

# HERITAGE IMPACT ASSESSMENT: PROPOSED CONSTRUCTION OF THE MARALLA WEST WIND ENERGY FACILITY NEAR SUTHERLAND IN THE NORTHERN CAPE

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

**CaseID: 10183**

Prepared for:  
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WSP/Parsons Brinckerhoff

On behalf of:  
BioTherm Energy (Pty) Ltd

January 2017



Prepared by:

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## EXECUTIVE SUMMARY

### Site Name:

The Maralla West Wind Energy Facility to the east of the R354, between Laingsburg and Sutherland in the Northern Cape Province.

### Location

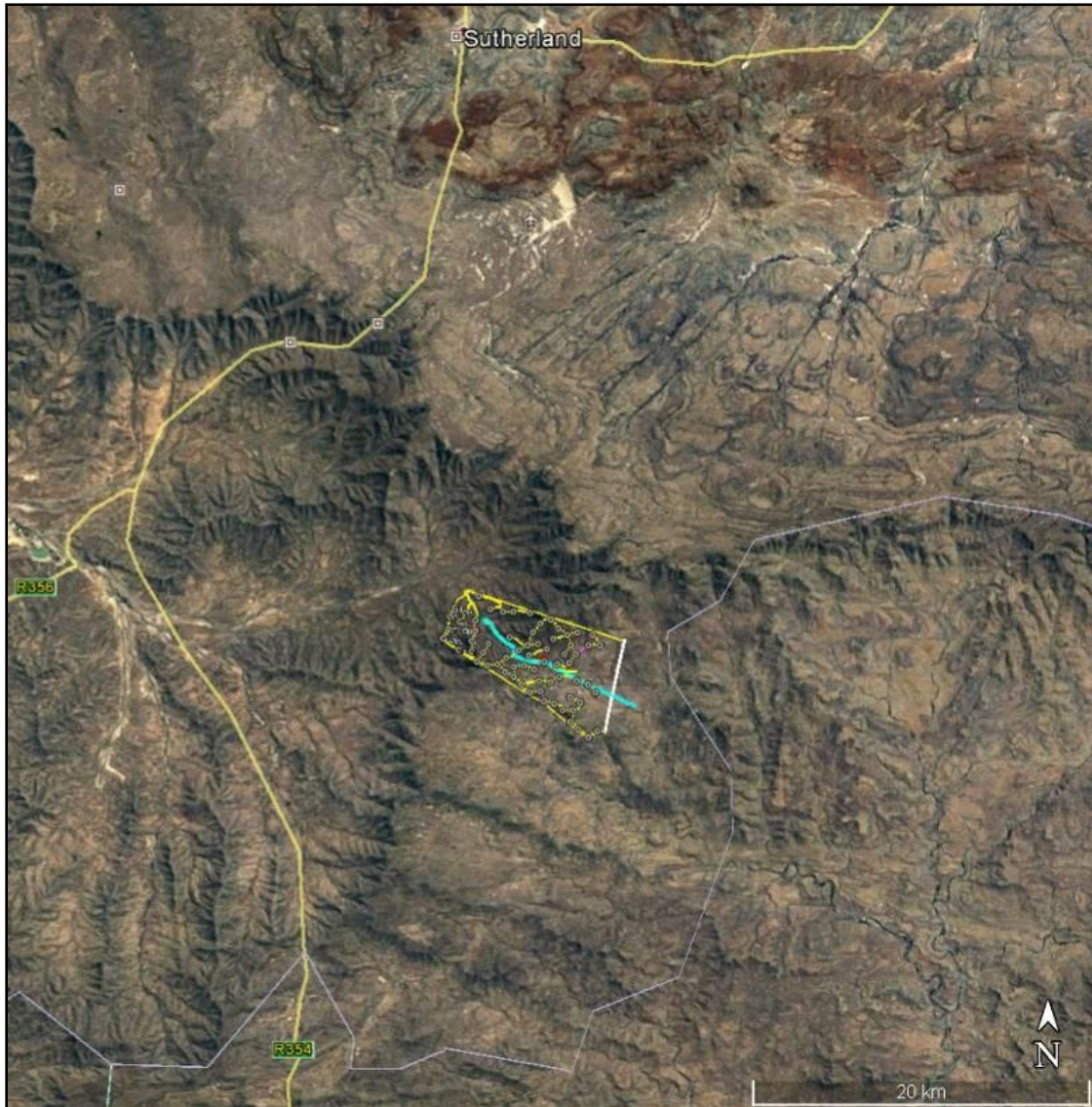


Figure: The location of Maralla West WEF below the escarpment and to the east of the R354 between Laingsburg and Sutherland. It is in the Northern Cape Province.

### South African Heritage Resources Agency

The Maralla West WEF falls inside the boundaries of the Northern Cape. The heritage authority responsible for providing comments (in terms of Section 38(8) of the NHRA) on the proposed development is the South African Heritage Resources Agency (SAHRA).

### SAHRA Interim Comment

SAHRA (CaseID:10183) have asked for an HIA including archaeological and historical heritage resources, burial grounds and graves, the palaeontological assessment conducted by Dr J

Almond, an visual impact assessment and any comments provided by the public regarding heritage resources.

### **Limitations**

- The limitations of this study are primarily related to the rough terrain, with many of the areas identified for turbines and powerline situated on the high ridges which were completely inaccessible;
- The size of the study area, and the time available for a survey, meant that a comprehensive field assessment of all heritage resources was not possible. Inferences must be drawn based on assessments conducted on adjoining farms.

### **Heritage Resources Identified: Maralla West (Northern Cape)**

#### **Palaeontology**

To be inserted by Dr John Almond

#### **Archaeology**

There is at least two concentrations of archaeological (with later, superimposed historical) sites on Maralla West, one along a stream ("River Settlement"), and the second along the public gravel road which bisects Drie Roode Heuvels (Die Kom) named "Road Settlement":

- River Settlement: There are several well-defined LSA sites with relatively abundant artefactual material (including Khoekhoen pottery) associated with water sources such as small streams and spring. These "pastoralist" sites are found on sandy river banks, often in proximity to later colonial sites. There are numerous stone kraals and abandoned stockpost dwellings in the same area;
- Road Settlement: There are remains of a large, late 19<sup>th</sup> century settlement, on Drie Roode Heuvels, on both sides of the public gravel road. It comprises a series of kraal complexes to the west of the road, as well as a threshing floor (*trapvloer*) and a wide distribution of 19<sup>th</sup> century ceramics and glass. This site has been bisected by the gravel road, as the graveyard, containing at least 12-15 Christian style graves, is located to the east of the road. There is also extensive stone walling, on both sides of the road.

There are no significant heritage resources on the high lying ridges which will accommodate the wind turbines.

#### **Built Environment**

- There is a vernacular, late 19<sup>th</sup> century cottage, next to the gravel farm road on the farm Wolven Hoek. It is 2 m from the farm road. If the access road is widened, there will be direct impacts to the building. There may also be indirect impacts if the cottage is used by contractors during the construction of the wind energy facility.

#### **Visual Impacts on the Cultural Landscape**

The cultural landscape is isolated and desolate with some areas, particularly the ridge tops where the proposed activities will take place, completely devoid of tracks and access. The sense of isolation and nature impart a distinct sense of place. Overall a Grade IIIB is recommended (medium low significance) but there are enclaves of very high aesthetic value and the view from the higher ridges are spectacular and worthy of Grade IIIA.

To be inserted by Belinda Gebhardt.

## Anticipated Impacts on Heritage Resources: Maralla West

- The widening of the public gravel road through the farm Drie Roode Heuvels (Die Kom) will result in the destruction of the settlement and graveyard next to the road;
- Widening of the access road on Maralla West will impact negatively on a vernacular cottage on the farm Wolven Hoek which is located next to the road.
- Most archaeological sites are located along river beds. The construction of access roads and underground cabling across river beds may result in the destruction of archaeological sites on the river banks;
- Informal cemeteries and graves are located close to farm houses (such as Die Kom) and due care must be undertaken when infrastructure, such as roads and underground cabling are constructed to avoid destroying them.

## Cumulative Impacts

Several renewable energy facilities have received environmental authorisation in the area around Eskom Komsberg substation, and cumulatively they may impact on the heritage resources in the area. This report consulted the following HIA reports:

- The Suurplaat Wind Energy facility (Hart et al. 2010)
- The Roggeveld Wind Energy facility (Hart & Webley 2011, 2013)
- The Sutherland WEF facility (Halkett & Webley 2011 & 2016)
- The Kareebosch Wind Energy facility (Roggeveld Phase 2) (Hart & Kendrick 2015)
- The Hidden Valley Wind Energy facility (Phases 1, 2 & 3) (Booth 2012)
- The Komsberg Wind Energy Facility (Hart 2016).

The cumulative impacts of several renewable energy facilities within a 70km radius on the heritage of the Maralla West WEF are acceptable if the required mitigation measures are implemented. If the heritage resources are not directly impacted, then they will still be available for the public, tourists and academics to enjoy.

However, it is the indirect, cumulative visual impact of the renewable energy facilities on the Cultural Landscape of the area which is more difficult to quantify. Due to the size of the turbines, and landscape scarring that will result from road construction, the impact of the proposed activity will be of high significance.

