

**HERITAGE IMPACT ASSESSMENT: PROPOSED CONSTRUCTION OF THE
BON ESPIRANGE SUBSTATION ON THE REMAINDER OF THE FARM BON
ESPIRANGE 73 AND A 132 kV POWERLINE FROM THE SUBSTATION IN
THE WESTERN CAPE TO THE KOMSBERG SUBSTATION IN THE
NORTHERN CAPE**

(Assessment conducted under Section 38 (8) of the
National Heritage Resources Act No 25 of 1999)

Prepared for:

Savannah Environmental (Pty) Ltd

PO Box 148
Sunninghill, 2157
Phone (011) 2346621
Fax (086) 684 0547

February 2016



Prepared by

Lita Webley
ACO Associates cc

Physical: Unit D17, Prime Park, 21 Mocke Rd, Diep River
Postal: 8 Jacobs Ladder St James, 7945
Lita.webley@aco-associates.com
Tel: 021 7064104
Cell: 0721796219
Fax to e-mail: 086 603 7195

EXECUTIVE SUMMARY

This desktop assessment considers the potential impacts to heritage features as a result of the proposed construction of the Bon Espirange substation (Laingsburg Local Municipality, Western Cape) and the construction of the 132kV powerline, for a distance of 6-7km, to the Komsberg substation (Karoo Hoogland Local Municipality, Northern Cape).

The substation forms part of the Roggeveld Wind Energy Facility (WEF) which has already received a positive comment from Heritage Western Cape and environmental authorisation from the Department of Environmental Affairs.

The proposed powerline will cross the R354, which runs between Matjiesfontein and Sutherland, approximately 20km north of Matjiesfontein.

The proposed development entails the following:

- An on-site Eskom substation (Bon Espirange) within the authorised Roggeveld Wind Farm footprint;
- The construction of the 132kV overhead powerline (approximately 6-7 km in length) from the Bon Espirange substation to the Komsberg substation.

Limitations

This is a desktop assessment of the proposed substation and powerline alternatives. No field studies have been undertaken. Our knowledge of the heritage resources of the area are based on field assessments of adjoining wind farms. Heritage resources cannot be identified from aerial photography (i.e. Google earth).

Heritage Resources Identified

- The underlying rocks of the Middle Permian Beaufort group are renowned for their rich fossil heritage of terrestrial vertebrates. All geological horizons in the study area are potentially fossiliferous;
- There are very few stone scatters on the high lying areas. Possible pastoralist sites tend to concentrate along the river valleys. Stone kraal enclosures are found along the lower slopes of the mountainous terrain;
- Farmsteads in the area of the Roggeveld WEF have a moderate to low heritage significance. There is no direct threat to the farmhouse or outbuildings on the Bon-Espirange farm;
- Cemeteries and graves are usually located near farmsteads;
- The powerline will cross the R354 which is a scenic route.

Anticipated Impacts on Heritage Resources

- The excavation for the Bon Espirange substation and the pylon footings, may penetrate bedrock and result in limited impacts to potentially fossiliferous rock. However, according to Miller (2010) surface exposures of bedrock material are scarce in the study area and the field survey for the Roggeveld WEF has confirmed that surface occurrences of fossils are

extremely scarce. This is also confirmed by Almond (2016) for the nearby Karusa substation;

- The construction for the Bon Espirange substation and the pylon footings may result in impacts to archaeological resources although our knowledge of the archaeology of the high ridges indicates that impacts are likely to be low;
- There are no farm houses or associated farming infrastructure along the powerline route and impacts are expected to be low;
- Unmarked graves may occur within the substation footprint or along the powerline route although this is unlikely;
- The impacts of the 132kV powerline on the R354 scenic route are likely to be low in view of the fact that there are already two 400kV powerlines crossing the road;
- The proposed Bon Espirange substation will be located some two kilometres to the west of the R354, in mountainous countryside and it is possible that it will not be visible from the road.

Recommendations

The construction of the Bon Espirange substation and 132 kV powerline is supported from a heritage perspective.

- During any deep excavations into the bedrock if fossil material is encountered a suitably qualified palaeontologist should be contacted to examine the material
- If fossil material is encountered, work must be stopped and once the palaeontologist is contacted, the palaeontologist must be given sufficient time to recover a scientifically representative sample;
- Mitigation normally involves recording and/or collection of fossil material with a permit issued by Heritage Western Cape.
- If any concentrations of archaeological material, such as stone artefacts are recovered, Heritage Western Cape must be notified;
- If any human remains are uncovered during the excavation of tower holes, work must stop in that area and Heritage Western Cape must be alerted immediately;
- Avoid direct impacts to stone walling, stone kraals, etc. which may occur on the top of the hill near the proposed Bon Espirange substation. While it is unlikely that these features will occur on elevated areas at a considerable distance from the farmhouse, nevertheless, the ECO should be alerted to this possibility;
- The cumulative impacts of an additional 132kV powerline, on the R354 scenic route, are likely to be minimal.

Alternative 1 (preferred alternative) will follow a short section of an existing servitude for a 400 kV powerline. It may be argued that from a heritage perspective it is preferable to keep infrastructure along an established servitude.

February 2016

Declaration of Independence:

I, Lita Webley, am an independent specialist consultant who is in no way connected with the proponent, other than in terms of the delivery of consulting services.

I hold a PhD degree in Archaeology and have been consulting since 1996 in the Northern, Eastern and Western Cape Provinces. I am an accredited Principal Investigator with the Association of Southern African Professional Archaeologists (ASAPA). I hold accreditation in Stone Age Archaeology, Shell Midden Archaeology and Colonial Period Archaeology (PI status) and Human Remains (Field Director).

