



KLAWER WIND ENERGY FACILITY

TERRESRIAL FAUNA & FLORA SPECIALIST INPUT FOR EIA AMENDMENT



PRODUCED FOR SAVANNAH ENVIRONMENTAL

BY



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1 INTRODUCTION

This ecological fauna and flora specialist report is to provide input on the proposed amendment for the Klawer Wind Farm. The original authorized facility consisted of 12 turbines generating up to 36MW. This is proposed to be reduced to two wind turbines generating up to 3MW each. The rotor diameter is also proposed to be increased from 90m-100m to 121.5m. The applicant is now Vendiwell (Pty) Ltd.

This report serves to address the ecological impacts of the current layout of the facility and provides an update to the original EIA study that was conducted at the site. As such, this report should be read in conjunction with that report and the main purpose of this report is to describe the area affected by the turbines and substation and indicate the extent of impact of the development in relation to the original assessed impacts.

A site visit to the Klawer Wind Farm was conducted in September 2016 to assess the revised layout and identify any features or species of conservation concern within the development footprint.

1.1 RELEVANT ASPECTS OF THE DEVELOPMENT

Vendiwell (Pty) Ltd propose to amend the Environmental Authorisation (EA) for the Klawer Wind Energy Facility as follows:

- Reduce the number of turbines from 10 to 2
- Amend the rotor diameter from 90-100m as detailed in the EIA to a rotor diameter of 121.5m.
- Include the details of the hub height (105m) and amended rotor diameter into the EA as this is not currently indicated.

