

KARREEBOSCH WIND FARM (RF) (PTY) LTD

KARREEBOSCH WIND ENERGY FACILITY

PART 2 AMENDMENT OF EXISTING ENVIRONMENTAL AUTHORISATION:
14/12/16/3/3/2/807/AM3

DRAFT AMENDMENT REPORT

23 AUGUST 2022

DRAFT





**KARREEBOSCH WIND
ENERGY FACILITY
PART 2 AMENDMENT OF
EXISTING
ENVIRONMENTAL
AUTHORISATION:
14/12/16/3/3/2/807/AM3**

**KARREEBOSCH WIND FARM (RF) (PTY)
LTD**

DRAFT AMENDMENT REPORT

TYPE OF DOCUMENT (VERSION)
DRAFT

PROJECT NO.: 41103843
DATE: AUGUST 2022

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QUALITY MANAGEMENT¹

ISSUE/REVISION	FIRST ISSUE	REVISION 1	REVISION 2	REVISION 3
Remarks	Draft Amendment Report – Public Review			
Date	August 2022			
Prepared by	Jennifer Green			
Signature				
Checked by	Ashlea Strong			
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Authorised by	Ashlea Strong			
Signature				
Project number	41103843			
Report number	01			
File reference	\\corp.pbwan.net\za\Central_Data\Projects\41100xxx\41103843 - Karreebosch WEF Part 2 & BAR\41 ES\01-Reports\01-Draft\04-Part 2			

¹ Please note that this is an internal quality control mechanism where reports are internally reviewed by at least one other senior staff member and then authorised for release to external sources.

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This Draft Amendment Report (Report) has been prepared by WSP Group Africa Proprietary Limited (WSP) on behalf and at the request of Karreebosch Wind Farm (RF) (Pty) Ltd (Client), to provide the Client and all interested and affected parties with an understanding of the impacts associated with the proposed amendments to their Environmental Authorisation (Ref: 14/12/16/3/3/2/807/AM3).

Unless otherwise agreed by us in writing, we do not accept responsibility or legal liability to any person other than the Client for the contents of, or any omissions from, this Report.

To prepare this Report, we have reviewed only the documents and information provided to us by the Client or any third parties directed to provide information and documents to us by the Client. We have not reviewed any other documents in relation to this Report, except where otherwise indicated in the Report

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ACRONYMS AND ABBREVIATIONS

BBU	Birds and Bats Unlimited
CBA	Critical Biodiversity Area
DEA	Department of Environmental Affairs
DEA&DP	Department of Environmental Affairs and Development Planning
DFFE	Department of Forestry, Fisheries and the Environment
DM	District Municipality
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
EMPr	Environmental Management Programme
FEIAR	Final Environmental Impact Assessment Report
GNR	Government Notice Regulations
Ha	Hectare
I&APs	Interested and Affected Parties
KB-WEF	Karreebosch Wind Energy Facility
LM	Local Municipality
MW	Megawatt
NDP	National Development Plan
NEMA	National Environmental Management Act
NPAES	National Protected Areas Expansion Strategy
REDZ	Renewable Energy Development Zone
REIPPPP	Renewable Energy Independent Power Producer Procurement Programme
S&EIA	Scoping and Environmental Impact Assessment
SANBI	South African National Biodiversity Institute
SCC	Species of Conservation Concern
SDF	Spatial Development Frameworks
SDG's	Sustainable Development Goals
SEA	Strategic Environmental Assessment
S&R	Search & Rescue
SIBIS	SANBI's Integrated Biodiversity Information System
WC-BSP	Western Cape Biodiversity Spatial Plan
WEF	Wind Energy Facility
WSP	WSP Group Africa (Pty) Ltd

CONTENT OF THIS REPORT

As per the Environmental Impact Assessment (EIA) Regulations 2014, as amended, Regulation 32 of Government Notice Regulation (GNR) 982 (as amended) identifies the legislated requirements, which must be contained within an Amendment Assessment Report for the competent authority to consider and come to a decision on the amendment application. **Table A** below details where the required information is located within this draft Amendment Assessment Report (this report).

Table A: Legal Requirements as detailed in Regulation 32 of GNR 982, as amended

Regulation 32 of GNR 982, as amended	DESCRIPTION	RELEVANT REPORT SECTION
1	The applicant must within 90 days of receipt by the competent authority of the application made in terms of regulation 31, submit to the competent authority:	The final Amendment Report will be submitted to DFFE as per requirement
(a)	A report reflecting:	
	(i) An assessment of all impacts related to the proposed change;	Section 5
	(ii) Advantages and disadvantages associated with the proposed change; and	Section 4.1
	(iii) Measures to ensure avoidance, management and mitigation of impacts associated with such proposed change; and	Section 6 Appendix Q
	(iv) Any changes to the EMPR:	Section 6 Appendix Q
	Which report:	
	(i) Had been subjected to a public participation process, which had been agreed to by the competent authority, and which was appropriate to bring the proposed change to the attention of potential and registered interested and affected parties, including organs of state, which have jurisdiction in respect of any aspect of the relevant activity, and the competent authority; and	Section 7. Proof of PPP to be included in the Final Report.
	(ii) Reflects the incorporation of comments received, including any comments of the competent authority	To be included in the Final Report.
(b)	A notification in writing that the report will be submitted within 140 days of receipt of application by the competent authority, as significant changes have been made or significant new information has been added to the report, which changes or information was contained in the report consulted on during the initial public participation process contemplated in subregulation 1(a) and that the revised report will be subjected to another public participation process of at least 30 days.	Not Applicable
2	In the event where subregulation (1)(b) applies, the report, which reflects the incorporation of comments received, including any comments of the competent authority, must be submitted to the competent authority within 140 days of receipt of the application by the competent authority	Not Applicable

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1 INTRODUCTION

1.1 PURPOSE OF THE REPORT

Karreebosch Wind Farm (RF) (Pty) Ltd (Karreebosch) proposes to develop the authored 140 megawatt (MW) Karreebosch Wind Energy Facility (WEF), located approximately 40km North of Matjiesfontein, in the Western Cape Province, and approximately 40km South of Sutherland in the Northern Cape Province, South Africa.

In 2015, Karreebosch appointed Savannah Environmental (Pty) Ltd (Savannah) to facilitate the Scoping and Environmental Impact Assessment (S&EIA) process for the construction and operation of the 140MW Karreebosch WEF. In January 2016, the Department of Environmental Affairs (DEA) (now known as the Department of Forestry, Fisheries and the Environment – DFFE) issued the Environmental Authorisation (EA) (DEA Ref: 14/12/16/3/3/2/807). The EA authorised up to 65 wind turbines of a maximum generating capacity of 140MW in total, with a hub height of 100m and the rotor diameter of 140m.

The project underwent subsequent amendments (EA Ref: 14/12/16/3/3/2/807/AM1, 14/12/16/3/3/2/807/AM2, 14/12/16/3/3/2/807/AM3) which included increases in the hub height (up to 125m), rotor diameter (up to 160m), blade length (up to 80m), and minor amendments to the wording of certain conditions of the authorisation, as well as an extension of the validity of the EA to 2026.

The associated 132V overhead powerline (OHPL) and onsite 33/132kV substation are currently subject to a separate EA application process.

There have been numerous advances in wind turbine technology since the authorisation of the Karreebosch WEF. As such Karreebosch wishes to again amend the EA to update the turbine specification and overall capacity of the facility as well as some respective administrative changes. This Draft Amendment Report (DAR) documents the process and findings of Karreebosch's application for amendment of the EA.

Due to the fact that the amendments result in a change of scope, a Part 2 Amendment Process in terms of Regulation 31 of the Environmental Impact Assessment (EIA) Regulations of 2014 (as amended) is applicable and required to be followed.

2 PROJECT DESCRIPTION

2.1 EIA PROCESS HISTORY

Karreebosch Wind Farm (Pty) Ltd (the Applicant) applied for Environmental Authorisation (EA) for the proposed Karreebosch WEF in 2015. The original Environmental Impact Assessment (EIA) was undertaken in September of 2015 for up to 71 wind turbines with a hub height of up to 100m and a rotor diameter of up to 140m including associated infrastructure. Environmental authorisation (EA) for 65 turbines was granted on 29 January 2016 (EA Ref: 14/12/16/3/3/2/807). The project underwent subsequent amendments (EA Ref: 14/12/16/3/3/2/807/AM1, 14/12/16/3/3/2/807/AM2, 14/12/16/3/3/2/807/AM3) which included increases in the hub height (up to 125m), rotor diameter (up to 160m), blade length (up to 80m), and minor amendments to the wording of certain conditions of the authorisation, as well as an extension of the validity of the EA to 2026.

The associated 132V overhead powerline (OHPL) and onsite 33/132kV substation are currently subject to a separate EA application process.

The authorised Karreebosch WEF and associated infrastructure is currently undergoing a Part 2 EA Amendment Process with the proposed amendments tabulated in **Table 2-1** below. Condition 16 of the original EA (EA Ref: 14/12/16/3/3/2/807) requires that the final development layout plan be made available for public comment and thereafter submitted to Department of Forestry, Fisheries and Environment (DFFE) for approval. Condition 18 of the original EA (Ref: 14/12/16/3/3/2/807) states that the Environmental Management Programme (EMPr) submitted as part of the Final EIA Report (2015) was not approved and must be amended to include the final layout which has undergone micro siting and walkdowns by relevant specialists, be made available for public comment and thereafter re-submitted to the DFFE for final approval. The final layout and EMPr approval process will run concurrently with the Part 2 EA Amendment process.

Table 2-1: Authorised infrastructure in terms of the Karreebosch WEF EA

COMPONENT	DESCRIPTION / DIMENSIONS
Number of turbines	Up to 65 turbines (generation capacity of up to 140MW)
Hub height	A range up to and including 125m
Blade length	~ 80m
Rotor Diameter	A range up to and including 160m
Area occupied by transformer stations / substation	<ul style="list-style-type: none"> — » Two 33/132kV Substations 100m x 200m — » Extension of the existing 400kV substation at Komsberg — » Transformer at each turbine: total area <1500 m² (2 m² per turbine up to 10m² at some locations)
Capacity of onsite substation	132kV
Area occupied by construction camp	300 x 300m = 900 000m ²
Area occupied by laydown areas	Operation: (70 x 50) x 71 = 248 500 m ²
Areas occupied by buildings	~10 000 m ²
Length of (new) internal access roads	~40 km
Width of internal roads	Up to 12 m
Height of fencing	Up to 3m
Type of fencing	Steel or mesh

2.2 PROJECT AREA

The Karreebosch WEF is located approximately 40km north of Matjiesfontein, and approximately 40 km south of Sutherland. The site falls within the Karoo Hoogland Local Municipality of the Namakwa District Municipality within the Northern Cape Province as well as the Laingsburg Local Municipality of the Central Karoo District Municipality and the Witzenberg Local Municipality of the Cape Winelands District Municipality within the Western Cape Province.

The Karreebosch WEF is currently authorised over seventeen (17) properties as described in the table below. The properties highlighted in grey in the table below are relevant only to the proposed 132kV Karreebosch Overhead Powerline, which is subject to a separate application for Environmental Authorisation. These properties are therefore not affected by the proposed amended Karreebosch WEF final layout. Thus, only the properties relevant to the WEF infrastructure are included in this amendment application. The proposed final layout of the Karreebosch WEF is located over thirteen (13) properties as highlighted in blue in the table below.

Table 2-2: Farm portions authorised for the Karreebosch WEF (as per the original EA: 14/12/16/3/3/2/807).

FARM NAME AND NUMBER	21 DIGIT SG CODE	MUNICIPALITY/PROVINCE
Farm Roode Wal No. 187	C0430000000018700000	Karoo Hoogland LM / Northern Cape
Farm Appels Fontein No. 201	C0430000000020100000	Karoo Hoogland LM / Northern Cape
Portion 1 of Farm Ek Kraal No. 199	C0430000000019900001	Karoo Hoogland LM / Northern Cape
Portion 2 (Nuwe Kraal) of Farm Ek Kraal No. 199	C0430000000019900002	Karoo Hoogland LM / Northern Cape
Portion 1 of Farm Klipbanks Fontein No. 198	C0430000000019800001	Karoo Hoogland LM / Northern Cape
Remainder of Farm Klipbanks Fontein No. 198	C0430000000019800000	Karoo Hoogland LM / Northern Cape
Remainder of Farm Wilgebosch Rivier No. 188	C0430000000018800000	Karoo Hoogland LM / Northern Cape
Farm Rietfontein No. 197	C0430000000019700000	Karoo Hoogland LM / Northern Cape
Remainder of Farm Kareebosch No. 200	C0430000000020000000	Karoo Hoogland LM / Northern Cape
Portion 1 of Farm Karreebosch No. 200	C0430000000020000001	Karoo Hoogland LM / Northern Cape
Farm Oude Huis No. 195	C0430000000019500000	Karoo Hoogland LM / Northern Cape
Portion 1 of Farm Karree Kloof No. 196	C0430000000019600001	Karoo Hoogland LM / Northern Cape
Remainder of Farm Brandvalley No. 75	C0430000000007500000	Laingsburg LM / Western Cape
The Farm Kranskraal 189 ²	C0430000000018900000	Karoo Hoogland LM / Northern Cape
Portion 2 of Standvastigheid 210	C0430000000021000002	Karoo Hoogland LM / Northern Cape
The Farm Aprils Kraal 105	C0430000000010500000	Laingsburg LM / Western Cape
The Remainder of Bon Espirange 73	C0430000000007300000	Laingsburg LM / Western Cape
Portion 1 of Bon Espirange 73	C0430000000007300001	Laingsburg LM / Western Cape

² No infrastructure associated with the Karreebosch WEF is located on Kranskraal 189 as indicated in the final layout. This property will therefore be removed from the EA.

