
**GREAT KAROO WIND ENERGY FACILITY
NEAR SUTHERLAND IN THE NORTHERN
CAPE PROVINCE
(DEA REF: 12/12/20/2370/3)**

**MOTIVATION FOR AMENDMENT OF
ENVIRONMENTAL AUTHORISATION**

**FOR PUBLIC REVIEW
8 APRIL 2016 - 11 MAY 2016**

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- Appendix A:** Noise Specialist Report
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- Appendix D:** Avifaunal Specialist Report
- Appendix E:** Public Participation Documentation
- Appendix F:** A3 layout maps

**GREAT KAROO WIND ENERGY FACILITY NEAR SUTHERLAND IN THE
NORTHERN CAPE PROVINCE
(DEA REF: 12/12/20/2370/3)**

MOTIVATION FOR AMENDMENT OF ENVIRONMENTAL AUTHORISATION:

**AMENDMENT OF TURBINE ROTOR DIAMETER, NUMBER OF TURBINES AND
THE TURBINE GENERATING CAPACITY**

FOR PUBLIC REVIEW

Great Karoo Wind Farm (Pty) Ltd received an Environmental Authorisation (EA) for the construction of the Great Karoo Wind Energy Facility near Sutherland in the Northern Cape (DEA ref: 12/12/20/2370/3) on 12 August 2014.

Following developments in technology after the issuing of the EA and in finalising the site development plan on the basis of the wind monitoring results from the site and economic efficiency considerations, the developer is now proposing an increase in rotor diameter from 120m to 140m and the reduction in the number of turbines from 56 to 52 (refer to Figure 1), each with a generating capacity of up to 3.6MW. These changes are proposed in order to increase the efficiency of the facility and consequently the economic competitiveness thereof.

The proposed amendments in themselves are not listed activities and do not trigger any new listed activity (as the proposed amendments are within the original development footprint).

In terms of Condition 5 of the Environmental Authorisation and Regulation 31 of the EIA Regulations of December 2014, it is possible for an applicant to apply, in writing, to the competent authority for a change or deviation from the project description to be approved. Savannah Environmental has prepared this motivation report in support of this amendment application on behalf of Great Karoo Wind Farm (Pty) Ltd.

This report aims to provide detail pertaining to the significance and impacts of the proposed change to the project description in order for interested and affected parties to be informed of the potential change in the project description, and for the competent authority to be able to reach a decision in this regard. This amendment motivation report is available to registered interested and affected parties for a 30 day review period from **8 April 2016 – 11 May 2016.**

