

Mobile: Sam - 072 437 1742  
Mobile: Luke - 083 784 1997  
Email: info@enviro-insight.co.za  
Website: www.enviro-insight.co.za

# Appendix D5:

## Heritage Impact Assessment



# HERITAGE IMPACT ASSESSMENT

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

FOR THE PROPOSED RED SANDS WIND AND SOLAR FACILITY NEAR AGGENEYS,  
NORTHERN CAPE.

## Type of development:

Wind and Solar Facility Development

## Client:

Enviro Insight

## Applicant:

TBC

## Report Prepared by:



## Beyond Heritage

Private Bag X 1049

Suite 34

Modimolle

0510

Tel: 082 373 8491

Fax: 086 691 6461

E-Mail: [jaco@heritageconsultants.co.za](mailto:jaco@heritageconsultants.co.za)

## Report Author:

Mr. J. van der Walt

## Project Reference:

Project number: 22115

## Report date:

September 2022

**APPROVAL PAGE**

<b>Project Name</b>	Proposed Red Sands Wind and Solar Facility.
<b>Report Title</b>	Heritage Impact Assessment for the Red Sands Wind and Solar Facility near Aggeneys, Northern Cape.
<b>Authority Reference Number</b>	TBC
<b>Report Status</b>	Draft Report
<b>Applicant Name</b>	TBC

<b>Responsibility</b>	<b>Name</b>	<b>Qualifications and Certifications</b>	<b>Date</b>
<b>Heritage Lead</b>	Jaco van der Walt - Archaeologist	MA Archaeology ASAPA #159 APHP #114	September 2022
<b>Archaeological support</b>	Ruan van der Merwe - Archaeologist	BA Hons Archaeology	July 2022
<b>Archaeological support</b>	Lara Kraljevic - Archaeologist	MA Archaeology	July 2022

**DOCUMENT PROGRESS****Distribution List**

Date	Report Reference Number	Document Distribution	Number of Copies
2 September 2022	22115	Enviro – Insight	Electronic Copy

**Amendments on Document**

Date	Report Reference Number	Description of Amendment

### INDEMNITY AND CONDITIONS RELATING TO THIS REPORT

The findings, results, observations, conclusions and recommendations given in this report are based on the author's best scientific and professional knowledge as well as available information. The report is based on survey and assessment techniques which are limited by time and budgetary constraints relevant to the type and level of investigation undertaken. Beyond Heritage reserves the right to modify aspects of the report including the recommendations if and when new information becomes available from ongoing research or further work in this field or pertaining to this investigation.

Although Beyond Heritage exercises due care and diligence in rendering services and preparing documents Beyond Heritage accepts no liability, and the client, by receiving this document, indemnifies Beyond Heritage against all actions, claims, demands, losses, liabilities, costs, damages and expenses arising from or in connection with services rendered, directly or indirectly by Beyond Heritage and by the use of the information contained in this document.

This report must not be altered or added to without the prior written consent of the author. This also refers to electronic copies of this report which are supplied for the purposes of inclusion as part of other reports, including main reports. Similarly, any recommendations, statements or conclusions drawn from or based on this report must make reference to this report. If these form part of a main report relating to this investigation or report, this report must be included in its entirety as an appendix or separate section to the main report.

### COPYRIGHT

Copyright on all documents, drawings and records, whether manually or electronically produced, which form part of the submission and any subsequent report or project document, shall vest in Beyond Heritage.

The client, on acceptance of any submission by Beyond Heritage and on condition that the client pays to Beyond Heritage the full price for the work as agreed, shall be entitled to use for its own benefit:

- The results of the project;
- The technology described in any report; and
- Recommendations delivered to the client.

Should the applicant wish to utilise any part of, or the entire report, for a project other than the subject project, permission must be obtained from Beyond Heritage to do so. This will ensure validation of the suitability and relevance of this report on an alternative project.

## 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 - (i) the specialist who prepared the report; and (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	<i>Declaration of Independence</i>
(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 10.1 and 10.5
(l) Conditions for inclusion in the environmental authorisation	Section 10. 1 and 10.5
(m) Monitoring requirements for inclusion in the EMPr or environmental authorisation	Section 10. 4.
(n) Reasoned opinion - (i) as to whether the proposed activity, activities or portions thereof should be authorised; (iA) regarding the acceptability of the proposed activity or activities; and (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 10.2
(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; and	Refer to BA report
(q) Any other information requested by the competent authority	No other information requested at this time

## Executive Summary

Enviro Insight has been appointed as the independent Environmental Assessment Practitioner (EAP) to apply for environmental authorisation for the proposed Red Sands Wind and Solar Facility development. Beyond Heritage was appointed 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. Key findings of the assessment include:


- The landscape setting in which the project is located consists of four topographical features with varying levels of heritage potential as outlined below:
  1. Flat grassy plains with red sandy soils that is of low heritage potential;
  2. Rocky outcrops named inselbergs and granite outcrops that is of high heritage potential;
  3. Red sand dunes that are of medium to high heritage potential; and
  4. Pans, seasonal water holes or fissures that hold water after the rains that is of high heritage potential.
- The findings of this assessment confirmed the expectations of heritage sensitive areas as outlined above and is in line with findings made by (Beaumont *et al.* 1995, Morris 201a, b,c and Pelsler 2011) where archaeological material is found at these locations.
- Beaumont *et al.* (1995) have also noted that there is a low-density background scatter of artefacts throughout Bushmanland. In the Aggeneys area, however, this scatter tends to be quite ephemeral. Several other surveys in the region support this distribution of archaeological materials (Morris 2011a; 2011b; 2013, Orton 2015; 2016, Webley & Halkett 2012).
- During the current survey material dating to all three phases i.e. Earlier Stone Age (ESA), Middle Stone Age (MSA) and Later Stone Age (LSA) were recorded. The most significant being the LSA sites centred around fissures that holds water or rocky outcrops with associated lithics, ostrich eggshell fragments and pottery.
- Significant sites are all located within environmental no go areas and will be preserved in-situ except for site AG009. This site will however also not be impacted on by the current layout.
- Other finds were limited to findspots with historical material that do not hold high significance due to low artefact ratio, farmsteads and graves.
- According to the SAHRA Paleontological sensitivity map, the majority of the study area is of low paleontological significance and the project can continue with the implementation of a Fossil Chance Find Protocol which should be added to the Environmental Management Programme (EMPr).

The impact on heritage resources is considered to be low as significant sites are not directly impacted on and preserved within no go areas. It is recommended that the project can be authorised provided that the recommendations in this report are adhered to and based on the South African Heritage Resource Authority (SAHRA) 's approval.

### Recommendations:

- 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 under Section 10.2;
- The recorded heritage sites of high significance (AG009, AG019, AG024, AG027, AG028) must be avoided and preserved within the environmental no go areas.
- Grave sites (AG010 and AG014) must be avoided and preserved as is within the environmental no go areas; and
- A pre-construction walkthrough must be conducted of the final layout of areas not previously covered.

**Declaration of Independence**

<b>Specialist Name</b>	Jaco van der Walt
<b>Declaration of Independence</b>	<p>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:</p> <ul style="list-style-type: none"> <li>• I act as an independent specialist in this application;</li> <li>• 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;</li> <li>• I declare that there are no circumstances that may compromise my objectivity in performing such work;</li> <li>• 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;</li> <li>• I will comply with the Act, Regulations and all other applicable legislation;</li> <li>• I have no, and will not engage in, conflicting interests in the undertaking of the activity;</li> <li>• 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;</li> <li>• All the particulars furnished by me in this form are true and correct; and</li> <li>• 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.</li> </ul>
<b>Signature</b>	
<b>Date</b>	19/08/2022

**a) Expertise of the specialist**

Jaco van der Walt has been practising as a Cultural Resource Management (CRM) archaeologist for 15 years. He obtained an MA degree in Archaeology from the University of the Witwatersrand focussing on the Iron Age in 2012 and is a PhD candidate at the University of Johannesburg focussing on Stone Age Archaeology with specific interest in the Middle Stone Age (MSA) and Later Stone Age (LSA). Jaco is an accredited member of the Association of South African Professional Archaeologists (ASAPA) (#159) and have 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



**TABLE OF CONTENTS**

<b>REPORT OUTLINE</b> .....	<b>4</b>
<b>EXECUTIVE SUMMARY</b> .....	<b>5</b>
<b>DECLARATION OF INDEPENDENCE</b> .....	<b>6</b>
A) EXPERTISE OF THE SPECIALIST.....	6
<b>ABBREVIATIONS</b> .....	<b>11</b>
<b>GLOSSARY</b> .....	<b>11</b>
<b>1 INTRODUCTION AND TERMS OF REFERENCE:</b> .....	<b>12</b>
1.1 TERMS OF REFERENCE.....	12
1.2 PROJECT DESCRIPTION .....	13
1.3 ALTERNATIVES .....	13
<b>2 LEGISLATIVE REQUIREMENTS</b> .....	<b>16</b>
<b>3 METHODOLOGY</b> .....	<b>17</b>
3.1 LITERATURE REVIEW.....	17
3.2 GENEALOGICAL SOCIETY AND GOOGLE EARTH MONUMENTS.....	17
3.3 PUBLIC CONSULTATION AND STAKEHOLDER ENGAGEMENT:.....	17
3.4 SITE INVESTIGATION.....	18
3.5 SITE SIGNIFICANCE AND FIELD RATING.....	20
3.6 IMPACT ASSESSMENT METHODOLOGY.....	22
3.7 LIMITATIONS AND CONSTRAINTS OF THE STUDY .....	23
<b>4 DESCRIPTION OF SOCIO-ECONOMIC ENVIRONMENT</b> .....	<b>23</b>
<b>5 RESULTS OF PUBLIC CONSULTATION AND STAKEHOLDER ENGAGEMENT:</b> .....	<b>23</b>
<b>6 CONTEXTUALISING THE STUDY AREA:</b> .....	<b>24</b>
6.1 LITERATURE REVIEW (SAHRIS) .....	24
6.2 ARCHAEOLOGICAL BACKGROUND.....	24
6.3 HISTORICAL INFORMATION .....	27
<b>7 DESCRIPTION OF THE PHYSICAL ENVIRONMENT</b> .....	<b>27</b>
<b>8 HERITAGE BASELINE</b> .....	<b>30</b>
8.1 HERITAGE RESOURCES.....	30
8.2 CULTURAL LANDSCAPE.....	51
8.3 PALEONTOLOGICAL HERITAGE .....	51
<b>9 ASSESSMENT OF IMPACTS</b> .....	<b>52</b>

<b>10</b>	<b>CONCLUSION AND RECOMMENDATIONS .....</b>	<b>58</b>
10.1	RECOMMENDATIONS FOR CONDITION OF AUTHORISATION.....	58
10.2	CHANCE FIND PROCEDURES.....	59
10.3	REASONED OPINION .....	60
10.4	POTENTIAL RISK.....	60
10.5	MONITORING REQUIREMENTS .....	61
10.6	MANAGEMENT MEASURES FOR INCLUSION IN THE EMPr.....	62
<b>11</b>	<b>REFERENCES.....</b>	<b>63</b>

## LIST OF FIGURES

FIGURE 1.1.	REGIONAL SETTING OF THE PROJECT (1: 250 000 TOPOGRAPHICAL MAP).....	14
FIGURE 1.2.	AERIAL IMAGE OF THE PROJECT COMPONENTS. THE GRID CONNECTION WILL FORM PART OF A SEPARATE ENVIRONMENTAL APPLICATION AND IS NOT ASSESSED HERE. ....	15
FIGURE 3.1.	TRACKLOG OF THE SURVEY PATH IN GREEN. ....	19
FIGURE 6.1.	SUMMARY OF ARCHAEOLOGICAL AND HISTORICAL EVENTS IN SOUTH AFRICA. ....	25
FIGURE 7.1.	GENERAL SITE CONDITIONS - DEEP LAYER OF AEOLIAN SAND COVERING MOST OF THE LANDSCAPE.....	28
FIGURE 7.2.	EXPOSED CALCRETE LAYERS. ....	28
FIGURE 7.3.	SANDY PLAINS WITH GRASS COVER. ....	28
FIGURE 7.4.	GENERAL VIEW OF THE LANDSCAPE SHOWING THE LACK OF MAJOR TOPOGRAPHICAL FEATURES.....	28
FIGURE 7.5.	CAST IRON TELEPHONE POLES. ....	29
FIGURE 7.6.	BULLERS LIMITED CAST IRON TELEPHONE POLES. ....	29
FIGURE 7.7.	FARMSTEAD AT DONKERDUISPRAAT.....	29
FIGURE 7.8.	FARMSTEAD AT ROOI DUIN.....	29
FIGURE 8.1.	SITE DISTRIBUTION IN RELATION TO ENVIRONMENTAL NO GO AREAS. SEVERAL OF THE HIGH SIGNIFICANT SITES ALSO FALL INTO THESE AREAS AND AS A RESULT WILL BE PRESERVED IN-SITU.....	31
FIGURE 8.2.	SMALL COLLECTION OF ESA BIFACIAL ARTEFACTS ON THE LEFT AND MSA BROKEN BLADES AND FLAKE WITH OES FRAGMENTS AT AG001.....	38
FIGURE 8.3.	GENERAL SITE CONDITIONS TYPICAL AT FINDSPOTS ON THE FLAT PLAINS WHERE NO FOCAL POINTS ARE LOCATED. ....	38
FIGURE 8.4.	SMALL GRANITE OUTCROP ON GRASSY PLAINS AT AG004.....	38
FIGURE 8.5.	AG004 SITUATED ON A LARGE OPEN LANDSCAPE WITH HIGH VISIBILITY IN ALL DIRECTIONS. ....	38
FIGURE 8.6.	UNDIAGNOSTIC CERAMIC SHERDS FOUND AT THE ROCKY OUTCROPPING AT AG004. ....	39
FIGURE 8.7.	DORSAL AND VENTRAL VIEW OF LSA LITHICS AT AG004.....	39
FIGURE 8.8.	OES FRAGMENTS SCATTERED ACROSS THE IMMEDIATE AREA AT AG004.....	39
FIGURE 8.9.	SMALL BONE FRAGMENT AT AG004.....	39
FIGURE 8.10.	RUSTED METAL CAN, FOUND AT THE ROCKY OUTCROP - POSSIBLY HISTORICAL AT AG004. ....	40
FIGURE 8.11.	REMAINS OF A RECTANGULAR CALCRETE STRUCTURE AT AG005. ....	40
FIGURE 8.12.	REMNANTS OF A KRAAL NEAR THE SMALL STRUCTURE AT AG005. ....	40
FIGURE 8.13.	AG005 - COLLECTION OF METAL AND GLASS ARTEFACTS. ....	40

