

11 August 2021

Attention: Alan Carter

Project Manager
Coastal and Environmental Services

WAAIHOEK WIND ENERGY FACILITY, KWA-ZULU NATAL: TERRESTRIAL AND AQUATIC ECOLOGICAL SPECIALIST ASSESSMENT OF AMENDED LAYOUT

Dear Alan

An amendment in the layout and turbine technology and associated infrastructure associated with the Waaihoek Wind Energy Facility refers. The project history and proposed amendments are listed below:

- The EA was amended in 2019 to reduce the number of turbines from **68 to 43**. This amendment did not specify which turbines would be removed and the layout remained the same.
- Waaihoek Wind Farm (Pty) Ltd wishes to amend the scope of the facility to:
 - increase the rotor diameter by 30m (from 140m to 170m); and
 - Make adjustments to turbine locations to make the most efficient use of wind resources on the site.
- The reduction in the number of turbines will not reduce the total power output of the WEF (i.e. 140MW).

The purpose and scope of this assessment is to:

- 1) Review recent published terrestrial and aquatic environmental information for the study area and provide comment with respect to the proposed Waaihoek WEF;
- 2) Revisit the wetland layer and update this where necessary;
- 3) Assess the new layout (Turbines and access road/cable routes) against the ecological sensitivity; and
- 4) Provide comment on the new proposed turbine and infrastructure (roads and cables) layout with regards to the anticipated impacts.

The assessment is structured as follows:

- 1) Terrestrial Ecology
 - a. Review of the South African Vegetation Map 2006-2018
 - b. Review of the KZN Biodiversity Sector Plan 2014
- 2) Aquatic Ecology
 - a. Revise wetland mapping (Wet5 and aerial digitising)
- 3) Conclusions and Recommendations
 - a. Amended Waaihoek WEF layout and implications for the terrestrial ecology
 - b. Amended Waaihoek WEF layout and implications for the aquatic ecology
 - c. Concluding remarks

1) Terrestrial Ecological Assessment

The Vegetation Map of South Africa 2018 (VEGMAP, 2006-2018)

According to the most recent publication of the South African vegetation map (VEGMAP, 2006-2018) the previous and amended layout of the Waaihoek WEF is located primarily on Wakkerstroom Montane Grassland (Figure 1). The vegetation comprises of short montane grasslands on the relatively flat plateaus, with short forest and *Leucosidea* thickets occurring along steep, east-facing slopes and drainage areas. *L. sericea* is the dominant woody pioneer species that invades areas as a result of grazing mismanagement. Wakkerstroom Montane Grassland (Gm14) is classified as **LEAST CONCERN**.

A short length of access road transverse across Northern KwaZulu-Natal Moist Grassland. This grassland predominates hilly and rolling landscapes and supports tall tussock grassland, generally dominated by *Themeda triandra* and *Hyparrhenia hirta*. On strongly eroded sites, open *Acacia siberiana* var. *woodii* savannoid woodlands tend to encroach up the valleys. This vegetation type is classified as **LEAST CONCERN**.

