Figure 7.10. Extract of the 2005 Topographic map (1: 50 000) indicating small tracks in the study area.

### 7.4 Paleontological Heritage

According to the SAHRA palaeontological sensitivity map, the study area is indicated insignificant palaeontological sensitivity and no further studies are required (Figure 7.11).




| Colour | Sensitivity | Required Action |
|---|---|---|
| RED | VERY HIGH | Field assessment and protocol for finds is required |
| ORANGE/YELLOW | HIGH | Desktop study is required and based on the outcome of the desktop study, a field assessment is likely |
| GREEN | MODERATE | Desktop study is required |
| BLUE | LOW | No palaeontological studies are required however a protocol for finds is required |
| GREY | INSIGNIFICANT/ZERO | No palaeontological studies are required |
| WHITE/CLEAR | UNKNOWN | These areas will require a minimum of a desktop study. As more information comes to light, SAHRA will continue to populate the map |

Figure 7.11. Paleontological sensitivity of the approximate study area (yellow polygon) as indicated on the SAHRA Palaeontological sensitivity map.

# 8 Assessment of impacts

## 8.1 Impacts on tangible heritage resources.

The main cause of impacts to heritage resources is physical disturbance of the cultural material itself and its context during removal of topsoil and vegetation as well as the excavations associated with the establishment of infrastructure. In terms of this Project the main source of impacts will happen during the following activities in the construction phase.

- Establishment of new roads and upgrade of existing roads;
- Earthworks for temporary infrastructure including laydown areas;
- Visual impact of the PV Facility and powerlines on the landscape and sense of place;
- Excavation and levelling of the PV facility footprint;
- Trenches for cables and erection of powerlines;
- Influx of people into the area;
- Excavations during construction of the sub stations.

Based on the current layout the isolated artefact scatter at DB001 will be directly impacted on by the development. The artefacts are out of context and are scattered too sparsely to be of significance apart from mentioning them in this report.

### 8.1.1 Cumulative impacts

Based on the current layout the proposed Project will have a low cumulative impact as no adverse impacts on significant heritage resources are expected.

## 8.2 Impact Assessment Tables

**Table 7. Impact assessment for the construction phase of the project.**

| Nature of the Impact | Status | | Extent | Probability | Reversibility | Irreplaceability | Duration | Cumulative Effect | Magnitude | Impact Significance | Impact Rating | Can impact be mitigated? | Is the impact acceptable ? | Proposed Mitigation Measures |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Loss of heritage resources | Before mitigation | Negative | 1 | 2 | 3 | 3 | 4 | 1 | 1 | 14 | Low (6-28) | Yes | Yes | • Heritage-walkdown of the final development footprint.<br>• Implementation of a Heritage Chance Find Procedure |
| | After mitigation | Negative | 1 | 1 | 1 | 3 | 4 | 1 | 1 | 11 | Low (6-28) | | | |

**Table 8. Impact assessment for the operational phase of the project.**

| Nature of the Impact | Status | | Extent | Probability | Reversibility | Irreplaceability | Duration | Cumulative Effect | Magnitude | Impact Significance | Impact Rating | Can impact be mitigated? | Is the impact acceptable ? | Proposed Mitigation Measures |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Loss of heritage resources | Before mitigation | Negative | 1 | 2 | 3 | 3 | 4 | 1 | 1 | 14 | Low (6-28) | Yes | Yes | Implementation of a Heritage Chance Find Procedure |
| | After mitigation | Negative | 1 | 1 | 1 | 3 | 4 | 1 | 1 | 11 | Low (6-28) | | | |

**Table 9. Impact assessment for the decommissioning phase of the project.**

| Nature of the Impact | Status | | Extent | Probability | Reversibility | Irreplaceability | Duration | Cumulative Effect | Magnitude | Impact Significance | Impact Rating | Can impact be mitigated? | Is the impact acceptable ? | Proposed Mitigation Measures |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Loss of heritage resources | Before mitigation | Negative | 1 | 2 | 3 | 3 | 4 | 1 | 1 | 14 | Low (6-28) | Yes | Yes | Implementation of a Heritage Chance Find Procedure |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | After mitigation | Negative | 1 | 1 | 1 | 3 | 4 | 1 | 1 | 11 | Low (6-28) | | | |

**Table 10. Impact assessment for the cumulative impacts of the project.**

| Nature of the Impact | Status | | Extent | Probability | Reversibility | Irreplaceability | Duration | Cumulative Effect | Magnitude | Impact Significance | Impact Rating | Can impact be mitigated? | Is the impact acceptable ? | Proposed Mitigation Measures |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Loss of heritage resources | Before mitigation | Negative | 1 | 2 | 3 | 3 | 4 | 1 | 1 | 14 | Low (6-28) | Yes | Yes | Implementation of a Heritage Chance Find Procedure |
| | After mitigation | Negative | 1 | 1 | 1 | 3 | 4 | 1 | 1 | 11 | Low (6-28) | | | |

# 9 Conclusion and recommendations

Although the larger region has well documented LIA sites, the Project area is generally flat and does not have any hills or topographical focal points that would have attracted human settlement in antiquity. Areas that are more favourable for Iron Age settlements are found to the north along focal points like hills and along the rivers like the Bierspruit (van Schalkwyk 1994, van der Walt 2009; 2014, 2016 and 2019, Pistorius 2020).