## BEYOND HERITAGE

FIGURE 8.14. COLLECTION OF METAL ARTEFACTS AT AG005.....	41
FIGURE 8.15. AG006 - ISOLATED QUARTZITE FLAKE.....	41
FIGURE 8.16. AG008 - ISOLATED HIGHLY WEATHERED ARTEFACT.....	41
FIGURE 8.17. GENERAL SITE CONDITIONS OF AG009 - LARGE GRANITE OUTCROP THAT HOLDS SEASONAL WATER.....	41
FIGURE 8.18. AG009 - GRINDING HOLLOWES.....	42
FIGURE 8.19. COLLECTION OF LSA LITHICS AT AG009 SOME. OES FRAGMENTS WERE ALSO IDENTIFIED.....	42
FIGURE 8.20. AG009 - GRINDING HOLLOWES SCATTERED OVER THE THE SITE.....	42
FIGURE 8.21. AG010 - SMALL FENCED OFF CEMETERY NEAR THE DONKERDUISPRAAT FARMSTEAD.....	42
FIGURE 8.22. GRAVE ONE AT AG010 - CILIA JACOBA VAN DER HEEVER 1974.....	43
FIGURE 8.23. GRAVE TWO AT AG010 - NICOLAAS JACOBUS VAN DER HEEVER 1960.....	43
FIGURE 8.24. AG013 – ISOLATED LITHIC ARTEFACT.....	44
FIGURE 8.25. GENERAL VIEW OF THE SMALL CEMETERY AT AG014.....	44
FIGURE 8.26. AG014 - GRAVES WITH GRANITE HEADSTONES AND BRICK SKIRTING WITH A FILLED GRAVEL COVER.....	44
FIGURE 8.27. AG014 - JOHANNES CORNELIS MULDER 1993.....	44
FIGURE 8.28. AG014 - ERGONDA ERETZEMA MULDER 2017.....	45
FIGURE 8.29. AG015 – DORSAL VIEW OF LITHICS.....	45
FIGURE 8.30. AG018 - COLLECTION OF LITHICS SHOWING A VARIETY OF RAW MATERIAL USED.....	45
FIGURE 8.31. GENERAL VIEW OF AG019 SHOWING GRANITE OUTCROP AND SEASONAL PAN.....	45
FIGURE 8.32. LARGE AMOUNTS OF OES FRAGMENTS IDENTIFIED AROUND THE SITE AT AG019.....	46
FIGURE 8.33. UNDIAGNOSTIC CERAMIC FRAGMENTS IDENTIFIED AT AG019.....	46
FIGURE 8.34. GRINDING HOLLOWES SCATTERED ACROSS THE STONE SURFACE AT AG019.....	46
FIGURE 8.35. COLLECTION OF LITHIC ARTEFACTS SCATTERED ACROSS THE OUTCROPPING AT AG019.....	46
FIGURE 8.36. BULLET CASING AT AG019.....	47
FIGURE 8.37. SMALL COLLECTION OF MISCELLANEOUS FLAKES ALONG WITH SOME OES FRAGMENTS AT AG021.....	47
FIGURE 8.38. AG024 – MSA FLAKE.....	48
FIGURE 8.39. AG024 - GRINDING HOLLOW.....	48
FIGURE 8.40. GRANITE OUTCROP THAT HOLDS SEASONAL WATER AT AG024.....	48
FIGURE 8.41. GENERAL SITE CONDITIONS AT AG027 - LARGE ROCKY OUTCROP THAT HOLDS SEASONAL WATER.....	48
FIGURE 8.42. GRINDING HOLLOWES SCATTERED ACROSS THE ROCK SURFACE AT AG027.....	49
FIGURE 8.43. AG027 – CERAMIC SHERDS.....	49
FIGURE 8.44. AG027 – DORSAL AND VENTRAL VIEW OF MSA ARTEFACTS.....	49
FIGURE 8.45. AG027 - SMALL COLLECTION OF LITHIC ARTEFACTS.....	49
FIGURE 8.46. AG027 - COLLECTION OF HISTORICAL METAL ARTEFACTS.....	50
FIGURE 8.47. PALEONTOLOGICAL SENSITIVITY OF THE APPROXIMATE STUDY AREA (YELLOW POLYGON) AS INDICATED ON THE SAHRA PALAEONTOLOGICAL SENSITIVITY MAP.....	51
FIGURE 9.1. OBSERVATION POINTS IN RELATION TO THE PROJECT LAY OUT.....	53
FIGURE 9.2. OBSERVATION POINTS IN RELATION TO THE PROJECT LAY OUT.....	54
FIGURE 9.3. OBSERVATION POINTS IN RELATION TO THE PROJECT LAY OUT.....	55

**LIST OF TABLES**

TABLE 1. SPECIALIST REPORT REQUIREMENTS.....	4
TABLE 2: PROJECT DESCRIPTION .....	13
TABLE 3: INFRASTRUCTURE AND PROJECT ACTIVITIES .....	13
TABLE 4: SITE INVESTIGATION DETAILS .....	18
TABLE 5: HERITAGE SIGNIFICANCE AND FIELD RATINGS.....	21
TABLE 6. SELECTED STUDIES CONDUCTED IN THE GREATER AREA. ....	24
TABLE 7. SITES RECORDED IN THE STUDY AREA. ....	32
TABLE 8. IMPACT ASSESSMENT FOR ISOLATED FINDS (AG001, AG002, AG003, AG006, AG007, AG008, AG011, AG012, AG013, AG015, AG016, AG017, AG018, AG020, AG021, AG022, AG023, AG025, AG026, AG029) .....	55
TABLE 9. IMPACT ASSESSMENT FOR CEMETERIES (AG010, AG014).....	56
TABLE 10. IMPACT ASSESSMENT FOR HIGH SIGNIFICANCE STONE AGE SITES (AG009, AG019, AG024, AG027, AG028) .....	56
TABLE 12. IMPACT ASSESSMENT FOR HISTORICAL KRAAL (AG005) .....	57
TABLE 13. MONITORING REQUIREMENTS FOR THE PROJECT .....	61
TABLE 14. HERITAGE MANAGEMENT PLAN FOR EMPR IMPLEMENTATION .....	62

**ABBREVIATIONS**

ASAPA: Association of South African Professional Archaeologists
BGG Burial Ground and Graves
CFPs: Chance Find Procedures
CMP: Conservation Management Plan
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
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)

Early 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 and Terms of Reference:

Beyond Heritage was appointed to conduct a Heritage Impact Assessment (HIA) for the proposed Red Sands Wind and Solar Facility development. The project is located on the remaining extent of the farm Donkerduispraat 95 (Portion of this will be for solar), the remaining extent of the farm Rooi Duin 101, the remaining extent of the farm Kliphakskeen 98, portion 1 of the farm Kliphakskeen 98, the remaining extent of the farm Kraalbosch Vlei 99, portion 1 of the farm Kraalbosch Vlei 99, Khâi-Ma Local Municipality, Northern Cape Province. The proposed project area is situated about 35km southwest of Aggeneys, and about 12km from the N14 highway heading towards Springbok (Figure 1.1 to 1.3). The report forms part of the Basic Assessment (BA) and Environmental Management Programme (EMPr) for the development.

The aim of the study is to survey the proposed development footprint to identify cultural heritage sites, document, and assess their importance within local, provincial, and national context. It serves to assess the impact of the proposed project on non-renewable heritage resources, and to 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. It is also conducted to protect, preserve, and develop such resources within the framework provided by the National Heritage Resources Act of 1999 (Act No 25 of 1999). 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, Stone Age sites and findspots were recorded as well as ruins and cemeteries. General site conditions and features on sites were recorded by means of photographs, GPS locations and site descriptions. Possible impacts were identified and mitigation measures are proposed in this report. The South African Heritage Resources Agency (SAHRA) as a commenting authority under section 38(8) of NHRA require all environmental documents, compiled in support of an Environmental Authorisation application as defined by NEMA EIA Regulations section 40 (1) and (2), to be submitted to SAHRA for commenting. 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).

### 1.1 Terms of Reference

#### Field study

Conduct a field study to: (a) locate, identify, 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 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 ASAPA.

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 the proposed Red Sands Wind and Solar Facility is outlined under Table 2 and 3.

**Table 2: Project Description**

<b>Farm and Magisterial District</b>	The proposed project is located on the following farms: Remaining Extent of the Farm Donkerduispraat 95 (Portion of this will be for solar), Remaining Extent of the Farm Rooi Duin 101, Remaining Extent of the Farm Kliphakskeen 98, Portion 1 of the Farm Kliphakskeen 98, Remaining Extent of the Farm Kraalbosch Vlei 99, Portion 1 of the Farm Kraalbosch Vlei 99, in the Khâi-Ma Local Municipality
<b>Central co-ordinate of the development</b>	Property co-ordinates: -29°34'44.11" South; 18°41'20.29" East
<b>Topographic Map Number</b>	2918 BC, BD, DA & DB

**Table 3: Infrastructure and project activities**

<b>Type of development</b>	Wind and Solar Facility
<b>Size of development</b>	28 000 hectares
<b>Project Details</b>	
<p>The Red Sands WEF and SEF will consist of a total of 192 wind turbines with a generation capacity of up to 7.5 MW per turbine. Each turbine will have a hub height of up to 150m and a rotor diameter of up to 175m. Two solar facilities on a portion of the farm Donkerduispraat 95 are proposed with a combined capacity of 480MW.</p> <p>Additional ancillary infrastructure would include underground and above-ground cabling between project components, onsite substation/s, Battery Energy Storage Systems (BESS), foundations to support turbine towers, internal/ access roads linking the wind turbines and other infrastructure on the site, and permanent workshop area and office for control, maintenance and storage. A formal laydown area for the construction period, containing a temporary maintenance and storage building along with a guard cabin</p>	

## 1.3 Alternatives

No alternatives were provided for assessment. The extent of the area assessed allows for siting of the development within this area to minimize impacts to heritage resources.

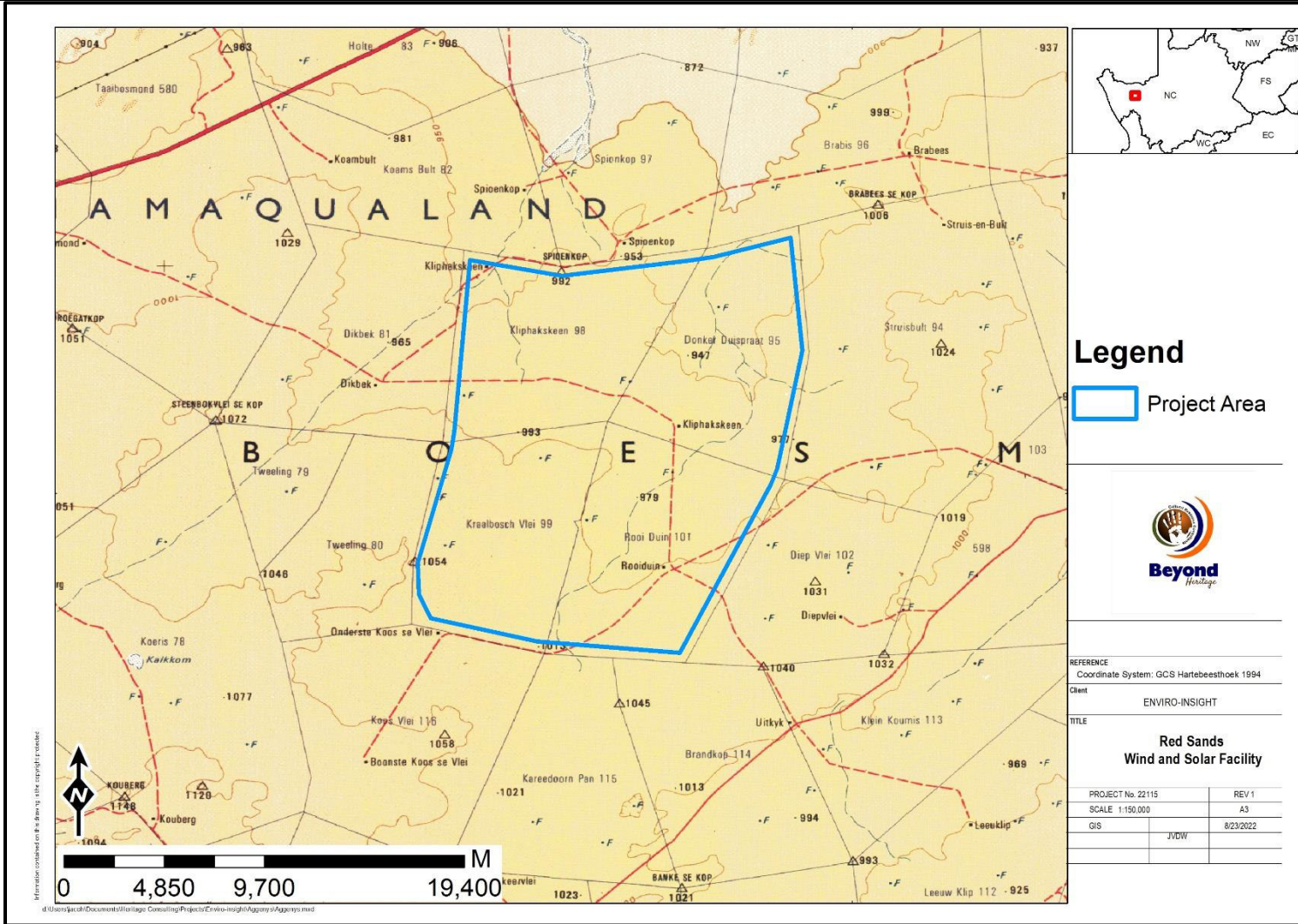


Figure 1.1. Regional setting of the Project (1: 250 000 topographical map).



