

Heritage Impact Assessment of a proposed Wind Energy Facility (Hopefield
Community Wind Farm) to be situated on Farm Leliefontein 1/317 Hopefield
District, South Western Cape.

Prepared for

Savannah Environmental (Pty) Ltd

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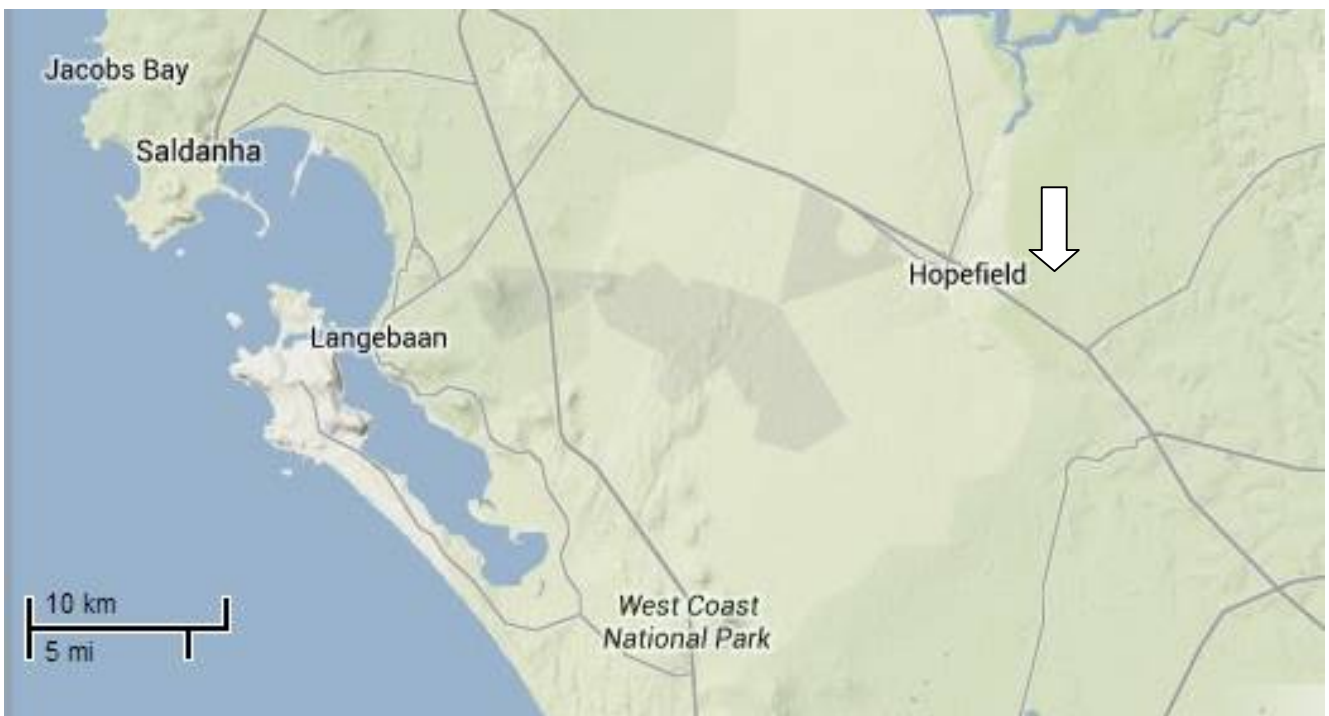
Summary

Hopefield Community Wind Farm (Pty) Ltd intend to erect 3 wind turbines on Farm Leliefontein 1/317 just 4 km outside of Hopefield. This relatively small project has triggered a Basic Assessment of which this heritage specialist report forms a component.

The study area has been subject to a physical site inspection. The site lies immediately adjacent to the already approved and almost complete Hopefield Wind Energy facility close to Koperfontein.

The turbine sites are located in ploughed land, will not impact archaeological material or any sensitive historic built environment. The landscape qualities of the study area are already overwhelmed by the adjacent Hopefield Wind Turbines, which in themselves do not visually clash with the cultivated landscape of the area.

In heritage terms, no fatal flaws have been identified for the proposed turbine sites, access road or power lines and sub-station. The project is acceptable and no mitigation is required.



Location of the project area.

