Phase 1 Cultural Heritage Impact Assessment:

DEVELOPMENT OF THE PROPOSED LIU ENERGY SOLAR PV FACILITY ON FARM VARSPUTS 564, EAST OF SPRINGBOK, NORTHERN CAPE PROVINCE

Prepared for:

4 Degrees Consulting: Mr T Mothibi

- Address: International Business Gateway, 113 Elizabeth Road, Midridge Park, Midrand, 1685. Tel: 084 440 1122; E-mail: reetsang@4degrees.co.za

Prepared by:

J A van Schalkwyk (D Litt et Phil),

- Heritage Consultant: ASAPA Registration No.: 164 - Principal Investigator: Iron Age, Colonial Period, Industrial Heritage.
- Postal Address: 62 Coetzer Avenue, Monument Park, 0181; Tel: 076 790 6777; E-mail: jvschalkwyk@mweb.co.za

Report No: 2021/JvS/095

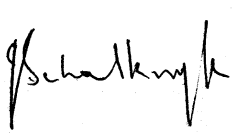
- Status: Final
- Date: November 2021
- Revision No: -
- Date: -

Submission of the report:

It remains the responsibility of the client to submit the report to the South African Heritage Resources Agency (SAHRA) or relevant Provincial Heritage Resources Agency (PHRA) by means of the online SAHRIS System.

Specialist competency:

Johan A van Schalkwyk, D Litt et Phil, heritage consultant, has been working in the field of heritage management for more than 40 years. Originally based at the National Museum of Cultural History, Pretoria, he has actively done research in the fields of anthropology, archaeology, museology, tourism and impact assessment. This work was done in Limpopo Province, Gauteng, Mpumalanga, North West Province, Eastern Cape Province, Northern Cape Province, Botswana, Zimbabwe, Malawi, Lesotho and Swaziland. Based on this work, he has curated various exhibitions at different museums and has published more than 70 papers, most in scientifically accredited journals. During this period, he has done more than 2000 impact assessments (archaeological, anthropological, historical and social) for various government departments and developers. Projects include environmental management frameworks, roads, pipeline-, and power line developments, dams, mining, water purification works, historical landscapes, refuse dumps and urban developments.



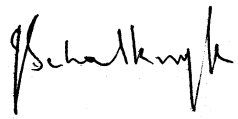
J A van Schalkwyk
Heritage Consultant
November 2021

SPECIALIST DECLARATION

I, J A van Schalkwyk, as the appointed independent specialist, in terms of the 2014 EIA Regulations (as amended), hereby declare that I:

- I act as the independent specialist in this application;
- I 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;
- regard the information contained in this report as it relates to my specialist input/study to be true and correct, and do not have and will not have any financial interest in the undertaking of the activity, other than remuneration for work performed in terms of the NEMA, the Environmental Impact Assessment Regulations, 2014 (as amended) and any specific environmental management Act;
- 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 have no vested interest in the proposed activity proceeding;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- I have ensured that information containing all relevant facts in respect of the specialist input/study was distributed or made available to interested and affected parties and the public and that participation by interested and affected parties was facilitated in such a manner that all interested and affected parties were provided with a reasonable opportunity to participate and to provide comments on the specialist input/study;
- I have ensured that the comments of all interested and affected parties on the specialist input/study were considered, recorded and submitted to the competent authority in respect of the application;
- all the particulars furnished by me in this specialist input/study 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 of the specialist



J A van Schalkwyk
November 2021

EXECUTIVE SUMMARY

Phase 1 Cultural Heritage Impact Assessment:
DEVELOPMENT OF THE PROPOSED LIU ENERGY SOLAR PV FACILITY ON FARM VARSPUTS 564, EAST OF SPRINGBOK, NORTHERN CAPE PROVINCE

4 Degrees Consulting is undertaking a Basic Assessment (BA) of the proposed Solar Photovoltaic (PV) facility and associated infrastructure on the farm Varsputs 564 east Springbok in Northern Cape Province. The proposed project is located within the Springbok Renewable Energy Development Zone (REDZ). The development footprint will be approximately 300 ha and the transmission line will be approximately 6 km.

In accordance with Section 38 of the NHRA, an independent heritage consultant was appointed by *4 Degrees Consulting* to conduct a cultural heritage assessment to determine if the development of solar PV facility would have an impact on any sites, features or objects of cultural heritage significance.

- On 16 November 2021 the specialist was informed by *4 Degrees Consulting* via e-mail that the power line / grid has been removed from the EIA application as it has not yet been surveyed.

This report describes the methodology used, the limitations encountered, the heritage features that were identified and the recommendations and mitigation measures proposed relevant to this. The investigation consisted of a desktop study (archival sources, database survey, maps and aerial imagery) and a physical survey that also included the interviewing of relevant people. It should be noted that the implementation of the mitigation measures is subject to SAHRA/PHRA's approval.

The cultural heritage profile of the larger region is very low. Most frequently found are stone artefacts, mostly dating to the Middle Stone Age. Sites containing such material are usually located along the margins of water features (pans, drainage lines), small hills and rocky outcrops. Such surface scatters or 'background scatter' is usually viewed to be of limited significance (Orton 2016a). In addition to the lithic materials, San and Khoi rock art dating to the Later Stone Age occur in the larger region. However, these are mostly confined to the more mountainous regions where shelters and rock faces are to be found. The colonial period manifests largely as individual farmsteads, in all its complexity, burial sites and infrastructure features such as roads, railways and power lines.

Identified sites

During the survey, the following sites, features or objects of cultural significance were identified.

- 7.1.1 Three probable MSA tools were found in a pan-like depression. The tools were identified over a transect distance of approximately 70 m, indicating a very low presence. The tools are made of quarts and can be classified as scrapers.

Some heritage sites have been identified adjacent to the project area, but they will not be directly impacted on by the development of the proposed Liu Energy Solar PV Facility.

- 6.3.1 The main farmstead on the property. It is clearly visible on the 1960 version of the aerial photographs, and it is therefore deemed to be older than 60 years. According to Mrs van den Berg, the house has been altered and expanded on in the past.

- 6.3.2 An informal burial site with probably only 5 graves. The graves belong to former landowners, all with the surname of Van den Heever. The death dates on the headstones range between 1973 and 2014.

Impact assessment and proposed mitigation measures

Impact analysis of cultural heritage resources under threat of the proposed prospecting activities is based on the present understanding of the project:

Site No.	Site type	NHRA category	Field rating	Impact rating: Before/After mitigation
7.1.1	Archaeological resources	Section 35	Generally protected 4C: Low significance - Requires no further recording before destruction.	Low (24) Low (24)
Mitigation: (5) No further action required				

Cumulative assessment

Heritage resources are sparsely distributed on the wider landscape with highly significant (Grade 1) sites being rare. Because of the low likelihood of finding further significant heritage resources in the region of the proposed project area and the generally low density of sites in the wider landscape the overall impacts to heritage are expected to be of generally low significance.

- The chances of further such material being found are considered to be negligible.

Legal requirements

The legal requirements related to heritage specifically are specified in Section 3 of this report.

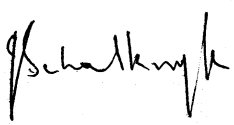
- For this proposed project, the assessment has determined that no sites, features or objects of cultural heritage significance occur in the project area, therefore no permits are required from SAHRA or the PHRA.
- If heritage features are identified during construction, as stated in the management recommendation, these finds would have to be assessed by a specialist, after which a decision will be made regarding the application for relevant permits.

Reasoned opinion as to whether the proposed activity should be authorised:

- From a heritage point of view, it is recommended that the Proposed Project be allowed to continue on acceptance of the mitigation measures presented above and the conditions proposed below.

Conditions for inclusion in the environmental authorisation:

- The Palaeontological Sensitivity Map (http://www.sahra.org.za/sahris/map/palaeo) indicate that project area has a low sensitivity of fossil remains to be found and therefore no palaeontological studies are required. However, a protocol for finds is required.
- Should archaeological sites or graves be exposed during construction work, it must immediately be reported to a heritage practitioner so that an investigation and evaluation of the finds can be made. The appropriate steps to take are indicated in Section 9 of the report, as well as in the **Management Plan: Burial Grounds and Graves, with reference to general heritage sites**, in the Addendum, Section 12.4.



J A van Schalkwyk
Heritage Consultant
November 2021

TECHNICAL SUMMARY

Project description	
Description	Development of a solar PV facility
Project name	Liu Energy Solar PV Facility

Applicant
Liu Energy (Pty) Ltd

Environmental assessment practitioner
Mr T Mothibi
4 Degrees Consulting

Property details						
Province	Northern Cape					
Magisterial district	Namaqualand					
District municipality	Namakwa					
Topographic map	2918AD					
Farm name	Varsputs 564					
Closest town	Springbok					
Coordinates	Centre point (approximate)					
	No	Latitude	Longitude	No	Latitude	Longitude
	1	S 29,47834	E 18,29751	2		
	.kml files[1]					

Development criteria in terms of Section 38(1) of the NHR Act	Yes/No
Construction of road, wall, power line, pipeline, canal or other linear form of development or barrier exceeding 300m in length	No
Construction of bridge or similar structure exceeding 50m in length	No
Development exceeding 5000 sq m	Yes
Development involving three or more existing erven or subdivisions	No
Development involving three or more erven or divisions that have been consolidated within past five years	No
Rezoning of site exceeding 10 000 sq m	No
Any other development category, public open space, squares, parks, recreation grounds	No

Land use	
Previous land use	Farming
Current land use	Farming

[1] Left click on the icon to open the file in Google Earth, if installed on the computer. Alternatively, right click on the icon. In dialog box, select "Save Embedded File to Disk" and save to folder of choice.

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GLOSSARY OF TERMS AND ABBREVIATIONS

TERMS

Bioturbation: The burrowing by small mammals, insects and termites that disturb archaeological deposits.

Cumulative impacts: In relation to an activity, means the past, current and reasonably foreseeable future impact of an activity, considered together with the impact of activities associated with that activity, that in itself may not be significant, but may become significant when added to existing and reasonably foreseeable impacts eventuating from similar or diverse activities.

Debitage: Stone chips discarded during the manufacture of stone tools.

Factory site: A specialised archaeological site where a specific set of technological activities has taken place – usually used to describe a place where stone tools were made.

Historic Period: Since the arrival of the white settlers - c. AD 1830 - in this part of the country.

Holocene: The most recent time period, which commenced c. 10 000 years ago.

Iron Age (also referred to as **Early Farming Communities**)**:** Period covering the last 1800 years, when new people brought a new way of life to southern Africa. They established settled villages, cultivated domestic crops such as sorghum, millet and beans, and herded cattle, sheep and goats. As they produced their own iron tools, archaeologists call this the Iron Age.

Early Iron Age	AD 200 - AD 900
Middle Iron Age	AD 900 - AD 1300
Later Iron Age	AD 1300 - AD 1830

Midden: The accumulated debris resulting from human occupation of a site.

Mitigation, means to anticipate and prevent negative impacts and risks, then to minimise them, rehabilitate or repair impacts to the extent feasible.

National Estate: The collective heritage assets of the Nation.

Pleistocene: Geological time period of 3 000 000 to 20 000 years ago.

Stone Age: The first and longest part of human history is the Stone Age, which began with the appearance of early humans between 3-2 million years ago. Stone Age people were hunters, gatherers and scavengers who did not live in permanently settled communities. Their stone tools preserve well and are found in most places in South Africa and elsewhere.

Early Stone Age	2 500 000 - 250 000 Before Present
Middle Stone Age	250 000 - 40-25 000 BP
Later Stone Age	40-25 000 - until c. AD 200

Tradition: As used in archaeology, it is a seriated sequence of artefact assemblages, particularly ceramics.

ACRONYMS and ABBREVIATIONS

AD	Anno Domini (the year 0)
ASAPA	Association of Southern African Professional Archaeologists

BC	Before the Birth of Christ (the year 0)
BCE	Before the Common Era (the year 0)
BP	Before Present (calculated from 1950 when radio-carbon dating was established)
CE	Common Era (the year 0)
CRM	Cultural Resources Management
CS-G	Chief Surveyor-General
DMRE	Department of Mineral Resources and Energy
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
EIA	Early Iron Age
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme
ESA	Early Stone Age
HIA	Heritage Impact Assessment
I & AP's	Interested and Affected Parties
ICOMOS	International Council on Monuments and Sites
LIA	Late Iron Age
LSA	Later Stone Age
MIA	Middle Iron Age
MSA	Middle Stone Age
NASA	National Archives of South Africa
NEMA	National Environmental Management Act 107 of 1998
NHRA	National Heritage Resources Act
PHRA	Provincial Heritage Resources Agency
SAHRA	South African Heritage Resources Agency
SAHRIS	South African Heritage Resources Information System
WUL	Water Use Licence

COMPLIANCE WITH APPENDIX 6 OF THE 2014 EIA REGULATIONS (AS AMENDED)

Requirements of Appendix 6 – GN R982	**Addressed in the Specialist Report**
1. (1) A specialist report prepared in terms of these Regulations must contain- 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;	 Front page Page i Addendum Section 5
b) a declaration that the specialist is independent in a form as may be specified by the competent authority;	Page ii
c) an 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 4
(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	Section 7
d) the duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment;	Section 4
e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;	Section 4
f) details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives;	Section 7; Figure 18
g) an identification of any areas to be avoided, including buffers;	Section 8
h) a map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	Figure 18 Section 7 & 8
i) a description of any assumptions made and any uncertainties or gaps in knowledge;	Section 2
j) a description of the findings and potential implications of such findings on the impact of the proposed activity or activities;	Section 7
k) any mitigation measures for inclusion in the EMPr;	Section 8 & 10
l) any conditions for inclusion in the environmental authorisation;	Section 10
m) any monitoring requirements for inclusion in the EMPr or environmental authorisation;	Section 9
n) a reasoned opinion- i. 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 Section 8, 9 & 10
o) a description of any consultation process that was undertaken during the course of preparing the specialist report;	-
p) a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	-
q) any other information requested by the competent authority.	-
(2) Where a government notice by the Minister provides for any protocol or minimum information requirement to be applied to a specialist report, the requirements as indicated in such notice will apply.	-

Phase 1 Cultural Heritage Impact Assessment:
DEVELOPMENT OF THE PROPOSED LIU ENERGY SOLAR PV FACILITY ON FARM VARSPUTS 564, EAST OF SPRINGBOK, NORTHERN CAPE PROVINCE

1. INTRODUCTION

1.1 Background

4 Degrees Consulting is undertaking a Basic Assessment (BA) of the proposed Solar Photovoltaic (PV) facility and associated infrastructure on the farm Varsputs 564 east Springbok in Northern Cape Province. The proposed project is located within the Springbok Renewable Energy Development Zone (REDZ). The development footprint will be approximately 300 ha and the transmission line will be approximately 6 km.

- On 16 November 2021 the specialist was informed by *4 Degrees Consulting* via e-mail that the power line / grid has been removed from the EIA application as it has not yet been surveyed.

South Africa's heritage resources, also described as the 'national estate', comprise a wide range of sites, features, objects and beliefs. According to Section 27(18) of the National Heritage Resources Act, No. 25 of 1999 (NHRA), no person may destroy, damage, deface, excavate, alter, remove from its original position, subdivide or change the planning status of any heritage site without a permit issued by the heritage resources authority responsible for the protection of such site.

In accordance with Section 38 of the NHRA, an independent heritage consultant was appointed by *4 Degrees Consulting* to conduct a cultural heritage assessment to determine if the development of solar PV facility would have an impact on any sites, features or objects of cultural heritage significance.

This report forms part of the Basic Assessment process as required by the EIA Regulations in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) as amended and is intended for submission to the South African Heritage Resources Agency (SAHRA).