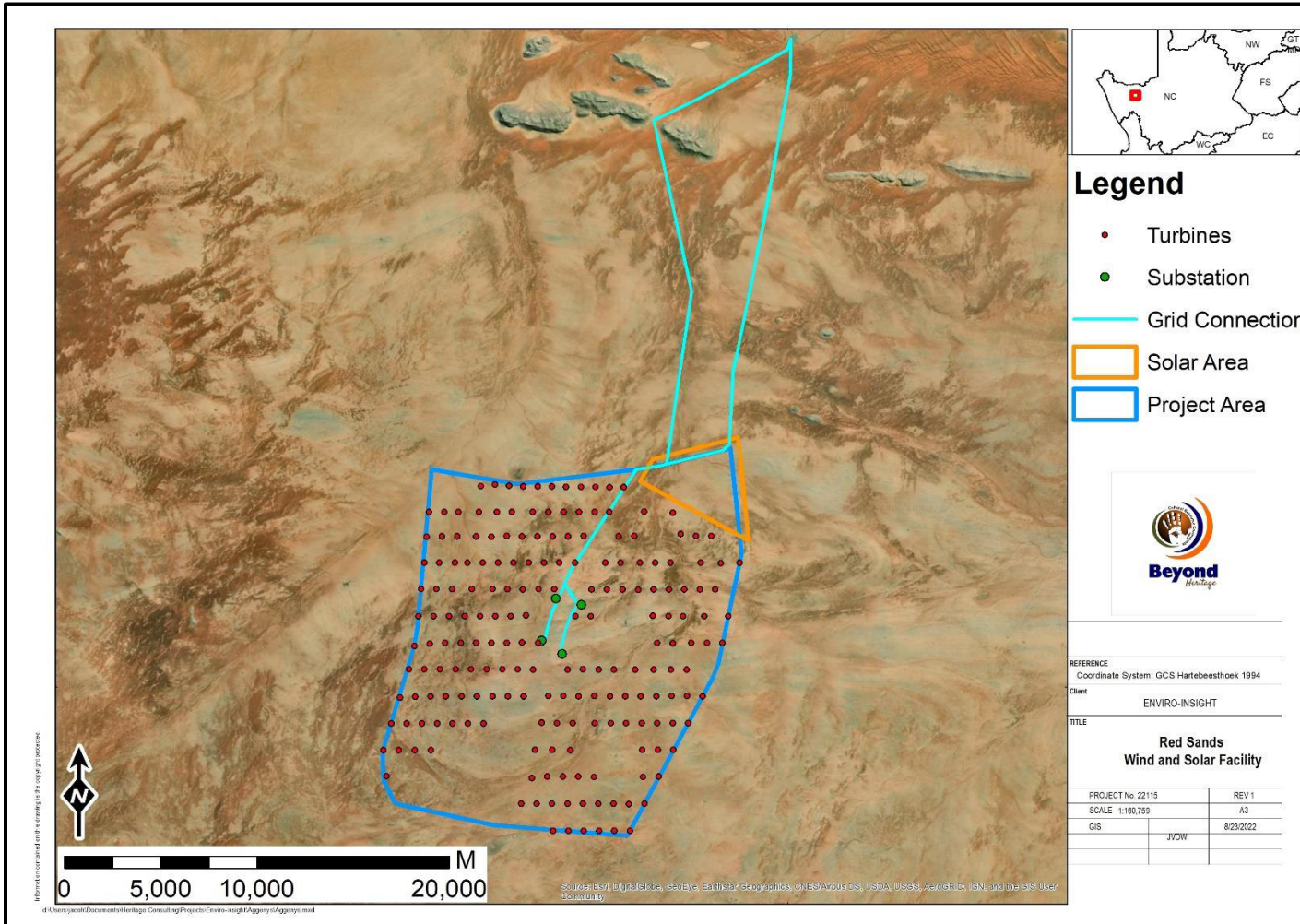


Figure 1.2. Aerial image of the Project components. The grid connection will form part of a separate environmental application and is not assessed here.

## 2 Legislative Requirements

The HIA, as a specialist sub-section of 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;
- Establish heritage informants/constraints to guide the development process through establishing thresholds of impact significance;
- 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 EMP, to the PHRA if established in the province or to 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 EMP, 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.

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 HIA's 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. Relevant conservation or Phase 2 mitigation recommendations should be made. Recommendations are subject to evaluation by SAHRA.

Conservation or Phase 2 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. Graves older than 60 years, but younger than 100 years fall under Section 36 of Act 25 of 1999 (National Heritage Resources Act), as well as the Human Tissues Act (Act 65 of 1983) 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), as well as the Human Tissues Act (Act 65 of 1983) 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. This function is usually delegated to the Provincial MEC for Local Government and Planning; or in some cases, the MEC for Housing and Welfare. 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 Section 24 of Act 65 of 1983 (Human Tissues Act).

### 3 METHODOLOGY

#### 3.1 Literature Review

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).

#### 3.2 Genealogical Society and Google Earth Monuments

Google Earth and 1:50 000 maps of the area were utilised to identify possible places where sites of heritage significance might be located; these locations were marked and visited during the fieldwork phase. The database of the Genealogical Society was consulted to collect data on any known graves in the area.

#### 3.3 Public Consultation and Stakeholder Engagement:

Stakeholder engagement is a key component of any BA 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.

### 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;
- 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**

	<b>Site Investigation</b>
Date	11 July 2022
Season	Winter – The time of year and season did not influence the survey as vegetation cover is low and heritage visibility high within the Project area marked by flat topography. This gave a wide field of visibility across the surrounding environment and the Project area was sufficiently covered to understand the heritage character of the area (Figure 3.1).

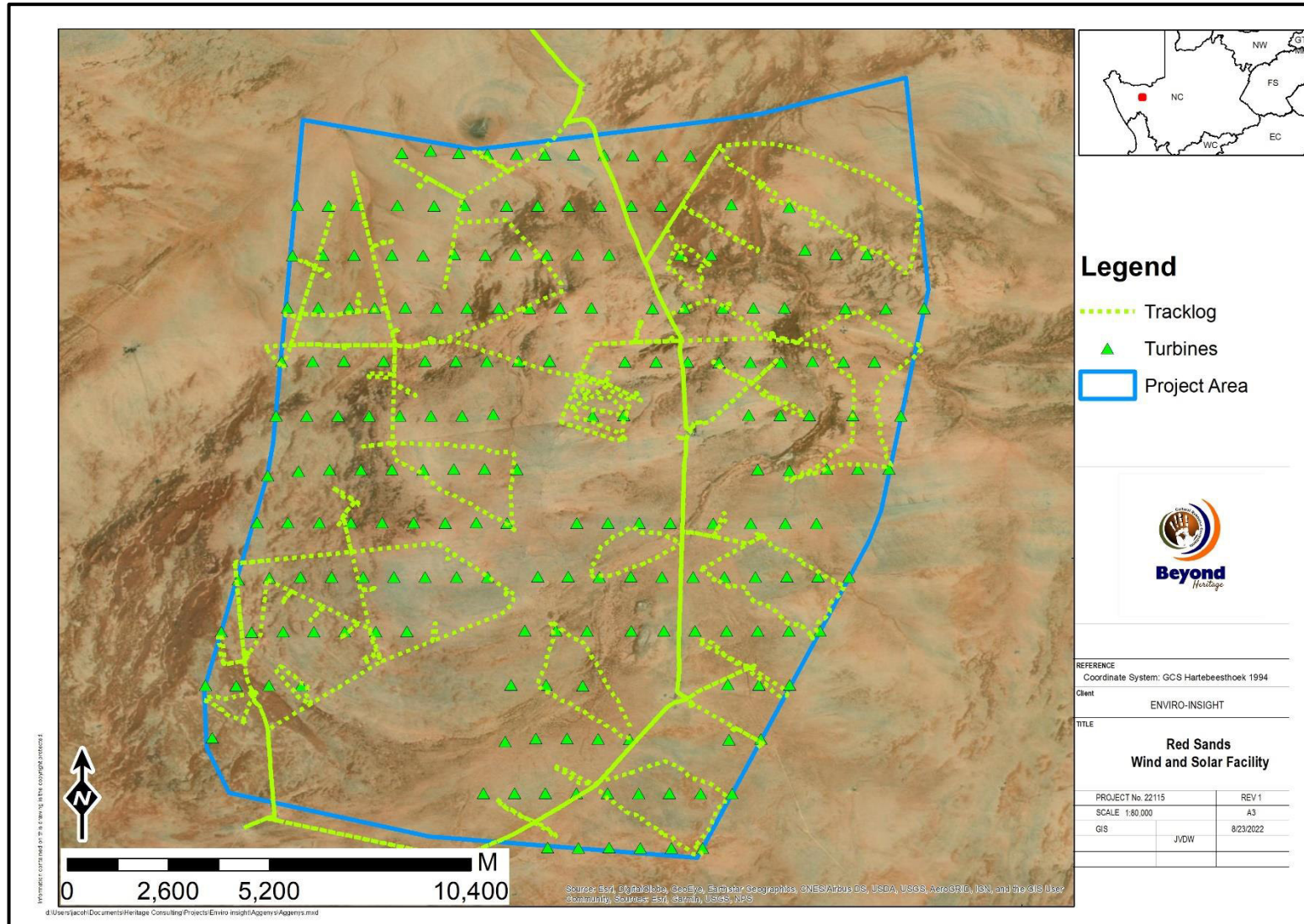


Figure 3.1. Tracklog of the survey path in green.

### 3.5 Site Significance and Field Rating

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.

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 prescribed by SAHRA (2007), and acknowledged by ASAPA for the SADC region, were used for the purpose of this report. The recommendations for each site should be read in conjunction with section 10 of this report.

**Table 5: Heritage significance and field ratings**

<b><i>FIELD RATING</i></b>	<b><i>GRADE</i></b>	<b><i>SIGNIFICANCE</i></b>	<b><i>RECOMMENDED MITIGATION</i></b>
National Significance (NS)	Grade 1	-	Conservation; national site nomination
Provincial Significance (PS)	Grade 2	-	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.C)	-	Low significance	Destruction

### 3.6 Impact Assessment Methodology

The criteria below are used to establish the impact rating on sites:

- The **nature**, which shall include a description of what causes the effect, what will be affected and how it will be affected.
- The **extent**, wherein it will be indicated whether the impact will be local (limited to the immediate area or site of development) or regional, and a value between 1 and 5 will be assigned as appropriate (with 1 being low and 5 being high):
- The **duration**, wherein it will be indicated whether:
  - \* the lifetime of the impact will be of a very short duration (0-1 years), assigned a score of 1;
  - \* the lifetime of the impact will be of a short duration (2-5 years), assigned a score of 2;
  - \* medium-term (5-15 years), assigned a score of 3;
  - \* long term (> 15 years), assigned a score of 4; or
  - \* permanent, assigned a score of 5;
- The **magnitude**, quantified on a scale from 0-10 where; 0 is small and will have no effect on the environment, 2 is minor and will not result in an impact on processes, 4 is low and will cause a slight impact on processes, 6 is moderate and will result in processes continuing but in a modified way, 8 is high (processes are altered to the extent that they temporarily cease), and 10 is very high and results in complete destruction of patterns and permanent cessation of processes.
- The **probability of occurrence**, which shall describe the likelihood of the impact actually occurring. Probability will be estimated on a scale of 1-5 where; 1 is very improbable (probably will not happen), 2 is improbable (some possibility, but low likelihood), 3 is probable (distinct possibility), 4 is highly probable (most likely) and 5 is definite (impact will occur regardless of any prevention measures).
- The **significance**, which shall be determined through a synthesis of the characteristics described above and can be assessed as low, medium or high; and
- the **status**, which will be described as either positive, negative or neutral.
- the degree to which the impact can be reversed.
- the degree to which the impact may cause irreplaceable loss of resources.
- the *degree* to which the impact can be mitigated.



