

**HERITAGE IMPACT ASSESSMENT: AMENDMENTS TO PREVIOUSLY
AUTHORISED WIND FARM AT KLAWER, VREDENDAL DISTRICT,
WESTERN CAPE**

(Assessment conducted under Section 38 (8) of the
National Heritage Resources Act as part of an EIA.)

Prepared for:
Savannah Environmental (Pty) Ltd
On behalf of:
Vendiwell (Pty) Ltd

March 2011
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Prepared by:

Lita Webley & David Halkett
ACO Associates
8 Jacobs Ladder
St James
Email: Lita.Webley@aco-associates.com

Tel: 021 706 4104
Fax: 086 603 7195

EXECUTIVE SUMMARY

Site Name

The Klawer Wind Energy facility ("WEF") to the south of Klawer, Western Cape Province.

Location



Description of the Proposed Development

The initial number of twelve turbines has been reduced to two. The WEF will include an on-site substation, hardstanding areas, construction camp, underground cabling, a 22kV powerline connection to the Eskom grid and the farm road will be upgraded to will serve as the access route.

Heritage Resources Identified

The fieldwork was conducted on the 1 October 2010. It involved a foot survey of the turbine positions, substation and underground electrical connections and a drive down of the access roads. No significant limitations were encountered during the survey.

A large number of archaeological sites, as well as scatters of archaeological material, were recorded on and around the base of a small kopje named Hottentotskop.

Anticipated Impacts on Heritage Resources

The palaeontological impact assessment concluded that the study Area is of low palaeontological significance. However, it was recommended that:

1. A palaeontologist conduct at least 1 site visit during excavation of foundations for turbines in order to assess the below ground geology. Changes to the layout of the WEF are not expected to have any impacts to the palaeontological resources;

With regard archaeology, the revised layout of two turbines and associated infrastructure (2016) will not result in any direct impact on Hottentotskop and its pre-colonial archaeological sites. Visual impacts will also be drastically reduced. However, the widening of the access road to enable heavy machinery onto site may result in accidental damage to archaeological Sites 40 and 41. It is recommended that:

2. The kopje is "off limits" during construction, so that archaeological sites are protected, in such a manner to allow free movement of animals. It is recommended that the temporary barricades be removed after the construction phase.

Recommendations

The following recommendations should be included in the EMP:

1. A palaeontologist must conduct at least 1 site visit during excavation of foundations for turbines in order to assess the below ground geology;
2. The kopje must off limits during construction, to avoid accidental damage to archaeological sites which are scattered around the base of the kopje;
3. If any archaeological material is uncovered during construction, then work must stop in that area and Heritage Western Cape must be notified immediately (Telephone: 021 483 9685);
4. If any human remains area uncovered during construction, then work must stop immediately in that area and Heritage Western Cape must be notified immediately(Telephone: 021 483 9685);
5. The old farmhouse on Klipheuvel must be declared a "no-go" area in order to avoid any damage or vandalization during the construction and operation of the WEF.

If mitigation, as outlined above, is implemented, then construction of the revised layout proposed for Klawer WEF is supported.

LIST OF DEFINITIONS

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.*

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.*

Acronyms

BP	Before the Present
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, No 25 of 1999
SAHRA	South African Heritage Resources Agency

Archaeologists/Heritage Specialists

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:

1. Principal Investigator: Stone Age, Shell Middens and Colonial Period; and
2. 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 –

1. I act as the independent specialist in this application;
2. 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;
3. I declare that there are no circumstances that may compromise my objectivity in performing such work;
4. 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;
5. I will comply with the Act, regulations and all other applicable legislation;
6. I have no, and will not engage in, conflicting interests in undertaking of the activity;
7. 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;
8. All the particulars furnished by me in this form are true and correct; and
9. 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

h. E. Webley

Specialist Field: Archaeology and Heritage

Name of Company: ACO Associates

1 INTRODUCTION

ACO Associates CC have been appointed by Savannah Environmental (Pty) Ltd on behalf of the proponent, Vendiwell (Pty) Ltd, to undertake a Heritage Impact Assessment, as part of the part of the EA and EMPr Amendments for the previously authorised Klawer Wind Farm. The wind energy facility (“**WEF**”) was initially proposed on Klipheuel (Farm 5/390) and Bird Field (Farm 99/306) approximately 6 km south-west of Klawer, Western Cape Province (Figure 1). The layout has been revised and the footprint reduced to exclude Klipheuel (Farm 5/390) from the development area.