1.2 Terms and references

The aim of a full heritage impact assessment (HIA) investigation is to provide an informed heritage-related opinion about the proposed development by an appropriate heritage specialist. The objectives are to identify heritage resources (involving site inspections, existing heritage data and additional heritage specialists if necessary); assess their significances; assess alternatives in order to promote heritage conservation issues; and to assess the acceptability of the proposed development from a heritage perspective.

The result of this investigation is a HIA report indicating the presence/ absence of heritage resources and how to manage them in the context of the proposed development.

Depending on SAHRA's acceptance of this report, the developer may receive permission to proceed with the proposed development, on condition of successful implementation of proposed mitigation measures.

1.2.1 *Scope of work*

The aim of this study is to determine the cultural heritage significance of the area where the development of the solar PV facility is to take place. This included:

- Conducting a desk-top investigation of the project area; and

- A visit to the proposed project area.

The project area includes the following properties:

- A portion of Farm 564 (Varsputs).

The objectives were to:

- Evaluate the potential impacts of construction, operation and maintenance of the proposed development on archaeological, cultural and historical resources;
- Recommend mitigation measures to ameliorate any negative impacts on areas of archaeological, cultural or historical importance; and
- Provide guideline measures to manage any impacts that might occur during the proposed project's construction and implementation phases.

1.2.2 *Assumptions and Limitations*

The investigation has been influenced by the following:

- It is assumed that the description of the proposed project, provided by the client, is accurate;
- It is assumed that the public consultation process undertaken as part of the Environmental Impact Assessment (EIA) is sufficient and that it does not have to be repeated as part of the HIA;
- It is assumed that the information contained in existing databases, reports and publications is correct.
- The unpredictability of buried archaeological remains;
- No subsurface investigation (i.e. excavations or sampling) were undertaken, since a permit from SAHRA is required for such activities;
- The vegetation cover encountered during a site visit can have serious limitations on ground visibility, obscuring features (artefacts, structures) that might be an indication of human settlement.

2. LEGISLATIVE FRAMEWORK

2.1 Background

HIAs are governed by national legislation and standards and International Best Practise. These include:

- South African Legislation
    - National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA);
    - Mineral and Petroleum Resources Development Act, 2002 (Act No. 22 of 2002) (MPRDA);
    - National Environmental Management Act 1998 (Act No. 107 of 1998) (NEMA); and
    - National Water Act, 1998 (Act No. 36 of 1998) (NWA).
- Standards and Regulations
    - South African Heritage Resources Agency (SAHRA) Minimum Standards;
    - Association of Southern African Professional Archaeologists (ASAPA) Constitution and Code of Ethics;
    - Anthropological Association of Southern Africa Constitution and Code of Ethics.
- International Best Practise and Guidelines
    - ICOMOS Standards (Guidance on Heritage Impact Assessments for Cultural World Heritage Properties); and
    - The UNESCO Convention concerning the Protection of the World Cultural and Natural Heritage (1972).

2.2 Heritage Impact Assessment Studies

South Africa's unique and non-renewable archaeological and palaeontological heritage sites are 'generally' protected in terms of the NHRA (Section 35) and may not be disturbed at all without a permit from the relevant heritage resources authority, subject to the provisions of Section 38(8) of the NHRA.

The NHRA, Section 38, contains requirements for Cultural Resources Management and prospective developments:

"38 (1) Subject to the provisions of subsections (7), (8) and (9), any person who intends to undertake a development categorised as:

(a) the construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;
(b) the construction of a bridge or similar structure exceeding 50m in length;
(c) any development or other activity which will change the character of a site:
(i) exceeding 5 000 m^2 in extent; or
(ii) involving three or more existing erven or subdivisions thereof; or
(iii) involving three or more erven or divisions thereof which have been consolidated within he past five years; or
(iv) the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority;
(d) the re-zoning of a site exceeding 10 000 m^2 in extent; or
(e) any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority, must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development."

And:

"38 (3) The responsible heritage resources authority must specify the information to be provided in a report required in terms of subsection (2)(a): Provided that the following must be included:

(a) The identification and mapping of all heritage resources in the area affected;
(b) an assessment of the significance of such resources in terms of the heritage assessment criteria set out in section 6(2) or prescribed under section 7;
(c) an assessment of the impact of the development on such heritage resources;
(d) an evaluation of the impact of the development on heritage resources relative to the sustainable social and economic benefits to be derived from the development;
(e) the results of consultation with communities affected by the proposed development and other interested parties regarding the impact of the development on heritage resources;
(f) if heritage resources will be adversely affected by the proposed development, the consideration of alternatives; and
(g) plans for mitigation of any adverse effects during and after the completion of the proposed development."

3. HERITAGE RESOURCES

3.1 The National Estate

The NHRA defines the heritage resources of South Africa which are of cultural significance or other special value for the present community and for future generations that must be considered part of the national estate to include:

- places, buildings, structures and equipment of cultural significance;

- places to which oral traditions are attached or which are associated with living heritage;
- historical settlements and townscapes;
- landscapes and natural features of cultural significance;
- geological sites of scientific or cultural importance;
- archaeological and palaeontological sites;
- graves and burial grounds, including-
    - ancestral graves;
    - royal graves and graves of traditional leaders;
    - graves of victims of conflict;
    - graves of individuals designated by the Minister by notice in the Gazette;
    - historical graves and cemeteries; and
    - other human remains which are not covered in terms of the Human Tissue Act, 1983 (Act No. 65 of 1983);
- sites of significance relating to the history of slavery in South Africa;
- movable objects, including-
    - objects recovered from the soil or waters of South Africa, including archaeological and palaeontological objects and material, meteorites and rare geological specimens;
    - objects to which oral traditions are attached or which are associated with living heritage;
    - ethnographic art and objects;
    - military objects;
    - objects of decorative or fine art;
    - objects of scientific or technological interest; and
    - books, records, documents, photographic positives and negatives, graphic, film or video material or sound recordings, excluding those that are public records as defined in section 1(xiv) of the National Archives of South Africa Act, 1996 (Act No. 43 of 1996).

3.2 Cultural significance

In the NHRA, Section 2 (vi), it is stated that ‘‘cultural significance’’ means aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance. This is determined in relation to a site or feature’s uniqueness, condition of preservation and research potential.

According to Section 3(3) of the NHRA, a place or object is to be considered part of the national estate if it has cultural significance or other special value because of

- its importance in 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; and
- sites of significance relating to the history of slavery in South Africa.

A matrix (see Section 2 of Addendum) was developed whereby the above criteria were applied for the determination of the significance of each identified site. This allowed some form of control over the application of similar values for similar identified sites.

4. PROJECT DESCRIPTION

4.1 Site location

The project area is located approximately 43 km (direct line) northeast of Springbok and 54 km (direct line) southwest of Aggeneys in the Namakwa District Municipality of Northern Cape Province (Fig. 1). For more information, see the Technical Summary on p. V above.

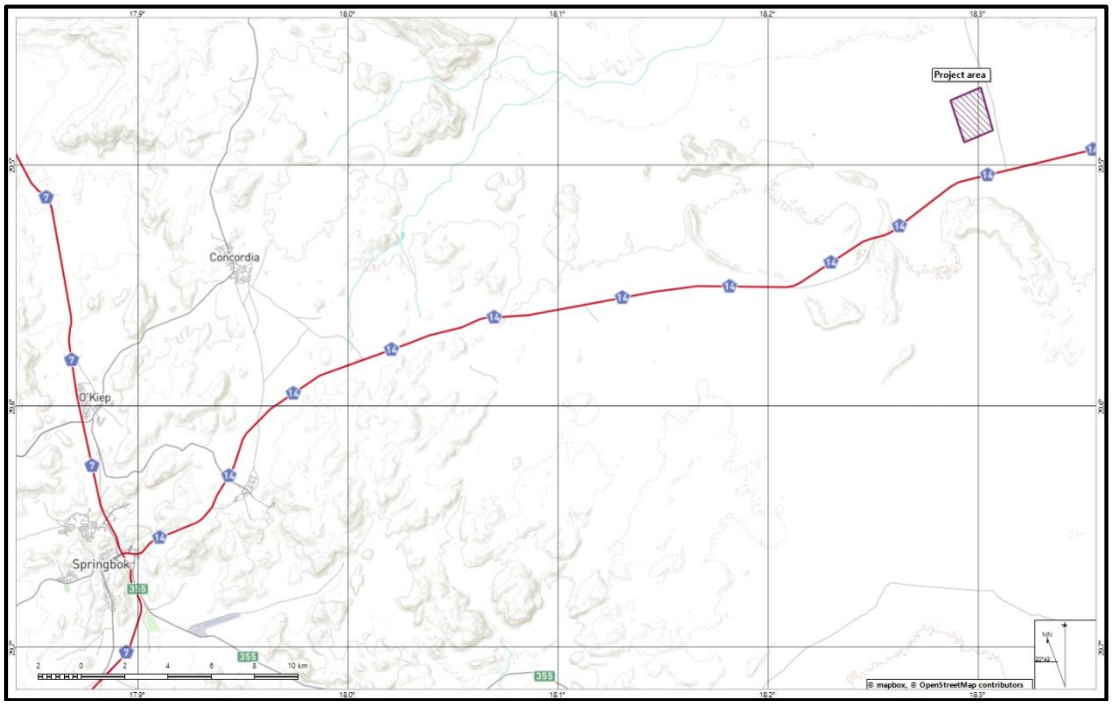


Figure 1. Location of the project area in regional context

4.2 Development proposal

The development footprint will be approximately 300 ha and the transmission line will be approximately 6 km.

- On 16 November 2021 the specialist was informed by *4 Degrees Consulting* via e-mail that the power line / grid has been removed from the EIA application as it has not yet been surveyed.

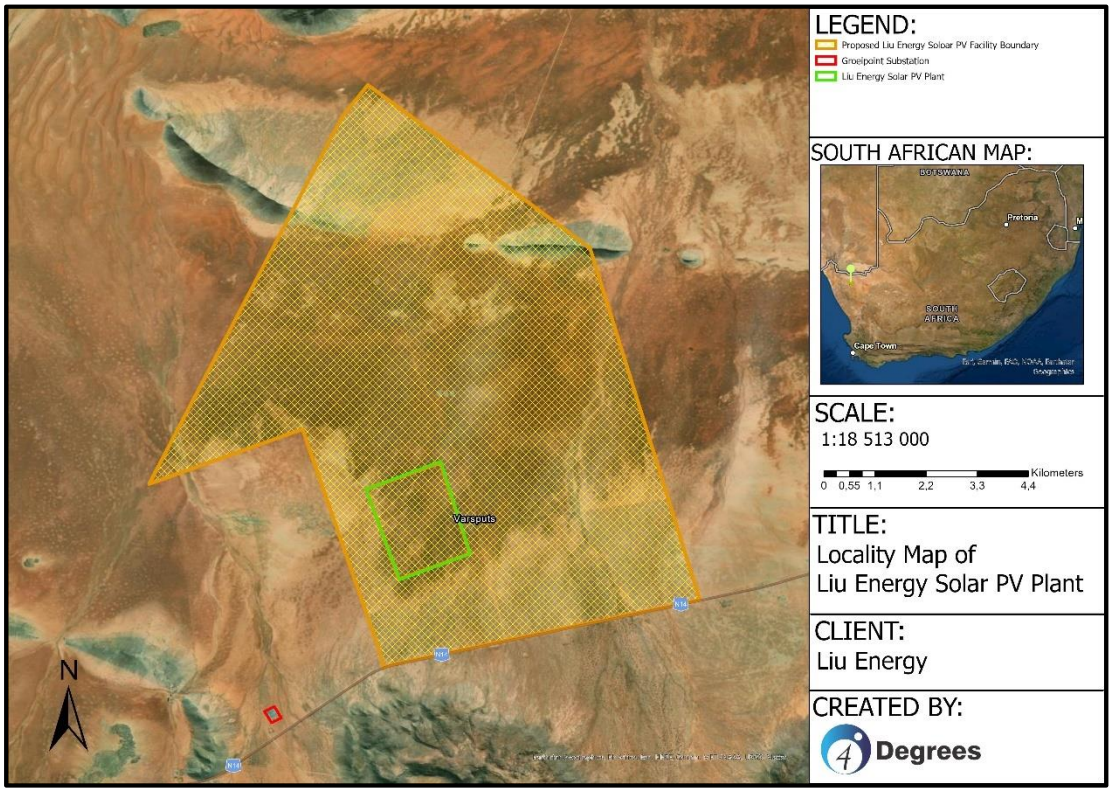


Figure 2. Layout of the proposed development
(Map supplied by 4 Degrees

5. STUDY APPROACH AND METHODOLOGY

5.1 Extent of the Study

This survey and impact assessment cover all facets of cultural heritage located in the project area as presented in Section 4 above and illustrated in Figures 1, 2 & 3.

5.2 Methodology

5.2.1 Pre-feasibility assessment

The objectives of this review were to:

- Gain an understanding of the cultural landscape within which the project is located;
- Inform the field survey.

5.2.1.1 Survey of the literature
A survey of the relevant literature was conducted with the aim of reviewing the previous research done and determining the potential of the area. In this regard, various anthropological, archaeological and historical sources were consulted – see list of references in Section 11.

- Information on events, sites and features in the larger region were obtained from these sources.

5.2.1.2 Survey of heritage impact assessments (HIAs)

A survey of HIAs done for projects in the region by various heritage consultants was conducted with the aim of determining the heritage potential of the area – see list of references in Section 11.

- Information on sites and features in the larger region were obtained from these sources.

5.2.1.3 Data bases
The *Heritage Atlas Database,* various SAHRA databases, the *Environmental Potential Atlas*, the *Chief Surveyor General* and the *National Archives of South Africa* were consulted.

- Database surveys produced a number of sites located in the larger region of the proposed development.

5.2.1.4 Other sources
Aerial photographs and topocadastral and other maps were also studied - see the list of references below.

- Information of a very general nature were obtained from these sources.

5.2.1.5 Results

The results of the above investigation are presented in Table 1 and Figure 4 below – see list of references in Section 11 – and can be summarised as follows:

- Sites containing stone tools dating to the Middle and Later Stone Age have been reported from the region to the south of the project area;
- Site containing San rock painting have been reported from the region to the south of the project area;
- Historic structures, inclusive of buildings (farmsteads) and bridges, occur sporadically all over the larger region;
- Formal and informal burial sites occur sporadically throughout the region.

Based on the above assessment, the probability of cultural heritage sites, features and objects occurring in the project area is deemed to be ***low***.