GLOSSARY

Archaeology: *Remains resulting from human activity which are in a state of disuse and are in or on land and which are older than 100 years, including artefacts, human and hominid remains and artificial features and structures.*

Calcrete: *A soft sandy calcium carbonate rock related to limestone which often forms in arid areas.*

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.*

Midden: *A pile of debris, normally shellfish and bone that have accumulated as a result of human activity.*

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.*

Palaeosole: *An ancient land surface.*

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

Pliocene: *A geological time period (of 5 million – 3 million years ago).*

Miocene: *A geological time period (of 23 million - 5 million years ago).*

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

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.

Varswater Formation: *Sediments laid down under estuarine circumstances by the proto-Berg River during the Pliocene. Certain layers of this formation are highly fossiliferous.*

Velddrif Formation: *Shelly estuarine sands of the last interglacial (Pleistocene) that can be consolidated into calcrete.*

Wreck (protected): *A ship or an aeroplane or any part thereof that lies on land or in the sea within South Africa is protected if it is more than 60 years old.*

Acronyms

DEAT	Department of Environmental Affairs and Tourism
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

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INTRODUCTION

1.1 The need for the project

South Africa is currently experiencing an energy crisis with the national electricity provider (Eskom) being unable to produce enough power to serve the nation's peak demand. Rural areas are presently subject to frequent load shedding. In addition global warming caused by emissions of greenhouse gas has meant that the pressure is on to utilise clean and renewable energy resources. Wind turbines have been proven internationally to be able to produce an important electricity contribution that produces no emissions. The proposed Hopefield Community facility will in a small way contribute to the overall pool of renewable energy and generate capital for those involved.

1.1.1 The proposal

The proposed activity is the establishment of a Wind Energy Facility and associated infrastructure (the Hopefield Community Wind Farm).

The project will have a generating capacity of 5 MW and will comprise of the following infrastructure:

- Up to 3 Wind turbines roughly 300 m apart
- Wind turbines will have hub height of up to 120m and a rotor diameter of up to 125m
- Each turbine will have an installed capacity of 1.5-3MW with a maximum combine capacity of 5MW.
- Concrete foundations to support the turbines
- Cabling between the turbines, to be laid underground where practical
- An on-site substation to facilitate the connection between the wind energy facility and the electricity grid.
- An overhead power line to connect the facility to the electricity grid
- Internal access roads to each turbine
- Workshop area/office for maintenance

1.2 The receiving environment

The study area is situated 4km south east of the town of Hopefield. The site is located about 1 km north east of the R45 (figure 1). The study area lie in cultivated land on the edge of the interface of the rolling hills of the wheat lands (Swartland) and the *sandveld* area which extends from the Sout River to the coast which is relatively uncultivated, and partially conserved within the West Coast National Park and the Elandsfontein Private Nature Reserve.

The topography of the site is generally un-interesting and flattish (figure 2). North of the R45 there are several silcrete outcrops, some of which have been quarried in recent years, possibly to

supply building material for the mill building at Koperfontein Station. For the main part the underlying geology of the area is characterized by the ancient Malmesbury formation with overlying acid sands of the Springfontein formation. There is a single farm complex roughly 800 m from the closest turbine (Boorwater owned by Mr Dirk Basson).