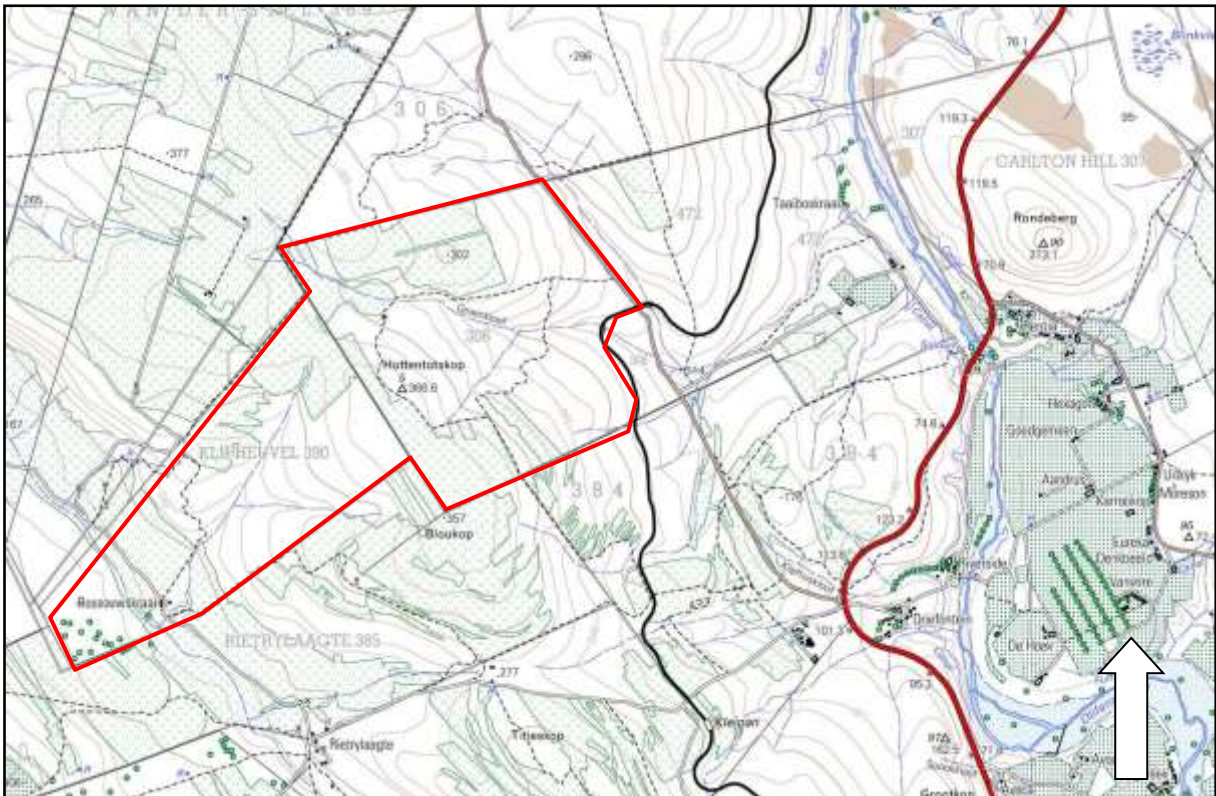


Figure 1: Map sheet 3118 DC Klawer (1: 50 000) with the Study Area highlighted in red. The N7 and the Olifants River are situated to the east. Mapping information supplied by: Chief Directorate Surveys and Mapping.

2 DEVELOPMENT PROPOSALS

1. It is proposed to reduce the original 12 wind turbines (Figure 2) to 2 turbines (Figure 3), each with a capacity of up to 2.5 MW, generating 5 MW of electricity which will be fed into the National Power Grid;
2. The hub height will be 105m, while the rotor diameter will increase from a diameter of 90-100m (as detailed in the original EIA) to 121m. The concrete foundation base is 15m x 15m x 3m deep;

3. There will be a gravel standing area adjacent to each turbine of approximately 2500 m² that will be used during the construction and maintenance phase;
4. Access roads will involve the up-grading of existing farm tracks but new tracks (with a maximum width of 8 m) may also need to be constructed;
5. A construction camp, office and storage building will be constructed on site;



Figure 2: The original layout of twelve turbines (2011), the proposed access roads, substation and underground electrical cable on Klipheuel and Bird Field.



Figure 3: The revised layout of two turbines (2016), the existing 66kV power line running along the southern boundary of the site in pink with a short 22kV line connection to the substation in yellow. The access road is in orange.

6. Turbines will be connected to each other via underground electrical cables;
7. A new sub-station will be built on site and it will connect to the National Grid via a new 22kV transmission line. The transmission line is below the NEMA threshold;

A temporary lay-down area of 63m x 65m will be required during the construction phase.



Figure 4: A closer view of the amended development proposals (2016).

3 METHODOLOGY

This study has been commissioned as an amendment to the original EIA and addressed the heritage component of an EIA. The report will be submitted in support of the amendment application. An independent visual assessment forms part of the specialist studies.

