

HERITAGE IMPACT ASSESSMENT

Submitted to

Heritage Western Cape

**In terms of Section 38 (8) of the National Heritage
Resources Act, Act 25 of 1999**

PROPOSED GROENE KLOOF WIND ENERGY GENERATION FACILITY AND POWER TRANSMISSION LINE(S) NEAR MAMRE, WESTERN CAPE PROVINCE

Applicant:

Dassenberg Wind Energy (Pty) Ltd.

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for

Withers Environmental Consultants

October 2012

Executive Summary

Dassenberg Wind Energy (Pty) Ltd is proposing the development of the proposed Groene Kloof wind energy facility near Mamre, in the Western Cape. Their proposal includes two alternative layout options. The first option (Revised Layout Option 1, “*Preferred Option*”) proposes a smaller number of turbines of lesser height (14 turbines, 160m high each), while the second option proposes one more wind turbine, and of greater height (15 turbines, 180m high each.) Both options require comment from the authorities; the developer is investigating both for feasibility. The development entails the associated infrastructure of a small substation, overhead power lines connecting to Eskom, underground cabling connecting the turbines to each other and to the substation on site, roads, and a temporary construction materials site.

The receiving environment is rural and characterised by farming activities and alien Port Jackson vegetation. The specific area earmarked for the wind farm is infested with alien vegetation (Port Jackson). The site lies on the foothills of the landscape, between the coastal plain and the range of hills known as the Darling Hills, Dassenberg Hills and Koeberg. The topography is relatively flat. A major powerline transects the landscape, already rendering it a partially “vertically disturbed landscape.” The Bobbejaansberg forms a visual barrier between the site and the R307 and Mamre Mission Station werf.

John Pether prepared a Paleontological Impact Assessment (PIA) for the neighbouring proposed Clover Valley Wind Energy Facility. The site conditions at Clover Valley are assumed to be very similar to that at the proposed Groene Kloof Wind Energy Facility. His main concern was with the deep foundation excavations. The possibility of exposing fossils were found to be low but distinct, and not a factor that would influence the decision on proceeding with the project. The paleontological mitigations proposed include monitoring for fossils by on site personnel and scheduled field inspections by a palaeontologist.

Jonathan Kaplan prepared the Archaeological Impact Assessment (AIA). The archaeological landscape is found to be compromised by 250 years of agricultural activity. The Darling Hills formed part of a local transhumance cycle where Khoi tribes moved between landscapes in search of fresh grazing for their stocks. No archaeological remains were found in the proposed turbine sites inspected, but interesting finds were made in the broader study area, outside of the proposed wind farm site. The AIA found that the development would not have an impact of great significance on the archaeological heritage for the greater part of the site, but further archaeological mitigation is required at the possible herder site identified by the archaeologist.

The Visual Impact assessment (VIA) was prepared by Megan Anderson. Other than the Darling Hills, which provide topographical screening towards the North East, the proposed wind farm would be visible from a large area. The VIA recommends that the option with more turbines of lesser height be pursued. The visual impact is anticipated to be high due to the significant vertical elements that would be imposed on a largely horizontal rural landscape. Of the visual receptors identified in the study,

Mamre Mission Station and Groote Post werf are considered of heritage importance. Bobbejaansberg screens the turbines from view from Mamre Mission Station werf. The cultural landscape in which the proposed windfarm is situated is made up of rural areas between the towns of Mamre, Darling and Atlantis. The area has a rich history spanning from pre colonial Khoi habitation, to VOC land holdings in the form of cattle trading- and military outposts, to later British occupation and settler farming. Mamre's Moravian church dates from 1838, but the other werf buildings are of an earlier period (c1770) and were used by the VOC. Groote Post was also originally a VOC military post, with the homestead possibly dating from c1752. Lord Charles Somerset is associated with the farm after the British Occupation. The built heritage resources are not directly/physically affected by the proposal, but are visually affected. (The general cultural landscape and Groote Post will be affected, while Mamre Mission Station werf is screened)

Different people may have different opinions to wind farms, their desirability and their effect on the "sense of place" of a landscape. Wind turbines may be perceived as majestic sculptures in the landscape and a positive move towards a greener future for the planet, positively affecting climate change rate and therefore the future of nature and agriculture, or they may be viewed as dominating unattractive eyesores.

The cultural landscape is continually evolving. From the Khoi habitation and cattle grazing, VOC outposts, settler farming, to modern-day farming, the landscape has been built up with layers which display agricultural activity (dry land farming, wheat, vineyards), more recent private nature conservation efforts/ rehabilitation, built structures (farmsteads, towns and villages) and roads. The continuation of the wind farm project could constitute another layer to the cultural landscape, which is true to today.

It should be noted that we are entering a new era where modern man needs to live sustainably. Man's existence on this planet will depend on "doing things differently", such as generating electricity from renewable resources. Wind turbines have certainly given a new dimension to the cultural landscape of historic Europe. The South African landscape will be no different, where modern meets historic and agriculture and renewable energy will need to continue side by side on the same land.

Contents

1. Introduction
2. Heritage Legislation
 - 2.1 Identification and Mapping of Heritage Resources
 - 2.2 Assessment of Significance (Criteria)
3. Description of Affected Environment
4. Methods/ Limitations
5. Heritage Context
 - 5.1 Palaeontology
 - 5.2 Pre-Colonial Archaeology
 - 5.3 Colonial Period
 - 5.3.1 Regional Development
 - 5.3.2 Development of Towns
 - 5.4 Built Environment
 - 5.5 Assessment of Significance and Grading
6. Assessment of Potential Impacts
 - 6.1 Palaeontology
 - 6.2 Archaeology
 - 6.3 Built Environment
 - 6.4 Graves
 - 6.5 Cultural Landscapes and Sense of Place
 - 6.6 Visual Impacts and Scenic Routes
7. Further Studies and Possible Mitigation Requirements
8. Comparison of Impacts relative to Socio Economic Benefits
9. Conclusions
10. References
11. List of Acronyms
12. List of Appendices
13. Author's declaration of independence

1 Introduction

Withers Environmental Consultants requested the author to prepare an integrated heritage impact assessment (HIA) consisting of a specialist archaeological study, a specialist paleontological study, an assessment of historic land use patterns and a visual study on the impacts of the proposed development on heritage resources, such as the Provincial Heritage Sites, with an integrated set of recommendations and the specialist studies appended in full, as required by Heritage Western Cape (Letter dated 25.04.2012; Case No 120123JL12)

Anne-Marie Fick from Malherbe Rust Architects has been appointed to undertake the integrated HIA. She is an architect and heritage management consultant with eight years experience in disciplines involving the built environment, and is an accredited member of The Association of Heritage Assessment Practitioners, Western Cape. Anne-Marie Fick of Malherbe Rust Architects and her associates have no financial interest in the property or development as such, and are not involved in any other projects being promoted by the client group, or companies owned by the client, other than the heritage impact assessments for these two wind farm sites (Groene Kloof and Clover Valley).

Dassenberg Wind Energy (Pty) Ltd proposes to develop a wind energy generation facility (called the Groene Kloof Wind Energy Facility) on a portion of the farm Groene Kloof, No 97; Portion 1 of the farm Laaste Stuiver No 976 and the remainder of Farm Laaste Stuiver No 976, Malmesbury RD in the Western Cape Province, and a proposed power transmission line linking the proposed facility to Eskom's Dassenberg substation in Atlantis.

The proposed Groene Kloof Wind Energy Facility seeks to address the need for renewable energy in South Africa, to assist in meeting the country's goals in terms of reduction in carbon dioxide emissions and to influence climate change. At the Copenhagen Climate Negotiations of 2009, the SA government undertook to reduce carbon emissions by 34% by 2020, and 42% by 2025. In 2011 the SA Government published an Integrated Resource Plan which plans the energy demands for the future; it indicated that 5% of new facilities must be wind power driven.

The proposed Wind Energy Facility is structured as two options with differing size and layout. Both options are being investigated by the developer, without there being a preferred alternative at this stage. HWC comment should therefore address both options.

Based on the outcome of the EIA specialist studies, Layout Option 1 (20 turbines, 100m hub height) was considered to be the preferable layout option. This layout was then amended, based on the recommendations made by the specialists, which resulted in a slightly revised layout option, i.e. Layout Option 3, being put forward as the Preferred Development Option in the Draft EIA Report. Layout Option 3 therefore superseded Layout Option 1, which in essence fell away. The preferred development option is now referred to (in this Integrated HIA) as the "Revised Layout Option 1".

The “Revised Layout Option 1 (Preferred Option)”, comprises 14 turbines (100m hub heights), which represents a 30% loss in production capacity, compared to the initial proposed 20 turbines. This reduction in production capacity illustrates the Applicant’s willingness to limit potential environmental impacts and to develop a sustainable wind energy facility, even if it means a reduction in power output.

The proposed Groene Kloof Wind Energy Facility site falls on state owned land. The entire site is approximately 560ha in extent, and the proposed construction lay down area will be approximately 1ha in extent.

Wind turbines consist of a rotor (with three blades), a nacelle, a tower, and a reinforced concrete foundation. The proposed turbines will have a total height (from foundation to tip of blade) of approximately 160m (Revised Option 1)/ 180m (Option 2). The nacelle height is approximately 100m (Revised Option 1)/ 120m (Option 2), with blade lengths of approximately 60m for both options. The turbine shafts will be tubular steel towers (tapering) with a diameter of approximately 5-6m at the base. The foundations will most likely be octagonal, with a diameter of approximately 20m. Its height will be in the order of 1.2m at the edge, increasing to 3m in the centre of the pedestal. Exact sizes will be confirmed by a geotechnical specialist and a structural engineer.

The tower height is an important factor contributing to the amount of energy generated. Wind strengths increase at higher altitudes. Each of these turbines would have an electricity generation capacity of 2-4MW.

Other infrastructure associated with the proposed wind energy facility (WEF) will include:

- a small substation on site
- an internal road network (using existing roads where possible, as well as constructing additional new roads). The roads will have a hardened surface and will be designed by an appropriate roads engineer in order to accommodate the weight (160t per nacelle) and road turn angles (required to transport blade lengths of 60m+)
- underground power cables linking the wind turbines to the substation on site. The trenches for these will be approximately 450mm wide and 1 to 2m deep, dug by a digger loader, and will run alongside the road network.
- temporary construction material lay down area at entrance to the site (area to be rehabilitated after completion of construction phase)
- overhead power transmission lines linking the proposed facility to the Dassenberg Substation near Atlantis.