Table 1: Pre-Feasibility Assessment

Category	Period	Probability	Reference
Landscapes			
Natural/Cultural		Low	Historic maps & aerial photographs
Early hominin	Pliocene – Lower Pleistocene		
	Early hominin	None	-
Stone Age	Lower Pleistocene – Holocene		
	Early Stone Age	None	-
	Middle Stone Age	Low	Birkholtz (2016); Orton & Webley (2012); Van Ryneveld (2017)
	Later Stone Age	Low	Orton & Webley (2012)
	Rock Art	Low	Orton & Webley (2012)
Iron age	Holocene		
	Early Iron Age	None	-
	Middle Iron Age	None	-
	Late Iron Age	None	-
Colonial period	Holocene		
	Contact period/Early historic	Possible	Backhouse (1844); Historic maps & aerial photographs

	Recent history	Possible	Birkholtz (2016); Burke (1995); Historic maps & aerial photographs; Orton & Webley (2012); Van Ryneveld (2017)
	Industrial heritage	None	Norman & Whitfield (2006)

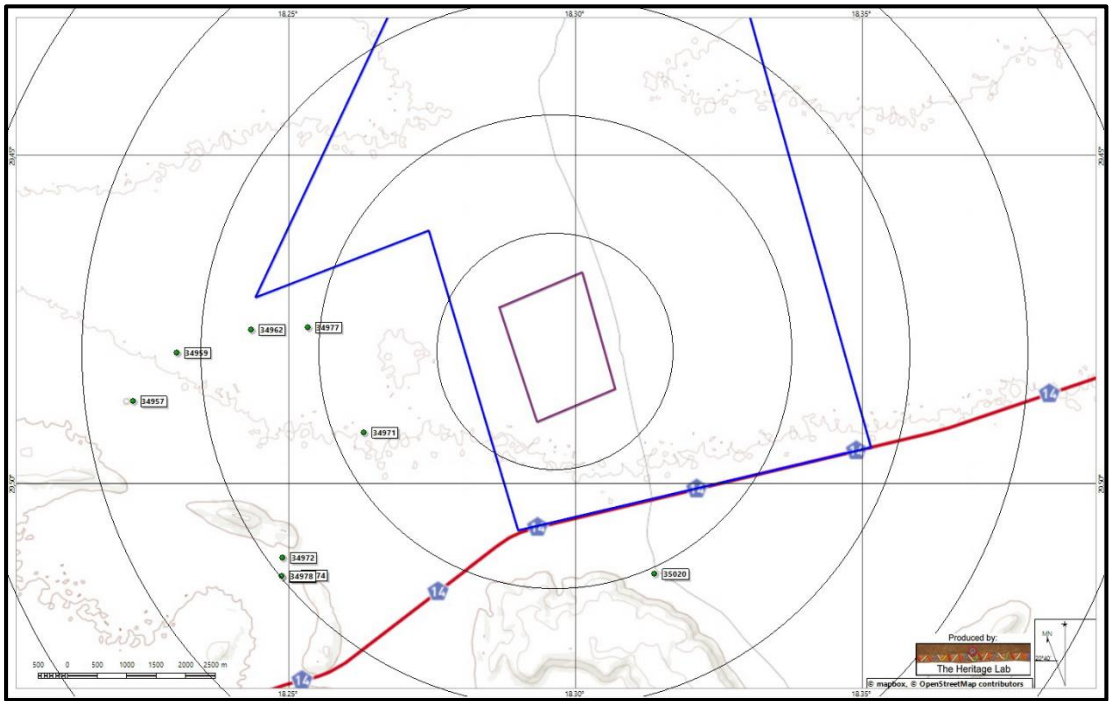


Figure 3. Location of known heritage sites and features in relation to the project area
(Circles spaced at 2km: heritage sites = coded green dots)

- The information presented in the map in Figure 3 is based mostly on the SAHRIS database.

5.2.2 *Field survey*

The field survey was done according to generally accepted archaeological practices, and was aimed at locating all possible heritage sites, objects and structures. The area that had to be investigated was identified by *4 Degrees Consulting* by means of maps and .k*ml* files indicating the project area. This was loaded onto a Samsung digital device and used in Google Earth during the field survey to access the project area.

The site was visited on 23 November 2021 and surveyed by walking several transects across it (Fig. 4). In addition, the rest of the farm was broadly reviewed to determine if there are any heritage sites in the larger region.

During the site visit, Mrs U van den Berg, wife of the farmer, Mr James van den Berg, was interviewed. They have been living and farming here for the last 27 years.

- According to Mrs van den Berg, there are no San rock paintings, graves other than the recent ones (see below), or historic built structures, apart from the existing farmhouse on the larger farm.

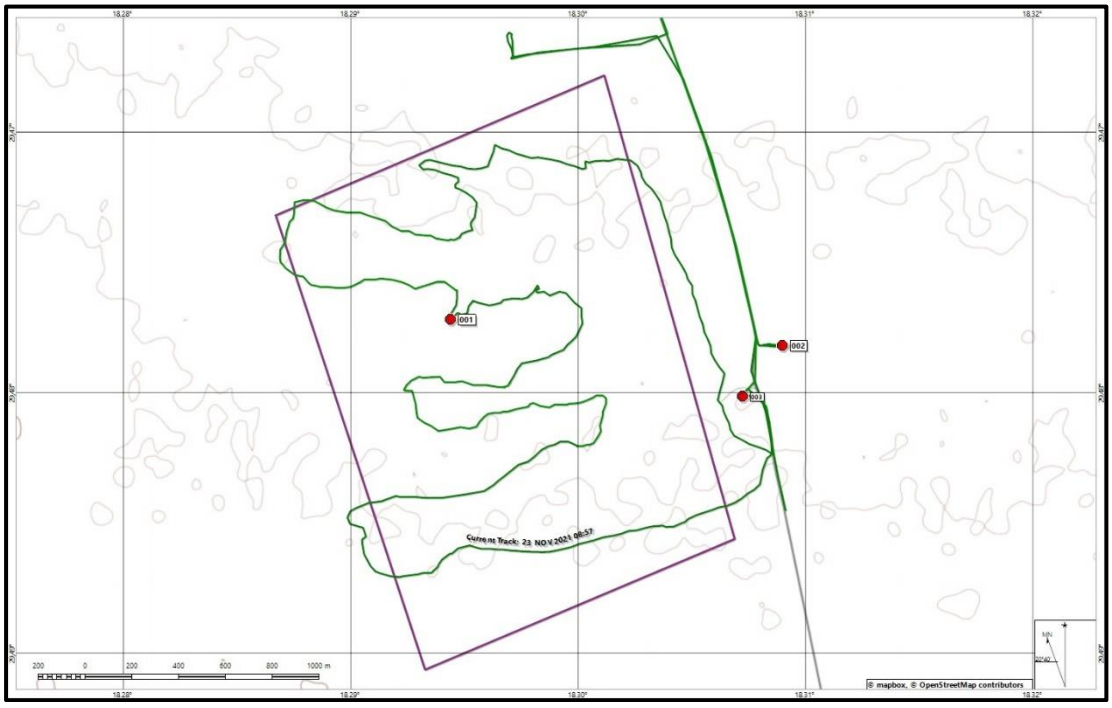


Figure 4. Map indicating the track log of the field survey
(Site = purple polygon; track log = green line)

Animal burrows

Pan-like depressions

Figure 5. Natural features that were specifically investigated

5.2.3 *Documentation*

All sites, objects and structures that were identified are documented according to the general minimum standards accepted by the archaeological profession. Coordinates of individual localities are determined by means of the *Global Positioning System* (GPS) and plotted on a map. This information is added to the description to facilitate the identification of each locality. Map datum used: Hartebeeshoek 94 (WGS84).

The track log and identified sites were recorded by means of a Garmin Oregon 550 handheld GPS device. Photographic recording was done by means of a Canon EOS 550D digital camera. Geo-rectifying of the aerial photographs and historic maps was done by means of a professional software package: ExpertGPS.

6. DESCRIPTION OF THE AFFECTED ENVIRONMENT

6.1 Natural Environment

The geology of the region is made up of alluvium, sand and calcrete of Quaternary age. The topography of the project area is classified as plains and no hills or outcrops are known to occur (Fig. 6). However, the larger region is characterized by some inselbergs, the Karasberg occurring to the south and Naib se Berg some distance to the north. The space in between is characterized by large tracks of flat areas, forming an ancient peneplain, sometimes with parallel dunes. No open water is known from the region and water is sourced from wells and bore holes.

The original vegetation is classified as Bushmanland Arid Grassland, a Nama-Karoo Biome, forming part of the larger Bushmanland Bioregion. Overall the area is covered by small shrub growth, with, in places, small stands of stunted tree-like growth. Due to a long-term drought lasting more than 6 years, the vegetation cover in the project area is much denuded, allowing for good ground visibility.

This was and still is essentially a rural landscape where sheep farming dominates. For large sections of the region even this is not a permanent type of settlement, as many farmers move their livestock to different regions for a couple of months (July to December) every year. It was only with the drilling of bore holes that the possibility of permanent settlement became a reality.

In recent years large scale mining took place in the region, e.g. at Aggeneys (copper-zinc) and Gamsberg (zinc) mines were developed – although Gamsberg is a still a going concern, the Aggeneys operation has been closed for some time (Norman & Whitfield 2006).

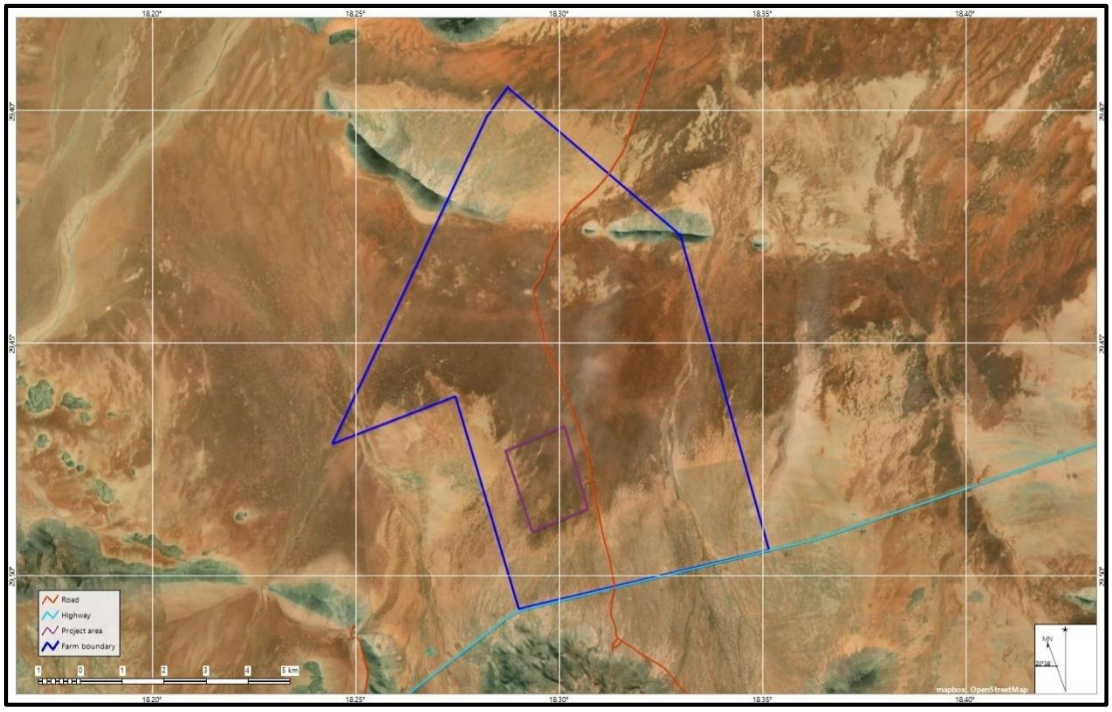


Figure 6. Aerial image showing the topography of the project area


Looking south towards the Karasberg


Looking north towards Naib se Berg


Looking east

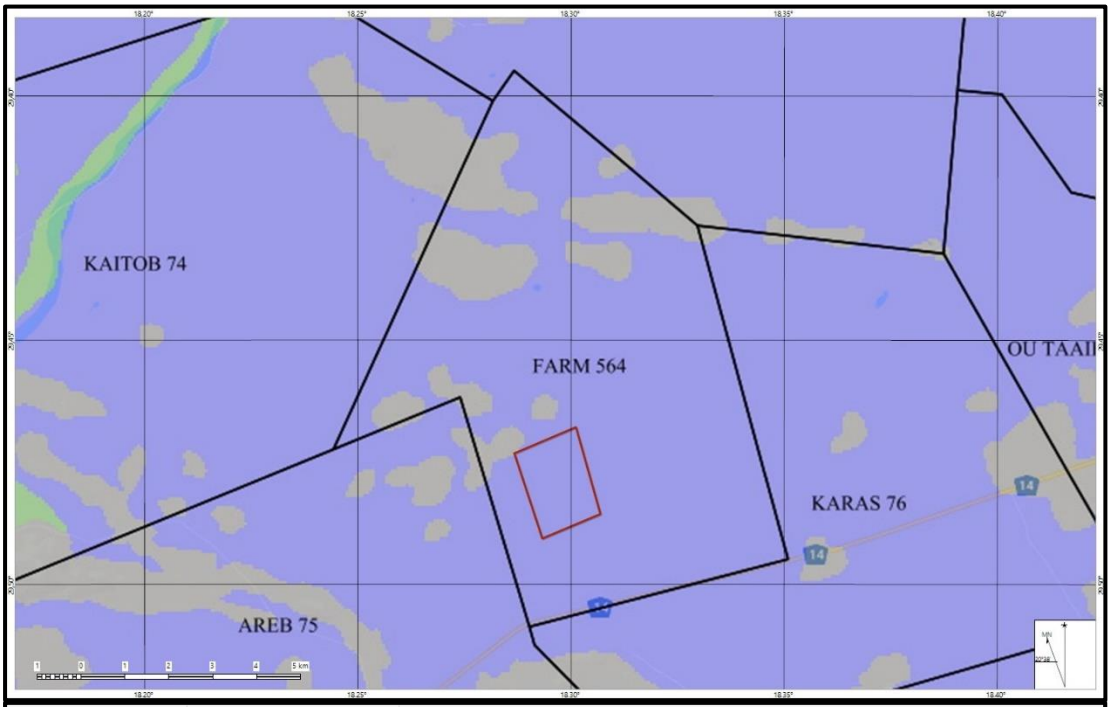

General ground visibility


View towards the farmstead


Faming related features (outside project area)

Figure 7. Views over the project area

The Palaeontological Sensitivity Map (http://www.sahra.org.za/sahris/map/palaeo) indicate that project area (Fig. 8) has a low sensitivity of fossil remains to be found and therefore no palaeontological studies are required. However, a protocol for finds is required.



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

Figure 8. The Palaeontological sensitivity of the project area

6.2 Cultural Landscape

The aim of this section is to present an overview of the history of the larger region in order to eventually determine the significance of heritage sites identified in the project area, within the context of their historic, aesthetic, scientific and social value, rarity and representivity.

The cultural landscape qualities of the region essentially consist of two components. The first is a rural area in which the human occupation is made up of a very limited Stone Age occupation and a later Late Iron Age occupation. The second component is a farming based, which eventually gave rise to an urban one which developed during the last 150 years or less.

6.2.1 *Stone Age*

Namaqualand, a winter rainfall area, occupies the north-western corner of South Africa between the Olifants and Gariep rivers and extends along the Atlantic coast. The territory occupied by Bushmanland includes parts of Namaqualand east of Springbok. It is an open undulating landscape with isolated koppies (inselbergs) and several generally low mountain ranges.

The oldest stone tools are known as choppers, crudely produced from large pebbles found in riverbeds. Later, *Homo erectus* and early *Homo sapiens* people made tools shaped on both sides, called bifaces. Biface technology is known as the Acheulean tradition, from St Acheul in France, where bifaces were first identified in the mid-19th century.

The Early Stone Age (ESA) is usually represented by isolated examples of hand-axes in Namaqualand. ESA Acheulean workshop locales (Gamsberg Sites GI 4 and 5) with handaxes and Victoria West cores were recorded at raw material sources on the western side of the Gamsberg basin. They represent some of the rare known ESA Acheulean sites that have been recorded in Bushmanland, and are therefore of regional significance (Morris 2013b).

The MSA in sealed shelter sites has received particular attention (Dewar & Stewart 2012). Conversely, there is a lack of detail on open-air and surface MSA sites in Namaqualand (van der Ryst & Küsel 2012). This period is of particular significance as the origins of modern culture and language are associated with the emergence of anatomically modern humans, *Homo sapiens*, during the MSA. The upland savannas of southern Africa are seen as a focal region of biological and cultural evolution during this time (Beaumont & Vogel 2006).

The MSA is widespread across Bushmanland but usually in low densities (Beaumont et al. 1995; Morris 2013a). An extensive MSA workshop was recorded at Gamsberg (GI 1) where the raw material, gossan, was extensively sourced (Morris 2013a). The site has been afforded a high rating of significance. A project near Garies in Namaqualand (Van der Ryst & Küsel 2012, 2013b) found a similar focus on a preferred source of quality toolstone at a MSA quarry site.