The study assesses the identified range of impacts in terms of accumulated knowledge of the area. The source of information that is used for this process is based on scientific publications related to archaeological work undertaken in the Study Area and other unpublished reports on the archaeology and history of the region, derived from the SAHRIS database. The 1:50 000 maps of the area as well as Google Earth aerial images were consulted.

3.1 Field Assessment

The study reported here has relied on a physical survey of the Study Area and the body of background information (published and unpublished)

about the area. The locations of the proposed turbines, access roads, electricity power lines, substations were loaded onto handheld GPS receivers (set to the WGS84 datum). Fieldwork was undertaken on 1 October 2010. Walk paths and site locations were recorded with GPS and finds were photographed and described.

1. The proposed locations of the original 12 proposed turbines, the substation and the underground power lines was surveyed on foot (Figure 2);
2. A drive down was undertaken of the access roads in 2010;
3. The Rossouwskraal farmhouse on the Klipheuvel farm was inspected (Figure 1) and recorded in order to assess the impact of the WEF on the built environment and possible farm graveyards;
4. Interviews were held with Mr Liebetrau of Bird Field and Mr van Zyl of Klipheuvel. They were questioned about the history of their respective farms and the presence of any heritage resources on their properties;
5. The impact of the proposed activity on the palaeontology of the area was assessed in terms of the known geology of the area.

3.2 Assumptions and Limitations

1. There were no significant study limitations as all turbine and substation locations were accessible on foot;
2. With regard to information gaps, there is very little published information on the archaeology of the area, with most archaeological research concentrated further south and west. This makes it difficult to compare the results of the survey or to infer the significance of the sites discovered during the field work;
3. The below surface conditions of the site are assumed in terms of the published geology of the area. Apart from a single sandstone kopje, the site is covered by ploughed sands;
4. It has been assumed that the concentration of archaeological remains around Hottentotskop reflects pre-colonial settlement of the kopje. The paucity of remains in the adjoining oats fields may reflect an absence of settlement but it is also possible that surface settlement may have been destroyed through several centuries of ploughing and grain cultivation.

4 REGULATORY AND LEGISLATIVE OVERVIEW

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 of the National Heritage Resources Act, No 25 of 1999.

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

1. Landscapes, cultural or natural (Section 3 (3))
1. Buildings or structures older than 60 years (Section 34);
2. Archaeological Sites, palaeontological material and meteorites (Section 35);
3. Burial grounds and graves (Section 36);
4. Public monuments and memorials (Section 37);
5. 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)).

4.1 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.

4.2 Scenic Routes

While not specifically mentioned in the NHRA, No 25 of 1999, Scenic Routes are recognised by DEA&DP as a category of heritage resources. 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.

4.3 Heritage 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 (Source: Winter & Baumann 2005: Box 5). The subdivision of Grade III sites has been introduced in the Western Cape to facilitate significance grading at the local level.

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 III heritage resources.
IIIA	Local	Of high intrinsic, associational and contextual heritage value within a local context, i.e. formally declared or potential Grade IIIA heritage resources.
IIIB	Local	Of moderate to high intrinsic, associational and contextual value within a local context, i.e. potential Grade IIIB 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 IIIC heritage resources.

4.4 Assessing heritage in the context of wind energy developments

Wind energy facilities have grown exponentially throughout the world in response to the international energy crisis and climate change. Initially communities enthusiastically accepted the presence of wind energy facilities, however web-based research of international experience has indicated that they are not without controversy. The impacts of clusters of massive wind turbines on *cultural landscape* can be severe, both in physical terms and with respect to the intangible and aesthetic qualities of a given locality. A pilot study commissioned by the Provincial Government of the Western Cape as part of its Strategic Initiative to Introduce Commercial Land Based Wind Energy Development to the Western Cape and Report 6 in the series titled "Towards a Regional Methodology for Wind Energy Site Selection in the West Coast region" (2006) considered landscape character rather than the cultural landscape but they concluded that wind energy facilities have an impact on the surrounding landscape in terms of the natural qualities of places.

Wind energy facilities are often big developments. Turbines can be up to 120m high with blades up to 140m in radius. The structure has to be counterweighted by a concrete block (up to 675 cubic meters) sunk deep into the ground. Each turbine position needs road access that can be negotiated by a heavy lift crane which means that in undulating topography deep cuttings and numerous roads may be made into a landscape to create workable gradients. Due to their size the visual impacts are immitigable (they are easily visible from 10 km) in virtually all landscapes, however indications are (PGWC 2006) that they are perceived to be aesthetically more acceptable in agricultural or manicured landscapes.

The point at which a wind turbine may be perceived as being “intrusive” in terms of the aesthetics of an area is a subjective judgment, however it can be anticipated that the presence of such facilities close to wilderness and heritage areas will destroy many of the intangible and aesthetic qualities for which an area is valued, or could be potentially valued in the future.