The properties affected are:

Wind Energy Facility (WEF)

Property	Registered Owner
Portion 1 of the Farm Laaste Stuiver No976, Malmesbury RD	National Housing Board
The remainder of Farm Laaste Stuiver No976, Malmesbury RD	National Housing Board
A portion of the farm Groene Kloof No	Republic of South Africa

971	
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Power Transmission Line (Preferred Route)

Property	Registered Owner
Rem Ext of Farm Groene Kloof No 971, Malmesbury RD	Republic of South Africa
Rem Ext of Farm Laaste Stuiver No 976, Malmesbury RD	National Housing Board
Rem Ext of Farm Papekuil Outspan No 6, Cape RD	Regional Services Council
Rem Ext of Erf 2756, Westfleur, Cape RD	National Housing Board
Rem Ext of Farm No 1183, Cape RD	City of Cape Town
Portion 42 of Farm Melk Post No 4, Cape RD	City of Cape Town
Portion 84 (a portion of 42) of Farm Melk Post No 4, Cape RD	City of Cape Town
Portion 82 (a portion of Portion 42) of Farm Melk Post No 4, Cape RD (<i>Dassenberg Substation Site</i>)	City of Cape Town

Power Transmission Line (Alternative Route)

Property	Registered Owner
Portion 1 of Farm Laaste Stuiver No 976, Malmesbury RD	National Housing Board
Portion 2 of Farm Laaste Stuiver No 976, Malmesbury RD	National Housing Board
Rem Ext of Farm Melk Post No 3, Cape RD	National Housing Board
Rem Ext of Erf 2756, Westfleur, Cape RD	National Housing Board
Portion 79 (a portion of Portion 42) of the Farm Melk Post No 4, Cape RD	City of Cape Town
Portion 78 (a portion of Portion 42) of the Farm Melk Post No4, Cape RD	City of Cape Town
Portion 42 of the Farm Melk Post No 4, Cape RD	City of Cape Town
Portion 83 (a portion of Portion 42) of the Farm Melk Post No 4, Cape RD	City of Cape Town
Portion 84 (a portion of Portion 42) of the Farm Melk Post No 4, Cape RD	City of Cape Town
Portion 82 (a portion of Portion 42) of the Farm Melk Post No 4, Cape RD (<i>Dassenberg Substation Site</i>)	City of Cape Town

Alternatives were considered in terms of the EIA regulations of 2010. The project team considered location alternatives, activity alternatives, design/layout alternatives, use of different technologies, demand and input alternatives, routing alternatives, and scale and magnitude alternatives.

The alternative site considered comprises of sections of the farms Burgers Post No. 754 and Hillside West No. 708 (Cloof), Malmesbury RD. This site was subjected to a pre-application environmental due diligence and environmental opportunities and constraints assessment. The assessment however found that the alternative site would not be suitable for the development of an alternative energy facility, due to the sensitive nature of the indigenous vegetation occurring on certain sections of the site, and due to the high visibility of the Dassenberg Hill, which is situated on a section of the site. This site was therefore not taken forward as part of the EIA process.

The power line route alternatives under consideration are:

Preferred Route:

A servitude is proposed to run parallel to Eskom's existing Aurora-Koeberg 2x400KV powerline servitude. This servitude transects the proposed Groene Kloof site on its Eastern boundary. The route will then run in a South Eastern direction towards Atlantis where it will link to the Dassenberg Substation. Eskom has indicated that this parallel servitude could be routed along the Southern side of their existing servitude. The servitude will be 31m wide.

Alternative Route:

The alternative route is situated south of the Groene Kloof site. A section of the proposed alternative route is situated between the site and the Silverstream substation to the South. It is proposed to route the power lines along the boundary fence of Portion 1 of the Farm Laaste Stuiver No.976, Malmesbury RD. From there it is proposed to run parallel to the City of Cape Town's existing 33KV power line servitude, which is situated between the Silverstream substation and the Dassenberg substation in Atlantis.

The property is zoned Agricultural Zone 1. A consent use application will be lodged for the proposed project.

Public Participation:

Section 38(3)(e) of the NHRA requires that *“the results of consultation with communities and other interested and affected parties regarding the impact of the development on heritage resources”*.

Interested & Affected Parties (I&APs) that were included in the Public Participation Process of the EIA have involved the following groups:

- owners of the land (WEF site and power line routes)
- owners/occupiers of land adjacent to application site
- organizations that represent the communities in the area (Mamre Community Property Association – replaced the Mamre Interim Steering Committee)
- municipalities
- Eskom
- Relevant NGO's/ community based organizations

Information was made available at public meetings, and at the Mamre, Westfleur (Atlantis), Koeberg and Darling public libraries.

The following two I&AP's have been added to the EIA public participation list:

- Swartland Heritage Foundation

- Cape Heritage and Development Forum

The Integrated HIA was available for public comment from 30 August 2012 to 24 September 2012, together with the Draft EIA Report. (The I&AP letter that announced the availability of the Draft EIA Report also invited comments on the Integrated HIA to be submitted by 24 September 2012.)

A Comments and Response Table is attached to this document as Appendix 5, and includes all the heritage-related comments that were received during the above-mentioned comment period. It therefore contains the results of consultation with communities affected by the proposed development and other interested parties regarding the impact of the development on heritage resources. [As per the section 38(3)(e) requirement of the NHRA.]

A public meeting was also held in Mamre on Wednesday, 19 September 2012 (during the Integrated HIA and Draft EIA Report comment period). The meeting was attended by about 50 I&APs, and no heritage-related comments were raised during the public meeting.

This Updated Integrated HIA, together with all its Appendices was also submitted [in electronic (CD) format] to the I&AP who commented on the Integrated HIA. The Comments and Response Table (Appendix 5) provides the relevant responses to the I&AP's comments.

2 Heritage Legislation

The National Heritage Resources Act (NHRA), Act 25 of 1999 protects heritage resources as defined under the National Estate. These resources include among others paleontological resources, prehistoric/historic material, human remains, structures older than 60 years, ruins older than 100 years, and landscapes of cultural significance.

The proposal involves changing the character of a site greater than 5000m² and a linear development (power line) exceeding 300m in length. A Notification of Intent to Develop was submitted to HWC in April 2012. The applicant, Dassenberg Wind Energy (Pty) Ltd., is a 100% subsidiary of Western Wind Energy (Pty) Ltd.

It should be noted that another company, called Clover Valley Wind Energy (Pty) Ltd., which is also a 100% subsidiary of Western Wind Energy (Pty) Ltd., is proposing to develop another wind energy facility on the neighbouring properties to the Groene Kloof site, i.e. on a portion of Farm 727 (Klawer Valley) and Farm 725, Malmesbury RD. This neighbouring project is called the 'Clover Valley Wind Energy Facility.' The HIA for the Clover Valley project is also being undertaken by the author.

The project is being conducted under the auspices of an EIA. As such the final decision making would rest with DEA&DP, with HWC being required to provide comment on the heritage impact assessment study.

Section 38(3) of the NHRA specifies the following information that should be included in a heritage impact assessment:

- (a) The identification and mapping of all heritage resources in the area affected; (Refer to section 2.1 and Figure 24 in Appendix 1a of this report)
- (b) An assessment of the significance of such resources in terms of the heritage assessment criteria set out in the act (Refer to section 5.5 of this report)
- (c) An assessment of the impact of the development on such heritage resources (Refer to section 5.5 and section 6 of this report)
- (d) An evaluation of the impact of the development on heritage resources relative to the sustainable social and economic benefits to be derived from the development (Refer to section 8 of this report)
- (e) The results of consultation with communities and other interested and affected parties regarding the impact of the development on heritage resources. (Refer to appendix 5, 6a, 6b and 7 of this report)
- (f) If heritage resources will be adversely affected by the proposed development, the consideration of alternatives. (Heritage resources will not be adversely affected)
- (g) Plans for mitigation of any adverse effects during and after the completion of the proposed development. (Refer to section 7 of this report)

2.1 Identification and mapping of heritage resources in the area affected

Section 38(3)(a) requires that all heritage resources in the affected area be identified and mapped.

Refer to Figure 24 of Appendix 1a at the end of this report for a spatialization of the resources identified below.

- Cultural landscape;
- Potential fossil finds;
- Darling Hills (Refer to “Table 2:Landscape Features of the Study area” in the VIA for the position of these hills. It lies too far towards the East of the application site in order for it to fit onto Figure 24 of Appendix 1a;
- Mamre Mission Station;
- Groote Post (also known as “Klawervlei”);
- The Modderrivier;
- Archaeological finds documented during AIA survey (Area identified by archaeologist as Site 230 and Area identified by archaeologist as Site 245);
- Town of Darling; and
- Surrounding historic farm werfs (Oudepost, The Towers, Pampoenvlei, Commercialdale, Ganzekraal).

2.2 Assessment of Significance

Section 38(3)(b) requires an assessment of the significance of the resources identified, in terms of the assessment criteria set out in section 6 (2) or prescribed under section 7.

The assessment criteria of section 7 distinguishes between the following categories of grading:

Grade I: Heritage resources with qualities so exceptional that they are of special national significance.

Grade II: Heritage resources which, although forming part of the national estate, can be considered to have special qualities which make them significant within the context of a province or a region.

Grade III: Other heritage resources worthy of conservation. It is common practice to further distinguish Grade III resources as A, B or C depending on the extent of their significance, intactness, and contextual value.

Section 7 further refers to the assessment criteria in section 3(3) which are to be used by heritage resources authorities to assess the intrinsic, comparative and contextual significance of a heritage resource. These criteria have been used in this document in order to assess the cultural significance of the identified heritage resources:

- (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
- (i) Sites of significance relating to the history of slavery in South Africa.

Refer to section 5.5 of this report for the assessment of significance and grading of the identified resources.

3 Description of Affected Environment

The environment in which the proposed site is situated is rural. Land is cultivated for wheat and grapes predominantly.

The site lies within a critically endangered indigenous flora area, but the natural vegetation on the proposed Groene Kloof site has been almost completely transformed by the invasion of exotic Port Jackson (*Acacia saligna*) vegetation.

A few patches of hardy woody species (species *Rhus*) occur between the Port Jackson trees on the site. A botanical specialist will assess and exclude these patches from the site development plan.

The Modder River is situated on the eastern extent of the proposed Groene Kloof site, and flows in a South East to North West direction.

The broader landscape can be divided into two landscape types: the granite hills, and the coastal plain. The coastal plain can further be divided into foothills, coastal plain and sand dunes. The proposed site is situated on the foothills between the coastal plain and the range of hills known as the Darling Hills and Dassenberg Hills (in the North East) and Koeberg (in the South East). The hills are rounded granite, which rise 100-200m above the foothills.

The terrain has an open topography with a very moderate slope. The undulating hills of the area have been heavily modified by agriculture. The WEF site is relatively flat and not situated on slopes of greater than 1:4 or significant mountains or ridge lines, and is situated on an elevation of approximately 160m above sea level.

There is a major power line that transects the site. This renders the site a “vertically disturbed landscape” according to DEA&DP (DEA&DP, 2006b referenced from EIA) since the Groene Kloof site lies within this 5km buffer of “disturbed landscape.”

The Bobbejaansberg (2km North East of the site) forms a visual buffer between the site and the R307 public road. Bobbejaansberg is approximately 370m above sea level.