A recent project that is focussed on human adaptations in low-productivity environments known as Adaptations to Marginal Environments in the MSA (AMEMSA) aims to investigate the economics, technologies and social organization that populations in Namaqualand developed to cope with the stress of marginal environments (Dewar & Stewart 2012). The research project aims to test the hypothesis that pre-modern humans exhibit a pattern of mosaic settlement that is directly related to favourable climatic periods. According to these premises physical and cultural modernity were required to cope with the demands of marginal ecozones to enable *Homo sapiens* populations to maintain settlement in harsh environments on a more constant basis (Dewar & Stewart 2012). Subsistence resources are unpredictable and patchy in marginal environments so that flexible social and technological strategies with innovative behaviour were required to successfully cope with environmental constraints (van der Ryst & Küsel 2012).

Surveyed areas in Bushmanland exhibited a markedly low incidence of artefactual material. Morris (2011a-c) and Orton (2016a-c) points out the reduced archaeological presence away from landscape features such as hills and rock outcrops. Morris (2011b) noted a general background noise of lithic elements but few sites. According to Morris (2000a-b, 2001, 2011a-c) late Holocene lithics constitute the most common archaeological occurrences within the Aggeneys-Pofadder region. LSA lithics often occur in association with ceramics and ostrich eggshell (OES) fragments (also Orton & Webley 2012). OES containers served as water flasks and fragments from broken flasks were used to make beads.

Beaumont *et al* (1995), found differences in the geographical distribution of LSA hunter-gatherer localities and the herder sites of pastoral groups. Beaumont *et al* (1995) believed increasing pressure brought about by the presence of herders in the Orange/Gariep River Basin resulted in the displacement of hunters to marginal areas such as Bushmanland. This came about largely in the last millennium when the archaeological remains of hunting and gathering settlements are commonly found near water sources (Morris 2011b). Notwithstanding, there was also a herder presence in this region is suggested by ceramics near Aggeneys and, east of Pofadder, at Schuitdrift South (Morris 1999), Karasberg (Orton & Webley 2012), grinding hollows on rock outcrops in the Aggeneys/Gamsberg area (Morris 2011a) and Karasberg (Orton & Webley 2012)

San and herder rock paintings are also present in the larger region. Janette Deacon documented finger paintings on a boulder next to the Aggregate Quarry at Black Mountain Mine (Morris 2011c), whereas Orton & Webley (2012) documented several shelters containing San paintings in the Karasberg.

6.2.2 *Iron Age*

Humphreys (1976) indicate that Iron Age occupation of the larger region surrounding the project area did not take place. He offers basically two interlinked reasons for this absence: the country was largely to dry to accommodate large herds of cattle; and intermittent raids by the Korana people, who were more mobile and whose focus was more on sheep and goat herding, who claimed large sections of the region as theirs, kept the SeTswana people away. This limit to the westward spread of Late Iron Age groups, particularly SeTswana-speakers, is also well demonstrated by Legassick (2010).

6.2.3 *Historic period*

The first documentary evidence of whites entering the larger region was the expedition by Simon van der Stel in 1685. He sank three shafts to establish the presence and quality of the copper deposits. However, the large distance from the Cape, as well as the absences of open water prevented them from further exploitation of the ore. One of the shafts excavated by the Van der Stel party was eventually declared a national heritage site.

During the early 1800s more and more whites, mostly hunters and explorers entered the region. They were soon followed by missionaries who settled down more permanently, trying to convert local herder and hunter communities. Some of the early stations were established, for example at Leliefontein, Komaggas, Bezondermijd/Steinkopf, Pella and De Tuin.

One early commentator on the region was James Backhouse (1844), whom had the following to say about the reason for his travels:

> The reason for these visits was purely the discharge of a religious duty, to which they believed themselves to be specially called; but in passing along, there attention was alive to a variety of secondary objects, which appeared worthy of notice (Backhouse 1844:xv).

Significantly, Backhouse also left us one of the earliest maps of the region, showing some interesting details such as settlements, mission stations, names of geographic features and even potential ore sources/mines (Fig. 9).

By the 19th century some Dutch speaking trekboers moved into the region, grazing their stock. As they depended on water for their livestock, these farmers would have stuck close to available water sources and it was only during the wetter parts of the rain season that they might have accessed other areas for short periods of time. An investigation of the Title Deeds of most of the farms under consideration indicated that they were surveyed during the early part of the twentieth century, implying that they would have been occupied since then.

Farmsteads are complex features in the landscape, being made up of different yet interconnected elements. Typically these consist of a main house, gardens, outbuildings, sheds and barns, with some distance from that labourer housing and various cemeteries. In addition roads and tracks, stock pens and wind mills complete the setup.

The architecture of these farmsteads can be described as an eclectic mix of styles modified to adapt to local circumstances. Farm buildings were generally single storied. Walls were thick and built with stone, or, in some cases self-made bricks. The roof was either flat or ridged and thatched or tiled and was terminated at either end by simple linear parapet gables In some cases outbuildings would be in the

same style as the main house if they date to the same period. However, they tend to vary considerably in style and materials used as they were erected later as and when they were required (Fagan 2008).

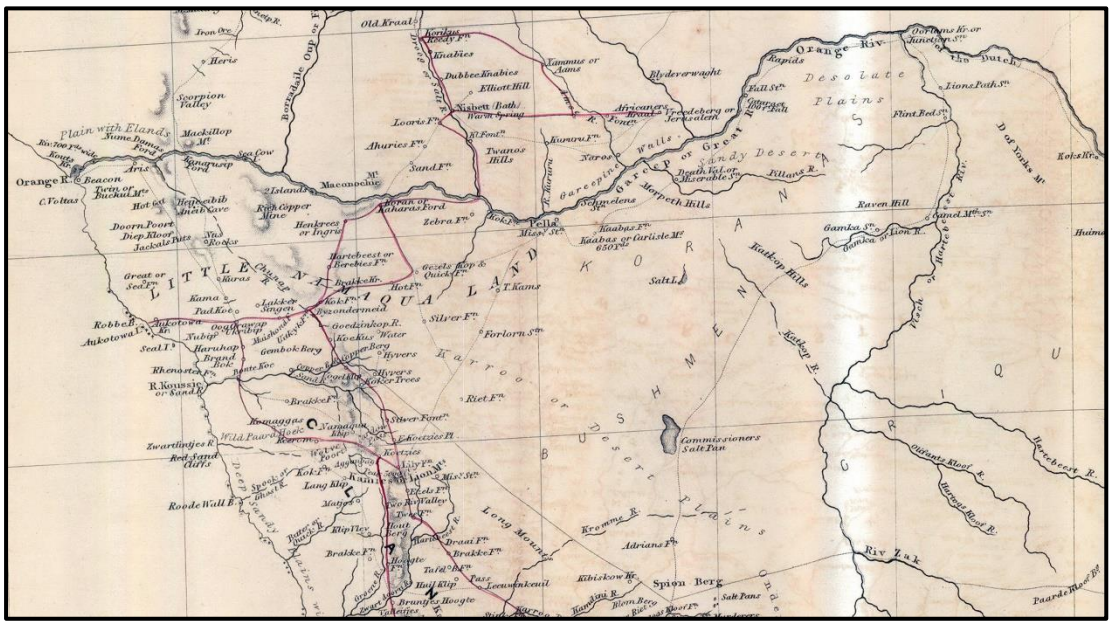


Figure 9. A section of Backhouse's map (1844) showing the larger region of the project area

Due to the sparse population, infrastructural development in this part of the world has always been low. The roads are gravel and graded occasionally. As there are no major rivers, river crossings remained informal.

The Second South African War (1899-1902) also touched the larger region. Assistant Commandant-General Jan Smuts led his men through the Cape Colony, first through the Stormberg Mountains and then southwards, before turning north-west to besiege the copper-mining town of O'Okiep (*sic* - Okiep). Lieutenant-colonel W. A. D. Shelton of the Queen's Royal Regiment was appointed Commandant of Namaqualand, the north-western region of Cape Colony, in January 1901. Shelton had made provision for their defence with blockhouses and barbed wire, manned partly by regular troops but mostly by volunteers. Following Smuts' invasion the British were forced to respond with the creation of a relieving force. The British relief expedition under Colonel H. Cooper was brought by sea to the copper-cargo harbour of Port Nolloth and landed on 12 April. They fought their way along the railway line against Vecht-general J. L. van Deventer's men. At 7.30 a.m. on 4 May the relief column arrived (Burke (1995).

These events also had an impact on the region of the project area as several small fortifications have been identified in the Karasberg to the southeast of the project area (Orton & Webley 2012).

6.3 Site specific review

Although landscapes with cultural significance are not explicitly described in the NHRA, they are protected under the broad definition of the National Estate (Section 3): Section 3(2)(c) and (d) list "historical settlements and townscapes" and "landscapes and natural features of cultural significance" as part of the National Estate.

The examination of historical maps and aerial photographs help us to reconstruct how the cultural landscape has changed over time as is show how humans have used the land.

A survey plan of farms in the region, dating to 1893/1894 shows the original farm names and boundaries. On this map (Fig. 10) the current Farm 564, is referred to as Karas 76 (arrowed in red below). On this several tracks/roads and wells are indicated, with similar information on other farms. No further developments, e.g. farmsteads are shown.

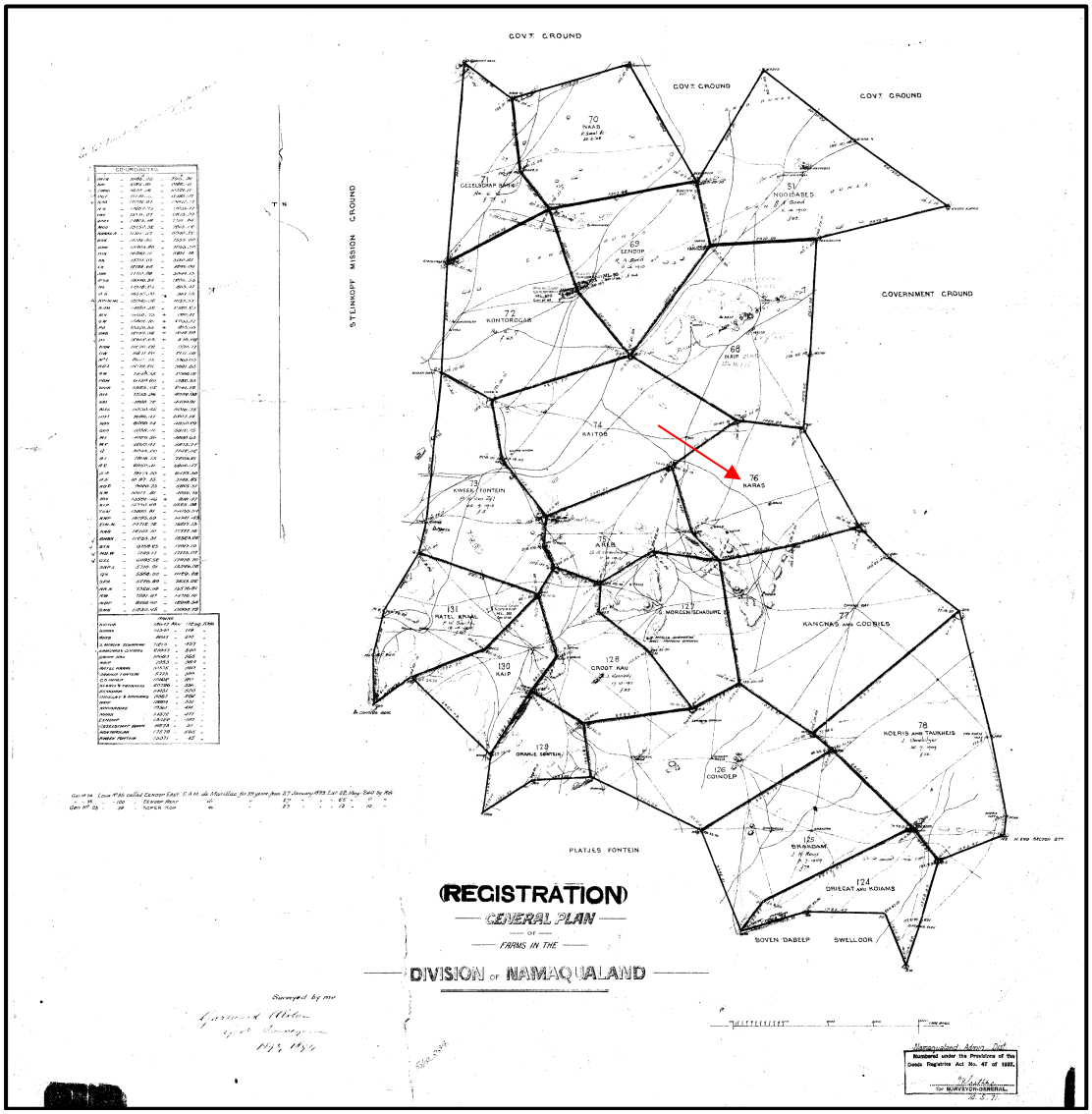


Figure 10. General Plan of the farms in the Division of Namaqualand
(GS-G Map: 7255)

In June 1953 the farm was surveyed, and a subdivision was made. This became Farm 564 also referred to as Varsputs (Fig. 11). On the map of this subdivision, the current farmstead as well as the road on its eastern side, passing to the north, is indicated. This also then serves as an indication of the dating of the main house.

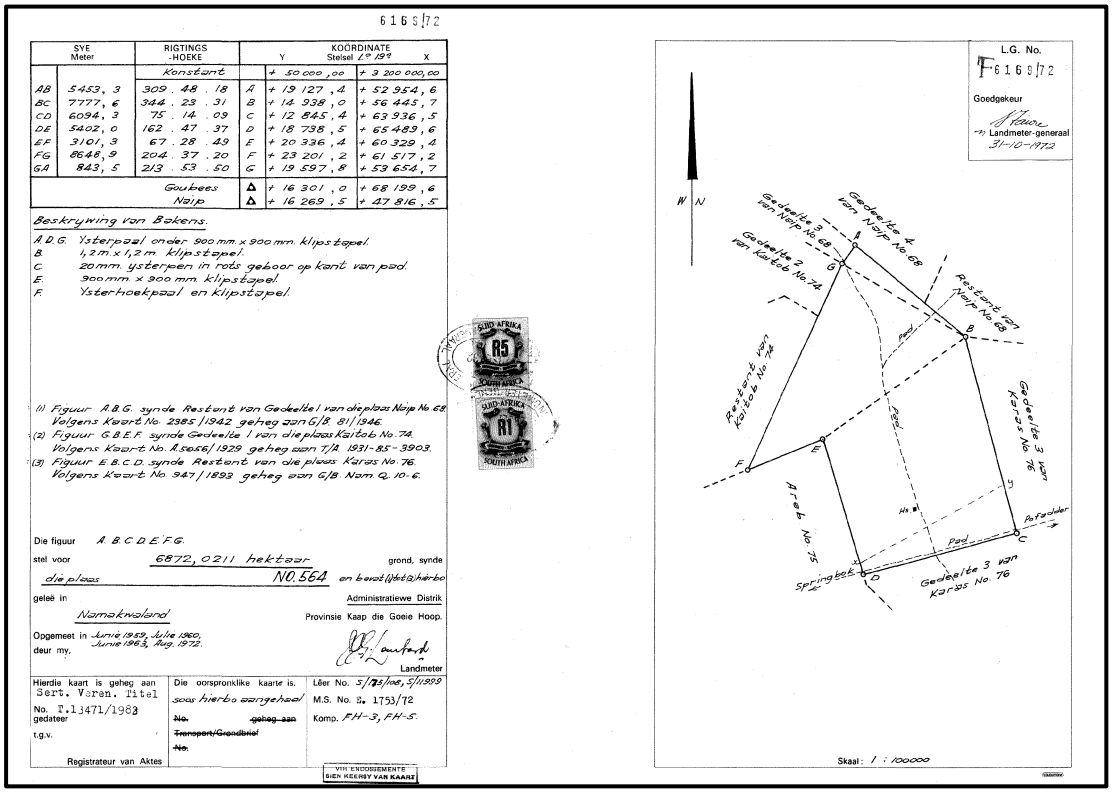


Figure 11. The Deed of Transfer to the farm Varsputs 564
(GS-G: Document 10059841)

Apparently, the farm Varsputs achieved some fame in the botanical world. From documents located in the National Archives of South Africa (NASA – Section 11.3 below), the following story can be put together. In 1912 Henry Harold Welch Pearson (28 January 1870 – 3 November 1916), a British-born South African botanist, visited the Great Karaberg region where he identified, on the farm Varsputs, the plant *Androcymbium eucomoides* commonly known as "Men in a Boat". (The name of this plant was recently changed to *Colchicum eucomoides*.)