## Comments from Interested and Affected Parties

STAKEHOLDER DETAILS	COMMENT	SPECIALIST RESPONSE
SAHRA	The pending HIA must take into consideration the following aspects: archaeological and historical heritage, burial grounds and graves, detailed Palaeontological Impact Assessment, Visual Impact of the proposed development, and any comments by the public regarding heritage resources	These are addressed in the HIA
DEA&DP (Western Cape) have responded to the Scoping HIA requesting:	"The final WEF layout must be subjected to an intensive heritage and archaeological survey and impact assessment, as per the specialist recommendations. All resulting micro-sitting mitigation measures identified must be reported on the in Draft EIA Report".	It is not possible to do an intensive survey at the EIA phase, as the final layout of the facility has not been finalised. The walk-down of the most sensitive area must take place during the EMPPr.
Mr B Kleinbooi has commented:	"There is also a graveyard that we want protected"	The exact location of the graveyard which Mr Kleinbooi is referring to is

		unknown. Several graveyards were recorded during the survey. They will all be protected.
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DEA&DP as well as some of the local landowners have raised the matter of the accumulative impacts of the authorized renewable energy facilities on the landscape. DEA&DP endorses the recommendations of the visual expert with respect avoiding placing turbines on prominent ridgelines on the landscape. In addition, that steep slopes, which are visually sensitive, should be excluded from the development footprint. Farmers have noted that the cumulative impacts of the wind energy facilities are that they will “industrialize the Karoo” and “destroy a massive part of the Karoo”.

**No-Go Areas**

The following highly sensitive areas have been identified and they must be declared *no-go* areas during the construction:

- The vernacular cottage on the farm Wolven Hoek;
- LSA sites with pottery along a river bed;
- Remains of a late 19<sup>th</sup> century settlement (including graveyard) on both sides of the public gravel road on Drie Roode Heuvels (Die Kom) on Maralla West.

**The following heritage recommendations are proposed**

The following highly sensitive areas have been identified and they must be declared no-go areas during construction:

- The vernacular cottage on the farm Wolven Hoek;
- River Settlement - LSA sites with pottery along a river bed;
- Road Settlement - Remains of a late 19<sup>th</sup> century settlement (including graveyard) on both sides of the public gravel road on Drie Roode Heuvels (Die Kom) on Maralla West.

The following recommendations are proposed:

- No-Go areas should be avoided;
- If there are any significant changes to the layout of the wind turbines, then a walk down of the proposed facility is recommended as part of the EMPr;
- It is recommended that there is a walk down of all river crossings during the EMP phase of the project, once the final location of the access roads and cable crossings has been finalised, to ensure that no heritage resources are destroyed;
- If any archaeological remains, including human remains, are uncovered during construction, then work must stop in that area and the responsible heritage authorities (SAHRA or Heritage Western Cape) must be notified;
- The potential visual impacts of the proposed facility on the heritage resources of the area (i.e. the results of the VIA), must be integrated with the heritage study. It is assumed that a buffer will be required along the R354, as the road between Matjiesfontein and Sutherland is considered a scenic tourism route.

**Author/s and Dates**

Lita Webley  
John Almond  
Belinda Gebhardt

ACO Associates cc  
Natura Viva cc

Archaeology  
Palaeontology  
Visual Impact Assessment

## 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
MSA	Middle Stone Age
NHRA	National Heritage Resources Act
SAHRA	South African Heritage Resources Agency
WEF	Wind Energy Facility

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**Figure 2:** The distribution of heritage sites is shown as red dots, our field survey tracks are not shown in this map for reasons of clarity. The yellow lines (within the yellow boundary lines) are the access roads and underground cabling connecting the turbines. The heritage sites concentrate in the valley floors, near sources of water.

**Figure 3:** The location of the Wolvenhoek and Die Kom farmhouses within the Maralla West WEF. Both include buildings older than 60 years which are protected in terms of the NHRA.

**Figure 4:** A landscape assessment by Winter & Oberholzer (2013) identifies the R354 (purple line) as a route of high scenic and rural value and an important tourist route to Sutherland (Route III). The abbreviation Knl.6 represents the Klein Roggeveldberge which is described as lying on an important scenic tourist route between Matjiesfontein on the N1 and Sutherland on the plateau (Grade III).

**Figure 5:** The proposed on-site powerline to the red substation crosses over a small stream with several LSA sites which may be impacted.

**Figure 6:** Note the concentration of sites on both side of the gravel road which runs through Drie Rode Heuvels. Although not directly impacted, any widening of the road will result in damage to the graveyard next to the road.

**Figure 7:** The access road and underground cabling will run within a few metres of the Wolvenhoek farmhouse (Plate 3). Any widening of the access road will result in destruction of the house (to the north of the road) or the stone kraal (to the south of the road).

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## 1 INTRODUCTION

ACO Associates cc was appointed by WSP/Parsons Brinckerhoff on behalf of BioTherm Energy (Pty) Ltd to undertake a Heritage Impact Assessment for the construction of the Maralla West Wind Energy Facility between Laingsburg and Sutherland in the Northern Cape Province (**Figure 1**).



**Figure 1:** The boundaries of the Maralla West WEF in yellow. They fall within the boundaries of the Northern Cape. The onsite substations are shown in blue and red, and the powerline connection to the substation in blue. Most turbines are placed in the higher ground. The terrain is very mountainous and cabling and roads need to cross valleys and river beds.

### 1.1 Scope of Work

This Heritage Impact Assessment considers the potential impacts of the proposed construction of a wind energy facility on the Remaining extent of Drie Roodeheuvels 180; Portion1 of Wolven Hoek 182; Portion 2 of Wolven Hoek 182 (**Figure 1**). The HIA specifically considers:

- The potential impacts on the palaeontological resources of the area (Dr John Almond);
- The potential impacts of the WEF on the archaeology and history of the site;
- Impacts on graves and cemeteries;
- Visual impacts of the proposed facility on the heritage of the area (Ms Belinda Gebhardt);
- and
- Addresses any comments of the public with regard impacts to heritage resources.

This impact assessment is based on the knowledge which has been accumulated from heritage impact assessment undertaken in surrounding areas as well as a site visit in March 2016.

## **1.2 Objectives of the Report**

The objectives of the report are to:

- Identify any potential impacts which may result from the proposed construction of the wind energy facility and associated infrastructure;
- Determine the significance of the heritage resources;
- Provide recommendations for mitigation of impacts.

## **1.3 Legislative Framework**

While the National Department of Environmental Affairs is the decision making authority acting in terms of the National Environmental Management Act (Act 107 of 1998) (NEMA) and Regulations (2014), they must ensure that the evaluation of the statutorily defined broad range of heritage resources fulfils the requirements of the relevant heritage resources authority in terms of Section 38 (3) of the National Heritage Resources Act (Act 25 of 1999) (NHRA) and that any comments and recommendations of the relevant heritage resources authority with regard to proposed development have been taken into account prior to the granting of the consent.

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

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)).

### **1.3.1 Structures (Section 34(1))**

No person may alter or demolish any structure part of a structure which is older than 60 years without a permit issued by SAHRA or HWC, i.e. the responsible provincial heritage resources authority.

### **1.3.2 Archaeology & Palaeontology (Section 35(4))**

No person may, without a permit issued by SAHRA, destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or palaeontological site or any meteorite.

Archaeological is defined as: “material remains resulting from human activity which is in a state of disuse and is in or on land and which is older than 100 years, including artefacts, human and hominid remains and artificial features and structures”.

Palaeontological is defined as: “any fossilised remains or 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”.

### **1.3.3 Burial Grounds and Graves (Section 36(3))**

No person may, without a permit issued by the South African Heritage Resources Authority (SAHRA), destroy, damage, alter, exhume or remove from its original position or otherwise disturb any grave or burial ground older than 60 years, which is situated outside a formal cemetery administered by a local authority.

### 1.3.4 Grading

The significance of heritage resources is assessed according to the grading criteria established by the National Heritage Resources Act, No 25 of 1999.

**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.

The subdivision of Grade III sites has been introduced in the Western Cape to facilitate significance grading at the local level.

### 1.3.5 Heritage Authority

The Maralla West WEF falls inside the boundaries of the Northern Cape Province. The heritage authority responsible for providing comments (in terms of Section 38(8) of the NHRA) on the proposed development is SAHRA.

SAHRA is required to provide comment on the proposed project to facilitate final decision making by the Department of Environmental Affairs (DEA).

SAHRA has issued an interim comment requesting the pending HIA must take into consideration the following aspects: archaeological and historical heritage, burial grounds and graves, detailed Palaeontological Impact Assessment, Visual Impact of the proposed development, and any comments by the public regarding heritage resources.

## 1.4 Study Approach and Methodology

This study has been commissioned as Heritage Impact Assessment.

It includes a review of the published material as well as unpublished reports on the SAHRIS database. The 1:50 000 maps of the area as well as Google Earth aerial images were consulted. Numerous impact assessments have been conducted in proximity to the proposed facility as

reflected on the SAHRIS database. Little was known of the archaeology of the study area until recently, when the area was identified as suitable for wind farm development. The following CRM reports provide valuable information on the heritage resources of the area and were consulted:

- The Suurplaat Wind Energy facility (Hart et al. 2010)
- The Roggeveld Wind Energy facility (Hart & Webley 2011, 2013)
- The Sutherland WEF facility (Halkett & Webley 2011 & 2016)
- The Kareebosch Wind Energy facility (Roggeveld Phase 2) (Hart & Kendrick 2015)
- The Hidden Valley Wind Energy facility (Phases 1, 2 & 3) (Booth 2012)
- The Komsberg Wind Energy facility (Hart 2016).

## **1.5 Assumptions**

This impact assessment is based on the knowledge which has been accumulated from heritage impact assessment undertaken in surrounding areas as well as a site visit in March 2016. It assumes that the heritage resources on Maralla West are like the surrounding areas.

## **1.6 Limitations to this study**

- Due to the mountainous nature of the terrain, only a small percentage of the proposed locations for the wind turbines could be assessed;
- Due to time constraints, an exhaustive field survey was not possible and various sensitive locations were sampled during this study. Many archaeological sites are probably undetected. Graves are difficult to identify, if they are not within a formal graveyard. Numerous cairns were recorded during the survey, but many more may occur. It is possible that they represent graves, but we can only be certain of this once construction uncovers them;
- The resolution on aerial photography (Google Earth) is not sufficiently high to identify all stone structures (including kraals), archaeological sites or graves. We are limited to our field assessment of the study area.