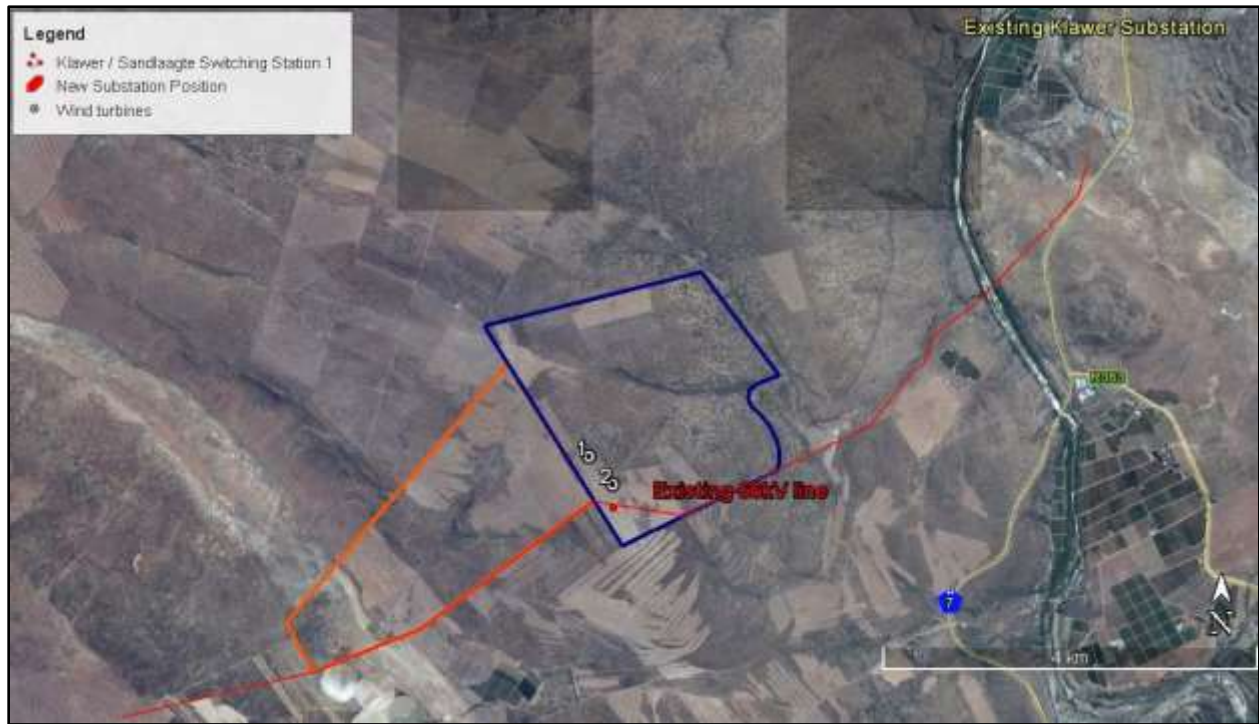


Figure 1. Satellite image of the Klawer site, showing the layout of the two turbines and substation. The blue polygon represents the border of farm Birdfield 99_306 and the orange polygon represents the border of farm Klipheuwel_390.

2 DESCRIPTION OF THE AFFECTED ENVIRONMENT



Turbine 1. Location of turbine 1, illustrating the location of the turbine itself left and the hardstand right. The vegetation is previously transformed and consists largely of weedy and alien species such as *Bromus pectinatus*, *Bromus diandrus*, *Hordeum murinum*, *Vulpia bromoides*, *Lolium rigidum*, *Erodium cicutarium*, *Hypochaeris radicata*, *Rhynchopsidium pumilum*, *Emex australis*, *Tribolium echinata*, *Athanasia trifurca*, *Gorteria personata*, *Moraea miniata*, *Ehrharta longiflora*, *Adenogramma glomerata*, *Aizoon canariense*, *Arctotheca calendula*. There are not species or features of conservation concern within the development footprint and the impact of the turbine on the terrestrial environment would be **LOW**.



Site Compound. The site compound lies between turbines 1 and 2 and has similar composition to the vegetation within the Turbine 1 area and is not further detailed here as there are no additional features or species of significance within the footprint.



Turbine 2. Turbine 2 hardstand in the foreground with the turbine position in the distance. The site is transformed and no intact vegetation will be impacted by the turbine. The vegetation is similar to that within Turbine 1 and consists of *Bromus diandrus*, *Bromus pectinatus*, *Hordeum murinum*, *Vulpia bromoides*, *Lolium rigidum*, *Erodium cicutarium*,

Rhynchosidium pumilum, *Emex australis*, *Tribolium echinata*, *Athanasia trifurca*, *Gorteria personata*, *Gorteria diffusa*, *Conicosia pugioniformis*, *Trachyandra falcata*, *Apatesia helianthoides*, *Asparagus capensis*, *Moraea miniata*, *Ehrharta longiflora*, *Adenogramma glomerata*, *Aizoon canariense*, *Arctotheca calendula* and *Euryops tenuissimus*.



On-site Substation. The substation site is located within a transformed area with no natural vegetation remaining. The vegetation is composed of species associated with old lands such as *Bromus diandrus*, *Bromus pectinatus*, *Hordeum murinum*, *Vulpia bromoides*, *Lolium rigidum*, *Erodium cicutarium*, *Rhynchosidium pumilum*, *Emex australis*, *Tribolium echinata*, *Athanasia trifurca*, *Gorteria personata*, *Gorteria diffusa* and *Conicosia pugioniformis*. There are no sensitive features or species of concern within the development footprint.



Access Road. Although the majority of the access road follows the existing road, the final section up the slope towards the ridge follows a new route to the left of the existing track visible above. This area is degraded with relatively low diversity. The tree visible in the middle of the slope is the alien *Acacia cyclops*. Common and dominant species in the affected area include *Didelta spinosa*, *Euphorbia mauritanica*, *E. burmanii*, *Phyllica olaeifolia*, *Euclea tomentosa*, *Ruschia caroli*, *R. brevibracteta*, *Rhus dissecta*, *R. undulata*, *Passerina glomerata*, *Euryops speciosissimus*, *Nylandtia spinosa*, *Eriocephalus africanus*, *Tetragonia arbuscula*, *Tylecodon wallichii*, *Montinia caryophyllacea*, *Wiborgia leptoptera*, *Galenia africana*, *Hermannia trifurca*, *Ehrharta calycina* and *E. thunbergii*.