Pearson is better known for his studies of the plant *Welwitschia mirabilis* found in Namibia. However, his main achievement was to convince the then South African government under the leadership of Prime Minister Louis Botha for the establishing of a botanical garden. This found much favour with the authorities and an area which Cecil Rhodes had bequeathed to the public, was set aside and Kirstenbosch National Botanical Garden came into being. Pearson was appointed as the first director in 1913.

By the 1950s the area was still much underdeveloped, as is evidenced by the USA Army Corps of Engineers map in Fig. 12. The official aerial photograph of the region, showing the project area in 1960 (Fig. 13), indicate the farmstead and the road passing by it as the only development. This situation remains the same throughout the years, as can be seen from the 1969 version of the topographic map (Fig. 14), as well as the Google Earth image dating to 2021 (Fig. 15).

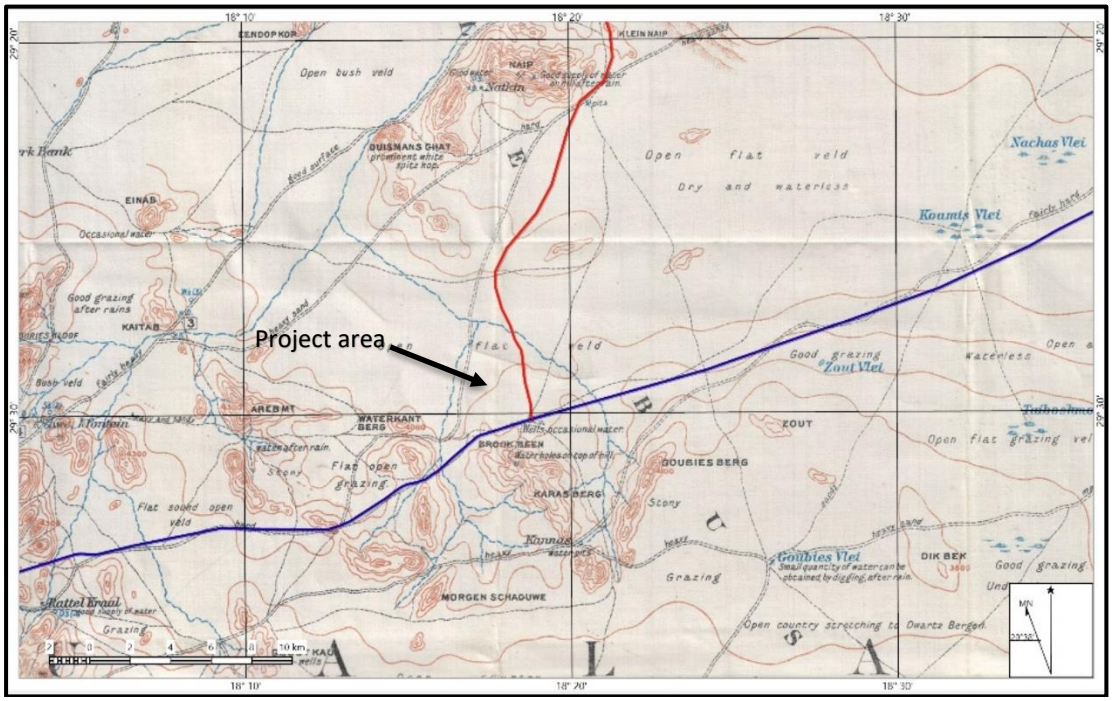


Figure 12. The project area on a section of the USA military map "Pofadder" (1954)
(Map produced by the US Army Corps of Engineers; scale = 1:250 000)

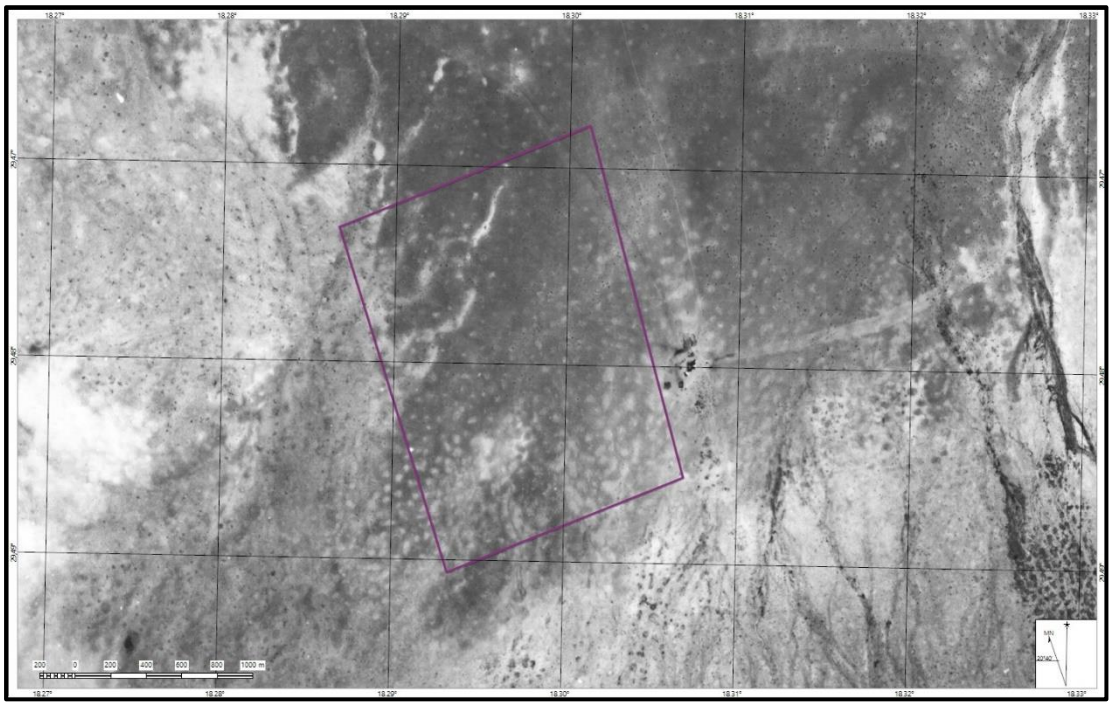


Figure 13. Aerial view of the project area dating to 1960
(CS-G photograph: 443_001_05151)

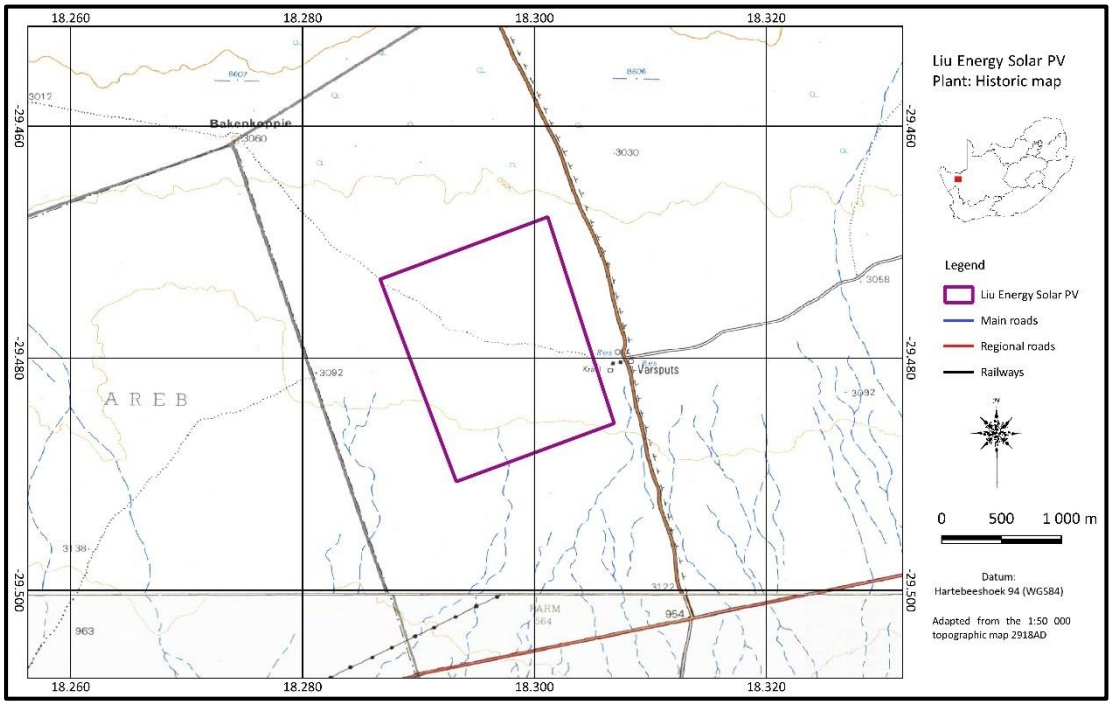


Figure 14. The project area on the 1969 version of the topographic map

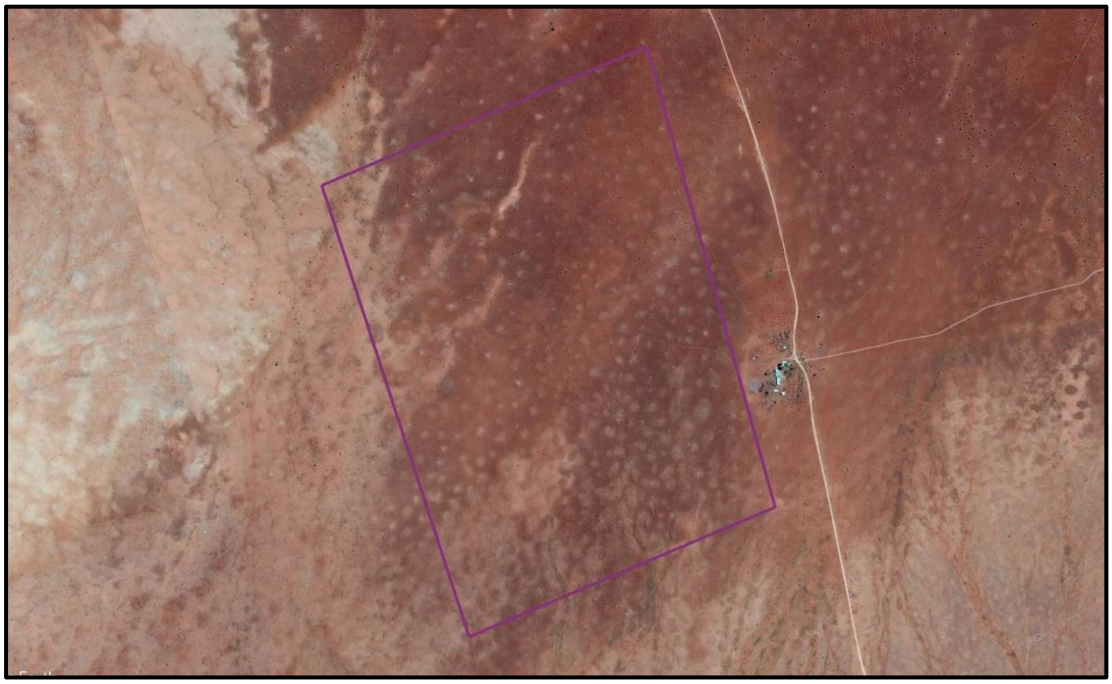


Figure 15. Aerial view of the project area dating to 2021
(Image: Google Earth)

During the survey, two heritage sites were identified in the vicinity of the project area. Fortunately, both are located outside the development footprint and would therefore not be impacted upon by the development of the solar PV facility:

NHRA Category	**Structures older than 60 years - Section 34**
6.3.1. Type: Farmstead **Farm**: Farm 564 (Varsputs). **Coordinates**: S 29,48009; E 18,30737	
Description: The main farmstead on the property. It is clearly visible on the 1960 version of the aerial photographs (Fig. 13 above) and it is therefore deemed to be older than 60 years. This statement is supported by the style and material used in its construction. Some outbuildings, some of which seems to be later in date, occur adjacent to it. According to Mr van den Berg, the house has been altered and expanded on in the past.	
Significance of site/feature	Generally protected 4B: Medium significance
Reasoned opinion: It represents the remains of a way of life that is becoming rare as farming areas are increasingly being abandoned and people moving to settle in adjacent towns.	
Impact assessment: This site is located outside the footprint of the project area and would not be impacted upon.	

Side view of the house

Some outbuildings

Figure 16. Views over the farmstead

NHRA Category	**Graves, Cemeteries and Burial Grounds - Section 36**
6.3.2. Type: Burial site. **Farm**: Farm 564 (Varsputs). **Coordinates**: S 29,47821; E 18.30902	
Description: An informal burial site with probably only 5 graves. The graves belong to former landowners, all with the surname of Van den Heever. The death dates on the headstones range between 1973 and 2014.	
Significance of site/feature	Generally protected 4A: High/medium significance
Reasoned opinion: Burial sites are viewed as having high emotional and sentimental value. However, mitigation is possible if proper procedures have been followed.	
Impact assessment: This site is located outside the footprint of the project area and would not be impacted upon.	

Overview of the burial site

View of the graves

Figure 17. Views of the burial site

7. SURVEY RESULTS

During the survey, the following sites, features and objects of cultural significance were identified in the project area (Fig. 18).