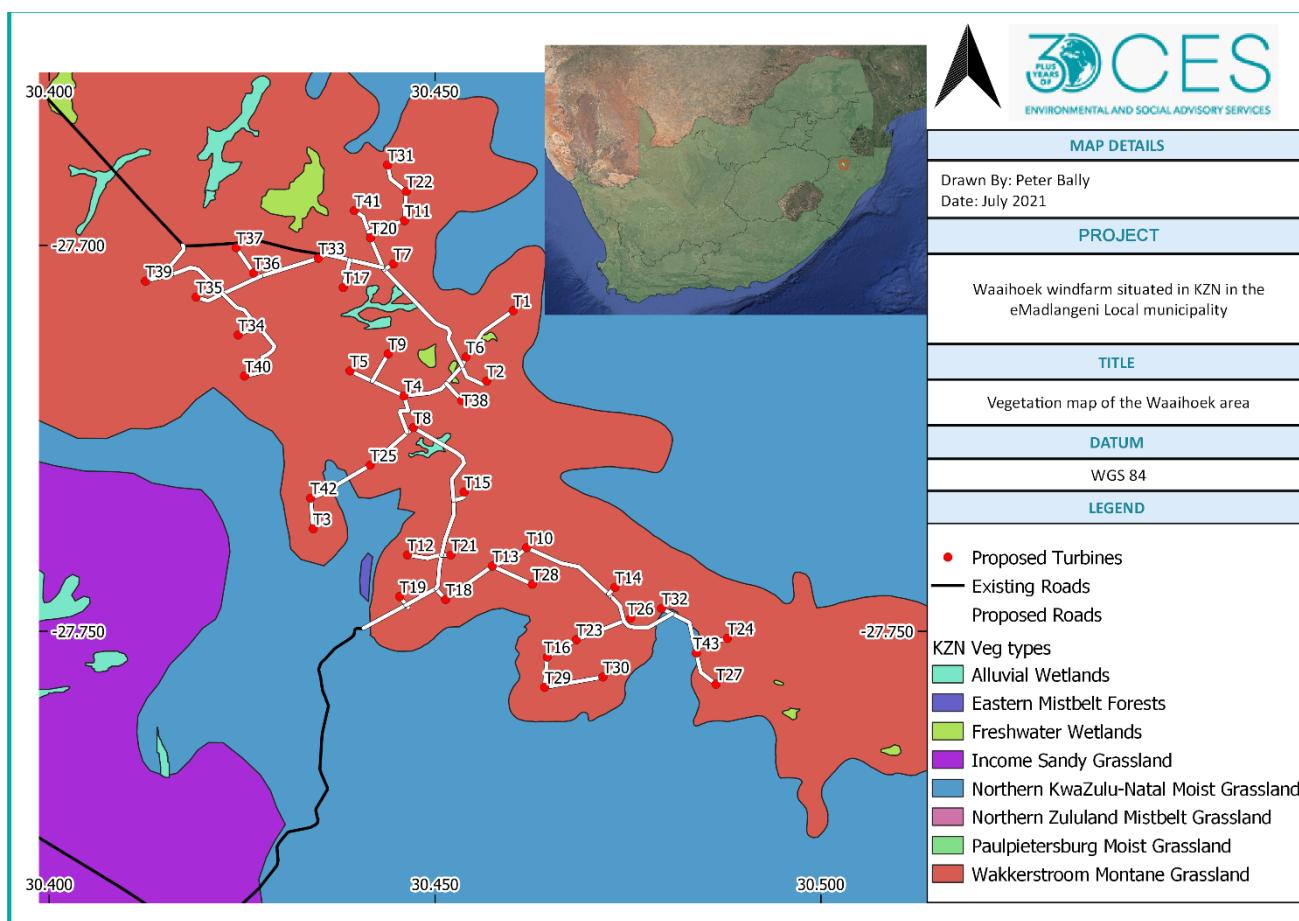


Figure 1 South African Vegetation Map (Mucina et al., 2006-2018)

KZN Amajuba District Biodiversity Sector Plan (2014)

The revision of the KZN Amajuba District Biodiversity Sector Plan in 2014 is a comprehensive integration of important data, including the Northern Interior Corridor. The Amajuba Biodiversity Sector Plan (BSP, 2014) provides the following subcategories of CBA and ESAs:

Critical Biodiversity Areas (CBAs) - Natural or near-natural landscapes that include terrestrial and aquatic areas that are considered critical for meeting biodiversity targets and thresholds, and which safeguard areas required to ensure the persistence of viable populations of species, and the functionality of ecosystems and Ecological Infrastructure

Critical Biodiversity Areas: Irreplaceable	Areas which are required to meet biodiversity conservation targets, and where there are no alternative sites available. (Category driven by species and feature presence) - Maintain in a natural state with limited to no biodiversity loss.
Critical Biodiversity Areas: Optimal	Areas that are the most optimal solution to meet the required biodiversity conservation targets while avoiding high cost areas as much as possible (Category driven primarily by process) - Maintain in a natural state with limited to no biodiversity loss.
Ecological Support Areas (ESAs) - Functional but not necessarily entirely natural terrestrial that are largely required to ensure the persistence and maintenance of biodiversity patterns and ecological processes within the Critical Biodiversity Areas.	
Terrestrial Ecological Support Areas (ESAs)	The area also contributes significantly to the maintenance of Ecological Infrastructure (Ecological Infrastructure) - Maintain ecosystem functionality and connectivity allowing for some loss of biodiversity.

