HERITAGE IMPACT ASSESSMENT

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

For The Bloemsmond Solar PV Facilities Grid Connection, Upington, Northern Cape Province

Type of development:

Electrical Infrastructure

Client:

Cape EA Prac

Client Contact: Dale Holder

Email: dale@cape-eaprac.co.za

Developer:

Bloemsmond Solar (Pty) Ltd

HCAC - Heritage Consultants
Private Bag X 1049
Suite 34
Modimolle
0510
Tel: 082 373 8491
Fax: 086 691 6461
E-Mail: jaco.heritage@gmail.com

Report Author:

Mr. J. van der Walt

Project Reference:

21974

Report date:

November 2019

APPROVAL PAGE

Project Name	Bloemsmond Grid
Report Title	Heritage Impact Assessment Bloemsmond PV Facilities Grid Project, Upington, Northern Cape Province
Authority Reference Number	TBC
Report Status	Draft Report
Applicant Name	Bloemsmond Solar (Pty) Ltd

	Name	**Qualifications and Certifications**	**Date**
Archaeologist	Jaco van der Walt	MA Archaeology ASAPA #159	November 2019

DOCUMENT PROGRESS

Distribution List

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Amendments on Document

Date	Report Reference Number	Description of Amendment

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REPORT OUTLINE

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

Table 1. Specialist Report Requirements.

Requirement from Appendix 6 of GN 326 EIA Regulation 2017	Chapter
(a) Details of - (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 Section 12
(b) Declaration that the specialist is independent in a form as may be specified by the competent authority	*Declaration of Independence*
(c) Indication of the scope of, and the purpose for which, the report was prepared	Section 1
(cA)an indication of the quality and age of base data used for the specialist report	Section 3.4 and 7.1.
(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	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 a site plan identifying site alternative;	Section 8 and 9
(g) Identification of any areas to be avoided, including buffers	Section 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 9
(k) Mitigation measures for inclusion in the EMPr	Section 9 and 10
(l) Conditions for inclusion in the environmental authorisation	Section 9 and 10
(m) Monitoring requirements for inclusion in the EMPr or environmental authorisation	Section 9 and 10
(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 6
(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	Section 10

Executive Summary

HCAC was appointed to conduct a Heritage Impact Assessment of the proposed Bloemsmond Grid to determine the presence of cultural heritage sites and the impact of the proposed development on these non-renewable resources. The study area was assessed both on desktop level and by a field survey. The field survey was conducted as a non-intrusive pedestrian survey.

The study area is divided into a western (on the farm Bloemsmond) and eastern section (on the farm McTaggart's Camp & Tungsten lodge). The western section was surveyed during the field work for the proposed Bloemsmond PV facilities and the eastern section was assessed during the fieldwork conducted for the proposed Sirius PV facilities, a small section in the middle on the farm Daysons Klip and the eastern section on Agricultural Holding 1080 were not physically surveyed due to access restrictions.

The assessment considered the preferred powerline corridor on the Eastern Boundary of the farm Bloemsmond as well as the alternative powerline corridor on the western boundary of the same farm and also the collector Alternative A (to the north) and B (southern line).

Key finding of the study includes:

- 28 Stone Age find spots and three historical find spots were recorded. No further mitigation is required for these find spots as they are scattered too sparsely to be of significance apart from noting their presence in this report;
- One distinct archaeological site comprising an open-air Stone Age site marked by lithics next to a seasonal waterhole (Site B3/3) was recorded. The site is located within the corridor of the preferred Bloemsmond powerline. The site is of medium significance;
- Seven features including six sites with trenches relating to Tungsten mining were recorded as well as the foundations of a labourer dwelling. These sites are of low significance;
- Due to the nature of the overhead powerlines and the relatively small impact of the pylons the recorded sites can be retained *in-situ* within the development.
- No graves were recorded but graves can occur anywhere on the landscape. If any additional graves are located in future they should ideally be preserved *in-situ* or alternatively relocated according to existing legislation.
- According to the SAHRA paleontological sensitivity map the area is of moderate paleontological sensitivity and an independent study was conducted by John Almond (2019). The study recommended that pending the discovery of significant new fossils remains before or during construction, exemption from further specialist palaeontological studies and mitigation be granted for the proposed project.

The impact of the proposed project on heritage resources is considered acceptable with the correct mitigation measures in place such as *in-situ* preservation. It is therefore recommended that the proposed project can commence based on the following recommendations as part of the EMPr and based on the approval of SAHRA.

- The final alignment must be subjected to a walk down prior to development;
- Avoidance of Site B3/3 by micro citing pylon positions;
- A chance find procedure must be implemented for the project as outlined in Section 10.1.

Both the proposed powerline corridors are acceptable from a heritage point of view but the preferred corridor will traverse recorded heritage site B3/3. The impact on the site can be mitigated by micro citing to avoid the site with a 30 m buffer. The Alternative corridor will not impact on any significant recorded heritage features. Through avoidance of site B3/3 both powerline corridors are acceptable from a heritage point of view.

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Declaration of Independence

Specialist Name	Jaco van der Walt
Declaration of Independence	I declare, as a specialist appointed in terms of the National Environmental Management Act (Act No 108 of 1998) and the associated 2014 Environmental Impact Assessment (EIA) Regulations (as amended), that I: • I act as the independent specialist in this application; • I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant; • I declare that there are no circumstances that may compromise my objectivity in performing such work; • I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity; • I will comply with the Act, Regulations and all other applicable legislation; • I have no, and will not engage in, conflicting interests in the undertaking of the activity; • I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority; • All the particulars furnished by me in this form are true and correct; and • I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.
Signature	
Date	20/11//2019

a) Expertise of the specialist

Jaco van der Walt has been practising as a 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 ASAPA (#159) and have conducted more than 500 impact assessments in Limpopo, Mpumalanga, North West, Free State, Gauteng, KZN as well as he Northern and Eastern Cape Provinces in South Africa.

Jaco has worked on various international projects in Zimbabwe, Botswana, Mozambique, Lesotho, DRC Zambia, Guinea and Tanzania. Through this he has a sound understanding of the IFC Performance Standard requirements, with specific reference to Performance Standard 8 – Cultural Heritage.

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ABBREVIATIONS

AIA: Archaeological Impact Assessment
ASAPA: Association of South African Professional Archaeologists
BGG Burial Ground and Graves
BIA: Basic Impact Assessment
CFPs: Chance Find Procedures
CMP: Conservation Management Plan
CRR: Comments and Response Report
CRM: Cultural Resource Management
DEA: Department of Environmental Affairs
EA: Environmental Authorisation
EAP: Environmental Assessment Practitioner
ECO: Environmental Control Officer
EIA: Environmental Impact Assessment*
EIA: Early Iron Age*
EIA Practitioner: Environmental Impact Assessment Practitioner
EMP: 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
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 recently, 100 years ago)
The Iron Age (~ AD 400 to 1840)
Historic (~ AD 1840 to 1950)
Historic building (over 60 years old)

1 Introduction and Terms of Reference:

HCAC has been contracted by Cape EA Prac to conduct a heritage impact assessment of the proposed grid connection infrastructure for the five proposed Bloemsmond solar PV facilities near Upington in the Northern Cape Province (Figure 1 & 2). The report forms part of the Basic Assessment (BA) and Environmental Management Programme Report (EMPR) for the proposed project.

The aim of the study is to assess the proposed development footprint 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. 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 utilised before and during the survey, which includes: Phase 1, review of relevant literature; Phase 2, the physical surveying of sections of the area on foot and by vehicle; Phase 3, reporting the outcome of the study.

During the survey, background scatters of Stone Age and historical artefacts were recorded and sites consisting of trenches from previous Tungsten mining and a rectangular stone wall foundation as well as one Stone Age site. 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 the following report. SAHRA as a commenting authority under section 38(8) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) requires all environmental documents, complied in support of an Environmental Authorisation application as defined by NEMA EIA Regs section 40 (1) and (2), to be submitted to SAHRA. As such the Basic Assessment report and its appendices must be submitted to the case as well as the EMPr, once it is 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).

Table 2: Project Description

Type of development	Electrical infrastructure
Farm and portions	The grid connection crosses the following properties: • Portion 5 of Farm Bloemsmond 455 • Portion 14 of Farm Bloemsmond 455 • Remainder of Farm Dyasonsklip 454 • Portion 3 of McTaggart's Camp 453 • Remainder 638 Tungsten Lodge • Agricultural Holding 1080
Magisterial District	Registration Division of Gordonia RD, ZF Mgcawu District Municipality, Northern Cape Province
1: 50 000 map sheet number	2821 CA
Co-ordinate of the development	-28.529113° 21.001066° to -28.543498° 21.143590°

Infrastructure and project activities

The proposed project consists of the grid connection infrastructure for the five proposed Bloemsmond solar PV facilities considering a joint grid solution required to evacuate power from the following Renewable Energy Projects:

- AEP Bloemsmond Solar 1 (Authorised - 14/12/16/3/3/2/814)
- AEP Bloemsmond Solar 2 (Authorised - 14/12/16/3/3/2/816)
- Bloemsmond 3 (Decision Pending - 14/12/16/3/3/1/2042)
- Bloemsmond 4 (Decision Pending - 14/12/16/3/3/1/2044)
- Bloemsmond 5 (Decision Pending - 14/12/16/3/3/1/2043)

The proposed grid connection infrastructure will align as far as possible along landscape divides (i.e. farm roads/tracks, fence lines, fire breaks) to avoid impacting of the agricultural land use and ecological sensitive areas. In addition, the pylons/towers will not be located on prominent landscape or sensitive features and would become a smaller component of the greater solar energy facility landscape emerging in the area.

Each of the above PV projects included applications for authorisation for the IPP portions of the respective on-site substations, and this project assesses the remainder of the joint grid solution as described below. The project components are divided into the following spatially distinct sections:

1. Infrastructure between the individual on-site substations and the Bloemsmond Collector Substation;
2. The Bloemsmond Collector Substation;
3. Infrastructure between the Bloemsmond Collector Substation and the Upington MTS; and
4. Works within the Upington MTS.

These are discussed separately below.

1. **Infrastructure between the individual on-site substations and the Bloemsmond Collector Substation:**

As mentioned above, the IPP portions of the on-site substations have all been assessed as part of separate environmental application processes. This application includes each of the Eskom portions of the on-site substations required for the Bloemsmond Grid Connection Infrastructure, namely:

•Bloemsmond 3 substation/ switching station: either 33kV or 132kV

•Bloemsmond 4 substation/ switching station: either 33kV or 132kV

•Bloemsmond 5 substation/ switching station: either 33kV or 132kV and

•33kV or 132kV overhead lines between each of the on-site substations and the Bloemsmond Collector Substation.

There are two alternatives proposed for the Bloemsmond 4 and Bloemsmond 5 substation/ switching stations: a western alternative and an eastern alternative for each project.

The on-site substations would include the following

- Platforms;
- Earth mat;
- 132kV (incoming/ outgoing) feeder bays as required, inclusive of breakers, CTs, VTs, isolators, surge arrestors and line terminal supports;
- New tubular busbar and bussection for the new feeder bays, inclusive of isolators, voltage transformers (VTs) and tubular busbar sections; and
- Access roads and fencing, lightning protection as may be required, and auxiliary buildings as may be required.

1.1.1 Bloemsmond Grid Connection Infrastructure:

The preferred powerline corridors for Bloemsmond 3, 4 and 5 extend from the respective eastern substation to the eastern boundary of Farm Bloemsmond 455 and then follow the eastern boundary (and PV facilities' access road) turning west into the Bloemsmond Collector Substation as described below:

- Bloemsmond 3-Bloemsmond Collector: a single circuit 33kV or 132kV line from Bloemsmond 3 substation/ switching station to the Bloemsmond Collector Substation
- Bloemsmond 4- Bloemsmond Collector: a single circuit 33kV or 132kV line from Bloemsmond 4 substation/ switching station to the Bloemsmond Collector Substation
- Bloemsmond 5-Bloemsmond Collector: a single circuit 33kV or 132kV line from Bloemsmond 5 substation to the Bloemsmond Collector Substation.

The Bloemsmond 1 and 2 approved on-site substations are directly adjacent to the Bloemsmond Collector Substation and as such will connect directly there.
Please note that this discussion relates to the preferred powerline corridor alternatives.

1.1.2 The Bloemsmond Collector Substation:

The Bloemsmond Collector Substation is situated within the substation footprint authorised for Bloemsmond 1 and 2.

The proposed Bloemsmond Collector Substation includes the following typical components:

- Platforms;
- Earth mat;

- Several 33kV-132kV incoming feeder bays (up to 3, depending on how many of the Bloemsmond projects will ultimately constructed), inclusive of breakers, CTs, VTs, isolators, surge arrestors and line terminal supports;
- Up to 2 outgoing 132kV feeder bays, inclusive of breakers, CTs, VTs, isolators, surge arrestors and line terminal supports;
- New tubular busbar and bussection for the new feeder bays, inclusive of isolators, voltage transformers (VTs) and tubular busbar sections; and
- Access roads and fencing, lightning protection as may be required, and auxiliary buildings as may be required.