GLOSSARY

Archaeology: Remains resulting from human activity which is 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.

Early Stone Age: The archaeology of the Stone Age between 700 000 and 2500 000 years ago.

Fossil: Mineralised bones of animals, shellfish, plants and marine animals. A trace fossil is the track or footprint of a fossil animal that is preserved in stone or consolidated sediment.

Heritage: That which is inherited and forms part of the National Estate (Historical places, objects, fossils as defined by the National Heritage Resources Act 25 of 1999).

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

Late Stone Age: The archaeology of the last 20 000 years associated with fully modern people.

Middle Stone Age: The archaeology of the Stone Age between 20-300 000 years ago associated with early modern humans.

National Estate: The collective heritage assets of the Nation

Palaeontology: 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.

Pleistocene: A geological time period (of 3 million – 20 000 years ago).

SAHRA: South African Heritage Resources Agency – the compliance authority which protects national heritage in the Northern Cape.

Structure (historic): 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. Protected structures are those which are over 60 years old.

Acronyms

DEA	Department of Environmental Affairs
ESA	Early Stone Age
GPS	Global Positioning System
HIA	Heritage Impact Assessment
HWC	Heritage Western Cape
LSA	Late Stone Age

LM	Local Municipality
MSA	Middle Stone Age
NHRA	National Heritage Resources Act, No 25 of 1999
WEF	Wind Energy Facility
MSA	Middle Stone Age
NHRA	National Heritage Resources Act

CONTENTS

1. INTRODUCTION	8
2. BACKGROUND	9
2.1 Project Description	9
3.1 Grading	10
4.1 Information Base.....	14
4.2 Field Assessment.....	14
4.3 Assumptions	14
4.4 Limitations	15
5. DESCRIPTION OF AFFECTED ENVIRONMENT	15
5.1 Palaeontology	15
5.2 Archaeological Background	16
5.3 Built Environment.....	17
5.4 Graves	18
5.5 Cultural Landscape	18
6. ASSESSMENT OF IMPACTS	18
6.1 Impacts to Palaeontology	18
6.2 Impacts to Pre-Colonial Archaeology	19
6.3 Impacts to Colonial Archaeology and the Built Environment	20
6.4 Cemeteries and Graves	21
6.5 Cultural Landscape	22
6.6 Cumulative Impacts.....	23
8. RECOMMENDATIONS	25
9. REFERENCES	25

1. INTRODUCTION

ACO Associates cc was appointed by Savannah Environmental, on behalf of the Roggeveld Wind Power (Pty) Ltd, to undertake an a Heritage Impact Assessment for the Bon Espirange substation located on the Remainder of the farm Bon Espirange 73 and a 132kV powerline (6-7km in length) to connect to the existing Eskom Komsberg Substation (Figure 1). The proposed project site is located approximately 20km north of Matjiesfontein (Figure 1). The project site falls within the borders of the Western Cape and Northern Cape Provinces (Figure 2).



Figure 1: The powerline crosses the R354, some 20km north of Matjiesfontein on the road to Sutherland.

Roggeveld Wind Power (Pty) Ltd has already received environmental authorisation for the Roggeveld WEF project (DEA Ref: 12/12/20/1988/1) on 12 August 2014.

It is proposed to construct an on-site substation (the Bon Espirange Substation) within the footprint of the Roggeveld WEF, and to connect it with the Komsberg substation (which falls within the boundary of the Northern Cape) via a 132kV overhead power line.

2. BACKGROUND

2.1 Project Description

In order to connect the Roggeveld WEF to the grid, an on-site substation (known as the Bon Espirange Substation) and a new overhead power line is required to be constructed. The substation will be located adjacent to the Roggeveld Substation, within the authorised Roggeveld Wind Farm Facility site, and the 132kV overhead power line (6-7 km in length) will connect the Bon Espirange Substation to the Komsberg Substation. Following completion of construction and commissioning, this infrastructure will be transferred to Eskom for ownership and operation.



Figure 2: Alternative 1 (blue corridor) runs to the northern side of Komsberg, while Alternative 2 (orange corridor) runs to the western side of Komsberg. Both corridors start at the Bon Espirange substation (red), on an west-east direction and end at the Komsberg substation (orange block).

The proposed development therefore entails the following:

- The construction of the 132kV overhead powerline (approximately 6-7 km in length);
- An on-site substation (Bon Espirange) within the authorised Roggeveld Wind Farm footprint.
- Limited upgrades to the Komsberg Substation

Two alternatives have been proposed, Alternative 1 and Alternative 2. A 300 m wide corridor is being investigated for the siting of the proposed route of the powerline. Alternative 1 (blue) is 6km long and the preferred alternative while Alternative 2 (orange) is 5.9km long.

The following farm portions will be crossed by the proposed line:

- RE/73 Bon Espirange
- 1/73 Bon Espirange
- 105 Aprilskraal
- 2/210 Standvastigheid
RE/210 Standvastigheid

The tower design for the proposed powerline will be a mixture of self-supporting monopoles, guyed monopoles as well as truss structures (A-frames), with up to 32m in height. Depending on the length of the pole, the maximum depth for the footing will be 3m. The dimensions of the footings (foundations) for the powerline towers are not specified in available information. The footings vary according to the size of the tower and the geotechnical characteristics at each tower site.

3. HERITAGE LEGISLATION

This report is conducted in terms of Section 38 (8) of the National Heritage Resources Act, No 25 of 1999 (NHRA).