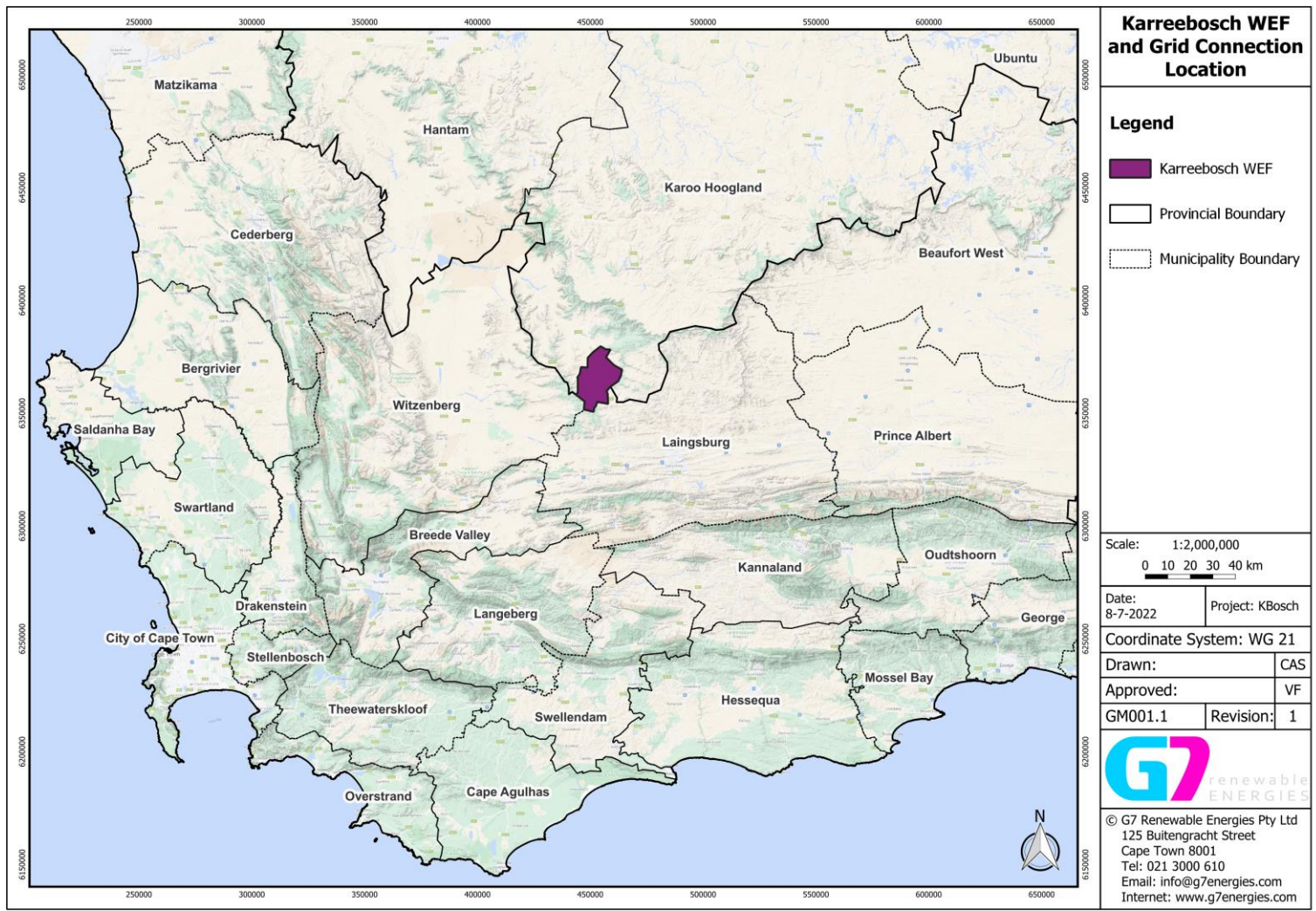


Figure 2-1: Locality of the Karreebosch WEF (Source: G7 Renewable Energies (Pty) Ltd, 2022)

2.3 NEED AND DESIRABILITY OF KARREEBOSCH WEF

The general need and desirability of the activity has already been motivated for and agreed to by the DEA (now DFFE) through the EA issued for the project on 29 January 2016 and the subsequent amendments. A summary as extracted from the EIA report (courtesy of Savannah Environmental, September 2015) is provided below for ease of reference:

NEED AND DESIRABILITY OF THE DEVELOPMENT AT THE PREFERRED SITE LOCATION

The Karreebosch WEF is proposed to be constructed outside of the urban edge. The 18 farms (now 13 as per the final layout) where the project is proposed to be located have not been considered for an alternative land use such as urban development. The site is also located within an area which has become a node for renewable energy projects, with the following preferred bidder projects (PB) located directly adjacent to, or in close proximity to, the project development site: Roggeveld Wind Farm, Karusa Wind Farm, and Soetwater Wind Farm. Given the competitive nature of the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP), a high wind resource and grid connectivity suitability are some of the most important factors for success. The selection of the above-mentioned projects as PB, with Roggeveld Wind Power bidding the very lowest fully indexed price, and the location of Karreebosch WEF being directly adjacent to the north of the Roggeveld wind farm is a confirmed indicator that the Karreebosch WEF possesses the required wind resources and grid connectivity characteristics to be highly competitive and suitable for the selection process by the Department of Energy for future bidding rounds of the REIPPPP (or a private off taker agreement).

DESIRABILITY FOR THE WIND ENERGY FACILITY: RECEPTIVENESS OF THE SITE TO DEVELOPMENT OF A WIND FARM

The use of wind power for electricity generation is essentially a non-consumptive use of a natural resource. Wind monitoring has been undertaken using 6 x 60m wind monitoring masts in order to confirm the wind resource on the site, and ultimately inform the layout of the facility as well as the turbine selection process.

The site displays characteristics which, in the opinion of the Karreebosch Wind Farm (Pty) Ltd experienced wind development team, make this development and project site desirable for Karreebosch WEF:

- The site covers an area of ~320 km² which will allow for a significant installed capacity on one location. The area would form part of the identified node for wind energy in the Sutherland area (the Komsberg Wind Focus Area as identified by DEA (now DFFE) as part of the REDZ.
- The strength and direction of the prevailing wind resources i.e. the predicted wind climate was measured over the duration of more than 4 year. This determined high average wind speeds exceeding 7.5 m/s over the entire site from its preferable main wind directions (see Figure 2 and 3 below). The economic viability of a wind energy facility is directly dependent on the annual wind speeds. This area of the Northern Cape close to the Escarpment is known to receive some of the highest average daily wind speeds in South Africa.
- Topography of the site, i.e. hills and ridges within the project area have a significant influence on average wind speed and represent areas of greater electricity generation relative to the number of turbines and the disturbance footprint.
- The suitable proximity in relation to the existing electricity grid:
 - The 400kV Komsberg Substation is adjacent to the Karreebosch WEF site and the electricity from the project will be evacuated, via the Bon Espirange substation, into this substation.
 - There are three 140 MW operational projects within the immediate area and others in process as detailed in Table 2-3 below. The grid in the area is being strengthened to accommodate these projects. This makes the area more suitable for new energy generation projects from a technical feasibility perspective.
- Generation of electricity on the proposed site will significantly reduce transmission losses experienced by Eskom due to decentralised generation.
- Construction and operation of the facilities would permit the continuation of present farming activities (mainly sheep farming) and as such so it would not be considered a drastic loss of agricultural land.
- The current land-use on the site is agriculture. The proposed site and majority of land surrounding it have minimal or no crop farming taking place. The development of the wind energy facility will allow current livestock grazing on areas of the farm portions which will not be occupied by wind turbines and associated

infrastructure. Therefore, the current land-use will be retained to a large degree, while also generating renewable energy from the wind. This represents a win-win situation for landowners and the developer.

- The proximity of the site to the National and Regional roads decreases the impact on secondary roads from traffic during the construction and operation phases for the transportation of material and components. As material and components would need to be transported to the project site during the construction phase of the project, direct accessibility to the site was a key factor in determining the viability of the project, particularly taking transportation costs (direct and indirect) into consideration and the impact of this on project economics.

Furthermore, the developer has been measuring the wind resources on site for more than 4 years and has determined with certainty that the site is viable for commercial electricity generation using wind turbines.

The developer further motivates the development of the Karreebosch WEF due to the following reasons:

- The establishment of the wind farm will reduce South Africa's dependence on fossil fuel resources;
- Improve reliability and range of electrical services;
- Meet demand for diversified energy sources;
- Ensure the future of sustainable energy use;
- Reduce CO₂ emissions and the nation's carbon footprint;
- Contribute to targets for emission reduction as outlined in IRP 2010/2030;
- Promote environmental, social and economically sustainable development;
- Create short and long-term jobs opportunities;
- Contribute to meeting the IRP goal of 30% of all new energy from IPPs.
- Aid in curbing energy shortage and avoiding load-shedding

NEED FOR THE WIND ENERGY FACILITY

The need for harnessing renewable energy resources (such as wind energy for electricity generation) is linked to increasing pressure on countries to increase their share of renewable energy generation due to concerns such as exploitation of non-renewable resources and the rising cost of fossil fuels. In order to meet the long-term goal of a sustainable renewable energy industry, a target of 17.8 GW of renewables by 2030 has been set by the Department of Energy (DoE) within the Integrated Resource Plan (IRP) 2010 and incorporated in the Renewable Energy Independent Power Producer Procurement (REIPPP) Programme initiated by the DoE. This programme has been designed so as to contribute towards a target of 3725 MW to be generated from renewable energy sources, required to ensure the continued uninterrupted supply of electricity, towards socio-economic and environmentally sustainable growth, and to start and stimulate the renewable industry in South Africa. In April 2015, the Minister of Energy announced that she intended to submit to NERSA a new determination for an additional 6 300MW for the REIPPP Programme. This was to be done in accordance with the IRP 2010-2030, and to maintain the momentum of the REIPPP, especially for future Bid Submission phases.

The energy procured through this programme will be produced mainly from wind, solar, biomass, and small-scale hydro (with wind and solar comprising the bulk of the power generation capacity). This 17,8GW of power from renewable energy amounts to ~42% of all new power generation being derived from renewable energy forms by 2030.

In response to the growing electricity demand within South Africa, as well as the country's targets for renewable energy, Karreebosch Wind Farm (Pty) Ltd proposes the establishment of the Karreebosch WEF to add new capacity to the national electricity grid through the REIPPP programme of through a private off taker agreement.

A wind energy facility takes approximately 2 years to come online (including development), while it takes longer than 5 years at best to realise a coal or a nuclear power station (based on recent developments with Eskom Medupi and Kusile power build). This further affirms renewable energy as being a plausible solution for the country's energy challenges, both in terms of cheaper electricity for consumers and the ability to implement quicker to meet the strained demand. That is over the above-mentioned environmental and economic development benefits mentioned above.

FINANCIAL VIABILITY AND COMMUNITY NEEDS

In terms of the energy yield predicted for the facility calculated from more than 48 months monitored wind data, the developer considers the Karreebosch WEF to be financially viable. The "need and desirability" of the local

community as reflected in an IDP for the area, is also considered in this EIA. In the South African context, developmental needs (community needs) are often determined through the above planning measures (IDP, SDF and EMF). The wind projects can contribute indirectly to the two Local Municipality's Integrated Development Plans (IDPs). In terms of the needs on the local community, the IDPs identified the need for development, social services, education and employment opportunities in this area. The Karreebosch Wind Energy facility would contribute positively to these community needs. The project will create the possibility of employment and business opportunities, as well as the opportunity for skills development for the local community. The project will result in benefits to the local community, including job creation, localisation and community ownership. In addition, indirect benefits and spend in the local area will benefit the local community.

The development of the project would benefit the local/regional/national community by developing a renewable energy project that would help achieve the country's targets. In addition, there is a potential for creation of employment and business opportunities, and the opportunity for skills development and upliftment for the local community.

CONSIDERATION OF WIND TECHNOLOGY

Wind turbines generate the highest energy yield while affecting the smallest land space when compared to other renewable energy sources such as solar and bio-energy. Wind technologies convert the energy of moving air masses at the earth's surface to mechanical power that can be directly used for mechanical needs (e.g. milling or water pumping) or converted to electric power in a generator (i.e. a wind turbine).

Use of wind for electricity generation is essentially a non-consumptive use of a natural resource. A wind energy facility also qualifies as a Clean Development Mechanism (CDM) project (i.e. a financial mechanism developed to encourage the development of renewable technologies) as it meets all international requirements in this regard.

The motivation above addresses the broader need and desirability for a WEF in the area and the proposed amendment does not change the context of the above and therefore the motivation remains as is.

2.4 SURROUNDING AREA

The South African government gazetted³ eight (8) areas earmarked for renewable energy development in South Africa. These areas are known as Renewable Energy Development Zones (REDZ) and this project falls within the Komsberg REDZ. The purpose of the REDZ is to cluster development of renewable energy facilities in order to streamline the grid expansion for South Africa, i.e. connect zones to one another as opposed to a wide scatter of projects. Therefore, a number of renewable energy developments within the surrounding area which have submitted applications for environmental authorisation (some of which have been approved and some now operational). It is important to note that the existence of an approved EA does not directly equate to actual development of the project.

The surrounding projects that have not already been awarded Preferred Bidder (PB) status under the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) Bid window 5 or the Risk Mitigation IPP procurement programme (RMIPPPP), are still subject to the REIPPPP bidding process or subject to securing an off taker of electricity through an alternative process. Some of the surrounding proposed WEFs secured EAs several years ago but have not obtained PB status (or a private off taker agreement) and as such have not been developed.