The **significance** is calculated by combining the criteria in the following formula:

$$S = (E + D + M) P$$

S = Significance weighting

E = Extent

D = Duration

M = Magnitude

P = Probability

The **significance weightings** for each potential impact are as follows:

- < 30 points: Low (i.e., where this impact would not have a direct influence on the decision to develop in the area),
- 30-60 points: Medium (i.e., where the impact could influence the decision to develop in the area unless it is effectively mitigated),
- 60 points: High (i.e., where the impact must have an influence on the decision process to develop in the area).

### 3.7 Limitations and Constraints of the study

The authors acknowledge that the brief literature review is not exhaustive on 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 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. 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 Census 2011, the Khâi-Ma Municipality has a total population of 12 465 people, of which 75,1% are coloured, 17,6% are black African, and 6,0% are white. Other groups make up 0,4% of the population. Of those aged 20 years and older, 46,3% have some secondary schooling, 17,5% have some primary schooling, 18,1 % completed Grade 12/matric, 5 8% have some higher education, 8,4% completed some primary schooling and 3,9% of this municipality have no schooling. Of the 5904 economically active people (employed and unemployed but looking for work), 22,1% are unemployed. 322 are classified as discouraged work-seekers. Of the youth (aged 15 – 34), 2 511 are employed, 776 are unemployed, 192 are classified as discouraged work-seekers, and 1 109 are not economically active. The unemployment rate for the youth is 23,6%.

## 5 Results of Public Consultation and Stakeholder Engagement:

### 5.1.1 Stakeholder Identification

Adjacent landowners and the public at large were informed of the proposed activity as part of the BA process by the EAP. Site notices and advertisements notifying interested and affected parties were placed at strategic points and in local newspapers as part of the process. No heritage concerns have been raised thus far.

## 6 Contextualising the study area:

### 6.1 Literature Review (SAHRIS)

The area under investigation was not previously assessed and few HIA's was conducted in the immediate area. Studies conducted in the general area that were consulted is listed in Table 6.

**Table 6. Selected studies conducted in the greater area.**

Author	Year	Project	Findings
Orton, J.	2015	Final Archaeological Survey for the Proposed Aggeneys Solar Energy Facility, Namakwaland Magisterial District, Northern Cape.	Stone Age scatters, lower grinding stone, historical glass fragments
Van der Walt, J.	2019	Heritage Impact Assessment for the Aroams Mining Right Application, Northern Cape Province.	Isolated Stone Age artefacts
Webley, L., & Halkett, D.	2012	Heritage Impact Assessment: Proposed Aggeneys Photo-voltaic Solar Power Plant on Portion 1 of the Farm Aroams 57, Northern Cape Province.	Middle Stone Age scatters, stone cairns.
Morris, D.	2011	Black Mountain Concentrated Solar Power Facility Development at Aggeneys, Northern Cape.	Stone Age artefacts, ostrich eggshell fragments
Orton, J., & Webley, L.	2013	Heritage Impact Assessment for the Proposed Namies Wind Energy Facility Near Aggeneys, Northern Cape.	Stone Age artefacts, pottery, ostrich eggshell fragments, historical artefacts and historical ruins, graves.
Morris, D., Henderson, A.	2019	Heritage Impact Assessment for the Proposed Extension of Swartberg Mine on Black Mountain Mine, Aggeneys, Northern Cape Province.	Stone Age artefacts, ostrich eggshell fragments, cupules, pottery, historical ruins
Morris, D.	2017	Amendment of the Final Heritage Impact Assessment for the Proposed Aggeneis – Paulputs 400kV Transmission Powerline and Substations Upgrade, Northern Cape.	Stone Age scatters, ostrich eggshell fragments. Pottery, stone-walled kraals, early 20th century farm structures, grinding grooves on bedrock

#### 6.1.1 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.

### 6.2 Archaeological Background

The archaeological record for the greater study area consists of Stone Age sites with some occurrences of historical occupation. A brief outline of the South African heritage chronology is illustrated in Figure 6.1.

## South Africa: A short chronology

**Early Stone Age: 2 million - 250 000 BP.** Hominins producing core and pebble tools, later stages includes handaxes and blades.

**Middle Stone Age: 250 000 - 40 000 / 25 000 BP.** *Homo Sapiens*. Prepared core techniques, formal tools, points, scrapers and backed artefacts. Occasionally includes bone points and ostrich eggshell fragments and grindstones.

**Later Stone Age: 40 000 - 100 BP.** Wide range of formal microlithic tools. Ostrich eggshell fragments, beads, rock art.

**Ceramic Final Later Stone Age: 2000 BP.** Wide range of formal microlithic tools, with thin-walled pottery, with some sites having faunal remains of ovicaprids.

**Early Iron Age: 200 - 900 CE.** Arrival of Bantu-speaking farmers who lived in sedentary settlements often located next to rivers. They kept livestock, cultivated sorghum, beans and cowpeas. Introduced metallurgy to the region and manufactured thick-walled pottery.

**Middle Iron Age: 900 - 1300 CE.** Confined to the modern-day Limpopo Province, and associated with early state formation, such as Mapungubwe and associated sites.

**Late Iron Age: 1300 - 1840 CE.** Marks the arrival of ancestral Eastern Bantu-speaking Nguni and Sotho-Tswana communities. Settlements are often located on or near hilltops for defensive purposes. The Iron Age as an archaeological period ends with the Mfecane, 1820s to 1840s CE. An event that caused major socio-political upheaval.

### Historic events

1652: Dutch East India Company establishes refreshment station at modern-day Cape Town.

1658: First slave ships arrive at Table Bay.

1660 - 1793: Various armed conflicts between Khoisan and Europeans, several frontier wars between Europeans, Khoisan and Xhosa communities.

1795 - 1807: First British occupation of the Cape, the Dutch East India Company collapses, and slave trade is abolished.

1808 - 1820: Several frontier wars and first British Settlers arrive.

1820 - 1840: Onset of the Mfecane, abolishment of slavery and slaves are freed at the Cape. Dutch farmers started to migrate towards the interior of South Africa, what will become known as the 'Great Trek'.

1860 - 1880: Discovery of mineral wealth, diamonds and gold. Establishment of the Zuid-Afrikaansche Republiek (ZAR).

1899 - 1902: The South African War.

1910 - 1945: Unification of South Africa, formation of the ANC, World War I and World War II.

BP - Before Present  
CE - Common Era

Figure 6.1. Summary of archaeological and historical events in South Africa.

The Stone Age is divided into the Early; Middle and Late Stone Age. It refers to the earliest period of occupation of South Africa when people mainly relied on stone for their tools.

**Earlier Stone Age (ESA):** The period from  $\pm 2.5$  million yrs. -  $\pm 250\ 000$  yrs. ago. The Early Stone Age in southern Africa is defined by the Oldowan complex, primarily found at the sites Sterkfontein, Swartkrans and Kromdraai, situated within the Cradle of Humankind, just outside Johannesburg (Kuman, 1998). Within this complex, tools are more casual and expediently made and tools consist of rough cobble cores and simple flakes. The flakes were used for such activities as skinning and cutting meat from scavenged animals.

**Middle Stone Age (MSA):** The Middle Stone Age includes various lithic industries in SA dating from  $\pm 250\ 000$  yrs. –  $25\ 000$  yrs. before present. This period is first associated with archaic *Homo sapiens* and later *Homo sapiens sapiens*. Material culture includes stone tools with prepared platforms and stone tools attached to handles.

**Later Stone Age (LSA):** The period from  $\pm 25\ 000$ -yrs before present to the period of contact with either Iron Age farmers or European colonists. This period is associated with *Homo sapiens sapiens*. Material culture from this period includes: microlithic stone tools; ostrich eggshell beads and rock art. Sites located in the open are usually poorly preserved and therefore have less value than sites in caves or rock shelters.

The study area and its surroundings have not undergone extensive research apart from development funded heritage surveys conducted in nearby areas. The landscape is rich in Stone Age sites and associated artefacts found scattered in many areas. Beaumont et al. (1995) have noted that there is a low-density background scatter of artefacts throughout Bushmanland. In the Aggeneys area, however, this scatter tends to be quite ephemeral. Several other surveys in the region support this distribution of archaeological materials (Morris 2011a; 2011b; 2013, Orton 2015; 2016, Webley & Halkett 2012). Within the Gamsberg Inselberg, however, scatters of Early Stone Age (ESA) artefacts have been recorded in open, often eroding areas (Morris 2010; Orton 2014). Surveys conducted by Morris (2010), in Gamsberg identified two ESA production sites with Acheulean stone tools, an MSA factory site, as well as a site with occupation from the ESA to MSA, all of which have been identified as being of high significance. Morris (2010) located bedrock exposures with fissures that trap water after rain 3.5 km to the southwest of the study area and just north of the N14, while further examples were reported from the area to the south of Aggeneys (Morris 2013). The rocks bear grinding hollows with associated scatters of stone artefacts, pottery and ostrich eggshell located around them. To the west of Aggeneys, Orton (2016) found a very large bedrock outcrop with a pool of water collected at a low point and many grinding grooves and artefact scatters around it. Similar fissures and artefacts were identified during this survey within the project footprint.

Just east of Aggeneys, Webley and Halkett (2012), examined an area to the north of the N14 and recorded many isolated artefacts with a few occurrences of light quartz and quartzite artefact scatters. Orton (2015), worked in the same area and located an isolated heavily used, grooved double-sided lower grindstone. Morris's (2011b) nearby survey found only a small number of isolated quartz artefacts.

The region was widely occupied by Khoi herders as well as San hunter-gatherers from the Later Stone Age with traces of occupation until Historical periods. Preserved rock engravings associated with these groups can be found at various sites along the Orange River. Morris (2011b), notes the presence of a rock painting on a boulder at Aggeneys. The painting is a finger painting likely associated with the Khoekhoen. Similar art is found on granite outcrops throughout Namaqualand but in very low densities (Orton 2013). A small finger-painted image also lies within the Gamsberg Inselberg to the south of the study area and N14 (Morris 2010, Orton 2014). Neither of these sites has any associated archaeological deposits but a small rock shelter high on Gamsberg has been excavated and found to contain a deposit some 30 cm deep (Orton

2014). Sites with deep deposits are incredibly rare in Bushmanland and excavations at this site were never completed and as such the deposit has not been dated.

### 6.3 Historical Information

Because it lies so far from the original Cape Colony (i.e. Cape Town), northern Bushmanland was colonised quite late with most farms only surveyed and granted in the very late 19th or even early 20th centuries. As a result, very few historical structures and features exist on the landscape. The majority of buildings date to the early-mid-20th century and tend to be of low or no heritage significance. Surveys conducted around the area have identified some historical ruins and graves but there is a lack of significant Historical sites within the area.

The town of Aggeneys was established in 1976 in order to supplement facilities such as housing and infrastructure for the Black Mountain Mine, situated west of Aggeneys. The Black Mountain Mine has been in operation since 1980 and mines copper, lead, zinc, with the by-product of silver. Morris (2010) has summarised the colonial history of this frontier zone in his reports for the Aggeneys and Gamsberg areas and the reader is referred to this report for more detail.

## 7 Description of the Physical Environment

The study area is classified as Bushmanland Sandy Grassland which is characterised by dense, sandy grassland plains with dominating white grasses (*Stipagrostis*, *Schmidtia*) and abundant drought-resistant shrubs. After rainy winters rich displays of ephemeral spring flora (*Grielum humifusum*, *Gazania lichtensteinii*) can occur. The study area is covered in a thick reddish Aeolian sand layer that caps a subsurface calcrete layer in some areas. The flat landscape is only broken by gradually elevated areas where the calcrete is closer to the surface. These elevated areas are still fairly flat. A few rocky outcrops also occur as well as some dunes. There are no trees situated on the landscape with the exception of small trees around water points such as wind pumps. Apart from windpumps and fences very little in terms of infrastructure occur, the only other feature is sparsely scattered farmsteads often linked with telephone lines some of which is historical. General site conditions are illustrated in Figures 7.1 to 7.8.



Figure 7.1. General site conditions - Deep layer of Aeolian sand covering most of the landscape.



Figure 7.2. Exposed calcrete layers.



Figure 7.3. Sandy plains with grass cover.



Figure 7.4. General view of the landscape showing the lack of major topographical features.



Figure 7.5. Cast iron telephone poles.

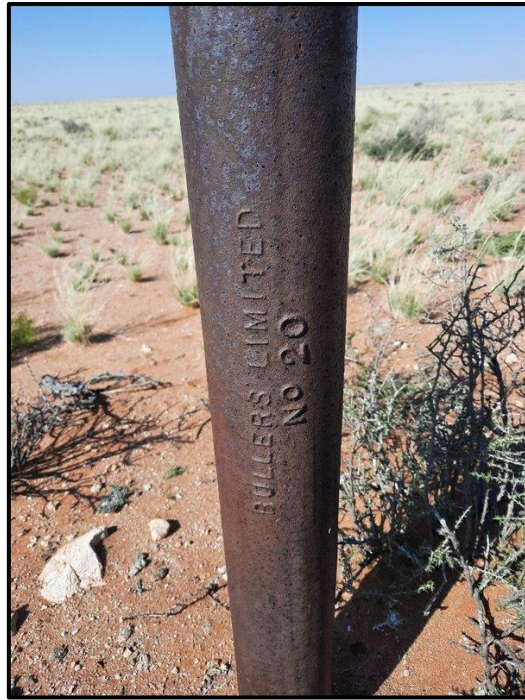


Figure 7.6. Bullers Limited cast iron telephone poles.