The NHRA provides protection for the following categories of heritage resources:

- Landscapes, cultural or natural (Section 3 (3))
- Buildings or structures older than 60 years (Section 34);
- Archaeological Sites, palaeontological material and meteorites (Section 35);
- Burial grounds and graves (Section 36);
- Public monuments and memorials (Section 37);
- Living heritage (defined in the Act as including cultural tradition, oral history, performance, ritual, popular memory, skills and techniques, indigenous knowledge systems and the holistic approach to nature, society and social relationships) (Section 2 (d) (xxi)).

A Notice of Intent to Develop (NID) has been submitted to Heritage Western Cape (HWC) for the construction of the Bon Espirange substation and 132 kV powerline linking the substation to the Komsberg substation. We have motivated in the NID that a desktop is sufficient and that no further studies are required, but HWC may request further specialist studies.

3.1 Grading

The South African heritage resources management system is based on grading, which provides for assigning the appropriate level of management responsibility to a heritage resource. Heritage resources were assessed according to criteria specified in the NHRA and HWC Policy & Guidelines (2015).

Table 1: Grading of Heritage Resources

Grade	Level of significance	Description
-------	-----------------------	-------------

I	National	Of high intrinsic, associational and contextual heritage value within a national context, i.e. formally declared or potential Grade 1 heritage resources.
II	Provincial	Of high intrinsic, associational and contextual heritage value within a provincial context, i.e. formally declared or potential Grade 2 heritage resources.
IIIA	Local	Of high intrinsic, associational and contextual heritage value within a local context, i.e. formally declared or potential Grade 3a heritage resources.
IIIB	Local	Of moderate to high intrinsic, associational and contextual value within a local context, i.e. potential Grade 3b heritage resources.
IIIC	Local	Of medium to low intrinsic, associational or contextual heritage value within a national, provincial and local context, i.e. potential Grade 3c heritage resources.

Our Ref: HMCENTRAL KAROO/LAINGSBURG/MATJIESFONTEIN/ROGGEVELD WIND ENERGY FACILITY

Enquiries Justin Bradfield **Date:** 07/11/2011
Tel: 021 483 9543 **Case No:** 111020JB18
Email: justin.bradfield@pgwc.gov.za **Auto IDs:** 1232 - 1591



INTERIM COMMENT
In terms of section 38(8) of the National Heritage Resources Act (Act 25 of 1999)
and the Western Cape Provincial Gazette 6061, Notice 298 of 2003

Attention: Ms Claire Alborough
 ERM, Silverwood House, Block A
 Steenberg Office Park
 Steenberg
 7945

CASE NUMBER: 111020JB18

DSR: PROPOSED ROGGEVELD WIND FARM, NORTHERN CAPE AND WESTERN CAPE.

The matter above has reference.

Your draft EIR dated 20 October was tabled at the Impact Assessment Committee meeting held on 02 November 2011 and the following was discussed:

1. The proposal is for 250 turbines to be located in the Klein Roggeveldberge;
2. The visual impact assessment noted that the proposed turbines will have high visual impact on the sensitive mountainous Karoo landscape although the impact would be reduced if turbines are removed from the koppie peaks and are set back at least 3 km from the R354.
3. There is little opportunity for further mitigation in this landscape;
4. The cumulative impact of similar wind farms within a 30 km radius of this area is a concern;
5. An archaeological impact assessment identified several early trekboere settlement remains and some nineteenth century farm houses;
6. Palaeontologically sensitive formations occur in the area;
7. The consultants recommend monitoring of borrow pits, road construction and bulk excavations for turbine footing.

Decision:

The committee endorses the recommendations of all the consultants contained in the draft EIR and further comments that:

1. No turbines are to be located on Tafelkop or any other mountain ridgelines in the Western Cape;
2. A suitably qualified palaeontologist must determine what palaeontological monitoring is necessary and must monitor bulk earthwork activities;
3. A suitably qualified and experienced professional must be consulted if any of the old farm buildings are intended for rehabilitation or re-use.

Comment with respect the Roggeveld WEF from Heritage Western Cape 2011

Our Ref: HMICENTRAL KAROOILAINGSBURGMATJIESFONTEINROGGEVELD WIND ENERGY FACILITY

Enquiries: Troy Smuts
 Tel: 021 483 9543
 Email: justin.bradfield@pgwc.gov.za

Date: 23/01/2013
 Case No: 111020JB18
 Auto IDs: 1232 - 2280



FINAL COMMENT

In terms of section 38(8) of the National Heritage Resources Act (Act 25 of 1999) and the Western Cape Provincial Gazette 6061, Notice 298 of 2003

Attention: Ms Claire Alborough
 ERM, Silverwood House, Block A
 Steenberg Office Park
 Steenberg
 7945

CASE NUMBER: 111020JB18

HIA: PROPOSED ROGGEVELD WIND FARM, NORTHERN CAPE AND WESTERN CAPE.

The matter above has reference.

Heritage Western Cape is in receipt of your correspondence on the above matter, dated 16 January 2013 and the following was discussed:

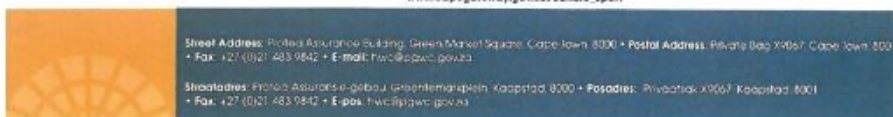
1. Site located west of the R354, ~45 km south of Sutherland and 30 km north of Matjiesfontein, in both Western and Northern Cape Provinces.
2. Turbines: max 100m hub height, 117m rotor diameter (3 blades of 58.5m)
3. The Department of Environmental Affairs in December 2011 requested that some changes be effected to this the wind energy Farm.
4. The recommendations of Heritage Western Cape were that no turbines are to be located on Tafelkop or any other mountain ridgelines in the Western Cape.
5. The HIA notes that: Although this is a high scenic area, it is very remote and not celebrated as a place with visual heritage qualities.
6. The revised proposal is to have no turbines on Tafelkop or Spitskop.