The degree of physical landscape disturbance caused during the construction of turbines is such that the destruction of archaeological and palaeontological heritage is a very high likelihood. Hence, in the assessment of impacts of wind energy proposals it is necessary to assess both physical damage to heritage caused by the establishment of infrastructure, as well as focus on the way that such a facility can change the aesthetic and intangible values of the cultural landscapes in which the physical heritage resources exist.

In terms of landscapes and heritage, there are no detailed studies that can be consulted, however the PGWC study recognises that severe impacts can occur and *suggests a buffer zone of 500 m from heritage sites to avoid physical impacts.*

5 DESCRIPTION OF THE AFFECTED ENVIRONMENT

The Study Area is located 6km south of Klawer and the N7 highway. Klawer is located on the Olifants River which provides the separation between the Sandveld and the Knersvlakte (Penn 1987), as well as between the Sandveld and the Cedarberg.

The farm of Bird Field is about 3 km west from the Olifants River. It is bounded on its eastern side by a gravel farm road and the railway line (Figure 1). The farm is bisected by the Groenkloof River, a tributary of the Olifants River. The land rises in the west to a granite kopje called “Hottentotskop” which reaches a height of 366 m. Bird Field is partially transformed by agricultural land use but a portion remains under indigenous vegetation. There are no farm buildings on Bird Field with the exception of a recently constructed store located in the centre of the property.



Plate 1: General view of landscape, showing Hottentotskop which is the most prominent feature in the Study Area; oats fields and patches of indigenous vegetation (Photo taken 2010).

Klipheuvel is a long narrow property which rises in the east to the meet/adjoin the Bird Field boundary at Hottentotskop (Figure 1). A large portion of the farm has been ploughed and is under oats cultivation although a substantial portion is still under indigenous vegetation. There are a number of farm buildings on the western section of the farm, on the farm road.

5.1 Palaeontological heritage

The area is underlain by sandstones of the Peninsula Formation of the Table Mountain Group, Cape Supergroup, with loamy and sandy soil in the southwest.

No fossiliferous deposits are exposed currently on the Klipheuvel or Bird Field areas. The sandstones of the Peninsula Formation are not fossiliferous. Any excavations into the loamy and sandy soil in the southwestern portion of Klipheuvel may expose palaeosols with calcified roots and dune snails, as immediately north of the Olifants River, where these palaeosols also contain Early and Middle Stone Age artefacts (Roberts *et al.* 2006). If these are encountered they should be checked by a palaeontologist before construction or in-filling.