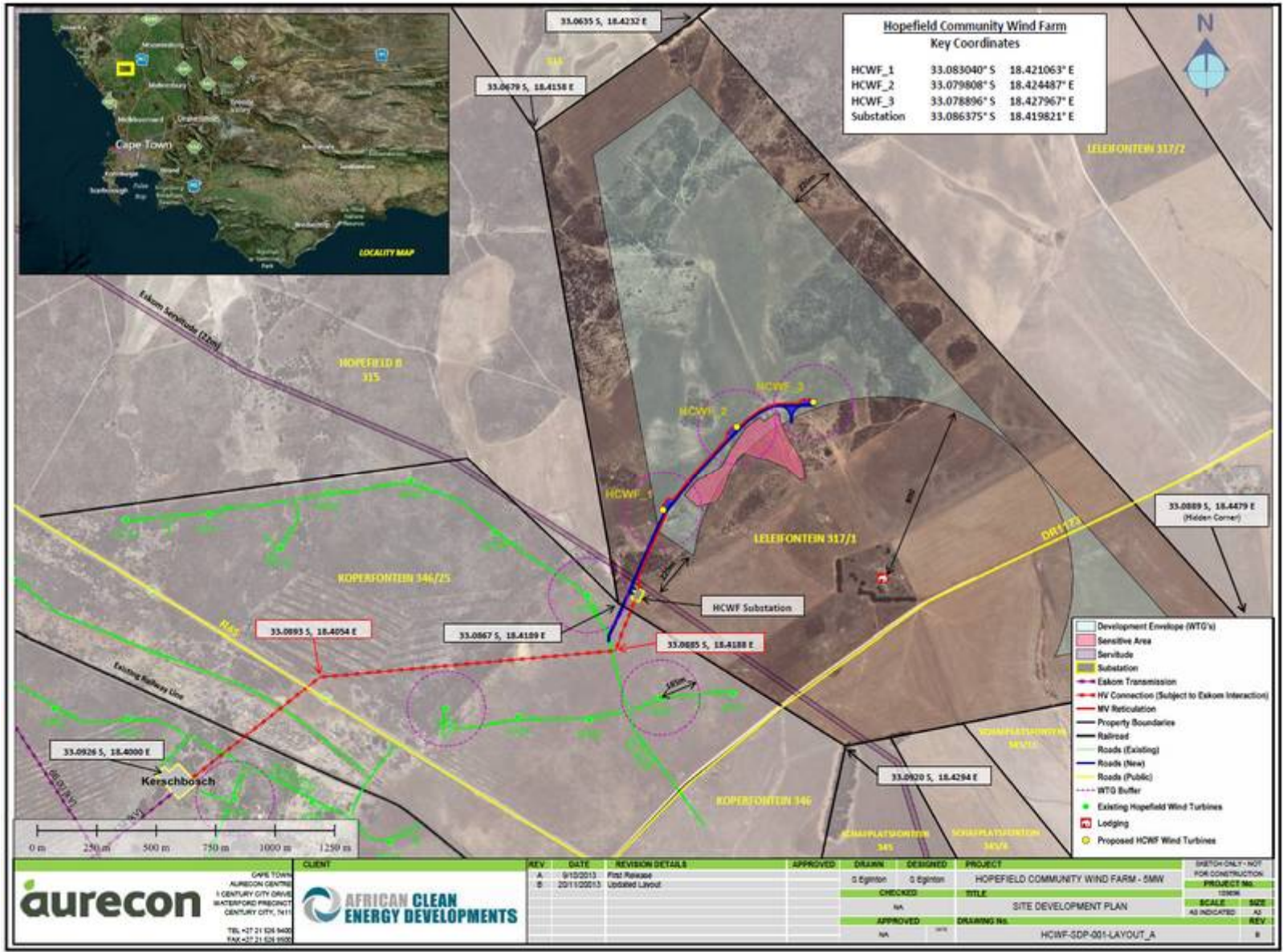


Figure 1 Location of the proposed activity

1.2.1 Historical overview

The pre-colonial heritage of the immediate area is not very well known, however the broader regional context is better described.

Palaeontology: The mineralised bones of ancient fauna are often found in this region of the Cape west coast. Fossils are regularly encountered between Woodstock Beach, near Cape Town, and Saldanha Bay. These include the material excavated from sites such as Elandsfontein near Hopefield (Klein 1988; Singer & Wymer 1968), Duinefontein 2 (Cruz-Urbe *et al.* 2003; Klein *et al.* 1999) and Langebaanweg (Halkett & Hart 1999; Hendey 1969, 1982; Singer 1961). Fossil bones were also seen at Bakoond (Orton 2007b) and Tygerfontein (Halkett & Hart 1995), both to the south of Yzerfontein, and a large collection has been made from an occurrence at Melkbosstrand (Hendey 1968). Material from the Milnerton beach area and adjacent interior has also been recorded (Avery 1995, 2007; Broom 1909). These findings show that the fossil beds along this part of the Western Cape coast are very extensive.