Decision

1. Heritage Western Cape resolved to support the proposal as currently proposed without turbines on Tafelkop or on Spitskop.

www.capegateway.gov.za/culture_sport

Page 1 of 2



Comment with respect the Roggeveld WEF from Heritage Western Cape 2013.

4. METHODOLOGY

4.1 Information Base

ACO Associates cc has been involved in a number of heritage studies in the immediate vicinity of the proposed powerline. In addition, a background search of other Cultural Resource Management (CRM) projects in the area was made via the South African Heritage Resources Information Systems (SAHRIS) database to assess the general heritage context of the area.

Background studies have already been conducted for the surrounding area namely:

- The Roggeveld Wind Energy Facility;
- The Hidden Valley Phase 1 Karusa;
- The Hidden Valley Phase 2 Soetwater;
- The Hidden Valley Phase 3;and
- The Kareebosch Wind Project (Roggeveld Phase 2)

The Roggeveld WEF has already been submitted to Heritage Western Cape and received a Final Comment. The Case Number is 111020JB18 dated 23/01/2013. Heritage Western Cape resolved to support the proposal as currently proposed without turbines on Tafelkop or on Spitskop (see attached above).

The Komsberg substation site is well studied as it lies within the impact assessment area which was assessed by Cape Archaeological Survey cc for the new Eskom Gamma-Omega 765kV transmission lines (Patrick 2009).

4.2 Field Assessment

This is a desktop review of the heritage resources in the immediate vicinity of the proposed powerline. A field assessment was not undertaken because of the abundance of heritage information for this area.

This desktop assessment for the 6-7km powerline and new substation is based on two previous field surveys, conducted by Hart & Webley (2011) and Hart & Kendrick (2013) for the Roggeveld Wind Energy Facility, which included a power line along a similar alignment.. The fieldwork involved a walk-down and drive-down survey and was able to arrive at a broad overview of the entire development site. The tracks were recorded by means of Garmin GPS devices and all sites were digitally recorded. The original fieldwork is comprehensive and remains relevant to this study.

4.3 Assumptions

It is assumed that the proposed powerline will cross over a section of mountainous terrain which is similar to sections of the Roggeveld WEF terrain and that comments to archaeology and palaeontology are likely to be similar. During the initial survey, the built environment around the Bon Espirance farmstead was recorded.

4.4 Limitations

This assessment is based on a desktop study and no field assessment was undertaken, other than the field assessments for the Roggeveld WEF. Our knowledge of the heritage resources of the area are based on field assessments of adjoining wind farms. Heritage resources cannot be identified from aerial photography (i.e. Google earth).

5. DESCRIPTION OF AFFECTED ENVIRONMENT

The study area is situated towards the southern margin of the Main Karoo basin and straddles the Sutherland – Matjiesfontein road (R354).

To the north, rocks of the Cape Supergroup make up the Cape Fold Belt mountains. Folding due to the tectonic forces which gave rise to the Cape Fold Belt is also present in the study area, but it is much more subdued. This has given rise to more or less parallel gentle anticlines and synclines, with their axes orientated approximately north-south. The high ridges are windswept, dry, inhospitable and undeveloped. The area is sparsely populated and most of the farms have absentee landlords.



Plate 3: View of the high mountainous landscape.

5.1 Palaeontology

The entire area is underlain by rocks of the Karoo Supergroup rocks of the Abrahamskraal Formation and the Permian Beaufort Group. In the south there

are scattered outcrops of the slightly older Waterford Formation of the Ecca Group, and also outcrops of the Tierberg and Fort Brown Formations in the extreme south (Miller 2011). The Abrahamskraal Formation underlies all of the northern area and makes up the ridges on which the Roggeveld WEF is to be erected. The hilltops and hill slopes expose horizons of resistant channel-fill sandstones, with intervening layers of shales, representing former muddy flats and flood splays from broken river banks.

A palaeontological study of the area was commissioned by Dr Duncan Miller with further comments provided by Dr John Almond. Almond (2010) has also completed a palaeontological assessment of the area, which covers the current study areas.

Miller (2010) reports that the only fossils found in the Abrahamskraal Formation were trace fossils in the form of sand-filled vertical burrows in the sandstone.

5.2 Archaeological Background

The Roggeveld WEF was surveyed by Hart & Webley (2011) and again by Hart & Kendrick (2013) during revisions to the proposed facility. The observations below are derived from the previous field trips as well as observations made by Halkett & Webley (2011) with regard the proposed Mainstream Wind Energy facility further to the east and Booth (2015) with respect the Karusa substation.

Stone Age: As expected the archaeology includes Early Stone Age (ESA), Middle Stone Age (MSA) and Later Stone Age (LSA) artefact scatters. Open sites are extremely sparse on the upper plateau with only one MSA site being recorded – a scatter associated with a dry pan. The most common raw materials are hornfels, quartzite, chert, and also quartz and Karoo shale. Occasional flakes were noted randomly on the landscape and lie scattered on the land surface which represents the “litter” of the Stone Age. On the upper plateau even incidental artefacts were scarce.

Stone kraals: The most common form of pre-colonial site on the upper plateau was stone kraals or kraal clusters. The kraal complexes (which are distinctly different from colonial period stock kraals) tend to be found along the leeward slopes of low ridges. In the past they are likely to have been associated with reed mat huts or brush shelter/s. It was noted that kraals are arranged in complexes of up to 13 interlocking enclosures with adjoining “lammerkraals”. Also associated with these ‘kraals’ is artefactual material in the form of fine thin red burnished pottery and ostrich egg shell fragments.