1.1.3 Infrastructure between the Bloemsmond Collector Substation and the Upington MTS:

A grid connection corridor approximately 300m wide (which increases to ~1.3 km at the Upington MTS) and 12 km long is being assessed to allow for the optimisation of the grid connection and associated infrastructure to accommodate the identified environmental sensitivities. The grid connection infrastructure will be developed within the 300m wide grid connection corridor.
One double circuit 132kV powerline from the Bloemsmond Collector Substation to the Upington MTS will be constructed.
The grid connection crosses the following properties:

- Portion 5 of Farm Bloemsmond 455
- Portion 14 of Farm Bloemsmond 455
- Remainder of Farm Dyasonsklip 454
- Portion 3 of McTaggart's Camp 453
- Remainder 638 Tungsten Lodge
- Agricultural Holding 1080

1.1.4 Works within the Upington MTS:

The following activities may take place within the authorised footprint of the existing Upington MTS:

- Establish 2 new 132kV feeder bays at the existing 400/132kV Upington MTS;
- Install 2 new 132kV line bays, inclusive of breakers, current transformers (CTs), isolators and surge arrestors; and
- Install a new tubular busbar and bus section for the new line bays, inclusive of isolators, voltage transformers (VTs) and tubular busbar sections.

1.1.5 Access roads

A two-track access road will be constructed within the powerline servitude for construction and maintenance activities. No formal structures will be constructed as part of this access road, which will remain as a jeep track for maintenance activities

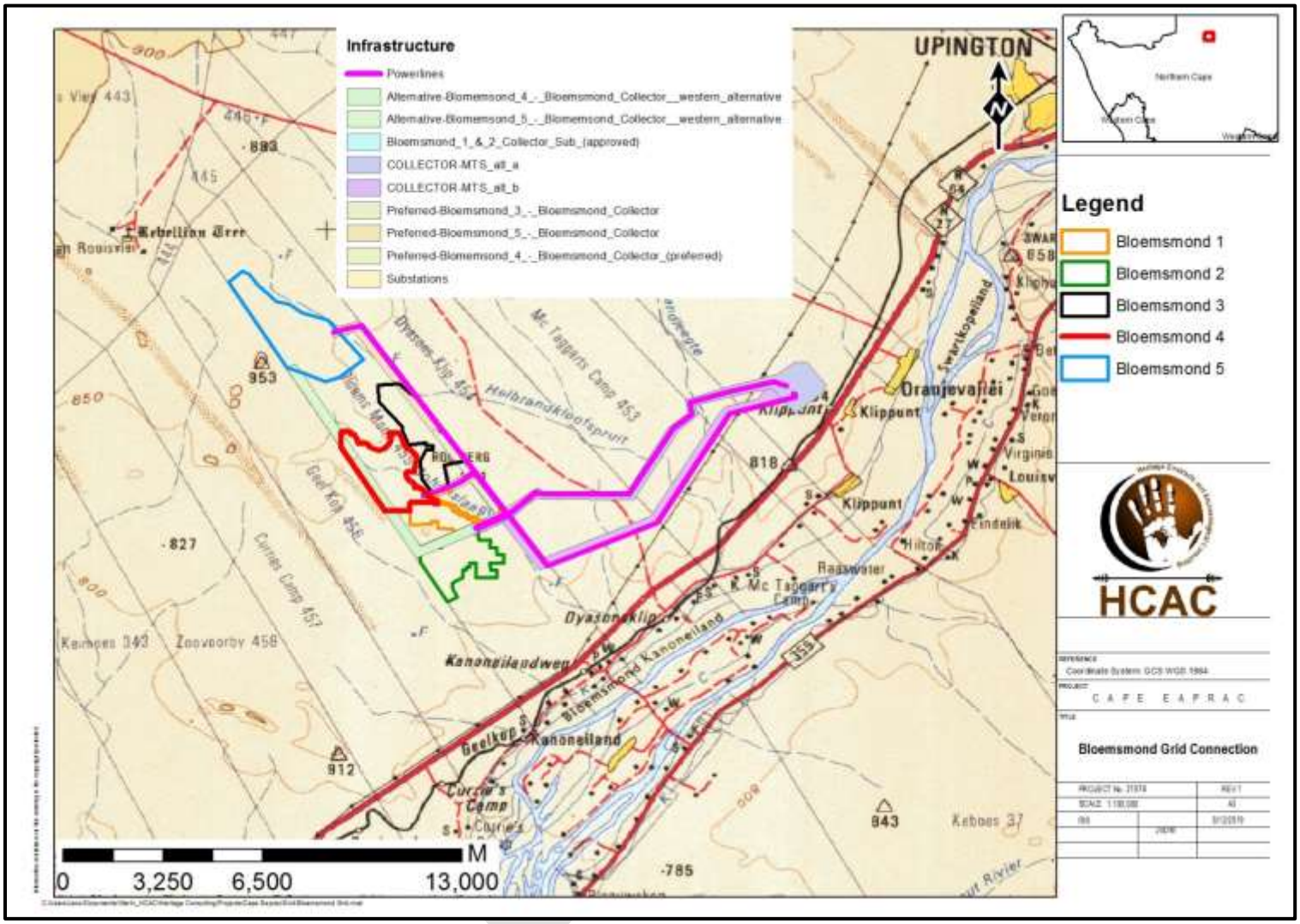


Figure 1. Provincial locality map (1: 250 000 topographical map).

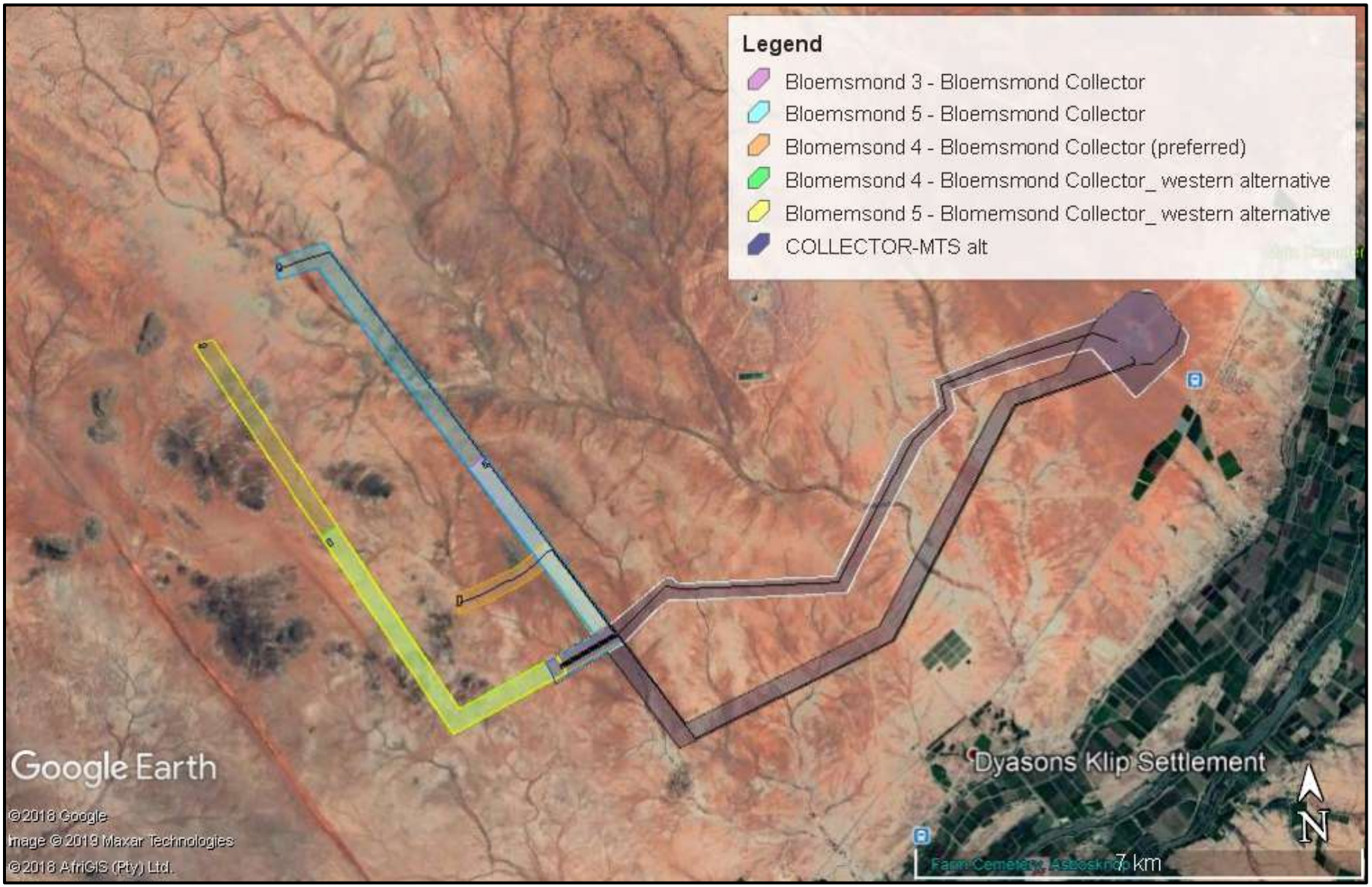


Figure 2. Satellite image indicating the study area (Google Earth 2019).

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)
- Mineral and Petroleum Resources Development Act (MPRDA), Act No. 28 of 2002 - Section 39(3)(b)(iii)

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 of these impacts.

The HIA should be submitted, as part of the impact assessment report or EMPr, to the PHRA if established in the province or to SAHRA. SAHRA will ultimately be responsible for the professional evaluation of Phase 1 AIA reports upon which review comments will be issued. 'Best practice' requires Phase 1 AIA reports and additional development information, as per the impact assessment report and/or EMPr, to be submitted in duplicate to SAHRA after completion of the study. SAHRA accepts Phase 1 AIA 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 AIA'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 field work 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 EIA process, it involves stakeholders interested in, or affected by the proposed development. Stakeholders are provided with an opportunity to raise issues of concern (for the purposes of this report only heritage related issues will be included). The aim of the public consultation process was to capture and address any issues raised by community members and other stakeholders during key stakeholder and public meetings. The process involved:

- Placement of advertisements and site notices
- Stakeholder notification (through the dissemination of information and meeting invitations);
- Stakeholder meetings undertaken with I&APs;
- Authority Consultation
- The compilation of a Basic Assessment Report (BA).
- The compilation of a Comments and Response Report (CRR).

3.4 Site Investigation

Conduct a field study to: a) systematically survey the proposed project area to 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 recorded in the project area.

During the survey, background scatters of Stone Age and historical artefacts as well as Stone Age and possible burial sites were identified. 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 the following report.

Table 3: Site Investigation Details

	Site Investigation
Date	2 – 7 June 2019
Season	Winter – vegetation cover in the study area is low with high archaeological visibility. Accesses to the entire powerline corridor were not possible and the areas surveyed consist of the farms Bloemsmond, McTaggart's Camp and Tungsten Lodge (Figure 3).