## **1.7 Declaration of Independence**

Lita Webley is an archaeologist (PhD from the University of Cape Town 1992) with ACO Associates cc and has been conducting Heritage Impact Assessment and archaeological specialist studies in the Western Cape, Northern Cape and Eastern Cape Provinces since 1996. She is a member of the Archaeology, Palaeontology and Meteorites Committee and the Impact Assessment Committee of Heritage Western Cape (HWC), the Provincial Heritage Resources Authority. She is accredited as a Principal Investigator by the Association of Southern African Professional Archaeologists (ASAPA) CRM section as follows:

- Principal Investigator: Stone Age, Shell Middens and Colonial Period; and
- Field Director: Grave Relocations.

ACO Associates cc has no financial or other interest in the proposed development and will derive no benefits other than fair remuneration for consulting services provided.

David Halkett (BA, BA Hons, MA (UCT)) is an Archaeologist and Member of the Association of Professional Archaeologists of Southern Africa (ASAPA) and accredited with Principal Investigator status. He has been working in heritage management for 23 years and has considerable experience in impact assessments with respect to a broad range of archaeological and heritage sites in the Northern Cape.

## SPECIALIST DECLARATION

I, Lita Webley, declare that –

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have potential of influencing – any decision to be taken with respect to the application by the competent authority; and – the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- All the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offense in terms of regulation 71 and is punishable in terms of section 24F of the Act.

Signature of specialist



Specialist Field: Archaeology and Heritage

Name of Company: ACO Associates

## 2 DESCRIPTION OF THE PROJECT

The two proposed Maralla wind energy facilities (Maralla East and Maralla West), each of 250MW, are located 33km south of the town of Sutherland. The site access to Maralla West is via a gravel road off the R354. It comprises the following farms:

- Remaining extent of Drie Roodeheuvels 180;
- Portion 1 of Wolven Hoek 182;
- Portion 2 of Wolven Hoek 182.

The boundary dividing Maralla West WEF from Maralla East runs through the centre of the farm Drie Roodeheuvels 180 (**Figure 1**).

Each Wind Farm will comprise:

- “Up to 125 wind turbines generators with a generating capacity of between 2 and 4MW each. The turbines will have a hub height of up to 120m and rotor diameter of up to 150m.
- Concrete foundation to support the turbines
- Onsite 132kV Substation, with the transformers for voltage step up from medium voltage to high voltage. Substation will occupy an area of 150mx 150m

- The medium voltage collector system will comprise of cables (1kV up to and including 33kV) that will be run underground, except where a technical assessment suggest that overhead lines are applicable, in the facility connecting the turbines to the onsite substation
- A laydown area for the temporary storage of materials during the construction activities.
- The laydown area will be a maximum of 4ha in size
- Permanent laydown for turbine crane platforms
- Haul roads between 4 – 6m wide. Double width roads required in strategic places for passing
- Temporary site compound for contractors

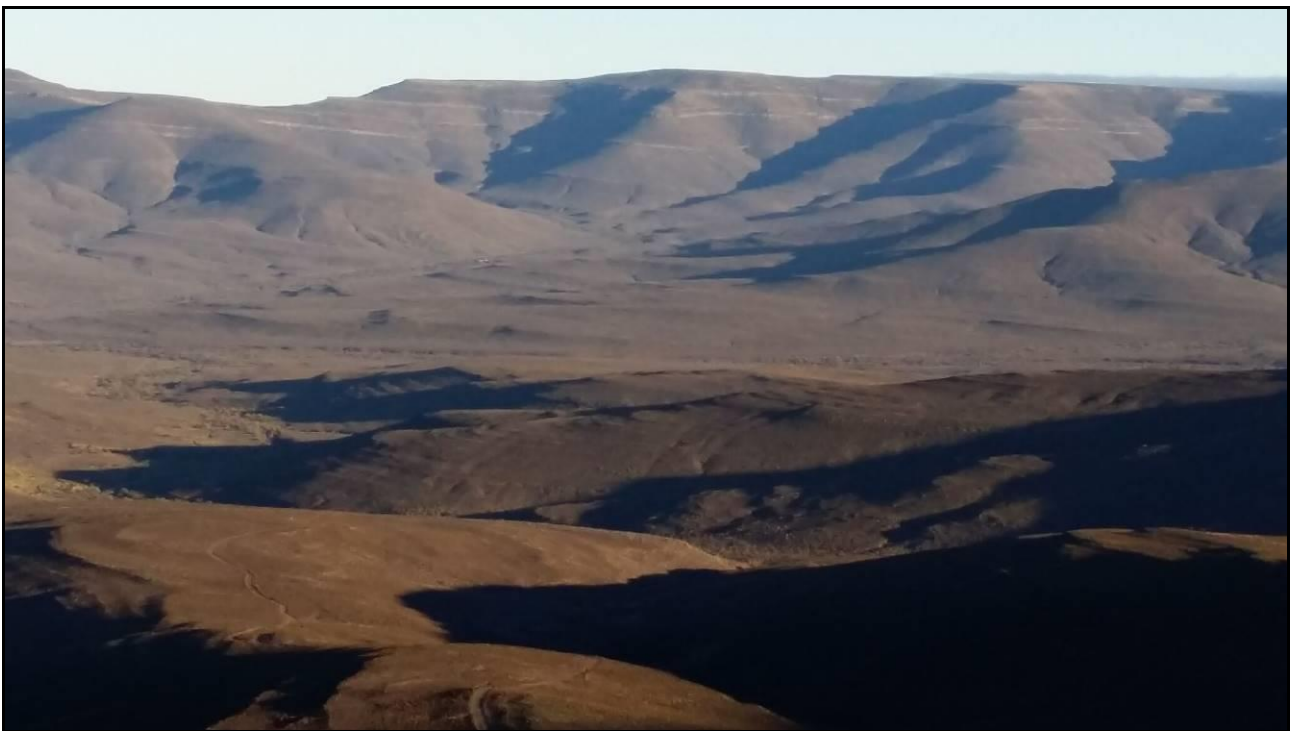
Operations and maintenance compound area including O&M building, car park and storage area”

The Maralla West WEF will have a 33/132kV powerline connection from the Onsite IPP substation to the Common Eskom substation, with a 250m wide corridor. The Common Eskom substation and Powerline will be assessed through a separate Basic Assessment Process.

### 3 DESCRIPTION OF THE AFFECTED ENVIRONMENT

The Study Area is located some 35km south-east of Sutherland, beneath the plateaux. The old road to Sutherland including the Komsberg pass runs through the Maralla West WEF and provides access to the plateaux. The western section of the WEF is particularly rugged and inaccessible (Plate 1).

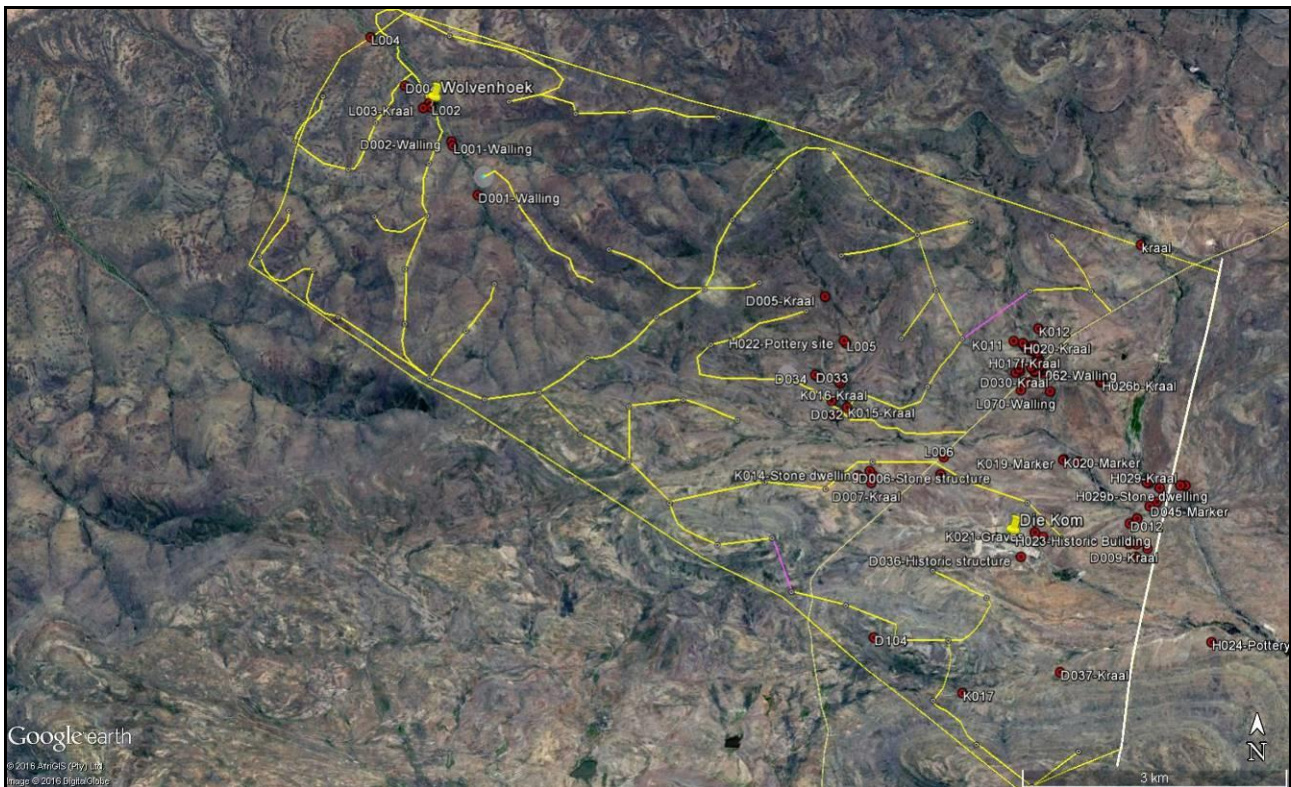
There are several small, unnamed streams which run through the Maralla West WEF, but the main drainage channels occur on the Maralla East WEF (e.g. the Venters, Komsberg and Riet Rivers). Old settlements tend to focus on the water resources and along river valleys. These areas contain numerous kraals, located near water and built against the rocky ridgelines along the valley sides.