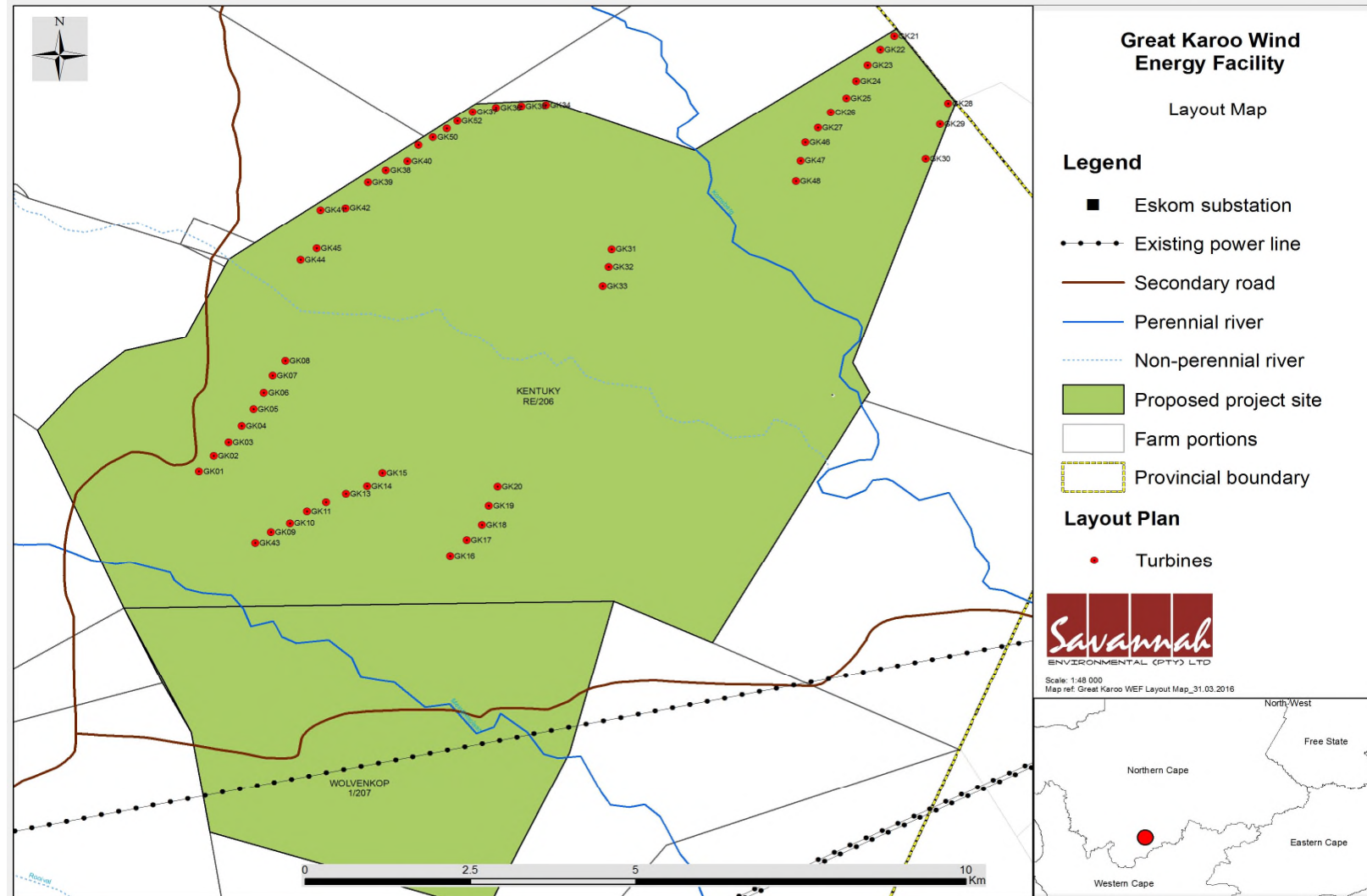


Figure 1: The new proposed turbine layout (A3 Map included in **Appendix F**- the final layout submitted with the Final EIAr is also included in **Appendix F**).

1. OVERVIEW OF THE PROJECT

Location:

The Great Karoo Wind Energy Facility is located near Sutherland in the Northern Cape Province on the following farm portions:

- » The Farm Kentucky 206; and

Environmental sensitivity:

From the specialist investigations undertaken within the EIA process for the proposed wind energy facility no environmental fatal flaws were identified. However, the following environmental sensitivities and potential impacts were identified:

- » Potential noise impact
- » Areas of visual impact
- » Potential impacts on birds
- » Potential impacts on bats
- » Potential heritage impacts
- » Potential ecological impacts

2. DETAILS OF THE AMENDMENTS APPLIED FOR

A Part 2 substantive amendment is being applied for considering the following amendment:

1. The authorised number of turbines is proposed to decrease from 56 turbines to 52 turbines.

It is requested that the project description in the EA be amended to include the correct number of turbines to be installed at the site. The wording on page 8 of the EA is therefore requested to be changed from:

Up to 56 wind turbines

To:

Up to 52 wind turbines

2. The turbine specification (as specified on page 8 of the EA) is to be amended

It is requested that the turbine specifications be amended from:

- Rotor Diameter: 120m
- Between 2MW and 3.5MW in capacity

To:

- **Rotor Diameter: up to 140 m**
- **Up to 3.6MW in capacity each**

It is requested that these turbine specifications be added into the project description on page 8 of the EA so that the EA reads:

Up to 52 wind turbines (with up to 3.6MW in capacity and with up to 140m rotor diameter and a hub height of up to 120m)

3. MOTIVATION FOR THE PROPOSED AMENDMENT

3.1. Technical Motivation

Following developments in technology after the issuing of the original EA and in finalising the site development plan on the basis of the wind monitoring results from the site as well as economic efficiency considerations, the developer is proposing an increase in rotor diameter from 120m to 140m and the reduction in the number of turbines from 56 to 52 within the assessed footprint. Each turbine will have a generating capacity of up to 3.6MW. These amendments are proposed in order to increase the efficiency of the facility and consequently the economic competitiveness thereof.

3.2. Considerations in terms of the requirements of the EIA Regulations

In terms of Regulation 31 of the EIA Regulations 2014, it is expected that the amendment may result in an impact where such level or nature of impact was not:

- a) Assessed and included in the initial application for environmental authorisation;
or
- b) Taken into consideration in the initial authorisation.

In this instance, the blade length increase was not assessed in the original EIA. Therefore, the application is made in terms of Regulation 31(a).

4. POTENTIAL FOR CHANGE IN THE SIGNIFICANCE OF IMPACTS AS ASSESSED IN THE EIA AS A RESULT OF THE PROPOSED AMENDMENTS

In terms of Regulation 32(1)(i), the following section provides an assessment of the impacts related to the proposed change. Understanding the nature of the proposed amendments the following has been considered:

- » Noise impacts
- » Visual impacts
- » Impacts on birds
- » Impacts on bats

The potential for change in the significance of impacts based on the proposed amendments as described within this motivation report is discussed below, and detailed in the specialist's assessment addendum Reports contained in **Appendix A-D**.

4.1. Noise impact

The optimization of the layout of the wind farm has resulted in the reduction of the number of wind turbines and micro-siting the wind turbines at optimal locations. The closest wind turbine is slightly further away from NSD07 than with the previous layout. The increase in the rotor diameter from 120m to 140m is proposed, likely using the Vestas V126 3.3-3.6MW or Acciona AW125 3-3.15MW wind turbines.

This turbine is slightly louder than the Vestas V90 3.0MW wind turbine (on which the EIA assessment was based) with about 1-2dB, but noise emissions from this wind turbine can be managed by means of different operational modes if required, as well as the use of blades with the optional serrated trailing edge. It is recommended that the turbine with such noise management option be used at locations closer than 1 200m from NSD07 if necessary.