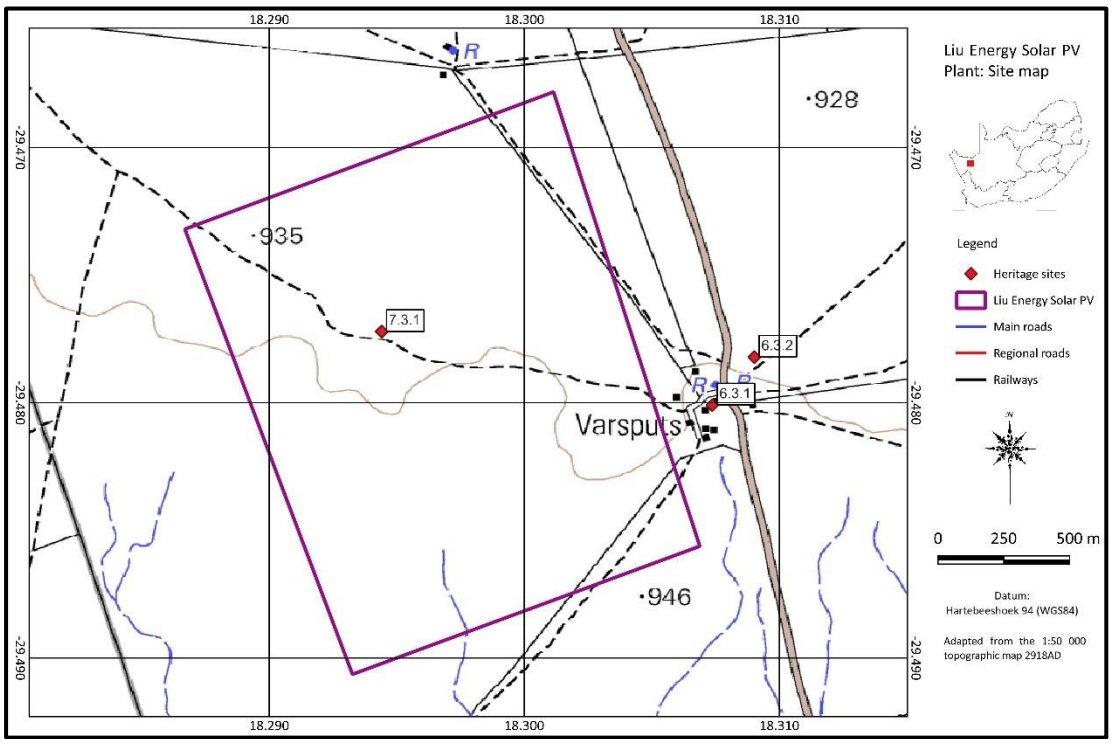


Figure 18. Location of heritage sites in the project area

7.1 Stone Age

NHRA Category	Archaeological resources – Section 35

7.1.1 Type: Stone Age chance finds **Farm**: Farm 564 (Varsputs). **Coordinates**: S 29,47721; E 18,29441

Description: Three probable MSA tools were found in a pan-like depression. The tools were identified over a transect distance of approximately 70 m, indicating a very low presence. The tools are made of quarts and can be classified as scrapers. Most researchers points out the reduced archaeological presence away from landscape features such as hills and rock outcrops. Morris (2011b) is of the opinion that there is a "general background noise of lithic elements but few sites."	
Significance of site/feature	Generally protected 4C: Low significance
Reasoned opinion: This material is rated to have low significance due to their low numbers as well as the fact that it is surface material and is not in its primary context anymore.	
References: Morris (2011a-c), Orton (2016a-c), Van Ryneveld (2017) and Van Schalkwyk (2011)	

Overview of the findspot

Type of tools identified

Figure 19. Location of stone tool findspot and type of tools

7.2 Iron Age

- No sites, features or objects of cultural significance dating to the Iron Age were identified in the project area.

7.3 Historic period

- No sites, features or objects of cultural significance dating to the historic period were identified in the project area.

8. IMPACT ASSESSMENT RATINGS AND MITIGATION MEASURES

8.1 Impact assessment

Heritage impacts are categorised as:

- Direct or physical impacts, implying alteration or destruction of heritage features within the project boundaries;
- Indirect impacts, e.g. restriction of access or visual intrusion concerning the broader environment;
- Cumulative impacts that are combinations of the above.

Impact analysis of cultural heritage resources under threat of the proposed development, is based on the present understanding of the development and is summarised in Table 2 below:

Table 2: Impact assessment

Liu Solar PV Facility		
Impact assessment: Chance find Stone Age lithics		
As the identified Stone Age lithics are of poor quality, surface occurrences and very few in number, their significance is rated to be very low and therefore the impact of the proposed solar PV facility is rated to be negligible.		
	Without mitigation	With mitigation
Extent	Site (1)	Site (1)
Duration	Permanent (5)	Permanent (5)
Intensity	Minor (2)	Minor (2)

Probability	Probable (3)	Improbable (3)
Significance	Low (24)	Low (24)
Status (positive or negative)	Neutral	Neutral
Reversibility	n/a	n/a
Irreplaceable loss of resources?	No	No
Can impacts be mitigated	n/a	
Mitigation: None required		

8.2 Cumulative impacts

The cumulative impact of the proposed Liu project is to be assessed by adding impacts from this proposed development to existing and other proposed developments with similar impacts within a 30 km radius. The existing and proposed developments that were taken into consideration for cumulative impacts include a total of 10 other plants. [2]

However, meaningful assessment of cumulative impacts require a comprehensive review of all developments in the larger region of the project area and not only those involving renewable energy.

From a review of databases, publications, as well as available heritage impact assessments done for the purpose of developments in the region, see list of references in Section 12.2 below, it was determined that the Liu project is located in an environment with a very low presence of heritage sites and features.

- The cultural heritage profile of the larger region is very low. Most frequently found are stone artefacts, mostly dating to the Middle Stone Age. Sites containing such material are usually located along the margins of water features (pans, drainage lines), small hills and rocky outcrops. Such surface scatters or 'background scatter' is usually viewed to be of limited significance (Orton 2016a). In addition to the lithic materials, San and Khoi rock art dating to the Later Stone Age occur in the larger region. However, these are mostly confined to the more mountainous regions where shelters and rock faces are to be found. The colonial period manifests largely as individual farmsteads, in all its complexity, burial sites and infrastructure features such as roads, railways and power lines. For this review, heritage sites located in urban areas have been excluded.

Heritage resources are sparsely distributed on the wider landscape with highly significant (Grade 1) sites being rare. Because of the low likelihood of finding further significant heritage resources in the region of the proposed development and the generally low density of sites in the wider landscape the overall impacts to heritage are expected to be of generally low significance before mitigation.

For the project area, the impacts to heritage sites and objects are expected to be of low significance. The chances of further such material being found, are considered to be negligible.

- The potential impact that the proposed development might have, has been calculated and is presented for each individual site in Table 3 below (this also include the cumulative impact assessment).

Table 3: Cumulative impact assessment

Liu Energy Solar PV Facility		
Impact assessment: As the identified Stone Age lithics are of poor quality, surface occurrences and very few in number, their significance is rated to be very low and therefore the impact of the proposed solar PV facility is rated to be negligible.		
	Without mitigation	With mitigation

[2] Only reports that were available on the SAHRIS database were consulted.

Extent	Local area (1)	Local area (1)
Duration	Permanent (5)	Permanent (5)
Intensity	Low (1)	Low (1)
Probability	Improbable (2)	Improbably (2)
Significance	Low (14)	Low (14)
Status (positive or negative)	Negative	Neutral
Reversibility	Non-reversible	Non-reversible
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated	No	
Mitigation: None		
Cumulative impact: Very limited loss of similar features in the larger landscape.		

8.3 Mitigation measures

Mitigation: means to anticipate and prevent negative impacts and risks, then to minimise them, rehabilitate or repair impacts to the extent feasible.

- For the current study, as no sites, features or objects of cultural significance were identified, no mitigation measures are proposed.

9. MANAGEMENT MEASURES

Heritage sites are fixed features in the environment, occurring within specific spatial confines. Any impact upon them is permanent and non-reversible. Those resources that cannot be avoided and are directly impacted by the proposed development can be excavated/recorded and a management plan can be developed for future action. Those sites that are not impacted on can be written into the management plan, whence they can be avoided or cared for in the future.

Sources of risk were considered with regards to development activities defined in Section 2(viii) of the NHRA that may be triggered and are summarised in Table 4A and 4B below. These issues formed the basis of the impact assessment described. The potential risks are discussed according to the various phases of the project below.

9.1 Objectives

- Protection of archaeological, historical and any other site or land considered being of cultural value within the Project Area against vandalism, destruction and theft.
- The preservation and appropriate management of new discoveries in accordance with the NHRA, should these be discovered during construction activities.

The following shall apply:

- Known sites should be clearly marked, so that they can be avoided during construction activities;
- The contractors and workers should be notified that archaeological sites might be exposed during the construction activities;
- Should any heritage artefacts be exposed during excavation, work on the area where the artefacts were discovered, shall cease immediately and the Environmental Control Officer (ECO) shall be notified as soon as possible;

- All discoveries shall be reported immediately to a heritage practitioner so that an investigation and evaluation of the finds can be made. Acting upon advice from these specialists, the ECO will advise the necessary actions to be taken;
- Under no circumstances shall any artefacts be removed, destroyed or interfered with by anyone on the site; and
- Contractors and workers shall be advised of the penalties associated with the unlawful removal of cultural, historical, archaeological or palaeontological artefacts, as set out in the NHRA, Section 51(1).

9.2 Control

In order to achieve this, the following should be in place:

- A person or entity, e.g. the ECO, should be tasked to take responsibility for the heritage sites and held accountable for any damage.
- Known sites should be located and isolated, e.g. by fencing them off. All construction workers should be informed that these are no-go areas, unless accompanied by the individual or persons representing the ECO as identified above.
- In areas where the vegetation is threatening the heritage sites, e.g. growing trees pushing walls over, it should be removed, but only after permission for the methods proposed has been granted by SAHRA. A heritage official should be part of the team executing these measures.

Table 4A: Construction Phase: Environmental Management Programme for the project

Action required	Protection of heritage sites, features and objects		
Potential Impact	The identified risk is damage or changes to resources that are generally protected in terms of Sections 27, 28, 31, 32, 34, 35, 36 and 37 of the NHRA that may occur in the Project Area.		
Risk if impact is not mitigated	Loss or damage to sites, features or objects of cultural heritage significance		
Activity / issue	**Mitigation: Action/control**	**Responsibility**	**Timeframe**
1. Removal of Vegetation 2. Construction of required infrastructure, e.g. access roads, water pipelines	See discussion in Section 9.1 above	Environmental Control Officer	During construction only
Monitoring	See discussion in Section 9.2 above		

Table 4B: Operation Phase: Environmental Management Programme for the project

Action required	Protection of heritage sites, features and objects		
Potential Impact	It is unlikely that the negative impacts identified for pre-mitigation will occur if the recommendations are followed.		
Risk if impact is not mitigated	Loss or damage to sites, features or objects of cultural heritage significance		
Activity / issue	**Mitigation: Action/control**	**Responsibility**	**Timeframe**
1. Construction of additional required infrastructure, e.g. access roads, water pipelines	See discussion in Section 9.1 above	Environmental Control Officer	During construction only
Monitoring	See discussion in Section 9.2 above		

10. CONCLUSIONS AND RECOMMENDATIONS

4 Degrees Consulting is undertaking a Basic Assessment (BA) of the proposed Solar Photovoltaic (PV) facility and associated infrastructure on the farm Varsputs 564 east Springbok in Northern Cape Province. The proposed project is located within the Springbok Renewable Energy Development Zone (REDZ). The development footprint will be approximately 300 ha and the transmission line will be approximately 6 km.

- On 16 November 2021 the specialist was informed by *4 Degrees Consulting* via e-mail that the power line / grid has been removed from the EIA application as it has not yet been surveyed.

This report describes the methodology used, the limitations encountered, the heritage features that were identified and the recommendations and mitigation measures proposed relevant to this. The investigation consisted of a desktop study (archival sources, database survey, maps and aerial imagery) and a physical survey that also included the interviewing of relevant people. It should be noted that the implementation of the mitigation measures is subject to SAHRA/PHRA's approval.

The cultural heritage profile of the larger region is very low. Most frequently found are stone artefacts, mostly dating to the Middle Stone Age. Sites containing such material are usually located along the margins of water features (pans, drainage lines), small hills and rocky outcrops. Such surface scatters or 'background scatter' is usually viewed to be of limited significance (Orton 2016a). In addition to the lithic materials, San and Khoi rock art dating to the Later Stone Age occur in the larger region. However, these are mostly confined to the more mountainous regions where shelters and rock faces are to be found. The colonial period manifests largely as individual farmsteads, in all its complexity, burial sites and infrastructure features such as roads, railways and power lines.

Identified sites

During the survey, the following sites, features or objects of cultural significance were identified.

- 7.1.1 Three probable MSA tools were found in a pan-like depression. The tools were identified over a transect distance of approximately 70 m, indicating a very low presence. The tools are made of quarts and can be classified as scrapers.

Some heritage sites have been identified adjacent to the project area, but they will not be directly impacted on by the development of the proposed Liu Energy Solar PV Facility.

- 6.3.1 The main farmstead on the property. It is clearly visible on the 1960 version of the aerial photographs, and it is therefore deemed to be older than 60 years. According to Mrs van den Berg, the house has been altered and expanded on in the past.

- 6.3.2 An informal burial site with probably only 5 graves. The graves belong to former landowners, all with the surname of Van den Heever. The death dates on the headstones range between 1973 and 2014.

Impact assessment and proposed mitigation measures

Impact analysis of cultural heritage resources under threat of the proposed prospecting activities is based on the present understanding of the project:

Site No.	Site type	NHRA category	Field rating	Impact rating: Before/After mitigation
7.1.1	Archaeological resources	Section 35	Generally protected 4C: Low significance - Requires no further recording before destruction.	Low (24) Low (24)
Mitigation: (5) No further action required				

Cumulative assessment

Heritage resources are sparsely distributed on the wider landscape with highly significant (Grade 1) sites being rare. Because of the low likelihood of finding further significant heritage resources in the region of the proposed project area and the generally low density of sites in the wider landscape the overall impacts to heritage are expected to be of generally low significance.

- The chances of further such material being found are considered to be negligible.

Legal requirements

The legal requirements related to heritage specifically are specified in Section 3 of this report.

- For this proposed project, the assessment has determined that no sites, features or objects of cultural heritage significance occur in the project area, therefore no permits are required from SAHRA or the PHRA.
- If heritage features are identified during construction, as stated in the management recommendation, these finds would have to be assessed by a specialist, after which a decision will be made regarding the application for relevant permits.

Reasoned opinion as to whether the proposed activity should be authorised:

- From a heritage point of view, it is recommended that the Proposed Project be allowed to continue on acceptance of the mitigation measures presented above and the conditions proposed below.

Conditions for inclusion in the environmental authorisation:

- The Palaeontological Sensitivity Map (http://www.sahra.org.za/sahris/map/palaeo) indicate that project area has a low sensitivity of fossil remains to be found and therefore no palaeontological studies are required. However, a protocol for finds is required.
- Should archaeological sites or graves be exposed during construction work, it must immediately be reported to a heritage practitioner so that an investigation and evaluation of the finds can be made. The appropriate steps to take are indicated in Section 9 of the report, as well as in the **Management Plan: Burial Grounds and Graves, with reference to general heritage sites**, in the Addendum, Section 12.4.

11. REFERENCES

11.1 Data bases

Chief Surveyor General
Environmental Potential Atlas, Department of Environmental Affairs and Tourism.
Heritage Atlas Database, Pretoria
National Archives of South Africa
SAHRA Archaeology and Palaeontology Report Mapping Project (2009)
SAHRIS Database

11.2 Literature

Backhouse, J. 1844. *A Narrative of a Visit to the Mauritius and South Africa*. London: Hamilton, Adams and Co.

Beaumont, P.B. & Vogel, J.C. 1984. Spatial patterning of the ceramic Later Stone Age in the Northern Cape Province, South Africa. In Hall, M., Avery, G., Avery, D.M., Wilson, M.L. & Humphreys, A.J.B. *Frontiers: Southern African Archaeology Today*. Cambridge.

Beaumont, P.B., Smith, A.B. & Vogel, J.C. 1995. Before the Einiqua: the archaeology of the frontier zone. In Smith, AB (ed.) *Einiqualand: studies of the Orange River frontier*: 236-264. Cape Town: University of Cape Town Press.

Beaumont, P.B. & Vogel, J.C. 2006. On a timescale for the past million years of human history in central South Africa. *South African Journal of Science* 102: 217–28.

Birkholtz, P. 2016. *Prospecting work programme: submitted for a prospecting right application without bulk sampling, various farm portions near Aggeneys, Nama Khoi Local Municipality, District Namakwaland, Northern Cape Province*. Pretoria: Unpublished report.

Burke, P. 1995. *The Siege of O'Okiep (guerilla campaign in the Anglo-Boer War)*. Bloemfontein: War Museum of the Boer Republics.