Below the escarpment in the southern part of the Roggeveld WEF, another form of archaeological site was identified. These are what we interpret to be open Khoekhoen encampments situated among the Kameeldoring trees along the dry river beds in the bottom of valleys. The sites are typically quite large (60 – 80m in diameter), artefactually rich with very fine thin-walled and burnished Cape Coastal pottery noted. There are numerous stone features, informal stone artefacts, grinding surfaces as well as a number of graves, some of which have broken grinding stones placed on top. Also evident were discreet ash middens and animal bone. On two of the sites there is evidence of European goods (19th century

glass and ceramics) which may indicate some form of continuous use of the sites by Khoekhoen herders into the colonial period.

Hart & Webley (2011) comments that the high ridges are devoid of rock shelters and water sources are scarce. Pre-colonial heritage seems to concentrate in the valley bottoms close to watercourses and springs.

5.3 Built Environment

Early Trekboer settlement in the area commenced by 1750. Early loan farms were frequently abandoned because of Bushmen attacks. Settlement became more permanent in the 19th century. The built environment is limited to farm complexes in river valleys.

Evidence for early colonial period settlement in the Roggeveld WEF, in all likelihood by *trekboere*, consists of collections of ruined stone and mud buildings, threshing floors and kraals located exclusively in the valley areas between the high longitudinal ridges that characterise the study area. There is a number of existing farm houses that contain 19th century fabric, however very few of these have anything more than moderate heritage significance.



Figure 3: Location of the heritage sites around the Bon Espirance farmstead.

The farmhouse of the Remainder of farm Bon Espirance 73 (known as “Bon Espirance”) is situated north of the proposed substation and powerline corridor (Figure 3). The following heritage resources were recorded by Hart & Webley

(2011) and Hart & Kendrick (2013) but are all outside of the proposed development footprint and would not be impacted:

Site Number	Site description
027	Bon Esperance farm complex
028	Stone kraal some 30m north of the road, it has two enclosures
029	"Trapvloer" or threshing floor some 15m from the road
030	Farmhouse, original part (running east west) was built in 1929, but the additions are newer
031	Stone kraals
032	Stone kraals
033	Stone house with probably external hearth. About 4x12m. Many historical artefacts and bones lying around the house.

5.4 Graves

Graves tend to be located close to settlements, often in loose sandy soils such as the banks of dry river beds. No graves have been reported in the immediate vicinity of the Bon Esperance farmstead although it is clearly possible that unmarked graves, particularly farm workers graves, may be found in the veld.

5.5 Cultural Landscape

The proposed 132kV powerline will cross the R354 between Matjiesfontein and Sutherland. According to Winter & Oberholzer (2013), the route, which crosses the Klein Roggeveld Mountains, is an area of high scenic and rural value. It is an important tourism route to the Sutherland Observatory of Route III significance (Figure 2).

6. ASSESSMENT OF IMPACTS

With respect to impacts to heritage resources, the potential for impacts are considered to be most severe during the construction phase. The main impacts resulting from the operational phase are potential vandalism of heritage sites by Eskom staff. This includes stripping of fittings from abandoned farm buildings, careless damage to kraal walls, graffiti on rock art sites, etc. Impacts resulting from the de-commissioning of the powerline and substation may include the dumping of electrical infrastructure on heritage sites.

6.1 Impacts to Palaeontology

The underlying rocks of the Middle Permian Beaufort group are renowned for their rich fossil heritage of terrestrial vertebrates. All geological horizons in the study area are potentially fossiliferous. Thus all excavations (i.e. for pylon footings), may uncover fresh fossiliferous rock.

However, surface exposures of bedrock material are scarce in the study area and the field survey (Miller 2010) for the Roggeveld WEF has confirmed that surface

occurrences of fossils are extremely scarce. Could we then extend the same to the powerline routing (and substation) as it is the same vicinity? ACO please make this connection for completeness sake.

Table 3: Potential impacts to Palaeontology

Nature: Potential impacts of the substation and powerline on the palaeontological heritage of the study area		
	Without Mitigation	With Mitigation
Extent	Local (1)	Local (1)
Duration	Permanent (5)	Permanent (5)
Magnitude	Moderate (6)	Low (4)
Probability	Probable (3)	Improbable (2)
Significance	Medium (36)	Low (20)
Status (positive or negative)	Negative	Neutral
Reversibility	No	No
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated?	Yes	
Mitigation: Mitigation of palaeontological heritage can be achieved by ensuring that during deep excavations if materials of palaeontological heritage are found, work is stopped and the materials are checked by a palaeontologist.		
Cumulative impacts: The addition of the substation and powerline is not expected to add significantly to the impact associated with the authorised Roggeveld Wind Farm		
Residual Impacts: N/A		

The palaeontologist recommended with respect the adjoining area:

- During any deep excavations into the bedrock if fossil material is encountered, work should be stopped and a suitably qualified palaeontologist should be notified to examine the material
- If fossil material is encountered, work must be stopped and once the suitably qualified palaeontologist has been notified, the palaeontologist must be given sufficient time to recover a scientifically representative sample;
- Mitigation normally involves recording and/or collection of fossil material with a permit issued by Heritage Western Cape.

6.2 Impacts to Pre-Colonial Archaeology

The proposed powerline may result in very minimal impacts along the 6km stretch of mountainous terrain. There are very few stone scatters on the high lying areas. And possible pastoralist sites tend to concentrate along the river valleys. Stone kraal enclosures are found along the lower slopes of the mountainous terrain.