With respect to the amended Waaihoek WEF layout (Figure 2), a single turbine (T36) is located in a 'CBA optimal' and 11 turbines are located within an Ecological Support Area which is known as the Northern Interior Corridor which connects. In the original layout, 3 turbines were located in 'CBA optimal' and 32 turbines located in the Northern Interior Corridor. Recommendations for moving T36 outside of the CBA optimal area and comment on the Ecological Impact of the amended layout on the Northern Interior Corridor is made in the Conclusion section.

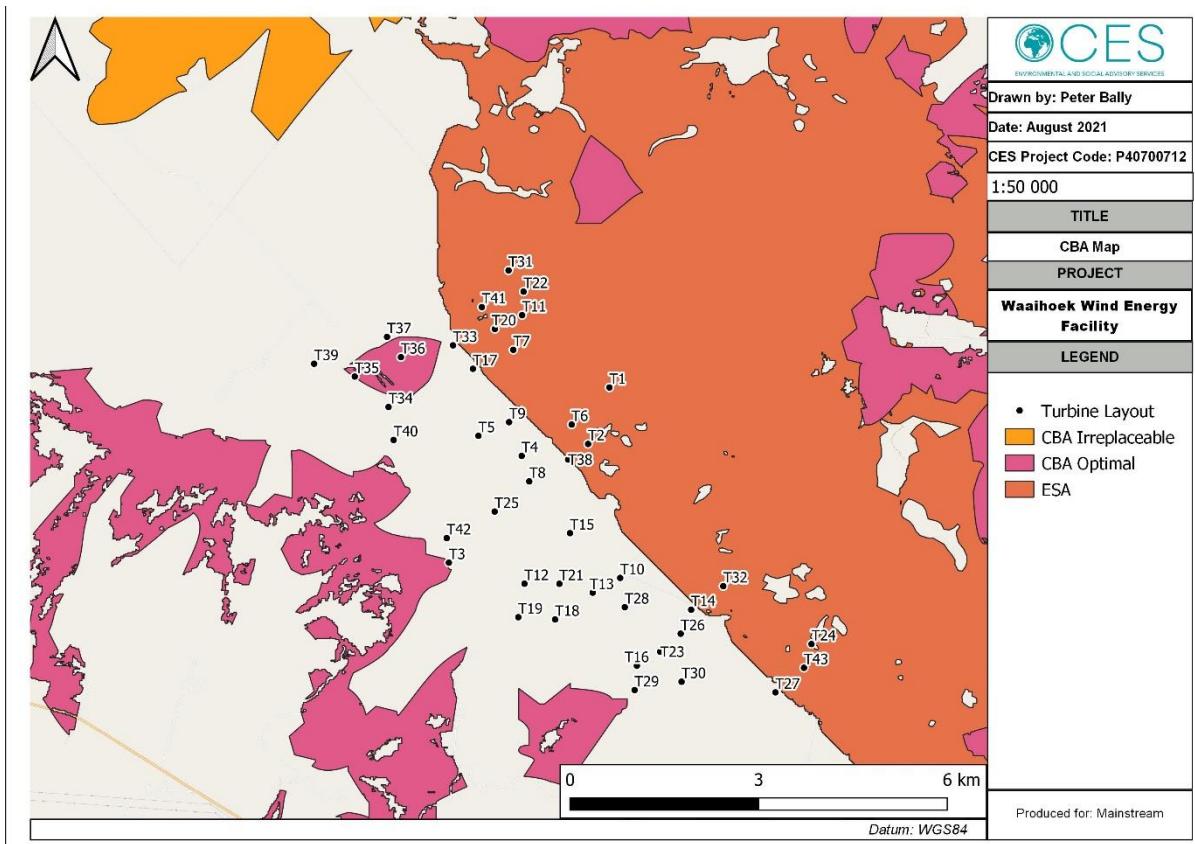


Figure 2 KwaZulu-Natal – Amajuba District CBA map.