The site falls within an area identified by DEA&DP as a preferred wind farm location, as published in their “Towards a Regional Methodology for Wind Energy Site Selection”, which forms part of the department’s strategic initiative to introduce land based wind energy development in the Western Cape. This preference is determined by wind energy potential as well as by the following:

- there are no National Parks or Provincial Reserves near the site
- there are no major perennial rivers near the site
- it is outside the 4km coastal buffer zone, being approximately 7km from the coast
- there are no major airports or security sites nearby
- it falls outside of the buffer areas of a major scenic drive (R27) and heritage sites (Mamre Mission Station) and
- it is within the ‘negotiable’ landscape character and visual area.

The current property zoning is Agricultural Zone 1, but the site is not used for intensive agricultural purposes. The soils have been found to be of low agricultural potential, and water sources are not available for irrigation purposes. The soils are pale to red and sandy. Based on the size of the Port Jackson plants and the level of alien invasion, the majority of the site is assumed not to have been cultivated in the last 10 years. The Western section of the property is occasionally used for small grain production and for cattle/game grazing.

Access to the site is by means of an informal sand road off the Silverstroom road in the south.

4 Methods

A review of existing literature was carried out to examine the heritage context. The contextual information forms the basis on which potential impacts can be evaluated.

The following specialist studies (of relevance to the HIA) were commissioned:

- a paleontological impact assessment
- an archaeological impact assessment
- a visual impact assessment

These studies are attached in full to this document.

An integrated set of recommendations is provided based on the various specialist studies.

5 Heritage Context

5.1 Palaeontology

The specialist paleontological study appended to this HIA (Appendix 2) was prepared by John Pether (Geological and Paleontological Consultant) as a desktop study in March 2012, in order to assess the probability of paleontological materials (fossils) being uncovered in the subsurface and being disturbed or destroyed in the process of bulk earth works of the proposed neighbouring Clover Valley Wind Energy Facility. The Clover Valley site is situated directly north of the proposed Groene Kloof site, and the palaeontological characteristics of the two sites are assumed to be very similar. The information provided below was therefore sourced from the desk-top Palaeontological Impact Assessment for the Clover Valley site.

The bedrock of the site is described as follows:

The Groene Kloof site is occupied by a plateau like feature of approximately 150-160m above sea level. The Eastern section of the site gently slopes descending towards the Modderivier drainage. These areas are underlain by light grey/pale sands of the Springfontein Formation.

The Springfontein Formation is an informal category that includes mainly non-calcareous, windblown sand sheets and dunes, and it has covered parts of the landscape since the middle Quaternary (approximately 800 000 years ago.) These deposits may locally include muddy sands (of marine/lagoon origin) and peaty sands (formed in marshy/vlei environments.) Due to the elevation of the site (120m asl), it is unlikely that residual marine deposits would occur beneath the Springfontein Formation. In the area of Elandsfontein, on the West Coast, excavations have exposed fossils in the Springfontein Formation. Fossil bones of terrestrial mammals, although sparse, were found. They were likely fossil hyaena dens. Artefacts such as well made leaf-shaped points were also found. Sand beds of various hues and pedogenic horizons are present in the subsurface of the Springfontein Formation. These features are consistent with episodic accumulation, where sand sheets and dunes of different ages are separated by palaeosurfaces/ palaeosols upon which sparse scatters of fossil bone/ artefacts are sometimes found.

5.2 Pre-Colonial Archaeology

The specialist archaeological study appended to this HIA was prepared by Jonathan Kaplan (Agency for Cultural Resource Management) in July 2012.

The study entailed the following:

- A 3-day foot survey (conducted in July 2011) which includes an assessment of the 18 proposed turbine sites as well as the surrounding landholdings.
- A desktop study – in order to locate the proposed project in a broader archaeological context
- The assessment of the preferred transmission route (by means of drive through and scoping on foot)

The AIA notes that there are no significant landscape features, that the site is fairly flat, but that the Modderrivier runs along the South East Boundary of the affected property. The wind turbines as proposed will be located on land densely infested by alien vegetation (Port Jackson.)

The desktop study revealed that no archaeological research had been done in the Mamre area specifically. There has not been a lot of focus on the areas between the coastal plain and the mountains. The low research interest is because it is normally not viewed as an archaeologically rich area. The archaeological landscape is compromised by 250 years of agricultural activity.

The undulating agricultural lands around Darling/Mamre are generally lacking in coherent archaeological sites. Sites with more spatial integrity would be better located at higher elevations, such as hill slopes and granite outcrops, as well as close to rivers and pans, which have been less/ not impacted by agricultural and related activities.

Closer to Darling, on a farm west of the town, a rare later stone age contact period site had been identified. The Darling Hills formed part of a local annual transhumance cycle as Khoi tribes moved between landscapes in search of fresh grazing for their stocks. It is likely that their settlements would have been visible in the landscape in the time before colonial frontier settlement farming. Traces of such temporary settlement camp sites may still be found, but they have more likely been destroyed/ lost integrity due to later agricultural practices.

Traces of archaeological remains appear more visible around Atlantis, where burnt/fragmented marine shellfish, stone flakes and ostrich egg shell had been found in the past.

It should be noted that the study area did not have a high archaeological visibility and movement over the landscape was not easy. Some areas of the site had poor accessibility due to the Port Jackson infestation and resulting ground cover of dead leaves, branches and grasses.

No archaeological artefacts were found in any of the footprint areas proposed for the turbines.

No archaeological remains were found during the scoping of the proposed overhead powerline route.

An interesting archaeological occurrence was found on a dune next to the Modder River. The archaeologist has identified the site in the AIA as “Site 245”, and believes that it may be a possible Herder settlement camp site. The remains potentially have high archaeological significance. A low density, but fairly extensive scatter of stone flakes, weathered marine shellfish, pottery, bone and ostrich eggshell was found on the soft, loose, heavily trampled sands of this partially vegetated dune. The Late Stone Age implements found included utilized and retouched stone flakes, chunks, a few round/cylindrical cones, ochre and several grindstone fragments (some speckled/scratched with red ochre). No formal tools (such as scrapers or adzes) were found. Interestingly the remains of a wooden bowl (possibly used as a large pipe) were found. The bowl was scraped with a sharp metal blade. The wood is not a local variety, as it is a type of bamboo, likely imported from the East. It is possible that the complete item (the bowl) was either brought into the country before, or soon after Dutch settlement at the Cape in 1652, or that the bamboo was imported and the item made here before finding itself in the hands of local LSA hunter-gatherers living in the Mamre area at the time. This bowl is an interesting cultural find, but the archaeological site has little spatial integrity, and is severely impacted by agriculture. No ostrich eggshell beads were found, and no evidence was found of cooking hearths, charcoal or any midden/ash deposits. The dune overlooks a natural freshwater pan alongside the Modder River in the extreme South Eastern corner of the study area. “Site 245” is located 250m to the North of the closest turbine (Turbine 3), and will not be directly impacted by the proposed development.

No archaeological/ historical archaeological remains were found in the proposed location sites for the turbines. (The sites for turbines 1, 2 and 3 were open and visible, while the rest of the sites were overgrown with Port Jackson, and had low visibility due to dead wood, leaves and long grasses. No finds were documented in the sections investigated of the preferred servitude for the power lines.

5.3 Colonial Period

5.3.1 Regional Development

The area in which the proposed windfarm is situated in an area that is believed to have been part of a transhumance cycle, where Khoi tribes moved through and camped in the area in search of new grazing pastures for their stocks. The VOC’s involvement with cattle trading, and the need to set up protection measures for colonial farmers settling in the area, led to the establishment of cattle trading posts and small military garrisons in the area. Settlement in the region has mostly been rural. Many historic farm complexes exist. The VOC owned and operated many farms as cattle posts in the 18th century. The towns of Darling, Mamre and Atlantis form the urban/ semi-urban centres, while the farms of historic significance include Oudepost, The Towers, Groote Post, Commercialdale, Klawervlei, Pampoenkloof, Ganzekraal, Waylands and Papkuilsfontein. The Duckitt family owned extensive land in the region.

5.3.2 Development of Towns

MAMRE

Mamre is situated 5km North of Atlantis, and 1.5km East South East of the proposed Groene Kloof WEF site. The village is surrounded by farmland. Mamre is one of the first Moravian mission stations in South Africa. The mission was established in 1808 on the farm Groenekloof, but Mamre's history spans a period even before that time, to Khoikhoi habitation.

It is estimated that approximately 100 000 Khoikhoi peoples in tribes of approximately 2500 each lived in the Cape around 1652 when the first European settlers arrived. Battle defeats against the colonizing Dutch, as well as the smallpox epidemic in the 18th century reduced the population and destroyed the tribal cohesion and culture to a large extent. (SAMJ Vol 74 1 Oct 1988) The colonial system was an assault on all components of their lifestyle and independence. Livestock and labour was drawn from the Khoi society. Farmers encroached upon commonly used pastures. The Khoi, with their chief system, was subjected to Dutch law. The sum total of these effects was the erosion of authentic Khoi culture and value systems.

The Khoi remained in small tribal groups by the mid 1700's, but some people had by then offered their services as freemen workers to farmers, no longer staying among a tribe, but settling or drifting between farms.

The farm Groenekloof was land formerly controlled by the Khoikhoi Cochoquas. In 1697 a government cattle post was established there. Between 1701 and 1791 a small garrison was stationed in the area and was known as De Kleine Post. When the VOC was on the verge of bankruptcy (1791) all military posts were put up for sale, along with their other properties. "De Kleine Post", as Groenekloof was known, was not sold.

The Moravian Church (Unitas Fratrum), based in Hernhut, Saxony (today Germany) involved itself in work among the Khoikhoi at the Cape between 1737 and 1744. Their first involvement was at Bavianskloof/ Genadendal, but soon grew into the establishment of other stations in the Eastern and Western Cape. Farmers often viewed the missions as a drain on potential farm workers, and missionaries were often criticized, even if their sole effort was directed at the build up of religious communities. The Moravian missions are not associated with expressions of social protest such as is the case with, for example, the London Missionary Society. (SAMJ Vol 74 1 Oct 1988)

Dutch was the language used at the missions. In due course, the Moravian Church in South Africa became totally independent from the Unitas Fratrum, and indigenous ministers and leaders were trained.

The colonial authorities saw the need for a mission station close to the Cape, and encouraged the Moravian missionaries to establish the station at Groenekloof. This provided an institution for Khoi (and their families) who served as soldiers of the Cape Corps to retire to, and stemmed the spread of Islamic influence that the slave community introduced the Khoi to. The Earl of Caledon was a strong motivator for this mission station.

In March 1808 the government farm, De Kleine Post (Groenekloof) as well as the neighbouring Louwskloof (a Khoi reserve at the time) and Crujwagenskraal was handed to the Moravians for the establishment of Mamre mission station.