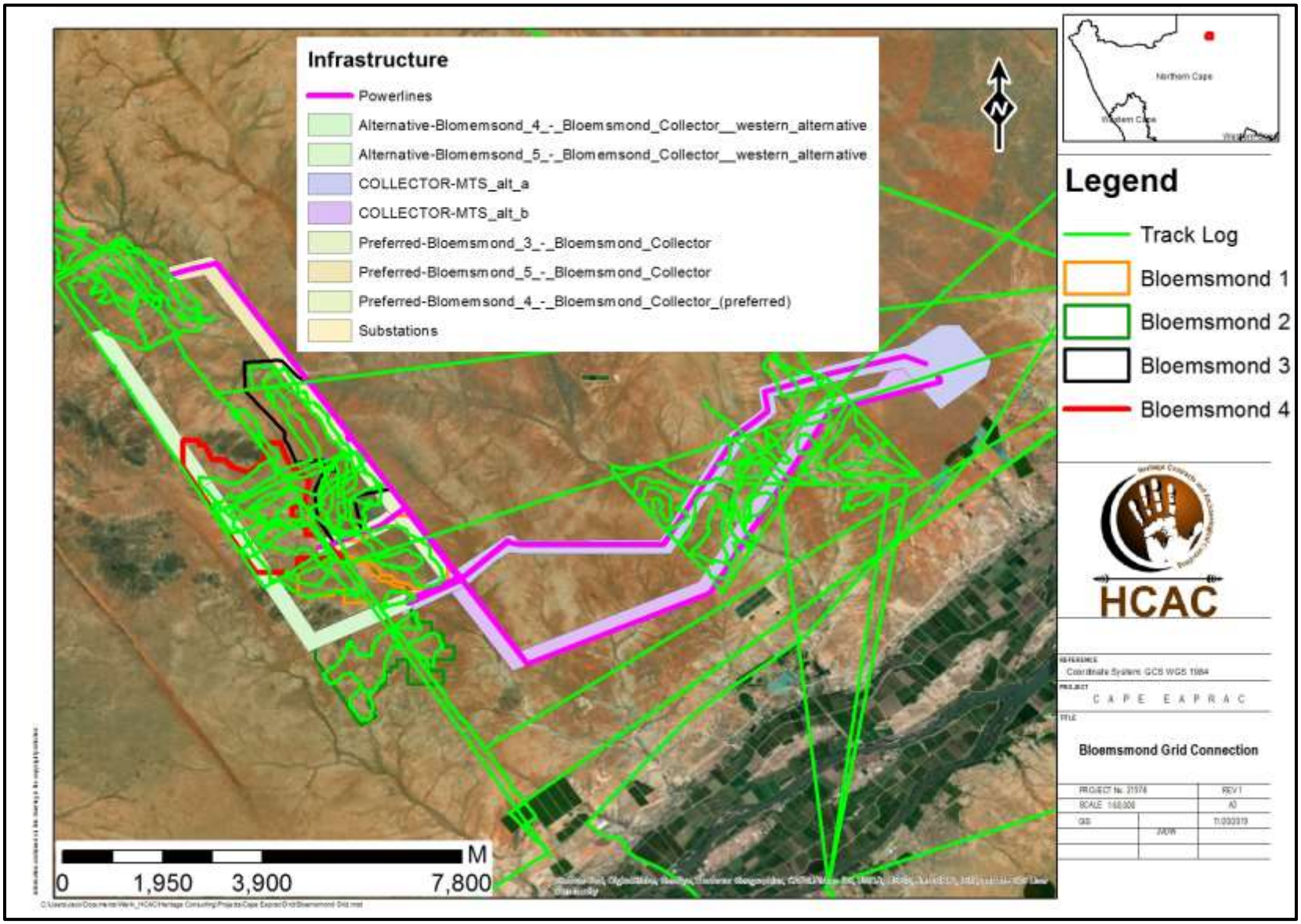


Figure 3. Track logs of the survey in green.

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 (2006), 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.

FIELD RATING	***GRADE***	***SIGNIFICANCE***	***RECOMMENDED MITIGATION***
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 subsurface nature of archaeological artefacts, the possibility exists that some features or artefacts may not have been discovered/recorded during the survey. Similarly, the occurrence of graves and other cultural material cannot be excluded. This report represents a high-level scan of the area where access was granted and consisted of non-intrusive surface surveys and incorporated the results of previous surveys. This study did not assess the impact on medicinal plants and intangible heritage as it is assumed that these components would have been 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 ENVIRONMENTAL

The Reviewed Integrated Development Plan – 2017 - 2022 of the Dawid Kruiper Municipality highlighted the following: "*With regards to the socio-economic characteristics of the local population, the employment rate for the Municipality is relatively high, with as much as 75% of people of working age who are actively seeking employment being able to secure a job. However, the majority of the employed population is found in elementary occupations, which require little or no skills. This is also reflected in the low education levels of the local population, with as much as 12% of the population aged 20 years and older having no form of education whatsoever. This, to some extent, constrains the development potential of the Municipality in the development of more advanced industries. The level of employment and type of occupations taken up by the population of the Municipality also directly affects their income levels.*
The Municipality's economy is rather centred on the trade and retail sector, due to its strong tourism sector, leaving the local economy fairly vulnerable for any significant changes in this industry. It is, therefore, important that the Municipality seeks to further diversify its economy into other sectors. Furthermore, the manufacturing sector of the municipality is one of the lowest performing sectors of the local economy. This sector has the potential to generate significant growth for the region, and Dawid Kruiper Municipality is experiencing a lack of manufacturing activities. As a result, much in the municipality has to be sourced from outside of the municipal boundaries, resulting in money flowing out of the local economy. "

5 DESCRIPTION OF THE PHYSICAL ENVIRONMENT:

The study area is located approximately 10 km north-east of Keimoes and to the west of the Orange River. There are various drainage lines draining the study area to the south east towards the Orange River. The topography of the area is undulating characterised by Aeolian sand on top of a calcrete sub strata with sparse grass cover and shrubs (Figure 4).

Figure 4:General site conditions.

The climate can be described as arid to semi-arid with rainfall occurring from November to April. The study area is currently used for grazing and falls within a Savannah Biome as described by Mucina et al (2006) with the vegetation described as Bushmanland Arid Grassland. The study area is surrounded by an area mostly characterised by agricultural and renewable energy developments.

6 RESULTS OF PUBLIC CONSULTATION AND STAKEHOLDER ENGAGEMENT:

Adjacent landowners and the public at large were informed of the proposed activity as part of the EIA process. Site notices and advertisements notifying interested and affected parties were placed at strategic points and in local newspapers as part of the process.

7 LITERATURE / BACKGROUND STUDY:

7.1 Literature Review

Several previous heritage studies were conducted in the general study area (SAHRIS) mostly to the west and south west of the study area (Beaumont 2005 & 2008, Dreyer 2006, Van Ryneveld 2007a & 2007b, Van Schalkwyk 2011, Gaigher 2012, Morris 2012, Fourie 2014, van der Walt 2015, 2019 a and b). These studies identified Early, Middle and Later Stone Age assemblages as well as historical structures and artefacts. Graves can also be expected anywhere on the landscape.

7.1.1 Genealogical Society and Google Earth Monuments

No known grave sites are indicated close to the study area.

7.1.2 General History of the area

7.1.2.1 Archaeology of the area

Stone Age History

South Africa has a long and complex Stone Age sequence of more than 2 million years. The broad sequence includes the Later Stone Age, the Middle Stone Age and the Earlier Stone Age. Each of these phases contains sub-phases or industrial complexes, and within these we can expect regional variation regarding characteristics and time ranges. For Cultural Resources Management (CRM) purposes it is often only expected/ possible to identify the presence of the three main phases.

Yet sometimes the recognition of cultural groups, affinities or trends in technology and/or subsistence practices, as represented by the sub-phases or industrial complexes, is achievable (Lombard 2011). The three main phases can be divided as follows;

- Later Stone Age; associated with Khoi and San societies and their immediate predecessors. Recently to ~30 thousand years ago
- Middle Stone Age; associated with Homo sapiens and archaic modern humans. 30-300 thousand years ago.
- Earlier Stone Age; associated with early Homo groups such as Homo habilis and Homo erectus. 400 000-> 2 million years ago.

The region is well-known as one that produced the largest sample (n = 56) of prehistoric skeletons in South Africa (Morris 1995). Excavated in 1936, known as the 'Kakamas Skeletons', and currently housed in the National Museum in Bloemfontein, they are considered the 'type' specimens of Khoi morphology (1992). Grave locations can be expected along the Gariep (perhaps up to 35 km from its shore), and on the Gariep Islands between Upington and the Augrabies Falls. They are often marked with stone burial cairns, dug into the alluvial soil or into degraded bedrock above the alluvial margin. Graves can be isolated or grouped in small clusters, sometimes containing up to eight graves (Morris 1995).

Burial cairns can be elaborately formed, some with upright stones in their centres, but they are often disturbed. Cairns from near the Gariep Islands are often characterised by their high conical shapes, and the grave shafts filled with stones. Those closer to Augrabies Falls, however, graves are low and rounded with ashes in the grave shaft. The placing of specularite or red ochre over the body was common, but other grave goods are rare (Morris 1995).

Where dating was possible, most of the skeletons were dated to the last 200 years-or-so, but association with archaeological material from up to about 1200 years old is possible. The grave sites show parallels to those of recent Khoi populations (Morris 1995).

Apart from the grave locations, archaeological sites of this period in the region have been further divided into the following industries.

Doornfontein sites are mostly confined to permanent water sources. The assemblages contain a consistently large complement of thin-walled, grit-tempered, well-fired ceramics with thickened bases, lugs, bosses, spouts, and decorated necks or rims. Lithics are often produced on quartz, and dominated by coarse irregular flakes with a small or absent retouched component (Beaumont et al. 1995; Lombard & Parsons 2008; Parsons 2008). Late occurrences contain coarser potsherds with some grass temper, a higher number of iron or copper objects, and large ostrich eggshell beads. These assemblages are mostly associated with the Khoi (Beaumont et al. 1995).

Swartkop sites can be almost contemporaneous with, or older than, the Doornfontein sites. They are usually characterised by many blades/bladelets and backed blades. Coarse undecorated potsherds, often with grass temper, and iron objects are rare. These sites are remarkably common throughout the region. They usually occur on pan or stream-bed margins, near springs, bedrock depressions containing seasonal water, hollows on dunes, and on the flanks or crests of koppies (Beaumont et al. 1995; Parsons 2008). Some of these sites are also associated with stone features, such as ovals or circles, that may represent the bases of huts, windbreaks or hunter's hides (Jacobson 2005; Lombard & Parsons 2008; Parsons 2004). These sites are linked to the historic /Xam communities of the area who usually followed a hunter-gatherer lifeway (Deacon 1986, 1988; Beaumont et al. 1995).

Wilton assemblages are distinguished by a significant incidence of cryptocrystalline silicates (mainly chalcedony) and contain many formal tools such as small scrapers, backed blades and bladelets. A regional variation of the Wilton in the area is often referred to as the Springbokoog Industry (Beaumont et al. 1995). A few heavily patinated Later Stone Age clusters, that include large scrapers, may represent Oakhurst-type aggregates (Beaumont et al. 1995).

The Middle Stone Age

Previous collections of stone tools in the region include artefacts with advanced prepared cores, blades and convergent flakes or points. Most of the scatters associated with the Middle Stone Age have a 'fresh' or un-abraded appearance. They appear to be mostly associated with the post-Howiesons Poort (MSA 3) or MSA 1 sub-phases (Beaumont et al. 1995).

Substantial Middle Stone Age sites seem uncommon. However, where archaeological sites were excavated, such as only two farms west of the study area, on Zoovoorbij 458, a Middle Stone Age assemblage was excavated beneath Later Stone Age deposits (Smith 1995). This shows that, although not always visible on the surface, the landscape was inhabited during this phase. The large flake component of the lower units of Zoovoorbij Cave has Levallois-type preparation on the striking platforms, reinforcing their Middle Stone Age context.

The Earlier Stone Age

Stone artefacts associated with this phase, based on their morphology, seem moderately to heavily weathered. Scatters may include long blades, cores (mainly on dolerite), and a low incidence of formal tools such as handaxes and cleavers. Clusters with distinct Acheulean characteristics have been recorded in the area (Beaumont et al. 1995).

7.1.2.2 Anglo-Boer War

The discovery of diamonds and gold in the Northern provinces had very important consequences for South Africa. After the discovery of these resources, the British, who at the time had colonized the Cape and Natal, had intensions of expanding their territory into the northern Boer republics. This eventually led to the Anglo-Boer War, which took place between 1899 and 1902 in South Africa, and which was one of the most turbulent times in South Africa's history. Even before the outbreak of war in October 1899 British politicians, including Sir Alfred Milner and Mr. Chamberlain, had declared that should Britain's differences with the Z.A.R. result in violence, it would mean the end of republican independence. This decision was not immediately publicized, and as consequence republican leaders based their assessment of British intentions on the more moderate public utterances of British leaders. Consequently, in March 1900, they asked Lord Salisbury to agree to peace on the basis of the status quo ante bellum. Salisbury's reply was a clear statement of British war aims. (Du Preez 1977).

In March 1900 Boer forces had taken Prieska, Kenhardt, Kakamas and Upington, attracting rebel support in the process. British columns were able to recapture the towns and the invasion had ended by June 1900. Local militias, including the Border Scouts (Upington), Bushmanland Borderers (Kenhardt) and Namaqualand Border Scouts (from the west) were established and patrolled the area.

7.1.2.3 Historical Context

The discovery of human skeletons was one of the most important archaeological discoveries to be made in the area under investigation. T.F. Dreyer and A.J.D. Meiring excavated the so-called "Kakamas Burials" in June and July 1936. Dreyer and Meiring excavated an area stretching from the Augrabies Falls to Upington along the banks of the Orange River. They were, however, most active in the region between the falls and Kakamas. Eighty-two graves from the area were excavated and 56 skeletons were retained. From radiocarbon dating it is deduced that the Kakamas burials indicate an eighteenth-century time span and some skeletons being interred at the beginning of the nineteenth century.

Some of the earliest known people to have lived in the Kakamas region were the Nameiqua people who lived at !Nawabdanas (today known as Renosterkop) during the late eighteenth century. In 1778 Hendrik Jacob Wikar and in 1779 Colonel R.J. Gordon came in contact with these people. The following descriptions of the Nameiqua and other groups of people that lived in this area are based on the accounts of Wikar and Gordon.