Table 4: Potential impacts to Pre-colonial Archaeology

Nature: Negative impacts to sub-surface archaeological material which may include stone artefact scatters, stone kraals and pastoralist sites along river valleys		
	Without Mitigation	With Mitigation
Extent	Local (2)	Local (1)
Duration	Permanent (5)	Permanent (5)
Magnitude	Low (4)	Minor (2)
Probability	Improbable (2)	Very improbable (1)
Significance	Low (22)	Low (8)
Status (positive or negative)	Negative	Neutral
Reversibility	No	No
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated?	Yes	Yes
Mitigation: If any concentrations of stone artefacts or human remains are uncovered during the excavations, then work must stop in that area and Heritage Western Cape must be notified (Tel: 021 483 9685).		
Cumulative impacts: The addition of the substation is not expected to add significantly to the impact associated with the authorised Roggeveld Wind Farm.		
Residual Impacts: N/A		

The tower footings for the 132 kV line are relatively small (About 1 X 1 m and up to ~2 m depth) and they are unlikely to result in significant damage to underlying pre-colonial archaeological material.

Archaeological recommendations:

- If any concentrations of archaeological material, such as stone artefacts are recovered during the construction phase, Heritage Western Cape must be notified.

6.3 Impacts to Colonial Archaeology and the Built Environment

The Bon Espirance substation and powerlines Alternatives 1 and 2 are proposed on a low hill overlooking the old Bon Espirance farmstead (Figure 3). With respect to the built environment, Hart & Webley (2011) note that the farmsteads in the area of the Roggeveld WEF have a moderate to low heritage significance. There is no direct threat to the Bon Espirance farmhouse or outbuildings. The only impacts that may be anticipated are of a visual nature, which must be considered in context, understanding that the Roggeveld Wind Farm is to be constructed on these farm portions.

Table 4: Summary of impacts to Built Environment and Colonial Archaeology

Nature of impact: Possible visual impacts on the farmhouse - Bon Espirance and surrounding outbuildings, kraals and rubbish dumps		
	Without mitigation	With mitigation
Extent	Local (2)	Local (1)
Duration	Long term (4)	Long term (4)
Magnitude	Low (4)	Minor (2)
Probability	Improbable (2)	Very Improbable (1)
Significance	-Low (20)	Very Low (7)
Status	Negative	Neutral
Reversibility	No	No
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	No	Yes
Mitigation: In the unlikely event that stone kraals, stone walling, etc are found during the construction phase on the top of the hill near the proposed Bon Espirance substation, Heritage Western Cape must be notified of the find.		
Cumulative impacts: n/a.		
Residual impacts: n/a.		

Built Environment Recommendations:

- Avoid direct impacts to stone walling, stone kraals, etc. which may occur on the top of the hill near the proposed Espirance substation. While it is unlikely that these features will occur on the elevated area at a considerable distance from the farmhouse, the ECO should be alerted to this possibility.

6.4 Cemeteries and Graves

Graves tend to concentrate near farm buildings and settlements and are usually high visible and easy to avoid. However, when settlements have been abandoned, and the graveyards are no longer fenced and overgrown, they become more difficult to identify. Farm graveyards have been recorded at all the farmhouses in the area. It is highly likely that there will be at least some graves at the farmhouse, Bon Espirance – but it is unlikely that it will be on top of the hillside above the house (i.e. on the route of the powerline).

Table 5: Summary of impacts to Cemeteries and Graves

Nature of impact: Possible negative impacts on cemeteries or graves at the location of the proposed Bon Espirance Substation.		
	Without mitigation	With mitigation
Extent	Local (2)	Local (1)
Duration	Permanent (5)	Long term (4)
Magnitude	High (8)	Low (4)
Probability	Improbable (2)	Very Improbable (1)
Significance	Medium (30)	Very Low (9)

Status	Negative	Neutral
Reversibility	No	No
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated?	Yes	
Mitigation: If any graves or human remains are uncovered during construction, then work should stop in that area, and Heritage Western Cape must be notified (Tel 021 483 9685)		
Cumulative impacts: n/a.		
Residual impacts: n/a.		

In the event of any burials or human bones being found during construction of the substation or the pylon footings, work must stop in that area, and Heritage Western Cape must be notified immediately (Tel: 021 483 9685). If the remains are archaeological in nature, then the remains may be removed by an archaeologist under an emergency permit. This process will incur some expense as removal of human remains is at the cost of the developer. Time delays may result while application is made to the authorities and an archaeologist is appointed to do the work. However, if the remains relate to a grave or burial ground older than 60 years which is situated outside a formal cemetery administered by a local authority, then Section 36(3)(b) may apply. In this case, the applicant (developer) may be required to consult with local communities and individuals who have an interest in such a grave or burial ground and will be required to reach an agreement with respect to the grave. Time delays may result from such a process.

6.5 Cultural Landscape

According to Winter & Oberholzer (2013), the R354 between Matjiesfontein and Sutherland is an important tourism route and the construction of the 132kV powerline across the road, to link with the Komsberg substation, may result in negative visual impacts on the route.

Table 6: Summary of impacts to the Cultural Landscape

Nature of impact: Possible negative impacts of the construction of the Bon Espirange Substation and the power line on the R354 scenic route between Laingsburg and Sutherland		
	Without mitigation	With mitigation
Extent	Local (2)	Local (1)
Duration	Long term (4)	Long term (4)
Magnitude	High (8)	Low (4)
Probability	Improbable (2)	Very Improbable (1)
Significance	Low (28)	Very Low (9)
Status	Negative	Neutral
Reversibility	No	No

Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated?	Yes	
Mitigation: Consolidation of this substation and power line with the authorised substation for the Roggeveld Wind Farm will mitigate the potential for impacts.		
Cumulative impacts: The addition of the substation and power line is not expected to add significantly to the impact associated with the authorised the Roggeveld wind farm.		
Residual impacts: n/a.		