However, considering the location of the wind turbines and the potential noise impact, the change in the rotor diameter and the number of turbines will not increase the significance of the noise impact as assessed within the EIA. A full noise impact assessment with new modelling will not be required and the recommendations as contained in the previous assessment remain valid. No additional mitigation measures have been proposed for the amendment under consideration. Please refer to **Appendix A** for the specialist report.

4.2. Visual impact

The proposed increase in the diameter of the rotor from 120m to 140m is likely to result in small differences in resulting visual impact from that assessed within the EIA. This is because of the following reasons:

- » Although the rotor diameter increase is 20m, this will result in a 10m overall height increase when the rotor blades are at the top of their rotation only. This will equate to a 5.5% increase in the overall height of structures.
- » The rotors rotate horizontally to face the wind direction and so are rarely seen from ninety degrees from where the full width of the rotor might be appreciated.
- » The section of the turbine with the greatest visual mass is the tower and nacelle which sits at the top of the tower. The height of the towers will not change from that assessed in the original VIA (120m).

Given that the nacelle or hub height of the proposed structures is the same as that originally proposed, it is expected that if the two options were visually compared, the difference is only likely to be obvious over a short distance. As the viewer moves away from the structures and the apparent scale reduces, it is likely to become increasingly difficult to tell the structures apart.

Based on the above, it is concluded that the proposed increase in the rotor diameter of the wind turbines of the Great Karoo Wind Energy Facility will not significantly increase the visibility of the structures. The changes in the nature of views of the facility will not be significant enough to alter the majority of the findings of the Original Visual Impact Assessment.

The only area where the additional rotor diameter could marginally increase identified impacts is shadow flicker that was identified as a potential threat to a homestead of a project participant that lies within 1km of proposed turbines. The new proposal sees turbine positions removed from the east and north east of the homestead which will reduce the risk of shadow flicker particularly during spring, autumn and winter. Given that the rotor diameter will increase from 120m to 140m with the new proposal and the overall height of the structure will increase by 10m when each blade reaches the top of a revolution, the potential for shadow flicker to affect the homestead will increase marginally. The assessed impact associated with the new proposal is therefore increased from very low to **low**. With mitigation this reduces to **very low**. Please refer to the assessment tables below and the Visual Impact Assessment Addendum Report in **Appendix B**.

4.2.1 Potential visual impact on observers travelling along arterial and secondary roads in close proximity to the proposed wind energy facility

The original VIA found that potential visual impact on users of the R354 and secondary roads in close proximity of the proposed wind energy facility (i.e. within 10km) was expected to be of moderate significance. No mitigation was possible.

The proposed increase in the rotor diameter will have a small influence on this assessment as it is likely to marginally increase the intensity of impacts and only from close quarters. With distance however (approximately >2km) the increase in rotor diameter is unlikely to be obvious.

There are approximately 36km of unsurfaced local road within 10km of the development from where the facility is visible. The wind energy facility is also likely to be visible from the R354 but at a distance greater than 14km and over an approximate 8km of the road.

Increased impacts associated with the proposed increase in rotor diameter are therefore likely to be marginal and will not change the original assessment (as indicated below).

Nature of Impact: Potential visual impact on observers travelling along arterial and secondary roads in close proximity to the proposed wind energy facility		
	Without Mitigation	Mitigation Considered
Extent	Local (4)	N/A
Duration	Long term (4)	N/A
Magnitude	Medium (6)	N/A
Probability	Highly Probable (4)	N/A
Significance	Moderate (56)	N/A
Status	Negative	N/A
Reversibility	Recoverable (3)	N/A
Irreplaceable loss	No	N/A
Can impacts be mitigated?	No	
Mitigation / Management: None		
Cumulative impacts: The construction of Phases 1, 2 and 3 of the greater Hidden Valley Wind Energy Facility will increase the cumulative visual impact of industrial and / or power related infrastructure (such as power lines and substations) within the region.		
Residual impacts: The visual impact will be removed after decommissioning, provided the facility and ancillary infrastructure is removed.		

4.2.2 Potential visual impact on residents of settlements and homesteads in close proximity to the proposed wind energy facility

The original VIA found that the potential visual impact on residents of settlements and homesteads within a 10km radius of the proposed wind energy facility was expected to be of moderate to high significance. No mitigation was possible.

The proposed increase in the rotor diameter will have a small influence on this assessment as it is likely to marginally increase the intensity of impacts and only from close quarters. With distance however (approximately >2km) the increase in rotor diameter is unlikely to be obvious.

There are only six homesteads within 10km, two (project participants) within 5km and one (project participant) within 1km of the proposed wind energy facility. The increased impacts associated with the proposed increase in rotor diameter are therefore likely to be marginal and will not change the original assessment (as indicated below).

Nature of Impact:		
Potential visual impact on residents of settlements and homesteads in close proximity to the proposed wind energy facility		
	Without Mitigation	Mitigation Considered
Extent	Local (4)	N/A
Duration	Long term (4)	N/A
Magnitude	Medium (4)	N/A
Probability	Highly Probable (4)	N/A
Significance	Moderate (48)	N/A
Status	Negative	N/A
Reversibility	Recoverable (3)	N/A
Irreplaceable loss	No	N/A
Can impacts be mitigated?	No	
Mitigation / Management:		
None		
Cumulative impacts:		
The construction Phases 1, 2 and 3 of the greater Hidden Valley Wind Energy Facility will increase the cumulative visual impact of industrial and / or power related infrastructure (such as power lines and substations) within the region.		
Residual impacts:		
The visual impact will be removed after decommissioning, provided the facility and ancillary infrastructure is removed.		