Although reference is made to the fact that Europeans started to move into this territory from at least the 1760s onwards, the first literate person to visit and describe the people living along the Orange River was H.J. Wikar. Wikar deserted the service of the Dutch East India Company and fled to the interior in 1775. He presented a report on his findings of the people he encountered in the interior to the Governor of the Cape with the hope that he would be pardoned and that he could return to live in the colony. In his report, Wikar, referred to the Khoi of the Orange River as Eynikkoa / Eynicqua. He divided them into four separate groups: the Namnykoa / Namikoa, who lived on the islands above the Augrabies Falls, the Kaukoa and the Aukokoa higher up the river close to Kanoneiland and the Gyzikoas in the vicinity near the present day Upington. Although these groups were closely related, the Gyzikoas were intermixed genetically and culturally with Bantu-speaking peoples from the northeast. Wikar also recorded the presence of a group of people who he called the "Klaare Kraal" people. This group of people was apparently "a strong Bushman Kraal of about twenty huts but with no cattle" (Morris, 1992)

Another European traveller that visited the same region was Colonel R.J. Gordon, who met a group of people called the Anoe Eys, roughly translated as "bright kraal" people. Gordon recorded that this group of "Bushmen catch fish and live by hunting, digging pits to trap rhinoceros at the side of the river." Morris feels it reasonable that Wikar's "Klaare Kraal" people and Gordon's "bright kraal" people are the same group (Morris, 1992). Gordon went on to describe other people living along the river too and although the spelling of the names of the various group differ between these two early travellers it can be assumed that they are indeed speaking and describing the same groups of people.

In 1813 Reverend John Campbell travelled down the Orange River and met a group of people near the Augrabies Falls but was surprised by the few inhabitants that now lived in the area. This was mainly because of a period of severe drought and there was very little water in the area to support large human settlements. In 1824 another traveller, George Thompson rode through the central Bushmanland and reached the confluence of the Hartebeest and Orange Rivers very close to the modern Kakamas. According to his writings the whole area was deserted except for a small group of !Kora close to the Falls (Morris, 1992).

The Renosterkop settlement was on one of the large islands in the Orange River. Geographically the area that the Orange River flows through from Upington to the Augrabies Falls is characterized by the river splitting into various loops thus forming islands in the river (Moolman, 1946). The settlement consisted of ten mat huts that housed about five to six people each. The Nameiqua herded cattle, sheep and to a lesser extend goats. Cattle were their most prized possession, both economically and ritually. They were also excellent hunters and would display the heads of rhino, hippo and buffalo in the centre of the settlement (Morris & Beaumont, 1991).

The Nameiqua people were not the only people that stayed in the area. Away from the river in areas less suitable for pastoralism lived groups such as the Noeeis, Eieis and the /Xam. These groups lived mainly from hunting and gathering.
The relationships between the various groups of people that lived in this area were “peripheral” and involved “varying degrees of clientship during certain seasons, with limited exchange in items such as pots”. The Khoi peoples would sometimes also take San wives. Around the area of Upington lived the Geissiqua (Twin-folk) people. This was a mixed group of Korana-BaTlhaping (Tswana) group who were in regular contact with Tswana Iron Age communities to the northeast. This group of people would seemingly once a year trade with the tribes living along the river and who traded in items, such as, tobacco, ivory spoons, bracelets, knives, barbed assegais and smooth axes (Morris & Beaumont, 1991).

In the period leading up to the First Koranna War in 1869 the northwards trek of the Basters and the white farmers into the vicinity of the Orange River provided the Koranna (!Kora) people with opportunistic opportunities to steal cattle from these new settlers and flee to islands located in the river. It was inevitable that this would lead to armed conflict between these groups (De Beer, 1992). The First Koranna War was in 1869 and a second war took place from 1878 to 1879. After the second war many of the Basters went to settle north of the river. Reverend Scröder advocated for the Cape government to allow these Basters to go and settle in the area and from a buffer zone between the white settlers and the black tribes to the north of the Cape Colony (De Beer, 1992).

The irrigation of the Orange River has been central to the economic existence of the area in the vicinity of Upington since the 1880s. To the north of the river lies the Kalahari and to the south lies “Bushmanland”, these two areas being some of the driest land in South Africa (Legassick, 1996). Moolman attributes the beginning of irrigation in this area to the Basters who he calls: “primitive pastoral people”, who had “crude” ways to divert the river water to their “little gardens” (Moolman, 1946). According to Legassick the first person to irrigate the Orange River was one Abraham September, from whose lead the Dutch Reformed Church missionary Reverend C.H.W. Scröder and John H. Scott, the Special Magistrate for the Northern Border, stationed at Upington, would have gotten the idea to start irrigating the river on a much larger scale (Legassick, 1996).

The first 81 farms to be given out to the north of the Orange River from Kheis (opposite the present Groblershoop) to the Augrabies Falls were allocated almost exclusively to Basters in 1882. The term “Baster” refers to a group of people who have moved out of the Cape Colony to avoid social oppression and could refer to people of mixed parentage, particularly white and Khoikhoi or slave and Khoikhoi and also implies an economic category that implies the possession of property and who is culturally European (Morris, 1992). The farms bordering on the river measured in sizes ranging from 4000 to 10 000 morgen,

these farms were “laid out on the basis of half an hour’s ride along the river and two and a half hours’ ride away from the river into the ‘back country’”. Once the irrigation canal was completed these farms were further divided into “water-erven” for irrigation and “dry-erven” for establishing buildings and the like (Legassick, 1996).

The district of Gordonia was established on 30 September 1885 and formed part of British Bechuanaland. It was only administrated as part of British Bechuanaland from April 1889. The Cape government instructed the Special Magistrate appointed for the area to settle the territory with “Baster farmers” living on the southern side of the Orange River. The area was soon settled with Basters, a few whites at first largely related to the Basters by marriage and some Kora, San and Xhosa people (Legassick, 1996). In 1891 the first census in the area recorded 735 whites, 1429 “aboriginal natives” and 3121 “other coloured persons” living in the area (Legassick, 1996).

Christiaan H. W. Scröder was a missionary from the Nederduits Gereformeerde Kerk in Upington, and knew all the islands and areas alongside the Orange River, stretching from his missionary station, far to the east and the west along the riverbank. He was an important figure with regards to the foundation of both the towns of Keimoes and Kakamas. Interestingly, the name Keimoes means “large eye”, and an eye appears on the coat of arms of the town, which was created in 1960 (De Beer, 1992). When Scröder first came to Upington in July 1883, there were already people in the area of Keimoes that used irrigation and planted fields. It is possible that the proficient Mr Scott, who was at that time the only person in “Basterland” who understood the art of channelling water to other areas, directed this irrigation project in 1882.

By 1883 it was necessary to build a second furrow for irrigation, and this was done under the vigilance of C. H. W. Scröder. These furrows contributed to the advancement of the town and in the following years many families started moving to the area (De Beer, 1992).

By 1886, the committee in charge of the settlement realized the necessity of building a school for the inhabitants of Gordonia. In 1887 a school was opened, with Pieter Rossouw as its first teacher. The school was closed again in 1899, due to the start of the Anglo-Boer War (De Beer, 1992). The construction on the church at Keimoes was started in 1888 and was completed in 1889. During the construction of the church, Scröder lived in Keimoes. The church can still be seen next to the main street running through Keimoes (De Beer, 1992).

Between 1889 and 1899, more and more white people started moving to the Gordonia area and by 1900 some 13 Afrikaner families had settled at Keimoes (De Beer, 1992). After the Anglo-Boer War, many farmers were forced to move to other areas, in search of greener pastures after their farms and livelihoods were destroyed during the war. Settling next to the Orange River was an obvious choice, due to the possibility of irrigating one’s crops. Many of the farmers who came to the Gordonia area opted rather to settle in Keimoes than in Kakamas, since it was only possible to buy land in the former town. When farmers did not have the means to buy properties of their own, they often became *bywoners* to other landowners, paying a rent to live and work on the land.

7.2.4. Cultural Landscape of the area

The study area is characterised by Aeolian sand on top of a calcrete sub strata with sparse grass cover and shrubs. The larger area is utilised mostly for extensive sheep and game farming with increasing numbers of solar projects also characterising the landscape. The area is vast and open with limited infrastructure with widespread occurrences of Stone Age material.

8 FINDINGS OF THE SURVEY

The study area is divided into a western (on the farm Bloemsmond) and eastern section (on the farm Mctaggarts Camp & Tungsten lodge). The western section was surveyed during the field work for the proposed Bloemsmond PV facilities and the eastern section was assessed during the fieldwork conducted for the proposed Sirius PV facilities, a small section in the middle on the farm Daysonsklip and the eastern section on Agricultural Holding 1080 were not physically surveyed due to access restrictions (Figure 3). The western section is characterised by Aeolian sand (Figure 4) on top of a calcrete sub strata with sparse grass cover and shrubs. The eastern section is characterised by various drainage lines and exposed calcrete (Figure 5) and here widespread occurrences of background scatter of mainly Middle and Later Stone Age flakes are found. A Prominent landscape feature referred to as Rooiberg occur outside and to the north west of the current study area and was a focal point for humans in antiquity (van der Walt 2015). In the eastern section the proposed powerlines follow existing infrastructure like farm roads (Figure 7 & 8) and the eastern section for a large part an existing powerline servitude (Figure 9 & 10).

According to Beaumont *et al* (1995) “thousands of square kilometres of Bushmanland are covered by a low-density lithic scatter” and are referred to as background scatter (Orton 2016) generally of low heritage significance. Similar occurrences of low heritage significance were recorded during HIA’s in the area (e.g., Gaigher 2013, Fourie 2014, van der Walt 2015 and 2018).

In an attempt to describe the background scatter within the area of investigation, artefacts located on the survey track path were recorded as find spots with the pre-fix “FS” and numbered numerically (Table 6). Heritage sites retained the numbers recorded during the surveys conducted previously for continuity, and are recorded with the pre-fix “B” for Bloemsmond solar and “S” for Sirius solar (Table 4). 31 Stone Age find spots and eight sites are recorded consisting of a Stone Age Site, Tungsten mining trenches and a square stone foundation (Figure 11). Find Spot 1 – 8 and the Stone Age Site B3 is located in the western section with Find Spot 9 – 31 and Site (S4/1, S4/2, S4/7 – S4/11) in the eastern section (Figure 12 & 13) and is briefly discussed under Section 8.1 and 8.2.

No burial sites were recorded and if any additional graves are located in future they should ideally be preserved *in-situ* or alternatively relocated according to existing legislation. No battlefield or concentration camp sites occur in the study area.

Figure 5: Site conditions in the western section.

Figure 6: Site conditions in the eastern section.

Figure 7: Route alignment conditions in the western section.

Figure 8: Route alignment conditions in the western section.

Figure 9: Existing powerlines in the eastern section.

Figure 10: Existing powerlines in the eastern section.

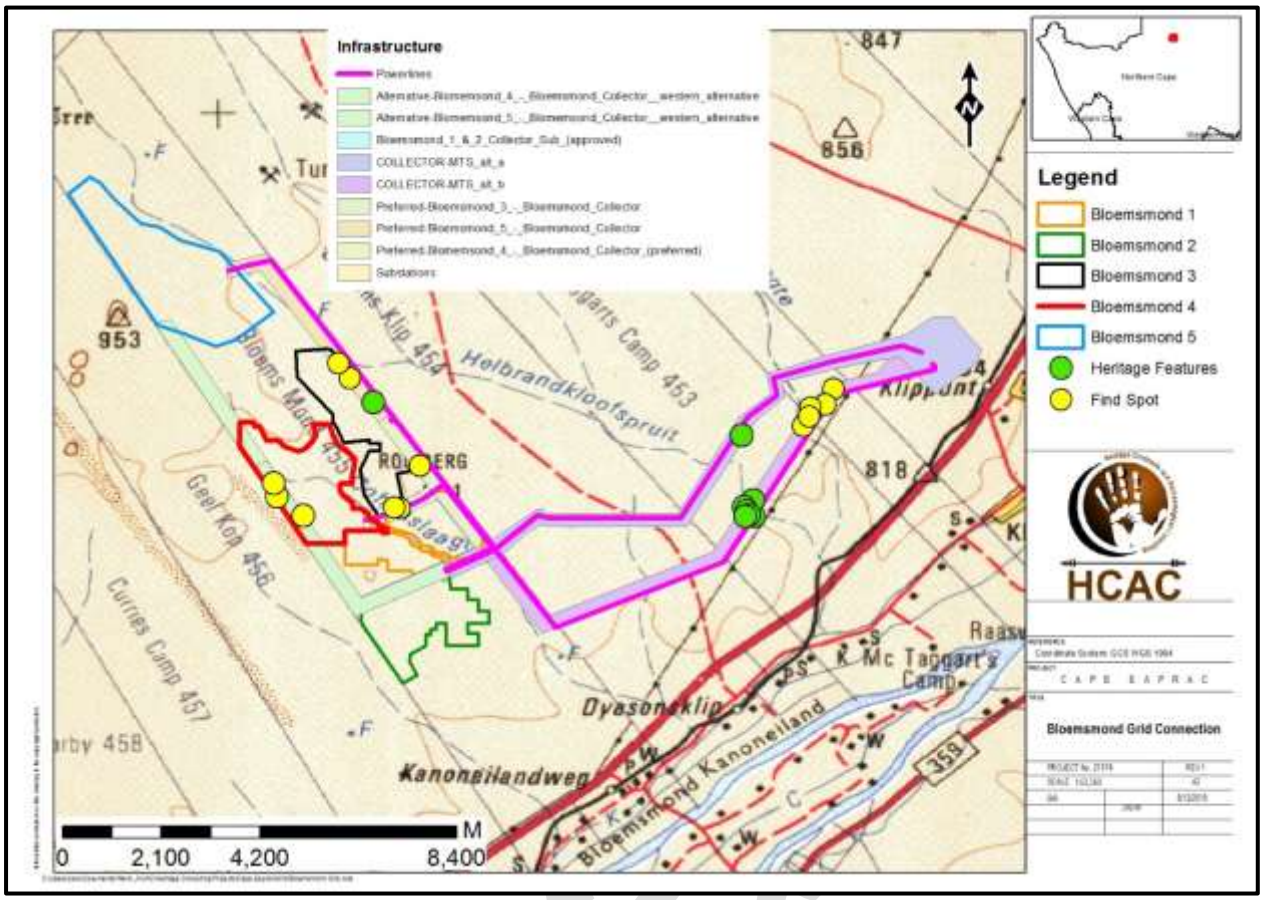


Figure 11. Site distribution map.