The two founding missionaries were Kohrhammer and Schmitt, who first named the place Groenekloof. The old homestead with its row of outbuildings dating from the cattle post and garrison days, were taken over by the mission. All the mission buildings remain, and form a very beautiful and unique complex. The church sits to the right, with the old homestead (the parsonage) to its left. Behind these two buildings there are three outbuildings: the langhuis, the Kupper house and the Storehouse. Furthermore there is a Mission Store, a watermill and a bakhuis. Fransen mentions that according to a drawing by Gorden in 1778, the old farmstead was surrounded by a walled forecourt, and that the old road to Saldanha bisected it.

At that time Captain Hans Clapmuts, a Khoi chief, and a tribe of 70 followers were still living in Louwskloof. Clapmuts resisted the influence of Christianity, but eventually, at age 110 and blind, joined the community in 1839.

Religious services were held in the open, before the church building was completed in 1818. (This church is the 5th oldest extant church in South Africa and has some very unique architectural features.) The land in the Louwskloof was divided and cottages were built for the mission community members. In 1835 there were 700 homes. The houses were at first arranged in single row along a level contour, with long garden plots sweeping down below them, similar to Genadendal, but parallel development was filled in later to create a harmonious group of thatched and limewashed cottages. Local residents were trained as teachers and a school was established at Groenekloof in 1833. Most people led lives of subsistence, working their gardens. Grains were milled from around 1830 with a horse mill, until in 1844 a water mill was built. The waterwheel fell into disuse in 1879 when a steam engine was installed. Some people worked as tradesmen in the area, and others as farm labourers on the surrounding farms.

In 1854 Groenekloof was renamed Mamre. This name was first given to the mission station on the Begha River, which had been closed due to the unrest and border wars with the Xhosa people. Mamre is a Hebrew word, meaning “temporary settlement/fatness.” In Genesis, Abraham built an altar to God at a place called Mamre.

The citizens of Mamre participated in the first Cape Parliament election of 1854 and petitioned against the subdivision of grant stations into freehold plots to be transferred into the ownership of individuals. The community was concerned that colonists might buy the land up from individuals and therefore joint property was preferred. The government was the official land owner.

Mamre residents sought work opportunities in Cape Town. The mission set up a congregation (1883-1887) in Cape Town to gather together all the Moravians who lived among the Malay community. This was the foundation of the community later known as “Moravian Hill” in District Six. This community was relocated and scattered under the Group Areas Act forced removals of 1981.

The first political organisation for “coloured” people, The Coloured Political Association of Mamre, was founded in Mamre in 1900.

The Moravian Church remained the only church in Mamre, until other churches were built after 1930.

Today the village houses are in disrepair, as funding for maintenance is not always readily available to the owners. No thatch roofs remain today; all have been replaced by corrugated iron sheeting. The well developed gardens of more than a century ago are neglected. The mill was restored in 1973. The old mission buildings, being a declared Provincial Heritage Site, are kept in good condition today.

Although Mamre was a fairly isolated community for a long period, the village reflected the general South African/ Western Cape developments in terms of culture, politics and architecture.

DARLING

The town, founded in 1853, was named after Sir Charles Henry Darling, an acting governor of the Cape at the time. Darling’s rectangular street grid with its elongated blocks was laid out on a portion of the farm Langfontein. It was established and laid out around the 1853 Dutch Reformed Church – and can therefore be described as a church-town, the church being the main reason for its initial existence. That church has since burnt down and was replaced by a modern structure in 1957. Darling attracts tourists for its golden wheat fields in summer, its rusty vineyards in autumn, green hills and fields of Arum Lilies in winter and wild flowers in spring. Arts and theatre has also become a big tourist attraction in the town, with Evita’s Perron being the main attraction. Darling lies 13km north of the proposed WEF site.

ATLANTIS

Atlantis was established in the 1970’s during the Apartheid era as a satellite suburb of Cape Town, to accommodate coloured people, displaced under the Group Areas Act. Initially Mamre was considered for the relocation site, but when a site 5km from the village was chosen, Mamre was able to remain a fairly protected rural village.

Atlantis has approximately 210 000 residents today, with high levels of poverty and unemployment. The establishment of Atlantis has also meant that the community living at Mamre became less isolated. Both the Mamre and Atlantis communities are largely absorbed into the Cape Town economy, and daily commuting is a part of their existence.

5.4 Built Environment

5.4.1 MAMRE

The mission buildings on Mamre were declared National Monuments in 1967; today the mission buildings are collectively recognized as a Provincial Heritage Site. The mission comprises of the following buildings:

The Moravian Church

The church was completed in 1818, and is unusually large for its time. It never needed to be enlarged subsequently. It is a rectangular building, 13x21m, with high

walls resting on a plinth. It has a very steep thatched roof, with large holbol type gables. The vestry is accommodated in a small flat roofed portion. According to Fransen, this and another small addition on the opposite side dates to after 1838. One side of the building has a pediment over a projecting portion of wall an unusual and interesting combination with a holbol gabled thatch building.

The Parsonage:

This was originally the homestead on the farm Groenekloof. The building has a compact TT shape with thatch roof, holbol front gable and early-straight end-gables. The front gable is not later than 1770. (Fransen 2004) The original windows have been replaced with steel windows, but on the back façade some original frames have remained.

“Langhuis” Dwelling

This dwelling is a conversion of a farm outbuilding, possibly used earlier as a barracks for VOC soldiers. It has a thatch roof with hipped ends. The double casement windows are in good condition, and are evenly spaced on the façade.

“Küpper House” Dwelling

This house used to have a front gable with the same date as the parsonage (i.e. c1770). The roof has small dormer windows and half hip ends. The fenestration is irregularly spaced on the walls, with some double and single casements and halved doors.

Store behind Parsonage

This building has been altered the most. It has a lifted corrugated iron roof with loft windows and clipped gables. Fransen suggests that it may incorporate an earlier structure of c1770.

Mission Store – perpendicular building

This building in its perpendicular arrangement to the other buildings creates a small square. This building is also substantially altered, and has a half hipped thatch roof, a modern front gable and late woodwork.

Water Mill

The mill was built in 1844. The building is made up of two portions that step up the slope. The upper portion (c1873) was once the miller’s house, and has a “Victorian” appearance with a corrugated iron roof and loft windows. The lower portion houses the mill itself, and has a half hipped thatch roof and earlier woodwork.

5.4.2 THE TOWERS

The T-T shaped homestead of this farm is situated on the Kapokberg slopes, and was known as Driepapfontein when it was first granted as lease hold to Jacob Van Reenen. The building was probably built by Van Reenen in the early 19th century, but it was altered (front gable and woodwork) by Charles John Duckitt c1870. This farm remained in ownership of the Duckitt family until 1990.

5.4.3 GROOTE POST

Groote Post started as one of the VOC military posts, but later farming became the main activity. In 1791 when the company, facing bankruptcy, put all its military posts (and many other properties) up for sale, this particular farm found no buyers. It passed into the possession of the British government with the change in control at the Cape. The homestead on Groote Post is dated 1808. Fransen speculates that the old homestead may have been in existence since c1752. William Duckitt (who later bought Klawervallei) lived on this farm for a short period, but was ordered to vacate by Charles Somerset, who periodically used the place for his hunting expeditions (1814-1828). It is possible that some of the outbuildings were erected during Somerset's time. Later on William Duckitt's son, Frederick, became the owner of Groote Post in 1838.

5.4.4 COMMERCIALDALE

This property has a building that was once used as a shop and inn (c1840) on the Darling – Mamre road.

5.4.5 KLAWERVALLEI/ KLAWERVLEI

This farm, also known as Groote Post Cellar, is first mentioned in 1701 when grazing rights on the land was granted to Johannes Starrenburgh, the magistrate of Stellenbosch. In 1791 the farm was acquired on loan by Sebastian Valentyn Van Reenen and his brothers. William Duckitt acquired the farm as part of a quitrent grant of more than 2500 morgen in 1815. The H-shaped homestead shows signs of various stages of development, with a T-section possibly being the oldest, according to Fransen probably slightly older than the date of the grant. Opposite the homestead stands a fairly plain building which, once a VOC fort, has since been converted into a modern cellar. The outbuilding next to the homestead is a reconstruction on old foundations.

5.4.6 PAMPOENKLOOF

This property has a small T-shaped homestead, situated halfway between Groote Post and Klawervlei, and was once part of Klawervlei.

5.4.7 GANZEKRAAL

Ganzekraal is another of the VOC's farms that were centred on the Kleine Post (military post) at Groenekloof (today Mamre). It was known as Ganzekraal bij de Groene Cloov from 1709, the date at which it was granted to Martin Mecklenburg. In 1724 it became a company cattle post. This farm was sold in 1791 and was transferred in three portions to the brothers Jan Gysbert, Sebastian Valentyn and Jacobus Arnoldus Van Reenen. Another brother, also named Jacobus, bought up the shares of the last two in 1799. Later he owned all the shares. Jacobus Van Reenen's widow, Catherina Versveld transferred Ganzekraal (as well as Modderrivier and Buffelsrivier) to Francis Dashwood in 1814. Dashwood soon got a re-grant, and the property was transferred back to the Van Reenen brothers' father, Jacob, in 1818. The farm has an interesting werf with an enclosed forecourt. The homestead is F-shaped and dates to approximately 1840, but is probably older as Josephus Jones' plan of 1791 indicates the presence of a T-shaped homestead. Lady Ann Barnard had done

a 1798 sketch of the werf, where the gables are shown as holbol shaped. According to Fransen the outbuildings are almost certainly VOC stores that were later converted to a dwelling. The company records indicate building activities in this area for the year 1724. Unfortunately the complex burnt down in 1965. The homestead walls are still left standing. The dovecot and adjoining outbuilding was saved and rethatched.

5.5 Assessment of Significance and Grading

CULTURAL LANDSCAPE

Description and Values

The area is rural and characterised by various farming activities and widely dispersed farmsteads. The area towards the North of the Modderrivier has more cohesiveness in terms of farming activity and cultivation of vineyard, while toward the South of the Modderrivier (i.e. the area wherein the proposed wind farm sites are located) it is non-cohesive. Towards the West of the sites and on a portion of the Clover Valley site, there are a few patches of cultivated land, but these are not continuous. The proposed sites, directly surrounding area to the North, and the surrounding area to the South is used as dry land grazing in parts and characterized by sand dunes. Here and there, where water is available, small scale crops are grown. The area is very dry and soils not of very good agricultural quality due to sandy nature.

It is the author's opinion that this landscape, due to its non-cohesiveness in pattern, and low development, is not worthy of formal protection as a cultural landscape of significance. It is not a good example of human kind's appropriation of the natural land, and does not demonstrate technical achievement. It is certainly not comparable to other protected landscapes such as the Cape Winelands Cultural landscape.