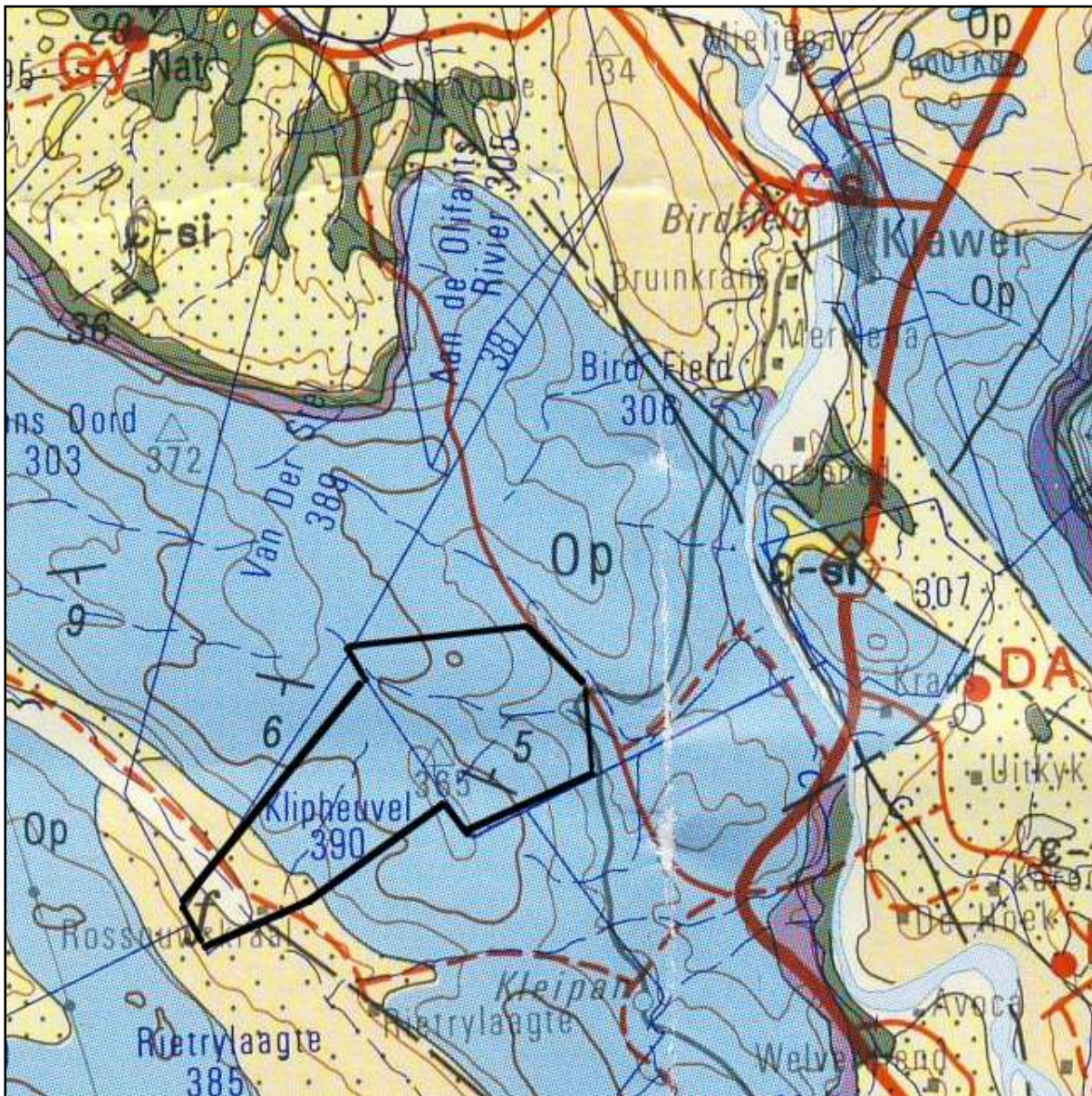


Figure 5: Geological map of the Klawer area, showing the approximate site boundary: Op = Peninsula Formation sandstone (from de Beer et al. 2002)

5.2 Pre-colonial Heritage

Little is known of the archaeology of the area around Klawer. The University of Cape Town was actively involved in archaeological research in the Sandveld region of the Western Cape during the 1970s and 1980s. However, the bulk of this work was in the Clanwilliam District and much of the research focussed on an area to the south of Lambert's Bay. Orton (2012) completed a doctoral study of the Namaqualand area which included the Knersvlakte, to the north of the Study Area.

The Sandveld area between the mountains and the coast is characterised by deflation areas many of which contain evidence of Later Stone Age (LSA) occupation characterised by scatters of microlithic stone tools. Where small kopjes or rocky outcrops occur in the Sandveld, they often contain rock art images and some may have shallow archaeological deposit. Archaeologists (Manhire et al. 1984) have commented that there

is evidence in the Sandveld for the impact of immigrant pastoralist groups on the hunter-gatherer populations between the 2nd and 1st millennium AD.

5.3 Colonial Heritage

The historian Nigel Penn is of the opinion that the Khoekhoen in the Western Cape would have confined themselves to certain resource rich areas, and one of these would have been the Olifants River Valley. However, Penn (1987:464) says "by 1705, the Khoi population of the Western Cape had been so badly affected by the open cattle trade that in a twelve day journey between the Berg River and the site of the present day Klawer, Starrenberg found only two kraals which, though they contained twelve Captains, had very few cattle".

Manhire *et al.* (1984:118) comment that "references to the diaries of seventeenth and eighteenth century travellers makes it clear that at least by then pastoralist groups were using the sandy plains for grazing their stock and that the mountains were the hideouts of 'Bosjesmans', a term used then to refer a heterogonous grouping of runaway slaves, destitute herders and genuinely residual hunter-gatherers".

The first European loan farms were allocated along the Olifants River Valley in 1725 and by 1732 these farms had reached the confluence of the Olifants and Doorn Rivers. There are numerous historic references to many Khoi kraals in the valley during the early part of the 18th century (Penn 1987).

6 FINDINGS

6.1 Palaeontology

No palaeontological material was observed during the course of the field survey however it is possible that excavation may produce evidence of evidence of invertebrates (snails), old land surface and mineralised bones of Pleistocene animals.

6.2 Pre-colonial Archaeology

Hottentotskop, on the farm Bird Field, is a large granite kopje which rises to a height of 366 m. It comprises a number of outcrops and there is archaeological evidence, in the form of stone artefact scatters, for pre-colonial settlement in various shelters and on rocky platforms around the kopje (Plate 2 & 3). Recorded sites are listed in Table 2 at the end of this report.

Site 34, illustrated below, and included an LSA stone tool scatter on a platform near the kopje. It included an abundance of grey silcrete flakes with some blade elements, an adze and some radial cores.



Plate 2: View of Hottentotskop from the east. There are archaeological sites around the hill (Photo taken in 2010).



Plate 3: Site 34 comprising a scatter of stone tools lying on a rocky platform near the kopje (Photo taken 2010).