Archaeology: The famous Hopefield skull (an ancient sub-species of human known as *Homo ergaster*) was found on the Elandsfontein Farm some 10 km to the west of the town of Hopefield (Singer 1954). Also in the area were extensive scatters of fossil bones in deflations among the dunes. The finds from this site have attracted numerous analyses of various aspects of the bone assemblage with the research still continuing to this day (e.g. Ewer & Singer 1956; Hendey 1969; Hooijer & Singer 1960, 1961; Keen & Singer 1956; Klein 1988; Klein *et al.* 2007; Singer 1962; Singer and Boné 1960, 1966; Singer & Inskeep 1961, Singer & Keen 1965; Singer & Wymer 1968). Presently Dr David Braun of UCT's Archaeology Department has started a new initiative to research the west coast Pleistocene fossil and archaeological deposits of the Hopefield-Saldanha area.

Among the stone artefacts found at Elandsfontein were Early Stone Age Acheulian hand-axes (Goodwin & Van Riet Lowe 1929), as well as artefacts pertaining to the Middle and Later Stone Ages (G. Avery, pers. comm. 2007). Little other archaeology is known from the immediate area. Extensive archaeological research has, however, been carried out in the dunefields of Geelbek to the southeast of Langebaan Lagoon (Kandel & Conard 2003, 2005; Kandel *et al.* 2003). There both Middle and Later Stone Age material was recovered. Extensive archaeological deposits dating to the Later Stone Age occur on the Vredenburg and Churchhaven Peninsulas where rocky shores provide abundant shellfish for food and on the former rocky outcrops form natural foci on the landscape (Sadr *et al.* 2003; Smith 2006; Smith *et al.* 1991, 1992). However, inland areas have not been well described, however the frequency of archaeological sites is expected to be quite low. The archaeological potential of the Salt River catchment has never been archaeologically studied, although it is anticipated that it would have been an important resource for pre-colonial people, in particular, the Khoekhoen pastoralists of the Late Stone Age.

European travellers penetrated the interior of the country remarkably soon after the first settlement of the Cape. The main motivation for doing this was seeking opportunities to exploit mineral wealth, or expeditions to barter for cattle from the local "Saldanhars" – the Khoekhoen

communities who lived on the Vredenberg Peninsula. Following this vanguard of explorers and hunters, followed transhumant Dutch farmers (trekboers) who established cattle posts deep into the heartland of the province. According to Fransen (2004) the farm Coenradenberg which lies several kilometers to the west of the study area was first granted as a loan farm in 1712 when a *Freeburgher* was permitted to use the area for grazing for a period of six months. It is unlikely that there were any formal structures on the landscape at that time, perhaps a temporary kraal and simple wattle and daub dwelling. In 1749 the farm was granted to Pieter Smit. Members of the same family reside on the property to this day.

1.2.2 Built environment

Within the boundaries of the study area there is a single farm complex (Boorwater).

Immediately south of the study area lies the small settlement of Koperfontein – a collection of houses, barns railway siding and grain elevator. A visit to this settlement has revealed that many of its buildings are older than 60 years and therefore constitute protected heritage. Noted were a number of Victorian and wood and iron buildings (Plate 2) which give this little railway settlement a certain ambiance and sense of history. Also notable is the spectacular stone mill building, which to our knowledge has never been previously recorded or included in any heritage register despite that fact that it enjoys statutory protection under the NHRA. The settlement is situated outside the southern boundary of the study area.

Hopefield has its origins in the mid-19th century. Before 1850, when it was surveyed and laid out by two British Military Engineers (Hope and Field) it was a small informal settlement called Zoute Rivier (named after the river which flows through the town). Like many of the wheat land towns, the church was pivotal to its development in the mid-19th century. Hans Fransen has remarked on the survival of the riverine fields which in previous years were market gardens that were established in the flood zone of the river. Before the construction of the R27 to Saldanha Bay in the 1970's, Hopefield was a significant stop on the network of country roads that led to Port of Saldanha and therefore saw a fair amount of passing traffic. Today the town is slightly off the beaten track but nevertheless an easy drive from Cape Town. Authors such as James Walton (1989, 1995) and Hans Fransen (2006) have commented on the vernacular architecture of the town (*langhuisies and Hardebees Huisies*), but sadly much of it was demolished in the name of the group areas act. Although the town does not enjoy quite the heritage status of the Cape Wine lands towns, it certainly has significance. Many Victorian and some vernacular buildings have survived throughout the town and along the edges of the Sout Rivier valley. These add interest to the place and certainly enhance its aesthetic qualities.