8.1 Sites in relation to the grid connection

A discreet archaeological site (B3/3) with scattered Stone Age Artefacts (Figure 12) was recorded at a small pan (Figure 13) during the Bloemsmond PV3 survey (Figure 14). It is recommended that this feature should be avoided with a 30 m buffer zone.

Field Rating – GP B: Heritage Significance – Medium

Figure 12. Range of artefacts and Ostrich eggshell fragments recorded at Site B3/3.

Figure 13. Site B3/3 location next to small pan.

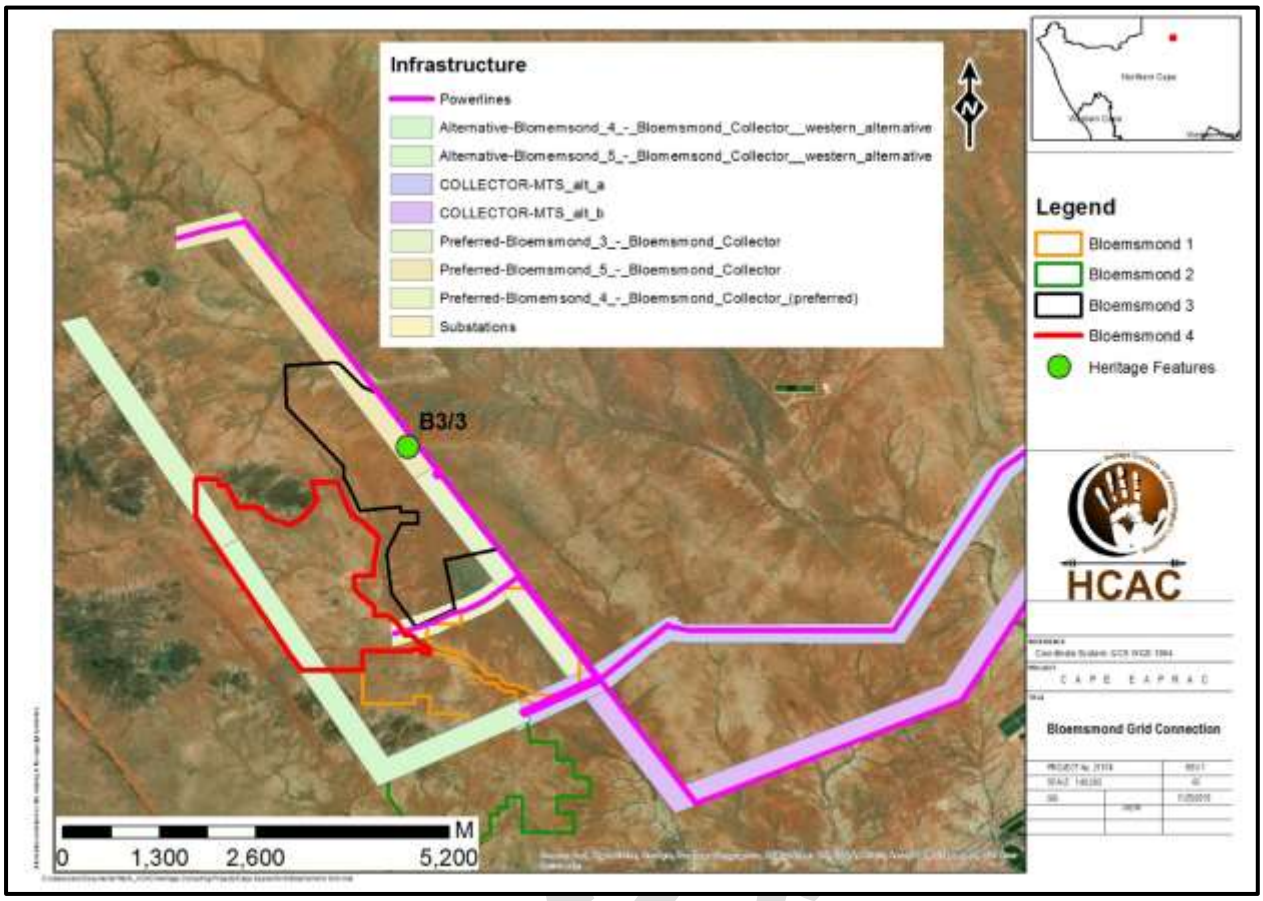


Figure 14. Site B3/3 in the western section in relation to the grid.

No standing structures older than 60 years occur in the study area. However, 7 features were recorded including 6 sites consisting of trenches associated with Tungsten mining/exploration and 1 rectangular foundation (Figure 19).

The exploration trenches are dug into the calcrete substrata and are mostly elongated although shaft like excavations were also recorded (Figure 15 & 16). The age of these features is unknown and it is not indicated on historical maps of the area (Van der Walt 2019b).

Site S4/2 is located next to a farm track and consists of rectangular calcrete foundations (Figure 17 and 18) mixed with clay bricks. A wheelbarrow and cans are scattered over the site and is associated with either farm labourer accommodation or mining activities.

Field Rating – GP C: Heritage Significance – Low

Figure 15: Tungsten mining/exploration trench Site S4/1

Figure 16: Tungsten mining/exploration trench Site S4/11

Figure 17: Rectangular calcrete foundation Site S4/2

Figure 18: Rectangular calcrete foundation Site S4/2

Table 4. Sites recorded during the assessment.

Feature Number	Longitude	Latitude	Description
B3/3	21° 01' 45.7644" E	28° 33' 19.3356" S	Small pan with low density scatters of LSA cores and flakes on CCS
S4/1	21° 06' 08.3088" E	28° 34' 37.9885" S	Two Trenches approximately 4 meters long associated with Tungsten mining/exploration
S4/2	21° 06' 08.1181" E	28° 34' 26.6448" S	Rectangular Calcrete foundation measuring 2.5 x 2.5 meters mixed with clay bricks. The remains of a wheelbarrow and iron cans etc. is scattered over the area.
S4/7	21° 06' 01.3825" E	28° 34' 31.5120" S	Trench approximately 2-meter-long associated with Tungsten mining/exploration
S4/8	21° 06' 03.3731" E	28° 34' 34.2371" S	Trench approximately 3-meter-long associated with Tungsten mining/exploration
S4/9	21° 06' 05.4685" E	28° 34' 36.8617" S	Trench approximately 2.5-meter-long associated with Tungsten mining/exploration
S4/10	21° 06' 02.2968" E	28° 34' 38.2187" S	Trench approximately 2-meter-long associated with Tungsten mining/exploration
S4/11	21° 05' 59.9495" E	28° 33' 41.9652" S	Trench approximately 3-meter-long associated with Tungsten mining/exploration

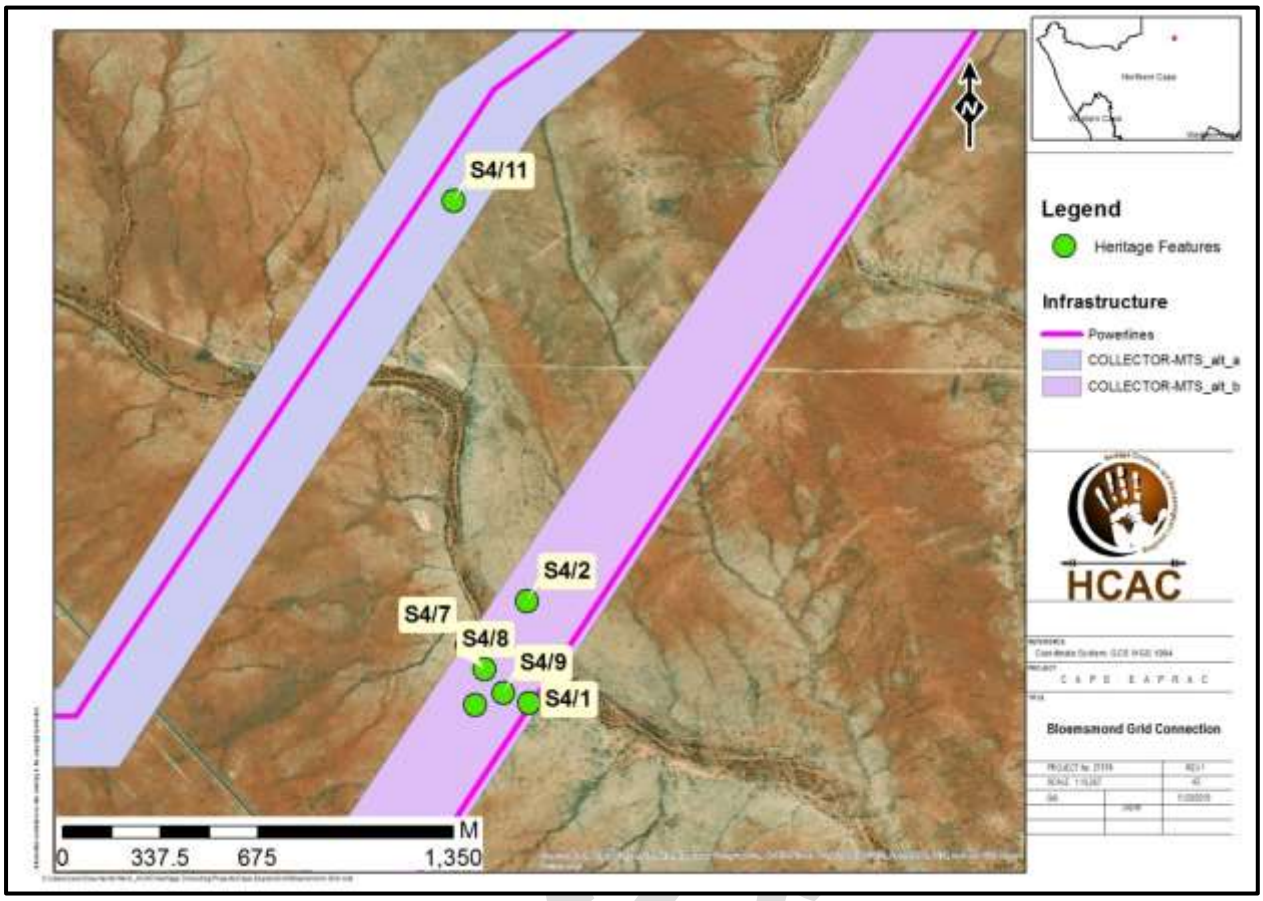


Figure 19: Sites in the eastern section.

8.2 Find Spots in relation to the grid connection

31 Find spots were recorded consisting of 28 widespread occurrences of background scatter of mainly Middle Stone Age artefacts and to a lesser extent Later Stone Age flakes and cores and 3 historical artefacts (Figure 25 and 26). Stone age Artefacts are found on a range of raw material consisting of quartz, quartzite, hornfells, banded ironstone and jaspelitic chert (Figure 20 and 21 and Table 5). The artefacts are mostly found where calcrete is exposed and found in deflated context. The features are scattered too sparsely to be of significance apart from noting them in this report.

Three historical (20th century) artefacts were recorded comprising pieces of porcelain and a metal can as well as a glass bottle dating to around 1910 (Lastovica 1982) (Figure 22, 23, 24 and Table 5). These isolated scattered features require no further mitigation.