Isolated stone artefacts were found in the fields on both Bird Field and Klipheuvél but they were very sparsely distributed and did not constitute a defined archaeological site. They were not considered to be *in situ* and they were recorded as being of low significance.



Figure 6: Map of 2010 field survey tracks (pale blue) and location of archaeological sites (red icons) situated around Hottentotskop in the middle of the photograph.

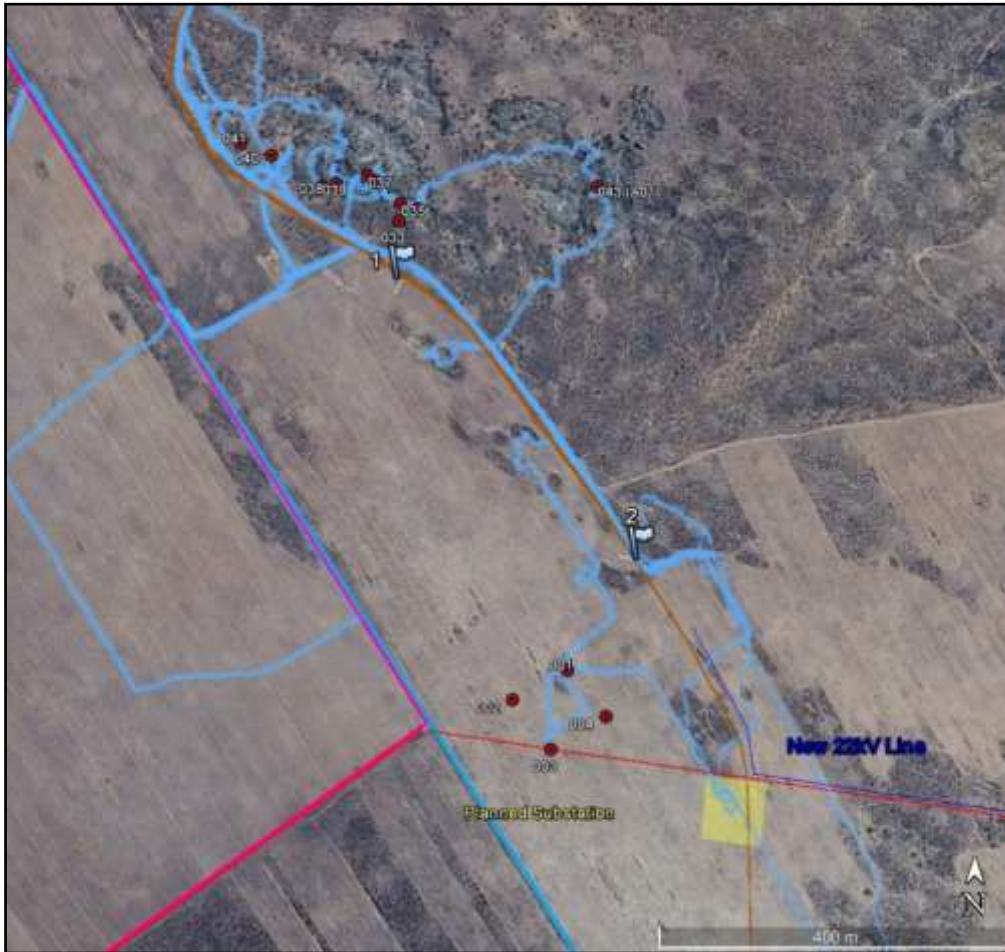


Figure 7: The 2010 field survey tracks (in blue) together with the 2016 layout, indicating that both the location of the substation (yellow square) and the turbines (blue flags) have been surveyed.



Plate 4: Site 37 is a small shelter under the beacon with evidence of pre-colonial settlement.



Plate 5: Stone artefacts on coarse-grained silcrete from Site 42; Plate 5: Stone artefacts from Site 34.

7 BUILT ENVIRONMENT

There is a single, recently constructed shed (Liebetrau pers comm.) on Bird Field associated with a fence kraal. It is situated next to the farm road.

The farm Klipheuvel (also known as Rossouwskraal) has a number of farm buildings situated on the farm road in the south-western corner of the farm (Figure 1). There are two recently constructed buildings (Van Zyl pers comm.) as well as an older unfired mud-brick building which is currently being used as a shed (Plates 6 & 7). The mud brick building has a more recent addition (Plate 6). Mr van Zyl indicated that he had considered restoring the building but that it was collapsing and was probably beyond repair. The building probably dates to the 19th century and is protected by the NHRA.



Plate 6 & 7: The transformed shed on Rossouwskraal comprising a collapsing, unfired mud-brick building with recent cement block additions.

In terms of the new layout, there are no turbines or associated infrastructure in proximity to the buildings.

