HERITAGE IMPACT ASSESSMENT:

PROPOSED 33KV/132KV SUBSTATION, 132KV POWERLINE WITH A 132KV SWITCHING STATION AND ASSOCIATED INFRASTRUTCURE FOR THE SUTHERLAND AND RIETRUG WIND ENERGY FACILITIES, SUTHERLAND MAGISTERIAL DISTRICT, NORTHERN CAPE

Required under Section 38(8) of the National Heritage Resources Act (No. 25 of 1999)
as part of a Heritage Impact Assessment.

Report for:

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On behalf of:

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SUMMARY

ASHA Consulting (Pty) Ltd was appointed by Nala Environmental to assess the potential impacts to heritage resources that might occur through the proposed construction and operation of a 33kV/132 kV substation, 132 kV powerline with a 132kV switching station that will be located on the Remaining Extent of Nooitgedacht Farm 148, 38 km to the southeast of Sutherland and within the Sutherland Magisterial District. The proposed infrastructure is required to support the already authorised Rietrug and Sutherland Wind Energy Facilities (WEFs). The co-ordinate locations for the project are as follows:

132kV Powerline co-ordinates (Alternative 1) preferred alternative:

	Latitude	Longitude
Start (Alternative 1 substation)	32°38'4.10"S	20°57'48.14"E
End	32°38'17.48"S	20°57'56.28"E

132kV Powerline co-ordinates (Alternative 2):

	Latitude	Longitude
Start (Alternative 2 substation)	32°37'36.43"S	20°57'42.78"E
Middle	32°38'0.51"S	20°57'45.92"E
End	32°38'17.48"S	20°57'56.28"E

132kV Switching Station (Eskom portion) (Alternative 1)- preferred alternative

Corner Co-ordinates	Latitude	Longitude
Corner 1	32°38'5.04"S	20°57'41.42"E
Corner 2	32°38'1.69"S	20°57'56.13"E
Corner 3	32°38'7.92"S	20°57'58.10"E
Corner 4	32°38'11.19"S	20°57'43.31"E

132kV Switching Station (Eskom portion) (Alternative 2)

Corner Co-ordinates	Latitude	Longitude
Corner 1	32°37'33.08"S	20°57'35.07"E
Corner 2	32°37'33.00"S	20°57'50.36"E
Corner 3	32°37'39.37"S	20°57'50.33"E
Corner 4	32°37'39.40"S	20°57'35.10"E

33kV/132kV Substation (Alternative 1)- preferred alternative

Corner Co-ordinates	Latitude	Longitude
Corner 1	32°37'58.74"S	20°57'39.35"E
Corner 2	32°37'55.47"S	20°57'54.13"E
Corner 3	32°38'1.64"S	20°57'56.17"E
Corner 4	32°38'4.91"S	20°57'41.34"E

33kV/132kV Substation (Alternative 2)

Corner Co-ordinates	Latitude	Longitude
Corner 1	32°37'26.54"S	20°57'35.12"E
Corner 2	32°37'26.58"S	20°57'50.34"E
Corner 3	32°37'32.92"S	20°57'50.40"E
Corner 4	32°37'32.90"S	20°57'35.10"E

This report supports two separate applications for environmental authorisation (EA) as follows:

1. On site 33 / 132kV substation and associated grid infrastructure (including transformer);

2. On site 132kV Switching Station, 132kV power line and associated grid infrastructure.

Two applications are being submitted so as to facilitate transfer of the EAs and associated Environmental Management Programs (EMPr) to either the Independent Power Producer (IPP) and Eskom respectively during the operational phase of the development.

The site is relatively flat but has low rocky ridges and bedrock exposures in places. Vegetation is generally about knee-height and ground visibility is good. The site lies within the Komsberg Renewable Energy Development Zone (REDZ).

No archaeological materials were found in the Alternative 1 substation footprint or within the powerline corridor, but a single stone-walled structure (collapsed to about 0.4 m high) was located within the IPP portion of the Alternative 2 substation site. The site is of low cultural significance and has no associated artefactual materials. The landscape is also identified as a heritage resource. However, the site is located very far from accessible viewpoints and, given that this project will not be built if the authorised WEFs (which would result in the landscape becoming dominated by electrical infrastructure) are not built, impacts to the landscape are not a significant concern and would be the same for both alternatives.

Despite the low significance of the archaeology in the IPP portion of the Alternative 2 33kV/132kV substation footprint, Alternative 1 of the 33kV/132kV substation footprint is preferred from a heritage point of view.

33kV/132kV Substation and Associated Infrastructure (BESS, O&M Building & Laydown Area) IPP Infrastructure It is recommended that the project be approved with either alternative but subject to the following:

- If Alternative 2 is selected and the stone-walled site can be protected then it should be fenced off during construction with a 30 m buffer and all construction activities must stay outside of this zone; and
- If any archaeological material or human burials are uncovered during the course of development then work in the immediate area should be halted. The find would need to be reported to the heritage authorities and may require inspection by an archaeologist. Such heritage is the property of the state and may require excavation and curation in an approved institution.

132kV Powerline, 132kV Switching Station and access road (Eskom Infrastructure)
It is recommended that the project be approved with either powerline or switching station alternative but subject to the following:

- If any archaeological material or human burials are uncovered during the course of development then work in the immediate area should be halted. The find would need to be reported to the heritage authorities and may require inspection by an archaeologist. Such heritage is the property of the state and may require excavation and curation in an approved institution.

Glossary

Early Stone Age: Period of the Stone Age extending approximately between 2 million and 200 000 years ago.

Hominid: a group consisting of all modern and extinct great apes (i.e. gorillas, chimpanzees, orangutans and humans) and their ancestors.

Later Stone Age: Period of the Stone Age extending over the last approximately 20 000 years.

Middle Stone Age: Period of the Stone Age extending approximately between 200 000 and 20 000 years ago.

Abbreviations

APHP: Association of Professional Heritage Practitioners

ASAPA: Association of Southern African Professional Archaeologists

BA: Basic Assessment

CRM: Cultural Resources Management

DFFE: Department of Forestry, Fisheries and the Environment

EA: Environmental Authorisation

ECO: Environmental Control Officer

EMPr: Environmental Management Program

ESA: Early Stone Age

GP: General Protection

GPS: global positioning system

HIA: Heritage Impact Assessment

IPP: Independent Power Producer

LSA: Later Stone Age

MSA: Middle Stone Age

NBKB: Ngwao-Boswa Ya Kapa Bokoni

NEMA: National Environmental Management Act (No. 107 of 1998)

NHRA: National Heritage Resources Act (No. 25) of 1999

PPP: Public Participation Process

REDZ: Renewable Energy Development Zone

SAHRA: South African Heritage Resources Agency

SAHRIS: South African Heritage Resources Information System

WEF: Wind Energy Facility

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1. INTRODUCTION

ASHA Consulting (Pty) Ltd was appointed by Nala Environmental to conduct an assessment of the potential impacts to heritage resources that might occur through the proposed construction and operation of a 33kV/132 kV substation with associated infrastructure, and 132 kV powerline with a 132kV switching station that will be located on the Remaining Extent of Nooitgedacht Farm 148, 38 km to the southeast of Sutherland and within the Sutherland Magisterial District (Figures 1 & 2; Appendix 3). The proposed infrastructure is required to support the already authorised Rietrug and Sutherland Wind Energy Facilities (WEFs). The co-ordinate locations for the project are as follows:

132kV Powerline co-ordinates (Alternative 1) preferred alternative:

	Latitude	Longitude
Start (Alternative 1 substation)	32°38'4.10"S	20°57'48.14"E
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132kV Switching Station (Eskom portion) (Alternative 2)

Corner Co-ordinates	Latitude	Longitude
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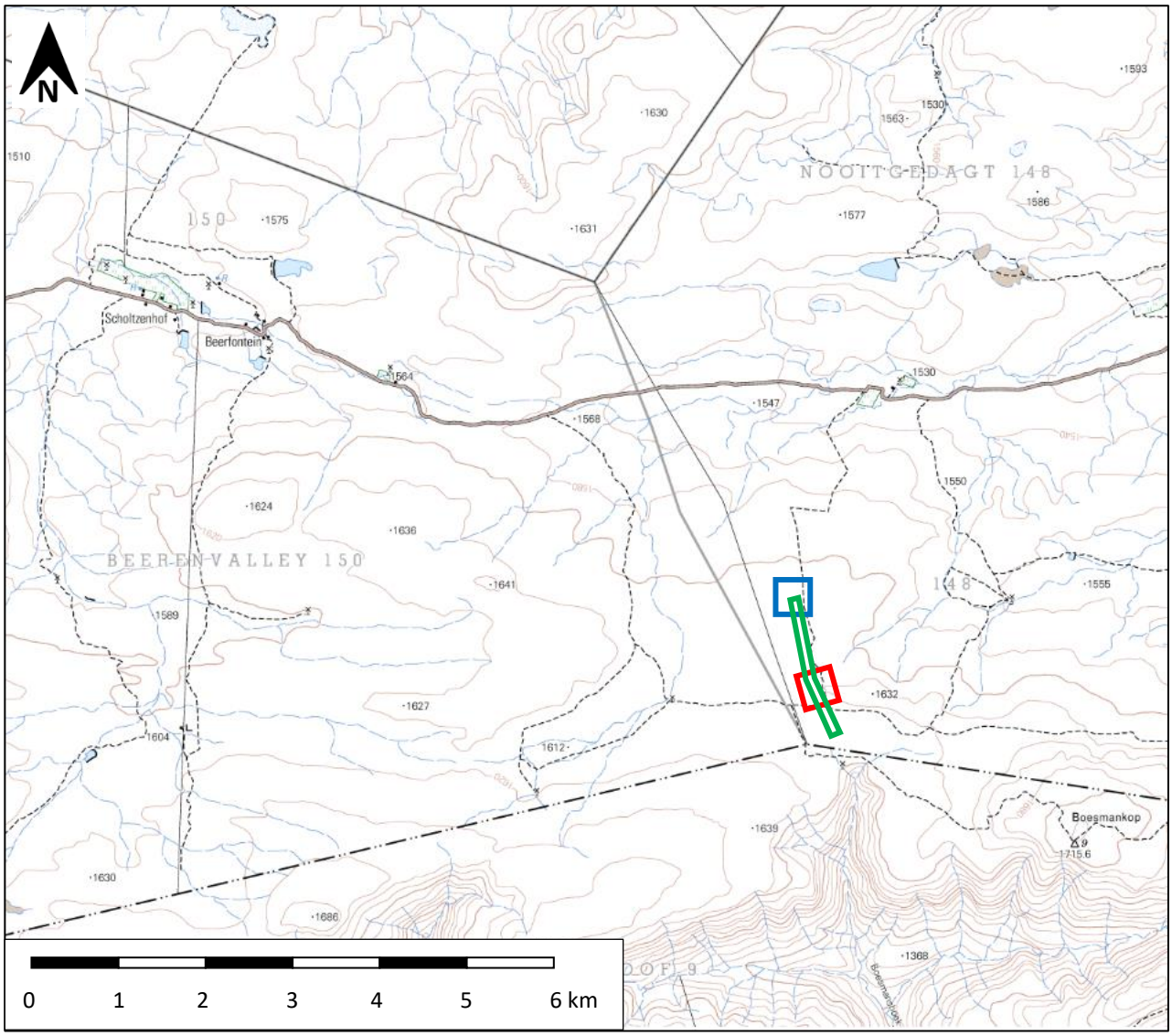