**Plate 1:** View towards the farm Wolven Hoek, on the western edge of the Maralla West WEF

## 4 FINDINGS FOR THE MARALLA WEST WEF

The study area was surveyed twice, once for the Sutherland WEF (Halkett & Webley 2011) in 2011 and for a second time in 2016 with the fieldwork for Maralla West WEF (**Figure 2**). In addition, surveys by academics from the Archeology Department at the University of Cape Town have increased our knowledge of the distribution of heritage resources in the area. The surveys have confirmed the fact that the heritage resources are concentrated in the valleys and that there has been re-occupation of the area over many hundreds of years, with colonial (late 19<sup>th</sup> century ruins overlaying archaeological sites).



**Figure 2:** The distribution of heritage sites is shown as red dots, our field survey tracks are not shown in this map for reasons of clarity. The yellow lines (within the yellow boundary lines) are the access roads and underground cabling connecting the turbines. The heritage sites concentrate in the valley floors, near sources of water.

### 4.1 Palaeontology

A palaeontological impact assessment (PIA) of the site was commissioned as part of a comprehensive HIA for BioTherm Energy (Pty) Ltd. The detailed PIA is attached separately.

### 4.2 Archaeology

Recent surveys by heritage practitioners as well as academics from the University of Cape Town have increased our knowledge of the archaeology of the area. The field survey identified the following heritage resources:

The archaeological resources are described in detail in the AIA document which is attached. Briefly they include:

There is at least two concentrations of archaeological (with later, superimposed historical) sites on Maralla West, one along a stream (“River Settlement”), and the second along the public gravel road which bisects Drie Roode Heuvels (Die Kom) named “Road Settlement”:

- River Settlement - There are several well-defined LSA sites with relatively abundant artefactual material (including Khoekhoen pottery) associated with water sources such as small streams and spring. These “pastoralist” sites are found on sandy river banks, often in proximity to later colonial sites. There are numerous stone kraals and abandoned stockpost dwellings in the same area;
- Road Settlement - There are remains of a large, late 19<sup>th</sup> century settlement, on Drie Roode Heuvels, on both sides of the public gravel road. It comprises a series of kraal complexes to the west of the road, as well as a threshing floor (*trapvloer*) and a wide distribution of 19<sup>th</sup> century ceramics and glass. This site has been bisected by the gravel road, as the graveyard, containing at least 12-15 Christian style graves, is located to the east of the road. There is also extensive stone walling, on both sides of the road.

There are no significant archaeological resources on the high lying ridges which will accommodate the wind turbines.

### 4.3 Historical Background



**Figure 3:** The location of the Wolvenhoek and Die Kom farmhouses within the Maralla West WEF. Both include buildings older than 60 years which are protected in terms of the NHRA.

The Roggeveld and Sutherland area were settled from as early as 1750 (Schoeman 1986; Penn 2005). The early farmers found the escarpment, which enjoys the highest rainfall, particularly suitable for small stock farming during the summer months but they moved down into the valleys and plains of the Karoo to escape the extreme winters. Drought, poor grazing and attacks by the San caused many farms to be abandoned. Per Penn (2005), in the 18<sup>th</sup> century there were numerous independent Khoekhoen kraals located amongst the *Trekboer* farms in the Roggeveld. While the violent conflict between the various groups has been well documented, very little is known of the peaceful interaction and assimilation which took place over the last 200 years.



The Built Environment of the area is characterised by farmhouses (some containing an inner core dating to the 19<sup>th</sup> century), barns, stone kraals, shepherds stockposts, etc. The generic house comprised a “small oblong low hut” built of slabs of *leiklip* piled on top of each other, un-plastered, with a reed roof. However, very few of these structures have been preserved. A fine example, although much altered, of a 19<sup>th</sup> century vernacular farmhouse can be found on Wolven Hoek (Maralla West WEF). Some of the stone structures described above under pre-colonial settlements, may in fact represent colonial-era stockposts. They are generally identified by associated historic ceramics and glass. These colonial settlements are invariably found in river valleys, close to a permanent source of water.

#### 4.3.1 The following farms are on the Maralla West WEF

- **Drie Roode Heuwels 180:** An earlier circular loan farm granted to SJ Botma (who also owned Schalkwykskraal) in 1838. It then passed into the hands of a Maritz, Moller and de Vos. It was subdivided in the 1930's. The historic farmhouse of Die Kom (Plate 2) has been renovated by the new owners.



**Plate 2:** The farmhouse of Die Kom on the farm Drie Roode Heuwels (2011). Since this photograph, the house has been substantially renovated and restored.

- **Annex Drie Roode Heuwels 181:** Granted to Abraham le Roux (who also owned Schalkwykskraal, Wolvenhoek and Schietfontein) in 1893. This portion of land was originally part of Wolvenhoek and subsequently incorporated into Drie Roode Heuwels;
- **Wolvenhoek 182:** Surveyed in 1893 and originally granted to Abraham le Roux. Thereafter the property was owned by a number of different families including Theron, Brink and van Wyk. It was subdivided in 1939. There is a late 19<sup>th</sup> century vernacular cottage on the property, right next to the access road (Plate 3). The house has been partially renovated, with a bathroom added to the back. It retains, however, many of its original features.



**Plate 3:** The abandoned farmhouse at Wolven Hoek, which probably dates to the late 19<sup>th</sup> century, has been partly restored. It is older than 60 years and protected in terms of the NHRA. It is located within 2m of the farm access road.

#### 4.4 Cemeteries and Graves/Cairns

Farm cemeteries and graves have been recorded in the Maralla West WEF study areas. The cemeteries are generally closely associated with farm settlements such as at Die Kom (Drie Roode Heuvels). In some cases, the cemetery is situated in proximity to a ruined settlement and is no longer easily identified, as is the case on Drie Roode Heuvels, where the current gravel road to the escarpment bisects and old settlement and graveyard.



**Plates 4 & 5:** There are approximately 15 overgrown graves marked by stone cairns and head and footstones next the road. Any widening of the road will result in destruction of the graveyard.

There are also several isolated graves in the veld, many of them covered with flat slabs and without headstones. These are very difficult to identify and the list provided in Tables 2 may not be comprehensive.

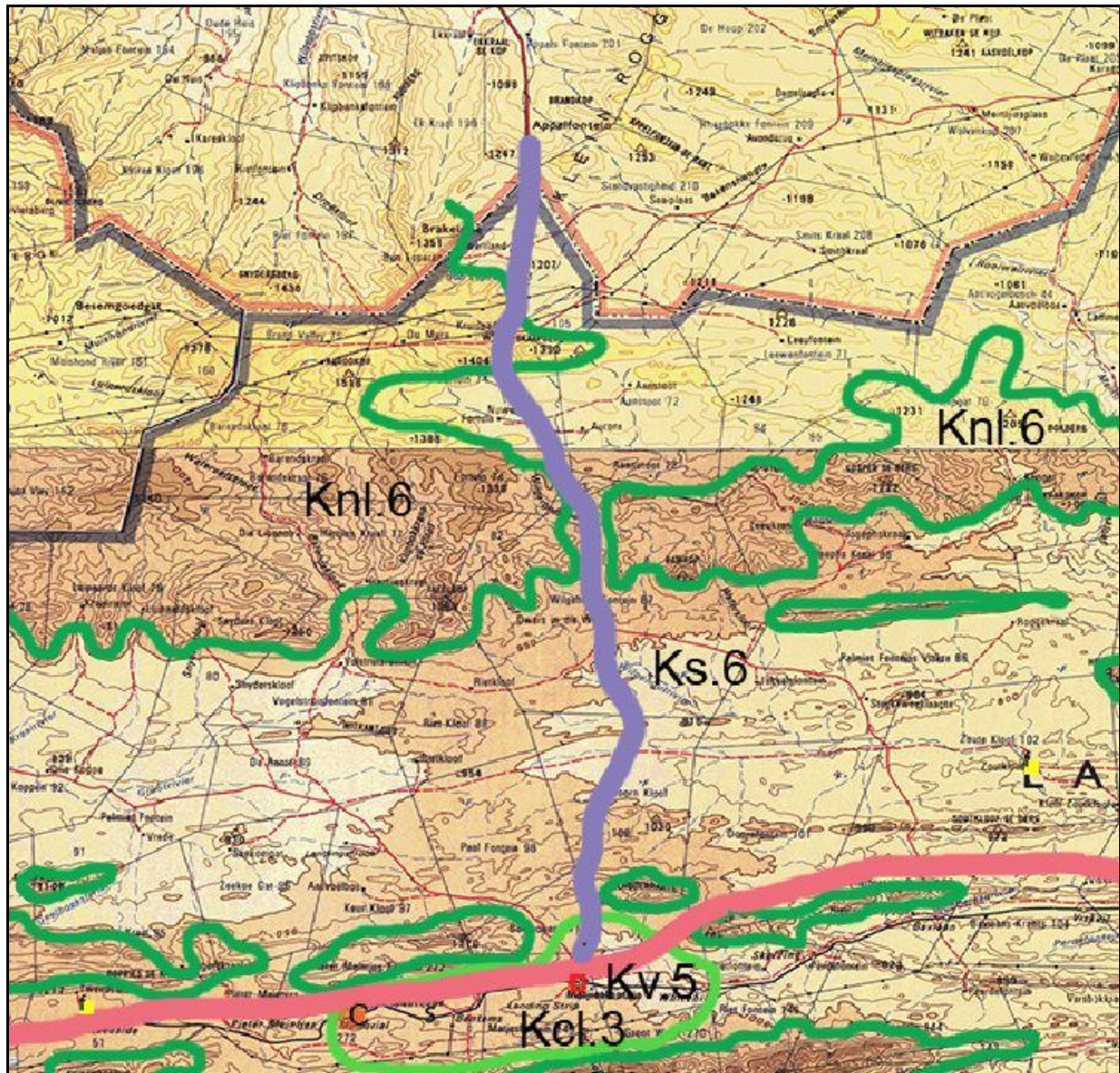
#### 4.5 Landscape and Scenic Routes

Hart (2016) describes the Cultural Landscape of the region thus: "The ridge tops where the proposed activities will take are windswept and bleak; some areas are completely devoid of farm tracks making access to the higher mountain areas a tortuous task. The sense of isolation, nature and desertification do impart a certain beauty and distinct sense of place. Overall a Grade III B is

recommended (medium local significance), however there are enclaves of high aesthetic value and views from the higher ridges are spectacular and worthy of Grade IIIA”.