The nearby farming settlement, Boorwater contains a number of vernacular structures which include stone elements that may have 19th century origins. They have been heavily altered over the years.

2. Methodology for study

This study has been commissioned as a heritage impact assessment that attempts to identify the

possible range of impacts and identify issues in terms of accumulated knowledge of the area as well as a physical survey of the study area and environs.

A site inspection was carried out by Tim Hart and Natalie Kendrick. Any heritage sites encountered were to be mapped using a Garmin 60csx hand-held GPS. The contents of each site were to be noted and examples of the material photographed. Each site was to be evaluated for significance in the field.

- Turbine positions were checked
- Cable and access routes between turbines were checked
- Proposed substation site was checked

The landscape crossed by proposed transmissions lines lies within the new Hopefield Wind Farm which has been surveyed, approved and is in an advanced stage of construction. ACO has conducted assessments and follow-up work at the Hopefield facility.



Figure 2 The recently constructed Hopefield wind farm abuts the project area to the south. Image taken from site of a proposed substation.

2.1 Restrictions and assumptions

Visibility was good throughout. No trial excavations were conducted so it is assumed that surface observations and observations obtained from the old mining areas are representative of sub-surface conditions.

2.2 Legislative context

The basis for all heritage impact assessment is the National Heritage Resources Act 25 (NHRA) of 1999, which in turn prescribes the manner in which heritage is assessed and managed. The National Heritage Resources Act 25 of 1999 has defined certain kinds of heritage as being worthy of protection, by either specific or general protection mechanisms. In South Africa the law is

directed towards the protection of human made heritage, although places and objects of scientific importance are covered. The National Heritage Resources Act also protects intangible heritage such as traditional activities, oral histories and places where significant events happened. Generally protected heritage which must be considered in any heritage assessment includes:

Cultural landscapes (described below), Buildings and structures (greater than 60 years of age), Archaeological sites (greater than 100 years of age), Palaeontological sites and specimens, Shipwrecks and aircraft wrecks, Graves and grave yards.

Section 38 of the NHRA requires that Heritage Impact Assessments (HIA's) are required for certain kinds of development such as rezoning of land greater than 10 000 sq m in extent or exceeding 3 or more sub-divisions, or for any activity that will alter the character of a site greater than 5000 sq m.

1.1 Cultural Landscapes

Section 3(3) of the NHRA, No 25 of 1999 defines the cultural significance of a place or objects with regard to the following criteria:

- (a) its importance in the community or pattern of South Africa's history;
- (b) its possession of uncommon, rare or endangered aspects of South Africa's natural or cultural heritage;
- (c) its potential to yield information that will contribute to an understanding of South Africa's natural or cultural heritage;
- (d) its importance in demonstrating the principal characteristics of a particular class of South Africa's natural or cultural places or objects;
- (e) its importance in exhibiting particular aesthetic characteristics valued by a community or cultural group;
- (f) its importance in demonstrating a high degree of creative or technical achievement at a particular period;
- (g) its strong or special association with a particular community or cultural group for social cultural or spiritual reasons;
- (h) its strong or special association with the life or work of a person, group or organisation of importance in the history of South Africa; and
- (i) sites of significance relating to the history of slavery in South Africa.

1.2 Scenic Routes

While not specifically mentioned in the NHRA (Act 25 of 1999), "scenic routes" are recognised by DEA&DP as a category of heritage resource. In the DEA&DP Guidelines for involving heritage specialists in the EIA process, Baumann & Winter (2005) comment that the visual intrusion of development on a scenic route should be considered a heritage issue. This is also given recognition in the Notice of Intent to Develop (NID) application which is used by Heritage Western Cape.

1.3 Heritage Grading

Heritage resources are graded following the system established by Winter and Baumann (2005) in the guidelines for involving heritage practitioners in EIA's (Table 1).

Table 2: Grading of heritage resources (Source: Winter & Baumann 2005: Box 5).