4.2.3 Potential visual impact on sensitive visual receptors within the region.

The original VIA found that visual impact on the users of roads and the residents of settlements and homesteads within the region (i.e. beyond the 10km radius) is expected to be of moderate significance. No mitigation is possible.

The proposed increase in the rotor diameter will have a negligible influence on this assessment as it is likely to only marginally increase the intensity of impacts and only from close quarters. With distance however (approximately 2km) the increase in rotor diameter is unlikely to influence the original assessment.

4.2.4 Potential visual impact of shadow flicker on visual receptors in close proximity to the proposed wind energy facility

Shadow flicker occurs when the sky is clear, and when the rotor blades of the wind turbine are between the sun and the receptor (i.e. when the sun is low). De Gryse in *Scenic Landscape Architecture* (2006) found that "*most shadow impact is associated with 3-4 times the height of the object*". Based on this research, a 400m buffer along the edge of the facility is submitted as the zone within which there is a risk of shadow flicker occurring.

In this respect, only the following receptors may possibly experience visual impact as a result of shadow flicker due to their proximity to turbine structures (<1km):

- » De Plaat homestead and a 3km section of secondary road to the west of this homestead.

The original VIA found that the anticipated impact was expected to be very low for the abovementioned settlements since they are at least 400m removed from the nearest turbines.

The new proposal sees turbine positions removed from the east and north east of the homestead which will reduce the risk of shadow flicker particularly during spring, autumn and winter; however remaining turbines to the south east could still impact during winter months. Given that the turbine diameter will increase from 120m to 140m with the new proposal and the overall height of the structure will increase by 10m when each blade reaches the top of a revolution, the potential for shadow flicker to affect the homestead will increase marginally. The assessed impact associated with the new proposal is therefore increased from very low to **low**. With mitigation this reduces to **very low**.

The risk of shadow flicker affecting the local road remains as identified in the original VIA

Nature of Impact:		
Potential visual impact of shadow flicker on visual receptors in close proximity to the proposed wind energy facility.		
	Without Mitigation	Mitigation Considered
Extent	Site (5)	Site (5)
Duration	Long term (4)	Long term (4)
Magnitude	Minor (2)	None (0)
Probability	Improbable (2)	Very improbable (1)
Significance	Low (22)	Very Low (9)
Status	Negative	Negative
Reversibility	Recoverable (3)	Recoverable (3)
Irreplaceable loss	No	No
Can impacts be mitigated?	Yes	
Mitigation / Management:		
The provision of:		
» Screening		
» Blinds on affected windows. As this is a relatively short term impact for the majority of the day blinds may be opened but for short periods when shadow flicker is experienced they may be closed.		
» The relocation of windows to walls unaffected by shadow flicker.		
Cumulative impacts:		
No cumulative impact		
Residual impacts:		
The visual impact will be removed after decommissioning, provided the facility and ancillary infrastructure is removed.		

4.2.5 Potential visual impact of the facility on the visual character of the Karoo landscape and sense of place of the region.

Sense of place refers to a unique experience of an environment by a user, based on his or her cognitive experience of the place. Visual criteria and specifically the visual character of an area (informed by a combination of aspects such as topography, level of development, vegetation, noteworthy features, cultural / historical features, etc.) play a significant role.

A visual impact on the sense of place is one that alters the visual landscape to such an extent that the user experiences the environment differently, and more specifically, in a less appealing or less positive light. Specific aspects contributing to the sense of place of this region include un-impacted picturesque landscapes, dramatic mountains and isolation.

The original VIA found that the visual impact on the visual character of the Karoo landscape and sense of place of the region is expected to be of moderate to high significance.

The proposed increase in the rotor diameter will have a marginal influence on this assessment as it is likely to marginally increase the intensity of impacts and only at from close quarters. With distance however (approximately 2km) the increase in rotor diameter is unlikely to influence the original assessment.

4.2.6 Potential visual impact of the proposed facility on tourist routes and tourist destinations within the region.

The original VIA considered that the area surrounding the site is itself not a major tourist attraction and that the R354 is a primary tourism route for visitors to the town of Sutherland and surrounding attractions.

Based on the above factors, the original VIA found that the visual impact on the R354 is expected to be of low significance and that no mitigation is possible.

The proposed increase in the rotor diameter will have no influence on the original assessment of this impact.

4.2.7 Over All conclusion

The proposed increase in the diameter of the rotor from 120m to 140m is likely to result in small differences in resulting visual impact from that assessed within the EIA but only at short distances (less than 2km).

4.3. Impacts on bats

No proposed turbines are located in areas of high bat sensitivity or their buffers, but rather on the higher surrounding hills. It was clear from the data gathered from the 12-month pre-construction bat monitoring study that the lower lying valley type areas had higher bat activity than the elevated regions of the site where turbines are proposed. The turbine layout has been devised such that turbines do not encroach on high or moderate bat sensitive areas or their respective buffer zones. Thus the reduced turbine layout is deemed acceptable.