Per Winter & Oberholzer (2013), the R354 between Matjiesfontein and Sutherland, 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 and is considered of Route III significance.

Webley & Halkett (2016) have given this landscape a preliminary field grading of IIIB to IIIA as the study area is remarkably intact and deeply layered.



**Figure 4:** A landscape assessment by Winter & Oberholzer (2013) identifies the R354 (purple line) as a route of high scenic and rural value and an important tourist route to Sutherland (Route III). The abbreviation Knl.6 represents the Klein Roggeveldberge which is described as lying on an important scenic tourist route between Matjiesfontein on the N1 and Sutherland on the plateau (Grade III).

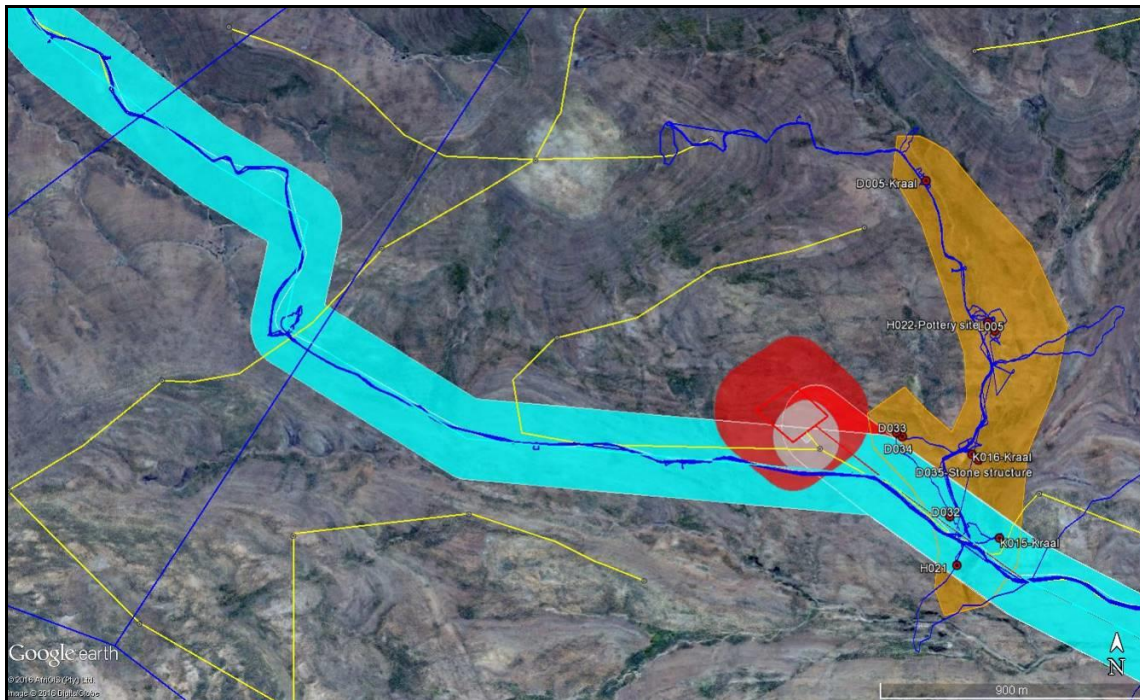
The VIA report by Belinda Gebhardt is attached separately.

#### 4.6 Anticipated Impacts to the heritage of the area

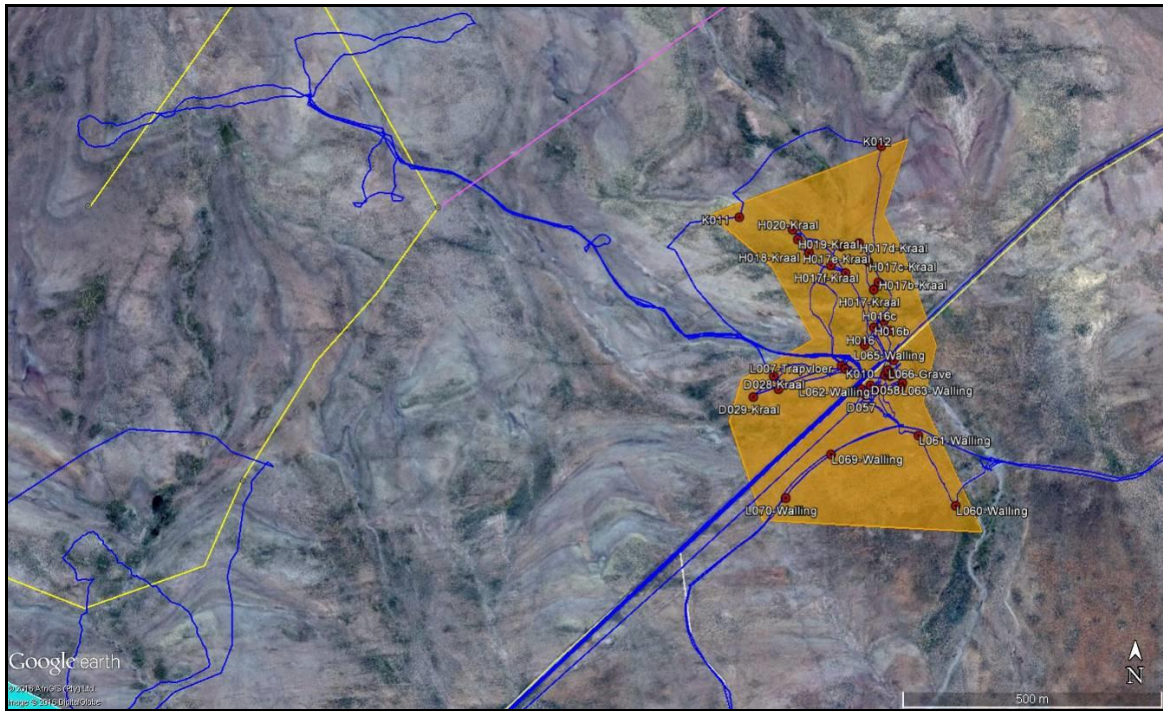
##### 4.6.1 Construction Phase

It is expected that most of the damage to the heritage resources on Maralla West will occur during construction. Heritage sites are concentrated along river valleys, while the turbines are generally located along the tops of the mountain ridges. Therefore, the following activities may result in direct impacts to the landscape and any heritage that lies on it:

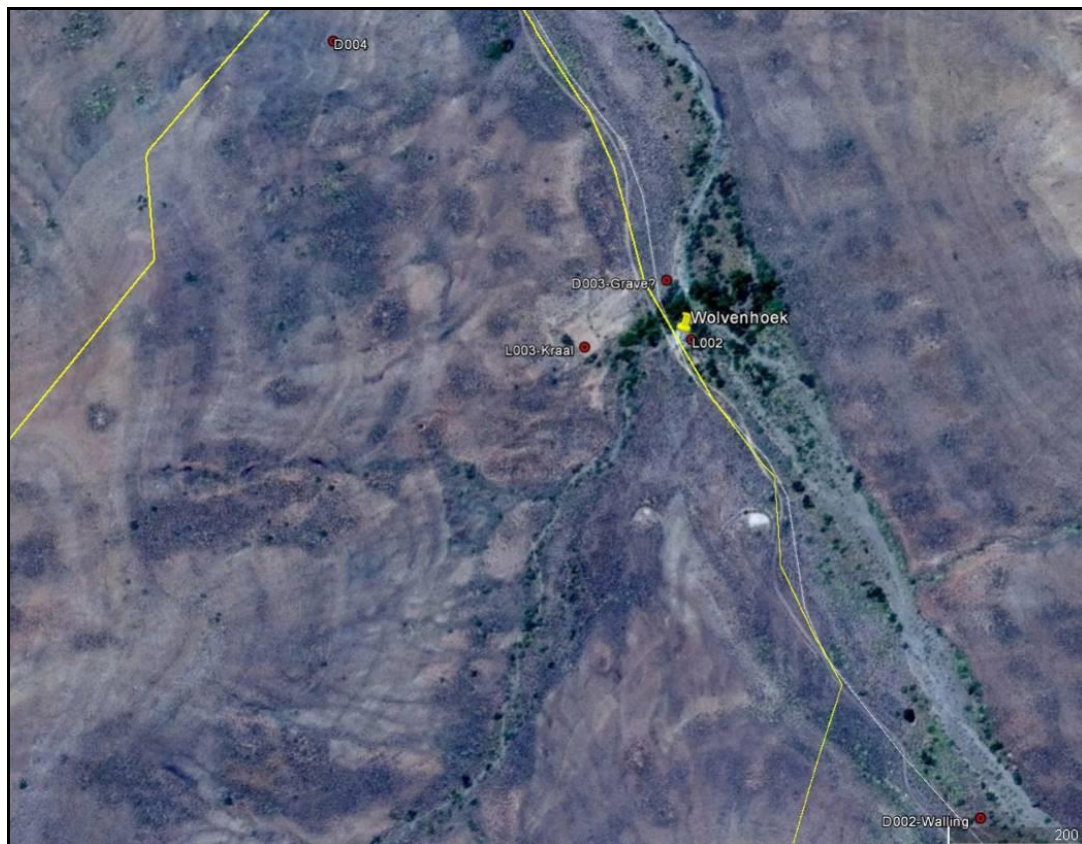
- Bulldozing of roads, or excavation of linear trenches for cables, through river valleys to the turbine sites. This may result in the destruction of archaeological sites or graves on the banks of rivers;
- Upgrading of existing roads particularly where they cut through river valleys or are in close proximity to ruined settlements and graves or existing settlements (i.e. farmhouse of Wolven Hoek);
- Construction of electrical infrastructure in the form of substations.