These existing surrounding projects of varying approval status have been detailed in **Table 2-3** and **Figure 2-2**. Given the site's location within the Komsberg REDZ, it is considered to be located within the renewable energy hub that is developing in this focus area.

Table 2-3: Existing surrounding projects within a 30km radius of the Karreebosch WEF

LABEL	DFFE REFERENCE	PROJECT TITLE	STATUS
1	12/12/20/1782/1/AM5	140MW Rietrug Wind Energy Facility near Sutherland, Northern Cape Province.	Preferred Bidder Round 5

³ Government Notice 114 of 16 February 2018.

LABEL	DFFE REFERENCE	PROJECT TITLE	STATUS
2	12/12/20/1782/2/AM6	140MW Sutherland 1 Wind Energy Facility near Sutherland, Northern Cape and Western Cape Provinces.	Preferred Bidder Round 5
3	12/12/20/1782/3/AM3	140 MW Sutherland 2 Wind Energy Facility near Sutherland, Northern Cape Provinces.	Preferred Bidder Round 5
4	12/12/20/1783/1/AM5	150MW Perdekraal West Wind Energy Facility, Western Cape Province.	Approved
5	12/12/20/1783/2/AM5	147MW Perdekraal East Wind Energy Facility, Western Cape Province.	Preferred Bidder Round 4, Operational
6	12/12/20/1988/1/AM6	140MW Roggeveld Phase 1 Wind Farm, North of Matjiesfontein, Northern Cape and Western Cape Provinces.	Preferred Bidder Round 4, Operational
7	12/12/20/2370/1/AM6	140 MW Karusa Wind Energy Facility,Phase 1, Karoo Hoogland Municipality, Northern Cape Province.	Preferred Bidder Round 4, Operational
8	12/12/20/2370/2/AM6	140MW Soetwater Wind Farm Phase 2, Karoo Hoogland Municipality, Northern Cape Province.	Preferred Bidder Round 4, Operational
9	12/12/20/2370/3/AM5	140MW Great Karoo Wind Energy Facility Phase 3, Karoo Hoogland Municipality, Northern Cape Province.	Approved
10	14/1/1/16/3/3/1/2318	310MW Pienaarspoort Wind Energy Facility Phase 1, Witzenberg local Municipality, Western Cape Province.	Approved
11	14/12/16/3/3/1/2441	360MW Pienaarspoort Wind Energy Facility Phase 2, Witzenberg local Municipality, Western Cape Province.	Approved
12	14/12/16/3/3/1/1976/1/AM3	226MW Kudusberg Wind Energy Facility between Matjiesfontein and Sutherland in Western and Northern Cape Provinces.	Approved
13	14/12/16/3/3/1/1115	325MW Rondekop Wind Energy Facility between Matjiesfontein and Sutherland in Western and Northern Cape Provinces	Approved
14	14/12/16/3/3/1/1977/AM3	183MW Rietkloof Wind Energy Facility near Matjiesfontein in the Western Cape Province.	Preferred Bidder Round 5
15	14/12/16/3/3/1/2542	200 MW Esizayo Wind Energy Facility Expansion near Laingsburg, Western Cape.	In Process
16	14/12/16/3/3/2/2009/AM1	Oya Energy Facility between Matjiesfontein and Sutherland in Western and Northern Cape Provinces.	Preferred Bidder Risk Mitigation Independent Power Producer Procurement Programme (RMIPPPP)
17	14/12/16/3/3/2/826	140MW Gunsfontein Wind Energy Facility Karoo Hoogland Municipality, Northern Cape Province.	Approved
18	14/12/16/3/3/2/856/AM4	275MW Komsberg West near Laingsburg, Western Cape Provinces	Approved
19	14/12/16/3/3/2/857/AM4	275 Komsberg East near Laingsburg, Western Cape Provinces.	Approved

LABEL	DFFE REFERENCE	PROJECT TITLE	STATUS
20	14/12/16/3/3/2/900/AM2	140MW Brandvalley Wind Energy Facility, within the Laingsburg and Witzenberg Local Municipalities in the Western and Northern Cape Province.	Preferred Bidder Round 5
21	14/12/16/3/3/2/962/AM1	140MW Maralla East Wind Energy Facility, Namakwa and Central Karoo District Municipalities, Western and Northern Cape Provinces.	Approved
22	14/12/16/3/3/2/963/AM1	140Maralla West Wind Energy Facility, Karoo Hoogland local Municipality, Northern Cape Province.	Approved
23	14/12/16/3/3/2/967/AM3	140MW Esizayo Wind Farm, Laingsburg Local Municipality Western Cape Province.	Approved
24	12/12/20/2235	10MW Inca Photovoltaic Facility near Sutherland, Northern Cape Province.	Approved

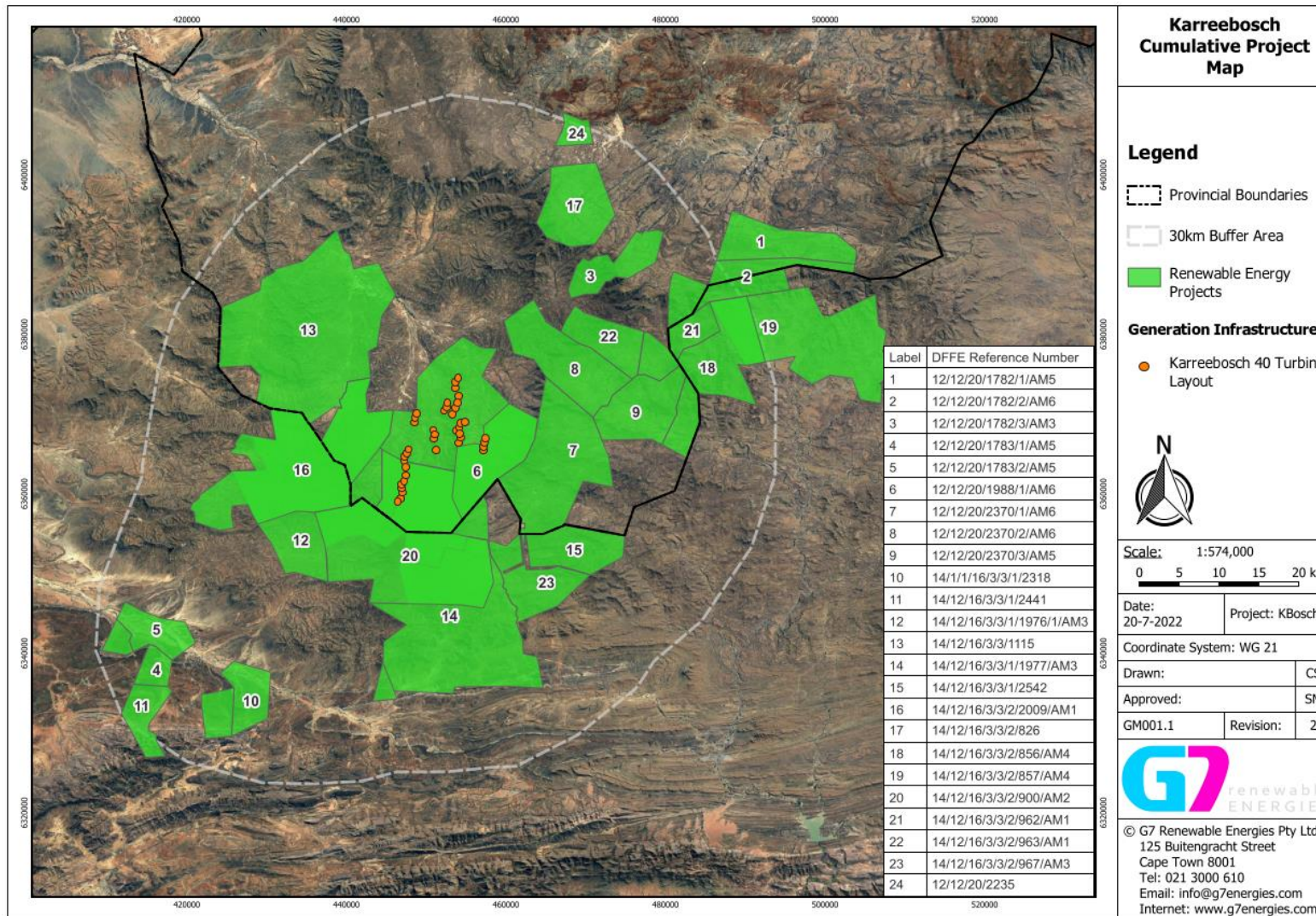


Figure 2-2: Existing surrounding projects (by approval status) within a 30km radius of the Karreebosch WEF

3 OVERVIEW OF PART 2 AMENDMENT PROCESS

3.1 TERMS OF REFERENCE

WSP Group Africa (Pty) Ltd (WSP) was appointed to undertake the amendment process in terms of Regulation 31 and 32 of the EIA Regulations (2014), as amended.

The amendment application process followed to date is summarised below:

- Payment of the prescribed application fee for the application for the variation of the EA was made on **10 August 2022**.
- The application for the amendment of the EA was submitted to the DFFE on **23 August 2022**.

Section 32 of the EIA Regulations (2014), as amended requires that the DAR be subject to a public participation process prior to submission to the DFFE. WSP facilitated the following public participation process on behalf of Karreebosch:

- Provision of the Draft Amendment Report for a 30-day comment period as per the requirements of Section 32 (1).
- All interested and affected parties (I&APs) (as per the existing Karreebosch I&AP database) were notified by WSP of the availability of the DAR for comment. Copies were made available at the Sutherland Library (Sarel Celliers Street), Laingsburg Library (Van Riebeeck Street), on the G7 webpage (<https://ppp.g7energies.com/KWEF6v78!>) for ease of access and available on request through WSP (the EAP).
- Two newspaper adverts in a provincial (Die Burger – **19 August 2022**) and local newspaper (Die Noordwester – **19 August 2022**) introducing the project and requesting public input.
- Site notices have been placed along the boundary fence of the project site and at various locations in Sutherland and Laingsburg.

The Final Amendment Report will include copies of all public participation records and this will be submitted to DFFE for decision-making purposes. All I&APs will thereafter be notified of the DFFE’s decision.

3.1.1 ENVIRONMENTAL ASSESSMENT PRACTITIONER

WSP was appointed in the role of Independent EAP to undertake the Part 2 Amendment processes. The CV of the EAP is available in **Appendix A**. The EAP declaration of interest and undertaking is included in **Appendix B**. **Table 3-1** details the relevant contact details of the EAP.

Table 3-1: Details of the EAP

EAP	WSP GROUP AFRICA (PTY) LTD
Contact Person:	Ashlea Strong
Physical Address:	Building C, Knightsbridge, 33 Sloane Street, Bryanston, Johannesburg
Postal Address:	P.O. Box 98867, Sloane Park 2151, Johannesburg
Telephone:	011 361 1392
Fax:	011 361 1301
Email:	Ashlea.Strong@wsp.com

STATEMENT OF INDEPENDENCE

Neither WSP nor any of the authors of this Report have any material present or contingent interest in the outcome of this Report, nor do they have any business, financial, personal or other interest that could be reasonably regarded as being capable of affecting their independence. WSP has no beneficial interest in the outcome of the assessment

3.2 LEGAL FRAMEWORK

On the 7th of April 2017, the Minister of Environmental Affairs promulgated amendments to the EIA Regulations (2014), as amended (GNR 982) in terms of Chapter 5 of the National Environmental Management Act (No. 107 of 1998), as amended (NEMA). Regulations 31 and 32 of the EIA Regulations (2014), as amended, details the process for a Part 2 (substantive) amendment of an environmental authorisation where a change of scope occurs, but a listed activity is not triggered.

The proposed amendments detailed below do not trigger any new listed activities in terms of the EIA Regulations (2014), as amended. Furthermore, no additional properties will be affected by the amendments that were not originally assessed. However, the proposed amendments will result in a change in scope of the valid EA. As such, a Regulation 31 Amendment Process in terms the EIA Regulations (GNR 326) of the EIA Regulations, 2014 as amended is applicable.

4 PROPOSED AMENDMENTS TO THE EA

Table 4-1 below outlines the amendments proposed to the existing EA as well as an outline of the relevant advantages and/or disadvantages and motivations for the amendments. The amendments include the following:

- Administrative changes;
- Changes to the authorised technical specifications; and
- Changes to various conditions with regards to wording or removal.

It can be confirmed that none of the amendments requested will result in new listed activities being triggered.

Figure 4-1 shows the original 66 turbine layout submitted as part of the EIA phase in 2015 and **Figure 4-2** shows the authorised 65 turbine layout relevant to the EA authorised in January 2016 which includes the removal of turbine 17 and subsequent November 2018 EA Amendment. **Figure 4-3** illustrates the proposed final 40-turbine layout subject to this Part EA amendment, final layout and EMPr approval process.