Figure 1: *Extract from 1:50 000 topographic map 3220DB showing the location of the site. Red = Alternative 1 substation, blue = Alternative 2 substation, green = powerline corridor. Source of basemap: Chief Directorate: National Geo-Spatial Information. Website: www.ngi.gov.za.*

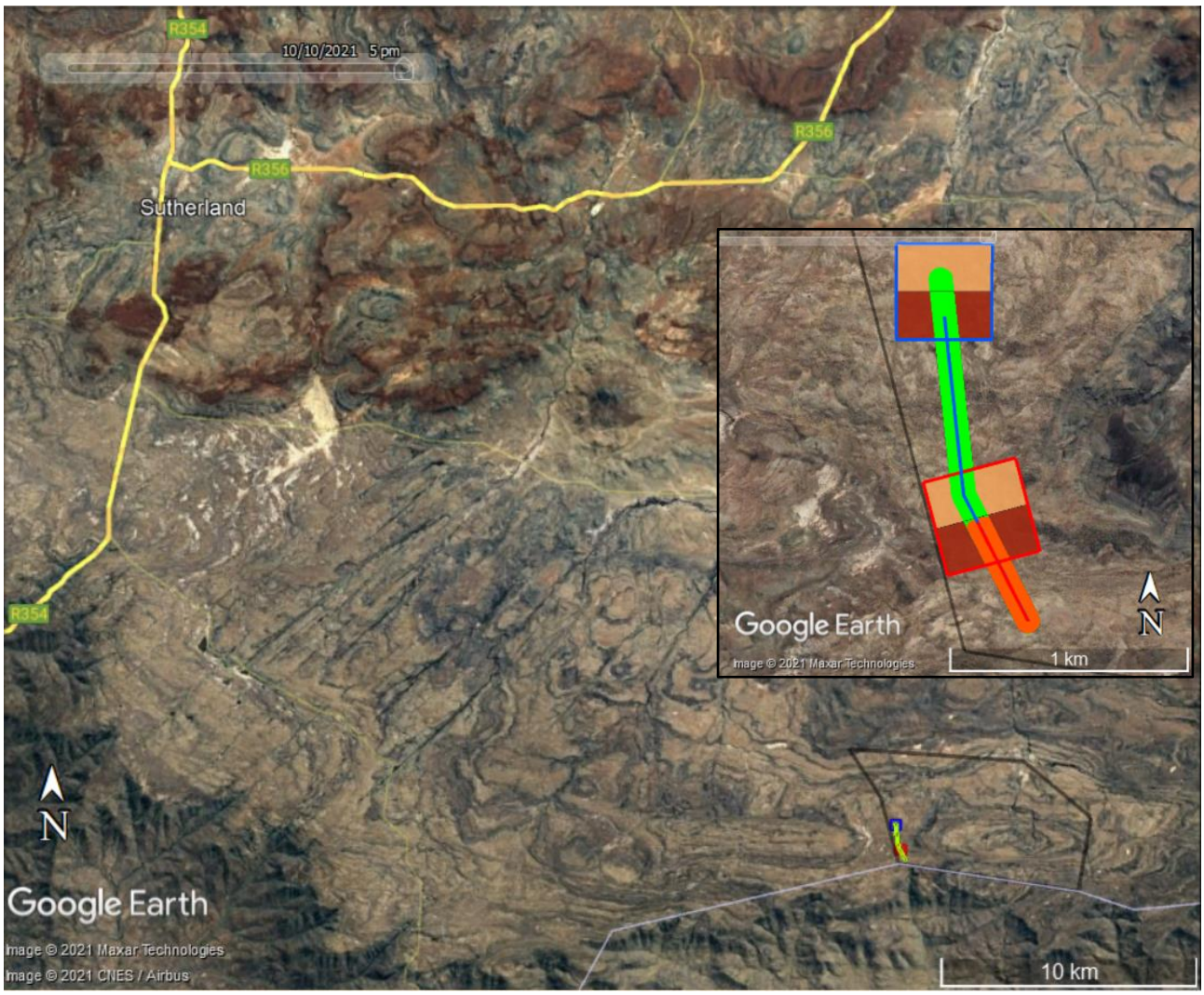

Figure 2: *Aerial view of the wider area showing the location of the study area in the southeast relative to the R354 and R356 roads (yellow line in the west and north respectively) and town of Sutherland in the northwest. The provincial boundary with Western Cape lies immediately south of the proposed project (thin purple line in the southeast). The black polygon in the main image shows Farm 148/rem. Red = Alternative 1 preferred 132kV switching station & preferred 33kV/132kV substation, blue = Alternative 2 132kV switching station & 33kV/132kV substation, orange = powerline alternative 1, green & orange = powerline alternative 2, pale brown = IPP portion in each case and dark brown = Eskom portion in each case.*

This report supports two separate applications for environmental authorisation (EA) as follows:

1. On site 33 / 132kv substation and associated grid infrastructure (including transformer);
2. On site 132kv Switching Station, 132kV power line and associated grid infrastructure.

Two applications are being submitted so as to facilitate transfer of the EAs and associated Environmental Management Programs (EMPr) to the Independent Power Producer (IPP) and Eskom respectively.

1.1. The proposed project

1.1.1. Project description

Infrastructure associated with the IPP (EA number 1) is as follows (see also Table 1):

- 33kV underground powerline that will connect to the IPP portion of the onsite 33kV/132kV substation;
- A 33kV/132kV IPP substation that will contain transformers for voltage step up from low voltage (33kV) to medium voltage (132kV). This 132kV substation will have a clearance footprint of 200m x 200m; and
- The IPP Portion of the substation clearance footprint will include:
    - A Battery Energy Storage System (BESS) with a footprint of 2ha in extent with an export capacity of approximately 500KWh and a total storage capacity of 100MW.
    - A laydown area with a footprint of 100m x 100m in extent; and
    - An O&M Building with a footprint of 100m x 100m in extent.

Table 1: *Proposed infrastructure to be included in EA to support the proposed IPP Infrastructure.*

Infrastructure	Details
Double circuit powerline	33kV Powerline to the IPP Portion of the substation.
Powerline capacity	33kV
Powerline corridor width	A 100m wide grid connection corridor is being assessed within which the grid connection infrastructure will be constructed and operated.
Powerline servitude	36m
IPP 33kV/132kV Substation Alternative 1 Alternative 2	The IPP portion of the 132kV substation will have a footprint of 200m x 200m in extent. Alternative 1 (Preferred) – The substation will be located within the authorised Sutherland WEF. Alternative 2 – The substation will be located within the authorised Rietrug WEF.
Battery Energy Storage Infrastructure (BESS)	The BESS will be located within the substation footprint and have a footprint of 2ha. The BESS technology will consist of Lithium Ion Batteries with an export capacity of approximately 500KWh and a total storage capacity of 100MW.
O&M Building	The O&M Building will be located within the footprint of the substation and will have a footprint 100m x 100m in extent.
Laydown area	The laydown area will be located within the footprint of the substation and will have a footprint of 100m x 100m.

Infrastructure associated with the Eskom Portion (EA number 2) is as follows (see also Table 2):

- A 132kV Switching Station (Eskom portion of the onsite substation) with a footprint of 200m x 200m;
- A new 132kV powerline. The length of the proposed powerline is approximately 0.46km – 1.35km long based on the alternatives with a 100m assessment corridor;

- The proposed new 132kV powerline will connect the onsite substation to the authorised electrical grid infrastructure that connects to the Koring Main Transmission Substation in the Western Cape Province; and
- Development of access tracks up to 4m wide within the powerline corridor to enable construction and maintenance activities.

Table 2: *Proposed infrastructure to be included in EA to support the infrastructure that will be proposed Eskom Infrastructure in the future.*

Infrastructure	**Details**
Double circuit powerline	132kV Powerline from the Switching Station to the authorised grid connection infrastructure.
Powerline capacity	132kV
Powerline corridor width	A 100m wide grid connection corridor is being assessed within which the grid connection infrastructure will be constructed and operated.
132kV Powerline length (alternative 1-Preferred)	0,46km – the powerline will start at the proposed 132kV switching station (alternative 1) located within the authorised Sutherland WEF within a 100m assessment corridor and traverse in a southerly direction connecting to the authorised grid connection for the Sutherland Cluster.
132kVPowerline length (alternative 2)	1,35km – the powerline will start at the proposed 132kV switching station (alternative 2) located within the authorised Rietrug WEF within a 100m assessment corridor and traverse in a southerly direction through the authorised Sutherland WEF and connect to the authorised grid connection for the Sutherland Cluster.
Powerline servitude	36m
Tower Height	32m
132kV switching station Alternative 1 (Preferred) Alternative 2	The switching station will have a footprint of 200m x 200m in extent. Alternative 1 (Preferred) – The proposed switching station will be located within the authorised Sutherland WEF. Alternative 2 – The proposed switching station will be located within the authorised Rietrug WEF.
Access Roads	Access tracks up to 4m wide will be required along the corridor of the 132kV powerline

1.1.2. Identification of alternatives

Two location alternatives have been identified as noted above. The length of the associated powerline will depend on which switching station alternative is authorised. The Alternative 1 33kV/132 kV substation and 132kV switching station is closer to the already authorised grid infrastructure such that a powerline of 0.46 km would be required, while the Alternative 2 33kV/132kV substation and 132kV switching station lies a short distance to the north and will require a longer connecting powerline of 1.35 km. A 100 m wide corridor is being assessed for each powerline option which would allow for the avoidance of any environmental sensitivities identified during the assessment process. In addition, the No-Go alternative will also be considered.

1.1.3. Aspects of the project relevant to the heritage study

All aspects of the proposed development are relevant, since excavations for foundations and/or services may impact on archaeological and/or palaeontological remains, while all above-ground aspects create potential visual (contextual) impacts to the cultural landscape and any significant heritage sites that might be visually sensitive.

1.2. Terms of reference

ASHA Consulting was asked to compile a Heritage Impact Assessment (HIA) that would meet the requirements of the heritage authorities. The assessment should include both desktop research and fieldwork and should assess all available alternatives. In addition, impact assessments and recommendations for each of the two Basic Assessment reports under consideration should be provided separately as needed. All relevant aspects of heritage were to be included, except palaeontology which was to be covered by another specialist (Dr John Almond of Natura Viva cc).

1.3. Scope and purpose of the report

An HIA is a means of identifying any significant heritage resources before development begins so that these can be managed in such a way as to allow the development to proceed (if appropriate) without undue impacts to the fragile heritage of South Africa. This HIA report aims to fulfil the requirements of the heritage authorities such that a comment can be issued by them for consideration by the National Department of Forestry, Fisheries and Environment (DFFE) who will review the Basic Assessment (BA) and grant or refuse authorisation. The HIA report will outline any management and/or mitigation requirements that will need to be complied with from a heritage point of view and that should be included in the conditions of authorisation, should this be granted.