Grading

Proposed grade IIIC for area surrounding proposed wind farm sites. The area North of the Modderrivier could be considered of higher value – possibly Grade IIIA

Impacts thereon (Discussed in greater detail in section 6 of this report)

The erection of the wind farm will introduce a modern element of technology, modern aesthetic and a dominantly vertical series of elements to this landscape. The "sense of place" embodied in the landscape will be affected to some extent. Parts of the landscape is already vertically disturbed by high tension overhead powerlines.

Farming practices would continue as normally on the surrounding properties, while the affected site will be re-populated with indigenous fynbos species as per the EIA. This is an improvement in terms of biodiversity, because the site is currently infested with alien species.

The cultural landscape is not of such significance as to warrant formal protection, and the impacts on the landscape do thus should not preclude the project from approval.

POTENTIAL FOSSIL FINDS

Description and Values

It is not possible to determine the significance of potential future fossil finds. The PIA has indicated that there is a low but distinct probability of finding fossils in the deeper excavations.

Grading

The value of such finds could range from local to international significance, depending on the nature of the find.

Impacts thereon (Discussed in greater detail in section 6 of this report)

The potential presence of fossils in the subsurface should not influence the decision to proceed with the project. Mitigation measures are essential to reduce the significance of the impact from medium-negative to low-negative. Even with mitigation there is still a probability of losing sparse valuable bone fossils. Unless formations bearing rare fossils crop out at a project site, paleontological concerns do not usually impede developments.

DARLING HILLS

Description and Values

According to the research in the AIA the Darling Hills formed part of a local transhumance cycle. The hills are potentially rich in archaeological deposits of pre-colonial, Middle- to Late Stone Age deposits.

Grading

It is not possible to determine a grading for the hills until specific archaeological finds are made. The potential archaeological value is high, and could contribute to new knowledge. Specific archaeological sites should ideally be graded, but an overall grading of 3A seems reasonable considering their archaeological potential. [Grade 2 status (i.e. formal protection) is difficult to consider at this stage, since there is not enough evidence in terms of actual archaeological sites, but the potential is there).

Impacts thereon (Discussed in greater detail in section 6 of this report)

The hills are not impacted by the proposed development. They are located so far away towards the East of the proposed sites, as to form a long distance backdrop. (5-10km).

MAMRE MISSION STATION

Description and Values

The Mamre Mission Station site has importance in the community or pattern of South Africa's history. It has importance in demonstrating the principal characteristics of a particular class of South Africa's cultural heritage. It has importance in exhibiting particular aesthetic characteristics valued by a community or cultural group. It has strong and special association with a particular community or cultural group for social, cultural and spiritual reasons.

Grading

Mamre mission station is a provincial heritage site.

Impacts thereon (Discussed in greater detail in section 6 of this report)

The mission station is not impacted physically or visually – therefore neither directly or indirectly. Bobbejaansberg screens the proposed sites from view, as demonstrated in the VIA.

GROOTE POST (“KLAWERVLEI”)

Description and Values

The Groote Post (“Klawervlei”) site has importance in the community or pattern of South Africa’s history. It has importance in demonstrating the principal characteristics of a particular class of South Africa’s cultural heritage. It has importance in exhibiting particular aesthetic characteristics valued by a community or cultural group. It has strong and special association with a particular community or cultural group for cultural reasons. It has importance in demonstrating a high degree of creative or technical achievement at a particular period. It has special association with the life of a person of importance in the history of South Africa.

Grading

It is a provincial heritage site.

Impacts thereon (Discussed in greater detail in section 6 of this report)

There will be no impact on this PHS.

MODDERRIVIER

Description and Values

The Modderrivier is a natural resources that has the potential to yield cultural resources and information, through future archaeological finds.

Grading

It is not possible to grade the river, but same as with the Darling Hills, a blanket grading of 3A may be suggested for the archaeological potential.

Impacts thereon (Discussed in greater detail in section 6 of this report)

The river is not impacted.

POTENTIAL NEW ARCHAEOLOGICAL FINDS ON THE PROPOSED SITE

Description and Values

The proposed wind farm sites lie in an area that is not archaeologically rich. (The area between the coastal plain and the foothills) The area has also been compromised by 250 years of agricultural activity. The likelihood of finding intact archaeological material cannot be excluded, but it is slim.

Grading

It is not possible to grade potential future finds.

Impacts thereon (Discussed in greater detail in section 6 of this report)

There is a possibility that new archaeological materials may be found during construction phase, therefore the AIA recommends the suitable mitigations as discussed.

ARCHAEOLOGICAL FINDS DOCUMENTED DURING THE AIA SURVEY ON THE PROPOSED SITE

Description and Values

A scatter of less than 20 Late Stone Age flakes and chunks were found.

Grading

The archaeologist recommended a 3C grading for the objects.

Impacts thereon (Discussed in greater detail in section 6 of this report)

These objects have been documented. No further impacts are foreseen.

SITE 230 (AS IDENTIFIED IN AIA)

Description and Values

A low density scatter of Late Stone Age artefacts were found, including a rare bamboo bowl. The site has little spatial integrity, and has been compromised by 250 years of farming activity – trampling by cattle and disturbance by ploughing.

Grading

The archaeologist recommended a 3C grading for the objects.

Impacts thereon (Discussed in greater detail in section 6 of this report)

The proposed development poses will have no impact on this site, as it lies outside of the wind farm site.

SITE 245 (AS IDENTIFIED IN AIA)

Description and Values

This site is a possible herder encampment site, and has the potential to yield information that will contribute to an understanding of South Africa's cultural heritage.

Grading

The archaeologist recommended a 3A grading for the site.

Impacts thereon (Discussed in greater detail in section 6 of this report)

The proposed development poses will have no impact on this site, should Revised Option 1 be pursued. Site 245 has been excluded in this option, proposed turbines have been removed from this area. No impacts are foreseen provided that the targets set out in the management plan are adhered to. (Refer to section 7 of this report)

TOWN OF DARLING

Description and Values

The town has various buildings and sites of varying significance, which is outside the scope of this study.

Grading

Various

Impacts thereon (Discussed in greater detail in section 6 of this report)

There are no impacts on the town of Darling due to its distance away and the topographical screening.

OTHER HISTORIC FARM WERFS DISCUSSED

Description and Values

The various sites have importance in the community or pattern of South Africa's history. It has importance in exhibiting particular aesthetic characteristics valued by a community or cultural group, although many of these sites have been compromised by additions and alterations.

Grading

Grade 3C's - These buildings are of contextual value, but do not merit formal protection. They are sufficiently protected under section 34 of the NHRA.

Impacts thereon (Discussed in greater detail in section 6 of this report)

There will be no direct/material impacts on these sites. Turbines may be visible from Pampoenvlei and Ganzekraal. Oudepost and The Towers are located too far away for visual impact, while Commercialdale is screened by Bobbejaansberg.

6 Assessment of Potential Impacts

6.1 Paleontology

The main concern with this project is the scale and extent of the deeper excavations needed for the turbine foundations. Each foundation will entail the excavation of approximately 600m³ of material, and will expose around 360m² of subsurface section in the bottom and sides of each excavation. Furthermore the cable trenches, although not deep, are very long. The construction of the overhead transmission pylons is regarded as having the lowest likelihood of fossil finds.

Although low, the possibility of exposing fossils during the excavations is distinct.

Unless formations bearing rare fossils crop out at a project site, paleontological concerns do not usually impede developments.

The potential presence of fossils in the subsurface should not influence the decision to proceed with the project. Mitigation measures are essential to reduce the significance

of the impact from medium-negative to low-negative. Even with mitigation there is still a probability of losing sparse valuable bone fossils. The finding and recovering of fossils will, however, have a positive impact (locally and/or internationally – depending on the nature of the find.)

6.2 Archaeology

The study has shown that the development will not have an impact of great significance on the archaeological heritage. Apart from the archaeologically sensitive dune East of the study area (“Site 245”), the proposed site is not in a threatened/vulnerable archaeological landscape and the development of the wind farm will likely have a low (negative) impact on the pre-colonial archaeological heritage. The AIA has identified a portion on the application site as “Site 245”, a possible Herder encampment site, and has advised that development should avoid that specific area. The South Eastern portion of the proposed site is covered in dense exotic vegetation (Port Jackson trees) with a lot of dead wood and leaves covering the ground surface, which has made it more difficult for the archaeologist to identify possible archaeological remains. Stone implements or other archaeological remains may be exposed during vegetation clearing operations and earthworks.

6.3 Built Environment

The built environment described in the previous section will not be directly affected by the proposed development. The proposed windfarm will be situated on a vacant piece of land. For visual impact on the built environment refer to section 6.6.

6.4 Graves

It is unlikely but unknown whether any graves associated with the nearby farmyards, or unmarked graves of earlier peoples might be present on the site. Should any such be present, they would be considered of high significance and it would be preferable to avoid them, otherwise the full legal process would need to be followed. Any such finds must be reported to Heritage Western Cape immediately.

6.5 Cultural Landscape and “Sense of Place”

The cultural landscape and ‘sense of place’ of the area has a making of more than 350 years. The indigenous Khoi tribes were the first users of the landscape, but their activities left no visually obvious marks on the landscape, and are mostly evident in archaeological study. Colonial activities left a more enduring mark on the landscape, starting with cattle trade and military outposts, and developing into settler farming. Farming practices have changed over the course of the centuries, and is continually evolving. The land in the area was historically used for dry land farming – mainly lucern, while now mostly used as grazing, although hills are cultivated with wheat and vineyards. Agricultural land use ranged from cattle grazing and grain crops, to vineyards, mixed farming, game, nature reserves and wild flowers. The associated structures, roads, buildings and towns, contribute to this landscape shaped by human activity.

Change to character of the landscape is unavoidable should the proposed windfarm project proceed. The cultural landscape is structured by the road systems linking the different settlements (towns and farmsteads) and the dotted historical farmsteads within a largely horizontal agricultural landscape of rolling hill plains and flats of

animal grazing, fynbos reserves and fields of wheat or vineyards. The erection of the windfarm will introduce a modern element of technology, modern aesthetic and a dominantly vertical series of elements to this landscape. Potential loss of fossils and/or archaeological artefacts is a consideration in cumulative impacts, but can be managed and mitigated as discussed in section 7. Heritage impact is mostly in the form of visual changes to the cultural landscape. The EIA assesses potential cumulative visual impact. Although wind farming is implemented at large scale in Europe and the United States, it is relatively new in South Africa. Two pilot wind farms (Klipheuwel and Darling) have been operational for a few years now. These wind farms are demonstration projects and contain a small number of turbines each. The cumulative impact of Groene Kloof with regards to Klipheuwel and Darling is therefore not significant. A number of wind farm developments are currently being proposed within the West Coast region, and are in different stages of the EIA and planning process (such as Kerriefontein WEF and Rheboksfontein WEF). The cumulative heritage impact of these different wind farms must be managed by the authorities by applying the necessary studies in the application process, through endorsement of the mitigations recommended by such studies. At this stage, because most of the applications (stemming from different applicants) are still in planning phase, and no large scale windfarms have been constructed, individual applicants cannot assess cumulative impacts in real terms. Many of the applications in process are also competing against each other in a bidding process through the energy regulator – which means that not all approved schemes will go ahead. The wind farm application sites are also not neighbouring lots of land, but are several kilometres apart, and will unlikely be visible from the same vantage point.