Table 4-1: Proposed amendments to the Karreebosch EA (DFFE Ref: 14/12/16/3/3/2/807/AM3)

EA REF	EA FIRST ISSUE 2016	AMENDMENT 2016	AMENDMENT 2018	AMENDMENT 2018 (CORRECTION)	2022 AMENDMENTS REQUESTED	MOTIVATION FOR AMENDMENT
	14/12/16/3/3/2/807	14/12/16/3/3/2/807/AM1	14/12/16/3/3/2/807/AM2	14/12/16/3/3/2/807/A M2	TBC	
Administrative Amendments						
Page 1, 2 and 3	Karreebosch Wind Farm (Pty) Ltd				Karreebosch Wind Farm RF (Pty) Ltd	The Amendment being applied for is to update the name of the EA Holder to ensure that the information contained in the EA is up to date and accurate. This amendment request is administrative in nature and therefore no disadvantages are foreseen.
Properties - Page 2 (# OF PROPERTIES ON PG 1)	Farm Appelsfontein 201 Remainder of Ekkraal 199 Portion 1 of Ekkraal 199 Portion 2 of Ekkraal 199 Remainder of Karreebosch 200 Remainder of Karreekloof 196 Remainder of Klipbanksfontein 198 Portion 1 of Klipbanksfontein 198 Farm Kranskraal 189 Farm Oude Huis 195 Farm Rietfontein 197 Farm Roode Wal 187 Portion 2 of Standvastigheid 210 Remainder of Wilgebosch Rivier 188				Farm Roode Wal No. 187 Farm Appels Fontein No. 201 Portion 1 of Farm Ek Kraal No. 199 Portion 2 (Nuwe Kraal) of Farm Ek Kraal No. 199 Portion 1 of Farm Klipbanks Fontein No. 198 Remainder of Farm Klipbanks Fontein No. 198 Remainder of Farm Wilgebosch Rivier No. 188 Farm Rietfontein No. 197 Remainder of Farm Kareebosch No. 200 Portion 1 of Farm Karreebosch No. 200 Farm Oude Huis No. 195 Portion 1 of Farm Karree Kloof No. 196 Remainder of Farm Brandvalley No. 75	The Amendment being applied for is to update the Property information to ensure that the information contained in the EA is up to date and accurate as per the final layout. This amendment request is administrative in nature and therefore no disadvantages are foreseen.

						AMENDMENT 2018
EA FIRST ISSUE 2016	AMENDMENT 2016	AMENDMENT 2018	(CORRECTION)	2022 AMENDMENTS REQUESTED	MOTIVATION FOR AMENDMENT	
EA REF	14/12/16/3/3/2/807	14/12/16/3/3/2/807/AM1	14/12/16/3/3/2/807/AM2	14/12/16/3/3/2/807/A M2	TBC	
	Farm Aprils Kraal 105 Remainder of Bon Espirange 73 Portion 1 of Bon Espirange 73					
21 SDG Codes - Page 8	C0430000000007300000 C0430000000007300001 C0430000000001050000 C0720000000001870000 C0720000000001880000 C0720000000001950000 C0720000000001880000 C07200000000019600001 C0720000000001970000 C0720000000001980000 C07200000000019800001 C0720000000001990000 C07200000000019900001 C07200000000019900002 C0720000000002000000 C07200000000020000001 C0720000000002010000 C07200000000021000002				C07200000000018700000 C07200000000020100000 C07200000000019900001 C07200000000019900002 C07200000000019800001 C07200000000019800000 C07200000000018800000 C07200000000019700000 C07200000000020000000 C07200000000020000001 C07200000000019500000 C07200000000019600001 C0430000000007500000	

AMENDMENT 2018

EA FIRST ISSUE 2016 AMENDMENT 2016 AMENDMENT 2018 (CORRECTION) 2022 AMENDMENTS REQUESTED MOTIVATION FOR AMENDMENT

EA REF 14/12/16/3/3/2/807 AM1 AM2 M2 TBC

Site Coordinates - WEF - Page 8 and 9	Site Coordinates:			1. 32°43' 10.25" S 20°30'56.22" E 2. 32°43' 54.98" S 20°32' 23.96" E 3. 32°43' 58.50" S 20°33' 42.64" E 4. 32°45' 49.76" S 20°32' 27.91" E 5. 32°46'8. 49" S 20°30'22.20"E 6. 32°47'28.35"S 20°32'13.45"E 7. 32°48'54.95" 20°33'5.07"E 8. 32°47'41.47"S 20°34'40.10"E 9. 32°48'47.90"S 20°36'57.87"E 10. 32°50'10.85"S 20°36'39.35"E 11. 32°51'34.75"S 20°35'52.67"E 12. 32°52'53.30"S 20°33'40.05"E 13. 32°53'58.77"S 20°32'31.52"E 14. 32°53'10.40"	The Amendment being applied for is to update the WEF boundary co-ordinates to ensure that the information contained in the EA is up to date and accurate as reflected in the final layout. This amendment request is administrative in nature and therefore no disadvantages are foreseen.
	Wind Farm boundary corners				
		Latitude	Longitude		
	1	32° 43' 10.25° S	20° 30' 56.22° E		
	2	32° 43' 54.98° S	20° 32' 23.96° E		
	3	32° 43' 58.50° S	20° 33' 42.64° E		
	4	32° 45' 49.76° S	20° 32' 27.91° E		
	5	32° 48' 47.44° S	20° 36' 57.76° E		
	6	32° 50' 9.78° S	20° 36' 40.16° E		
	7	32° 51' 34.59° S	20° 35' 52.85° E		
	8	32° 52' 51.47° S	20° 33' 40.51° E		
	9	32° 55' 34.23° S	20° 35' 31.86° E		
	10	32° 55' 51.13° S	20° 35' 29.79° E		
	11	32° 55' 51.48° S	20° 35' 52.83° E		
	12	32° 56' 12.14° S	20° 35' 50.58° E		
	13	32° 56' 10.49° S	20° 35' 27.30° E		
14	32° 56' 34.77° S	20° 35' 24.24° E			
15	32° 57' 23.11° S	20° 34' 19.95° E			

AMENDMENT 2018

EA FIRST ISSUE 2016 AMENDMENT 2016 AMENDMENT 2018 (CORRECTION) 2022 AMENDMENTS REQUESTED MOTIVATION FOR AMENDMENT

EA REF	14/12/16/3/3/2/807	14/12/16/3/3/2/807/ AM1	14/12/16/3/3/2/807/ AM2	14/12/16/3/3/2/807/A M2	TBC	
		32° 56' 29.81" S	20° 29' 57.44" E		S	20°32'4.72"E
		32° 56' 23.69" S	20° 26' 18.32" E		15.	32°52'19.01"S 20°30'44.60"E
		32° 56' 8.94" S	20° 25' 52.10" E		16.	32°52'16.97"S 20°30'16.52"E
		32° 55' 33.27" S	20° 25' 3.22" E		17.	32°54'3.02"
		32° 54' 46.59" S	20° 23' 49.71" E		S	20°30'0.97"E
		32° 54' 8.73" S	20° 24' 21.43" E		18.	32°55'36.56"S 20°30'49.83"E
		32° 50' 44.73" S	20° 24' 24.34" E		19.	32°56'30.33"S 20°29'57.62"E
		32° 50' 40.50" S	20° 24' 14.19" E		20.	32°56'24.62"S 20°26'19.45"E
		32° 49' 43.33" S	20° 25' 2.08" E		21.	32°55'32.40"
		32° 48' 7.71" S	20° 25' 18.36" E		S	20°25'3.38"E
		32° 48' 15.26" S	20° 23' 14.63" E		22.	32°54'49.12"S 20°23'56.71"E
		32° 47' 3.78" S	20° 23' 8.12" E		23.	32°54'11.01"S 20°24'22.74"E
		32° 45' 55.53" S	20° 23' 32.91" E		24.	32°50'48.83"S 20°24'23.37"E
		32° 44' 23.13" S	20° 26' 22.17" E		25.	32°50'41.52"S 20°24'13.75"E
		32° 45' 58.70" S	20° 27' 15.57" E		26.	32°49'44.55"S 20°24'59.34"E
		32° 44' 34.23" S	20° 28' 46.99" E		27.	32°48'8.53"S 20°25'18.95"E

AMENDMENT 2018

EA FIRST ISSUE 2016	AMENDMENT 2016	AMENDMENT 2018	AMENDMENT 2018 (CORRECTION)	2022 AMENDMENTS REQUESTED	MOTIVATION FOR AMENDMENT	
EA REF	14/12/16/3/3/2/807	14/12/16/3/3/2/807/AM1	14/12/16/3/3/2/807/AM2	14/12/16/3/3/2/807/A M2	TBC	
				28. 32°48'16.33"S 20°27'10.93"E 29. 32°45'55.77"S 20°27'14.83"E 30. 32°44'34.75"S 20°28'46.21"E 31. 32°56'37.58"S 20°29'42.21"E		
Coordinates - Powerline - Page 9	Power line route Alternative 1 a Latitude Longitude Starting point 32° 51' 39.91" S 20° 28' 42.54" E Middle point 32° 52' 5.72" S 20° 33' 14.49" E End point 32° 55' 59.31" S 20° 35' 29.25" E			The powerline co-ordinates must be removed in totality	The Amendment being applied for requires the co-ordinates of the original approved powerline to be removed as this alignment is no longer valid. A new powerline alignment is being applied for under a separate application. This amendment request is administrative in nature and therefore no disadvantages are foreseen.	
Page 10 (Bullet 5)	Approximately 25km of 132kV overhead power lines from the on-site substation to Eskom's Komsberg Substation;			Reference to 132kV powerline to be removed	The powerline alignment is being applied for under a separate application. No disadvantages are foreseen.	
Technical Specifications						
Page 9 (Bullet 1)	Up to 65 wind turbines (2MW to 3.3MW in capacity each) with a foundation of 25m in diameter		up to 65 wind turbines (2MW to 5.5MW in capacity	up to 65 wind turbines (2MW to 5.5MW in capacity	Up to 40 turbines (up to 7.5 MW in capacity each) with a foundation of 30m in diameter and 5m in depth	The increase in generation capacity per turbine to a maximum of up to 7.5MW will result in a reduced number of turbine

		AMENDMENT 2018				
EA FIRST ISSUE 2016	AMENDMENT 2016	AMENDMENT 2018	(CORRECTION)	2022 AMENDMENTS REQUESTED	MOTIVATION FOR AMENDMENT	
EA REF	14/12/16/3/3/2/807	14/12/16/3/3/2/807/AM1	14/12/16/3/3/2/807/AM2	14/12/16/3/3/2/807/A M2	TBC	
	and 4m in depth;		each) with a foundation of 25m in diameter and 4m in depth	each) with a foundation of 25m in diameter and 4m in depth		positions being utilised on site. The exact orientation, position and dimensions of the hardstands will be subject to minor change pending the final selection of the TSA. The increased maximum allowable size of the hard standing areas will allow for these changes, should they be required. As confirmed by the specialists and EAP, there are no disadvantages associated with the amendment of the EA in terms of reduction in the numbers of turbines. The reduction in the number of turbines will result in advantages such as the reduced requirement for vegetation clearing and the associated impacts on biodiversity as well as the reduced risk for bat and avifauna collisions and fatalities. Wind turbine generators are constantly under development to increase the potential energy output per wind turbine. These amendments are proposed in order to increase the efficiency of the facility and consequently the economic competitiveness thereof, in turn reducing the electricity tariffs to be charged by the facility which would benefit electricity consumers at large.
Page 10 (Row one of Table)	Up to 65 turbines (generation capacity of up to 140MW)				Up to 40 turbines (installed capacity is 149.9 MW and export capacity will be 140MW)	

		AMENDMENT 2018				
EA FIRST ISSUE 2016	AMENDMENT 2016	AMENDMENT 2018	(CORRECTION)	2022 AMENDMENTS REQUESTED	MOTIVATION FOR AMENDMENT	
EA REF	14/12/16/3/3/2/807	14/12/16/3/3/2/807/AM1	14/12/16/3/3/2/807/AM2	14/12/16/3/3/2/807/A M2	TBC	
					<p>The increase in generation capacity per turbine to a maximum of up to 7.5MW is as a result of the advances in turbine technology. The benefit of increasing the generation capacity of each turbine results in the need to utilise fewer turbine positions than originally authorised. As confirmed by the specialists and EAP, there are no disadvantages associated with the amendment of the EA in terms of generation capacity per turbine. The increased capacity will potentially result in the Environmental Authorisation Limit and IFC Guideline of 45 dB(A) being exceeded at NSA 27 for sound power levels of the turbines at 111.0dB(A) and 113.0dB(A), when modelled on worst case scenario. It must however be noted that the wind noise will provide a masking effect and the exceedance is only marginal (0.2 dBA and 2.2dBA). The noise specialist concluded that it is unlikely that the receiver will be negatively impacted and therefore no significant disadvantage is noted.</p>	

						AMENDMENT 2018
EA FIRST ISSUE 2016	AMENDMENT 2016	AMENDMENT 2018	(CORRECTION)	2022 AMENDMENTS REQUESTED	MOTIVATION FOR AMENDMENT	
EA REF	14/12/16/3/3/2/807	14/12/16/3/3/2/807/ AM1	14/12/16/3/3/2/807/ AM2	14/12/16/3/3/2/807/A M2	TBC	
Page 9 (Bullet 2) & Page 10 (Row 2 of table)	The hub height of each turbine will be 100 metres		The hub height of each turbine will be 125 metres	The hub height of each turbine will be 125 metres	The hub height of each turbine will be up to 140 metres	This amendment is being applied for to allow for the use of newer technology available. Wind shear refers to the variation in wind speed over vertical distances. Installing wind turbine generators with a higher hub height will increase the overall performance of the WEF. This amendment will increase the economic competitiveness of the WEF, in turn reducing the electricity tariffs to be charged by the facility which would benefit electricity consumers at large. As confirmed by the specialists and EAP, there are no disadvantages associated with the amendment of the EA in terms of the turbine hub height.
Page 9 (Bullet 2) & Page 10 (Row 4 of table)	The rotor diameter 140 metres;		The rotor diameter will be 160 metres	The rotor diameter will be 160 metres	The rotor diameter will be up to 170 metres	This amendment is being applied for to allow for the use of newer technology available. The power output of a wind turbine is directly related to the swept area of the blades. The larger the diameter of swept area / rotor diameter of the blades, the more power it is capable of generating from the wind. By potentially installing wind turbine generators with a larger rotor diameter, it will increase the energy output per
Page 10 (Row 3 of Table)	Blade length approximately 70m				Blade length Approximately 85m	