1.4. The author

Dr Jayson Orton has an MA (UCT, 2004) and a D.Phil (Oxford, UK, 2013), both in archaeology, and has been conducting Heritage Impact Assessments and archaeological specialist studies in South Africa (primarily in the Western Cape and Northern Cape provinces) since 2004 (please see curriculum vitae included as Appendix 1). He has also conducted research on aspects of the Later Stone Age in these provinces and published widely on the topic. He is an accredited heritage practitioner with the Association of Professional Heritage Practitioners (APHP; Member #43) and also holds archaeological accreditation with the Association of Southern African Professional Archaeologists (ASAPA) CRM section (Member #233) as follows:

- Principal Investigator: Stone Age, Shell Middens & Grave Relocation; and
- Field Director: Colonial Period & Rock Art.

1.5. Declaration of independence

ASHA Consulting (Pty) Ltd and its consultants have no financial or other interest in the proposed development and will derive no benefits other than fair remuneration for consulting services provided.

2. LEGISLATIVE CONTEXT

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

The NHRA protects a variety of heritage resources as follows:

- Section 34: structures older than 60 years;
- Section 35: prehistoric and historical material (including ruins) more than 100 years old as well as military remains more than 75 years old, palaeontological material and meteorites;
- Section 36: graves and human remains older than 60 years and located outside of a formal cemetery administered by a local authority; and
- Section 37: public monuments and memorials.

Following Section 2, the definitions applicable to the above protections are as follows:

- Structures: "any building, works, device or other facility made by people and which is fixed to land, and includes any fixtures, fittings and equipment associated therewith";
- Palaeontological material: "any fossilised remains or fossil trace of animals or plants which lived in the geological past, other than fossil fuels or fossiliferous rock intended for industrial use, and any site which contains such fossilised remains or trace";
- Archaeological material: a) "material remains resulting from human activity which are in a state of disuse and are in or on land and which are older than 100 years, including artefacts, human and hominid remains and artificial features and structures"; b) "rock art, being any form of painting, engraving or other graphic representation on a fixed rock surface or loose rock or stone, which was executed by human agency and which is older than 100 years, including any area within 10m of such representation"; c) "wrecks, being any vessel or aircraft, or any part thereof, which was wrecked in South Africa, whether on land, in the internal waters, the territorial waters or in the maritime culture zone of the Republic, as defined respectively in sections 3, 4 and 6 of the Maritime Zones Act, 1994 (Act No. 15 of 1994), and any cargo, debris or artefacts found or associated therewith, which is older than 60 years or which SAHRA considers to be worthy of conservation"; and d) "features, structures and artefacts associated with military history which are older than 75 years and the sites on which they are found";
- Grave: "means a place of interment and includes the contents, headstone or other marker of such a place and any other structure on or associated with such place"; and
- Public monuments and memorials: "all monuments and memorials a) "erected on land belonging to any branch of central, provincial or local government, or on land belonging to any organisation funded by or established in terms of the legislation of such a branch of government"; or b) "which were paid for by public subscription, government funds, or a public-spirited or military organisation, and are on land belonging to any private individual."

Section 3(3) describes the types of cultural significance that a place or object might have in order to be considered part of the national estate. These are as follows:

a) its importance in the community, or pattern of South Africa's history;
b) its possession of uncommon, rare or endangered aspects of South Africa's natural or cultural heritage;
c) its potential to yield information that will contribute to an understanding of South Africa's natural or cultural heritage;

d) its importance in demonstrating the principal characteristics of a particular class of South Africa's natural or cultural places or objects;
e) its importance in exhibiting particular aesthetic characteristics valued by a community or cultural group;
f) its importance in demonstrating a high degree of creative or technical achievement at a particular period;
g) its strong or special association with a particular community or cultural group for social, cultural or spiritual reasons;
h) 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
i) sites of significance relating to the history of slavery in South Africa.

While landscapes with cultural significance do not have a dedicated Section in the NHRA, they are protected under the 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. Furthermore, some of the points in Section 3(3) speak directly to cultural landscapes.

Section 38(8) of the NHRA states that if an impact assessment is required under any legislation other than the NHRA then it must include a heritage component that satisfies the requirements of S.38(3). Furthermore, the comments of the relevant heritage authority must be sought and considered by the consenting authority prior to the issuing of a decision. Under the National Environmental Management Act (No. 107 of 1998; NEMA), as amended, the project is subject to an BA. The present report provides the heritage component. Ngwao-Boswa Ya Kapa Bokoni (Heritage Northern Cape; for built environment and cultural landscapes) and the South African Heritage Resources Agency (SAHRA; for archaeology and palaeontology) are required to provide comment on the proposed project in order to facilitate final decision making by the National Department of Forestry, Fisheries and the Environment (DFFE).

3. METHODS

3.1. Literature survey and information sources

A survey of available literature was carried out to assess the general heritage context into which the development would be set. The information sources used in this report are presented in Table 3. Data were also collected via a field survey.

Table 3: *Information sources used in this assessment.*

Data / Information	Source	Date	Type	Description
Maps	Chief Directorate: National Geo-Spatial Information	Various	Spatial	Historical and current 1:50 000 topographic maps of the study area and immediate surrounds
Aerial photographs	Chief Directorate: National Geo-Spatial Information	Various	Spatial	Historical aerial photography of the study area and immediate surrounds

Aerial photographs	Google Earth	Various	Spatial	Recent and historical aerial photography of the study area and immediate surrounds
Cadastral data	Chief Directorate: National Geo-Spatial Information	Various	Survey diagrams	Historical and current survey diagrams, property survey and registration dates
Background data	South African Heritage Resources Information System (SAHRIS)	Various	Reports	Previous impact assessments for any developments in the vicinity of the study area
Palaeontological sensitivity	South African Heritage Resources Information System (SAHRIS)	Current	Spatial	Map showing palaeontological sensitivity and required actions based on the sensitivity.
Background data	Books, journals, websites	Various	Books, journals, websites	Historical and current literature describing the study area and any relevant aspects of cultural heritage.

3.2. Field survey

The site was subjected to a detailed foot survey on 10 October 2021. This was during spring but, in this very dry area, the season makes no meaningful difference to vegetation covering and hence the ground visibility for the archaeological survey. Other heritage resources are not affected by seasonality. During the survey the positions of finds and survey tracks were recorded on a hand-held Global Positioning System (GPS) receiver set to the WGS84 datum (Figure 3). Photographs were taken at times in order to capture representative samples of both the affected heritage and the landscape setting of the proposed development.

It should be noted that amount of time between the dates of the field inspection and final report do not materially affect the outcome of the report.

3.3. Impact assessment

For consistency among specialist studies, the impact assessment was conducted through application of a scale supplied by Nala Environmental.

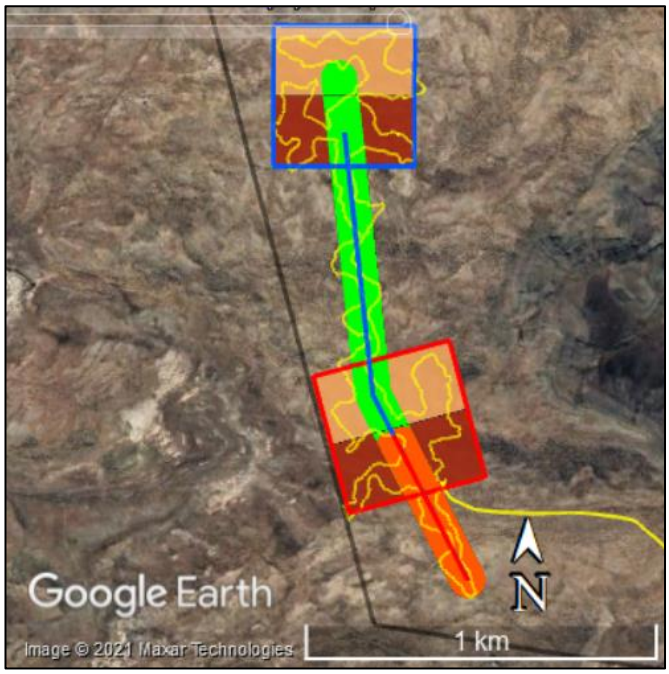

Figure 3: *Aerial view of the study area (key as per Figure 1) showing the survey tracks (yellow lines).*

3.4. Grading

S.7(1) of the NHRA provides for the grading of heritage resources into those of National (Grade I), Provincial (Grade II) and Local (Grade III) significance. Grading is intended to allow for the identification of the appropriate level of management for any given heritage resource. Grade I and II resources are intended to be managed by the national and provincial heritage resources authorities respectively, while Grade III resources would be managed by the relevant local planning authority. These bodies are responsible for grading, but anyone may make recommendations for grading.

It is intended under S.7(2) that the various provincial authorities formulate a system for the further detailed grading of heritage resources of local significance but this is generally yet to happen. SAHRA (2007) has formulated its own system[1] for use in provinces where it has commenting authority. In this system sites of high local significance are given Grade IIIA (with the implication that the site should be preserved in its entirety) and Grade IIIB (with the implication that part of the site could be mitigated and part preserved as appropriate) while sites of lesser significance are referred to as having 'General Protection' (GP) and rated as GP A (high/medium significance, requires mitigation), GP B (medium significance, requires recording) or GP C (low significance, requires no further action).

3.5. Consultation

The NHRA requires consultation as part of an HIA but, since the present study falls within the context of an EIA which includes a public participation process (PPP), no dedicated consultation was undertaken as part of the HIA. Interested and affected parties would have the opportunity to provide comment on the heritage aspects of the project during the PPP.

[1] The system is intended for use on archaeological and palaeontological sites only.

3.6. Assumptions and limitations

The field study was carried out at the surface only and hence any completely buried archaeological sites would not be readily located. Similarly, it is not always possible to determine the depth of archaeological material visible at the surface. The footprint of the Alternative 1 33kV/132 substation and 132kV switching station was rotated slightly after the completion of fieldwork, but the change is small enough that it does not affect the outcome of this report or the powerline corridor being assessed.

4. PHYSICAL ENVIRONMENTAL CONTEXT

4.1. Site context

The site is located in a predominantly natural landscape, although pockets of land could better be described as rural where farming and farmsteads occur. The area is used predominantly for livestock grazing, but does lie within the Komsberg Renewable Energy Development Zone (REDZ) and the Central Power Corridor. It is notable that a number of WEFs and powerlines have already been approved in the vicinity.

4.2. Site description

The site was fairly level but with some low rocky ridges in places. It was well vegetated with low bushes (generally about knee-high) but some areas of exposed bedrock also occurred. Figures 4 to 10 show the nature of the study area.