2) Aquatic Ecological Assessment

The wetland layer developed in 2013/14 has been updated and revised in this assessment based on the Wetland Inventory V5 (Wet5, 2019) and digitising from Google Earth Pro aerial imagery. A number of additional wetlands, which were previously indicated as water courses, have been incorporated into the wetland layer (Figure 3). No turbines are located within a wetland, but most fall within the 500 m buffer, for which WULAs will be required.

It is also important to note that all the slope-wetlands in the study area that were delineated in the Wet5 layer were assessed as **CRITICALLY ENDANGERED (CR)**, and depression wetlands as **LEAST CONCERN (LC)**. Only one wetland is considered as a depression wetland and, therefore, by extrapolation, the wetlands delineated in this report have been classified as Critically Endangered. Recommendations for micro-siting turbines and re-routing the access roads and cables are made in the Conclusion section.

Access roads and underground electric cables are associated infrastructure which will also impact on the wetlands. A draft layout for this infrastructure was provided. Where practical, recommendations to move infrastructure outside the ambit of wetlands and water courses have been provided in the Conclusion section.

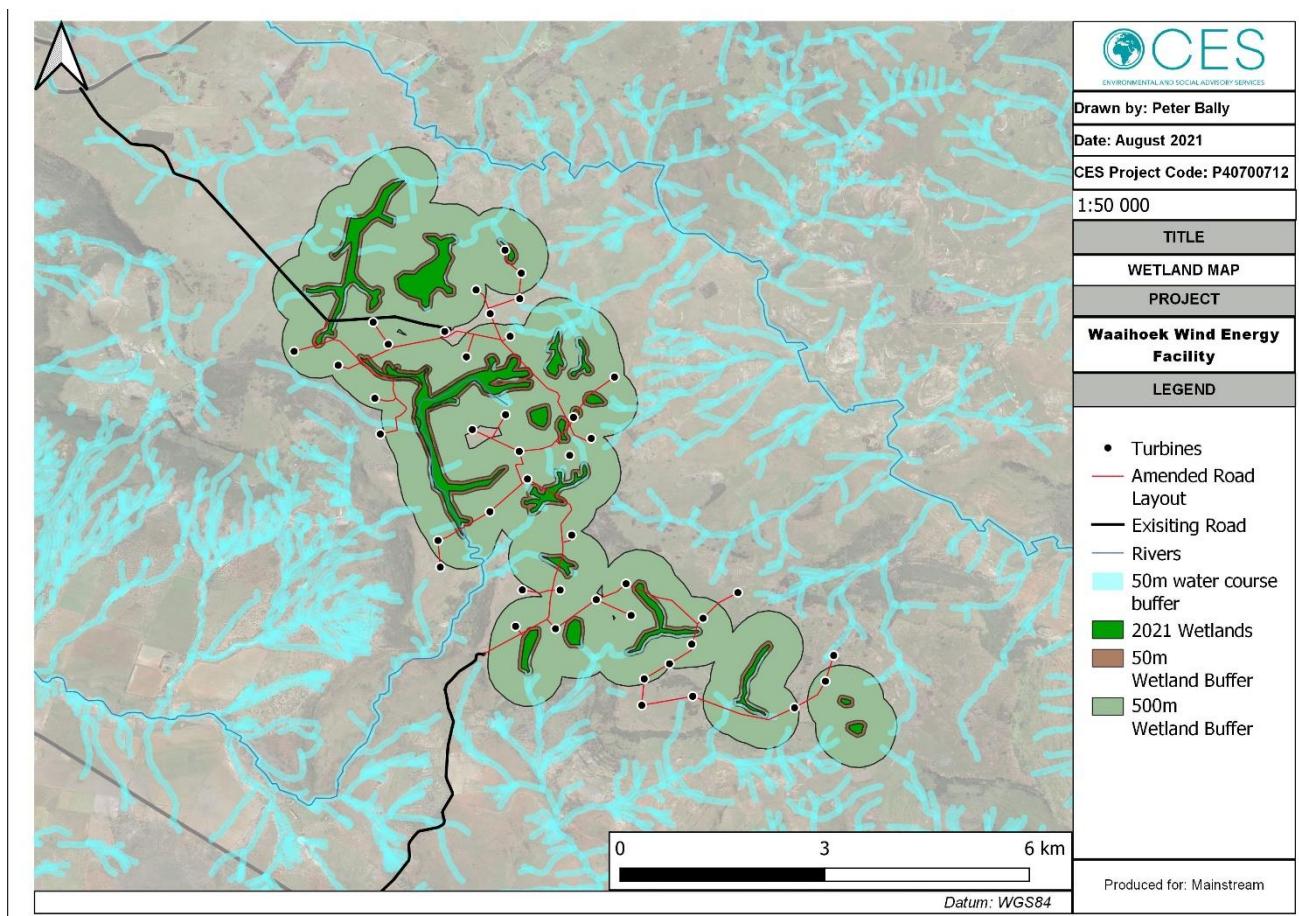


Figure 3 Wetlands in the study area of the Waaihoek WEF.

3) Conclusions and Recommendations

This assessment considered the new layout of the turbines and associated road and cable infrastructure in relation to biodiversity and wetland sensitivity. The following observations were made when comparing the new layout in terms of the mapped sensitive areas:

Amended Waaihoek WEF layout and implications for the terrestrial ecology

The following observations relating to the terrestrial ecological impact of the original and the amended Waaihoek WEF layout were made:

2014 Waaihoek WEF layout	2021 Waaihoek WEF layout
<p>The Ecological Impact Assessment identified the following key impacts in the planning and design, construction and operation phases:</p> <ul style="list-style-type: none"> ● Loss of indigenous vegetation ● Disturbance of sensitive areas ● Spread of Alien Invasive Plants ● Loss/displacement of fauna ● Fragmentation of ecosystem <p>The impacts could all be mitigated to an acceptable level by implementing appropriate measures.