Field Rating – GP C: Heritage Significance – Low

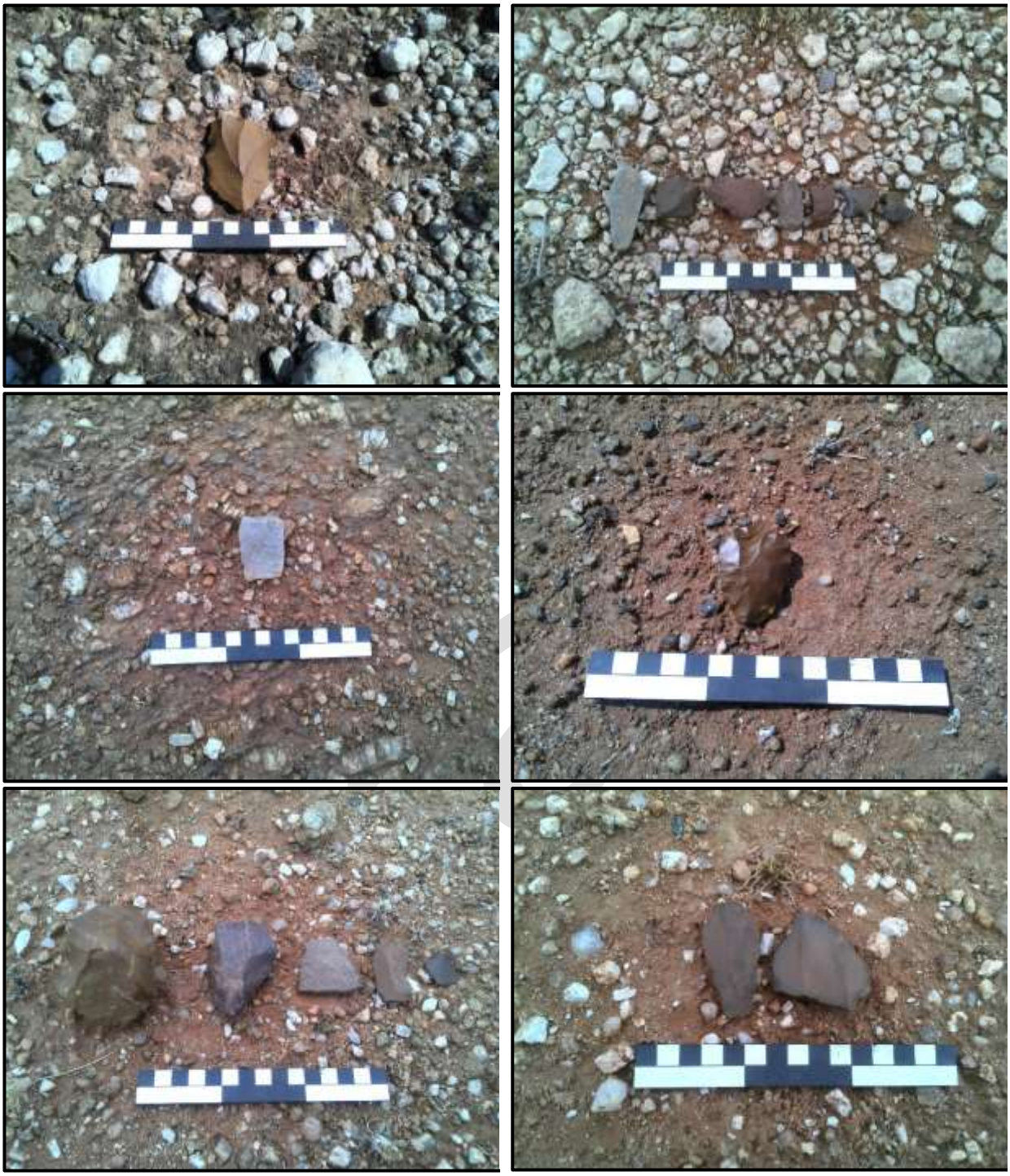


Figure 20. Range of artefacts and raw material used

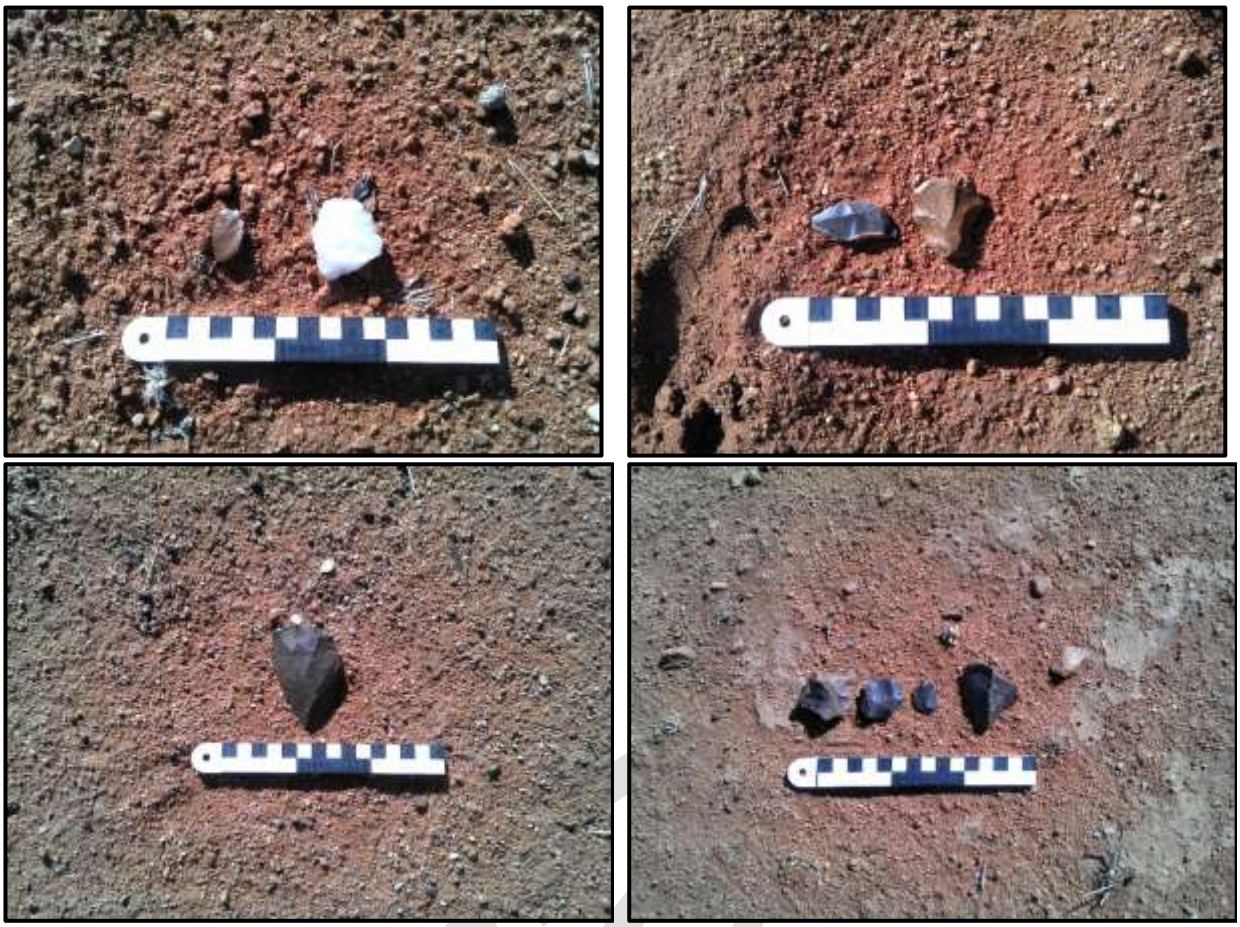


Figure 21. Dorsal and ventral views of artefacts illustrating the range of raw material used.

Figure 22. Metal can

Figure 23. Earthenware fragment

Figure 24. Glass bottle dating to around 1910.

Table 5. Recorded find spots

Site Name	Longitude	Latitude	Description
3	21° 02' 17.5237" E	28° 34' 03.2663" S	Backed blade/ segment on CCS. Pointed flake on red CCS
1	21° 02' 03.7392" E	28° 34' 32.5884" S	Metal can possibly historical
2	21° 01' 59.9629" E	28° 34' 31.9115" S	Miscellaneous flakes on CCS possibly LSA
4	21° 01' 29.4241" E	28° 33' 02.6208" S	A few flakes on CCS as well as banded iron stone and quartzite
5	21° 01' 21.3131" E	28° 32' 52.2853" S	Early 20th century earthenware fragment
6	21° 00' 57.1283" E	28° 34' 37.6104" S	Triangular flake on CCS. Made from cobble
7	21° 00' 39.0565" E	28° 34' 24.3407" S	Blade on CCS possibly LSA no platform preparation
8	21° 00' 36.6769" E	28° 34' 15.0133" S	Glass bottle Heynes Mathew Ltd dating to 1910.
9	21° 05' 32.1361" E	28° 34' 18.3540" S	Microlithic artefacts on CCS possibly LSA.
10	21° 06' 02.5343" E	28° 34' 33.3623" S	Miscellaneous broken blade on quartzite
11	21° 06' 04.9968" E	28° 34' 43.7591" S	Miscellaneous flake on CCS
12	21° 05' 56.4359" E	28° 34' 50.7575" S	Miscellaneous flake on CCS
13	21° 05' 55.6728" E	28° 34' 50.3653" S	Miscellaneous flake on CCS
14	21° 05' 48.7392" E	28° 34' 50.8043" S	Various flakes on CCS possibly LSA
15	21° 05' 59.4097" E	28° 33' 32.1337" S	Pointed flake on quartzite possibly MSA
16	21° 05' 52.5551" E	28° 33' 48.2147" S	Broken flake on quartzite
17	21° 05' 54.9097" E	28° 33' 48.0961" S	Area consists of exposed calcrete with a wide scatter of mainly MSA flakes, a few blades on quartzite and hornfells.
18	21° 05' 55.0177" E	28° 33' 48.1176" S	Area consists of exposed calcrete with a wide scatter of mainly MSA flakes, a few blades on quartzite and Hornfells
19	21° 05' 55.1939" E	28° 33' 48.1429" S	Area consists of exposed calcrete with a wide scatter of mainly MSA flakes, a few blades on quartzite and Hornfells
20	21° 05' 55.3237" E	28° 33' 48.1284" S	Area consists of exposed calcrete with a wide scatter of mainly MSA flakes, a few blades on quartzite and Hornfells
21	21° 05' 55.4495" E	28° 33' 48.1067" S	Area consists of exposed calcrete with a wide scatter of mainly MSA flakes, a few blades on quartzite and Hornfells
22	21° 05' 55.5684" E	28° 33' 48.1176" S	Area consists of exposed calcrete with a wide scatter of mainly MSA flakes, a few blades on quartzite and Hornfells
23	21° 06' 18.2376" E	28° 34' 07.1688" S	LSA flake on CCS
24	21° 06' 19.4005" E	28° 34' 06.8052" S	Irregular core on CCS
25	21° 06' 22.4533" E	28° 34' 06.2436" S	Core on ccs, pointed flake and broken blade (MSA) on quartzite, bladelet on hornfell possibly LSA, miscellaneous flake on CCS
26	21° 06' 23.6123" E	28° 34' 14.5453" S	Pointed flake and broken flake on CCS. Possibly MSA/LSA.
27	21° 07' 03.3167" E	28° 33' 10.0692" S	1 miscellaneous flake on Quartzsite
28	21° 06' 57.7440" E	28° 33' 20.8763" S	Several artefacts on a calcrete layer protruding through the sand cover. Approximately 50 meters wide and 100 meters long. Irregular core on quartzite. one flake with secondary retouch on ccs one miscellaneous flake
29	21° 06' 47.6064" E	28° 33' 22.9931" S	Several artefacts on CCS possibly LSA because it is microlithic most are miscellaneous flakes. Some LSA blade cores. Calcrete is protruding through the sand cover with more artefacts closer to the stream. Artefact ratio is less than one per 2 m²
30	21° 06' 42.4909" E	28° 33' 35.5537" S	MSA blade where Calcrete protrudes through sand cover close to stream
31	21° 06' 46.8288" E	28° 33' 29.1744" S	Several miscellaneous flakes on banded Ironstone