Figure 7.7. Farmstead at Donkerduispraat



Figure 7.8. Farmstead at Rooi Duin.

## 8 Heritage Baseline

### 8.1 Heritage Resources

The landscape setting in which the project is located consist of four topographical features with varying levels of heritage potential as outlined below:

- Flat grassy plains with red sandy soils that is of low heritage potential;
- Rocky outcrops named inselbergs and granite outcrops that is of high heritage potential;
- Red sand dunes that are of medium to high heritage potential; and
- Pans, seasonal water holes or fissures that holds water after the rains that is of high heritage potential.

The survey aimed to verify these sensitivities and, in the process, to cover as much of the current layout. The findings of the assessment confirmed the expectations of heritage sensitive areas as outlined above and is in line with findings made by (Beaumont *et al.* 1995, Morris 201a, b,c and Pelser 2011). Numerous archaeological sites were identified at these topographical focal points and the distribution of sites is spatially illustrated in Figure 8.1. Significant sites are all located within environmental no go areas and will be preserved *in-situ* except for site AG009. This site will however also not be impacted on by the current layout. Findings of the survey include Stone Age material dating from the ESA to the LSA, two small cemeteries, a historical kraal, and isolated historical material like lead sealed cans and glass bottles. Most of the stone tool finds are isolated occurrences or areas with a very low density of artefacts and were recorded as Find spots as these locations does not constitute an archaeological site. Distinct archaeological sites were however recorded marked by LSA lithics, pottery, ostrich eggshell fragments (OES), and grinding hollows. These sites are located at rock outcrops where fissures retains seasonal water after the rains.

The recorded observations were numbered sequentially with the prefix AG for Aggeneys. General site conditions, and selected features are illustrated in Figure 8.2 – 8.46. Recorded observations are briefly described in Table 7.



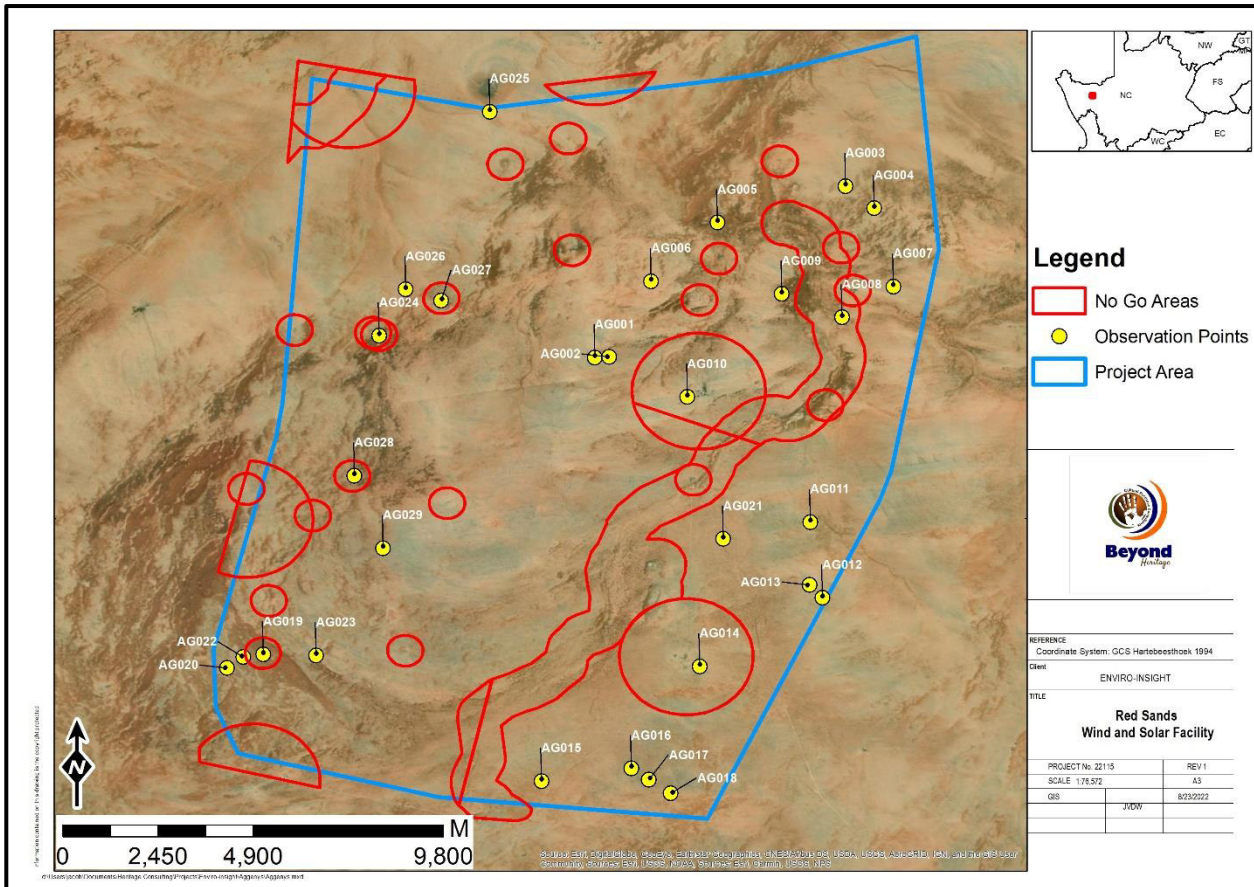


Figure 8.1. Site distribution in relation to environmental no go areas. Several of the high significant sites also fall into these areas and as a result will be preserved in-situ.

Table 7. Sites recorded in the study area.

Label	Location	Type Site	Description	Significance and Field Rating	Located in a No Go area?
AG001	-29.5624952, 18.6986142	Find spot	Low-density scatter of artefacts scattered over a wide area. Some fragments of Ostrich eggshell were also identified but could not be verified as anthropogenic. Artefacts are exposed where calcrete protrudes through the mantle of sand cover. Raw material is predominantly on CCS, quartz and igneous material. Artefacts have faceted striking platforms and are classified as MSA with broken blades and flakes with a single ESA/MSA bifacial handaxe	Low Generally protected (CP.C)	- C
AG002	-29.5626049, 18.701924	Find spot	Isolated core on CCS possibly dating to the LSA, exposed where calcrete protrudes through the mantle of sand cover.	Low Generally protected (CP.C)	- C
AG003	-29.5231069, 18.7567196	Find spot	Isolated chunk on quartz with fragments of Ostrich eggshell that could not be verified as anthropogenic. Located on sandy plain.	Low Generally protected (CP.C)	- C
AG004	-29.5281998, 18.7633456	LSA site	The area is small measuring ~5 x 5m in size marked by a small granite outcrop situated on the open plains. The outcropping is unique for the immediate area and is visible from a fair distance away from the site. No water was visible at the site, however various artefacts were identified scattered around the outcrop. These included undiagnostic ceramics, LSA flakes and blades , OES fragments, bone fragments as well as metal cans. The artefact ratio of the site is <5	Medium Generally Protected (GP. A)	- A

			artefacts p.m <sup>2</sup> but more could be covered by sand.		
AG005	-29.5315607, 18.7271336	Historical kraal	Small stone packed kraal with another small stone foundation nearby. This could have been a herder camp. Various metal and glass artefacts are scattered across the immediate area. The stone features are built from locally available calcrete.	Medium - Generally Protected (GP. B) B	
AG006	-29.5451606, 18.7115082	Find spot	Isolated flake on quartzite located on open plains.	Low - Generally protected (CP.C) C	
AG007	-29.546315, 18.7677046	Find spot	Isolated MSA flake on open plains.	Low - Generally protected (CP.C) C	
AG008	-29.55728, 18.759298	Find spot	Highly weathered flake possibly ESA/ MSA located on open plains.	Low - Generally protected (CP.C) C	Yes
AG009	-29.5480096, 18.7420181	Stone Age site	The site is 50 x 50m in size and is characterised by a large granite outcrop that holds seasonal water. Multiple grinding hollows are scattered across the rock surface. High densities of LSA lithics are found scattered around the granite outcrop with OES fragments.	High - Local significance (LS) Grade 3B	
AG010	-29.571861, 18.7201284	Cemetery	Small fenced off cemetery that is 10 x 10m in size, located near the Donkerduispraat farmstead. The cemetery contains two graves with granite skirting and headstones.	High social Significance	Yes
AG011	-29.6008432, 18.7486808	Find spot	Isolated MSA flake on open plains.	Low - Generally protected (CP.C) C	
AG012	-29.6183964, 18.7514	Find spot	Isolated chunk with two removals located on open plains.	Low - Generally protected (CP.C) C	
AG013	-29.6154323, 18.7484142	Find spot	Isolated MSA flake located on open plains.	Low - Generally protected (CP.C) C	

AG014	-29.6341235, 18.7237439	Modern cemetery	Small fenced off cemetery that is 10 x 5m in size located west of the Rooi Duin farmstead. The cemetery contains two graves with granite headstones and brick skirting.	High social Significance	Yes
AG015	-29.6607534, 18.6864051	Find spot	Low density of lithics in a deflated context with MSA and LSA on CCS and quartz	Low - Generally protected (CP.C)	C
AG016	-29.6578082, 18.70703	Find spot	Highly weathered miscellaneous flake	Low - Generally protected (CP.C)	C
AG017	-29.6604165, 18.7112451	Find spot	Isolated MSA flake located on open plains.	Low - Generally protected (CP.C)	C
AG018	-29.6641359, 18.7159622	Stone Age site	MSA lithics with a possible LSA component are scattered over an area of ~20 x 20m. The artefacts are in a deflated context located on the open plains where calcrete is exposed. The site has an artefact ratio of ~2 artefacts p.m <sup>2</sup> . MSA are represented by points, chunks with blade removals and flakes with faceted platforms. Small flakes on CCS could be LSA based on their size	Low- Generally Protected (GP.C) - Low significance	C
AG019	-29.6314678, 18.6219957	Later Stone Age site	The site measures ~80 x 50m in size and consists of large granite outcropping with a large seasonal pan. The majority of lithics is typologically ascribed to the LSA but a couple of lithics date to the MSA. The LSA component is further marked by. OES fragments and undiagnostic ceramic sherds. Multiple grinding hollows were also identified scattered across the granite surface. Some historical glass fragments and bullet casings were noted. The site has an	High - Local Significance (LS) Grade 3B	Yes

			artefact ratio of <15 artefacts p.m <sup>2</sup> .		
AG020	-29.6346239, 18.6136003	Find spot	Isolated lithic artefact located on a large open landscape. The landscape is characterised by sandy soil and small calcrete stones scattered across the area.	Low Generally protected (CP.C)	- C
AG021	-29.6047379, 18.7284253	Find spot	Low density scatter of miscellaneous lithics scattered over an area of 20 x 20m with some OES fragments. It is unknown if these are anthropogenic. Based on the size of the lithics and the association with OES could possibly date to the LSA. The findspot is situated on the vast open plains with no rocky outcrops nearby. The artefacts are exposed where the calcrete protrudes through the sand cover. Artefact ratio ~2 artefacts p.m <sup>2</sup> .	Generally Protected (GP.C) - Low significance	C
AG022	-29.6324051, 18.6139845	Find spot	A small collection of low-density scatter of artefacts consisting of miscellaneous flakes on quartz and based on the size of artefacts probably date to the LSA.	Low Generally protected (CP.C)	- C
AG023	-29.6317307, 18.6342805	Find spot.	Isolated finds dating to the MSA. Artefacts consist of a chunk with a blade removal and a radial core on quartzite.	Low Generally protected (CP.C)	- C
AG024	-29.5576644, 18.648775	LSA site with MSA component	Two granite outcrops occur here, the one smaller than the other. Notable finds date to the LSA with grinding hollows and lithics. Artefact ratio is <5 artefacts. p.m <sup>2</sup> . The site forms part of a larger series of granite outcrops that all have signs of human occupation. Occasional MSA flakes on quartzite is found here.	High - Local Significance (LS) Grade 3A	Yes
AG025	-29.5058857, 18.674374	Find spot	Isolated and weathered miscellaneous flake on igneous material	Low Generally protected (CP.C)	- C

AG026	-29.5472985, 18.6541449	Find spot	A small rocky outcrop containing a collection of lithic artefacts (lsa flakes on quartz and CCS) scattered over a wide area ~50 meters. This outcrop is not as pronounced as others with the rock surface barely visible above the sand.	Generally Protected C (GP.C) - Low significance	
AG027	-29.5495555, 18.6631271	LSA site with MSA component	The site measures ~ 60 x 50m in size and consists of a large granite outcrop situated on the flat plains. The outcrop contains water catchments on the rock surface. A large number of artefacts were identified scattered across the area. These included high density LSA material (mostly on quartz), OES fragments, undiagnostic ceramics and metal artefacts of a Historical nature with lead-sealed cans. Multiple grinding hollows were also identified scattered across the rock surface. Several MSA flakes (on igneous material) were also noted with faceted striking platforms. The site has an artefact ratio of <15 artefacts p.m <sup>2</sup> .	High - Local Significance (LS) Grade 3A	Yes
AG028	-29.5900252, 18.6429957	LSA site	The site is 30 x 30m in size and consists of small granite outcropping situated on a large open landscape. The outcropping contains an area where water collects on the stone surface or between the large granite boulders. A small collection of lithic artefacts was identified scattered across the area. Multiple grinding cupules were also identified on the rock surface of the outcropping. The site has an artefact ratio of <5 artefacts p.m <sup>2</sup> .	High - Local Significance (LS) Grade 3A	Yes
AG029	-29.6073926, 18.6468959	Find spot	Isolated MSA flake on the flat plains.	Low - Generally	

				protected (CP.C)	C	
--	--	--	--	---------------------	---	--



Figure 8.2. Small collection of ESA bifacial artefacts on the left and MSA broken blades and flake with OES fragments at AG001.