**Figure 5:** The proposed on-site powerline to the red substation crosses over a small stream with several LSA sites (River Settlement) which may be impacted. The orange polygon indicates a sensitive area.



**Figure 6:** Note the concentration of sites on both side of the gravel road which runs through Drie Rode Heuvels. Although not directly impacted by any of the Wind Farm infrastructure, any widening of the road will result in damage to the graveyard next to the road. The orange polygon indicates a sensitive area.



**Figure 7:** The access road and underground cabling will run within a few metres of the Wolvenhoek farmhouse (Plate 3). Any widening of the access road will result in destruction of the house (to the north of the road) or the stone kraal (to the south of the road).

#### 4.6.2 Operational Phase

During the operational phase of the wind facility the only risks are potential vandalism of heritage sites by staff of the wind facility(s). This includes stripping of fittings from abandoned farm buildings, careless damage to kraal walls, graffiti on rock art sites, etc. No further impacts to heritage would occur during operation of the currently proposed facility, although any expansion to the facility (effectively a new construction phase), would introduce new impacts.

- The potential adaptive re-use of the Wolven Hoek or Die Kom farmhouses (Plates 2 & 3) may result in vandalism and damage.

#### 4.6.3 Decommissioning Phase

The decommissioning phase of the wind farm facilities may include the dumping of electrical infrastructure on heritage sites. At this stage, indirect impacts to heritage resources that were felt during construction and operation can be reduced or removed with the successful rehabilitation of the site. Direct impacts to heritage resources would, however, remain the same. These impacts are all considered to be negative.

### 5 ASSESSMENT OF IMPACTS

This study notes that the proposed wind turbines are located on high lying ridges and hills and that these areas are generally devoid of heritage resources.

The most significant heritage sites, both colonial settlements and archaeological sites, are located in river valleys and kloofs, and they will not be impacted by the construction of the turbines. However, impacts may occur when access roads, underground cabling or powerlines cross these river valleys/kloofs. This is where careful placement of the access roads through river valleys will be required.

In general, heritage resources are non-renewable, and once they are destroyed they cannot be recovered or re-introduced. This applies to palaeontological and archaeological resources, buildings that are older than 60 years as well as cemeteries and graves. It is therefore important that heritage resources are identified and their significance assessed prior to development.

It is preferable that archeological sites are conserved. Mitigation, in the form of archaeological excavations, means that while the material may have been retained and while conserved in a museum, the context of the archaeological site has been lost forever.

**Table 3:** No-Go areas to be avoided

Maralla West - No-Go									
Potential Impact	Mitigation	Extent (E)	Duration (D)	Magnitude (M)	Probability (P)	Significance (S=(E+D+M)*P)	Status (+ve or -ve)	Confidence	
To ruined settlement (Road Settlement) and graveyard on public access road through De Kom	Nature of impact:	Negative - destruction of a graveyard							
	Without Mitigation	2	5	8	4	60	Medium	-	High
	degree to which impact can be reversed:	Heritage resources are non-renewable and impacts cannot be reversed							
	degree of impact on irreplaceable resources:	High impacts on graveyard							
	Mitigation Measures	Avoid widening the public access road at this section of the road							
	With Mitigation	1	5	2	2	16	Low	-	High
Impacts to LSA sites along river bed (River Settlement)	Nature of impact:	Negative - destruction of LSA archaeological sites of significance							
	Without Mitigation	2	5	6	3	39	Medium	-	Medium
	degree to which impact can be reversed:	Heritage resources are non-renewable and impacts cannot be reversed							
	degree of impact on irreplaceable resources:	High impacts on archaeological sites of significance							
	Mitigation Measures	Micro-siting of access roads, underground cabling through river beds							
	With Mitigation	1	5	4	2	20	Low	-	Medium
Impacts to the farm house of Wolven Hoek	Nature of impact:	Negative - indirect impacts to house or direct impacts to river beds							
	Without Mitigation	2	5	6	4	52	Medium	-	High
	degree to which impact can be reversed:	Heritage resources are non-renewable and impacts cannot be reversed							
	degree of impact on irreplaceable resources:	High							
	Mitigation Measures	Re-route the access road to avoid impacting on the house or stone kraal							
	With Mitigation	1	5	4	2	20	Low	-	High

With respect to cemeteries and graves, any impacts which result in a disturbance to a grave are considered high. They are best avoided by development. An extensive consultation process with interested and affected parties is required if exhumation is considered. Apart from the family graveyard on Die Kom, which is fenced and not under any direct threat, there is the informal graveyard next to the gravel access road (Figure 6; Plates 4 & 5) which will be damaged or destroyed if the road is widened. *All graveyard and graves should be declared “No-Go” areas.*

Historic structures, such as abandoned farmhouses (such as Wolven Hoek) are sensitive to physical damage such as demolition as well as neglect. They are also context sensitive, in that changes to the surrounding landscape will affect their significance.

In the case of the proposed wind energy on Maralla West, it is expected that impacts to heritage will be moderate to high, if the most sensitive areas are not avoided.

With respect the proposed wind energy facility, the probability of encountering heritage sites is “probable” and the severity impact is likely to range between “low” on the tops of the ridges and “moderately severe” in the river valleys.

## 6 MITIGATION AND MANAGEMENT MEASURES

- Construction
- The access road and underground cabling which run within a few metres of the Wolven Hoek farmhouse must be relocated. This will require careful placement, since there is a stone kraal on the opposite side of the road;
- Since heritage resources (in particular LSA sites with pottery) are concentrated in the river valleys, it is important that access roads and underground cabling is carefully placed to

avoid negative impacts to heritage sites along rivers. This will require a final walk down during the EMP phase, of all river crossings;

- The gravel farm road which bisects Drie Rode Heuvels, has cut through an historic ruined settlement, separating the ruins from the graveyard. Any widening of the gravel road will result in the destruction of the graves;
- If any human remains are uncovered during the excavations for the Wind Farm, work must stop in that area and SAHRA must be alerted immediately.

Activity	Mitigation and management measure	Responsible Person	Applicable Development Phase	Include as Condition of Authorisation	Monitoring requirements
Construction	Change route of access road to avoid passing within 10m of the Wolven Hoek farmhouse, kraal and outbuildings		EIA	Yes	No
	Avoid widening access road through settlement on Drie Roode Heuvels		EIA	Yes	Site inspection
	Walk down of river crossings to avoid archaeological sites and graves	Archaeologist	EMPr	Yes	No
	Report graves/human remains	ECO	Construction	Yes	No

- Operational Phase
- Any abandoned farm buildings (such as Wolven Hoek) should be protected from vandalism during the operational phase of the wind farm. If there are any proposals for adaptive re-use of the building during the operational phase of the wind farm, then the provisions of the NHRA must be complied with regarding any restoration or renovation of the building.

Activity	Mitigation and management measure	Responsible Person	Applicable Development Phase	Include as Condition of Authorisation	Monitoring requirements
Operational	Ensure abandoned farm buildings (like Wolven Hoek) are not vandalised	ECO	Operational	Yes	Yes

- De-commissioning Phase – no further requirements
- Cumulative Impacts – see Section 8

## 7 STAKEHOLDER CONSULTATION

### 7.1 Stakeholder Consultation Process

Public consultation has been completed for the Scoping Phase of the proposed development. The only comments received to the Scoping Report were from SAHRA.



STAKEHOLDER DETAILS	COMMENT	SPECIALIST RESPONSE
SAHRA	The pending HIA must take into consideration the following aspects: archaeological and historical heritage, burial grounds and graves, detailed Palaeontological Impact Assessment, Visual Impact of the proposed development, and any comments by the public regarding heritage resources	This report addresses these issues
DEA&DP (Western Cape) have responded to the Scoping HIA requesting:	"The final WEF layout must be subjected to an intensive heritage and archaeological survey and impact assessment, as per the specialist recommendations. All resulting micro-sitting mitigation measures identified must be reported on the in Draft EIA Report".	It is not possible to do an intensive survey at the EIA phase, as the final layout of the facility has not been finalised. The walk-down of the most sensitive area must take place during the EMPPr.
Mr B Kleinbooi has commented:	"There is also a graveyard that we want protected"	The exact location of the graveyard which Mr Kleinbooi is referring to is unknown. Several graveyards were recorded during the survey. They have been identified. More unmarked graveyards may exist.

DEA&DP as well as some of the local landowners have raised the matter of the accumulative impacts of the authorized renewable energy facilities on the landscape. DEA&DP endorses the recommendations of the visual expert with respect avoiding placing turbines on prominent ridgelines on the landscape. In addition, that steep slopes, which are visually sensitive, should be excluded from the development footprint. Farmers have noted that the cumulative impacts of the wind energy facilities are that they will "industrialize the Karoo" and "destroy a massive part of the Karoo".