Grid Connection. Views over different sections of the power line route, left the initial section from near the on-site substation and right, looking towards Klawer along the middle section of the line. The vegetation consists largely of Doringriver Quartzite Karoo dominated by species

such as *Didelta spinosa*, *Othonna quercifolia*, *Euphorbia mauritanica*, *E. burmanii*, *E. hamatum*, *Phyllica olaeifolia*, *Euclea tomentosa*, *Ruschia caroli*, *R. brevibracteta*, *Rhus dissecta*, *R. undulata*, *Passerina glomerata*, *Euryops speciosissimus*, *Nylandtia spinosa*, *Eriocephalus africanus*, *Diospyros ramulosa*, *Tetragonia arbuscula*, *T. fruticosa*, *Tylecodon paniculatus*, *T. wallichii*, *Montinia caryophyllacea*, *Wiborgia leptoptera*, *Galenia africana*, *Hermannia trifurca*, *Tripterys sinuata*, *Trachyandra adamsonii*, *Ehrharta calycina*, *E. thunbergii*.

3 IMPACTS ON ECOLOGY

The impact assessment tables below display the impacts on Flora and Terrestrial Fauna assessments for both the authorised 10 turbine layout and the proposed 2 turbine layout with the increased rotor diameter.

The major impacts on flora and terrestrial fauna are likely to occur in the construction phase and these are assessed below. Given the limited extent of the amended site layout and restriction of the infrastructure to transformed lands, there will be minimal to negligible impacts during the operation phase. The maintenance works during the operation phase will lead to some intermittent human activity and traffic but significantly less than that anticipated during the construction phase and therefore it is expected that impacts to terrestrial fauna and flora will be minimal.

Nature of impact: Construction activities would result in a negative direct impact on the natural vegetation of the Wind Farm site				
	Authorized		Proposed amendment	
	Without mitigation	With mitigation	Without mitigation	With mitigation
Extent	Regional(3)	Regional (3)	Local (2)	Local (2)
Duration	Long term (4)	Long-term (4)	Long-term (4)	Long-term (4)
Magnitude	High (8)	Moderate (7)	Low (4)	Low (3)
Probability	Definite (5)	Highly probable (4)	Probable (3)	Probable (3)
Significance	High (75)	Medium (56)	Low (30)	Low (27)
Status (positive or negative)	Negative	Negative	Negative	Negative
Reversibility	Very low	Very low	Very low	Very low
Irreplaceable loss of resources?	Yes	Yes	No	No
Can impacts be mitigated?	Yes	Yes	Yes	Yes
Mitigation:				

- Vegetation clearing should be kept to a minimum.
- Soil disturbance should be kept to a minimum.

Nature of impact: Construction activities would result in a negative direct impact on reptiles present. Construction phase disturbance will be transient, but some habitat loss would be long term.

	Authorized		Proposed amendment	
	Without mitigation	With mitigation	Without mitigation	With mitigation
Extent	Local (2)	Local (2)	Local (2)	Local (2)
Duration	Permanent (5)	Permanent (5)	Short-term (2)	Short-term (2)
Magnitude	High (8)	Medium (5)	Low (4)	Low (1)
Probability	Definite (5)	Definite (5)	Improbable (2)	Improbable (2)
Significance	High (75)	Moderate (60)	Low (24)	Low (20)
Status (positive or negative)	Negative	Negative	Negative	Negative
Reversibility	Very low	Low	Very low	Very low
Irreplaceable loss of resources?	Yes	Yes	No	No
Can impacts be mitigated?	Yes	Yes	Yes	Yes

Mitigation:

- The illegal collection, hunting or harvesting of any plants or animals at the site should be strictly forbidden. Personnel should not be allowed to wander off the construction site.
- All hazardous materials should be stored in the appropriate manner to prevent contamination of the site. Any accidental chemical, fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill.
- All construction vehicles should adhere to a low speed limit (40km/h for cars and 30km/h for trucks) to avoid collisions with susceptible species such as snakes and tortoises.
- All personnel should undergo environmental induction with regards to fauna and in particular awareness about not harming or collecting species such as snakes, tortoises.