With regards to the amended turbine specifications, a change to rotor diameter can increase the risk of impact on bats due to the fact that an increased turbine size increases the airspace in which bat mortality may occur. The proposed increased rotor diameter of 140m increases the blade length by 10m closer to the ground and 10m higher above the ground. Thus the amended turbine size may have an increased impact on high flying bat species, such as *Tadarida aegyptiaca*, as well as low flying species that are active near vegetation clutter, such as *Neoromicia capensis*. The very slight increased impact is reflected in the impact assessment tables below, although impact category ratings have not changed. The very slight

increased impact is reflected in the impact assessment tables although impact category ratings have not changed. However, the slightly reduced turbine layout from 56 turbines to 52 turbines is a positive amendment and simultaneously decreases the negative impacts on bats which is ultimately more favourable than the currently authorised layout. Please refer to the assessment tables below and the Bat Amendment Report in **Appendix C**.

The impact assessment tables below display the assessments for both the authorised 56 turbine layout and the proposed amended 52 turbine layout with the increased rotor diameter.

4.3.1 Construction phase

Nature of impact: Destruction of bat roosts during construction				
Possible roosting space on site are mostly in the form of rock crevices where water erosion has exposed rock on hill slopes. Water drainage areas are demarcated in the sensitivity map and these are avoided				
	Authorized		Proposed amendment	
	Without mitigation	With mitigation	Without mitigation	With mitigation
Extent	Low (1)	Low (1)	Low (1)	Low (1)
Duration	Permanent (5)	Permanent (5)	Permanent (5)	Permanent (5)
Magnitude	Minor (2)	Minor (2)	Minor (2)	Minor (2)
Probability	Very improbable (1)	Very improbable (1)	Very improbable (1)	Very improbable (1)
Significance	8 (Low)	8 (Low)	8 (Low)	8 (Low)
Status (positive or negative)	Negative	Negative	Negative	Negative
Reversibility	Very low	Very low	Very low	Very low
Irreplaceable loss of resources?	Yes	No	Yes	No
Can impacts be mitigated?	Yes		Yes	
Mitigation: Strictly adhere to the bat sensitivity map				

Nature of impact: Artificial lighting				
During construction strong artificial lights used in the work environment during night time will attract insects and thereby also bats. However only certain species of bats will readily forage around strong lights, whereas others avoid such lights even if there is insect prey available.				
This can draw insect prey away from other natural areas and thereby artificially favour certain species, affecting bat diversity in the area.				
	Authorized		Proposed amendment	
	Without mitigation	With mitigation	Without mitigation	With mitigation
Extent	Low (1)	Low (1)	Low (1)	Low (1)
Duration	Very short (1)	Very short (1)	Very short (1)	Very short (1)
Magnitude	Minor (2)	Minor (2)	Minor (2)	Minor (2)
Probability	Highly probable (4)	Probable (3)	Highly probable (4)	Probable (3)
Significance	16 (Low)	12 (Low)	16 (Low)	12 (Low)
Status (positive or negative)	Negative	Negative	Negative	Negative
Reversibility	High	High	High	High
Irreplaceable loss of resources?	No	No	No	No
Can impacts be mitigated?	Yes		Yes	
Mitigation:				
Consciously switch off all lights at a construction area when not required anymore, do not let it burn throughout the night. If suitable for the purpose, utilize lighting temperatures (colours/wavelengths) that attract fewer insects.				

Nature of impact: Foraging habitat loss				
Some foraging habitat will be permanently lost by construction of turbines and access roads. Temporary foraging habitat loss will occur during construction due to storage areas and movement of heavy vehicles.				
	Authorized		Proposed amendment	
	Without mitigation	With mitigation	Without mitigation	With mitigation
Extent	Low (1)	Low (1)	Low (1)	Low (1)
Duration	Medium (3)	Short (2)	Medium (3)	Short (2)
Magnitude	Moderate (6)	Low (4)	Moderate (6)	Low (4)
Probability	Highly probable (4)	Probable (3)	Highly probable (4)	Probable (3)
Significance	40 (Medium)	21 (Low)	40 (Medium)	21 (Low)

Status (positive or negative)	Negative	Negative	Negative	Negative
Reversibility	Moderate	High	Moderate	High
Irreplaceable loss of resources?	Yes	No	Yes	No
Can impacts be mitigated?	Yes		Yes	
Mitigation: Adhere to the bat sensitivity map. Keep to designated areas when storing building materials, resources, turbine components and/or construction vehicles and keep to designated roads with all construction vehicles. Damaged areas should be rehabilitated by an experienced vegetation succession specialist after construction.				

4.3.2 Operational phase

Nature of impact: Bat mortalities due to direct blade impact or barotrauma during foraging (not migration).				
	Authorized		Proposed amendment	
	Without mitigation	With mitigation	Without mitigation	With mitigation
Extent	Low-medium (2)	Low-medium (2)	Low-medium (2)	Low-medium (2)
Duration	Long term (4)	Long term (4)	Long term (4)	Long term (4)
Magnitude	Moderate (6)	Low (4)	Moderate (7)	Low (5)
Probability	Probable (3)	Improbable (2)	Probable (3)	Improbable (2)
Significance	36 (Medium)	20 (Low)	39 (Medium)	22 (Low)
Status (positive or negative)	Negative	Negative	Negative	Negative
Reversibility	Low	Low	Low	Low
Irreplaceable loss of resources?	Yes	No	Yes	No
Can impacts be mitigated?	Yes		Yes	
Mitigation: Adhere to the sensitivity map, and do not move any turbines into Moderate sensitivity areas.				