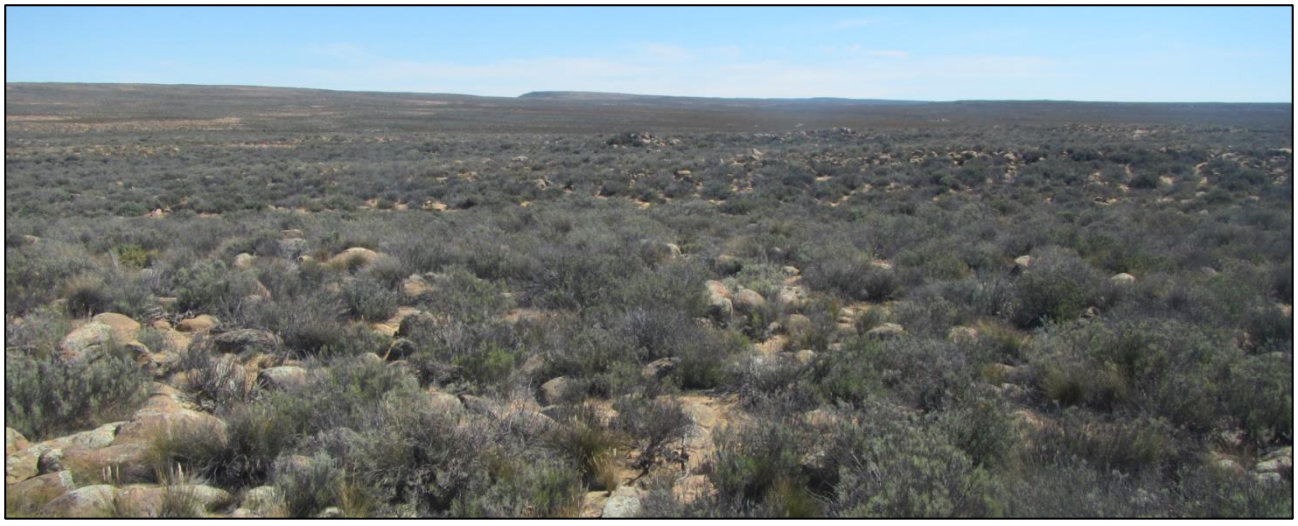

Figure 4: *View towards the west through the centre of Alternative 1 33kV/132 substation & the 132kV switching station.*

Figure 5: *View towards the southwest from the north-eastern corner of substation Alternative 1 (33kV/132kV substation) showing low rocky ridges.*

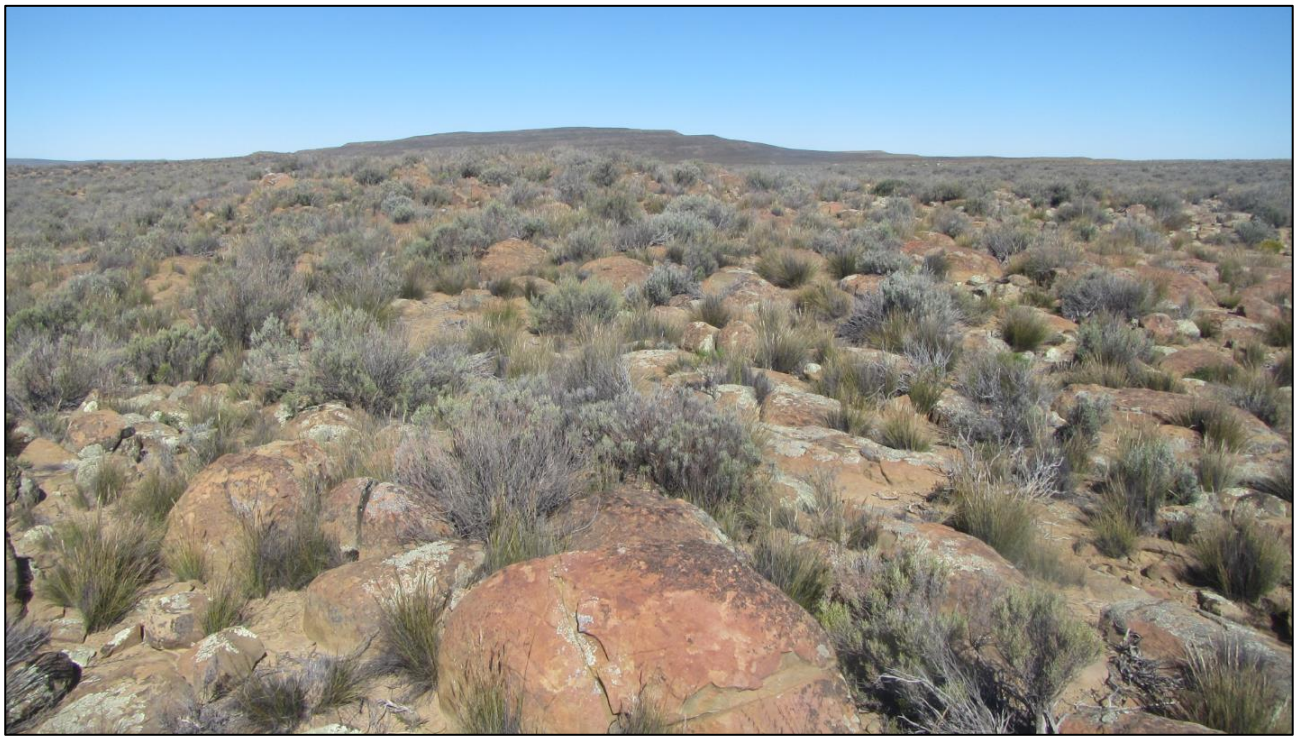

Figure 6: *View towards the south through the powerline corridor and 132kV switching station Alternative 1 along a low rocky ridge.*

Figure 7: *View towards the northeast from the south-western corner of the 132kV switching station Alternative 1 showing exposed bedrock.*

Figure 8: *View towards the north along the powerline corridor into the Alternative 2 132kV switching station site.*

Figure 9: *View towards the southwest from the north-eastern corner of the 33kV/132kV substation Alternative 2.*

Figure 10: *View towards the east through the southern part of the 132kV switching station Alternative 2.*

5. FINDINGS OF THE HERITAGE STUDY

This section describes the heritage resources recorded in the study area during the course of the project.

5.1. Palaeontology

The SAHRIS Palaeosensitivity Map shows the study area to be of theoretically very high sensitivity (Figure 11). A separate palaeontological specialist study is being carried out by Almond (2021) and

is submitted together with the present report. Based on field observations, the study area was found to be of low sensitivity.

Figure 11: *Extract from the SAHRIS Palaeosensitivity map showing the entire study area and surrounds to be of very high sensitivity (red shading).*

5.2. Archaeology

5.2.1. Desktop study

Prior to the colonial incursion into the interior of southern Africa the Bushmen and, within the last two millennia, the Khoekhoen occupied the area. Very little archaeological research has been undertaken in the area, although a number of impact assessments have been carried out, especially in connection with proposed renewable energy facilities in the surrounding Roggeveld Mountains. Most surveys show that Stone Age material is generally quite sparse on the landscape, although scatters of Early (ESA), Middle (MSA) and Late Stone Age (LSA) material have been reported (Hart *et al.* 2010; Halkett & Webley 2011). Occasional small rock shelters are known from the area (e.g. Evans *et al.* (1985), Hart (2005), Orton & Halkett 2011)) with one having been excavated. This one yielded a typical Later Stone Age assemblage with small scrapers, thin-walled potsherds, ostrich eggshell beads and some *Nassarius kraussianus* beads (Evans *et al.* 1985). The latter are estuarine shells that must have been obtained from the coast.

A very important aspect of the pre-colonial archaeology of the area is the many stone-built *kraals* (livestock enclosures) that have been recorded in various areas. The vast majority are in the Seacow River valley to the east (Hart 1989; Sampson 1985, 2008), but an excellent example has also been reported from the southern edge of Sutherland (Hart 2005). This example was a complex of 13 interlocking enclosures. Just to the south of the present study area and in fact bisected by the internal access road, is a very important kraal complex with some 27 enclosures (Orton 2017a, 2017b, 2017c). Artefactual and other related materials were very rare with just eight stone artefacts and eight ostrich eggshell fragments being found across the complex. A number of other examples

are on record from the area, largely from the top of the escarpment. Some had stone artefacts, red burnished, thin-walled pottery, and ostrich eggshell associated with them. Stone Age *kraals* are important sites and are as yet poorly understood (Hart *et al.* 2010).

Along the dry riverbeds at the base of the escarpment Hart *et al.* (2010) also identified sites which they thought were large Khoekhoen encampments situated among the Kameeldoring trees in the bottom of valleys. The sites contained thin-walled, burnished pottery, stone features, stone artefacts, grinding surfaces and graves, some of which have broken grinding stones on them. Also evident were discreet ash middens and animal bone. Hart *et al.* (2010) noted colonial period artefacts (19th century glass and ceramics) on some of the sites, possibly indicating continuous use of the area by Khoekhoen herders into the colonial period.

Although geometric rock art has been mapped by researchers across large swathes of South Africa, there is a gap in the distribution surrounding the study area (Orton 2013; Russell 2012; Smith & Ouzman 2004). Nevertheless, geometric rock art has been documented in the area. One site lies along the subject road but outside the study area close to its intersection with the R354 (Orton & Halkett 2011). Two others lie some 22 km and 32 km southwest of the study area, just below the escarpment edge (Halkett & Webley 2011). One of these has an indeterminate image that may be a human figure. Another site lies 25 km southeast of the present study area at the base of the escarpment (Orton 2017a, 2017b, 2017c). It contains a number of finger smears.

Historical archaeology abounds in the area with many ruined stone-built structures being present (e.g. Hart *et al.* 2010; Hart & Kendrick 2014; Halkett & Webley 2011; Kaplan 2009; Orton 2017a, 2017b, 2017c, 2021). These often have artefactual material (broken ceramics and glass, metal items, etc) scattered about them. Occasionally a refuse midden is found alongside an old farmstead. These middens are largely early 18th to late 19th century in age and reflect the material remains of domestic life on the early frontier farms.

5.2.2. Site visit

The survey revealed just one archaeological site at waypoint 411. It was located in the north-western corner of the alternative 2 33kV/132 substation site (Figure 12). This was a stone-walled enclosure measuring 6 m west to east and 5 m north to south (Figures 13 & 14). It had an opening in the eastern wall. The walls were partially collapsed and only about 0.4 m high. The enclosure was built on a bedrock outcrop and no artefacts were found inside or anywhere around it. Its function is unknown. The site is located at S32° 37’ 27.8” E20° 57’ 38.1” and, because it is an isolated find with no associated archaeology, is rated as having low cultural significance (grade GPB). No archaeology was seen within the Alternative 1 132kV switching station site or the Alternative 2 33kV/132kV substation site or in the powerline corridor.