		AMENDMENT 2018				
EA FIRST ISSUE 2016	AMENDMENT 2016	AMENDMENT 2018	(CORRECTION)	2022 AMENDMENTS REQUESTED	MOTIVATION FOR AMENDMENT	
EA REF	14/12/16/3/3/2/807	14/12/16/3/3/2/807/AM1	14/12/16/3/3/2/807/AM2	14/12/16/3/3/2/807/A M2	TBC	
					turbine. This will result in increasing the overall performance of the WEF. This amendment will increase the economic competitiveness of the WEF, in turn reducing the electricity tariffs to be charged by the facility which would benefit electricity consumers at large. As confirmed by the specialists and EAP, there are no disadvantages associated with the amendment of the EA in terms of the rotor diameter.	
Page 10 (Bullet 1)	Permanent compacted hard standing areas crane pads for each wind turbine (70mx50m);			Permanent compacted hard standing areas/ crane pads for each wind turbine of up to 1.2ha	The updates are all based on the dimensions included in the Final layout. As confirmed by the specialists and EAP, there are no disadvantages associated with the amendment of the EA in terms of new dimensions for the associated infrastructure. The reduced areas of impact will be advantageous due to the	
Page 10 (Bullet 2)	Electrical turbine transformers (690V/33kV) at each turbine (2m x 2m) footprint typical but up to 10m x 10m at certain locations;			Electrical turbine transformers (690V/33kV) at each turbine (3m x 6m) footprint typical but up to 10m x 10m at certain locations;		

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EA FIRST ISSUE 2016	AMENDMENT 2016	AMENDMENT 2018 (CORRECTION)	2022 AMENDMENTS REQUESTED	MOTIVATION FOR AMENDMENT		
EA REF	14/12/16/3/3/2/807	14/12/16/3/3/2/807/ AM1	14/12/16/3/3/2/807/ AM2	14/12/16/3/3/2/807/A M2	TBC	
Page 10 (Bullet 3)	Internal access roads up to 12 m wide;				Internal Access roads up to 12m wide (turns will have a radius of up to 55m) with additional yet associated servitudes/ reserve for above/underground cabling installation and maintenance where needed. 200m wide road corridor along the internal access roads for micro-siting during construction. Internal 4x4 tracks associated with the 33kV and 132Kv OHPLs will be up to 4m wide and substation access roads of up to 9m.	reduced requirement for vegetation clearing and the associated impacts on biodiversity.
Page 10 (Bullet 4)	Approximately 25km of 33kV overhead power lines linking the wind turbines to each other and to the on-site substations;				Approximately up to 34km of 33kV of buried/ and or overhead power lines linking the wind turbines to each other and to the on-site substation;	
Page 10 (Bullet 6)	Up to two electrical substations on-site (33/132 kV substations with a footprint of 100m x 200m each);				one substation with a footprint of up to 150m x 200m (3ha) (Option 1 - Southern Alternative)	These updates are all based on the dimensions included in the Final layout. As confirmed by the specialists and EAP, there are no disadvantages associated with the amendment of the EA in terms of new dimensions for the associated infrastructure. The reduced areas of impact will be advantageous due to the reduced requirement for vegetation
Page 10 (Bullet 7)	Underground cabling between turbines buried along the internal access roads, where feasible;				Above/underground cabling between turbines alongside internal access roads where feasible, with sections of overhead 33kV lines as needed across steeper terrain and valleys.	

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EA REF	14/12/16/3/3/2/807	14/12/16/3/3/2/807/ AM1	14/12/16/3/3/2/807/ AM2	14/12/16/3/3/2/807/A M2 TBC	
Page 10 (Bullet 10)	Up to 4 x 100m tall wind measuring masts;			Wind Measuring Mast Height within a range up to and including 125m	clearing and the associated impacts on biodiversity.
Page 10 (Bullet 11)	Temporary infrastructure required during the construction phase includes construction lay down areas and a construction camp up to 9ha (footprint size 300m x 300m); and			Temporary infrastructure required during the construction phase includes construction lay down areas and a construction camp up to 14ha	
Page 10 (Bullet 12)	A borrow pit for locally sourcing aggregates required for construction (~3ha).			A batching plant required for construction (~3ha) will be located within the construction camp area. Aggregate material for construction will be sourced from existing licensed borrow pits or a separate application will be lodged with the DMRE for a new mining permit.	
Page 10 (Row 5 of Table)	>> One 33/132kV Substation 100m x 200m >>Extension of the existing 400kV substation at Komsberg >>Transformer art each turbine: total area <1500m ² (2 m ² per turbine up to 10m ² at some locations)	>> Two 33/132kV Substation 100m x 200m >>Extension of the existing 400kV substation at Komsberg >>Transformer art each turbine: total		>> one 33/132kV substation 150m x 200m (3ha) >> Extension of the existing 400kV substation at Komsberg >>Transformer at each turbine: 6m x 3m= 720m ² total area <0.4ha (up to 10mX10m at some locations)	

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EA REF	14/12/16/3/3/2/807	14/12/16/3/3/2/807/AM1	14/12/16/3/3/2/807/AM2	14/12/16/3/3/2/807/A M2	TBC
		area <1500m ² (2 m ² per turbine up to 10m ² at some locations)			
Page 10 (Row 6 of Table)	132kV				33/132kV
Page 10 (Row 7 of table)	300 x 300m = 90 000m ²				Areas occupied by construction camp and laydown areas up to 14ha
Page 10 (Row 8 of table)	Operation: (70 x 50) x 71 =248 500m ²				Turbines and crane pads will be up to 41ha in total
Page 10 (Row 9 of table)	~10 000m ²				~10 000m ² and will be located within the construction camp for use during the operational phase
Page 11 (Row 1 of Table)	~40 km				~76 km of new internal access roads and up to ~13km of 4x4 access tracks . ~30km of existing access roads which are 4m wide will be widened by up to 9m

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EA REF	14/12/16/3/3/2/807	14/12/16/3/3/2/807/ AM1	14/12/16/3/3/2/807/ AM2	14/12/16/3/3/2/807/A M2	TBC	
Page 11 (Row 2 of Table)	Up to 12m				Internal Access roads up to 12m wide (turns will have a radius of up to 55m) with additional yet associated servitudes/ reserve for above/underground cabling installation and maintenance where needed. 200m wide road corridor along the internal access roads for micro-siting during construction. Internal 4x4 tracks associated with the 33kV and 132Kv OHPLs will be up to 4m wide and substation access roads of up to 9m.	
Page 11 (Row 3 of Table)	Up to 3m				Up to 4m	
EA Conditions						
Page Condition 2	11	2. Substation Alternative 1 is hereby approved. One 33/132kV substation will collect all cables at one central point to the south of Turbine 27.			This condition should be reworded to state: "2. Substation Option 1 is hereby approved. One 33/132kV substation will collect all cables at one central point to the south of Turbine 22"	The amendment is requested such that the condition reflects the preferred alignment as per the separate Grid Basic Assessment Process underway as well as reflecting the Final Layout
Page Condition 3	14	3. Power line option Alternative 1 is hereby approved and will be routed southeast from the Alternative 1 Substation and thereafter towards the R354 connecting to the new 400kV			This condition should be removed.	This amendment is requested as this powerline is no longer feasible and a new powerline alignment is the subject of a new Grid Basic Assessment Process that is currently being undertaken.

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EA FIRST ISSUE 2016	AMENDMENT 2016	AMENDMENT 2018	(CORRECTION)	2022 AMENDMENTS REQUESTED	MOTIVATION FOR AMENDMENT	
EA REF	14/12/16/3/3/2/807	14/12/16/3/3/2/807/ AM1	14/12/16/3/3/2/807/ AM2	14/12/16/3/3/2/807/A M2	TBC	
	substation to be located adjacent to the Komsberg Substation.					
Page 14 Condition 19.2	19.2 The grazing withdrawal area agreement as per condition 37.				This condition should be removed.	<p>This recommendation was included in the EA after the initial assessment undertaken by Todd (2014) and suggested the establishment of a 1,300h exclusion area (restricting sheep grazing) and to maintain the area for a period of 20 years.</p> <p>This recommendation was reviewed by two independent specialists (Balfour and Logie, 2022) and was found to be poorly justified and an impractical intervention for promoting conservation of biodiversity in response to perceived agricultural and grazing practices in the area (which found no indication of over-grazing, but presented under stocking) which also have no connection to the development of the WEF itself. Logie (2022) concludes that the recommendation by Todd (2014) has been</p>

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EA REF	14/12/16/3/3/2/807	14/12/16/3/3/2/807/AM1	14/12/16/3/3/2/807/AM2	14/12/16/3/3/2/807/A M2	TBC
					<p>founded on weak scientific evidence, if any at all, causing the non-grazing plan to be a fatally flawed mitigation strategy and ecological management philosophy. As such, it is the considered opinion of Logie (2022) that there are exceptionally strong grounds for the removal of the non-grazing plan requirement (as per conditions 19.2 and 37 of the EA - 14/12/16/3/3/2/807) from the Environmental Authorisation in totality. Balfour (2022) concludes that the recommendation to establish a 1,300h sheep fenced exclusion area and to maintain it for 20 years is a weakly justified and impractical intervention and that it should be removed from the Environmental Authorisation. The recommendation is based on weak evidence and scientific logic. As such it the opinion of the specialist that the requirement for a non-grazing plan should not form part of the Environmental Authorisation (EA - 14/12/16/3/3/2/807) and that the following conditions (19.2 and 37) should be removed from said Environmental Authorisation in their</p>

	EA FIRST ISSUE 2016	AMENDMENT 2016	AMENDMENT 2018	AMENDMENT 2018 (CORRECTION)	2022 AMENDMENTS REQUESTED	MOTIVATION FOR AMENDMENT
EA REF	14/12/16/3/3/2/807	14/12/16/3/3/2/807/ AM1	14/12/16/3/3/2/807/ AM2	14/12/16/3/3/2/807/A M2	TBC	totality. Fencing has not been favoured in general as it can restrict the movement of fauna. Please refer to the specialist opinion letters (Balfour and Logie, 2022) attached in Appendix F and Appendix G for a detailed motivation.

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EA FIRST ISSUE 2016	AMENDMENT 2016	AMENDMENT 2018	(CORRECTION)	2022 AMENDMENTS REQUESTED	MOTIVATION FOR AMENDMENT
EA REF	14/12/16/3/3/2/807	14/12/16/3/3/2/807/ AM1	14/12/16/3/3/2/807/ AM2	14/12/16/3/3/2/807/A M2	TBC
<p>Page 18</p> <p>Condition 37</p>	<p>37. The grazing withdrawal area recommended by the Ecological Specialist must form part of the Lease Agreement between the holder of this authorisation and the land owners. A minimum of 1300 ha must be set aside for the grazing withdrawal area; this area must be fenced and not grazed by livestock for at least 20 years. A copy of this agreement must be included in the EMPr.</p>				<p>This condition should be removed.</p> <p>The recommendation to establish a 1,300h sheep fenced exclusion area and to maintain it for 20 years is a weakly justified and impractical intervention and that it should be removed from the Environmental Authorisation. The recommendation is based on weak evidence and scientific logic. As such it the opinion of the specialist that the requirement for a non-grazing plan should not form part of the Environmental Authorisation (EA - 14/12/16/3/3/2/807) and that the following conditions should be removed from said Environmental Authorisation in their totality. Fencing has not been favoured in general as it can restrict the movement of fauna. Please refer to the specialist opinion letters (Balfour and Logie, 2022) attached in Appendix F and Appendix G for a detailed motivation.</p>

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EA REF	14/12/16/3/3/2/807	14/12/16/3/3/2/807/AM1	14/12/16/3/3/2/807/AM2	14/12/16/3/3/2/807/A M2	TBC	
<p>Page 15</p> <p>Condition 19.6</p>	<p>19.8. A storm water and wash water management plan to be implemented during the construction and operation of the facility. The plan must ensure compliance with applicable regulations and prevent off-site migration of contaminated storm water or increased soil erosion. The plan must include the construction of design measures that allow surface and subsurface movement of water along drainage lines so as not to impede natural surface and subsurface flows. Drainage measures must promote the dissipation of storm water run-off.</p>				<p>This condition should be reworded to state: "A stormwater management plan must be implemented during construction and operation". for inclusion in the draft reports.</p>	<p>This plan has been provided as part of the Hydrological (Floodline Assessment) and SWMP which has been included in the Final EMPr</p>
<p>Page 18</p> <p>Condition 35</p>	<p>35. Turbine position 17 must be excluded from the proposed development as per the recommendation of the Avifaunal Impact Assessment;</p>				<p>This condition should be removed.</p>	<p>This amendment is requested as Turbine 17 included in the original 65 Turbine Layout has been excluded from the Final layout, therefore Turbine 17 is thus no longer relevant.</p>

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EA REF	14/12/16/3/3/2/807	14/12/16/3/3/2/807/AM1	14/12/16/3/3/2/807/AM2	14/12/16/3/3/2/807/A M2	TBC	
	bringing the total number of turbines approved to 65.					
Page 18 Condition 39	39. During construction the applicant must restrict the construction activities to the footprint area. No access to the remainder of the property is allowed				This condition should be reworded to state: "During construction the applicant must restrict the construction activities to the footprint area and make use of designated access routes"	This amendment is request to ensure that the condition is more accurate to areas being utilised on site. Mitigation measures to this effect are included in the Final EMPr.
Page 18 Condition 43	43. Anti-collision devices such as bird flappers must be installed where power lines cross avifaunal corridors (e.g. grasslands, rivers, wetlands, and dams). The input of an avifaunal specialist must be obtained for the fitting of the anti-collision devices onto specific sections of the line once the exact positions of the towers have been surveyed and pegged. Additional areas of high sensitivity along the preferred alignment must also be identified by the avifaunal specialist for the fitment of anti-collision devices. These devices				This condition should be reworded to state: "The input of an avifaunal specialist must be obtained for the fitting of the anti-collision devices onto specific sections of the line once the exact positions of the towers have been surveyed and pegged. Additional areas of high sensitivity along the preferred alignment must also be identified by the avifaunal specialist for the fitment of anti-collision devices. These devices must be according to Eskom's Transmission and EWT's Guidelines."	This amendment is request to ensure that the condition is more specific, as the powerline (132kV) is being assessed as part of a separate application with a specific Avifaunal assessment to ensure impacts are reduced and mitigated.