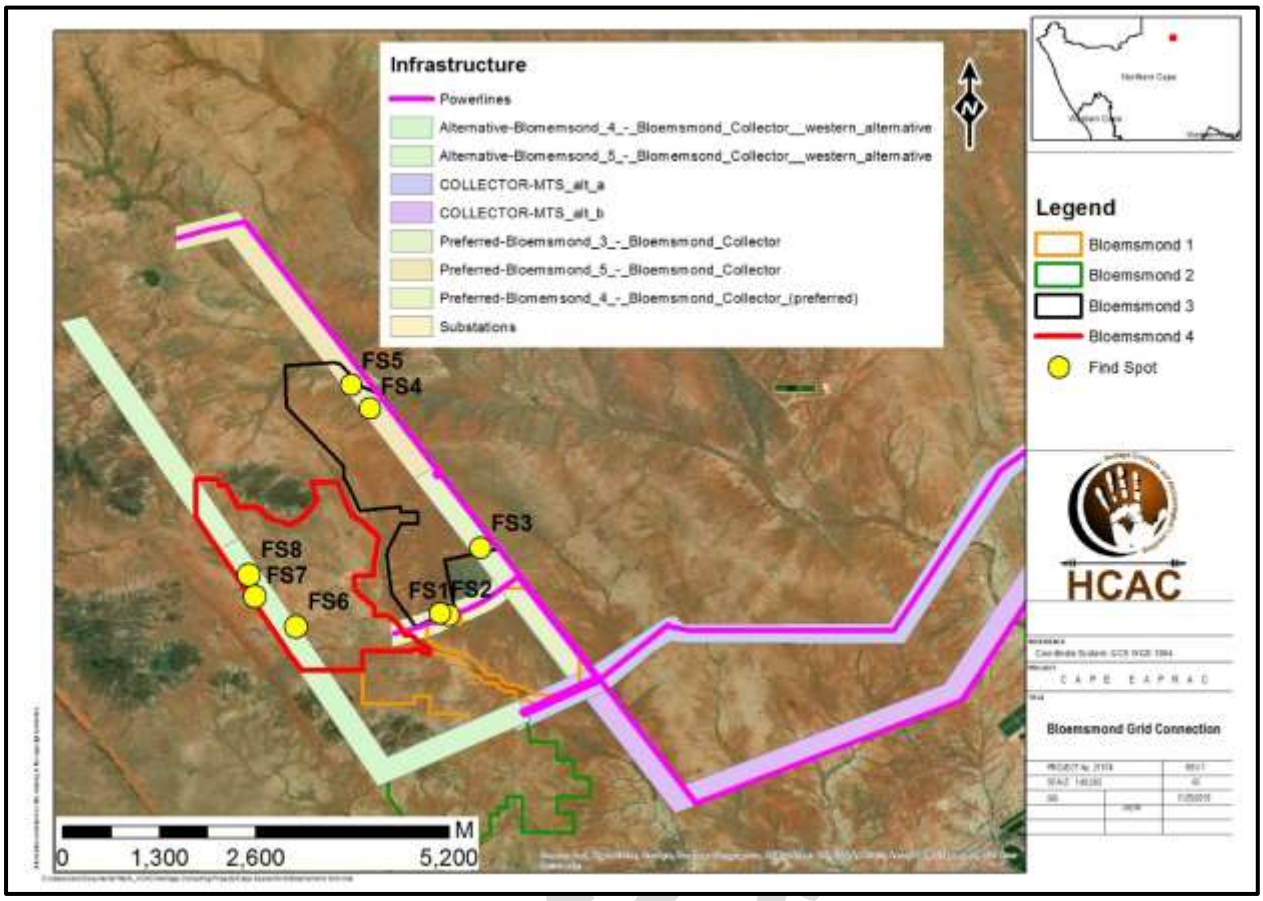


Figure 25. Find spots in relation to the preferred and alternative Bloemsmond Powerline Corridors.

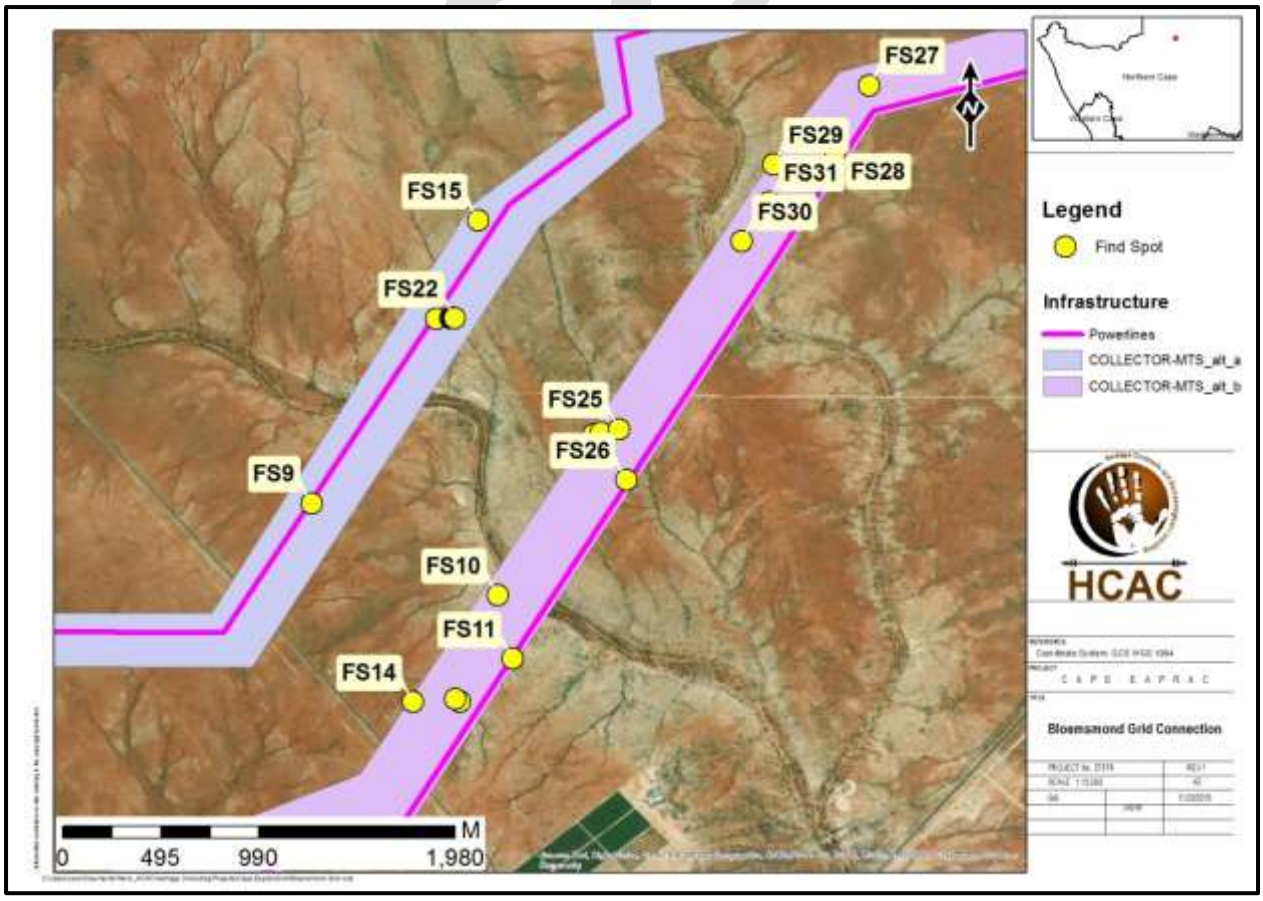


Figure 26. Find spots in relation to Collector Alternative A and B.

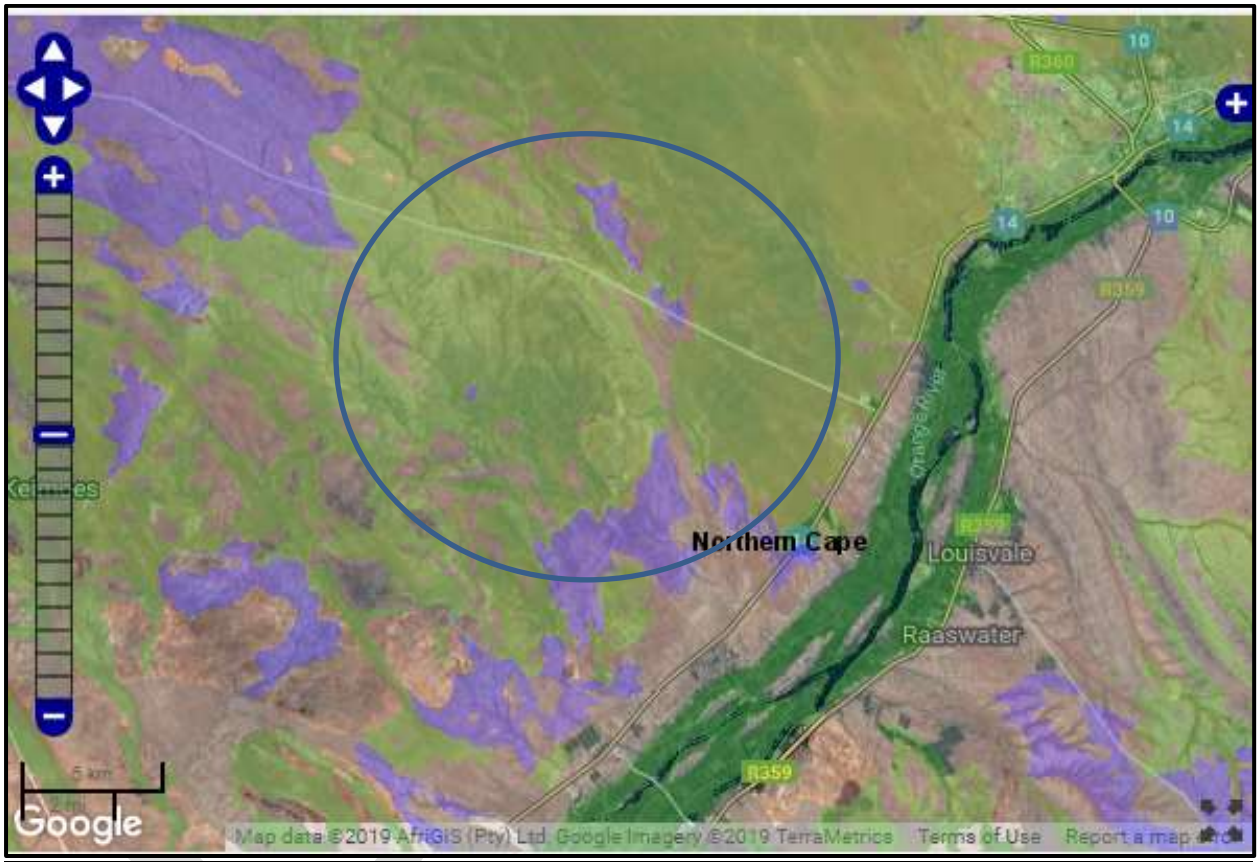
8.3 Cultural Landscape

The cultural landscape of the greater study area is characterised by agricultural developments as well as adjacent renewable energy developments (Figure 27) and the project will not impact on significant viewscapes.

Figure 27. Existing solar development adjacent to the study area.

8.4 Palaeontology

According to the SAHRA paleontological sensitivity map the area is of moderate sensitivity (Figure 27). The paleontological component was addressed in an independent study (Almond 2019). The study recommended that pending the discovery of significant new fossils remains before or during construction, exemption from further specialist palaeontological studies and mitigation be granted for the proposed project. Almond (2019) also noted that should any substantial fossil remains (e.g. mammalian bones and teeth) be encountered during excavation, however, these should be safeguarded, preferably in situ, and reported by the ECO to SAHRA so that appropriate action can be taken by a professional palaeontologist, at the developer's expense. Mitigation would normally involve the scientific recording and judicious sampling or collection of fossil material as well as associated geological data (e.g. stratigraphy, sedimentology, taphonomy) by a professional palaeontologist.



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 28.Paleontological sensitivity of the approximate study area (indicated in blue) as indicated on the SAHRIS paleontological sensitivity map.

9 Impact Assessment

9.1 Potential Impact

Both the proposed powerline corridors are acceptable from a heritage point of view but the preferred corridor will traverse recorded heritage site B3/3 (Figure 14). The impact on the site can be mitigated by micro citing the pylon positions to avoid the site with a 30 m buffer. The Alternative corridor will not impact on any significant recorded heritage features and is therefore preferred from a heritage point of view. The Collectors alternative A and B travers the areas six sites with trenches were recorded as well as one site with rectangular foundations associated with mining activities occur (Figure 19). These sites are of low significance and both alternatives are acceptable from a heritage point of view.

Both the Alternatives (A and B) for the collectors and the Preferred and Alternative Powerline corridors will traverse areas where heritage find spots were recorded (Figure 25 and 26). The find spots include isolated 20th century glass and cans as well as widespread isolated Stone Age scatters of no heritage significance apart from mentioning them in this report and the impacts are acceptable.

Impacts that may occur would be during the construction phase only and would be of low to medium significance.

Cumulative impacts occur from the combination of effects of various impacts on heritage resources. The importance of identifying and assessing cumulative impacts is that the whole is greater than the sum of its parts. The area is rich in terms of the number of archaeological features present. These features are of low to medium significance and taking in consideration existing impacts by renewable energy developments the cumulative impact is still regarded as low. This and other projects in the area could, however, have an indirect impact on the larger heritage landscape.

9.2 Pre-Construction phase:

It is assumed that the pre-construction phase involves the removal of topsoil and vegetation as well as the establishment of infrastructure needed for the construction phase. These activities can have a negative and irreversible impact on heritage sites. Impacts include destruction or partial destruction of non-renewable heritage resources.

9.3 Construction Phase

During this phase, the impacts and effects are similar in nature but more extensive than the pre-construction phase. These activities can have a negative and irreversible impact on heritage sites. Impacts include destruction or partial destruction of non-renewable heritage resources.

9.4 Operation Phase:

No impact is envisaged for the recorded heritage resources during this phase.

Table 6. Impact table – Archaeological heritage resources.