During the survey finds were limited to an isolated Stone Age scatter. The hiatus of archaeological sites in the Project area can be attributed to the local geology and the topography that lack any of the above-mentioned focal points. Stones sourced from the hills and rocky outcrops provide building material for the stonewalled settlements as well as lookouts and defensive positions on the elevated areas and is not present in the Project area. In terms of the Stone Age the Project area also lacks raw material for manufacturing stone tools and shelters that would have been inhabited or water sources that would have been focal points during the Stone Age. According to the SAHRA Paleontological sensitivity map the study area is of insignificant paleontological significance and no further studies are required for this aspect.

The impact to heritage resources is low provided that the recommendations in this report are adhered to, based on the South African Heritage Resource Authority (SAHRA) 's approval.

## 9.1 Recommendations for condition of authorisation

The following recommendations for Environmental Authorisation apply and the Project may only proceed based on approval from SAHRA:

- Heritage walk-down of the final development footprint prior to construction;
- Monitoring of the Project area by the ECO during pre-construction and construction phases for heritage chance finds, if chance finds are encountered to implement the Chance Find Procedure for the Project as outlined in Section 9.2.

## 9.2 Heritage Resources

The possibility of the occurrence of subsurface finds cannot be excluded. Therefore, if during construction any possible finds such as stone tool scatters, artefacts or bone and fossil remains are made, the operations must be stopped, and a qualified archaeologist must be contacted for an assessment of the find and therefor chance find procedures should be put in place as part of the EMP. A short summary of chance find procedures is discussed below and monitoring guidelines applicable to the Chance Find procedure is discussed below and monitoring guidelines for this procedure are provided in Section 9.5.

This procedure applies to the developer's permanent employees, its subsidiaries, contractors and subcontractors, and service providers. The aim of this procedure is to establish monitoring and reporting procedures to ensure compliance with this policy and its associated procedures. Construction crews must be properly inducted to ensure they are fully aware of the procedures regarding chance finds as discussed below.

- If during the pre-construction phase, construction, operations or closure phases of this project, any person employed by the developer, one of its subsidiaries, contractors and subcontractors, or service provider, finds any artefact of cultural significance or heritage site, this person must cease work at the site of the find and report this find to their immediate supervisor, and through their supervisor to the senior on-site manager.
- It is the responsibility of the senior on-site Manager to make an initial assessment of the extent of the find and confirm the extent of the work stoppage in that area.

- The senior on-site Manager will inform the ECO of the chance find and its immediate impact on operations. The ECO will then contact a professional archaeologist for an assessment of the finds who will notify the SAHRA.

### 9.3 Reasoned Opinion

The overall impact of the Project with the recommended mitigation measures is considered to be low and residual impacts can be managed to an acceptable level through implementation of the recommendations made in this report. The socio-economic benefits also outweigh the possible impacts of the development if the correct mitigation measures are implemented for the project.

### 9.4 Potential risk

Potential risks to the proposed Project are the occurrence of intangible features and unrecorded cultural resources (of which graves, and subsurface cultural material are the highest risk). This can cause delays during construction, as well as additional costs involved in mitigation and possible layout changes. The stakeholder engagement process will assess intangible heritage resources further if this is listed as a concern.

### 9.5 Monitoring Requirements

Day to day monitoring can be conducted by the ECO. The ECO or other responsible persons should be trained along the following lines:

- *Induction training:*
  - Responsible staff identified by the developer should attend a short course on heritage management and identification of heritage resources.
  - Staff should also receive training on the CFP.
- *Site monitoring and watching brief*: As most heritage resources occur below surface, all earth-moving activities need to be routinely monitored in case of accidental discoveries. The greatest potential impacts are from pre-construction and construction activities. The ECO should monitor all such activities. If any heritage resources are found, the chance finds procedure must be followed as outlined above.

**Table 11**. Monitoring requirements for the Project

| Heritage Monitoring | | | | | |
|---|---|---|---|---|---|
| **Aspect** | **Area** | **Responsible for monitoring and measuring** | **Frequency** | **Proactive or reactive measurement** | **Method** |
| Cultural Heritage Resource Chance Find | Entire Project area | ECO | Weekly (Pre construction and construction phase) | Proactively | • Refer to Appendix A. |

## 9.6 Management Measures for inclusion in the EMPr

**Table 12. Heritage Management Plan for EMPr implementation**

| Area | Mitigation measures | Phase | Timeframe | Responsible party for implementation | Target | Performance indicators (Monitoring tool) |
|---|---|---|---|---|---|---|
| General Project area | Monitoring of the Project area by the ECO during pre-construction and construction phases for chance finds, if chance finds are encountered to implement the Chance Find Procedure for the project | Pre-Construction & Construction | Weekly | Applicant<br>Construction Contractor | Ensure compliance with relevant legislation and recommendations from SAHRA under Section 35, 36 and 38 of NHRA | ECO Checklist/Report |
| Development footprint | Heritage walk-down of the final development footprint prior to construction; | Pre-Construction & Construction | Weekly | Applicant<br>Construction Contractor | Ensure compliance with relevant legislation and recommendations from SAHRA under Section 35, 36 and 38 of NHRA | ECO Checklist/Report |

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