Nature of impact: Construction activities would result in a negative direct impact on the amphibians present of the Wind Farm site. Construction phase disturbance will be transient, but some habitat loss would be long term.

	Authorized		Proposed amendment	
	Without mitigation	With mitigation	Without mitigation	With mitigation
Extent	Local(2)	Local (2)	Local (2)	Local (2)
Duration	Short term (2)	Short-term (2)	Very Short term (1)	Very short-term (1)
Magnitude	Moderate (6)	Moderate (5)	Low(4)	Very Low (3)

Probability	Probable (3)	Probable (3)	Improbable (2)	Improbable (2)
Significance	Medium (30)	Low (27)	Low (14)	Low (12)
Status (positive or negative)	Negative	Negative	Negative	Negative
Reversibility	Very low	Low	Very low	Very low
Irreplaceable loss of resources?	Yes	No	No	No
Can impacts be mitigated?	Yes	Yes	Yes	Yes

Mitigation:

- During construction any fauna directly threatened by the construction activities should be removed to a safe location by the ECO or other suitably qualified person.
- All hazardous materials should be stored in the appropriate manner to prevent contamination of the site. Any accidental chemical, fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill.

Nature of impact: Construction activities would result in a negative direct impact on mammals present of the Wind Farm site. Vegetation clearance, increased disturbance through noise and increased human activity and an increase in dust is likely to negatively impact mammals.

	Authorized		Proposed amendment	
	Without mitigation	With mitigation	Without mitigation	With mitigation
Extent	Local(2)	Local (2)	Local (2)	Local (2)
Duration	Short term (2)	Short-term (2)	Short term (2)	Short-term (2)
Magnitude	Moderate (6)	Moderate (5)	Low(4)	Low (3)
Probability	Definite (5)	Highly probable (4)	Probable (3)	Probable (3)
Significance	Medium (50)	Medium (36)	Low (24)	Low (21)
Status (positive or negative)	Negative	Negative	Negative	Negative
Reversibility	Very low	Very low	Very low	Very low
Irreplaceable loss of resources?	No	No	No	No
Can impacts be mitigated?	Yes	Yes	Yes	Yes

Mitigation:

- During construction any fauna directly threatened by the construction activities should be removed to a safe location by the ECO or other suitably qualified person.
- The illegal collection, hunting or harvesting of any plants or animals at the site should be strictly forbidden. Personnel should not be allowed to wander off the construction site.
- No fires should be allowed within the site.

- No fuelwood collection should be allowed on-site.
- All construction vehicles should adhere to a low speed limit (40km/h for cars and 30km/h for trucks) to avoid collisions with susceptible species such as rabbits or hares.

4 CONCLUSIONS & RECOMMENDATIONS

There are no significant biodiversity features within the revised footprint of the Klawer Wind Farm and all likely impacts on flora and terrestrial fauna are likely to be **LOW**. The footprint of the turbines, camp and substation are all restricted to previously transformed areas and no intact vegetation is likely to be lost within these areas. The access road to the site will need to be widened and will result in some loss of vegetation along the sides of the road. No species of conservation concern were observed within the immediate environment of the access road and impacts along the road are also likely to be low. The power line to Klawer is approximately 8 km long and there are no highly sensitive features along the route that cannot be avoided. Although a significant proportion of the route traverses degraded or transformed areas, the final pylons positions within the intact sections, should be inspected in the field before construction as there are a number of listed species in the area that could be affected. These can however be avoided through micro-siting of the pylon positions.

The impact of the revised layout of Klawer Wind Farm on flora and terrestrial fauna will be significantly lower than the original assessed layout and no impacts would be higher than the original development. The Klawer Wind Farm will generate **Low impacts on flora** and **Low impacts on terrestrial fauna**. Cumulative impacts will also be minimal as a result of the low overall extent of habitat loss resulting from the development and the location of the turbines and other infrastructure within previously transformed areas. No additional mitigation measures are required to be implemented as a result of the proposed amendments. The amendments are therefore considered to be acceptable.