Nature of impact: Bat mortalities due to direct blade impact or barotrauma during migration Migratory routes in the region are completely unknown, and there is no knowledge of

whether any such migrations exist. However, no caves capable of providing roosting space for migratory species are known in the area, and furthermore the migratory species *M. natalensis* have only been detected in low numbers.

	Authorized		Proposed amendment	
	Without mitigation	With mitigation	Without mitigation	With mitigation
Extent	Medium (3)	Medium (3)	Medium (3)	Medium (3)
Duration	Long term (4)	Long term (4)	Long term (4)	Long term (4)
Magnitude	Moderate (6)	Low (4)	Moderate (7)	Low (5)
Probability	Probable (3)	Probable (3)	Probable (3)	Probable (3)
Significance	39 (Medium)	33 (Medium)	42 (Medium)	36 (Medium)
Status (positive or negative)	Negative	Negative	Negative	Negative
Reversibility	Low	Low	Low	Low
Irreplaceable loss of resources?	Yes	No	Yes	No
Can impacts be mitigated?	Yes		Yes	
Mitigation: Monitor passive data and mortalities over the operational phase to determine if new migrations occur on site or not. If migrations occur affected turbines must be curtailed accordingly to avoid impact to migrating bats.				

4.3.3 Conclusion

It can be concluded that the impact on bats is expected to be relatively low as a result of to the reduction in number of turbines. This is mainly due to the relatively low bat activity levels recorded by passive bat monitoring systems for the Great Karoo Wind Energy Facility, confidence in the impact statement is high. The proposed increase in the diameter of the rotor from 120m to 140m can increase the risk of impact on bats due to the fact that an increased turbine size increases the airspace in which bat mortality may occur but as shown above this is only marginal and offset by the reduction in number of turbines.

4.4. Impacts on avifauna

Although the increase in rotor diameter means a larger potential risk area per turbine (known as the Rotor Swept Area- RSA), there is an indirect resultant lower impact due to the reduction in the number of turbines (from 56 to 52). Published literature generally found that the number of turbines is a more important consideration when determining collision risk than the RSA or the turbine dimensions. It was also important to determine, and ensure, that the all turbines

in the revised layout remained outside of the high sensitivity exclusion zones identified by EWT (2014). This was found to be the case.

Detailed mitigation measures have been provided along with those mitigation measures provided by the EWT (2014) which remain relevant. The updated mitigations, required for the project to proceed are shown in Tables A to G below (in Section 4.4.1 and 4.4.2) and were considered when rating the residual impacts. No additional impacts (i.e. that were not identified by EWT, 2014) due to the proposed changes were found.

A change in the 'With Mitigation' significance rating (i.e. the residual impact significance rating) following the updated assessment was found for the following impacts associated with the Great Karoo Wind Energy Facility due to the reduction in the number of turbines:

- » Disturbance of birds during construction changed from a score of 30 (Medium) to 21 (Low).
- » Disruption of local bird movement patterns changed from a score of 36 (Medium) to 24 (Low).

Please refer to the Updated Bird Impact Assessment Report in Appendix D.

4.4.1 Construction Phase

Disturbance of Birds

Table A: Impact Rating for Disturbance of Birds during Construction

Nature: Disturbance of birds during construction of Great Karoo Wind Farm. For shy or sensitive species this can impact on their usual daily activities, particularly whilst breeding.		
	Without mitigation	With mitigation
Extent	2 (local)	1 (local)
Duration	2 (short term)	2 (short term)
Magnitude	6 (moderate)	4 (low)
Probability	4 (most likely)	3 (probable)
Significance	40 (Medium)	21 (Low)
Status (positive or negative)	Negative	Negative
Reversibility	Medium	Medium
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Partially	
Mitigation:		
» Strict control should be maintained over all activities during construction, in particular heavy machinery and vehicle movements, and staff.		
» Sensitive zones and exclusion zones (as identified by EWT, 2014) should be avoided where possible.		
» Environmental measures will be detailed in the site specific EMP and will be enforced		

- and overseen by the ECO for the project.
- » Prior to construction, an avifaunal specialist should conduct a site walkthrough, covering the final road and power line routes as well as the final turbine positions, to identify any nests/breeding/roosting activity of sensitive species, as well as any additional sensitive habitats. The results of which may inform the final construction schedule (in close proximity to the applicable sensitive location/s, if any are found), including abbreviating construction time, scheduling activities around avian breeding and/or movement schedules, and lowering levels of associated noise.
 - » The appointed Environmental Control Officer (ECO) must be trained by an avifaunal specialist to identify the potential priority species and Red Data species as well as the signs that indicate possible breeding by these species. The ECO must then, during audits/site visits, make a concerted effort to look out for such breeding activities of Red Data species, and such efforts may include the training of construction staff (e.g. in Toolbox talks) to identify Red Data species, followed by regular questioning of staff as to the regular whereabouts on site of these species. If any of the Red Data species or "Focal Species" (identified by EWT, 2014) are observed to be roosting and/or breeding in the vicinity, the avifaunal specialist is to be contacted for further instruction.
 - » It is recommended that a ridge survey is undertaken for the identification of nesting sites before construction.