7.1 Cultural Landscape

The landscape of the farms Bird Field and Klipheuvel consists of rolling hills, covered in cereal crops, rising to the granite kopje of Hottentotskop (Plate 1). The only historic buildings on Klipheuvel are situated 2.5 km to the west of the proposed facility. The cultural landscape, as defined in Section 3.1 above, is considered to be of low significance. The only exception is Hottentotskop which could be considered to represent an archaeological landscape of moderate significance in terms of prehistoric inhabitants.

8 IMPACT IDENTIFICATION AND ASSESSMENT

8.1 Turbines

Any deep excavation has the potential to impact palaeontological material; however it is expected that the trenches and foundations required will not go deep enough to intersect with any major fossil bearing sediments.

Wind Turbines 1 & 2 are located to the south of Hottentotskop on the farm Bird Field (Figure 4). They are situated on the edge of the agricultural lands. There are a number of sandstone surfaces, covered in indigenous vegetation, located within the oats fields. It is possible that isolated stone artefacts, of low significance, may be impacted by the placement of the turbines and underground connecting cables. The occasional flaked stone artefact recovered from the fields has already been previously impacted by decades of agriculture. No mitigation will be required.

8.2 Substation

The proposed location of the substation (Figure 4), in the fields to the south of Hottentotskop on Bird Field, will not impact on the pre-colonial or colonial heritage of the farms. The visual impact with respect to motorists travelling along the N7 has been assessed by the visual specialist.

8.3 Connecting electrical lines

There are no heritage issues with respect the impact of the proposed construction of underground electrical lines connecting the turbines. There may be isolated stone artefacts in the oats fields, but they have already been impacted by previous agricultural activities.

8.4 Access Road

The access road will be an existing gravel farm road (Figure 2) which will need to be widened to accommodate the machinery needed on site. There may be some places where the sharp bends in the existing roads may be straightened out to accommodate the larger construction trucks. There

are two archaeological sites (Sites 40 and 41) which are located within 30m of the existing farm road.

Table 3: The potential impact of construction of turbines, substation, access roads and power line on the *palaeontological heritage* of the Study Area (**2016 layout**).

	Without Mitigation	With Mitigation
Nature/Type	Negative & Direct	Positive
Extent	Local (2)	On-site (1)
Duration	Permanent (5)	Long-term (4)
Magnitude	Low (3)	Low (2)
Probability/likelihood	Improbable (2)	Improbable (2)
Significance	Minor (20)	Minor (14)
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	
Mitigation: Mitigation of palaeontological heritage can be achieved by ensuring that trenches and excavations are checked by a palaeontologist. The collection of new scientific information is a positive impact.		
Operational Phase: n/a		
Decommissioning Phase: n/a		
Cumulative impacts: n/a		

Table 4: The potential impact of the construction of two turbines, substation, access roads and power line (**2016 layout**) on the *pre-colonial archaeology* and *built environment* of the Study Area

	Without Mitigation	With Mitigation
Nature/Type	Negative & Direct	Neutral
Extent	On-site (1)	On-site (1)
Duration	Permanent (5)	Long-term (4)
Magnitude	Minor (2)	Minor (1)
Probability/likelihood	Improbable (2)	Very improbable (1)
Significance	Low (16)	Minor (6)
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	
Mitigation:		
1. Ensure that when widening the access road, there are no impacts to archaeological sites 40 & 41, some 30m from the road;		
2. It is recommended that the kopje area be declared "off-limits" during the construction period, to ensure that no building material is dumped on archaeological artefacts scattered around the kopje;		
3. No mitigation is required for the built environment.		
Operational Phase:		
1. Prevent access of workers to the kopje area to ensure that archaeological sites are not damaged;		
2. Ensure that the old farmhouse on Klipheuvel is not damaged or vandalized during the operation of the WEF.		
Decommissioning Phase: Prevent access of workers to the kopje area, as well as old farmhouse, to ensure sites are not vandalized.		
Cumulative impacts: Minor		

Table 6: The potential impact of the construction of the turbines, substation, access roads and power line on *buried graves* in the Study Area (**2016 layout**).

	Without Mitigation	With Mitigation
Nature/Type	Negative & Direct	Neutral
Extent	On-site (1)	On-site (1)
Duration	Permanent (5)	Permanent (5)
Magnitude	High (8)	Moderate (6)
Probability/likelihood	Improbable (2)	Very Improbable (1)
Significance	Low (28)	Low (12)
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated?	Yes	
Mitigation: Impacts are expected to be low. It is recommended that: If any human remains area uncovered during construction, that work must stop immediately in that area and Heritage Western Cape must be notified (Telephone: 021 483 9685). Mitigation may involve exhumation with a Work Plan issued by Heritage Western Cape.		
Operational Phase: None		
Decommissioning Phase: None		
Cumulative impacts: The cumulative impact is not likely to differ from the above.		