Figure 8.3. General site conditions typical at findspots on the flat plains where no focal points are located.



Figure 8.4. Small granite outcrop on grassy plains at AG004.



Figure 8.5. AG004 situated on a large open landscape with high visibility in all directions.





Figure 8.6. Undiagnostic ceramic sherds found at the rocky outcropping at AG004.



Figure 8.7. Dorsal and ventral view of LSA lithics at AG004.



Figure 8.8. OES fragments scattered across the immediate area at AG004.



Figure 8.9. Small bone fragment at AG004.



Figure 8.10. Rusted metal can, found at the rocky outcrop - Possibly historical at AG004.



Figure 8.11. Remains of a rectangular calcrete structure at AG005.



Figure 8.12. Remnants of a kraal near the small structure at AG005.



Figure 8.13. AG005 - Collection of metal and glass artefacts.



Figure 8.14. Collection of metal artefacts at AG005.



Figure 8.15. AG006 - Isolated quartzite flake.



Figure 8.16. AG008 - Isolated highly weathered artefact.



Figure 8.17. General site conditions of AG009 - Large granite outcrop that holds seasonal water.



Figure 8.18. AG009 - Grinding hollows.



Figure 8.19. Collection of LSA lithics at AG009. Some. OES fragments were also identified.



Figure 8.20. AG009 - Grinding hollows scattered over the the site.



Figure 8.21. AG010 - Small fenced off cemetery near the Donkerduispraat farmstead.

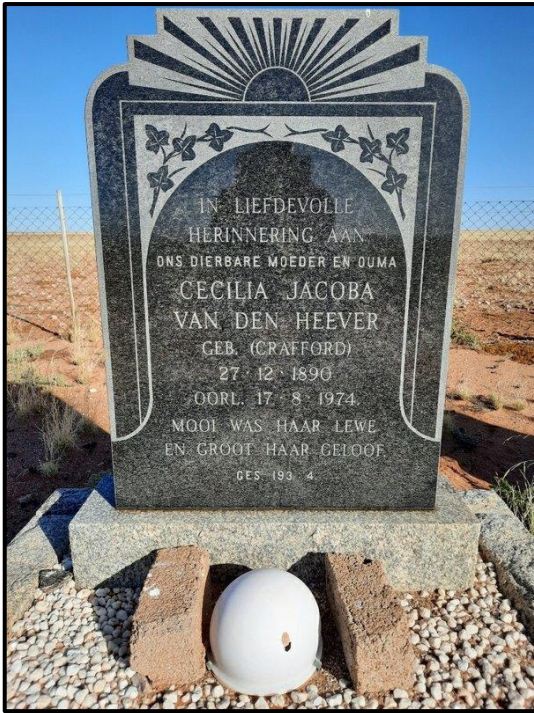


Figure 8.22. Grave one at AG010 - Cicilia Jacoba van der Heever 1974.

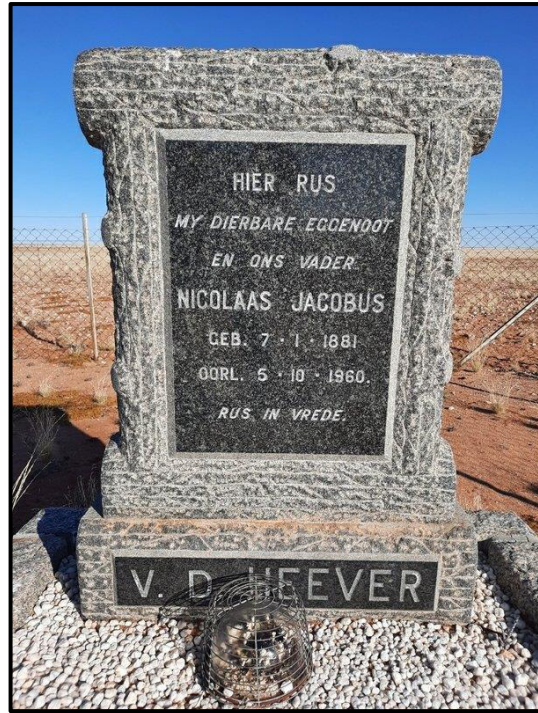


Figure 8.23. Grave two at AG010 - Nicolaas Jacobus van der Heever 1960



Figure 8.24. AG013 – Isolated lithic artefact.



Figure 8.25. General view of the small cemetery at AG014.

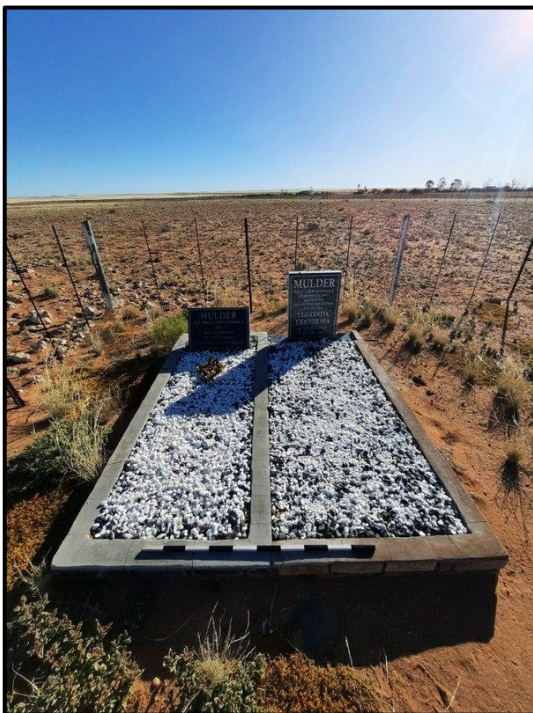


Figure 8.26. AG014 - Graves with granite headstones and brick skirting with a filled gravel cover.

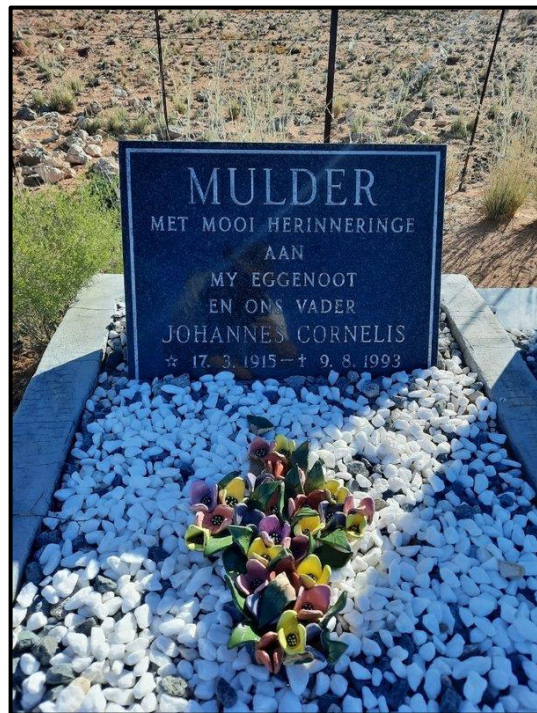


Figure 8.27. AG014 - Johannes Cornelis Mulder 1993.

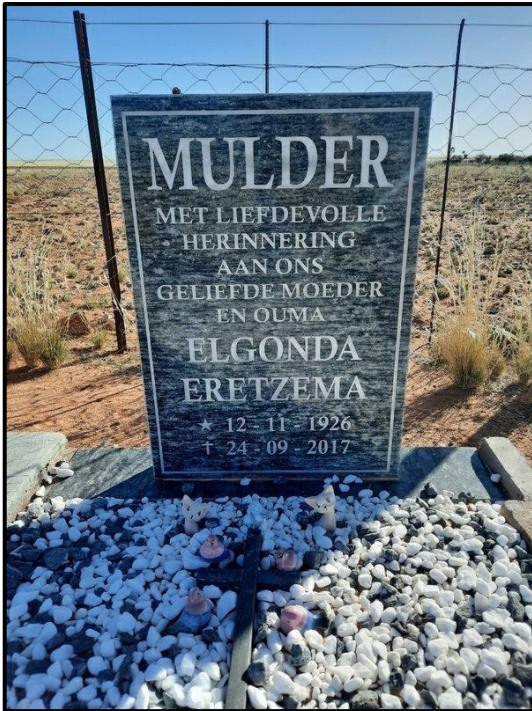


Figure 8.28. AG014 - Ergonda Eretzema Mulder 2017.



Figure 8.29. AG015 – Dorsal view of lithics.



Figure 8.30. AG018 - Collection of lithics showing a variety of raw material used.



Figure 8.31. General view of AG019 showing granite outcrop and seasonal pan.



Figure 8.32. Large amounts of OES fragments identified around the site at AG019.



Figure 8.33. Undiagnostic ceramic fragments identified at AG019.



Figure 8.34. Grinding hollows scattered across the stone surface at AG019.



Figure 8.35. Collection of lithic artefacts scattered across the outcropping at AG019.





Figure 8.36. Bullet casing at AG019.



Figure 8.37. Small collection of miscellaneous flakes along with some OES fragments at AG021.



Figure 8.38. AG024 – MSA flake.



Figure 8.39. AG024 - Grinding hollow.



Figure 8.40. Granite outcrop that holds seasonal water at AG024.



Figure 8.41. General site conditions at AG027 - Large rocky outcrop that holds seasonal water.



Figure 8.42. Grinding hollows scattered across the rock surface at AG027.



Figure 8.43. AG027 – Ceramic sherds.



Figure 8.44. AG027 – Dorsal and ventral view of MSA artefacts.



Figure 8.45. AG027 - Small collection of lithic artefacts.



**Figure 8.46.** AG027 - Collection of historical metal artefacts.

### 8.2 Cultural Landscape

The proposed project area is situated about 35km south west of Aggeneys, Northern Cape and about 12km from the N14 highway headed towards Springbok. The farms in the project area are mainly used for the farming of sheep and some cattle. A Cultural Landscape feature of significance in this area is the “Cultural Heritage of the Gamsberg”, which is located at ~ 32 km to the north of the Project. The area surrounding the Project has already been impacted on by mining at Black Mountain and Gamsberg with several solar and wind energy facilities between Gamsberg and Aggeneys.

### 8.3 Paleontological Heritage

According to the SAHRA Paleontological map, majority of the study area is of low paleontological significance, with some smaller areas of insignificant palaeontological sensitivity (Figure 8.121) and no further studies are required for this aspect.



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

## 9 Assessment of Impacts

Impacts to heritage resources without mitigation within the project footprint will be permanent and negative and occur during the pre-construction and construction activities. It is assumed that the pre-construction and construction phase involves the removal of topsoil and vegetation as well as the establishment of infrastructure. These activities can impact on heritage features and impacts include destruction or partial destruction of non-renewable heritage resources. Impacts during the operation phase is considered to affect the cultural landscape and sense of place.

Stone Age sites AG009, AG019, AG024, AG027, AG028 is of high significance and will not be directly impacted on by the proposed development. All of these sites are located within environmental no-go areas with a minimum buffer zone of ~ 250 meters that will facilitate their protection *in situ* (Figure 8.1). The only site located outside a no-go area is site AG009 but no tower or infrastructure is located closer than 200 meters from this site and no impact is expected on this site. Two cemeteries (AG010, AG014) of high social significance are also located in the environmental no-go area with a minimum buffer zone of ~ 250 meters (Figure 9.1 to 9.3).

Stone Age sites of medium significance AG004 & AG005 will also not be directly impacted on as Tower 30 is located ~170 from AG004 and tower 33 ~200 meters from the latter.

### 9.1.1 Nature of impacts

The main cause of impacts to archaeological resources is physical disturbance of the 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.

- Establishment of new roads and upgrade of existing roads;
- Excavations of foundations for the turbines at WEF;
- Flicker effect associated with rotating blades of the WEF towers on the surrounding landscape;
- Visual impact of the WEF towers on the landscape and sense of place;
- Establishment of laydown areas;
- Excavation and levelling of the PV facility footprint;
- Trenches for cables and erection of powerlines;
- Excavations during construction of the sub stations;

The best way to mitigate impacts to the recorded sites is through avoidance. On the current layout no sites of significance will be impacted on, and it is unlikely that any major impact will manifest.

### 9.1.2 Extent and duration of impacts

Some of the recorded archaeological sites, date to the ceramic final Later Stone Age associated with hunters-gatherers or herders dating to ~< 2 thousand years. These sites could be associated with the potential importance of the Gamberg site to the north that was likely a massacre site of local hunter-gatherers and was alluded to include the site in a potential /Xam and Khomani Heartlan World Heritage Site (Morris 2010 & 2013). The extent of impacts to these sites are therefore expected to be regional. Due to the non-renewable nature of heritage resources impacts are negative, irreversible and permanent.