Habitat destruction

Table B: Impact Rating for Habitat Destruction during Construction

Nature: Destruction of habitats used by birds		
	Without mitigation	With mitigation
Extent	2 (local)	1 (local)
Duration	4 (long term)	4 (long term)
Magnitude	4 (low)	3 (minor-low)
Probability	5 (definite)	5 (definite)
Significance	50 (Medium)	40 (Medium)
Status (positive or negative)	Negative	Negative
Reversibility	Medium	Medium
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Partially	
Mitigation:		
<ul style="list-style-type: none"> » Strict control over contractors, to ensure only the minimum required areas is cleared. » No off-road driving. » Minimize footprint areas, road lengths, road widths, wherever possible during the final layout design. » Where possible existing roads must be used and batching plants, labour camps, equipment storage, etc. should be situated in areas that are already disturbed. » A full site specific EMP must also be compiled to specify all of the impacts and mitigation measures and provide a step by step programme to follow for the ECO on site. » Construction of infrastructure must consider avifaunal sensitivity zones and avoid areas of higher sensitivities where possible. » Prior to construction, an avifaunal specialist should conduct a site walkthrough, covering the final road and power line routes as well as the final turbine positions, to identify any 		

<p>nests/breeding activity of sensitive species, as well as any additional sensitive habitats within which construction activities may need to be excluded.</p> <p>» Any clearing of stands of alien trees on site should be approved first by an avifaunal specialist.</p> <p>» Following construction, rehabilitation of all areas disturbed (e.g. temporary access tracks and laydown areas) must be undertaken and to this end a habitat restoration plan is to be developed by a specialist and included within EMPr.</p>
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4.4.2 Operational Phase

Collision with Turbines

Table C: Impact Rating for Collision with Turbines during Operation.

Nature of impact: Collision with Turbines during Operation.		
	Without mitigation	With mitigation
Extent	2 (Site- Impact will occur locally, but may have regional implications for certain species)	2 (Site- Impact will occur locally, but may have regional implications for certain species)
Duration	4 (long term)	4 (long term)
Magnitude	10 (very high)	10 (very high)
Probability	3 (probable)	3 (probable)
Significance	48 (Medium)	48 (Medium)
Status (positive or negative)	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources?	Yes	Yes
Can impacts be mitigated?	Possibly and only partially if the developer is willing to implement operational phase mitigation if issues are detected by monitoring.	
Mitigation:		
<p>» The most important mitigation option is the correct positioning of turbines outside of the identified high sensitivity zones, and where possible, outside of the medium sensitivity zones. This mitigation measure has already been undertaken and guided the final turbine layout and the high risk turbines were moved into medium/low sensitivity areas.</p> <p>» Develop and implement a carcass search programme for birds during the first two years of operation, in line with the South African monitoring guidelines.</p> <p>» Develop and implement a 24 month post-construction bird activity monitoring program that mirrors the pre-construction monitoring surveys and is in line with the South African post-construction monitoring guidelines. This program must include thorough and ongoing nest searches and nest monitoring.</p> <p>» Frequent and regular review of operational phase monitoring data (activity and carcass) and results by an avifaunal specialist. This review should also establish the requirement for continued monitoring studies (activity and carcass) throughout the operational and decommissioning phases of the development.</p> <p>» Additional available or potential mitigation options would need to be employed if</p>		

operational monitoring reveals significant impacts. Some mitigation options that can be tested and employed if monitoring reveals significant numbers of collisions for particular species (in the opinion of the specialist and independent peer review), include: the installation of deterrent devices (e.g. DT Bird and ultrasonic/radar/electromagnetic deterrents for bats) to reduce collision risk; curtailment, i.e. shutting down certain turbines at certain times; and any others that may be identified as our understanding of the impacts progresses.

Disturbance during Operation and Maintenance

Table F: Impact Rating for Disturbance during Operation and Maintenance.

Nature: Disturbance during Operation and Maintenance		
	Without mitigation	With mitigation
Extent	1 (local)	1 (local)
Duration	4 (long term)	4 (long term)
Magnitude	5 (moderate-low)	4 (low)
Probability	3 (probable)	2 (improbable)
Significance	30 (Medium)	18 (Low)
Status (positive or negative)	Negative	Negative
Reversibility	Medium	Medium
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Partially	
Mitigation:		
<ul style="list-style-type: none"> » A site specific Operational Environmental Management Plan (OEMP) must be implemented, which gives appropriate and detailed description of how operational and maintenance activities must be conducted to reduce unnecessary disturbance. All contractors are to adhere to the OEMP and should apply good environmental practice during all operations. » The on-site WEF manager (or a suitably appointed Environmental Manager) must be trained by an avifaunal specialist to identify the potential priority species and Red Data species as well as the signs that indicate possibly breeding by these species. If a priority species or Red Data species is found to be breeding (e.g. a nest site is located) on the operational Wind Farm, the nest/breeding site must not be disturbed and an avifaunal specialist must be contacted for further instruction. » Operational phase bird monitoring, in line with applicable guidelines, must be implemented and must include monitoring of all raptor nest sites for breeding success. » Strict control should be maintained over all maintenance activities, in particular heavy machinery and vehicle movements, and staff. » Operating procedures and maintenance schedules must be properly followed. 		