Dewar, G, and Stewart, BA. 2012. Preliminary results of excavations at Spitzkloof Rockshelter, Richtersveld, South Africa. *Quaternary International* 270: 30-39.

Evans, M.F.M. 2000. *Encyclopedia of the Boer War*. Bodmin, Cornwall: MPG Books Limited.

Fagan, G. 2008. *Brakdak: platdakke in die Karoo*. Kaapstad: Breestraat Publikasies.

Humphreys, A.J.B. 1976. Note on the southern limits of Iron Age settlement in the Northern Cape. *South African Archaeological Bulletin* 31(121/122): 54-57.

Legassick, M.C. 2010. *The Politics of a South African Frontier*. Basel: Basler Afrika Bibliographien.

Morris, D. 1999. *Archaeological impact assessment, Skuitklipkop microwave tower, Kenhardt District, Northern Cape*. Unpublished report. Kimberley: McGregor Museum.

Morris, D. 2000a. *Archaeological impact assessment, Black Mountain Mine, Aggeneys, Northern Cape*. Unpublished report. Kimberley: McGregor Museum.

Morris, D. 2000b. *Archaeological specialist report: desktop assessment of possible archaeological resources along the proposed route, Helios to Aggeneis, Northern Cape*. Unpublished report. Kimberley: McGregor Museum.

Morris, D. 2001. *Gamsberg Zinc: supplementary report on archaeological resources at Gamsberg. Unpublished report for Gamsberg Zinc Project*. Unpublished report. Kimberley: McGregor Museum.

Morris, D. 2011a. *SATO Energy Holdings Zuurwater Photovoltaic Energy Generation Facility development near Aggeneys, Northern Cape: Heritage Impact Assessment*. Unpublished report. Kimberley: McGregor Museum.

Morris, D. 2011b. *Black Mountain Concentrated Solar Power Facility Development at Aggeneys, Northern Cape: Heritage Impact Assessment*. Unpublished report. Kimberley: McGregor Museum.

Morris, D. 2011c. *A Phase 1 Heritage Impact Assessment for the proposed Aggeneis – Paulputs 220KV Transmission Line*. Unpublished report. Kimberley: McGregor Museum.

Morris. D. 2013a. *Heritage Impact Assessment for four proposed photovoltaic solar energy facilities on the farm Zuurwater near Aggeneys, Northern Cape Province*. Unpublished report. Kimberley: McGregor Museum.

Morris, D. 2013b. *Archaeological and Cultural Heritage Investigation for the Environmental and Social Impact Assessment (ESIA) for the Gamsberg Zinc Mine and associated infrastructure in Northern Cape, South Africa*.

Muncina, L. & Rutherford, M.C. 2006. *The Vegetation Map of South Africa, Lesotho and Swaziland*. Pretoria: SANBI.

Norman, N. & Whitfield, G. 2006. *Geological Journeys*. Cape Town: Struik Publishers.

Orton, J. 2015. *Final archaeological survey for the proposed Konkoonsies II Solar energy Facility, Kenhardt Magisterial District, Northern Cape*. Muizenberg: Unpublished report.

Orton, J. 2016a. Prehistoric cultural landscapes in South Africa: a typology and discussion. *South African Archaeological Bulletin* 71:119-129.

Orton, J. 2016b. *Heritage Impact Assessment for the proposed development of a 75MW Solar Photovoltaic Facility (Gemsbok Solar PV5) on Gemsbok Bult 120/8, northeast of Kenhardt, Northern Cape Province*. Muizenberg: Unpublished report.

Orton, J. 2016c. *Heritage Scoping Study for Sol Invictus Solar PV development on Ou Taaibosmond 66/5, Namakwaland Magisterial District, Northern Cape.* Muizenberg: Unpublished report.

Orton, J. & Webley, L. 2012. *Heritage impact assessment for the proposed Kangnas wind and solar energy facilities, Namakwa Magisterial District, Northern Cape*. Cape Town: Unpublished report.

Playne, E. (Ed.) 1910-1911. *Cape Colony (Cape Province): its History, Commerce, Industries and Resources*. London: The Foreign and Colonial Compiling and Publishing Co.

Van der Ryst, M. & Küsel, S. 2012. *Phase 2 mitigation and specialist study of Middle Stone Age localities on the farm Zandkopsdrift 357, Garies District, Northern Cape Province*. Pretoria:Unpublished report.

Van Ryneveld, K. 2017. *Koa Valley Prospecting Right Application (without Bulk Sampling), Portions of the Farms Haramoep 53, Oonab-Noord 609, Amam 46 and Nooisabes 51, near Springbok / Aggeneys, Namakwa District Municipality, Northern Cape*. Unpublished report.

Van Schalkwyk, J.A. 2011. *Heritage impact assessment for the proposed Eskom 400kV electricity transmission line, Aggeneys to Helios Substations, Northern Cape Province*. Pretoria: Unpublished report 2011/JvS/010.

Van Schalkwyk, J.A. 2013 (updated July 2015). *Heritage scoping assessment for the proposed Aries-Helios 765kV transmission power line and substations upgrade, Northern Cape Province*. Pretoria: Unpublished report 2013/JvS/020.

11.3 Archival sources, maps and aerial photographs

1: 50 000 Topographic maps
Google Earth
Aerial Photographs: Chief Surveyor-General
http://artefacts.co.za
http://*vmus*.adu.org.za
http://www.sahra.org.za/sahris/map/palaeo
NASA:

- Depot: SAB; Source: GG; Volume no. 113; Reference: 3/11059; Date: 1912
- Depot: SAB; Source: GG; Volume no. 114; Reference: 3/1100; Date: 1912

12. ADDENDUM

1. Indemnity and terms of use of this report

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

Although all possible care is taken to identify all sites of cultural importance during the investigation of study areas, it is always possible that hidden or sub-surface sites could be overlooked during the study. The author of this report will not be held liable for such oversights or for costs incurred as a result of such oversights.

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

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

2. Assessing the significance of heritage resources and potential impacts

A system for site grading was established by the NHRA and further developed by the South African Heritage Resources Agency (SAHRA 2007) and has been approved by ASAPA for use in southern Africa and was utilised during this assessment.

2.1 *Significance of the identified heritage resources*

According to the NHRA, Section 2(vi) the **significance** of a heritage sites and artefacts is determined by it aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technical value in relation to the uniqueness, condition of preservation and research potential. It must be kept in mind that the various aspects are not mutually exclusive, and that the evaluation of any site is done with reference to any number of these.

Matrix used for assessing the significance of each identified site/feature

1. SITE EVALUATION			
1.1 Historic value			
Is it important in the community, or pattern of history			
Does it have strong or special association with the life or work of a person, group or organisation of importance in history			
Does it have significance relating to the history of slavery			
1.2 Aesthetic value			
It is important in exhibiting particular aesthetic characteristics valued by a community or cultural group			
1.3 Scientific value			
Does it have potential to yield information that will contribute to an understanding of natural or cultural heritage			
Is it important in demonstrating a high degree of creative or technical achievement at a particular period			
1.4 Social value			
Does it have strong or special association with a particular community or cultural group for social, cultural or spiritual reasons			
1.5 Rarity			
Does it possess uncommon, rare or endangered aspects of natural or cultural heritage			
1.6 Representivity			
Is it important in demonstrating the principal characteristics of a particular class of natural or cultural places or objects			
Importance in demonstrating the principal characteristics of a range of landscapes or environments, the attributes of which identify it as being characteristic of its class			
Importance in demonstrating the principal characteristics of human activities (including way of life, philosophy, custom, process, land-use, function, design or technique) in the environment of the nation, province, region or locality.			
2. Sphere of Significance	High	Medium	Low
International			
National			
Provincial			
Regional			
Local			
Specific community			
3. Field Register Rating			
1.	National/Grade 1: High significance - No alteration whatsoever without permit from SAHRA		
2.	Provincial/Grade 2: High significance - No alteration whatsoever without permit from provincial heritage authority.		
3.	Local/Grade 3A: High significance - Mitigation as part of development process not advised.		

4.	Local/Grade 3B: High significance - Could be mitigated and (part) retained as heritage register site	
5.	Generally protected 4A: High/medium significance - Should be mitigated before destruction	
6.	Generally protected 4B: Medium significance - Should be recorded before destruction	
7.	Generally protected 4C: Low significance - Requires no further recording before destruction	

2.2 *Significance of the anticipated impact on heritage resources*

All impacts identified during the HIA stage of the study will be classified in terms of their significance. Issues would be assessed in terms of the following criteria:

Nature of the impact
A description of what causes the effect, what will be affected and how it will be affected.

Extent
The physical **extent**, wherein it is indicated whether:
- 1 - The impact will be limited to the site;
- 2 - The impact will be limited to the local area;
- 3 - The impact will be limited to the region;
- 4 - The impact will be national; or
- 5 - The impact will be international.

Duration
Here it should be indicated whether the lifespan of the impact will be:
- 1 - Of a very short duration (0–1 years);
- 2 - Of a short duration (2-5 years);
- 3 - Medium-term (5–15 years);
- 4 - Long term (where the impact will persist possibly beyond the operational life of the activity); or
- 5 - Permanent (where the impact will persist indefinitely).

Magnitude (Intensity)
The magnitude of impact, quantified on a scale from 0-10, where a score is assigned:
- 0 - Small and will have no effect;
- 2 - Minor and will not result in an impact;
- 4 - Low and will cause a slight impact;
- 6 - Moderate and will result in processes continuing but in a modified way;
- 8 - High, (processes are altered to the extent that they temporarily cease); or
- 10 - Very high and results in complete destruction of patterns and permanent cessation of processes.

Probability
This describes the likelihood of the impact actually occurring and is estimated on a scale where:
- 1 - Very improbable (probably will not happen);
- 2 - Improbable (some possibility, but low likelihood);
- 3 - Probable (distinct possibility);
- 4 - Highly probable (most likely); or
- 5 - Definite (impact will occur regardless of any prevention measures).

Significance
The significance is determined through a synthesis of the characteristics described above (refer to the formula below) and can be assessed as low, medium or high:

S = (E+D+M) x P; where
S = Significance weighting

E = Extent
D = Duration
M = Magnitude
P = Probability

Significance of impact		
Points	Significant Weighting	Discussion
< 30 points	Low	Where this impact would not have a direct influence on the decision to develop in the area.
31-60 points	Medium	Where the impact could influence the decision to develop in the area unless it is effectively mitigated.
> 60 points	High	Where the impact must have an influence on the decision process to develop in the area.

Confidence
This should relate to the level of confidence that the specialist has in establishing the nature and degree of impacts. It relates to the level and reliability of information, the nature and degree of consultation with I&AP's and the dynamic of the broader socio-political context.

- High, where the information is comprehensive and accurate, where there has been a high degree of consultation and the socio-political context is relatively stable.
- Medium, where the information is sufficient but is based mainly on secondary sources, where there has been a limited targeted consultation and socio-political context is fluid.
- Low, where the information is poor, a high degree of contestation is evident and there is a state of socio-political flux.

Status
- The status, which is described as either positive, negative or neutral.

Reversibility
- The degree to which the impact can be reversed.

Mitigation
- The degree to which the impact can be mitigated.

Nature:		
	Without mitigation	With mitigation
Construction Phase		
Probability		
Duration		
Extent		
Magnitude		
Significance		
Status (positive or negative)		
Operation Phase		
Probability		
Duration		
Extent		
Magnitude		
Significance		
Status (positive or negative)		
Reversibility		
Irreplaceable loss of resources?		
Can impacts be mitigated		

3. Mitigation measures

- *Mitigation: means to anticipate and prevent negative impacts and risks, then to minimise them, rehabilitate or repair impacts to the extent feasible.*

Impacts can be managed through one or a combination of the following mitigation measures:

- Avoidance
- Investigation (archaeological)
- Rehabilitation
- Interpretation
- Memorialisation
- Enhancement (positive impacts)

For the current study, the following mitigation measures are proposed, to be implemented only if any of the identified sites or features are to be impacted on by the proposed development activities:

- (1) Avoidance/Preserve: This is viewed to be the primary form of mitigation and applies where any type of development occurs within a formally protected or significant or sensitive heritage context and is likely to have a high negative impact. This measure often includes the change / alteration of development planning and therefore impact zones in order not to impact on resources. The site should be retained *in situ* and a buffer zone should be created around it, either temporary (by means of danger tape) or permanently (wire fence or built wall). Depending on the type of site, the buffer zone can vary from
    - 10 metres for a single grave, or a built structure, to
    - 50 metres where the boundaries are less obvious, e.g. a Late Iron Age site.

- (2) Archaeological investigation/Relocation of graves: This option can be implemented with additional design and construction inputs. This is appropriate where development occurs in a context of heritage significance and where the impact is such that it can be mitigated. Mitigation is to excavate the site by archaeological techniques, document the site (map and photograph) and analyse the recovered material to acceptable standards. This can only be done by a suitably qualified archaeologist.
    - This option should be implemented when it is impossible to avoid impacting on an identified site or feature.
    - This also applies for graves older than 60 years that are to be relocated. For graves younger than 60 years a permit from SAHRA is not required. However, all other legal requirements must be adhered to.
        - Impacts can be beneficial – e.g. mitigation contribute to knowledge

- (3) Rehabilitation: When features, e.g. buildings or other structures are to be re-used. Rehabilitation is considered in heritage management terms as an intervention typically involving the adding of a new heritage layer to enable a new sustainable use.
    - The heritage resource is degraded or in the process of degradation and would benefit from rehabilitation.
    - Where rehabilitation implies appropriate conservation interventions, i.e. adaptive reuse, repair and maintenance, consolidation and minimal loss of historical fabric.
        - Conservation measures would be to record the buildings/structures as they are (at a particular point in time). The records and recordings would then become the 'artefacts' to be preserved and managed as heritage features or (movable) objects.
        - This approach automatically also leads to the enhancement of the sites or features that are re-used.

- (4) Mitigation is also possible with additional design and construction inputs. Although linked to the previous measure (rehabilitation) a secondary though 'indirect' conservation measure would be to use the existing architectural 'vocabulary' of the structure as guideline for any new designs.
    - The following principle should be considered: **heritage informs design**.
        - This approach automatically also leads to the enhancement of the sites or features that are re-used.

- (5) No further action required: This is applicable only where sites or features have been rated to be of such low significance that it does not warrant further documentation, as it is viewed to be fully documented after inclusion in this report.
    - Site monitoring during development, by an ECO or the heritage specialist are often added to this recommendation to ensure that no undetected heritage/remains are destroyed.

4. Management Plan: Burial Grounds and Graves, with reference to general heritage sites

1. Background

Burial grounds and graves are viewed as having high emotional and sentimental value and accordingly always carry a high cultural heritage significance rating. Best practice principles dictate that they should preferably be preserved *in situ*. It is only when it is unavoidable and the site cannot be retained, that the graves should be exhumed and relocated after all due processes had been successfully implemented.

For retaining the burial sites and graves, the SAHRA Burial Grounds and Graves (BGG) unit requires a detailed Heritage Management Plan (HMP) clearly outlining a grave management plan that provides details of grave management and access protocols. In addition, the HMP should also provide detailed change finds protocol or procedures in the case of the identification human remains.

The primary aim of the Burial Grounds and Graves Management Plan therefore is to assist in the implementation of mitigation measures to reduce potential negative impacts through the modification of the proposed project development design.

2. Legal Implications

South Africa's unique and non-renewable archaeological and palaeontological heritage sites, inclusive of burial grounds and graves, are 'generally' protected in terms various laws and by-laws:

- Nationally: National Heritage Resources Act, No. 25 of 1999;
- Provincially: KwaZulu-Natal Heritage Act, No. 4 of 2008.