6.6 Cumulative Impacts

Parts of the study area enjoy very high aesthetic qualities hence the significance of the study area lies mainly with its undeveloped wilderness qualities.

The proposed Bon Espirange substation will be located some two kilometres to the west of the R354, in mountainous countryside and it is possible that it will not be visible from the road.

The 132kV line will introduce an additional powerline to the landscape and it will cross the R354, mid-way between Matjiesfontein and Sutherland. This route is considered a scenic route and an additional route may contribute minimally to cumulative impacts on the landscape. However, there are already two 400kV lines in the area and a further 765kV line has been approved.

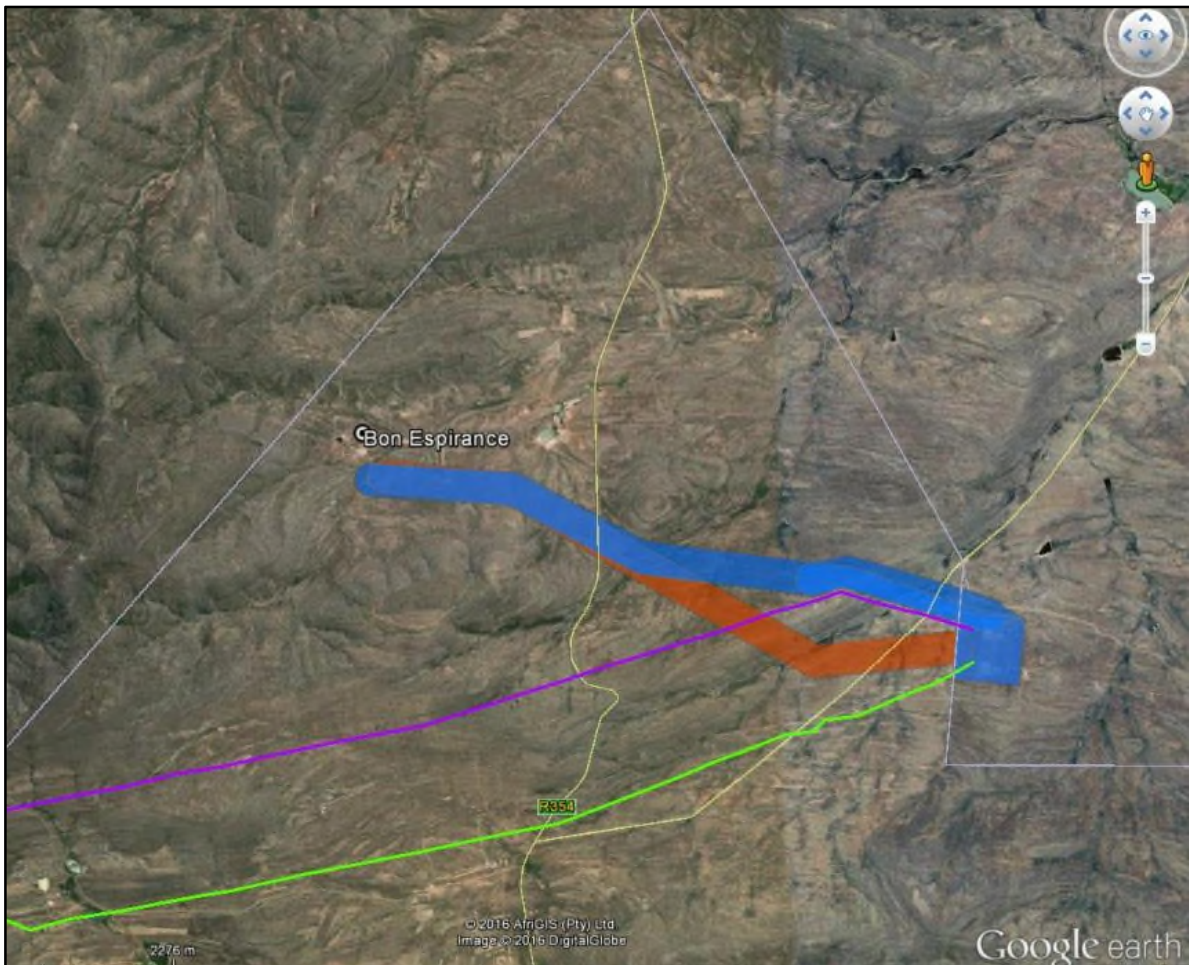


Figure 4: There are two existing 400kV powerlines (purple and green) which run immediately south of the proposed line and which also cross the R354 and connect with the Komsberg substation.

The construction of an additional powerline which will cross the R354, in tandem with two existing powerlines, will result in an increased visual impact on the road and landscape. The construction of the Bon Espirance substation, however, is unlikely to have a cumulative impact, as it will not be visible from the road.

7. CONCLUSIONS

The impacts of the proposed Bon Espirance substation are likely to be limited in view of the size of the footprint and its location some 2km to the west of the R354.

The general Roggeveld WEF area incorporates the tops of high ridges which are generally remote, exposed and inhospitable. The proposed substation and powerline will cross the lower slopes of this area. Palaeontological surveys in the Roggeveld WEF have failed to identify and significant fossil material on the surface due to the absence of bedrock exposures, except on the crests of hills and cliff faces (Miller 2010). Further Almond (2016) with respect the nearby Karusa on the Karusa Wind Farm substation has issued a letter of exemption from further studies, noting that; 'scientifically important fossil remains are very scarce within the development site'. It is therefore likely that similar low occurrences of significant fossil material will be found in the substation footprint and along the powerline route, although important remains may occur below the surface.