Disruption in Local Bird Movement Patterns

Table G: Impact Rating for Disruption in Local Bird Movement Patterns.

Nature: Disruption in Local Bird Movement Patterns		
	Without mitigation	With mitigation
Extent	3 (local-regional)	3 (local-regional)
Duration	4 (long term)	4 (long term)
Magnitude	5 (low-moderate)	5 (low-moderate)
Probability	3 (probable)	2 (some possibility)
Significance	36 (Medium)	24 (Low)
Status (positive or negative)	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources?	Unlikely	Unlikely
Can impacts be mitigated?	Partially, although this impact is not yet well understood, and difficult to mitigate for.	
Mitigation:		
<ul style="list-style-type: none"> » Turbines must not be constructed within any of the Exclusion zones identified by EWT (2014). » Lighting on turbines to be the minimum required, and to be of an intermittent and coloured nature rather than constant white light to reduce the possible impact on the movement patterns of nocturnal migratory species. 		

4.4.3 Conclusion

The increase in rotor diameter means a larger potential risk area per turbine, however the reduction in the number of turbines from 56 to 52 will result indirect lower impact. It can be concluded that the proposed amendment can be granted on condition that all the updated mitigations and recommendations are implemented.

5. ADVANTAGES AND DISADVANTAGES OF THE PROPOSED AMENDMENTS

In terms of Regulation 32(1)(a)(ii), this section provides details of the advantages and disadvantages of the proposed amendment.

Advantages of the amendment	Disadvantages of the amendment
The increase in rotor diameter will increase the efficiency of the facility and consequently the economic competitiveness thereof. Increased efficiency of a facility is considered to be beneficial to the environment as this will reduce the need for additional facilities to generate additional electricity. It is also beneficial from a macroeconomic perspective as it results in the lower cost per unit of	The proposed amendment will not result in any additional impacts nor will it result in an increase in the significance of impacts identified and assessed within the EIA process. Therefore, no disadvantages are anticipated.

Advantages of the amendment	Disadvantages of the amendment
<p>energy, ultimately benefiting the South African public.</p> <p>The number of turbines is proposed to be reduced from 56 originally authorised to 52 and the generating capacity for each turbine was increased up to 3.6MW each. This would result in significantly lower impacts on the environment (in terms of Noise impact, visual impacts, impacts on bats and avifauna impacts) if the amendment is granted. The significance of all identified impacts in this regard would be reduced.</p>	

Based on the above, it can be concluded that the advantages of the proposed change outweigh the disadvantages from an environmental and technical perspective.

6. REQUIREMENT FOR ADDITIONAL MITIGATION AS A RESULT OF THE PROPOSED AMENDMENTS

As required in terms of Regulation 32(1)(a)(iii), consideration was given to the requirement for additional measures to ensure avoidance, management and mitigation of impacts associated with the proposed change. From the specialist inputs provided into this amendment motivation, it is concluded that the mitigation measures proposed within the EIA would be sufficient to manage potential impacts within acceptable levels. Updated mitigation measures were provided by the Avifaunal and Bat specialists for the proposed amended layout or turbine dimension changes.

No changes to the EMPr (as required to be considered in terms of Regulation 32(1)(a)(iv)) are required at this stage.

7. PUBLIC PARTICIPATION

A public participation process is being conducted in support of a Part 2 application for amendment of the Environmental Authorisation for the Great Karoo Wind Energy Facility in the Northern Cape Province.

This public participation includes:

- This motivation report is available for a 30 day public review period between **8 April 2016 and 11 May 2016** at www.savannahsa.com/projects. CD copies can be provided to stakeholders on request.
- Notification of registered I&APs regarding the availability of the amendment motivation report.
- Placement of an advert in the printed press.
- Placement of site notices at the site on 6 April 2016.

Comments received will be included in the final submission to the DEA for consideration in the decision-making process.

8. CONCLUSION

It is concluded that the proposed amendments will not result in changes to the assessed impacts within the EIA and will lead to an overall reduction in the impact significance ratings for many of the impacts as assessed in the EIA. In addition, there are no new impacts identified as a result of the proposed amendment. The amendment in itself does not constitute a listed or specified activity. Mitigation measures described in the original EIA document and the additional mitigation measures recommended are adequate to manage the likely impacts for the revised layout.

Taking into consideration the significantly reduced overall impacts associated with the reduced 52 turbine layout (as opposed to the original 56 turbine layout) and amended turbine specifications, these amendments are considered acceptable.

**APPENDIX A:
NOISE SPECIALIST REPORT**

**APPENDIX B:
VISUAL SPECIALIST REPORT**

**APPENDIX C:
BAT SPECIALIST REPORT**

**APPENDIX D:
AVIFAUNAL SPECIALIST REPORT**

**APPENDIX E:
PUBLIC PARTICIPATION DOCUMENTATION**

APPENDIX F:
A3 MAPS