Grade	Level of significance	Description
1	National	Of high intrinsic, associational and contextual heritage value within a national context, i.e. formally declared or potential Grade 1 heritage resources.
2	Provincial	Of high intrinsic, associational and contextual heritage value within a provincial context, i.e. formally declared or potential Grade 2 heritage resources.
3A	Local	Of high intrinsic, associational and contextual heritage value within a local context, i.e. formally declared or potential Grade 3A heritage resources.
3B	Local	Of moderate to high intrinsic, associational and contextual value within a local context, i.e. potential Grade 3B heritage resources.
3C	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.

1.4 Wind Energy Guidelines and Heritage

Neither SAHRA nor HWC have developed policies with respect to heritage and renewable energy and therefore the issue of distance of wind turbines from heritage resources has not been resolved.

3. FINDINGS

3.1 Palaeontology

The landscape is underlain by largely sterile Malmesbury shales. No paleontological material or fossil bone was observed in the sands of the study area.

3.2 Pre-colonial archaeology

The land is cultivated and ploughed. No material of archaeological significance was observed.

3.3 Colonial period heritage

No colonial period heritage or structures will be directly impacted by the proposal. The nearby farm of Boorwater will not be directly impacted. This collection of buildings does contain elements greater than 60 years of age, however since it is a working farm almost all of these have been changed and adapted. *Suggested group field grading: IIIc.*

3.4 The cultural landscape

Impacts to the cultural landscape will result in visual change to places that will take place when the landscape is transformed by the creation of rows of wind turbines. These structures which are substantial in size will be highly visible for a radius of up to 15 km. However the small size of the proposed facility is insignificant in the context of the 37 recently constructed large turbines on the adjacent Hopefield Wind Energy Facility and do not constitute any form of impact further than that which has already occurred (see figures 2 and 3).



Figure 3 Typical view of the study area (turbine site 1). The turbines of the Hopefield wind energy facility are visible in the background.