The “sense of place” embodied in the landscape will be affected to some extent. Farming practices would continue as normally on the surrounding properties, while the affected site will be re-populated with indigenous fynbos species as per the EIA. This is an improvement in terms of biodiversity, because the site is currently infested with alien species.

Different people may have different opinions to wind farms, their desirability and their effect on the “sense of place” of a landscape. Wind turbines may be perceived as majestic sculptures in the landscape and a positive move towards a greener future for the planet, positively affecting climate change rate and therefore the future of nature and agriculture, or they may be viewed as dominating unattractive eyesores.

6.6 Visual Impacts and Scenic Routes

The visual impact study (attached in full) describes the proposed wind energy facility site as situated in a landscape of moderate visual sensitivity, with a regional significance.

The landscape is relatively sparsely populated and rural towards the North, while the density of population is greater in the South East in the towns of Mamre and Atlantis.

The topography provides some screening. Towards the North East the WEF and turbines will be screened by the Darling Hills. The turbines will however be visible from the North West, South West and South East within a 20km radius in a relatively flat landscape. The dunes provide limited screening.

The VIA identified the following receptors:

1. The heritage precinct at Groote Post
2. Residents of Mamre village (not the Mission Station, as it is screened by topography and trees.
3. Residents of the Northern parts of Atlantis
4. Users of the R27 and R307 scenic routes. The windfarm will be visible for a short (5km) section of the N7, 20km from the proposed site.
5. Farmsteads within a 4,5 – 7km distance from the proposed facility.
6. Users of local roads that serve towns and farms
7. Coastal resort visitors (Ganzekraal, and Silwerstroomstrand, but not Grotto Bay) It should be noted that the main orientation of the resorts are Westward; while the proposed WEF is towards the East.

Lighting of the turbines will be visible from Groote Post and Mamre and should be kept to the minimum requirement.

Shadow flicker, caused by the sun shining through the turbine blades affect an area of 1km surrounding a turbine. There is one farm building approximately 1km away from the closest turbine that may be affected.

The recommendation of the visual impact assessor is that the proposed option using lower but more turbines be pursued. It will not reduce the number of receptors, but it would result in less turbines being seen.

The response of observers to wind turbines in the landscape is complex, as it is often based on the viewer's perception of wind energy. Wind turbines may be perceived as majestic sculptures in the landscape or as dominating unattractive eyesores. Wind turbines are significant vertical elements in the landscape and the visual impact is always anticipated to be high.

7 Further Studies and Possible Mitigation Requirements

In terms of the natural landscape, the EIA identifies various further studies, such as a further botanist study, to identify the no-go areas in terms of protection of valuable indigenous vegetation, and various avifauna/bat studies. The natural landscape forms the basis on which the cultural landscape is formed. Therefore it is important that programmes of alien vegetation removal and re-establishment of natural vegetation be followed through.

In terms of the cultural landscape, the heritage resources of palaeontology are unlikely to be affected.

The following mitigation measures are required for palaeontology:

Monitoring by on-site personnel and field inspections by a palaeontologist or trained fossil excavator during the construction of the excavations.

The contracted palaeontologist must carry out field inspections at appropriate stages in the making of the excavations. His aim being to examine a representative sample of the various deposits exposed in the excavation, recording context, fossil content and to take samples.

Fossil find procedures are stipulated in Appendix 2 of the Paleontological Impact Assessment attached.

The study has shown that the development will not have an impact of great significance on the archaeological heritage. The proposed site is not in a threatened/vulnerable archaeological landscape and the development of the wind farm will likely have a low (negative) impact on the pre-colonial archaeological heritage.

The recommendations regarding archaeological impact are:

1. The development must avoid the site identified in the AIA as “Site 245”, which may be a rare Herder encampment site. This includes all construction phase activities such as internal access roads, excavations for underground cabling and laydown areas. If this cannot be guaranteed, archaeological test excavations will have to be carried out on this potentially important site.
2. As a precaution, vegetation clearing operations across the South Eastern portion of the proposed site must be monitored by a professional archaeologist.
3. The proposed construction camp site must be inspected for archaeological remains, once this has been identified
4. Should any unmarked human remains or buried ostrich eggshell caches, for example, be disturbed, exposed or uncovered during excavations/earthworks, these should be reported to Heritage Western Cape immediately.

The following mitigations is advised for the visual impacts:

Visual Mitigation in General:

For the most part, no mitigation measures would change the significance of the landscape impact other than avoiding the site entirely. To promote the visual cohesiveness and harmony of the windfarm, the turbines should all be of the same style and scale, with consistent spacing between turbines as far as possible.

Mitigation specific to Mamre Mission Station

Although the VIA has shown that the turbines will not be visible from the historic mission buildings, it is recommended that additional trees be planted below the water mill, which will replace the old oak trees when these die out in time to come.

While the proposed turbines will not be visible from the historic buildings, as one moves south from the watermill, through the open, tree planted space, visual screening as a result of the landform gives way to visual screening by the old oak trees. The oak trees are old and will probably fall over during the lifespan of the wind farm project. Hence the recommendation to plant new trees that will continue the visual screening from the open space south of the historic buildings. This tree planting will provide screening from the access road to the Mission Station. Negotiation

between the proponent and the relevant Mission Station authorities will be required for this planting to occur.

Mitigation specific to Darling Hills Road, the R27 and R307

Turbines are not intrusive to these receptors, which are 4,5km away from the proposed site. Screening would be difficult, and only achievable in localized areas by means of row planting of trees. Such planting could also be seen as intrusive to the otherwise flat landscape, and is not regarded as a good option. The recommendation is that Option 1 would be preferable, as the height of the turbines would be less conspicuous.

Mitigation with regards to shadow flicker

One farm building is located approximately 1km from the closest turbine. The turbine should be moved North West ward. The extent of shadow flicker can be reduced by the use of lower turbines. Tree planting immediately West of the farm building would mitigate the impact through screening.

Mitigation specific to light pollution

In order to minimise the impacts on the night time views of the area, and the sense of place, it is recommended to minimise the number of light fittings to the minimum requirements as set out by the Civil Aviation Authority.

Mitigation to minimise scarring and dust as a result of vegetation clearing and the visual impact of construction equipment

Restrict the new road widths, power line trench widths, size of base areas of the substation, control room, turbines and crane standing areas, so that as much as possible of the vegetation will be retained. Clearly demarcate the construction areas to minimise disturbance to unnecessary areas. Re-vegetate the disturbed areas as part of the construction phase of the project. Initialize dust suppression measures, as described in the VIA, as required.

The accommodation of construction workers and staff should be in the local towns or farms.

Mitigation specific to construction phase light pollution

No high lighting masts or spot light security lighting should be allowed. No up lighting should be allowed; only down lighting is to be used.

Mitigation specific to the visibility of the turbines and related infrastructure to sensitive receptors

The colour and material selection should fit in with the surroundings. The siting of roads and excavations should be along contours, which will result in less cut and fill visual scarring. The siting should be kept off ridgelines which are visually exposed/highly visible landforms. Formal erosion management should be applied to the roads.

Mitigation specific to the operational phase in terms of light pollution

Only one (medium intensity Type B) type of light fixture should be used throughout, to fulfil the Civil Aviation Authority requirements. The lights on each turbine are to flash simultaneously. No intermediate level lighting should be allowed. Only down lighting should be allowed on the related infrastructure.

Cultural landscape mitigations:

The development of a wind farm within this landscape constitutes a radical change in land use, although the new use can function side by side with agriculture in the area. The greatest impact is visually, and as such no mitigation measures would be able to counteract the degree of impact imposed by the development.

Cultural landscapes are not stagnant environments, but are continually evolving according to humankind's activities. They are a record of history, but at the same time they are a product of the present. It can be argued that renewable energy is one of the most important human developments that will affect the quality of environments in the future; therefore accommodating such facilities in the landscape, within reason, will contribute to the reading of the cultural landscape in years to come.

The Environmental Management Plan (EMP) has incorporated the mitigation measures put forward by the specialist studies in terms of heritage resources as follows:

The EMP prepared by Withers Environmental Consultants tables E3-4 and G3-4 stipulates the targets and objectives in terms of environmental/conservation management, as based upon the specialists' recommendations:

E3 Palaeontological, Archaeological and Heritage Aspects

Environmental Objective: Conserve any palaeontological, archaeological and/or heritage artefacts and/or resources that may be uncovered during the construction phase.

Environmental Aspects (Project Activity)	Environmental Target	Mitigation Measures (Management Actions)	Responsible Person/Party
a. Bulk earthworks and excavations for foundations and trenches for cabling	i. To identify and recover any fossils (palaeontological artefacts) that may be uncovered, as are required in terms of the relevant legislation.	1. Inform staff on the need to watch out for fossil occurrences	ECO and Construction Contractor(s)
		2. Inform staff on the procedures to be followed in the event of fossil occurrences	ECO and Construction Contractor(s)
		3. The site should be monitored by on-site personnel and field inspections should be undertaken by a palaeontologist/trained fossil excavator at appropriate stages in the making of excavations for the wind turbines and its associated infrastructure, including the power transmission line pylons.	Construction Contractor(s) and Palaeontologist / Trained Fossil Excavator

		<p>The aim of field inspection is to examine a representative sample of the various deposits exposed in the turbine excavations, recording context, fossil content and to take samples</p> <p>The contracted palaeontologist should liaise with WEC and Clover Valley Wind Energy(Pty)Ltd. and their contractors about the specifics of setting up a monitoring and inspection programme. Ideally, for cost effectiveness, the contracted palaeontologist should carry out the inspections at a stage when several excavations have been made and are open and available.</p> <p>Refer to Section 1 in the EMP for the recommended monitoring by construction personnel and general Fossil Find Procedures.</p>	
		4. Liaise on the nature of potential finds and appropriate responses.	ECO and Palaeontologist
		5. Excavate main finds, inspect pits and record selected, key/higher risk excavations.	Palaeontologist / Trained Fossil Excavator
		6. Obtain permits from HWC for fossil finds.	Palaeontologist
	ii. Conserve archaeological artefact resources that may be uncovered	1. Restrict all construction activities to the demarcated construction areas	Construction Contractor(s)
		2. The proposed construction camp site must be inspected for archaeological remains, once this has been identified.	Specialist Archaeologist
		3. When excavating the site during construction, the construction workers should be on the lookout for any dense accumulations of shell, pieces of bone, pottery and stone	Construction Contractor(s)

		artefacts, fossilised bone or human remains, including burials and report such finds immediately to the Site Agent or the ECO	
		4. Should any unmarked human remains, or archaeological artefacts such as buried ostrich eggshell caches be disturbed, exposed or uncovered during excavations and earthworks, these should immediately be reported to HWC (Att Jenna Lavin or Troy Smuts)	Construction Contractor(s)
		5. Work in areas where archaeological finds have been made must be stopped immediately, until such finds have been assessed by the ECO and/or an archaeologist. The site agent must inform the ECO of any such finds immediately. The ECO is to assess such finds and, if necessary, contact an archaeologist to undertake a full assessment of such material. If necessary the find must then be reported to HWC. Archaeological artefacts may not be disturbed further until the necessary research has been undertaken.	Construction Contractor(s)

E4: Visual Aspects

Environmental Objective: To ensure that visual impacts associated with the construction phase are minimised where possible.