During previous archaeological surveys in 2011 and 2013, the tops of the high ridges were found to be generally sterile of any form of human made heritage material. The farmhouse on the Bon Espirange property and associated farm buildings are located north of the planned substation, as well as both powerline alternatives and it is anticipated that no buildings or kraals will be impacted.

The construction of an additional 132kV line across the R354, in addition to the two existing 400kV lines will add an industrial clutter to the landscape.

8. RECOMMENDATIONS

The construction of the proposed Bon Espirange substation and 132 kV powerline is supported from a heritage perspective.

It is recommended that no further work is required with the following proviso:

- Any deep excavations into the bedrock should be examined by a suitably qualified palaeontologist;
- If fossil material is encountered, the palaeontologist must be given sufficient time to recover a scientifically representative sample;
- Mitigation normally involves recording and/or collection of fossil material with a permit issued by Heritage Western Cape.
- If any concentrations of archaeological material, such as stone artefacts are recovered, Heritage Western Cape must be notified.
- If any human remains are uncovered during the excavation of tower holes, work must stop in that area and Heritage Western Cape must be alerted immediately;
- Avoid direct impacts to stone walling, stone kraals, etc. which may occur on the top of the hill near the proposed Espirange substation. While it is unlikely that these features will occur on an elevated area at a considerable distance from the farmhouse, nevertheless, the ECO should be alerted to this possibility.
- The cumulative impacts of an additional 132kV powerline, on the R354 scenic route, are likely to be minimal.

Both alternatives are acceptable. However, Alternative 1 (preferred alternative) will follow a short section of an existing servitude for a 400 kV powerline. It may be argued that it is preferable to keep infrastructure along a single servitude.

The provisions, as outlined above, must be included in the EMP.

9. REFERENCES

Almond, J. & Pether, J. 2008. Heritage Western Cape Interim Technical Report (May 2008): Palaeontological Heritage of the Western Cape. Unpublished report prepared for Heritage Western Cape.

Almond, J. 2010. Palaeontological impact assessment: pre-scoping desktop study. Proposed Mainstream wind farm to the southeast of Sutherland, Northern Cape and Western Cape Provinces. Prepared for Cape Archaeological Survey cc on behalf of Mainstream Renewable Power South Africa. Natura Viva cc.

Almond, J. 2016. Recommended letter of exemption from further palaeontological studies: Proposed construction of the Eskom Karusa switching station complex, 132kV double circuit overhead power line, Karusa facility substation complex and ancillary developments near Sutherland. Unpublished report for Savannah Environmental (Pty) Ltd.

Booth, C. 2015. Phase 1 Archaeological Impact Assessment for the proposed Karusa Facility Substation and ancillaries, near Sutherland, Karoo Hoogland Local Municipality, Namakwa District Municipality, Northern Cape. Unpublished report for Savannah Environmental (Pty) Ltd.

Booth, C. 2015b. Phase 1 Archaeological Impact Assessment for the proposed Soetwater Facility Substation, 132kV powerline and ancillaries, near Sutherland, Karoo Hoogland Local Municipality, Namakwa District Municipality, Northern Cape. Unpublished report for Savannah Environmental (Pty) Ltd.

Halkett, D. & Webley, L. 2011. Heritage Impact Assessment of the proposed Mainstream wind energy facility at the Sutherland site, Western and Northern Cape Provinces. Prepared for ERM by ACO Associates.

Hart, T., Halkett, D., Webley, L & Bluff, K. 2010. Heritage impact assessment: proposed Suurplaat wind energy facility near Sutherland, Western Cape and Northern Cape. Prepared for Savannah Environmental (Pty) Ltd. ACO Associates cc.

Hart, T. & Webley, L. 2011 & Updated 2013. Heritage Impact Assessment: Proposed Wind Energy Facility (Roggeveld), Ekkraal etc. Unpublished report for ERM SA.

Hart, T. & Kendrick, N. 2014. Heritage Impact Assessment: Kareebosch Wind farm (Phase 2) of Roggeveld Wind Farm. Unpublished report for Savannah Environmental (Pty) Ltd.

Miller, D. 2011. Appendix 2: Palaeontological Assessment: Roggeveld Wind Farm.

Patrick, M. (2009). Final Scoping Heritage Impact Assessment: Gamma-Omega 765kV transmission line. Unpublished report for PD Naidoo and associates on behalf of Eskom Holdings. Cape Archaeological Survey cc.

Winter, S. & Baumann, N. 2005. Guideline for involving heritage specialists in EIA processes: Edition 1. CSIR Report No ENV-S-C 2005 053 E. Republic of South Africa, Provincial Government of the Western Cape, Department of Environmental Affairs & Development Planning, Cape Town.

Winter, S. & Oberholzer, B. 2013. Heritage and Scenic Resources: Inventory and Policy Framework. A study prepared for the Western Cape Provincial Development Framework.



Figure 1: The proposed powerline connection is located on the R354 between Sutherland and Laingsburg, some 35 km north of Matjiesfontein and the N1.



Figure 2: The two powerline alternatives run in an easterly direction from the proposed Bon Espirance substation (small red rectangle) inside the Roggeveld WEF to the Komsberg substation, which is located immediately inside the boundaries of the Northern Cape Province.



Figure 3: The sites recorded by Hart & Kendrick (2013) around the farmhouse of Bon Espirance are related to the Built Environment.



Figure 4: The location of heritage sites recorded by Hart & Webley (2011; 2013) during a survey of the Roggeveld WEF. The sites were all located in deeply incised river valleys.