Table 7: The potential impact of the construction of two turbines, substation, access roads and power line on the *Cultural Landscape (archaeological landscape)* of the Study Area (**2016 layout**)

	Without Mitigation	With Mitigation
Nature/Type	Negative & Direct	Neutral
Extent	Local (2)	On-site (1)
Duration	Permanent (lifespan of WEF) (5)	Permanent (5)
Magnitude	Moderate (4)	Low (2)
Probability/likelihood	Probable (3)	Improbable (2)
Significance	Low (27)	Minor (16)
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	
Mitigation: No further mitigation measures are recommended.		
Operational Phase: See above		
Decommissioning Phase: None		
Cumulative impacts: There are two other facilities planned for within a 75 km radius. Since Klaver is a Preferred Bidder Project, it will be constructed well before any of the other wind farms proposed for the area.		

9 CUMULATIVE IMPACTS

There are two other facilities planned for within a 75 km radius. Since Klaver is a Preferred Bidder Project, it will be constructed well before any of the other wind farms proposed for the area.

10 CONCLUSION

The palaeontological impact assessment concluded that the study Area is of low palaeontological significance. However, it was recommended that a palaeontologist conduct at least 1 site visit during excavation of foundations for turbines in order to assess the below ground geology. Changes to the layout of the WEF are not expected to have any impacts to the palaeontological resources and will not change the rating of impacts as originally predicted.

The revised layout of two turbines and associated infrastructure (2016) will not result in any direct impact on Hottentotskop and its pre-colonial archaeological sites. Visual impacts will also be drastically reduced. The widening of the access road to enable heavy machinery onto site may result in accidental damage to archaeological Sites 40 and 41. It is recommended that the kopje is fenced off during construction, so that archaeological sites are protected.

The proposed amendment is viable and it is not expected to have any significant impacts to heritage resources. The proposed amendment is therefore supported.

10.1 Emp

The following recommendations should be included in the EMP:

3. A palaeontologist must conduct at least 1 site visit during excavation of foundations for turbines in order to assess the below ground geology
4. The kopje must be declared "off-limits" during construction, to avoid accidental damage to archaeological sites which are scattered around the base of the kopje;
5. If any archaeological material is uncovered during construction, then work must stop in that area and Heritage Western Cape must be notified immediately (Telephone: 021 483 9685);
6. If any human remains area uncovered during construction, then work must stop immediately in that area and Heritage Western Cape must be notified immediately (Telephone: 021 483 9685);
7. The old farmhouse on Klipheuvel must be declared a "no-go" area in order to avoid any damage or vandalization during the construction and operation of the WEF.

11 REFERENCE LIST

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Table 2: List of heritage sites recorded during the survey

Site Number	GPS Co-ordinates	Type	Description	Significance
033	S31.83915 E18.56670	MSA	Small cluster of silcrete flakes on the edge of an open area near the kopje. The stone tools are weathered and are perhaps MSA. Some artefacts are on quartz.	IIIC
034	S31.83902 E18.56692	LSA	Some LSA stone tools near the kopje, in front of the boulders and on a rocky platform; there is an abundance of grey silcrete flakes with some blade elements, 1 x adze, some radial cores.	IIIB
035	S31.83897 E18.56672	Indeterminate	A swathe of soil covered in stone tools; one quartzite lower grindstone used as a core	IIIC
036	S31.83875 E18.56643	LSA	One level up on kopje, rocky platform with stone tools in quartz, chert and silcrete, quartzite. An endscraper in red silcrete. There is a significant amount of material with excavation potential although no organic remains identified.	IIIA
037	S31.83869 E18.56632	LSA and contact	Small south-facing shelter located under the survey beacon. Some of the open gaps in the shelter have been roughly filled with stone walling. There is minimal deposit with a Cobra polish tin, some spoons and also some prehistoric pottery and stone artefacts.	IIIB
038	S31.83877 E18.56596	Indeterminate	Stone tools	NCW
039	S31.83880 E18.56578	Indeterminate	Stone tools	NCW
040	S31.83849 E18.56519	Indeterminate	More stone tools in big swathe of soil next to distinctly shaped standing rock.	IIIC
041	S31.83837 E18.56483	Indeterminate	More ephemeral scatter of stone tools	NCW
042	S31.83408	MSA	Ephemeral stone	NCW

Site Number	GPS Co-ordinates	Type	Description	Significance
	E18.55734		scatter in ploughed lands on road alignment	
043	S31.855832 E18.543732	Historic	Collapsing unfired mud-brick building, possibly 19 th century.	IIIC
043 (A01)	S31.83875 E18.56911	LSA?	Spread of small, grey chert flakes and cores located in a sheltered area between rocks.	IIIC