Environmental Aspects (Project Activity)	Environmental Target	Mitigation Measures (Management Actions)	Responsible Person/Party
a. Construction activities	Limit the visual impacts associated with the construction site and the	1. Remove as little vegetation as possible for the construction of the proposed project and its associated activities	Construction Contractor(s)
		2. Existing natural vegetation	Construction

	construction activities	should be retained wherever possible	Contractor(s)
		3. Clearly demarcate construction areas to minimise disturbance.	Construction Contractor(s)
		4. Restrict road widths, power line trench widths, substation, control rooms, turbine and crane base areas and associated temporary work areas, in order to minimise scarring.	Construction Contractor(s)
		5. Re-vegetate disturbed areas (eg around turbine sites) as part of the construction phase.	Construction Contractor(s)
		6. Accommodation of construction staff and workers to be in local towns or farms	Construction Contractor(s)
		7. Colour and material selection for road paving, to fit in with surroundings – i.e. gravel to be of local source, and surface to blend in with existing roads	Construction Contractor(s)
f. Earthworks	Limit the visual impacts associated with the earthworks during the construction phase	1. Dust suppression methods should be implemented as provided in the EMP, as required and if dust creates a visible plume.	Construction Contractor(s)
		2. Development footprints should be kept as small as possible	Construction Contractor(s)
		3. Roads and excavations should be sited along contours (which will result in less cut and fill and visual scarring) and off ridgelines which are visually exposed/ highly visible landforms.	Construction Contractor(s)
h. Access Roads	Limit the visual impacts associated with dust and/or erosion on access roads	1. Implement effective dust suppression measures as provided in the EMP, as required and if dust creates a visible plume	Construction Contractor(s)
		2. Provide formal erosion management for roads (eg stormwater gullies) to prevent erosion scars	Construction Contractor(s)
j. Lighting	Limit the visual impacts associated with	1. Lighting of the construction site should be carefully considered and kept to a	Construction Contractor(s)

	night lighting	<p>minimum wherever possible. If security lighting is required, it should only be used where absolutely necessary and it should be carefully directed.</p> <p>2. The negative impact of night lighting, glare and spotlight effects should be mitigated by implementing the following measures:</p> <ul style="list-style-type: none"> - Install light fixtures that provide precisely directed illumination to reduce light spillage beyond the immediate surrounds of the project area - Avoid high pole top security lighting along the periphery of the project site. The light fixture should be designed in such a way so that it only illuminates the area that needs to be illuminated ie not into the sky or beyond the perimeter of the area that must be controlled. It should therefore be directed downwards and inwards (not towards neighbouring properties) - If possible, use security lighting that is activated by movement and are not permanently switched on. 	
			Construction Contractor(s)
k. Construction Activities	To limit the visibility of the turbines from sensitive visual receptors	<p>1. If possible, plant localised trees at strategic localities to limit views of the turbines from Groote Post</p> <p>Trees with a minimum height of 3m should be planted, with larger trees (5m+) being considered in critical places. Typical indigenous species to be considered include Erythrina spp, Ficus spp, Trichelia spp. These trees should be planted during the construction phase.</p>	Developer
		2. If possible, plant localised trees at strategic localities to	Developer

		<p>limit views of the turbines from the Mamre residents.</p> <p>Trees with a minimum height of 3m should be planted, with larger trees (5m+) being considered in critical places. Typical indigenous species to be considered include Erythrina spp, Ficus spp, Trichel ia spp. These trees should be planted during the construction phase.</p>	
		<p>3. Additional trees should be planted below the Watermill at the Mamre Mission Station, which will replace old oak trees if these die out.</p> <p>Trees with a minimum height of 3m should be planted, with larger trees (5m+) being considered in critical places. Typical indigenous species to be considered include Erythrina spp, Ficus spp, Trichel ia spp. These trees should be planted during the construction phase.</p>	Developer

G3: Palaeontological, Archaeological and Heritage Aspects

Environmental Objective: Conserve any palaeontological, archaeological and/or heritage artefacts and/or resources that may be uncovered during the operational phase.

Environmental Aspects (Project Activity)	Environmental Target	Mitigation Measures (Management Actions)	Responsible Person/Party
a. Excavations and maintenance activities	Conserve archaeological artefacts and heritage resources	1. Restrict all operational activities to within the project footprint areas	Project Manager
		2. In the event of any archaeological or associated artefacts (fossils, pottery) being uncovered during operational phase excavations or maintenance on site, all activities in the direct vicinity	Project Manager

		of the uncovered artefacts must cease immediately. The find must then be reported to HWC and/or an appointed archaeologist. Archaeological artefacts may not be disturbed further until the necessary research has been undertaken.	
		<p>3. If any graves or unmarked human burials are uncovered on site, all activities in the direct vicinity of the finding must cease immediately and HWC must be notified.</p> <p>Such graves must be treated with respect and must not be disturbed further until the necessary approval has been obtained from HWC. An archaeologist or suitably qualified person must be contracted to apply for the necessary permit to remove such remains at the expense of the developer.</p>	Project Manager

G4: Visual Aspects

Environmental Objective: To ensure that visual impacts associated with the operational phase are minimised where possible.

Environmental Aspects (Project Activity)	Environmental Target	Mitigation Measures (Management Actions)	Responsible Person/Party
a. Screening of turbines from sensitive visual receptors	To limit the visibility of turbines (and related infrastructure) from sensitive visual receptors.	<p>1. If possible, plant localised trees at strategic localities to limit views of the turbines from Groote Post</p> <p>Trees with a minimum height of 3m should be planted, with larger trees (5m+) being considered in critical places. Typical indigenous species to be considered include Erythrina spp, Ficus spp, Trichel ia spp. These trees should be planted during the</p>	[Construction Contractor(s)] and Project Manager

		<p>construction phase.</p> <p>2. If possible, plant localised trees at strategic localities to limit views of the turbines from the Mamre residents.</p> <p>Trees with a minimum height of 3m should be planted, with larger trees (5m+) being considered in critical places. Typical indigenous species to be considered include Erythrina spp, Ficus spp, Trichel ia spp. These trees should be planted during the construction phase.</p>	[Construction Contractor(s)] and Project Manager
		<p>3. Additional trees should be planted below the Watermill at the Mamre Mission Station, which will replace old oak trees if these die out.</p> <p>Trees with a minimum height of 3m should be planted, with larger trees (5m+) being considered in critical places. Typical indigenous species to be considered include Erythrina spp, Ficus spp, Trichel ia spp. These trees should be planted during the construction phase.</p>	[Construction Contractor(s)] and Project Manager
d. Aviation safety lighting	Limit the visual impacts associated with night lighting	<p>1. Install the minimum number of aviation lights as required by the Central Aviation Authority (CAA)</p>	Project Manager
		<p>2. Any array of flashing or pulsed obstruction lighting, intended to warn of a group of wind turbines forming an entity (i.e. a line, string, or series of units) shall be synchronised to flash simultaneously (as per CAA requirements)</p>	Project Manager
		<p>3. Night time wind turbine obstruction lighting should consist of medium intensity type B aviation red flashing lights. Minimum intensities of</p>	Project Manager

		2000 candela for nighttime red flashing or strobe lights are required (as per CAA requirements).	
g. Security Lighting	Limit the visual impacts associated with night lighting	1. Night time security lighting of the project site should be carefully considered and kept to a minimum wherever possible. If security lighting is required, it should only be used where absolutely necessary and it should be carefully directed.	Project Manager
		2. The negative impact of night lighting, glare and spotlight effects should be mitigated by implementing the following measures: - Install light fixtures that provide precisely directed illumination to reduce light spillage beyond the immediate surrounds of the project area - Avoid high pole top security lighting along the periphery of the project site. The light fixture should be designed in such a way so that it only illuminates the area that needs to be illuminated ie not into the sky or beyond the perimeter of the area that must be controlled. It should therefore be directed downwards and inwards (not towards neighbouring properties) - If possible, use security lighting at the periphery of the site that is activated by movement and are not permanently switched on.	Project Manager
		3. Security lighting should be yellow, and facing inwards and downwards.	Project Manager

8 Comparison of Impacts relative to Socio Economic Benefits

A socio economic impact assessment (dated July 2012, and appended in full) was prepared by Prof Jonathan Bloom of Multipurpose Business Solutions) to assess whether the development of the WEF would be desirable from societal cost-benefit perspective.

From his review of national and provincial legislation, policies, strategies, and action programs, it is clear that targets have been set to achieve a greater energy output from renewable sources.

The study found that the WEF would have a positive impact on:

- education and training opportunities (during the operational phase) – Skills development and associated social benefits are limited due to the small number of employment opportunities linked to the construction and operation of the WEF
- community benefit from renewable energy (during the operational phase)
- multiplied increase in Gross Regional Product (GRP) (during the operational phase)
- economic income (during the construction phase) – A policy of local procurement is advised to be followed by the developer in order to contribute to the local economic income during the construction phase.
- new employment opportunities (during the construction and operational phase)

The impacts on tourism and farming activities were found to be low negative, with the potential to convert them to positive impacts. WEFs are new to South Africa, therefore local data is not readily available. Studies in Australia and Denmark have shown that WEFs can have a positive effect on tourism. Wind farms are more likely to attract tourists than to deter them. A British study found that the effect of WEFs on tourism is negligible at worst, with many respondents taking a positive view.

Tourism is an important consideration, because heritage resources are often maintained by businesses who derive their income from tourism. The report suggests that wind farm tourism be formalized by means of public access and formal guided tours and information boards.

The study finds that the socio economic benefits outweigh potential impacts as identified in the EIA and the specialist socio economic impact assessment. This specialist study is deemed sufficient in terms of unpacking the socio economic benefits. No further analysis or evaluation will be done for this HIA report, because the impacts on heritage resources are not deemed substantial enough to warrant further study.

Socio-economic benefits emanating from the two projects

Not only does this proposed projects offer a unique opportunity for the Mamre Community to benefit from the development of renewable energy, the projects

(Groene Kloof and Clover Valley) also offers upliftment opportunities for the socio-economic development of the community.