## 8 CUMULATIVE IMPACTS

Several renewable energy facilities have received environmental authorisation (Table 5). They include:

- The Suurplaat Wind Energy facility (Hart et al. 2010)
- The Roggeveld Wind Energy facility (Hart & Webley 2011, 2013)
- The Sutherland WEF facility (Halkett & Webley 2011)
- The Kareebosch Wind Energy facility (Roggeveld Phase 2) (Hart & Kendrick 2015)
- The Hidden Valley Wind Energy facility (Phases 1, 2 & 3) (Booth 2012)

**Table 5:** Cumulative impacts of the proposed WEF.

BioTherm Energy - Maralla West								
Significance Rating Table								
Cumulative Impacts								
Maralla West								
Potential Impact		Extent (E)	Duration (D)	Magnitude (M)	Probability (P)	Significance (S=(E+D+M)*P)	Status (+ve or -ve)	Confidence
Destruction of heritage sites of significance, leading to a loss of heritage resources	Nature of impact:	Negative impacts - loss of heritage resources in this region						
	Without Mitigation	2	5	6	4	52	Medium	High
	degree to which impact can be reversed:	Heritage resources are non-renewable and cannot be replaced						
	degree of impact on irreplaceable resources:	High impacts of heritage resources in the region, leading to a loss of heritage						
	Mitigation Measures	Avoid sensitive areas which have been identified during the field work and walk down						
	With Mitigation	1	5	2	3	24	Low	Medium

The cumulative impacts of several Wind Energy facilities in this area – increases the probability of negative impacts to heritage resources, of medium to high significance, such as cemeteries and the potential South African War military outpost. This is despite the mitigation measures proposed in each individual HIA report. This is because:

- Heritage resources are non-renewable. The loss of heritage resources during the construction of a wind farm is inevitable, despite implementing robust mitigation measures. Incrementally, this results in the loss of heritage which cannot be renewed;
- Surveys can never achieve a 100% cover of the area which may potentially be impacted. They sample a portion of the proposed area, and make deductions from this. There may be significant sites (such as rock art sites or graves) which were not identified during the survey and which may be destroyed or damaged;
- Many archaeological sites (including graves) are located under the soil surface, and are only exposed once the construction work commences. For this reason, it is necessary to have a robust management plan in place to ensure that significant sites are not destroyed.

## 9 CONCLUSIONS

The following highly sensitive areas have been identified and they must be declared *no-go* areas during the construction:

- The vernacular cottage on the farm Wolven Hoek;
- River Settlement - LSA sites with pottery along a river bed;
- Road Settlement - Remains of a late 19<sup>th</sup> century settlement (including graveyard) on both sides of the public gravel road on Drie Roode Heuvels (Die Kom) on Maralla West.

### The following heritage recommendations are proposed

The following highly sensitive areas must be declared no-go areas during construction:

- The vernacular cottage on the farm Wolven Hoek;
- River Settlement - LSA sites with pottery along a river bed which will be crossed by the on-site powerline;

- Road Settlement - Remains of a late 19<sup>th</sup> century settlement (including graveyard) on both sides of the public gravel road on Drie Roode Heuvels (Die Kom) on Maralla West.

The following recommendations are proposed:

- No-Go areas must be avoided;
- If there are any significant changes to the layout of the wind turbines, then a walk down of the proposed facility is recommended as part of the EMPr;
- It is recommended that there is a walk down of all river crossings during the EMP phase of the project, once the final location of the access roads and cable crossings has been finalised of the EMPr, to ensure that no heritage resources are destroyed;
- If any archaeological remains, including human remains, are uncovered during construction, then work must stop in that area and the responsible heritage authorities (SAHRA or Heritage Western Cape) must be notified;
- The potential visual impacts of the proposed facility on the heritage resources of the area (i.e. the results of the VIA), must be integrated with the heritage study. It is assumed that a buffer will be required along the R354, as the road between Matjiesfontein and Sutherland is considered a scenic tourism route.

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**Table 2:** Archaeological Sites (and Built Environment) recorded during the field survey for Maralla West WEF (NCW = No research potential or other cultural significance). Farm Drie Roodeheuvelds 180 = DRH; Annex Drie Roodeheuvelds 181 = ADRH; Wolven Hoek 182 = WH; Schalkwyskraal 204 = SWK; Welgemoed 268 = WG.

Farm	Site	Lat S	Lon E	Type	Description	Significance
WH	L001	-32.70305403	20.67209803	Stone walling	Packed semi-circular stone walling at road, 2 stones high, no historic material	NCW
WH	L002	-32.69911202	20.66944096	House	So-called "hartebeest huis" only 2m from farm road. Corrugated iron roof, solder room, originally one room of stone, 2 <sup>nd</sup> room of red brick. Recent bathroom at the back. Windows replaced with iron frames. Inside wall cupboards. Inside kitchen hearth in 1 <sup>st</sup> room. Ceiling of new pine. Outside kookskerm	IIIC
WH	L003	-32.69917002	20.66849699	Kraal	Large rectangular stone kraal (20mx50m), with lamb kraal, some 60m from the farm road.	IIIC
WH	L004	-32.69193602	20.66209900	Midden	20 <sup>th</sup> century remains on banks of small stream	NCW
	L005	-32.72307102	20.71882303		?	
DRH	L006	-32.73434300	20.73048603	Midden	Isolated tin can, green bottle glass on position of proposed substation	NCW
DRH	L007	-32.72539800	20.74075202	Trapvloer	Recorded previously. 20m in diameter, with flat and smooth (clay?) base, and very large boulders supporting outer stones. Floor has historic material, including horse shoe blue glass and spongware ceramics	IIIC
DRH	L008	-32.74348003	20.75481903	Stone walling/stone marker?	Short section of rough walling on side of rocky knoll, on position of substation	NCW
DRH	12H			Kraal	Stone kraal (50mx30m) against the side of the hill, about 1m high.	IIIC
DRH	L060	-32.72782004	20.74310498	Stone walling	An extensive stone wall, this is not the beginning or end. Very rough walling, reaches 1m in height, in some places.	
DRH	L061	-32.72660499	20.74233603	Stone walling	Continuation of above. Much reduced in height. Bits of metal and blue glass, old cans, ceramics, etc. Stone wall starts to curve here, following route of the road.	
DRH	L062	-32.72580201	20.74153597	Stone walling	Section of stone walling, which forms a triangle with L063, L064 and L065 enclosing a possible graveyard.	IIIC
DRH	L063	-32.72577996	20.74197200	Stone walling	Ditto	IIIC
DRH	L064	-32.72569799	20.74200603	Stone walling	Ditto	IIIC
DRH	L065	-32.72530102	20.74182901	Stone walling	Ditto	IIIC
DRH	L066	-32.72547402	20.74170504	Grave	Forms part of the cemetery (D031) recorded by Halkett in 2011	IIIB
DRH	L067	-32.72551602	20.74173798	Grave	Ditto	IIIB
DRH	L068	-32.72557897	20.74175701	Grave	Ditto	IIIB
DRH	L069	-32.72693197	20.74053702	Stone walling	Continuation of walling L060, L061	IIIC
DRH	L070	-32.72768601	20.73960504	Stone walling	Ditto. Here the wall swings away from the road.	IIIC
		-32.75277799	20.80569299	possible kraal?	not visited – identified on Google Earth in 2016	
		-32.70160798	20.82283800	ruin	One of a number of buildings at the farm on the upper part of the Venters River – some buildings recorded in 2011.	
		-32.72585004	20.82946700	146 rock art	Recorded in 2011	
WH	D001	-32.70805199	20.67512004	Stone walling	Possible stone "walling" on silt terrace. Some sections appear man-made while others less clear. Lots of cobbles thrown here by river.	
WH	D002	-32.70260601	20.67190700	Stone walling?	Possible stone arrangement – largish boulders (walling??)	
WH	D003	-32.69867197	20.66922203	Grave?	Small rectangular stone arrangement – possible grave though not conventional vernacular pattern for the area. Approx 50m to the north of the small cottage L002	
WH	D004	-32.69691696	20.66629800	Stone artefact	Isolated large flake – possibly ESA	
DRH	D005	-32.71847396	20.71630200	Stone kraal	Stone kraal and hut/lammerkraal close to the edge of a stream. 1x frag clear bottle glass	
DRH	D006	-32.73613103	20.72026396	Stone dwelling	Small 2 room stone dwelling with attached semi-circular stone arrangement (kookskerm?). Few artefacts except 1x small ceramic sherd (ref earthenware – no	

					decoration), and 1x iron strip.	
DRH	D007	-32.73689303	20.72187002	Old kraal?	Denuded area in veld. Believe this is the remains of an old kraal.	
DRH	D008	-32.73606196	20.73013399	Grave?	Concentration of slabby stone in veld. Unlikely to be a grave!	
DRH	D009	-32.74301098	20.75259799	Kraal	Possible old pre-colonial kraal against a low bedrock platform, almost not visible (no photos as a result). Few rocks to suggest some human intervention.	
DRH	D010	-32.74429902	20.75342998	Stone artefact	Isolated chalcedony flake in veld.	
DRH	D011	-32.74304903	20.75350701	Stone artefact	Isolated weathered quartz side-scraper	
DRH	D012	-32.74096001	20.75267896	Stone artefact	Isolated chert flake (unweathered)	
DRH	D056 D057 D058	-32.72580000 -32.72590402 -32.72573596	20.74115099 20.74124596 20.74134797	Historic ash heap	Very large ash heap/dump (approx. 50m diam). Bone ash, refined earthenware (many patterns), porcelain (oriental), brass/copper buttons (1 x military), glass (many types and colours), stoneware, iron work, tin cans (incl Anglo-Boer types), clay pipe stems, oes, 1x Mrtini Henri cartridge case (foil type). This is associated with a settlement and graveyard recorded in 2011.	
?	D059 D060	-32.73483502 -32.73478196	20.74657601 20.74654601	?	Concentration of large rocks – likely to have been dragged from ploughed fields alongside - no heritage significance	