### 9.1.3 Magnitude of Impacts

As stated, the destruction of cultural resources is considered to be negative and if any sites are impacted on the magnitude is moderate; however opportunities for the advancement of science and knowledge about

who occupied the area exists if the sites are impacted on and subjected to Phase 2 mitigation that will result in the magnitude being low.

**9.1.4 Probability of Impacts**

It is unlikely that any of the significant sites will be impacted on by the Project (Figure 9.1 to 9.3). Any additional effects to previously unknown heritage resources can be successfully mitigated by implementing a Chance Find Procedure as outlined under Section 10.2

**9.1.5 Cumulative impacts**

The cumulative impact on the area is increasing, this is the result of the expansion of renewable energy facilities. Impacts are also indirect where the sense of place have been altered at these sites. In the case of this Project, adjacent areas are marked by renewable energy facilities. As such, it is not anticipated that the Project will have a high negative cumulative impact on the broader landscape which is already dominated by WEF. The fact that sites of high significance are preserved further mitigate the cumulative impacts of the current Project.

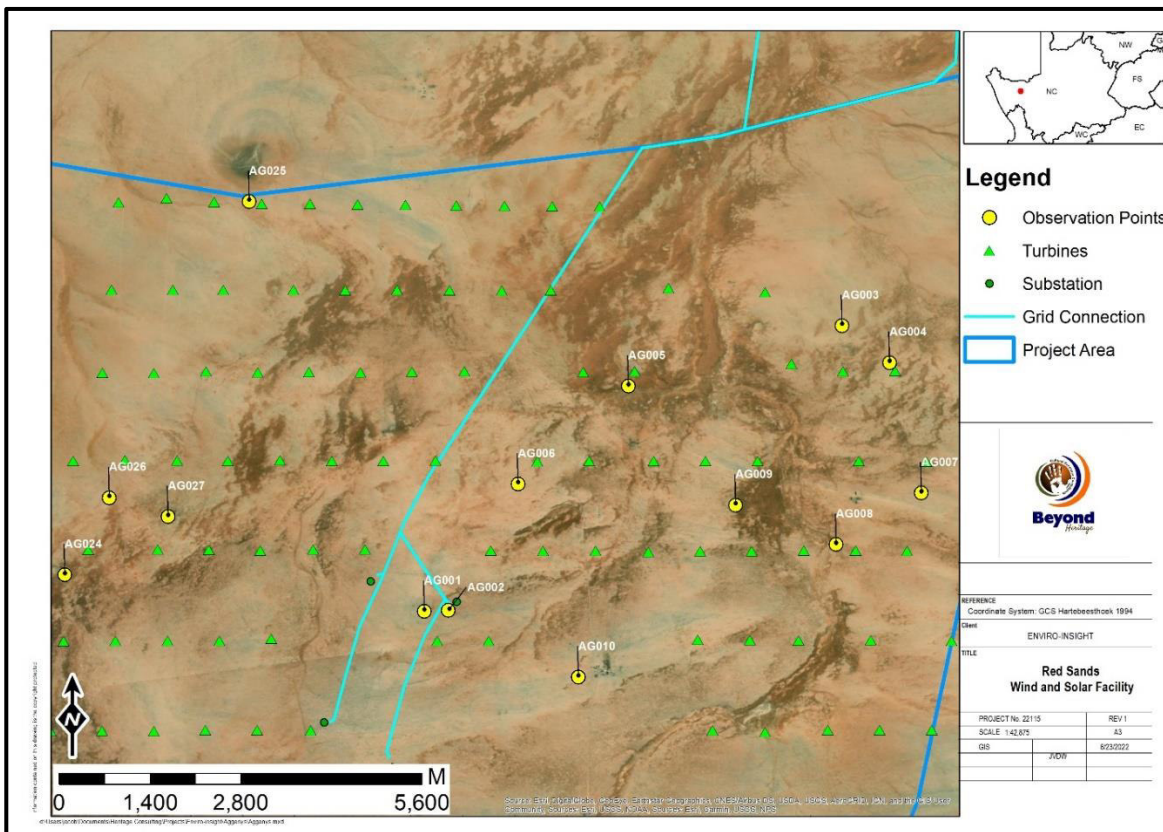


Figure 9.1. Observation points in relation to the project lay out.

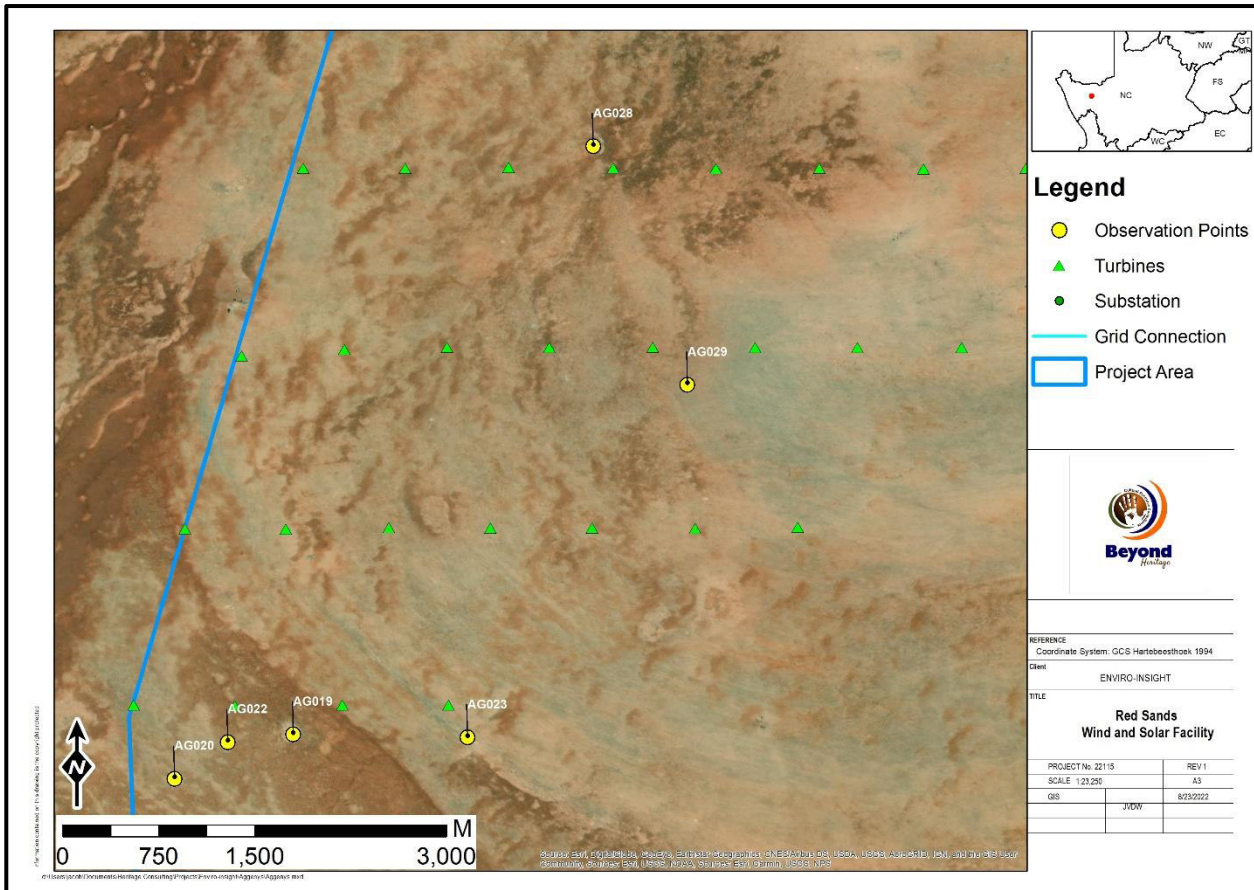


Figure 9.2. Observation points in relation to the project lay out.



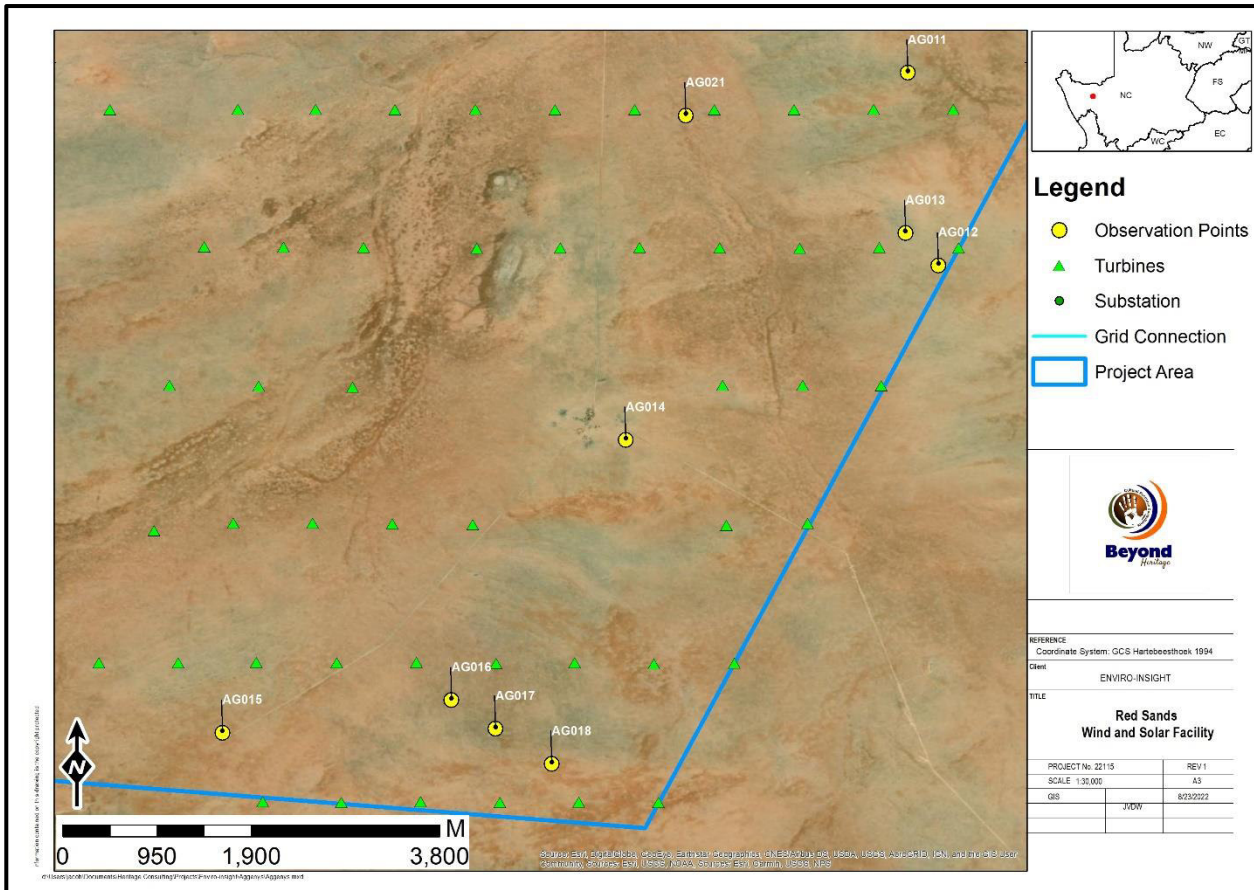


Figure 9.3. Observation points in relation to the project lay out.

9.1.6 Impact Assessment for the Project

Table 8. Impact assessment for isolated finds (AG001, AG002, AG003, AG006, AG007, AG008, AG011, AG012, AG013, AG015, AG016, AG017, AG018, AG020, AG021, AG022, AG023, AG025, AG026, AG029)

<b>Nature:</b> During the construction phase activities resulting in disturbance of surfaces and/or sub-surfaces may destroy, damage, alter, or remove from its original position archaeological and paleontological material or objects.		
	<b>Without mitigation</b>	<b>With mitigation (Preservation/excavation of site)</b>
<b>Extent</b>	Local (1)	Local (1)
<b>Duration</b>	Permanent (5)	Permanent (5)
<b>Magnitude</b>	No effect (0)	No effect (0)
<b>Probability</b>	Improbable (2)	Improbable (2)
<b>Significance</b>	<b>12 (Low)</b>	<b>12 (Low)</b>
<b>Status (positive or negative)</b>	Neutral	Neutral
<b>Reversibility</b>	Not reversible	Not reversible
<b>Irreplaceable loss of resources?</b>	Yes	Yes
<b>Can impacts be mitigated?</b>	NA	NA
<b>Mitigation:</b>		
<ul style="list-style-type: none"> <li>Implementation of a Chance Find Procedure for the project;</li> <li>Artefact ratio is low, and the isolated finds are of low significance.</li> </ul>		
<b>Cumulative impacts:</b>		

Other authorised projects (e.g., renewable energy developments) in the area could have a cumulative impact on the heritage landscape. The impact on physical heritage is low and will not be impacted on by the new developments.
<b>Residual Impacts:</b> Although surface sites can be avoided or mitigated, there is a chance that completely buried sites would still be impacted on, but this cannot be quantified.