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EA REF	14/12/16/3/3/2/807	14/12/16/3/3/2/807/AM1	14/12/16/3/3/2/807/AM2	14/12/16/3/3/2/807/A M2	TBC
	must be according to Eskom's Transmission and EWT's Guidelines.				
Page 18 Condition 46	46. All power lines linking wind turbines to each other and to the internal substation must be buried. Only power lines linking the wind energy facility to the grid may be above the ground.	Power lines linking wind turbines to each other and to the internal substation must be buried where feasible.		This condition should be reworded to state: "33kV lines will be buried alongside internal access roads where feasible, with sections of 33kV overhead lines as needed across steeper terrain and valleys to connect at the Karreebosch substation. The 132kV powerline will be an overhead powerline."	This amendment is request to ensure that the condition is more specific and covers the exact scope of work being applied for and to be undertaken on site.
Page 19 Condition 49	49. Before the clearing of the site, the appropriate permits must be obtained from the Department of Agriculture, Forestry and Fisheries (DAFF) for the removal of plants listed in the National Forest Act and from the relevant provincial department for the destruction of species protected in terms of the specific provincial legislation. Copies of the permits must be kept by the ECO.			This condition should be reworded to state: "Before the clearing of the site, the appropriate permits must be obtained from the Department of Forestry, Fisheries and the Environment (DFFE) for the removal of plants listed in the National Forest Act and from the relevant provincial department for the destruction of species protected in terms of the specific provincial legislation. Copies of the permits must be kept by the ECO"	This amendment is request to reflect the correct authority now responsible for the issuance of permits required in terms of the National Forest Act.

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EA REF	14/12/16/3/3/2/807	14/12/16/3/3/2/807/AM1	14/12/16/3/3/2/807/AM2	14/12/16/3/3/2/807/A M2 TBC	
<p>Page 19</p> <p>Condition 53</p>	<p>53. The holder of this authorisation must ensure that all the "No-go" and buffer areas are clearly demarcated (using fencing and appropriate signage) before construction commences.</p>			<p>This condition should be reworded to state: "The holder of this authorisation must ensure that all the "No-go" and buffer areas are clearly demarcated (using appropriate demarcation and signage) before construction commences."</p>	<p>The amendment request for the removal of the use of fencing for demarcation of No-go areas, as this will be impractical and expensive. Furthermore, fencing is not preferred from an ecological/biodiversity point of view as it adds additional and unnecessary barriers to movement of fauna on site, and requires additional linear footprints to be disturbed.</p>
<p>Page 19</p> <p>Condition 55</p>	<p>55. Where roads pass right next to major water bodies, provision shall be made for fauna such as toads to pass under the roads by using culverts or similar structures."</p>			<p>This condition should be reworded to "where roads pass over major water bodies, provision shall be made for fauna such as toads to pass under the roads by using culverts or similar structures."</p>	<p>Major water bodies will be avoided as far as possible, including the 1:100 year flood extent. In instances where water bodies or drainage lines must be crossed or existing road crossings upgraded, appropriate culvert structures will be installed where necessary which have been suggested in the SWMP and floodline assessment and will be supervised by an appropriate engineer.</p>

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EA REF	14/12/16/3/3/2/807	14/12/16/3/3/2/807/AM1	14/12/16/3/3/2/807/AM2	14/12/16/3/3/2/807/A M2	TBC	
<p>Page 19</p> <p>Condition 59</p>	<p>59. Wetlands, rivers and river riparian areas must be treated as "no-go" areas and appropriately demarcated as such. No vehicles, machinery, personnel, construction material, fuel, oil, bitumen or waste must be allowed into these areas without the express permission of and supervision by the ECO, except for rehabilitation work in these areas.</p>				<p>This condition should be reworded to state: "Wetlands, rivers and river riparian areas must be treated as "no-go" areas and appropriately demarcated as such. No vehicles, machinery, personnel, construction material, fuel, oil, bitumen or waste must be allowed into these areas without the express permission of and supervision by the ECO, except for the use of and/or construction or upgrades to authorised road crossings in line with the water use license issued by DWS"</p>	<p>This amendment is request to ensure that the condition is more specific and covers the mitigations suggested by the specialist for the actual work to be undertaken on site.</p>
<p>Page 20</p> <p>Condition 67</p>	<p>67. Freshwater ecosystems located in close proximity to the site must be inspected on a regular basis (but especially after rainfall) by the ECO for signs of sedimentation and pollution. If signs of sedimentation or pollution are noted, immediate action must be taken to remedy the situation and, if necessary, a freshwater ecologist must be consulted for advice on the most suitable remediation measures.</p>				<p>This condition should be removed.</p>	<p>This amendment is requested as it is an exact duplicate of Condition 63 and only one is required.</p>

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EA REF	14/12/16/3/3/2/807	14/12/16/3/3/2/807/AM1	14/12/16/3/3/2/807/AM2	14/12/16/3/3/2/807/A M2	TBC	
Page 20 Condition 68	68. Existing road infrastructure must be used as far as possible for providing access to the proposed turbine positions. Where no road infrastructure exists, new roads should be placed within existing disturbed areas or environmental conditions must be taken into account to ensure the minimum amount of damage is caused to natural habitats.				This condition should be reworded to state: "Existing road infrastructure must be used as far as possible for providing access to the proposed turbine positions. Where no road infrastructure exists, new roads should be placed within existing disturbed areas where possible or environmental conditions must be taken into account to ensure the minimum amount of damage is caused to natural habitats."	The amendment is requested to specify the condition for the use of existing disturbed areas for new roads where possible in that disturbed areas may not always be near or within planned road networks and thus including existing disturbed areas on site for roads may not always be feasible. The impacts of the new roads proposed as per the final layout has been assessed and deemed acceptable by all specialists and the mitigations suggested by the specialist has been included in the final EMPr.
Page 20 Condition 73	73. Construction vehicles carrying materials to the site must avoid using roads through densely populated built-up areas so as not to disturb existing retail and commercial operations				This condition should be reworded to state: "Construction vehicles carrying materials to the site must avoid using roads through densely populated built-up areas so as not to disturb existing retail and commercial operations, where possible and as per the findings of the detailed traffic assessment."	This amendment is requested as it is dependent on the detailed traffic assessment which is required to be undertaken prior to construction.
Page 21 Condition 79	79. The holder of this authorisation must ensure that all equipment and machinery are well maintained and equipped with silencers.				This condition should be reworded to state: "The holder of this authorisation must ensure that all equipment and machinery are well maintained and equipped with silencers, where possible"	This amendment is requested as it is not practical nor necessary to have a silencer on every machine

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EA REF	14/12/16/3/3/2/807	14/12/16/3/3/2/807/AM1	14/12/16/3/3/2/807/AM2	14/12/16/3/3/2/807/A M2	TBC	
Page 21 Condition 84	84. A lighting engineer must be consulted to assist in the planning and placement of light fixtures in order to reduce visual impacts associated with glare and light trespass.				This condition should be removed.	This condition should be removed as this is being undertaken in consultation with the Civil Aviation Authority (CAA) and the Air Traffic Navigation Service (ATNS) and the specific recommendations of the Visual Specialist included in the final EMPr.
Page 21 Condition 87	87. Potentials interference with public safety communication systems (e.g. radio traffic related to emergency activities) must be avoided.				This condition should be removed.	This amendment is requested as all necessary approvals / confirmations have been received (EMI approvals), furthermore it is a near duplicate of the requirements outlined in Condition 88.
Page 23 Condition 106	106. Anti-erosion measures such as silt fences must be installed in disturbed areas.				This condition should be reworded to state: "Anti-erosion measures such as silt fences must be installed in disturbed areas where needed, and as informed by the Stormwater Management Plan"	This amendment is request to ensure that the condition is more specific and covers the mitigations suggested by the specialist for the actual work to be undertaken on site.
Page 23 Condition 107	107. Dust abatement techniques must be used before and during surface clearing, excavation, or blasting activities.				This condition should be reworded to state: "Dust abatement techniques must be used before and during surface clearing, excavation, or blasting activities, as needed"	This amendment is request to ensure that the condition takes the water scarce nature of the project area into account and is done as needed to ensure compliance with the final EMPr.

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EA FIRST ISSUE 2016	AMENDMENT 2016	AMENDMENT 2018 (CORRECTION)	2022 AMENDMENTS REQUESTED	MOTIVATION FOR AMENDMENT		
EA REF	14/12/16/3/3/2/807	14/12/16/3/3/2/807/ AM1	14/12/16/3/3/2/807/ AM2	14/12/16/3/3/2/807/A M2	TBC	
Page 23 Condition 108	108. Appropriate dust suppression techniques must be implemented on all exposed surfaces during periods of high wind. Such measures may include wet suppression, chemical stabilisation, the use of a wind fence, covering surfaces with straw chippings and re-vegetation of open areas.				This condition should be reworded to state: "Appropriate dust suppression techniques must be implemented, as needed, on all exposed surfaces during periods of high wind. Such measures may include wet suppression, chemical stabilisation, the use of a wind fence, covering surfaces with straw chippings and re-vegetation of open areas."	
Page 23 Condition 111	111. All buffers and no-go areas stipulated in this report must be adhered to for both the facilities and all roads and power lines.				This condition should be reworded to state: "All buffers and no-go areas stipulated in this report must be adhered to for both the facilities and all roads and power lines, except where water crossing infrastructure is permitted in terms of an approved WULA/GA"	This amendment is request to ensure that the condition is more specific and covers the mitigations suggested by the specialist for the actual work to be undertaken on site.
Page 23 Condition 113	113. All construction and maintenance crew and vehicles (except small vehicles which may use existing farm tracks) should be kept out of the buffer zones.				This condition should be removed.	This amendment is requested as the restriction of movement is sufficiently covered in Condition 39 and Condition 111 which requires that construction activities should be restricted to the footprint area and make use of designated access routes. The avoidance of buffer zones is referenced in Condition 111.

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EA REF	14/12/16/3/3/2/807	14/12/16/3/3/2/807/AM1	14/12/16/3/3/2/807/AM2	14/12/16/3/3/2/807/A M2 TBC	
<p>Page 24</p> <p>Condition 116</p>	<p>116. Removal of alien invasive Species or other vegetation and follow-up procedures must be in accordance with the Conservation of Agricultural Resources Act. 1983 (Act 43 of 1983).</p>			<p>This condition should be reworded to state: "Removal of alien invasive Species or other vegetation and follow-up procedures must be in accordance with an approved alien invasive vegetation management plan"</p>	<p>This amendment is request to ensure that the condition is more specific and to align with the Final EMPr.</p>

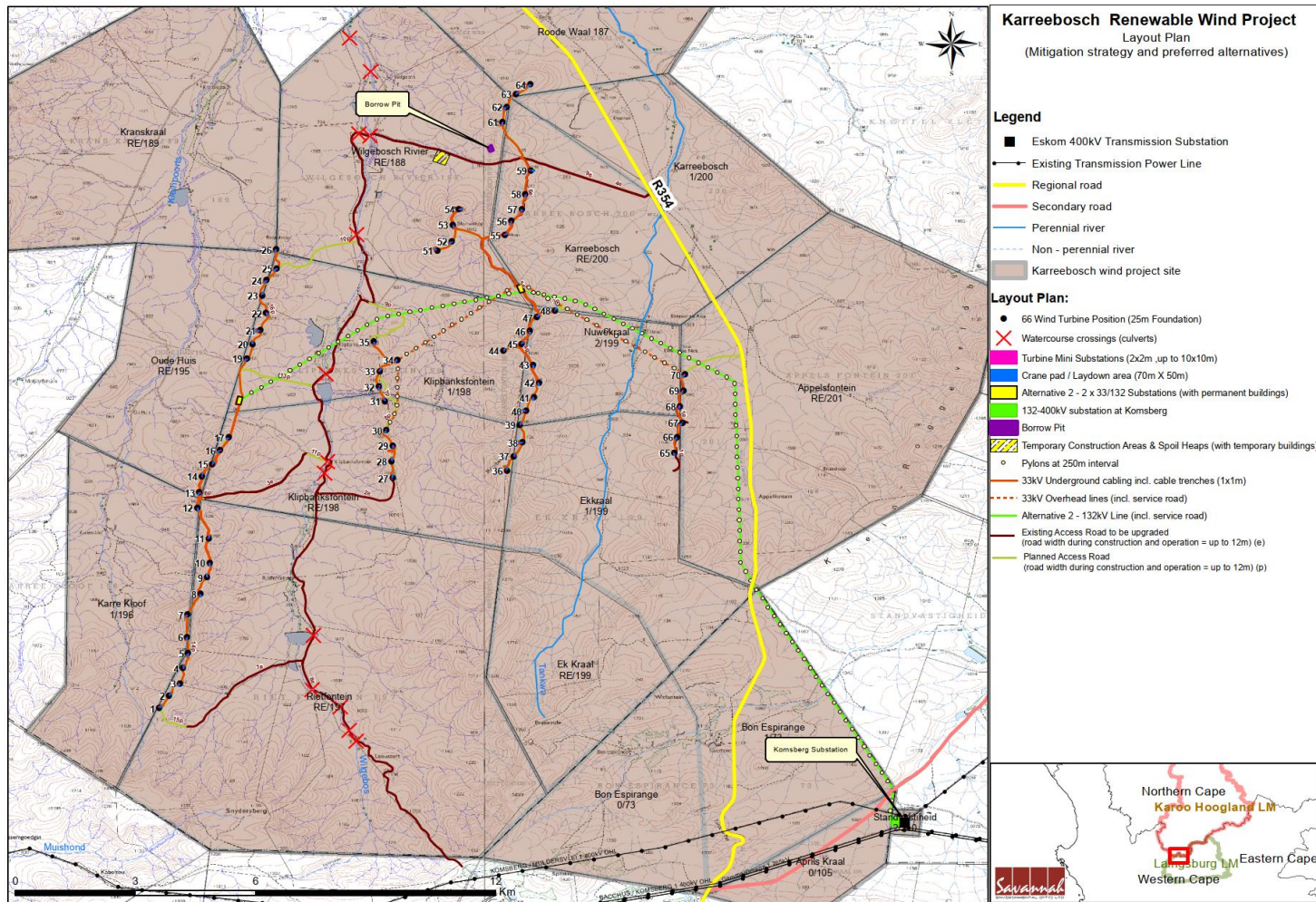


Figure 4-1: Position of the 66 Turbines which formed the Original Layout submitted during the EIA phase(source: Savannah Environmental, 2015)