The selection of preferred bidders is based on a scorecard where 70% of the points are allocated to price and 30% to the socio-economic obligations proposed by the bidder. The bidder needs to contribute to various social development and economic goals during the construction and operations phases, namely employment creation and skills development, small business development and capacity building and social investment. This contribution is measured against various empowerment benchmarks listed as part of the BEE scorecard. The developer of the wind energy facility will be afforded the opportunity to use the benchmarks to establish levels of commitment and participation in the projects by the Mamre Community.

Western Wind Energy (Pty) Ltd intends adhering to the economic development obligations required by the Department of Energy as part of the bidding requirements. A synopsis of the economic development obligations required by the Department of Energy that are applicable to the Mamre Community are stated below:

Job creation	Construction and Operations- employment opportunities
Ownership	Community participation – funds from projects or dividends paid to community
Preferential procurement	BBBEE, Qualifying Small Enterprises (QSE) and Emerging Medium Enterprises (EME)
Small enterprise development	Finance and training for establishment of small business
Socio-economic development	Assistance to schools

Benefit streams from participation in the projects

The Mamre Community is offered an opportunity for co-ownership in both projects (Groene Kloof and Clover Valley) for a period of 20 years, i.e. the envisaged duration of the lease. The implications of co-ownership are illustrated in the above table.

The benefits mentioned above would accrue to the Mamre Community over the 20-year period and apply to the Clover Valley and Groene Kloof projects. In addition, the landowner of the portions of land earmarked for the Groene Kloof project would also benefit from a lease income over the period of 20 years. It has been suggested by members of the community that the lease income could be applied in the form of an electricity rebate for all households. If this suggestion is adopted, the detail thereof and the distribution mechanism would be finalised together with the community.

Estimate of income from lease of land

A rental is offered for the lease of the land portions envisaged for the Groene Kloof project at 1,1% of gross revenue generated by 14 turbines escalated at 5% per annum over a period of 20 years. Based on this proposal, the funds accruing to the land owner(s) is as follows:

Lease rental	Financial benefit
Year 1	R1 million (rounded)
Over 20 years	R 33,6 million (rounded)
Average per annum	R1,7 million (rounded)

However considering that there is an expectation from the Department of Human Settlement that while it owns Portion 1 and Remainder of Laastestuiwer No 976, the department will receive and use the lease income generated by those 10 turbines, the lease income needs to be portrayed separately:

Lease rental	Groenekloof Lease Income	Laastestuiwer Lease Income
Year 1	R 0,3 million (rounded)	R0,7 million (rounded)
Over 20 years	R9,6 million (rounded)	R 24 million (rounded)
Average per annum	R0.5 million (rounded)	R1,2 million (rounded)

To ensure that the Mamre community receives maximum benefits out of this project, it is imperative that the illegal tenants are removed from the property in order for the Laastestuiwer claim to be settled and the land to be transferred to the community.

Employment opportunities for Mamre residents

Employment would be created during the construction (establishment) and operational phase of the wind energy facilities. The envisaged number of jobs that could be created during the construction phase for both projects and which refer specifically to semi and low skilled opportunities are as follows:

- Clover Valley: 24 to 30 semi and low skilled jobs
- Groene Kloof: 30 to 37 semi and low skilled jobs

The operational phase of the project would also provide 11 to 22 direct jobs for each project. These do not include potential small business opportunities due to sub-contracting arrangements that would be offered to small businesses.

Small enterprise development

The developer of the wind energy facilities need to adhere to economic development obligations as stated above. A requirement exists to achieve and make available 0,6% (as stated target) of gross revenue for the development of small enterprises. Based on the estimated revenue^[1] and an annual escalation of 5%, the funds that could accrue for small enterprise development is as follows per project:

Project	Year 1	Over 20 years	Average per annum
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^[1] The finalisation of the Revenue figure is subject to the tariff proposed as part of the bidding process and the final negotiation with the National Energy Regulator. The figures presented in this proposal are considered within the ballpark of the potential funds that may accrue to the community for the said purpose.

Clover Valley	R 0,5 million	R 16,5 million	R 0,8 million
Groene Kloof	R 0,5 million	R 17,7 million	R 0,8 million

Although the Department of Human Settlement may receive the lease income for Laastestuiwer until the land is transferred to the Mamre community, the department will not be entitled to the small enterprise or socio-economic development funds. This will be allocated to the community.

Socio-economic development

A need also exists for the developer of the wind energy facilities to make available 1,5% of gross revenue (as a stated target) for socio-economic development, which essentially refers to the development of community projects. Based on the estimated revenue and an annual escalation of 5%, the funds that could accrue to the Mamre Community for socio-economic development is as follows per project:

Project	Year 1	Over 20 years	Average per annum
Clover Valley	R 1,2 million	R 41,2 million	R 2 million
Groene Kloof	R 1,3 million	R 44,4 million	R 2,2 million

The Mamre Community could benefit on an annual basis from several sources of income. The funds accruing from both projects on average over the 20 years is as follows:

Clover Valley: R3,7 million

Groene Kloof: R4,7 million (inclusive of Laastestuiwer lease income stream)

No monetary cost or liability would or needs to be incurred by the Mamre Community for participation in the projects. There is a visual impact caused by the height of the turbines, which may cause a non-monetary cost from a sense of place perspective. However, the wind turbines should be considered in the context of the existing Eskom pylons that lead to the Deisenberg Electrical sub-station.

9 Conclusions

The proposed wind energy facility will result in some impacts to heritage resources. The paleontological resources are unlikely to be affected. The impacts on archaeological resources are likely to be minimal, and easily mitigated, and should not affect the decision to proceed with the project. The impacts to the natural and cultural landscapes are difficult to address, but they are by nature tied up, dependant and invested in a future of renewable energy. The visual impacts have been identified and mitigations proposed where possible, bearing in mind that for the most part, no mitigation measures would change the significance of the landscape impact other than avoiding the site entirely. The two heritage precincts of concern are the Mamre Mission Station and the Groote Post Werf (Originally called Klavervlei, commercially known as Groote Post Cellar today), both Provincial Heritage Sites. The VIA has found that the proposed wind farm will not be visible from the mission buildings (due to topographical screening), but that it will be clearly visible from the Western portion of the residential area of Mamre. The proposals for the Groene Kloof Wind Energy Facility do not affect the Groote Post Werf (Originally called Klavervlei, commercially known as Groote Post Cellar today).

Revised Option 1 is preferable, because even though the number of turbines is more than in Option 2, the reduced overall height of the units, will result in less turbines being visible at the identified receptors.

Different people may have different opinions to wind farms, their desirability and their effect on the “sense of place” of a landscape. Wind turbines may be perceived as majestic sculptures in the landscape and a positive move towards a greener future for the planet, positively affecting climate change rate and therefore the future of nature and agriculture, or they may be viewed as dominating unattractive eyesores.

This project is in the public interest in terms of broader societal needs, as renewable energy is a national priority. In the I&AP commenting process it was evident that the residents of Mamre are positive about the project.

The following conclusions can be made when assessing the impacts in terms of:

Extent/ Magnitude – The spatial scale of the project is large.

Duration – The impact is potentially permanent.

Probability of Impact Occurring – Definite if proposal goes ahead.

Irreplaceability – Except for the impacts on the cultural landscape, which are difficult to qualify/quantify, other heritage resources are unlikely to be lost, as the PIA and AIA have indicated. The impact on the built environment is indirect (visual) and do not constitute material loss of resources.

Reversibility – The impacts could potentially be reversed to some extent should the WEF reach the end of its lifespan. The turbines, which pose the greatest impact (which is visual), could be removed. The foundations will in all probability remain, but indigenous vegetation could cover large areas, and thereby reduce scarring.

If the impacts on heritage resources are mitigated as recommended, the project can be considered for approval/ positive comment.

10 References

De Villiers MM, Withers AW; 2012; Scoping Report: EIA for the Proposed Clover Valley Wind Energy Facility near Mamre, Western Cape Province; Report prepared for Clover Valley Wind Energy (Pty) Ltd

De Villiers MM, Withers AW; 2012; Scoping Report: EIA for the Proposed Groenekloof Wind Energy Facility near Mamre, Western Cape Province; Report prepared for Dassenberg Wind Energy (Pty) Ltd

Fransen, H; 2004; A Guide To The Old Buildings Of The Cape; Jonathan Ball Publishers (Pty) Ltd; Jeppes town.

Kaplan, J; 2012; Archaeological Impact Assessment for the proposed Groene Kloof Wind Energy Facility near Mamre, Western Cape, Report prepared for Withers Environmental Consultants. ACRM Cape Town.

Kaplan, J; 2012 Archaeological Impact Assessment for the proposed Groenekloof Wind Energy Facility near Mamre, Western Cape, Report prepared for Withers Environmental Consultants. ACRM Cape Town.

Pether, J; Paleontological Impact Assessment – Desktop Study for the proposed Clover Valley Wind Energy Facility, near Mamre, Swartland Municipality, Malmesbury District, Western Cape; Report prepared for Withers Environmental Consultants.

JM, Katzenellenbogen; The South African Medical Journal Vol 74, 1 October 1988; Mamre – history and development.

Chief Directorate National Geo-Spatial Information – Aerial photos and flight plans.

11 List of Acronyms

AIA	Archaeological Impact Assessment
ECO	Environmental Control Officer
EMP	Environmental Management Plan
HIA	Heritage Impact Assessment
HWC	Heritage Western Cape
I&AP	Interested and Affected Party
NID	Notice of Intent to Develop
PIA	Palaeontological Impact Assessment
WEF	Wind Energy Facility
VIA	Visual Impact Assessment

12 List of Appendices

- Appendix 1a Images
- Appendix 1b Revised Layout Option 1 (Preferred Site Layout Plan)
- Appendix 2 Palaeontological Impact Assessment (*prepared for the neighbouring proposed Clover Valley Wind Energy Facility*)
- Appendix 3 Archaeological Impact Assessment
- Appendix 4 Visual Impact Assessment
- Appendix 5 Comments and Responses Table (*comments raised on Integrated HIA between 31 August and 24 September 2012*)
- Appendix 6a List of Interested and Affected Parties (I&APs) that were invited to comment on the Draft EIA Report and the Integrated HIA
- Appendix 6b Letter sent to I&AP inviting comment on the Integrated HIA
- Appendix 7 Written comments received on the Integrated HIA
- Appendix 8 Socio-economic Impact Assessment

13 AUTHOR'S DECLARATION OF INDEPENDENCE

The author, Anne-Marie Fick, is an architect and heritage management consultant with eight years experience in disciplines involving the built environment, and is an accredited member of the Association of Heritage Assessment Practitioners, Western Cape.

Anne-Marie Fick of Malherbe Rust Architects and her associates have no financial interest in the property or development as such, and are not involved in any other projects being promoted by the client group, or companies owned by the client, other than the heritage impact assessments for the two wind farm sites (Groene Kloof and Clover Valley)