</p>	<p>The 2012 layout involved the assessment of 68 turbines, which have now been reduced to 43. The current layout amendment proposes the elimination of 25 turbines.</p> <p>The implication of this amendment is a reduced footprint of both turbine and access road and is, therefore, an ecologically favourable amendment.</p> <p>The impact assessment and mitigation measures prepared for the Ecological Impact Assessment in 2014 is still relevant and the findings/conditions thereof are still appropriate.</p>
<p>The original layout located 3 turbines in what is now classified as a CBA Optimal area.</p>	<p>In the amended layout, one (1) turbine is located in the CBA optimal area. This small patch is clearly demarcated for a particular species feature and even though T36 is placed on an area covered by Black Wattles, the site may (or will) constitute the required habitat for the population. The turbine, therefore, needs to be moved to the following site:</p> 
<p>The original layout located 32 turbines in Northern Interior Corridor.</p>	<p>In the amended layout, 11 turbines are located in the Northern Interior Corridor. This is a favourable amendment towards achieving the goals of the corridor.</p>

Amended Waaihoek WEF layout and implications for the aquatic ecology

The following observations relating to the aquatic ecological impact of the amended Waaihoek WEF layout were made:

Development activity	2021 Assessment of impacts on wetlands
Turbines and wetlands	No turbines are located in any wetlands, however some are still within 100 m. Minor micro-siting of the turbine layout needs to ensure that turbines are outside of the 100 m buffer. This should be conducted through the WULA process and will be subject to conditions of the WUL, the process of which will determine the impact risk to the respective wetland.
Access roads and underground cables and wetlands.	Numerous recommendations to realignment of the road (and hence underground cable) have been provided (Figure 4). The realignment recommendations seek to avoid crossing wetlands. There is one instance (T13-T14) where an existing track is routed through a wetland/water course (see insert below). This assessment proposes that the existing track (green line) is used instead of constructing an additional road upstream of the same wetland (red line) to prevent cumulative impact and degradation of the wetlands/water course. It is also a recommendation of this assessment that the wetland crossing is formalised and designed to minimise impact on the wetland. 