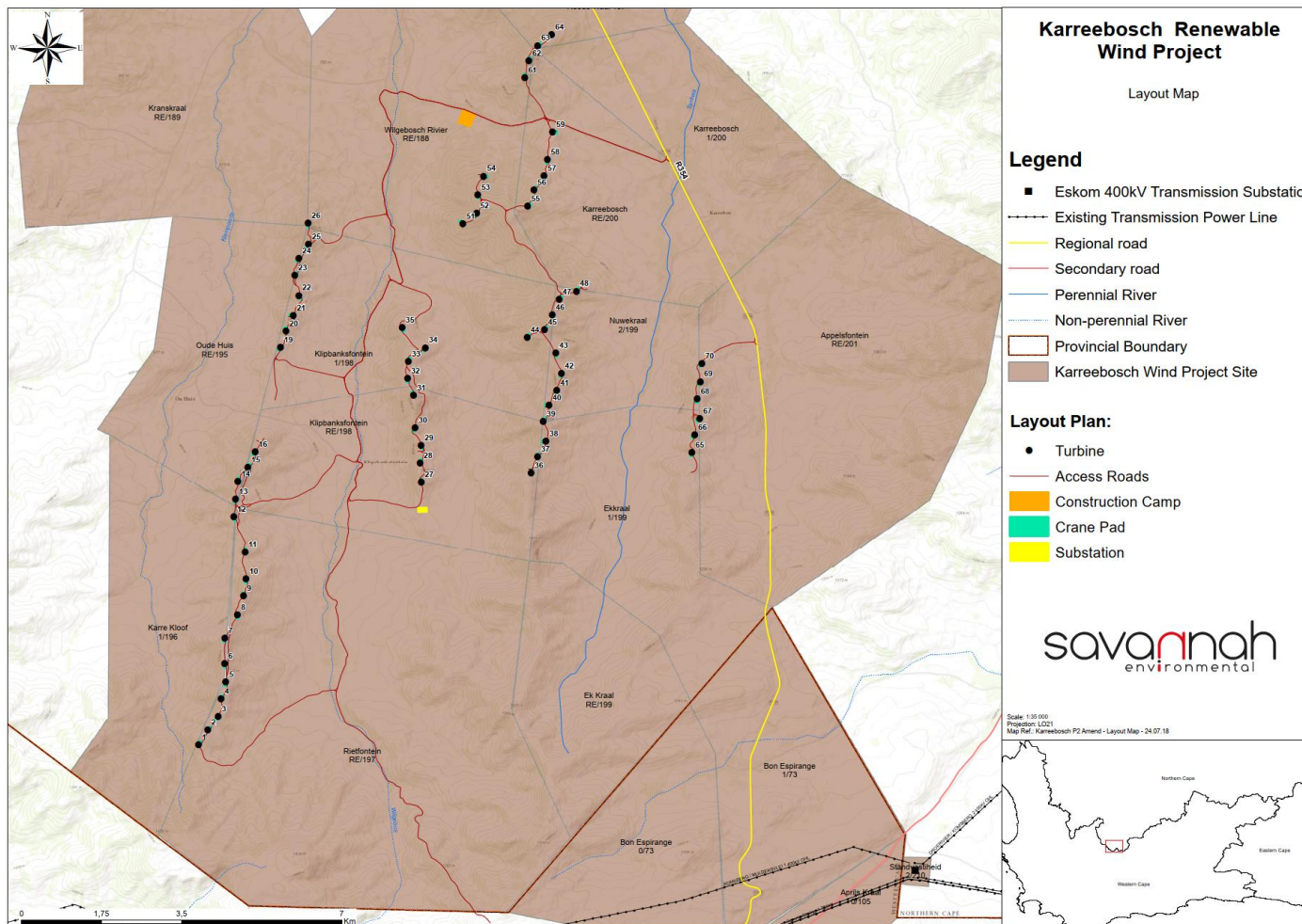


Figure 4-2: Position of the 65 Authorised Turbines (January 2016). Layout relevant to November 2018 EA Amendment (removal of Turbine 17) (source: Savannah Environmental, 2018)

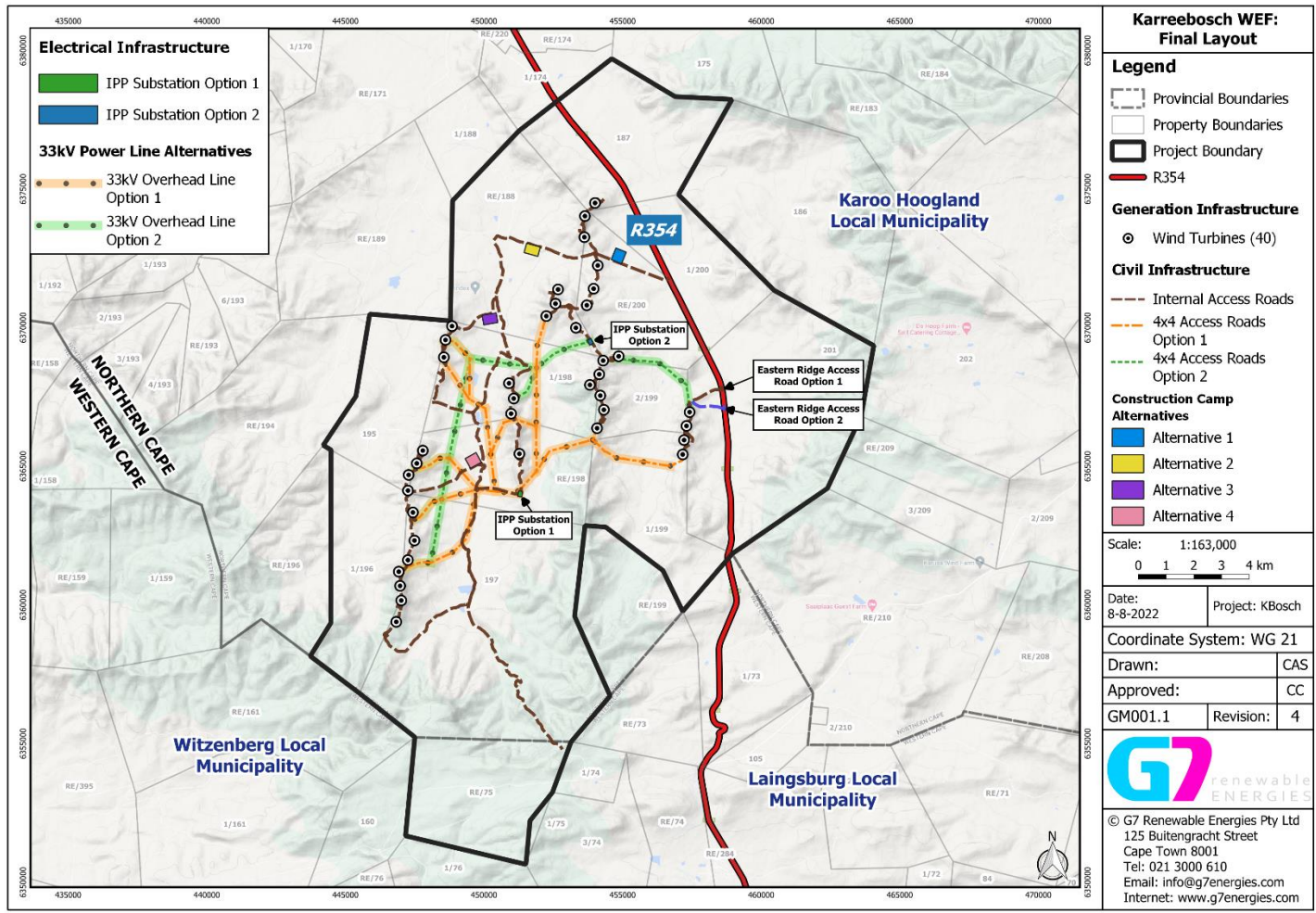


Figure 4-3: Final layout, including the 40 turbine positions for the Karreebosch WEF (Source: G7 Renewable Energies (Pty) Ltd, 2022)

5 IMPACT ASSESSMENT

5.1 IMPACT ASSESSMENT METHODOLOGY

To ensure a direct comparison between various specialist studies, a standard rating scale has been defined and was used to assess and quantify the identified impacts. This is necessary since impacts have a number of parameters that need to be assessed.

Please note that this impact assessment methodology was utilised for the 2015 Savannah Final EIA Report and has been utilised again for this amendment process in instances where the proposed amendment results in a change in the original impacts.

5.1.1 IMPACT TYPES AND DEFINITION

An impact is any change to a resource or receptor brought about by the presence of a project component or by the execution of a project related activity. The evaluation of baseline data provides crucial information for the process of evaluating and describing how the project could affect the bio-physical and socio-economic environment. Impacts are described as summarised in Table 5.1. Impacts are also described as associated, those that will occur, and potential, those that may occur.

Table 5-1: Impact Nature and Type

NATURE OR TYPE	DEFINITION
Positive	An impact that is considered to represent an improvement on the baseline or introduces a positive change.
Negative	An impact that is considered to represent an adverse change from the baseline, or introduces a new undesirable factor.
Direct Impact	Impacts that result from a direct interaction between a planned project activity and the receiving environment/receptors (e.g. between occupation of a site and the pre-existing habitats or between an effluent discharge and receiving water quality).
Indirect Impact	Impacts that result from other activities that are encouraged to happen as a consequence of the Project (e.g. in-migration for employment placing a demand on resources).
Cumulative impact	Impacts that act together with other impacts (including those from concurrent or planned future third party activities) to affect the same resources and/or receptors as the Project.

5.1.2 ASSESSING SIGNIFICANCE

Impacts are described in terms of ‘significance’. Significance is a function of the magnitude of the impact and the likelihood of the impact occurring. Impact magnitude (sometimes termed severity) is a function of the extent, duration and intensity of the impact. The criteria used to determine significance are summarised in **Table 5-2**. Once an assessment is made of the magnitude and likelihood, the impact significance is rated through a matrix process as shown in **Table 5-3** and **Table 5-4**.

Significance of an impact is qualified through a statement of the degree of confidence. Confidence in the prediction is a function of uncertainties, for example, where information is insufficient to assess the impact. Degree of confidence is expressed as low, medium or high.

Table 5-2: Significance Criteria

IMPACT MAGNITUDE

Extent	<p>On-site – impacts that are limited to the boundaries of the development site.</p> <p>Local – impacts that affect an area in a radius of 20km around the development site.</p> <p>Regional – impacts that affect regionally important environmental resources or are experienced at a regional scale as determined by administrative boundaries, habitat type/ecosystem.</p> <p>National – impacts that affect nationally important environmental resources or affect an area that is nationally important/ or have macro-economic consequences.</p>
Duration	<p>Temporary – impacts are predicted to be of short duration and intermittent/occasional.</p> <p>Short-term – impacts that are predicted to last only for the duration of the construction period.</p> <p>Long-term – impacts that will continue for the life of the Project, but ceases when the project stops operating.</p> <p>Permanent – impacts that cause a permanent change in the affected receptor or resource (e.g. removal or destruction of ecological habitat) that endures substantially beyond the project lifetime.</p>
Intensity	<p>BIOPHYSICAL ENVIRONMENT: <i>Intensity can be considered in terms of the sensitivity of the biodiversity receptor (i.e. habitats, species or communities).</i></p> <p>Negligible – the impact on the environment is not detectable.</p> <p>Low – the impact affects the environment in such a way that natural functions and processes are not affected.</p> <p>Medium – where the affected environment is altered but natural functions and processes continue, albeit in a modified way.</p> <p>High – where natural functions or processes are altered to the extent that it will temporarily or permanently cease.</p> <p><i>Where appropriate, national and/or international standards are to be used as a measure of the impact.</i> Specialist studies should attempt to quantify the magnitude of impacts and outline the rationale used.</p> <hr/> <p>SOCIO-ECONOMIC ENVIRONMENT: <i>Intensity can be considered in terms of the ability of project affected people/communities to adapt to changes brought about by the Project.</i></p> <p>Negligible – there is no perceptible change to people’s livelihood</p> <p>Low – People/communities are able to adapt with relative ease and maintain pre-impact livelihoods.</p> <p>Medium – Able to adapt with some difficulty and maintain pre-impact livelihoods but only with a degree of support.</p> <p>High – Those affected will not be able to adapt to changes and continue to maintain-pre impact livelihoods.</p>
Likelihood - the likelihood that an impact will occur	
Unlikely	The impact is unlikely to occur.
Likely	The impact is likely to occur under most conditions.