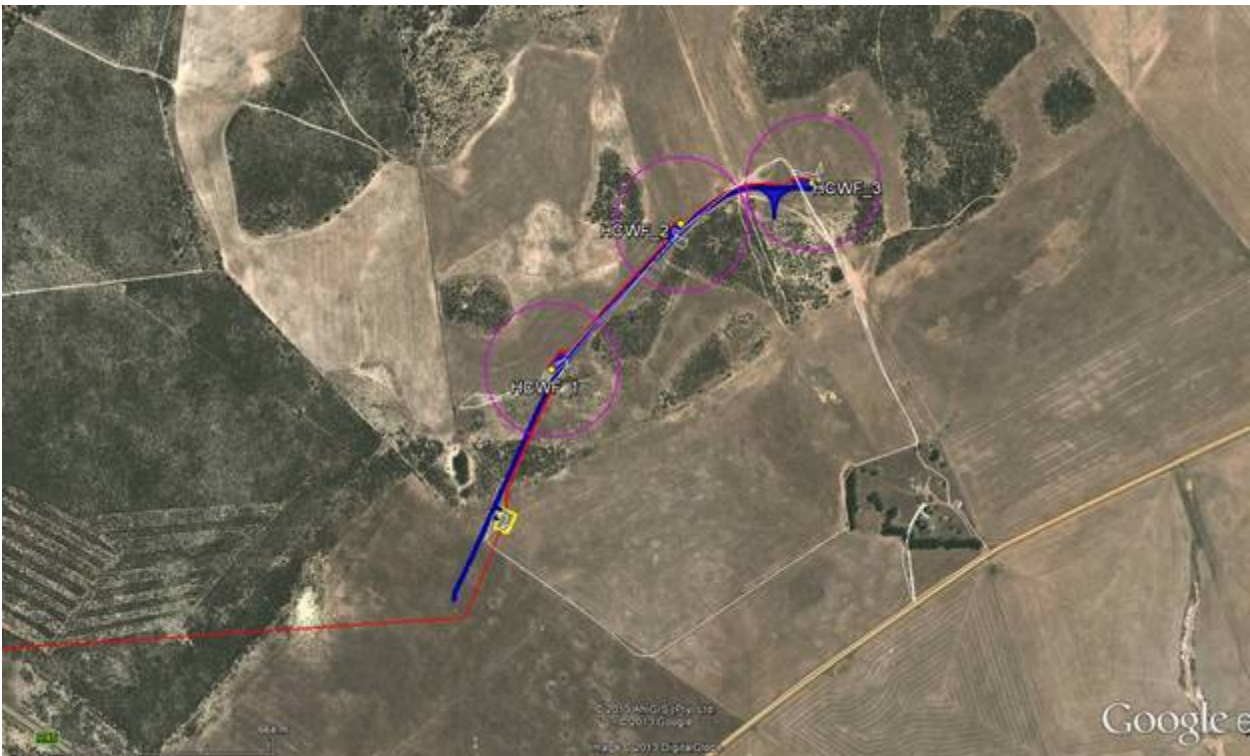


Figure 4 Turbine and infrastructure positions. Track logs are in beige.

4. ASSESSMENT OF IMPACTS

4.1 Palaeontological and archaeological material

The study has revealed that both archaeological and palaeontological material is absent and does not constitute a heritage concern.

4.1.1 Nature of impacts

The main cause of impacts to archaeological and palaeontological sites is physical disturbance of the material itself and its context. The heritage and scientific potential of an archaeological site is highly dependent on its geological and spatial context. This means that even though, for example a deep excavation may expose archaeological artefacts, the artefacts are relatively meaningless once removed from the area in which they were found. In the case of the proposed activity the main source of impact is likely to be the construction of access roads, lay-down areas and excavation of the footings for the turbines. The construction of power lines is unlikely to cause a significant impact in this area which is generally not very sensitive in heritage terms.

4.1.2 Extent of impacts

In the case of the proposed wind energy facility, it is expected that impacts will be limited (local) There is a chance that the deep excavations for the tower bases could potentially impact buried archaeological material, similarly excavation of cable trenches and clearing of access roads could

impact material that lies buried in the surface sand. Potential impacts caused by power line and proposed access roads are similarly likely to be limited and local. The physical survey of the study area has shown that archaeological material is absent, which means that the extent of impacts is likely to be highly localised (if at all) with no regional implications for heritage of this kind.

4.1.3 Significance of impacts

In terms of the information that has been collected, indications are that impacts to pre-colonial archaeological material will be highly limited, In terms of palaeontological material, one can never be sure of what lies below the ground surface, however indications are that this is extremely sparse and that impacts caused by the construction of footings and other ground disturbance is likely to be negligible.

4.1.4 Status of impacts

The destruction of palaeontological and archaeological material is usually considered to be negative, however opportunities for the advancement of science and knowledge about a place can result provided that professional assessments and mitigation is carried out in the event of an unexpected find.

Table 1 Summary of Impacts for Archaeology and Palaeontology		
	Without Mitigation	With Mitigation
Extent	Local (1)	Local (1)
Duration	Permanent (5)	Permanent (5)
Magnitude	Low (1)	Low (1)
Probability	Possible (2)	Possible (2)
Significance	Low (14)	Very Low (14)
Status	Neutral	Neutral
Reversibility	Low reversibility	Low reversibility
Irreplaceable loss of resources?	No	No
Mitigation: No mitigation required prior to construction.		
Cumulative impacts: n/a.		
Residual Impact: n/a		

4.2 Colonial period heritage

Colonial period heritage – that is buildings and historical sites of significance have not been identified within the boundaries of the study area. Boorwater farm contains some historical elements but these are not under threat (figure 5).

4.2.1 Nature of impacts

Historic structures 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.

4.2.2 Extent of Impacts

Direct impacts are not expected, however if the proposed activity stimulates changes in the way that historic structures are utilised both negative and positive impacts may result. The impact that could result will be local and confined to the site, with no wider heritage implications.

4.2.3 Significance of impacts

Given that there are no structures or historical sites within the study area, the significance of any impacts is very low.

4.2.4 Status of impacts

Within the boundaries of the proposed wind energy facility, impacts are considered improbable. The overall status is considered to be neutral

Table 2: Summary of impacts on colonial period heritage .		
	Without Mitigation	With Mitigation
Extent	Local (1)	Local (1)
Duration	Permanent (5)	Temporary (2)
Magnitude	Low (1)	Low (1)
Probability	Possible (2)	Possible (2)
Significance	Low (14)	Low (8)
Status	Neutral - negative	Neutral-positive
Reversibility	Low reversibility	Reversible
Irreplaceable loss of resources?	No	No
Mitigation: Approach Heritage Western Cape for permit to alter a building more than 60 years of age, seek advice from conservation architect if alteration is envisaged.		
Cumulative impacts: No cumulative impacts		
Residual Impact: n/a		



Figure 5. The farm house at Boorwater is likely to contain an historic core. It has been extensively modified.