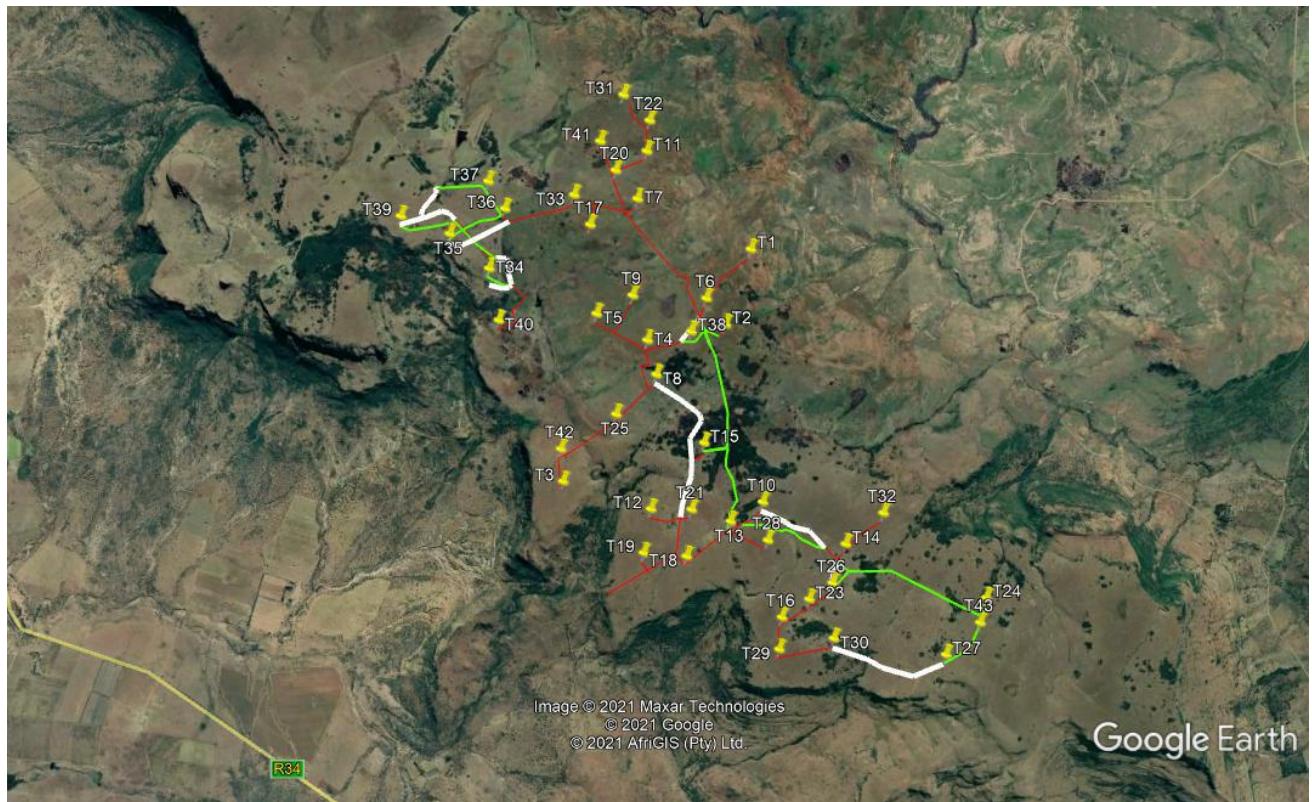


Figure 4 Recommended road and cable realignment (Red = amended road alignment; green = recommended revision of road alignment, white = recommended removal of road alignment)

Concluding remarks

- The new layout constitutes a better outcome in terms of overall ecological impacts due a reduced physical footprint of the WEF and associated infrastructure;
- The amended layout and reduced number of turbines (25 fewer turbines) reduces the need for connecting roads and therefore reduces the requirement for, and footprint of, road construction;
- One turbine in the amended layout falls within a CBA Optimal area and should be moved eastwards to avoid this area;
- Some turbines and access road/cable routes fall within 500 m of a wetland and WULAs will be necessary to permit these;
- The access road and cable routes have been realigned in this assessment to avoid wetlands. There is one instance where it is desirable to formalise an existing wetland crossing (as described above). This will require and WUL from the Department of Water Affairs and Sanitation.