In addition, the following also refer specifically to burial grounds and graves:
- Human Tissue Act, No. 65 of 1983;
- Section 46 of the National Health Act, No. 61 of 2003;
- Removal of Graves and Dead Bodies Ordinance (Ordinance No. 7 of 1925)
- By-laws:
    - R363 of 2013: Regulations Relating to the Management of Human Remains
    - Local Authorities Notice 34 of 2017, Cemeteries, Crematoria and Funeral Undertakers By-Laws as per Provincial Gazette of 7 April 2017 No. 2800.

In terms of the National Heritage Resources Act, No. 25 of 1999, graves and burial grounds are divided into the following categories:
- Ancestral graves;
- Royal graves and graves of traditional leaders;
- Graves of victims of conflict;
- Graves of individuals designated by the Minister by notice in the Gazette;
- Historical graves and cemeteries; and
- Other human remains which are not covered in terms of the Human Tissue Act, 1983 (Act No. 65 of 1983);

For KwaZulu-Natal, the KwaZulu-Natal Heritage Act No. 4 of 2008, graves and burial grounds are divided into the following categories:
- Clause 34: Clause 34 seeks to generally protect, against damage or alteration, graves of victims of conflict.
- Clause 35: Clause 35 seeks to generally protect, against damage or alteration, traditional burial places.

- Clause 40: Clause 40 seeks to give special protection to graves of members of the Royal Family listed in the schedule.

In terms of Section 36(3) of the National Heritage Resources Act, no person may, without a permit issued by the relevant heritage resources authority:

- Destroy, damage, alter, exhume or remove from its original position of otherwise disturb the grave of a victim of conflict, or any burial ground or part thereof which contains such graves;
- Destroy, damage, alter, exhume or remove from its original position or otherwise disturb any grave or burial ground older than 60 years which is situated outside a formal cemetery administered by a local authority; or
- Bring onto or use at a burial ground or grave referred to in paragraph (a) or (b) any excavation, or any equipment which assists in the detection or recovery of metals.

Marked graves younger than 60 years do not fall under the protection of the NHRA (Act No. 25 of 1999) with the result that exhumation, relocation and reburial can be conducted by a register undertaker. This will include logistical aspects such as social consultation, purchasing of plots in cemeteries, procurement of coffins, etc.

Marked graves older than 60 years are protected by the NHRA (Act No. 25 of 1999) an as a result an archaeologist must be in attendance to assist with the exhumation and documentation of the graves. Unmarked graves are by default regarded as older than 60 years and therefore also falls under the NHRA (Act No. 25 of 1999, Section 36).

For graves in KwaZulu-Natal permission is required as follows:

- Clause 34: Approval of the Council must first be sought;
- Clause 35: Approval of the Council must first be sought;
- Clause 40: Nothing is stated in the Act.

3. Management Plan

3.1 *Definitions*

Heritage Site Management: Heritage site management is the control of the elements that make up physical and social environment of a site, its physical condition, land use, human visitors, interpretation, etc. Management may be aimed at preservation or, if necessary, at minimizing damage or destruction or at presentation of the site to the public. A site management plan is designed to retain the significance of the place. It ensures that the preservation, enhancement, presentation and maintenance of the place/site is deliberately and thoughtfully designed to protect the heritage values of the place (from: *SAHRA Site management plans: guidelines for the development of plans for the management of heritage sites or places*).

Mitigation: means to anticipate and prevent negative impacts and risks, then to minimise them, rehabilitate or repair impacts to the extent feasible.

3.2 *Heritage management plan (HMP)*

3.2.1 Phase 1: Site identification and verification

This part of the process usually take place during the Phase 1 heritage impact assessment and is discussed in Section 7 of the main body of the HIA.

Locality and identification:

- The location of the identified site (e.g. farm name, GPS coordinates) is given;

- Determination of the number of graves and the date range of the burials.

The physical condition of the site is also described in terms of:
- The condition of the burial grounds and graves, e.g. has the headstones been pushed over;
- The approximate number of graves and the date range of the graves;
- Is the site fenced off;
- Is there access to the site, in the case it is fenced off;
- Has the site recently been visited by next of kin or other individuals;
- The status of the vegetation cover on the site.

3.2.2 Phase 2: Determination of the potential impact on the identified sites

Identified impacts on the graves and burial sites are calculated and discussed in Section 8.1 of the main body of the HIA.

The second phase consists of information that should be collected in order to develop the conservation management plan. This includes:
- The needs of the client;
- External needs, i.e. the next of kin;
- Requirements for the maintenance of the cultural significance.

From the above an evaluation is made of the impact of the proposed development project on the status of each of the identified burial grounds and graves.

3.2.3 Phase 3: Mitigation measures

Proposed mitigation measures for each identified burial ground or graves are developed and is discussed in the main body of the HIA (Section 8.2).

The main aim of the mitigation measures, as far as is feasible, is to remove any physical, direct impacts on the burial grounds and graves.

- A minimum buffer of 20m must be established around known burial grounds and graves for the duration of the mining/construction phase. This is relevant where the burial site has been static for a considerable period of time and has already been fenced off;
- In cases the burial site is still in use and might expand in the future and is not fenced off, a minimum buffer of 100m should be implemented;
- In the case where blasting takes place during mining activities, the buffers should increase correspondingly to 200m;
- The buffers must be clearly demarcated, and signage placed during the construction/mining period;
- Access to the graves should be allowed to the descendants. However, they should adhere to the managing authorities' conditions regarding permissions, appointments, health, environment and safety.
- The areas with graves should be kept clean and the grass short so that visitors may enter it without any concerns.
    - However, this might create problems as in many cases not all graves are well-marked, carrying the possibility that they might inadvertently be damaged and therefore contractors/land-owners might not be will to accept this responsibility. The descendants should therefore be held responsible for the maintenance of the site.

- Sites that are located close to access/haul roads might need additional mitigation. All personnel and especially drivers of heavy haul vehicles should be informed where these sites are, and they should keep to the speed limits (usually 30km/h on mining sites);
- Any change in the development layout, future development plans, condition of the grave sites and individual graves should immediately be reported to the heritage inspector/SAHRA for guidance;
- Relevant strategies should be put in place for the managing of the burial grounds and graves after the closure of the mine or the completion of the project. It needs to be stated that the land-owner or developer always will be responsible for the preservation of the site. Therefore, measures should be put in place to ensure that the site is handled appropriately after closure, which, in essence would entail the continuation measures already put in place;

3.3 *Management strategy*

A general approach to this is set out in Section 9 of the main body of the HIA report and is equally applicable to general heritage sites and feature as well as to burial grounds and graves.

A strategy for the implementation of the conservation plan is developed:

- A heritage practitioner should be appointed to develop a heritage induction program and conduct training for the ECO, as well as team leaders, in the identification of heritage resources and artefacts;
- Known sites must be demarcated and fenced off and signage placed during the construction/mining period;
- This management strategy should be applicable to the construction, operation as well as the post operation phases of the development/mining activities.
- Relevant strategies should be put in place for the managing of the burial grounds and graves after the closure of the mine or the completion of the project. It needs to be stated that the land-owner or developer always will be responsible for the preservation of the site. Therefore, measures should be put in place to ensure that the site is handled appropriately after closure, which, in essence would entail the continuation measures already put in place;
- The managing authority should be able to regularly inspect the sites in order to ensure that construction and other such activities do not damage the graves;
    - SAHRA and the relevant PHRA are the competent authorities responsible for the regulation of the HMP in terms of the national legislative framework. The NHRA states:

        36(1) *Where it is not the responsibility of any other authority, SAHRA must conserve and generally care for burial grounds and graves protected in terms of this section, and it may make the necessary arrangement for their conservation as they see fit.*

4. Relocation of graves

Once it has been decided to relocate particular graves, the following steps should be taken:

- Notices of the intention to relocate the graves need to be put up at the burial site for a period of 60 days. This should contain information where communities and family members can contact the developer/archaeologist/public-relations officer/undertaker. All information pertaining to the identification of the graves needs to be documented for the application of a SAHRA permit. The notices need to be in at least 3 languages, English, and two other languages. This is a requirement by law.
- Notices of the intention needs to be placed in at least two local newspapers and have the same information as the above point. This is a requirement by law.
- Local radio stations can also be used to try contact family members. This is not required by law, but is helpful in trying to contact family members.
- During this time (60 days) a suitable cemetery need to be identified close to the development area or otherwise one specified by the family of the deceased.

- An open day for family members should be arranged after the period of 60 days so that they can gather to discuss the way forward, and to sort out any problems. The developer needs to take the families requirements into account. This is a requirement by law.
- Once the 60 days has passed and all the information from the family members have been received, a permit can be requested from SAHRA. This is a requirement by law.
- Once the permit has been received, the graves may be exhumed and relocated.
- All headstones must be relocated with the graves as well as any items found in the grave.

Information needed for the SAHRA permit application:

- The permit application needs to be done by an archaeologist.
- A map of the area where the graves have been located.
- A survey report of the area prepared by an archaeologist.
- All the information on the families that have identified graves.
- If graves have not been identified and there are no headstones to indicate the grave, these are then unknown graves and should be handled as if they are older than 60 years. This information also needs to be given to SAHRA.
- A letter from the landowner giving permission to the developer to exhume and relocate the graves.
- A letter from the new cemetery confirming that the graves will be reburied there.
- Details of the farm name and number, magisterial district and GPS coordinates of the gravesite.

5. Defining next of kin

An extensive Burial Grounds and Graves Consultation process must be implemented in accordance with NHRA Regulations to identify bona fide next of kin and reach agreement regarding relocation of graves.

Anthropologically speaking three type of kin are distinguished: patrilineal (called *agnates*), maternal (*uterine* kin) and kin by marriage (*affines*). All three categories have their important part to play in social life.

In terminologies used in the west the close-knit group of family members is clearly marked off from other kin - family terms, such as ‘father’, ‘mother’, ‘brother’ and ‘sister’ are never used for aunts, uncles and cousins.

In many non-western societies this is not the case and the family is merged with the wider group of kin and the family terms are applied much more widely. Next of kin for the Southern Bantu-language speakers is based on a classificatory system where a man uses a term to refer to three significant relatives – his father, his father’s brother and his mother’s brother.

For example, a man (A) may call his father’s brother (i.e. uncle) also a father. All of that latter person’s children will then also be called his (A) brothers and sisters, prohibiting him from marrying any of them (however, *vide* preferred marriages). In Anthropology this system is referred to as the Iroquois system (with reference to the North American Indian tribe where it was first described). When a man calls his father’s brother ‘father’ a suffix is usually added to indicate whether he is an elder or junior brother (e.g. (*ra)mogolo* = elder brother; (*ra)ngwane* = junior brother; also (*ra)kgadi* = younger sister; (*ma)lome* = mother’s brother)(SePedi terminology is used).

Consultants having to relocate graves might find it confusing if they do not have insight into this complex system of kinship, where, for example a single individual can have more than one father or mother.

5. Chance find procedures

A general approach to this is set out in Section 9 of the main body of the HIA report and is equally applicable to general heritage sites and features as to burial grounds and graves.

- A heritage practitioner should be appointed to develop a heritage induction program and conduct training for the ECO, as well as team leaders, in the identification of heritage resources and artefacts;
- An appropriately qualified heritage consultant should be identified to be called upon if any possible heritage resources or artefacts are identified;
- Should an archaeological site or cultural material be discovered during construction (or operation), the area should be demarcated, and construction activities be halted;
- The qualified archaeologist will then need to come out to the site and evaluate the extent and importance of the heritage resources and make the necessary recommendations for mitigating the find and impact on the heritage resource;
- The contractor therefore should have some sort of contingency plan so that operations could move elsewhere temporarily while the material and data are recovered;
- Should the heritage consultant conclude that the find is a heritage resource protected in terms of the NHRA (1999) Sections 34, 35, 37 and NHRA (1999) Regulations (Regulation 38, 39, 40), he or she should notify SAHRA and/or the relevant PHRA;
- Based on the comments received from SAHRA and/or the PHRA, the heritage consultant would present the relevant terms of reference to the client for implementation;
- Construction/Operational activities can commence as soon as the site has been cleared and signed off by the archaeologist.

6. Curriculum vitae

Johan Abraham van Schalkwyk

Personal particulars

Date of birth:	14 April 1952
Identity number:	520414 5099 08 4
Marital status:	Married; one daughter
Nationality:	South African

Current address: home

62 Coetzer Ave, Monument Park, Pretoria, 0181
Mobile: 076 790 6777; E-mail: jvschalkwyk@mweb.co.za

Qualifications

1995 DLitt et Phil (Anthropology), University of South Africa
1985 MA (Anthropology), University of Pretoria
1981 BA (Hons), Anthropology, University of Pretoria
1979 Post Graduate Diploma in Museology, University of Pretoria
1978 BA (Hons), Archaeology, University of Pretoria
1976 BA, University of Pretoria

Non-academic qualifications

12th HSRC-School in Research Methodology - July 1990
Dept. of Education and Training Management Course - June 1992
Social Assessment Professional Development Course - 1994
Integrated Environmental Management Course, UCT - 1994

Professional experience

Private Practice
2017 - current: Professional Heritage Consultant

National Museum of Cultural History
1992 - 2017: Senior researcher: Head of Department of Research. Manage an average of seven researchers in this department and supervise them in their research projects. Did various projects relating to Anthropology and Archaeology in Limpopo Province, Mpumalanga, North West Province and Gauteng. Headed the Museum's Section for Heritage Impact Assessments.
1978 - 1991: Curator of the Anthropological Department of the Museum. Carried out extensive fieldwork in both anthropology and archaeology

Department of Archaeology, University of Pretoria
1976 - 1977: Assistant researcher responsible for excavations at various sites in Limpopo Province and Mpumalanga.

Awards and grants

1. Hanisch Book Prize for the best final year Archaeology student, University of Pretoria - 1976.
2. Special merit award, National Cultural History Museum - 1986.
3. Special merit award, National Cultural History Museum - 1991.
4. Grant by the Department of Arts, Culture, Science and Technology, to visit the various African countries to study museums, sites and cultural programmes - 1993.
5. Grant by the USA National Parks Service, to visit the United States of America to study museums, sites, tourism development, cultural programmes and impact assessment programmes - 1998.
6. Grant by the USA embassy, Pretoria, under the Bi-national Commission Exchange Support Fund, to visit cultural institutions in the USA and to attend a conference in Charleston - 2000.
7. Grant by the National Research Foundation to develop a model for community-based tourism - 2001.

8. Grant by the National Research Foundation to develop a model for community-based tourism - 2013. In association with RARI, Wits University.

Publications
Published more than 70 papers, mostly in scientifically accredited journals, but also as chapters in books.

Conference Contributions
Regularly presented papers at conferences, locally as well as internationally, on various research topics, ranging in scope from archaeology, anthropological, historical, cultural historical and tourism development.

Heritage Impact Assessments
Since 1992, I have done more than 2000 Phase 1 and Phase 2 impact assessments (archaeological, anthropological, historical and social) for various government departments and developers. Projects include environmental management frameworks, roads, pipeline-, and power line developments, dams, mining, water purification works, historical landscapes, refuse dumps and urban developments.

Latest publications
Van Schalkwyk, J.A. 2020. A cognitive approach to ordering of the world: some case studies from the Sotho- and Tswana-speaking people of South Africa. In Whitley, D.S., Loubser, J.H.N. & Whitelaw, G. (eds.) *Cognitive Archaeology. Mind, Ethnography, and the Past in South African and Beyond*. London: Routledge. Pp. 184-200.

Namono, C. & Van Schalkwyk, J.A. 2020. Appropriating colonial dress in the rock art of the Makgabeng plateau, South Africa. In Wingfield, C., Giblin, J. & King, R. (eds) *The pasts and presence of art in South Africa: Technologies, Ontologies and Agents*. University of Cambridge: McDonald Institute for Archaeological Research. Pp. 51-62.