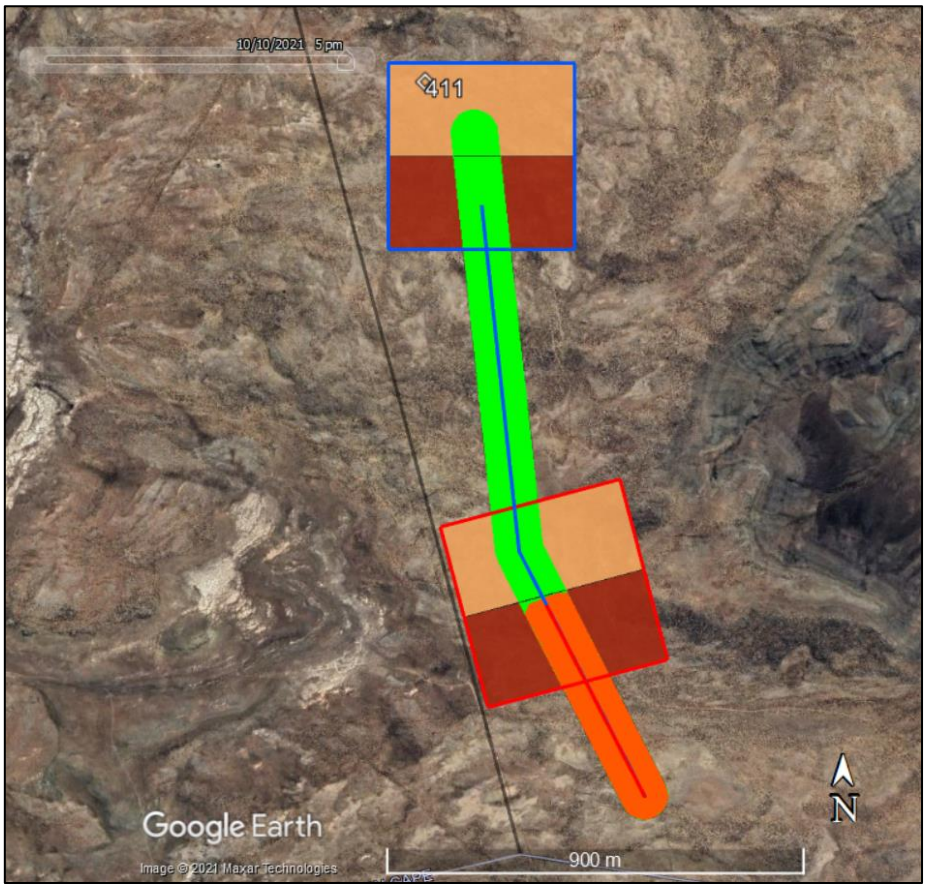

Figure 12: *Aerial view of the study area showing the location of the single site found.*

Figure 13: *View of the stone-walled enclosure looking towards the west. The entrance is in the foreground.*

Figure 14: *View of the stone-walled enclosure looking towards the south.*

5.3. Graves

Farm graveyards are known from the area. Hart *et al.* (2010) and Halkett & Webley (2011) recorded numerous graveyards, generally associated with homesteads and with abandoned settlements, including one in the north-eastern part of Farm 148/rem. However, no graves were seen in the study area and due to the rocky substrate, no graves are expected to be present.

5.4. Historical aspects and the Built environment

5.4.1. Desktop study

Schoeman (1986) has described the early settlement of the Roggeveld and Sutherland area from about 1750 onwards. The escarpment area, with its higher rainfall, was found to be good for small stock farming in summer but the extreme winter cold forced people down into the valleys and plains to the south. Initially, the European population remained small because many early loan farms were used merely as "stock posts" – the owners lived elsewhere and often had more than one loan farm. The early days of colonial settlement were conflict-ridden because indigenous groups, called "Boschiesman Hottentoten" (Khoekhoen and San/Bushmen) were unhappy about losing their traditional lands and attempted to force the Europeans to flee what can best be described as 'guerrilla warfare'. Livestock theft was rife and attacks on farmers and indigenous populations were commonplace. From the late 18th century commando groups (comprised of local farmers) were called up to attack the *kraals* of local Khoekhoe and Bushmen groups. Although they defended their positions with bow and arrow, the firearms of the farmers generally resulted in many indigenes being killed (Schoeman 1986). These commandos were initiated in response to the so-called "Roggeveld Rebellion" of 1772 when many Khoekhoe labourers left their farms and banded together in response to a rumour that all Khoekhoe living in kraals would be killed (Penn 2005). They were defeated and the San and Khoekhoen were gradually driven northwards from the Roggeveld. By 1809 there was reported to have been only one Bushman *kraal* left in the area. Penn (2005:21) notes that "Without access to the resources on both sides of the escarpment, and the water of the

escarpment itself, both pastoralists and hunter-gatherers were doomed; hence the desperate fighting of the 1770s, 1780s and 1790s. These were years of intense commando activity and Khoisan resistance."

The early 19th century saw an increase in permanent European settlement, although the farmers' main source of income was still small stock – wheat could only be grown with great difficulty in isolated and protected valleys and there was very little standing water and grazing suitable for cattle. The early settlers were responsible for the construction of the well-known stone corbeled houses of the Northern Cape (Kramer 2012). The nearest known corbeled house lies about 17 km northeast of the study area. While two more lie 22 km and 27 km to the northwest.

Schoeman (1986) notes that during the early years of settlement in the Roggeveld, many of the Trekboers lived in grass huts or Matjies houses, or even in tents. The use of Matjies houses was reported as late as 1839. Attempts at constructing more permanent structures were inhibited by the lack of wood suitable for building. One technique that was often used to overcome this difficulty was to use drystone walling to half height and then construct a wooden framework to support a reed roof on top of it. These were tiny houses and were known as *Hartebeeshuise*. Sometimes they were made without the stone courses and looked like a tent made of vegetation. Examples were reported below the escarpment to the southwest of the study area by Almond (pers. comm. 2016 in Orton 2016).

During the South African War (a.k.a. Anglo-Boer War), the British forces built fortifications at a number of strategic passes through the Roggeveld. Two stone blockhouses guard a pass on the farm Gunsfontein (Discover Sutherland 2017). With the Boer leader Manie Maritz active in the Calvinia District, many young men from the Roggeveld joined the Boer cause. In 1901 there appear to have been some skirmishes in the vicinity of Skietfontein, a farm through which the Komsberg Pass runs.

Various types of built structures have been recorded in the area. Because many are ruined and in a state of disuse, they would generally fall into the category of archaeological resources rather than built environment heritage resources. The types of structures included here include:

- Various boundary markers, cairns and beacons (e.g. Hart *et al.* 2010; Orton & Halkett 2011). They may have been built when the original farm surveys took place in the 19th century;
- Military structures occur in places, most notably on Jakkalsvalley, the farm at the western end of the subject road where it meets the R354 (Orton & Halkett 2011). Many of these are ruined and would technically be archaeological sites;
- Farmhouses, outbuildings and farm workers dwellings occur widely, sometimes built from dressed stone; and
- Dry stone *kraals* and boundary walls.

There are also many tracks which are likely to have their origins in the 19th century wagon routes between farms, although these are perhaps better regarded as elements of the cultural landscape.

5.4.2. Site visit

Aside from the historical archaeological site reported above, no other historical materials were seen in the study area.

5.5. Cultural landscapes and scenic routes

Winter and Oberholzer (2013) regard the escarpment as a significant natural landscape at the local level. It is a very extensive landscape extending for many hundreds of kilometres through central South Africa, often providing very long and aesthetically pleasing views which afford a cultural aspect to its significance. It can also be regarded as a cultural landscape, perhaps not so much in the regular sense of a 'landscape shaped by man' but in the opposite way where we find a landscape that has determined how and where human settlement and activities have taken place. Farmsteads are relatively few and far between, often tied to natural water sources. The landscape, although best described as a rural one, frequently has a strong feeling of emptiness and remoteness. It is used almost exclusively for small stock grazing and the many small historic stone features scattered across the landscape are indicative of this use in times gone by. In some remote areas the only indicators of human intervention for many kilometres are occasional fences and vehicle tracks. The site is very remote and located well away from any public roads.

It must be noted that the proposed development is but a small part of a far larger electrical development involving two WEFs and associated infrastructure which has been authorised under separate environmental authorisations. Should all of this infrastructure be constructed then the landscape will be strongly dominated by electrical infrastructure and the proposed development would not be out of place. It is also worth noting that should the other infrastructure not be developed then the presently proposed substation and powerline would also not be built.

5.6. Statement of significance and provisional grading

Section 38(3)(b) of the NHRA requires an assessment of the significance of all heritage resources. In terms of Section 2(vi), ''cultural significance'' means aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance. The reasons that a place may have cultural significance are outlined in Section 3(3) of the NHRA (see Section 2 above).

The archaeological resources are deemed to have low cultural significance at the local level for their architectural, historical and scientific values.

The cultural landscape is largely a natural landscape with aesthetic value and is rated as having medium cultural significance at the local level. It can be graded IIIB.

5.7. Summary of heritage indicators

Archaeological resources are fragile and easily destroyed or disturbed.

- Indicator: Significant archaeological sites should not be damaged without further study as required.

The present cultural landscape is a remote natural landscape with minimal cultural aspects. This, and its location on the escarpment, means that its significance is largely aesthetic and could easily be disrupted by inappropriate development.

- Indicator: The proposed project should not dominate views from multiple directions.

6. ASSESSMENT OF IMPACTS

Impacts to archaeology would occur during construction only, while impacts to the cultural landscape would occur during all phases of the development.

6.1. Construction Phase

6.1.1. Impacts to archaeological resources

Proposed 33kV/132kV substation (IPP infrastructure) Alternative 1 and 132kV switching station (Eskom portion) Alternative 2

Because no culturally significant material is known within the footprint of Alternative 1, no impacts to archaeology are expected through development of this alternative. Although isolated artefacts may be present on the landscape, their destruction would be of zero consequence. Potential impacts through implementation of Alternative 1 (33kV/132kV substation) are thus seen as **neutral**. There are no fatal flaws in terms of archaeology.

33kV/132kV Infrastructure (IPP Portion) associated with Alternative 2

Direct impacts to archaeological resources would occur during the construction phase. Impacts during operation (when maintenance would occur) are not expected since the site would have already been cleared and an access road would be present meaning that new ground would never be impacted. Because the cultural significance of the one site found is rated as low at the local level the extent and magnitude have been rated as local and low. Because the known site is within the Alternative 2 footprint, the probability is definite. The calculated significance before mitigation is **medium negative** (Table 4). This significance is higher than necessary and has been inflated by the permanent nature of the impact and certainty with which it would occur. Mitigation is possible but is not recommended due to the low cultural significance of the site and the lack of any associated archaeological materials. The most desirable option is always to protect and avoid the site, but it is expected that this will not be possible. Since no archaeological mitigation is suggested, the post-mitigation significance remains **medium negative**. There are no fatal flaws in terms of archaeology.

Table 4: *Assessment of archaeological impacts for the 33kV/132kV infrastructure (IPP portion) of Alternative 2.*

Nature: Potential impacts to archaeological sites		
Extent	Local (1)	Local (1)
Duration	Permanent (5)	Permanent (5)
Magnitude	Minor (2)	Small (1)
Probability	Definite (5)	Very improbable (1)
Significance	Medium (40)	Low (7)
Status	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources?	Yes	Yes
Can impacts be mitigated?	Yes, but not really necessary	
Mitigation:	• Demarcate, avoid and protect the archaeological site if possible.	

Residual impacts	It is likely that isolated artefacts may be present in the area and these may be damaged or destroyed. Such isolated materials are of no cultural significance and are of no further concern.