4.3 Cultural landscape and sense of place

No impacts are expected.

4.3.1 Nature of impacts

Cultural landscapes are highly sensitive to accumulative impacts and large scale development activities that change the character and public memory of a place. In terms of the National Heritage Resources Act, a cultural landscape may also include a natural landscape of high rarity value and scientific significance. The construction of a large facility can result in profound changes to the overall sense of place of a locality, if not a region. In this case the addition of three turbines to the existing turbine rich environment will have no impact at all.

4.3.2 Extent of impacts

Massed wind turbines, are without doubt conspicuous structures which will affect the atmosphere of the "place". While this impact may be considered local in terms of physical extent, there may be wider implications in terms of the change in "identity" of the area and the accumulative effect this could have on future tourism potential (not necessarily negative). The impact of the proposed activity will be highly localised.

4.3.3 Significance of impacts

The impact of the proposed activity is low.

4.3.4 Status of impacts

The status of the impact is neutral (without mitigation).

Table 3 Summary of Impacts on cultural landscape		
	Without Mitigation	With Mitigation
Extent	Local (1)	Local (1)
Duration	Long term (4)	Long term (4)
Magnitude	Low (1)	Low (1)
Probability	Possible(2)	Possible (2)
Significance	Low (12)_	Low (12)
Status	Neutral	Neutral
Reversibility	Reversible after closure of WEF	Reversible after closure of WEF.
Irreplaceable loss of resources?	No	No
Mitigation: A no-development buffer zone of a radius of 500m must be implemented around Boorwater Farm		
Cumulative impacts: No cumulative impacts are expected..		
Residual Impact: n/a		

4.4 The no-go alternative

The no-go alternative will result in retention of the status-quo in heritage terms. This status quo is not dissimilar to the very low impacts that would result from implementing the proposal.

No accumulative impacts are expected.

5. Mitigation and conservation

5.1 Archaeological and palaeontological heritage

There is no surface archaeological and palaeontological material that requires any form of mitigation prior to construction work.

5.2 Built environment and colonial period sites

There are no protected sites or structures within the study area that require mitigation.

Cautionary advice is offered in that the Boorwater farm buildings that lie outside the proposed WEF boundary are greater than 60 years of age and fall under the protection of the NHRA. This means that any alteration or demolition of these structures will need to go through the Heritage Western Cape permitting process.

5.3 Cultural landscape

No mitigation measures are suggested.

5.4 Human remains

Human remains can occur at any place on the landscape. They are regularly exposed during construction activities along the west and south coasts. Such remains are protected by a plethora of legislation including the Human Tissues Act (Act No 65 of 1983), the Exhumation Ordinance of 1980 and the National Heritage Resources Act (Act No 25 of 1999). In the event of human bones being found on site, SAHRA must be informed immediately and the remains removed 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.

6. CONCLUSION

Indications are that in terms of palaeontological and archaeological heritage the proposed activity is acceptable; impacts will be limited and controllable. The landscape affected by the proposal is transformed by agriculture.

In general the mitigation requirements for the project are minimal requiring a little vigilance on the part of the construction team who must report any un-anticipated finds to an archaeologist. No fatal flaws are anticipated.

The proposed activity should be permitted to proceed.

Project component/s	<ul style="list-style-type: none">• 3 Wind turbines• Concrete foundations to support the turbines• Cabling between the turbines, to be laid underground where practical• An on-site substation to facilitate the connection between the wind energy facility and the electricity grid.• An overhead power line to connect the facility to the electricity grid• Internal access roads to each turbine• Workshop area/office for maintenance
Potential Impact	Physical destruction of both palaeontological and human made heritage, intentional/unintentional neglect of historic buildings
Activity/risk source	Construction of roads, turbines bases, transmission lines and substation. Neglect or illegal alteration of heritage structures.
Mitigation:	No mitigation is deemed necessary, other than to observe

Target/Objective heritage law and report un-anticipated finds.

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