**Table 9. Impact Assessment for cemeteries (AG010, AG014)**

<b>Nature:</b> During the construction phase activities resulting in disturbance of surfaces and/or sub-surfaces may destroy, damage, alter, or remove from its original position archaeological and paleontological material or objects.		
	<b>Without mitigation</b>	<b>With mitigation (Preservation/excavation of site)</b>
<b>Extent</b>	Local (5)	Local (5)
<b>Duration</b>	Permanent (5)	Permanent (5)
<b>Magnitude</b>	Moderate (6)	Low (4)
<b>Probability</b>	Improbable (2)	Very Improbable (1)
<b>Significance</b>	<b>32 (Medium)</b>	<b>14 (Low)</b>
<b>Status (positive or negative)</b>	Negative	Negative
<b>Reversibility</b>	Not reversible	Not reversible
<b>Irreplaceable loss of resources?</b>	Yes	Yes
<b>Can impacts be mitigated?</b>	NA	NA
<b>Mitigation:</b> <ul style="list-style-type: none"> <li>• Implementation of a Chance Find Procedure for the project;</li> <li>• The graves should be avoided with 30m buffer zone.</li> </ul>		
<b>Cumulative impacts:</b> Other authorised projects (e.g., renewable energy developments) in the area could have a cumulative impact on the heritage landscape.		
<b>Residual Impacts:</b> Although surface sites can be avoided or mitigated, there is a chance that completely buried sites would still be impacted on, but this cannot be quantified.		

**Table 10. Impact Assessment for high significance Stone Age Sites (AG009, AG019, AG024, AG027, AG028)**

<b>Nature:</b> During the construction phase activities resulting in disturbance of surfaces and/or sub-surfaces may destroy, damage, alter, or remove from its original position archaeological and paleontological material or objects.		
	<b>Without mitigation</b>	<b>With mitigation (Preservation/excavation of site)</b>
<b>Extent</b>	Local (5)	Local (5)
<b>Duration</b>	Permanent (5)	Permanent (5)
<b>Magnitude</b>	High (8)	Low (4)
<b>Probability</b>	Improbable (2)	Very Improbable (1)
<b>Significance</b>	<b>36 (Medium)</b>	<b>14 (Low)</b>
<b>Status (positive or negative)</b>	Negative	Negative
<b>Reversibility</b>	Not reversible	Not reversible
<b>Irreplaceable loss of resources?</b>	Yes	Yes

<b>Can impacts be mitigated?</b>	NA	NA
<b>Mitigation:</b>		
<ul style="list-style-type: none"> <li>• Implementation of a Chance Find Procedure for the project;</li> <li>• These Stone Age sites are of high significance and should be avoided.</li> </ul>		
<b>Cumulative impacts:</b>		
Other authorised projects (e.g., renewable energy developments) in the area could have a cumulative impact on the heritage landscape. The impact on physical heritage is low as high significance sites will not be impacted on by the new developments.		
<b>Residual Impacts:</b>		
Although surface sites can be avoided or mitigated, there is a chance that completely buried sites would still be impacted on, but this cannot be quantified.		

**Table 11. Impact Assessment for Historical kraal (AG005) and medium significance Stone Age Site (AG004)**

<b>Nature:</b> During the construction phase activities resulting in disturbance of surfaces and/or sub-surfaces may destroy, damage, alter, or remove from its original position archaeological and paleontological material or objects.		
	<b>Without mitigation</b>	<b>With mitigation (Preservation/ excavation of site)</b>
<b>Extent</b>	Local (2)	Local (2)
<b>Duration</b>	Permanent (5)	Permanent (5)
<b>Magnitude</b>	Moderate (6)	Low (4)
<b>Probability</b>	Improbable (2)	Very Improbable (1)
<b>Significance</b>	<b>26 (Low)</b>	<b>11 (Low)</b>
<b>Status (positive or negative)</b>	Negative	Negative
<b>Reversibility</b>	Not reversible	Not reversible
<b>Irreplaceable loss of resources?</b>	Yes	Yes
<b>Can impacts be mitigated?</b>	NA	NA
<b>Mitigation:</b>		
<ul style="list-style-type: none"> <li>• Implementation of a Chance Find Procedure for the project;</li> <li>• Based on the current lay out the features will be avoided and retained as is.</li> </ul>		
<b>Cumulative impacts:</b>		
Other authorised projects (e.g., residential developments) in the area could have a cumulative impact on the heritage landscape. The impact on physical heritage is medium..		
<b>Residual Impacts:</b>		
Although surface sites can be avoided or mitigated, there is a chance that completely buried sites would still be impacted on, but this cannot be quantified.		

## 10 Conclusion and recommendations

The landscape setting in which the project is located consist of four topographical features with varying levels of heritage potential as outlined below:

- Flat grassy plains with red sandy soils that is of low heritage potential;
- Rocky outcrops named inselbergs and granite outcrops that is of high heritage potential;
- Red sand dunes that are of medium to high heritage potential; and
- Pans, seasonal water holes or fissures that holds water after the rains that is of high heritage potential.

The survey aimed to verify these sensitivities and, in the process, to cover as much of the current layout. The findings of the assessment confirmed the expectations of heritage sensitive areas as outlined above and is in line with findings made by (Beaumont *et al.* 1995, Morris 201a, b,c and Pelser 2011). Numerous archaeological sites were identified at these topographical focal points and the distribution of sites is spatially illustrated in Figure 8.1. Findings of the survey include Stone Age material dating from the ESA to the LSA, two small cemeteries, a historical kraal, and isolated historical material like lead sealed cans and glass bottles. Most of the stone tool finds are isolated occurrences or areas with a very low density of artefacts and were recorded as Find spots as these locations does not constitute an archaeological site. Distinct archaeological sites were however recorded marked by LSA lithics, pottery, ostrich eggshell fragments (OES), and grinding hollows. These sites are located at rock outcrops where fissures retains seasonal water after the rains.

Stone Age sites AG009, AG019, AG024, AG027, AG028 is of high significance and will not be directly impacted on by the proposed development. All of these sites are located within environmental no-go areas with a minimum buffer zone of ~ 250 meters that will facilitate their protection *in situ* (Figure 8.1). The only significant site located outside a no-go area is site AG009 but no tower or infrastructure is located closer than 200 meters from this site and no impact is expected on this site. Two cemeteries (AG010, AG014) of high social significance are also located in the environmental no-go area with a minimum buffer zone of ~ 250 meters. Stone Age sites of medium significance AG004 & AG005 will also not be directly impacted on as the closest infrastructure (Tower 30) is located ~170 from AG004 and tower 33 ~200 meters from the latter.

According to the SAHRA Paleontological sensitivity map, the majority of the study area is of low paleontological significance and the project can continue with the implementation of a Fossil Chance Find Protocol which should be added to the Environmental Management Programme (EMPr).

The impact on heritage resources is considered to be low as significant sites are not directly impacted on and preserved within no go areas and the project can be authorised provided that the recommendations in this report are adhered to and based on the South African Heritage Resource Authority (SAHRA) 's approval.

### 10.1 Recommendations for condition of authorisation

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

#### Recommendations:

- 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 under Section 10.2;
- A pre-construction walk through must be conducted of the final layout focussing on areas not previously covered.

## **10.2 Chance Find Procedures**

### **10.2.1 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 therefore 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 for this procedure are provided in Section 10.5. 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.

### **10.2.2 Monitoring Program for Paleontology – to commence once the excavations / drilling activities begin.**

1. The following procedure is only required if fossils are seen on the surface and when drilling/excavations commence.
2. When excavations begin the rocks must be given a cursory inspection by the environmental officer or designated person. Any fossiliferous material (trace fossils, fossils of plants, insects, bone or coalified material) should be put aside in a suitably protected place. This way the project activities will not be interrupted.
3. Photographs of similar fossils must be provided to the developer to assist in recognizing the fossil plants, vertebrates, invertebrates or trace fossils in the shales and mudstones. This information will be built into the EMP's training and awareness plan and procedures.
4. Photographs of the putative fossils can be sent to the palaeontologist for a preliminary assessment.
5. If there is any possible fossil material found by the developer/environmental officer then the qualified palaeontologist sub-contracted for this project, should visit the site to inspect the selected material and check the dumps where feasible.
6. Fossil plants or vertebrates that are considered to be of good quality or scientific interest by the palaeontologist must be removed, catalogued and housed in a suitable institution where they can be made available for further study. Before the fossils are removed from the site a SAHRA permit must be obtained. Annual reports must be submitted to SAHRA as required by the relevant permits.
7. If no good fossil material is recovered, then no site inspections by the palaeontologist will be necessary. A final report by the palaeontologist must be sent to SAHRA once the project has been completed and only if there are fossils.
8. If no fossils are found and the excavations have finished then no further monitoring is required.

### **10.3 Reasoned Opinion**

The overall impact of the project 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.

### **10.4 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.

**10.5 Monitoring Requirements**

Day to day monitoring can be conducted by the Environmental Control Officers (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.
- *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 12.** Monitoring requirements for the project

Heritage Monitoring					
Aspect	Area	Responsible for monitoring and measuring	Frequency	Proactive or reactive measurement	Method
Cultural Heritage Resources chance finds	Entire project area	EO & ECO	Weekly (Pre construction and construction phase)	Proactively	<ul style="list-style-type: none"> <li>• If risks are manifested (accidental discovery of heritage resources) the chance find procedure should be implemented:                             <ol style="list-style-type: none"> <li>1. Cease all works immediately;</li> <li>2. Report incident to Site Manager</li> <li>3. EPC (Engineering Procurement and Construction) Contractor to contact an archaeologist/ palaeontologist to inspect the site;</li> <li>4. Report incident to SAHRA; as advised by specialist and</li> <li>5. Employ site specific mitigation measures recommended by the specialist after assessment in accordance with the requirements of the relevant authorities.</li> </ol> </li> <li>• Only recommence operations once impacts have been mitigated.</li> </ul>

## 10.6 Management Measures for inclusion in the EMPr

**Table 13. 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 heritage chance finds, if chance finds are encountered to implement the Chance Find Procedure for the project as outlined under Section 10.2	Construction	Throughout the project	Applicant EPC Contractor	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 35, 36 and 38 of NHRA	ECO Checklist/Report
AG009, AG019, AG024, AG027, AG028	The recorded heritage sites of high significance must be avoided and preserved as is within the environmental no go areas.	Pre-Construction, construction and operation	Throughout the project	Applicant/ EAP	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 35 of NHRA	ECO Checklist/Report
AG010, AG014	The two cemeteries must be avoided and preserved as is within the environmental no go areas.	Pre-Construction, construction and operation	Throughout the project	Applicant/ EAP	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 36 of NHRA	ECO Checklist/Report
Final impact area	A pre-construction walk through must be conducted of the final layout of areas not previously covered.	Pre-Construction	Pre-Construction	Applicant EPC Contractor	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 35, 36 and 38 of NHRA	ECO Checklist/Report



## 11 References

- Beaumont, P.B., Smith, A.B., & Vogel, J.C. 1995. Before the Einiqua: the archaeology of the frontier zone. In A. B. Smith (ed.) Einiqualand: studies of the Orange River frontier. Cape Town: UCT Press.
- Morris, D. 2010. Cultural Heritage Assessment Gamsberg: supplementary observations to a previous specialist report on archaeological resources. Unpublished report. Kimberley: McGregor Museum.
- Morris, D. 2011a. A Phase 1 Heritage Impact Assessment for the proposed Aggeneis – Paulputs 220kV transmission line. Unpublished report for SSI Engineers and Environmental Consultants. Kimberley: McGregor Museum.
- Morris, D. 2011b. Black Mountain Concentrated Solar Power Facility Development at Aggeneys, Northern Cape.
- Morris, D. 2013. Heritage Impact Assessment: proposed Aggeneys Photovoltaic Solar Energy Facility at Bloemhoek near Aggeneys, Northern Cape Province. Unpublished report prepared for Solar Capital (Pty) Ltd. Kimberley: McGregor Museum.
- Morris, D. 2017. Amendment of the Final Heritage Impact Assessment for the Proposed Aggeneis – Paulputs 400kV Transmission Powerline and Substations Upgrade, Northern Cape.
- Morris, D., Henderson, A. 2019. Heritage Impact Assessment for the Proposed Extension of Swartberg Mine on Black Mountain Mine, Aggeneys, Northern Cape Province.
- Mucina, L. & Rutherford, M.C. 2006. The vegetation map of South Africa, Lesotho and Swaziland. SANBI, Pretoria.
- Orton, J. 2013. Geometric rock art in western South Africa and its implications for the spread of early herding. *South African Archaeological Bulletin* 68: 27-40.
- Orton, J. 2014. Final archaeological mitigation report for the Gamsberg Zinc Mine, Aggeneys, Northern Cape. Unpublished report prepared for ERM Southern Africa (Pty) Ltd. Diep River: ACO Associates cc.
- Orton, J. 2015. Final Archaeological Survey for the Proposed Aggeneys Solar Energy Facility, Namakwaland Magisterial District, Northern Cape.
- Orton, J. 2016. Heritage Impact Assessment for the proposed Sol Invictus 1 PV Facility, Namakwaland Magisterial District, Northern Cape. Unpublished report prepared for Savannah Environmental (Pty) Ltd. Muizenberg: ASHA Consulting (Pty) Ltd.
- Orton, J., & Webley, L. 2013. Heritage Impact Assessment for the Proposed Namies Wind Energy Facility near Aggeneys, Northern Cape.
- Van der Walt, J. 2019. Heritage Impact Assessment for the Aroams Mining Right Application, Northern Cape Province.
- Webley, L., & Halkett, D. 2012. Heritage Impact Assessment: Proposed Aggeneys Photo-voltaic Solar Power Plant on Portion 1 of the Farm Aroams 57, Northern Cape Province.