6.1.2. Impacts to the cultural landscape

<u>33kV/132kV substation (IPP Portion) and 132kV switching station & powerline (Eskom Portions) of Alternatives 1 and 2</u>

Despite the slightly longer powerline associated with the 33kV/132kV and 132kV switching station associated with Alternative 2, the impacts to the cultural landscape are considered to be the same for both alternatives. Direct impacts to the cultural landscape will occur during construction when the land is cleared and the infrastructure is ereceted. It is important to remember that the development will not occur in isolation so this assessment assumes that the associated WEFs will also be present and part of the landscape. The proposed infrastructure would be visually subservient to the turbines and located far from accessible viewpoints so the extent is low. The duration is regarded as very short because construction will likely be less than one year. Because of the electrical context (i.e. WEFs assumed to be existing), the magnitude is rated as minor. The impact significance calculates to **low negative** (Table 5). Mitigation would entail reducing landscape scarring as far as possible and rehabilitating any areas not required during operation. These will make no meaningful difference and the post-mitigation significance thus remains **low negative**. There are no fatal flaws in terms of the cultural landscape.

Table 5: *Assessment of construction impacts to the cultural landscape for Alternatives 1 & 2 for the 33kV/132kV substation and Alternatives 1 & for the 132kV switching station & powerline.*

Nature: Potential impacts on the cultural landscape through the addition of new electrical infrastructure		
Extent	Local (1)	Local (1)
Duration	Very short (1)	Very short (1)
Magnitude	Minor (1)	Minor (1)
Probability	Definite (5)	Definite (5)
Significance	Low (15)	Low (15)
Status	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources?	Yes	Yes
Can impacts be mitigated?	Yes, partially.	
Mitigation:	• Minimise landscape scarring. • Rehabilitate any areas not required during operation.	
Residual impacts	The impacts can never be completely avoided but given that much other electrical infrastructure would be present in the area, the residual impacts are of no concern.	

6.2. Operation Phase

6.2.1. Impacts to the cultural landscape

<u>33kV/132kV substation (IPP Portion) and 132kV switching station & powerline (Eskom Portion) of Alternatives 1 and 2</u>

Despite the slightly longer powerline associated with the 33kV/132kV and 132kV switching station associated with for Alternative 2, the impacts to the cultural landscape are considered to be the

same for both alternatives. Direct impacts to the cultural landscape will occur during operation because of the presence of the infrastructure in the landscape. It is important to remember that the development will not occur in isolation so this assessment assumes that the associated WEFs will also be present and part of the landscape. The proposed infrastructure would be visually subservient to the turbines and located far from accessible viewpoints so the extent is low. The duration is regarded as long term because the infrastructure would remain present for the life of the WEFs. Because of the electrical context (i.e. WEFs assumed to be existing), the magnitude is rated as minor. The impact significance calculates to **medium negative** (Table 6). This rating may be slightly higher than expected given that the project will not happen without construction of the associated WEF, but it is driven by the certainty with which impacts would occur if the project does get built. Mitigation would entail not clearing any new land during operation and keeping all maintenance activities within the approved footprint. These will make no meaningful difference and the post-mitigation significance thus remains **medium negative**. There are no fatal flaws in terms of the cultural landscape.

Table 6: *Assessment of operation impacts to the cultural landscape for Alternatives 1 & 2 for the 33kV/132kV substation and Alternatives 1 &2 for the132kV switching station & powerline.*

Nature: Potential impacts on the cultural landscape through the addition of new electrical infrastructure		
Extent	Local (1)	Local (1)
Duration	Long term (4)	Long term (4)
Magnitude	Minor (1)	Minor (1)
Probability	Definite (5)	Definite (5)
Significance	Medium (30)	Medium (30)
Status	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources?	Yes	Yes
Can impacts be mitigated?	Yes, partially.	
Mitigation:	• No clearing of new land. • All maintenance work to stay within approved footprint.	
Residual impacts	The impacts can never be completely avoided but given that much other electrical infrastructure would be present in the area, the residual impacts are of no concern.	

6.3. Decommissioning Phase

6.3.1. Impacts to the cultural landscape

Decommissioning phase impacts to the cultural landscape are expected to be the same as those for the construction phase since the same sorts of activities and equipment would be present on site but they would be removing infrastructure rather than erecting it.

6.4. Evaluation of impacts relative to sustainable social and economic benefits

Section 38(3)(d) of the NHRA requires an evaluation of the impacts on heritage resources relative to the sustainable social and economic benefits to be derived from the development.

The project is intended to support renewable energy facilities that will be providing electricity to South Africa. Given the current electricity shortages and load shedding episodes, any project that assists in rectifying this shortage will have important socio-economic benefits. The heritage impacts

associated with 33kV/132kV substation and 132kV switching station for Alternative 1 are negligible and the impacts the 33kV/132kV substation and 132kV switching station associated with Alternative 2 are of low significance. The socio-economic benefits thus outweigh the potential impacts.

6.5. Existing impacts to heritage resources

There are currently no obvious threats to heritage resources on the site aside from the natural degradation, weathering and erosion that will affect archaeological materials. Trampling from grazing animals and/or farm/other vehicles could also occur. These impacts would be of **negligible negative** significance. The cultural landscape is not currently experiencing any negative impacts and this aspect is thus regarded as **neutral**.

6.6. The No-Go alternative

If the project were not implemented then the site would stay as it currently is. Although the heritage impacts with implementation would be greater than the existing impacts, the loss of socio-economic benefits is more significant and suggests that the No-Go option is less desirable.

6.7. Cumulative impacts

Cumulative impacts are likely to occur due to the quantity of electrical infrastructure planned for the area. However, with just one archaeological site of low significance located within the Alternative 2 footprint of the 33kV/132kV substation, the present project's contribution to the cumulative impacts on archaeology will be small. With all proposed electrical facilities and infrastructure developed there will be a significant change to the landscape and it will be strongly dominated by this new land use. Given the site's location within a REDZ, this use is considered acceptable. Although the cumulative impacts to the landscape will be at least of medium significance (Table 7), the present project's contribution will be small.

Table 7: *Assessment of cumulative impacts to heritage for Alternatives 1 and 2.*

Nature: Potential impacts on the cultural landscape through the addition of new electrical infrastructure		
Extent	Local (2)	Local (2)
Duration	Long term (4)	Long term (4)
Magnitude	Moderate (6)	Moderate (6)
Probability	Definite (5)	Definite (5)
Significance	Medium (60)	Medium (60)
Status	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources?	Yes	Yes
Can impacts be mitigated?	No, the majority of proposed electrical infrastructure is far too large to screen.	
Mitigation:	• Minimise land areas cleared. • All work to stay within approved footprints.	
Residual impacts	Mitigation will make very little difference to the impacts so residual impacts will be very similar to the overall impacts.	

6.8. Levels of acceptable change

Any impact to an archaeological or palaeontological resource or a grave is deemed unacceptable until such time as the resource has been inspected and studied further if necessary. Impacts to the landscape are difficult to quantify but in general a development that visually dominates the landscape from many vantage points is undesirable.

7. INPUT TO THE ENVIRONMENTAL MANAGEMENT PROGRAM

The actions recorded in Table 8 should be included in the environmental management program (EMPr) for the project. Note that preservation of the stone-walled feature is not required but is still best practice if possible.

Table 8: *Heritage considerations for inclusion in the EMPr.*

EA number	Impact	Mitigation / management objectives & outcomes	Mitigation / management actions	Monitoring		
				Methodology	Frequency	Responsibility
	Impacts to archaeology and graves					
1 (IPP)	Damage or destruction of archaeological sites or graves	Avoid impacts (preferred, but not required)	Cordon off and protect the archaeological site with a 30 m buffer if feasible	Cordon off site as no-go area	Once-off	ECO
1 (IPP) & **2** (Eskom)	Damage or destruction of archaeological sites or graves	Rescue information, artefacts or burials before extensive damage occurs	Reporting chance finds as early as possible, protect in situ and stop work in immediate area	Inform staff and carry out inspections of excavations	Ongoing basis	Construction Manager or Contractor
					Whenever on site (at least weekly)	ECO
	Impacts to the cultural landscape					
1 (IPP) & **2** (Eskom)	Visible landscape scarring	Minimise landscape scarring	Ensure disturbance is kept to a minimum and does not exceed project requirements. Rehabilitate areas not needed during operation.	Monitoring of surface clearance relative to approved layout	Ongoing basis	Construction Manager or Contractor
					As required	ECO

8. CONCLUSIONS

There are no significant heritage concerns for this project. Impacts to archaeology will be zero for both the IPP (33kV/132kV substation) and Eskom portions (132kV switching station) of Alternative 1 as well as for the Eskom portion of Alternative 2 (132kV switching station, 132kV powerline and access road infrastructure). They would be low negative for the 33kV/132kV substation footprint associated with of Alternative 2. Landscape impacts are of low significance for both alternatives. Nevertheless, because of the single archaeological site in the Alternative 2 33kV/132kV substation

footprint, Alternative 1 is preferred from a heritage point of view. Being the same for both the IPP and Eskom portions of both alternatives, landscape impacts should not affect decision-making. Table 9 summarises the heritage indicators and the project responses.

Table 9: *Heritage indicators and project responses.*

Indicator	Project Response
Significant archaeological sites should not be damaged without further study as required.	Alternative 1 (both the 33kV/132kv substation and the 132kV switching station footprints) is free of archaeology and the single site in the IPP portion (33kV/132kV substation) footprint of Alternative 2 is regarded as being of low cultural significance (grade GPB) and can be destroyed if necessary.
The proposed project should not dominate views from multiple directions.	The project site is far from any easily accessible public viewpoints and, because of the WEFs and related infrastructure without which it would not be built, it will not have a significant new impact on the landscape.

Should Alternative 2 be used and it is possible to protect the stone-walled enclosure in the 33kV/132kV substation site, then a buffer of 30 m should be applied around the site as shown in Figure 15.

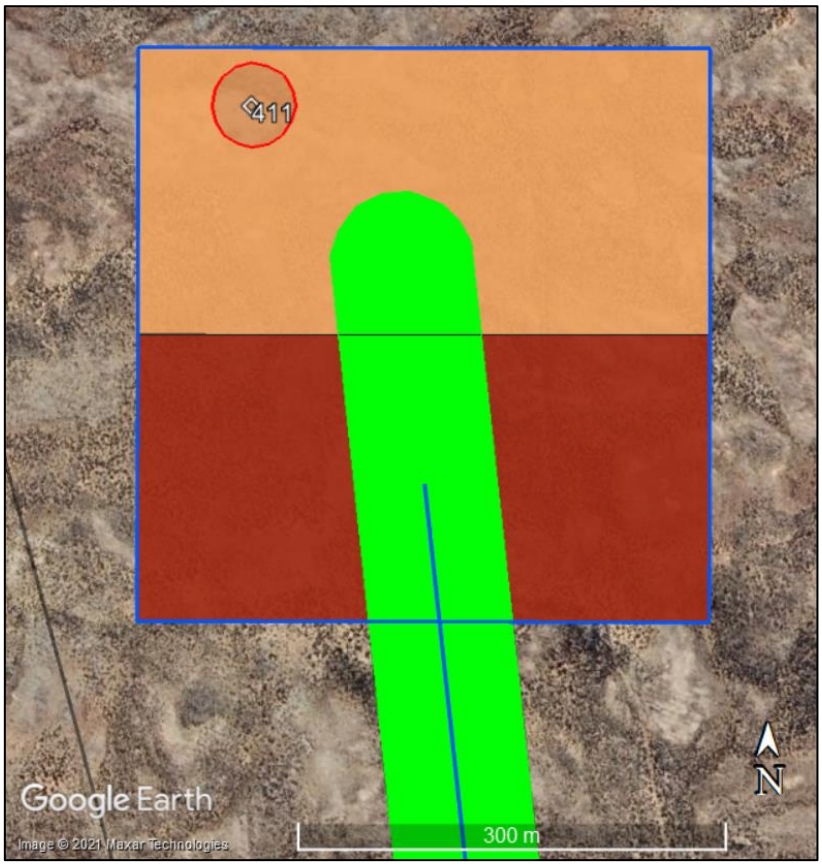

Figure 15: *Aerial view of the Alternative 2 (33kV/132kV substation site- IPP portion=light brown ; and 132kV switching station site – Eskom portion = dark brown) showing the location of the single archaeological site (waypoint 411) with a 30 m buffer.*

8.1. Reasoned opinion of the specialist

Alternative 1 for both the 33kV/132kV substation (IPP Infrastructure) and the 132kV switching station and the associated powerline (0,46km) is the preferred option from a heritage point of view, but the single heritage resource within the IPP portion of Alternative 2 has low cultural significance. It is thus the opinion of the heritage specialist that either option may be authorised in full.