Nature: 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 material or objects.		
	Without mitigation	**With mitigation (Preservation/ excavation of site)**
Extent	Site specific (1)	Site specific (1)
Duration	Permanent (5)	Permanent (5)
Magnitude	Low (4)	Low (4)
Probability	Probable (3)	Improbable (2)
Significance	**30 (Medium)**	**20 (Low)**
Status (positive or negative)	Negative	Negative
Reversibility	Not reversible	Not reversible
Irreplaceable loss of resources?	yes	Yes
Can impacts be mitigated?	Yes, a chance find procedure should be implemented.	Yes
Mitigation: • The final alignment must be subjected to a walk down prior to development; • Avoidance of Site B3/3 by micro citing pylon positions; • A chance find procedure must be implemented for the project as outlined in Section 10.1.		
Residual Impacts: If sites are destroyed this results in the depletion of archaeological record of the area and even though surface features can be avoided or mitigated, there is a chance that completely buried sites would still be impacted but this cannot be quantified. However, if sites are recorded and preserved or mitigated this adds to the record of the area.		

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9.5 Cumulative Impacts

From a cumulative perspective, it is anticipated that the development of the Bloemsmond Grid will not result in a whole-scale change to the heritage character of the area as the development will not impact on any significant heritage resources and is in line with other developments in the area.

Table 7. Cumulative impacts of the project

Nature: The development of the project and other renewable energy developments within the area may result in disturbance of surfaces and/or sub-surfaces and may destroy, damage, alter, or remove from its original position archaeological material or objects.		
	Overall impact of the proposed project considered in isolation	**Cumulative impact of the project and other projects in the area**
Extent	Local (1)	Local (1)
Duration	Permanent (5)	Permanent (5)
Magnitude	Minor (2)	Minor (2)
Probability	Very Improbable (1)	Very Improbable (1)
Significance	**8 (Low)**	**8 (Low)**
Status (positive or negative)	Negative	Negative
Reversibility	Not reversible	Not reversible
Irreplaceable loss of resources?	No resources were recorded	No resources were recorded.
Can impacts be mitigated?	NA	NA
Confidence in findings	High	High

10 CONCLUSION AND RECOMMENDATIONS

HCAC was appointed to conduct a Heritage Impact Assessment of the proposed Bloemsmond Grid project to determine the impact of the proposed development on non-renewable resources. The study area is located approximately 10 km north-east of Keimoes and to the west of the Orange River. There are various drainage lines draining the study area to the south east towards the Orange River. The topography of the area is undulating characterised by Aeolian sand on top of a calcrete sub strata with sparse grass cover and shrubs.

The study area is divided into a western (on the farm Bloemsmond) and eastern section (on the farm Mctaggarts Camp & Tungsten lodge). The western section was surveyed during the field work for the proposed Bloemsmond PV facilities and the eastern section was assessed during the fieldwork conducted for the proposed Sirius PV facilities, a small section in the middle on the farm Daysonsklip and the eastern section on Agricultural Holding 1080 were not physically surveyed due to access restrictions. For continuity site numbers allocated for the project were retained in this assessment.

The assessment considered the preferred powerline corridor on the Eastern Boundary of the farm Bloemsmond as well as the alternative powerline corridor on the western boundary of the same farm and also the collector Alternative A (to the north) and B (southern line).

Key finding of the study includes:

- 28 Stone Age find spots and three historical find spots were recorded. No further mitigation is required for these find spots as they are scattered too sparsely to be of significance apart from noting their presence in this report;
- One distinct archaeological site comprising an open-air Stone Age site marked by lithics next to a seasonal waterhole (Site B3/3) was recorded. The site is located within the corridor of the preferred Bloemsmond powerline. The site is of medium significance;
- Seven features including six sites with trenches relating to Tungsten mining were recorded as well as the foundations of a labourer dwelling. These sites are of low significance;
- Due to the nature of the overhead powerlines and the relatively small impact of the pylons the recorded sites can be retained *in-situ* within the development.
- No graves were recorded but graves can occur anywhere on the landscape. If any additional graves are located in future they should ideally be preserved *in-situ* or alternatively relocated according to existing legislation.
- According to the SAHRA paleontological sensitivity map the area is of moderate paleontological sensitivity and an independent study was conducted by John Almond (2019). The study recommended that pending the discovery of significant new fossils remains before or during construction, exemption from further specialist palaeontological studies and mitigation be granted for the proposed project.

The impact of the proposed project on heritage resources is considered acceptable with the correct mitigation measures in place such as *in-situ* preservation. It is therefore recommended that the proposed project can commence based on the following recommendations as part of the EMPr and based on the approval of SAHRA.

- The final alignment must be subjected to a walk down prior to development;
- A chance find procedure must be implemented for the project as outlined in Section 10.1.

Both the proposed powerline corridors are acceptable from a heritage point of view but the preferred corridor will traverse recorded heritage site B3/3. The impact on the site can be mitigated by micro citing to avoid the site with a 30 m buffer. The Alternative corridor will not impact on any significant recorded heritage

features. Through avoidance of site B3/3 both powerline corridors are acceptable from a heritage point of view.

10.1 Chance Find Procedures

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

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 Reasoned Opinion

The impact of the proposed project on heritage resources is considered to be of low significance. Therefore, the project is considered to be acceptable from a heritage perspective and no further pre-construction mitigation in terms of archaeological resources is required based on approval from SAHRA. Furthermore, the socio-economic benefits also outweigh the possible impacts of the development with the correct mitigation measures (i.e. chance find procedure) implemented for the project.

10.3 Potential Risk

Potential risks to the proposed project are the occurrence of unknown and unmarked graves. The possibility exists that the study area could contain graves of which surface indicators have been destroyed and subsurface material could be uncovered during earth works. These risks can be mitigated to an acceptable level with monitoring and the implementation of a chance find procedure as outlined in Section 10.1.

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APPENDICES:

Appendix A

Curriculum Vitae of Specialist

Jaco van der Walt
Archaeologist

jaco.heritage@gmail.com
+27 82 373 8491
+27 86 691 6461

Education:

Particulars of degrees/diplomas and/or other qualifications:

Name of University or Institution:		University of Pretoria
Degree obtained	**:**	BA Heritage Tourism & Archaeology
Year of graduation	**:**	2001
Name of University or Institution:		University of the Witwatersrand
Degree obtained	**:**	BA Hons Archaeology
Year of graduation	**:**	2002
Name of University or Institution	**:**	University of the Witwatersrand
Degree Obtained	**:**	MA (Archaeology)
Year of Graduation	:	2012
Name of University or Institution:		University of Johannesburg
Degree	**:**	PhD
Year	:	Currently Enrolled

EMPLOYMENT HISTORY:

2011 – Present:	**Owner – HCAC (Heritage Contracts and Archaeological Consulting CC)**.
2007 – 2010 :	**CRM Archaeologist,** Managed the Heritage Contracts Unit at the University of the Witwatersrand.
2005 - 2007:	**CRM Archaeologist**, Director of Matakoma Heritage Consultants
2004:	**Technical Assistant**, Department of Anatomy University of Pretoria
2003:	**Archaeologist**, Mapungubwe World Heritage Site
2001 - 2002:	**CRM Archaeologists,** For R & R Cultural Resource Consultants, Polokwane
2000:	**Museum Assistant**, Fort Klapperkop.

Countries of work experience include:

Republic of South Africa, Botswana, Zimbabwe, Mozambique, Tanzania, The Democratic Republic of the Congo, Lesotho and Zambia.

SELECTED PROJECTS INCLUDE:

Archaeological Impact Assessments (Phase 1)

Heritage Impact Assessment Proposed Discharge Of Treated Mine Water Via The Wonderfontein Spruit Receiving Water Body Specialist as part of team conducting an Archaeological Assessment for the Mmamabula mining project and power supply, Botswana

Archaeological Impact Assessment Mmamethlake Landfill

Archaeological Impact Assessment Libangeni Landfill

Linear Developments

Archaeological Impact Assessment Link Northern Waterline Project At The Suikerbosrand Nature Reserve

Archaeological Impact Assessment Medupi – Spitskop Power Line,

Archaeological Impact Assessment Nelspruit Road Development

Renewable Energy developments

Archaeological Impact Assessment Karoshoek Solar Project

Grave Relocation Projects

Relocation of graves and site monitoring at Chloorkop as well as permit application and liaison with local authorities and social processes with local stakeholders, Gauteng Province.

Relocation of the grave of Rifle Man Maritz as well as permit application and liaison with local authorities and social processes with local stakeholders, Ndumo, Kwa Zulu Natal.

Relocation of the Magolwane graves for the office of the premier, Kwa Zulu Natal

Relocation of the OSuthu Royal Graves office of the premier, Kwa Zulu Natal

Phase 2 Mitigation Projects

Field Director for the Archaeological Mitigation For Booysendal Platinum Mine, Steelpoort, Limpopo Province. Principle investigator Prof. T. Huffman

Monitoring of heritage sites affected by the ARUP Transnet Multipurpose Pipeline under directorship of Gavin Anderson.

Field Director for the Phase 2 mapping of a late Iron Age site located on the farm Kameelbult, Zeerust, North West Province. Under directorship of Prof T. Huffman.

Field Director for the Phase 2 surface sampling of Stone Age sites effected by the Medupi – Spitskop Power Line, Limpopo Province

Heritage management projects

Platreef Mitigation project – mitigation of heritage sites and compilation of conservation management plan.

MEMBERSHIP OF PROFESSIONAL ASSOCIATIONS:

- Association of Southern African Professional Archaeologists. Member number 159

  Accreditation:
  - Field Director Iron Age Archaeology
  - Field Supervisor Colonial Period Archaeology, Stone Age Archaeology and Grave Relocation
- Accredited CRM Archaeologist with SAHRA
- Accredited CRM Archaeologist with AMAFA
- Co-opted council member for the CRM Section of the Association of Southern African Association Professional Archaeologists (2011 – 2012)

PUBLICATIONS AND PRESENTATIONS

- A Culture Historical Interpretation, Aimed at Site Visitors, of the Exposed Eastern Profile of K8 on the Southern terrace at Mapungubwe.
  - J van der Walt, A Meyer, WC Nienaber
  - Poster presented at Faculty day, Faculty of Medicine University of Pretoria 2003
- 'n Reddingsondersoek na Anglo-Boereoorlog-ammunisie, gevind by Ifafi, Noordwes-Provinsie. South-African Journal for Cultural History 16(1) June 2002, with A. van Vollenhoven as co-writer.
- Fieldwork Report: Mapungubwe Stabilization Project.
  - WC Nienaber, M Hutten, S Gaigher, J van der Walt
  - Paper read at the Southern African Association of Archaeologists Biennial Conference 2004
- A War Uncovered: Human Remains from Thabantšho Hill (South Africa), 10 May 1864.
  - M. Steyn, WS Boshoff, WC Nienaber, J van der Walt
  - Paper read at the 12th Congress of the Pan-African Archaeological Association for Prehistory and Related Studies 2005
- Field Report on the mitigation measures conducted on the farm Bokfontein, Brits, North West Province .
  - J van der Walt, P Birkholtz, W. Fourie
  - Paper read at the Southern African Association of Archaeologists Biennial Conference 2007
- Field report on the mitigation measures employed at Early Farmer sites threatened by development in the Greater Sekhukhune area, Limpopo Province. J van der Walt
  - Paper read at the Southern African Association of Archaeologists Biennial Conference 2008
- Ceramic analysis of an Early Iron Age Site with vitrified dung, Limpopo Province South Africa.
  - J van der Walt. Poster presented at SAFA, Frankfurt Germany 2008

- Bantu Speaker Rock Engravings in the Schoemanskloof Valley, Lydenburg District, Mpumalanga (*In Prep)*
    - J van der Walt and J.P Celliers
- Sterkspruit: Micro-layout of late Iron Age stone walling, Lydenburg, Mpumalanga. W. Fourie and J van der Walt. A Poster presented at the Southern African Association of Archaeologists Biennial Conference 2011
- Detailed mapping of LIA stone-walled settlements' in Lydenburg, Mpumalanga. J van der Walt and J.P Celliers
    - Paper read at the Southern African Association of Archaeologists Biennial Conference 2011
- Bantu-Speaker Rock engravings in the Schoemanskloof Valley, Lydenburg District, Mpumalanga. J.P Celliers and J van der Walt
    - Paper read at the Southern African Association of Archaeologists Biennial Conference 2011
- Pleistocene hominin land use on the western trans-Vaal Highveld ecoregion, South Africa, Jaco van der Walt.
    - J van der Walt. Poster presented at SAFA, Toulouse, France. Biennial Conference 2016

REFERENCES:

1. Prof Marlize Lombard — Senior Lecturer, University of Johannesburg, South Africa
   E-mail: mlombard@uj.ac.za
2. Prof TN Huffman — Department of Archaeology Tel: (011) 717 6040
   University of the Witwatersrand
3. Alex Schoeman — University of the Witwatersrand
   E-mail:Alex.Schoeman@wits.ac.za