Table 4: Cumulative Impacts – Wind Heritage

PROPOSED DEVELOPMENT NAME	DEA REFERENCE	CURRENT EA STATUS	PROPONENT	EXTENT	PROPOSED CAPACITY	FARMS	IMPACTS													PROPOSED MITIGATION MEASURES						
							Construction					Operation					Decommissioning									
							Overall	Archaeology	Built Environment	Graves	Cultural Landscape	Overall	Archaeology	Built Environment	Graves	Cultural Landscape	Overall	Archaeology	Built Environment		Graves	Cultural Landscape				
Proposed 280 MW Gunstfontein Wind Energy Project	14/12/16/3/3/2/395	S&EIR	Networkx Eolos Renewables (Pty) Ltd	12 000	280 MW			M	L	M	M															<ul style="list-style-type: none"> <li>For archaeology, open air sites mitigated either in the form of conservation of the sites with development or by a Phase 2 where the sites will be recorded and sampled before the client can apply for a destruction permit for these sites during development.</li> <li>All grave sites should be identified prior to the development and avoided.</li> <li>It is not envisaged that the built environment will be directly impacted on during development. Should any buildings more than 60 years need to be demolished the site should be assessed by a conservation architect.</li> <li>Formal and informal cemeteries exist as pre-colonial graves occur throughout the region. These may be preserved within a development or can also be relocated if conservation is not possible, but this must be considered as the last resort and is not advisable.</li> </ul>
Proposed development of renewable energy facility at the Sutherland site, Western Cape	12/12/20/1782/AM1	S&EIR	Mainstream Power Sutherland	28 600	811 MW			L	M	L	M															<ul style="list-style-type: none"> <li>For archaeology, micro siting of turbine positions during the EIA should be done. If micro siting is not possible, some physical mitigation measures may be required (excavation or collection) and a permit may be required from the relevant authority in order to undertake such mitigation.</li> <li>For the built environment, micro siting of turbine positions and associated infrastructure must be done during the EIA.</li> </ul>



PROPOS	DATE	CURR	PRO	EXT	PRO	FA	IMPACTS	PROPOSED MITIGATION MEASURES
Northern Cape.								<p>EMP to avoid placing turbine infrastructure directly over environment features and built bisecting coherent complexes.</p> <ul style="list-style-type: none"> <li>For graves, once the exact position of infrastructure is known, a more detailed assessment of the access roads, construction roads, laydown areas, substation positions and cable routes needs to be undertaken to identify marked graves within the affected area. In the case of unmarked graves, a protocol will need to be a protocol in place in order to deal with them on a case by case basis if and when discovered during the course of construction. HWC will be notified immediately if a human remains are uncovered during construction. Work in the specific area must stop pending inspection and mitigation as required.</li> <li>For cultural landscape, any facilities on site must be placed in a way that avoids visual clutter.</li> </ul>
Proposed Hidden Valley Wind Energy Facility, Northern Cape	12/12/2020/2370/2	S&EIR	Hidden Valley Wind-African Clean Energy Developments (Pty) Ltd	9530	150 MW	L		<ul style="list-style-type: none"> <li>A 10m perimeter boundary fence must be established around the heritage structures (dry packed walling dwelling on Portion of the Orange Fontein 201 (HV) adjacent to the farm gravel road) and during all construction and development activities.</li> <li>If concentrations of archaeological materials are exposed during construction, then all work must stop and an archaeologist to investigate for human remains (or any concentrations of archaeological heritage material) are exposed during construction, all work must cease and must be reported immediately to the nearest museum or archaeologist in the SAHRA, so that a systematic professional investigation can be undertaken. Sufficient time should</li> </ul>

PROPOSED PROJECT	DATE	CURRENT STATUS	PROPOSED PROJECT	EXTENSION	PROPOSED PROJECT	FA	R	M	IMPACTS	PROPOSED MITIGATION MEASURES
										allowed to investigate and to re collect such material.
Proposed Hidden Valley wind energy facility , Northern cape	12/12/20/2370/3	S&EIR	Hidden Valley Wind-African Clean Energy Develop ments (Pty) Ltd	9 180	150 MW				L	<ul style="list-style-type: none"> <li>Refer to 12/12/20/2370/2 above.</li> </ul>
Proposed Hidden Valley wind energy facility , Northern cape	12/12/20/2370/1	S&EIR	Hidden Valley Wind-African Clean Energy Develop ments (Pty) Ltd	13 620	150M W				L	<ul style="list-style-type: none"> <li>Refer to 12/12/20/2370/2 above.</li> </ul>
Proposed Hidden Valley wind energy facility , Northern cape	12/12/20/2370	S&EIR	Hidden Valley Wind-African Clean Energy Develop ments (Pty) Ltd		650 MW				L	<ul style="list-style-type: none"> <li>Refer to 12/12/20/2370/2 above.</li> </ul>
Proposed Constructi on Of The 140Mw Roggeveld Wind Farm Within The Karoo Hoogland Local Municipality Of The	12/12/20/1988/1/AM1	Amend ment	G7 Renera ble Energies (Pty) Ltd	26 529	140 MW				L L L M	<ul style="list-style-type: none"> <li>For colonial archaeology, a fi down of the proposed route of alignments and transmission lin be done. Heritage resources identified, flagged and avoided construction. No substations built in prominent positions o sight of historic farms. These should be avoided for power line</li> <li>For the built environment, micro turbine positions and as</li> </ul>

PROPOS	DATE	CURR	PROPOS	EXT	PROPOS	FA	IMPACTS	PROPOSED MITIGATION MEASURES
Northern Cape Province And Within The Laingsburg Local Municipality Of The Western Cape Province								<p>infrastructure must be done du EMP to avoid placing tur infrastructure directly ove environment features and buil bisecting coherent se complexes. The sensitive r vacant buildings is encouraged as advice is sort on sensitivities) as this will help them.</p> <ul style="list-style-type: none"> <li>No practical mitigation meas impacts on the cultural landscap</li> </ul>
Proposed Photovoltaic (PV) Solar Energy Facility On A Site South Of Sutherland, Within The Karoo Hoogland Municipality Of The Namakwa District Municipality, Northern Cape Province	12/12/202235	BAR	Inca Komsberg Wind (Pty) Ltd	2	10 MW		L N/A L H	<ul style="list-style-type: none"> <li>Use Option 1 as it has the pre stone-walled structures abou north of it compared to Option they are &lt;50 m to the east of it.</li> <li>Consider option 1 as it does n Anglo-Boer War sites.</li> <li>Option 1 is preferable visually partially screened by a low ro that lies between it and R354 the central and eastern parts o would be visible.</li> </ul>
Proposed establishment of the Suurplaat wind energy facility and associated infrastructure on a site near Sutherland, Western Cape and	12/12/201583	S&EIR	Moyeng Energy (Pty) Ltd	28 600	120 MW		L L H H	<ul style="list-style-type: none"> <li>Existing farm tracks must be re upgraded to minimise the an change to un-transformed lands</li> <li>In general terms, construction of and roads in valley bottoms sh kept to a minimum. Archaeolog close to the access ro Hartebeestfontein and in the bottoms close to the roads Klipfontein and Modderfontein v active protective intervention a archaeological sampling.</li> <li>Any pre-colonial kraal comple</li> </ul>

PROPOS	DEAR	CURRE	PROP	EXT	PROP	FARM		IMPACTS	PROPOSED MITIGATION MEASURES
Northern Cape.									<p>will be affected by the proposed... should be mapped, and measures to protect the sites.</p> <ul style="list-style-type: none"> <li>• During the detailed planning drawings of proposed road alignment infrastructure and near-final positions should be submitted to an archaeologist for review and proofing. Micro-adjustment of alignment and turbine positions is likely sufficient to achieve adequate mitigation.</li> <li>• A “walkdown” of final cable route all power lines, substation sites and access roads will be required.</li> <li>• If farm buildings at Louw se Modderfontein are to be re-used middens should be protected.</li> <li>• It is illegal at all times to demolish change and archaeological sites without permit.</li> <li>• Conserve old buildings, kraals and wall alignments – do not demolish damage.</li> <li>• Do not demolish wind pumps. If these are protected structures and are greater than 60 years of age they should be conserved.</li> <li>• Follow a policy of non-intervention. Farm buildings such as those at Modderfontein should be conserved or rehabilitated.</li> <li>• Theft of fittings from buildings should be monitored and offenders fined or charged under NHRA.</li> <li>• Seek guidance from a heritage consultant if any buildings are to be restored.</li> <li>• Keep infrastructure at least 500m away from all farm complexes as most of the elements that are of heritage value are located on the farm.</li> <li>• Apply to the relevant provincial authorities to demolish or alter historic structures (buildings, walls, kraals, etc.)</li> </ul>



PROJECTS	DATE	CURRENT	PROPOSED	EXT	PROPOSED	FA	M	IMPACTS										PROPOSED MITIGATION MEASURES	
Proposed Touwsrivier Solar energy facility	12/12/201956	S&EIR	Unknown	215	36 MW			L	L	L		L	L		L	L	L	M	<ul style="list-style-type: none"> <li>For cultural landscape, the old embankments would provide considerable amount of screening for proposed activity from the N1.</li> <li>No mitigation measures are required with respect to prehistoric archaeological heritage as no significant finds were identified within the area. Depending on the type and location of grid connection selected, the final walk down of the transmission line would be negotiated so that tower positions can be adjusted to avoid any sensitive areas.</li> <li>The old 1876 rail alignment is protected as an archaeological site as an element of the built environment. The 1930 railway line alignment, station foundations, 1946 tunnel are protected as elements of the environment over 60 years of operation. It is recommended that a policy of non-intervention is implemented where structures are left as is.</li> <li>Any necessary changes, destruction or physical alteration of these structures would necessitate applying for a permit to modify a protected structure under HWC.</li> <li>It is recommended that in the interests of resource conservation and sustainability, re-use of ballast from the 1930 railway alignment is permitted provided that the alignment remains a legible feature in the landscape. This means not demolishing the embankments, culverts, cuttings or other railway related features.</li> </ul>
		<b>Total Ha</b>	<b>Total MW</b>																
		128 276	2667 MW																
<b>Significance Totals</b>	Significance			<b>Total Hectares per impact</b>															

P R O P O S	D E A R	C U R R E	P R O P	E X T	P R O P	F A R M	IMPACTS										PROPOSED MITIGATION MEASURES											
per impact	Rating																											
	High Significance																											
	Medium Significance							12000	28600	12000	67129															215		
	Low Significance							116276	67344	55131	215		215	215	0	215										215	215	
	Positive Impacts																											