9. RECOMMENDATIONS

9.1. 33kV/132kV substation including the laydown area, O&M Buildings and BESS Infrastructure (IPP portion)

It is recommended that the project be approved with either alternative but subject to the following:

- If Alternative 2 for either the 33kV/132kV substation is selected and the stone-walled site can be protected then it should be fenced off during construction with a 30 m buffer and all construction activities must stay outside of this zone; and
- If any archaeological material or human burials are uncovered during the course of development then work in the immediate area should be halted. The find would need to be reported to the heritage authorities and may require inspection by an archaeologist. Such heritage is the property of the state and may require excavation and curation in an approved institution.

9.2. 132kV switching station, 132kV powerline and access road (Eskom portion)

It is recommended that the project be approved with either alternative but subject to the following:

- If any archaeological material or human burials are uncovered during the course of development then work in the immediate area should be halted. The find would need to be reported to the heritage authorities and may require inspection by an archaeologist. Such heritage is the property of the state and may require excavation and curation in an approved institution.

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APPENDIX 1 – Curriculum Vitae

Curriculum Vitae

Jayson David John Orton

ARCHAEOLOGIST AND HERITAGE CONSULTANT

Contact Details and personal information:

Address: 23 Dover Road, Muizenberg, 7945
Telephone: (021) 788 1025
Cell Phone: 083 272 3225
Email: jayson@asha-consulting.co.za

Birth date and place: 22 June 1976, Cape Town, South Africa
Citizenship: South African
ID no: 760622 522 4085
Driver's License: Code 08
Marital Status: Married to Carol Orton
Languages spoken: English and Afrikaans

Education:

SA College High School	Matric	1994
University of Cape Town	B.A. (Archaeology, Environmental & Geographical Science)	1997
University of Cape Town	B.A. (Honours) (Archaeology)*	1998
University of Cape Town	M.A. (Archaeology)	2004
University of Oxford	D.Phil. (Archaeology)	2013

*Frank Schweitzer memorial book prize for an outstanding student and the degree in the First Class.

Employment History:

Spatial Archaeology Research Unit, UCT	Research assistant	Jan 1996 – Dec 1998
Department of Archaeology, UCT	Field archaeologist	Jan 1998 – Dec 1998
UCT Archaeology Contracts Office	Field archaeologist	Jan 1999 – May 2004
UCT Archaeology Contracts Office	Heritage & archaeological consultant	Jun 2004 – May 2012
School of Archaeology, University of Oxford	Undergraduate Tutor	Oct 2008 – Dec 2008
ACO Associates cc	Associate, Heritage & archaeological consultant	Jan 2011 – Dec 2013
ASHA Consulting (Pty) Ltd	Director, Heritage & archaeological consultant	Jan 2014 –

Professional Accreditation:

Association of Southern African Professional Archaeologists (ASAPA) membership number: 233
CRM Section member with the following accreditation:

- Principal Investigator: Coastal shell middens (awarded 2007)
  Stone Age archaeology (awarded 2007)
  Grave relocation (awarded 2014)
- Field Director: Rock art (awarded 2007)
  Colonial period archaeology (awarded 2007)

Association of Professional Heritage Practitioners (APHP) membership number: 43

- Accredited Professional Heritage Practitioner

➢ *Memberships and affiliations:*

South African Archaeological Society Council member	2004 – 2016
Assoc. Southern African Professional Archaeologists (ASAPA) member	2006 –
UCT Department of Archaeology Research Associate	2013 –
Heritage Western Cape APM Committee member	2013 –
UNISA Department of Archaeology and Anthropology Research Fellow	2014 –
Fish Hoek Valley Historical Association	2014 –
Kalk Bay Historical Association	2016 –
Association of Professional Heritage Practitioners member	2016 –

Fieldwork and project experience:

Extensive fieldwork and experience as both Field Director and Principle Investigator throughout the Western and Northern Cape, and also in the western parts of the Free State and Eastern Cape as follows:

Feasibility studies:

- Heritage feasibility studies examining all aspects of heritage from the desktop

Phase 1 surveys and impact assessments:

- Project types
  - Notification of Intent to Develop applications (for Heritage Western Cape)
  - Desktop-based Letter of Exemption (for the South African Heritage Resources Agency)
  - Heritage Impact Assessments (largely in the Environmental Impact Assessment or Basic Assessment context under NEMA and Section 38(8) of the NHRA, but also self-standing assessments under Section 38(1) of the NHRA)
  - Archaeological specialist studies
  - Phase 1 archaeological test excavations in historical and prehistoric sites
  - Archaeological research projects
- Development types
  - Mining and borrow pits
  - Roads (new and upgrades)
  - Residential, commercial and industrial development
  - Dams and pipe lines
  - Power lines and substations
  - Renewable energy facilities (wind energy, solar energy and hydro-electric facilities)

Phase 2 mitigation and research excavations:

- ESA open sites
  - Duinefontein, Gouda, Namaqualand
- MSA rock shelters
  - Fish Hoek, Yzerfontein, Cederberg, Namaqualand
- MSA open sites
  - Swartland, Bushmanland, Namaqualand
- LSA rock shelters
  - Cederberg, Namaqualand, Bushmanland
- LSA open sites (inland)
  - Swartland, Franschhoek, Namaqualand, Bushmanland
- LSA coastal shell middens
  - Melkbosstrand, Yzerfontein, Saldanha Bay, Paternoster, Dwarskersbos, Infanta, Knysna, Namaqualand
- LSA burials
  - Melkbosstrand, Saldanha Bay, Namaqualand, Knysna
- Historical sites
  - Franschhoek (farmstead and well), Waterfront (fort, dump and well), Noordhoek (cottage), variety of small excavations in central Cape Town and surrounding suburbs
- Historic burial grounds
  - Green Point (Prestwich Street), V&A Waterfront (Marina Residential), Paarl

Awards:

Western Cape Government Cultural Affairs Awards 2015/2016: Best Heritage Project.

APPENDIX 2 – Site Sensitivity Verification

A site sensitivity verification was undertaken in order to confirm the current land use and environmental sensitivity of the proposed project area. The details of the site sensitivity verification are noted below:

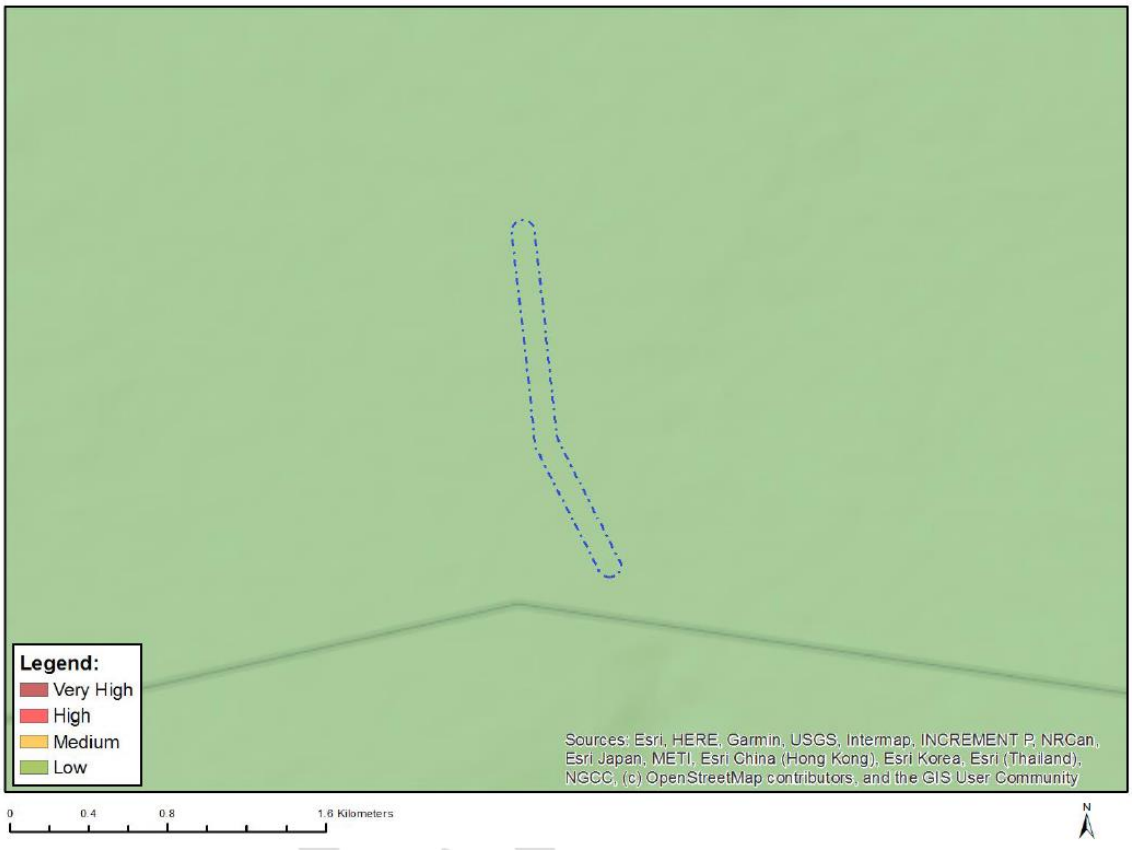
Date of Site Visit	10 October 2021
Specialist Name	Dr Jayson Orton
Professional Registration Number	ASAPA: 233; APHP: 043
Specialist Affiliation / Company	ASHA Consulting (Pty) Ltd

- Provide a description on how the site sensitivity verification was undertaken using the following means:
(a) desk top analysis, using satellite imagery;
(b) preliminary on -site inspection; and
(c) any other available and relevant information.

Initial work was carried out using satellite aerial photography in combination with the author's accumulated knowledge of the local landscape. Subsequent fieldwork served to ground truth the site, including areas identified as potentially sensitive. Desktop research was also used to inform on the heritage context of the area. This information is presented in the report (Sections 5.2.1 and 5.4.1).