The following concluding comments are made to the amended layout as are relevant to the Ecological Impact Assessment:

Table 1. Comments on the proposed specification changes to the Waaihoek WEF

Proposed new specifications	Effect on impacts and mitigation measures	Effect on current EA conditions	Effect on cumulative impacts	Notes on land-use changes
Number of turbines:				
The number of turbines will decrease from 68 to 43. Some of the turbine positions have changed or been removed completely.	All mitigation measures identified in the original Ecological Report are still valid for this change. One additional change must include the re-positioning of T36 to be located outside of the CBA optimal area.	All conditions listed in the EA are still valid for this change. There are no additional conditions proposed for this change.	The proposed amendment will have no additional cumulative impact on the ecological landscape and therefore no additional cumulative issues were identified.	There have been no changes in land use that affect the impact assessment of the original or amended turbine layout.
Access road alignment and underground cables:				
Terrestrial Ecological Impact	All mitigation measures identified in the original Ecological Report are still valid for this change. There are no additional mitigations proposed for this change.	All conditions listed in the EA are still valid for this change. There are no additional conditions proposed for this change.	The cumulative impacts of ecosystem fragmentation is reduced by the lower number of turbines and a reduced road footprint.	There have been no changes in land use that affect the impact assessment of the original or amended turbine layout.
Aquatic Ecological Impact	All mitigation measures identified in the original Ecological Report are still valid for this change. There is a requirement to realign the access roads and underground cable to avoid sensitive wetlands. This realignment has been provided.	All conditions listed in the EA are still valid for this change. One additional condition for the proposed change is that the access road alignment is revised to avoid wetlands as per recommendations in this report.		

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The proposed amendments to the Waaihoek Wind Energy Facility will have no additional impact (direct, indirect or cumulative) on the ecology and ecosystems associated with the Waaihoek WEF site. Rather, the amended layout it will achieve a better outcome in terms of a reduced turbine and road footprint. In conjunction with the recommendations laid out above, the recommendations and mitigation measures contained in the Ecological and Wetland Impact Assessments (2014) are still applicable, remain valid, and should be included as conditions for approval.

This Letter of Opinion is not a standalone document and the conclusions made must be read in conjunction with the findings of the original Ecological Impact Assessment (2014).

Yours faithfully



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Dr Greer Hawley-McMaster has a BSc degree in Botany and Zoology, a BSc (Honours) in Botany from the University of Cape Town and a PhD (Microbiology) from Rhodes University. Greer has a diverse skill set including biodiversity surveys and assessments (plants, fungi and terrestrial ecosystems), developing environmental management policy (EMP's and EMF's), analysis and interpretation of environmental and biodiversity spatial datasets, training, feasibility assessments, environmental impact assessments for a wide range of land use activity proposals, aquaculture feasibility assessments, alien invasive management planning and conservation management planning. Greer has undertaken work in a number of African countries and has specifically surveyed many parts of the Eastern Cape. Greer has managed large projects and has experience with co-ordinating big specialist teams. Greer has recently completed the review of the Eastern Cape Biodiversity Conservation Plan (2019) and continues to develop the Eastern Cape Biodiversity strategy and Action Plan.

Declaration:

I, Greer Hawley, declare that I am an independent consultant and have no business, financial, personal or other interest in the proposed development, application or appeal in respect of which I was appointed other than fair remuneration for work performed in connection with the activity, application or appeal. There are no circumstances that compromise the objectivity of my performing such work.

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