- Provide a description of the outcome of the site sensitivity verification in order to:
(a) confirm or dispute the current use of the land and the environmental sensitivity as identified by the screening tool, such as new developments or infrastructure, the change in vegetation cover or status etc.; and
(b) include a motivation and evidence (e.g. photographs) of either the verified or different use of the land and environmental sensitivity.

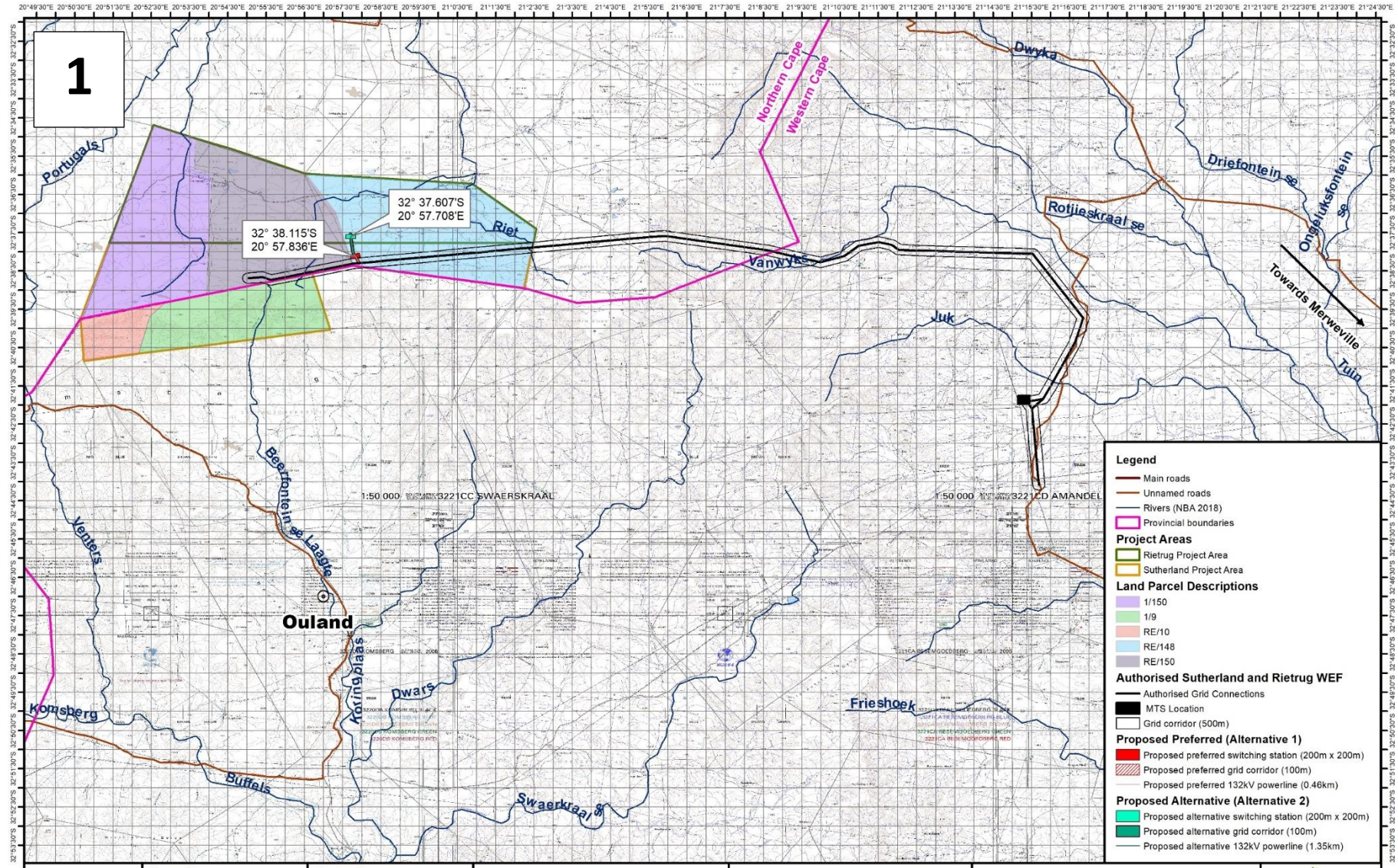
The maps below are extracted from the screening tool reports and show the archaeological and heritage sensitivity to be low. The site visit verified this sensitivity since just one heritage resource of low sensitivity was found. A photographic record and description of the relevant heritage resource is contained within the impact assessment report.


Legend:
Very High
High
Medium
Low
Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community
0
0.4
0.8
1.6 Kilometers
N


Legend:
Very High
High
Medium
Low
Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community
0
0.375
0.75
1.5 Kilometers
N

APPENDIX 3 – Additional Mapping

1. *Topographic Map indicating the 132kV switching station and powerline alternatives located within the respective wind energy facility sites that will connect to the authorised grid infrastructure.*
2. *Topographic Map indicating the 33kV/132kV substation alternatives located within the respective wind energy facility sites that will house the IPP infrastructure such the Battery Energy Storage System (BESS), O&M Buildings and Laydown area.*



Prepared for:
Nala Environmental Consulting Firm

Prepared by:
Ecofluence Consulting

ENVIRONMENTAL IMPACT ASSESSMENT

Proposed Powerline & Switching Station associated with the authorised Sutherland and Rietrug Wind Energy Facilities.

Topographic locality map: Eskom Infrastructure

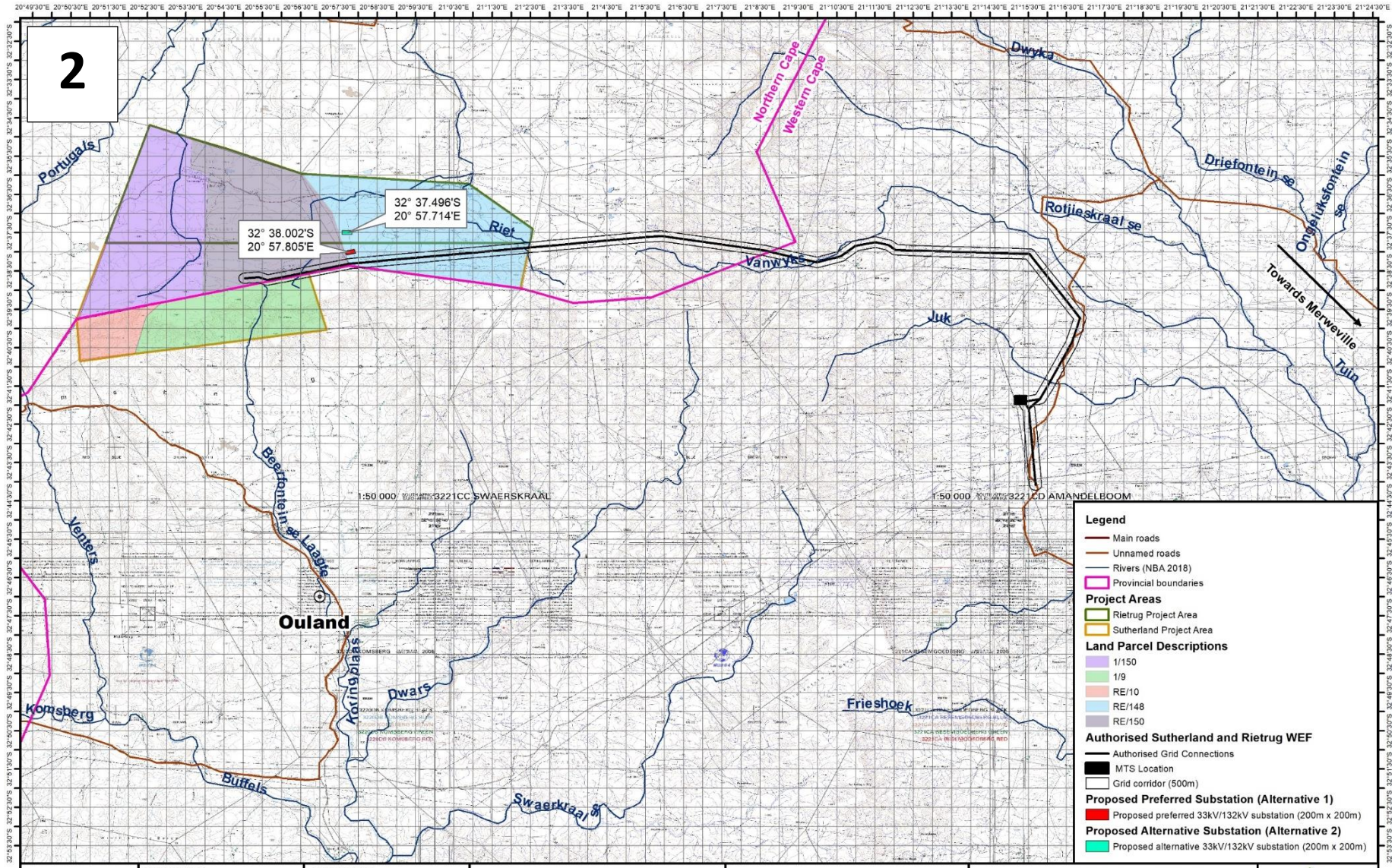
Province	Northern Cape
District Municipality	Namakwa
Local Municipality	Karoo Hoogland

Prevailing wind direction: West

Coordinate System: GCS WGS 1984
Datum: WGS 1984
Units: Degree
Scale: 1:160 000

Date: October 2021

0 2.5 5 10 km


2
32° 37.496'S
20° 57.714'E
32° 38.002'S
20° 57.805'E
Portugals
Riet
Vanwyksvlei
Northern Cape
Western Cape
Dwyka
Driefontein se
Rotjieskraal se
Ongelukfontein se
Towards Merweville
Juk
Tuin
Beerfontein se Laagte
Ouland
Ventersberg
Komsberg
Buffels
Koringplaas
Dwars
Swaerkraal se
Frieshoek
1:50 000 3221CC SWAERSKRAAL
1:50 000 3221CD AMANDELBOOM
Legend
Main roads
Unnamed roads
Rivers (NBA 2018)
Provincial boundaries
Project Areas
Rietrug Project Area
Sutherland Project Area
Land Parcel Descriptions
1/150
1/9
RE/10
RE/148
RE/150
Authorised Sutherland and Rietrug WEF
Authorised Grid Connections
MTS Location
Grid corridor (500m)
Proposed Preferred Substation (Alternative 1)
Proposed preferred 33kV/132kV substation (200m x 200m)
Proposed Alternative Substation (Alternative 2)
Proposed alternative 33kV/132kV substation (200m x 200m)
Prepared for:
Nala Environmental Consulting Firm
NALA ENVIRONMENTAL
Prepared by:
Ecofluence Consulting
ecofluence CONSULTING
ENVIRONMENTAL IMPACT ASSESSMENT
Proposed IPP Substation associated with the authorised Sutherland and Rietrug Wind Energy Facilities.
Topographic locality map: IPP Infrastructure
Province: Northern Cape
District Municipality: Namakwa
Local Municipality: Karoo Hoogland
Prevailing wind direction: West
N
Coordinate System: GCS WGS 1984
Datum: WGS 1984
Units: Degree
Scale: 1:160 000
Date: October 2021
0 2.5 5 10 km