Definite	The impact will occur.
Reversibility - the degree to which the impact and risk can be reversed (High, Medium or Low or None)	
Irreplaceable Loss - the degree to which the impact and risk may cause irreplaceable loss of resources	

Once a rating is determined for magnitude and likelihood, the following matrix can be used to determine the impact significance.

Table 5-3: Significance Rating Matrix

SIGNIFICANCE		LIKELIHOOD		
		Unlikely	Likely	Definite
MAGNITUDE	Negligible	Negligible	Negligible	Minor
	Low	Negligible	Minor	Minor
	Medium	Minor	Moderate	Moderate
	High	Moderate	Major	Major

Table 5-4: Significance Definitions

SIGNIFICANCE DEFINITIONS

Negligible significance	An impact of negligible significance (or an insignificant impact) is where a resource or receptor (including people) will not be affected in any way by a particular activity, or the predicted effect is deemed to be 'negligible' or 'imperceptible' or is indistinguishable from natural background variations.
Minor significance	An impact of minor significance is one where an effect will be experienced, but the impact magnitude is sufficiently small (with and without mitigation) and well within accepted standards, and/or the receptor is of low sensitivity/value.
Moderate significance	An impact of moderate significance is one within accepted limits and standards. The emphasis for moderate impacts is on demonstrating that the impact has been reduced to a level that is as low as reasonably practicable (ALARP). This does not necessarily mean that 'moderate' impacts have to be reduced to 'minor' impacts, but that moderate impacts are being managed effectively and efficiently.
Major significance	An impact of major significance is one where an accepted limit or standard may be exceeded, or large magnitude impacts occur to highly valued/sensitive resource/receptors. A goal of the EIA process is to get to a position where the Project does not have any major residual impacts, certainly not ones that would endure into the long term or extend over a large area. However, for some aspects there may be major residual impacts after all practicable mitigation options have been exhausted (i.e. ALARP has been applied). An example might be the visual impact of a development. It is then the function of regulators and stakeholders to weigh such negative factors against the positive factors such as employment, in coming to a decision on the Project.

Once the significance of the impact has been determined, it is important to qualify the degree of confidence in the assessment. Confidence in the prediction is associated with any uncertainties, for example, where information is insufficient to assess the impact. Degree of confidence can be expressed as low, medium or high.

5.1.3 MITIGATION MEASURES AND RESIDUAL IMPACTS

For activities with significant impacts, the EIA process is required to identify suitable and practical mitigation measures that can be implemented. The implementation of the mitigations is ensured through compliance with the EMP. After first assigning significance in the absence of mitigation, each impact is re-evaluated assuming the appropriate mitigation measure/s is/are effectively applied, and this results in a significance rating for the residual impact.

5.1.4 IDENTIFICATION OF MITIGATION MEASURES

For the identified significant impacts, the project team with the input of the client has identified suitable and practical mitigation measures that are implementable. Mitigation that can be incorporated into the project design in order to avoid or reduce the negative impacts or enhance the positive impacts have been defined and require final agreement with the client as these are likely to form the basis for the conditions of authorisation by DEA.

5.2 2015 IMPACT SUMMARY⁴

The following Independent Specialist Studies were undertaken during the original 2015 S&EIA process for the establishment of the 140MW Karreebosch WEF located within the Karoo Hoogland, Witzenberg and Laingsburg Local Municipalities in the Northern and Western Cape Provinces, which was originally authorised on 29 January 2016:

- Heritage, Archaeological and Palaeontological Impact Assessment
- Agriculture and Soils Impact Assessment
- Hydrological Impact Assessment
- Avifaunal Impact Assessment
- Bat Impact Assessment
- Ecological Impact Assessment
- Noise Impact Assessment
- Social Impact Assessment
- Visual Assessment

Error! Reference source not found. to **Table 5-7** provide a summary of the impacts identified during the 2015 S&EIA undertaken for the original authorised 65 Turbine WEF.

Table 5-5: 2015 Impact Assessment Summary (Planning and Construction Phase)⁵

Environmental Aspect	Impact	Pre-Mitigation Significance	Residual Impact Significance
Flora and Fauna	Impacts on vegetation and listed or protected plant species	MAJOR (-)	MODERATE (-)
	Faunal impacts – construction disturbance	MODERATE (-)	MODERATE (-)
	Soil erosion risk during construction	MAJOR (-)	MINOR (-)

⁴ The full 2015 specialist reports can be made available on request.

⁵ Table 10.1 pg 291 Savannah Environmental, 2015 EIR

Environmental Aspect	Impact	Pre-Mitigation Significance	Residual Impact Significance
Birds	Habitat loss	MINOR (-)	MINOR (-)
	Disturbance	MINOR (-)	MINOR (-)
Bats	Destruction of bat roosts due to earthworks and blasting	MODERATE (-)	NEGLIGIBLE
	Artificial lighting	MINOR (-)	NEGLIGIBLE
	Loss of foraging habitat	MODERATE (-)	MINOR (-)
Soils and Agriculture	Erosion	MODERATE (-)	MINOR (-)
	Dust generation	MODERATE (-)	MINOR (-)
	Powerline construction	MODERATE (-)	MINOR (-)
Hydrology	Impact on localised surface water quality	MODERATE (-)	MINOR (-)
	Impact on riparian systems through the possible increase in surface water runoff from hard surfaces and/or roads on riparian form and function	MODERATE (-)	MINOR (-)
	Loss of riparian systems and watercourses	MODERATE (-)	MINOR (-)
Visual	Potential visual impact of construction activities on visual receptors in close proximity to the proposed facility	MODERATE (-)	MINOR (-)
Heritage	Disturbance or damage to palaeontological resource	MINOR (-)	MINOR (+)
	Physical destruction of archaeological material	MINOR (-)	NEGLIGIBLE
	Physical destruction of buildings, unauthorised demolition, theft of fabric and fixtures or neglect	MINOR (-)	MINOR (+)
Social	Employment and business creation opportunities during the construction phase	MINOR (+)	MODERATE (+)
	Benefit of technical advice for local farmers and municipalities	NEGLIGIBLE	MINOR (+)
	Impact of construction workers	MINOR (-) for communities	MINOR (-) for communities
	Influx of job seekers	MINOR (-)	MINOR (-)

Environmental Aspect	Impact	Pre-Mitigation Significance	Residual Impact Significance
	Risk to safety, livestock and damage to farm infrastructure	MODERATE (-)	MINOR (-)
	Increased risk of veld fires	MODERATE (-)	MINOR (-)
	Impact of construction vehicles on roads	MODERATE (-)	MINOR (-)
	Loss of agricultural land	MODERATE (-)	MINOR (-)

Table 5-6: 2015 Impact Assessment Summary (Operational Phase)⁶

Environmental Aspect	Impact	Pre-Mitigation Significance	Residual Impact Significance
Flora and Fauna	Impact on flora and fauna	MODERATE (-)	MINOR (-)
	Erosion	MAJOR (-)	MINOR (-)
	Alien plant invasion	MODERATE (-)	MINOR (-)
Birds	Displacement and disturbance	MINOR (-)	MINOR (-)
	Mortality through collision with powerlines	MINOR - MODERATE (-)	MINOR (-)
	Mortality through collision with turbines	MINOR (-)	MINOR (-)
Bats	Mortality due to collision of bats with turbines or barotrauma	MAJOR (-)	MINOR (-)
Soils and Agriculture	Loss of high potential agricultural land	MINOR (-)	NEGLIGIBLE
Hydrology	Increase in sedimentation and erosion within the development footprint	MODERATE (-)	MINOR (-)
	Impact on localised surface water quality	MODERATE (-)	MINOR (-)
	Impact on riparian systems through the possible increase in surface water runoff from hard surfaces and/or roads on riparian form and function	MODERATE (-)	MINOR (-)
	Loss of riparian systems and watercourses	MODERATE (-)	MINOR (-)
Visual	Visual impact on observers traveling along arterial and secondary roads in close proximity to the proposed facility	MAJOR (-)	MAJOR (-)

⁶ Table 10.2 pg 292, Savannah Environmental, 2015 EIR

Environmental Aspect	Impact	Pre-Mitigation Significance	Residual Impact Significance
	Visual impact on observers residing in close proximity to the proposed facility	MODERATE - MAJOR (-)	MODERATE (-)
	Visual impact on sensitive visual receptors within the region	MODERATE (-)	MODERATE (-)
	Visual impact of ancillary infrastructure	MODERATE (-)	MODERATE (-)
	Visual impact of overhead powerline and substation	MODERATE (-)	MODERATE (-)
	Visual impact of shadow flicker	NEGLIGIBLE	NEGLIGIBLE
	Visual impact of lighting	MODERATE (-)	MINOR (-)
	Visual impact of the wind energy facility on visual character	MINOR - MODERATE (-)	MINOR - MODERATE (-)
	Visual impact of night-lighting on SALT	NEGLIGIBLE	NEGLIGIBLE
Noise	Wind turbine noise during operation (beyond the boundary)	NEGLIGIBLE	NEGLIGIBLE⁷
	Wind turbine noise during operation (within the site)	NEGLIGIBLE	NEGLIGIBLE⁸
Heritage	Cultural heritage visual or sense of place	MAJOR (-)	MAJOR (-)
Social	Employment and business creation opportunities	MINOR (+)	MINOR (+)
	Community trust benefits	MODERATE (+)	MAJOR (+)
	Promotion of clean renewable energy	MINOR (-)	MINOR (+)
	Sense of place impacts	MODERATE (-)	MODERATE (-)
	Impact on tourism	MINOR (+ and -)	MINOR (+ and -)

Table 5-7: 2015 Impact Assessment Summary (Decommissioning Phase)⁹

Environmental Aspect	Impact	Pre-Mitigation Significance	Residual Impact Significance
Flora and Fauna	Inadequate rehabilitation following decommissioning	MODERATE (-)	MINOR (-)

⁷ While the recorded noise levels comply with the NNR legal requirements and thus require no mitigation, the NIA found that turbine noise would probably be distinctly audible both outside and within the dwellings.

⁸ While the recorded noise levels comply with the NNR legal requirements and thus require no mitigation, the NIA found that turbine noise would probably be distinctly audible both outside and within the dwellings.

⁹ Table 10.2 pg 294, Savannah Environmental, 2015 EIR

Environmental Aspect	Impact	Pre-Mitigation Significance	Residual Impact Significance
Birds	Habitat Loss	MINOR (-)	MINOR (-)
	Disturbance	MINOR (-)	MINOR (-)
Bats	Artificial Lighting	MINOR (-)	NEGLIGIBLE
	Loss of bat foraging habitat	MINOR (-)	NEGLIGIBLE
Soils and Agriculture	Erosion	MODERATE (-)	MINOR (-)
Hydrology	Impact on localised surface water quality	MODERATE (-)	MINOR (-)
Visual	Potential visual impact of decommissioning activities on visual receptors in close proximity to the proposed WEF	MODERATE (-)	MINOR (-)
Heritage	Disturbance or damage to archaeological resources	MINOR (-)	NEGLIGIBLE
	Disturbance or damage to built environment	MINOR (-)	MINOR (-)
	Disturbance or damage to cultural landscape	MAJOR (-)	MAJOR (-)
Social	Social impacts associated with decommissioning	MINOR (-)	NEGLIGIBLE

5.3 2018 AMENDMENT SUMMARY

In 2018, the above-mentioned Specialists were consulted again as part of the previous amendment process in order to ascertain if the proposed amendments to the WEF would result in additional impacts on the site and its surroundings.

The Specialists all provided statements/revisions advising that the proposed changes will not affect/change the impacts already identified in the already authorised 2015 EIR Report, therefore no additional assessments were required to supplement the Amendment Report at that time.

Based on the specialist findings, it was concluded that the proposed amendments to the turbine and wind measuring mast specifications were not expected to result in an increase to the significance ratings for any of the identified impacts.

Only in the case of the bat specialist assessment, was there a potential decrease in potential risk levels. However, these variances were found not to influence the risk levels enough to change the significance in ratings in the original impact assessment. Therefore, there was not a change to the qualitative category (i.e. Low, Medium, High) in the original significance ratings. This held true for all specialist assessments in that there were no changes to the qualitative category (i.e. Low, Medium, High) in the original significance ratings with respect to the bats, avifaunal, visual and noise assessments.

No new mitigation measures were to be included in the 2018 updated EMPr. Given the above, the following amendments were requested and approved (EA Ref: 14/12/16/3/3/2/807/AM2):

- An increase in each wind turbine generation capacity from 2MW to 3.3MW, to a range between 2MW up to and including 5.5MW for each wind turbine;
- An increase of the rotor diameter for each wind turbine from 140m, to a range up to and including 160m;
- An increase of the hub height for each wind turbine from 100m, to a range up to and including 125m;
- An increase in blade length from 70m to be dependent on the final rotor diameter, maximum length to be up to 80m; and
- An increase in height of the wind measuring masts from 100m to up to 125m.

5.4 2015 AND 2018 CUMULATIVE IMPACTS

During the 2015 EIA and 2018 Amendment processes, all specialists assessed the cumulative impacts that would result from the existing projects within a 30km - 50km radius of the site. The following projects were taken into account during the 2015 and 2018 assessments:

- Konstabel Solar Project;
- Roggeveld Wind Project;
- Perdekraal Wind Project;
- Witberg Wind Project;
- Sutherland Wind and Solar Project;
- Suurplaat Wind Project;
- Hidden Valley Wind Project (Karusa and Soetwater wind farms);
- Gunstfontein Wind Project; and
- Lainsburg Solar Energy Project.

Table 5-8 provides a summary of the cumulative impacts identified during the 2015 EIA undertaken for the original 65 Turbine WEF. During the 2018 Amendment process, it was noted that the cumulative impacts would remain unchanged for all studies.

Table 5-8: 2015 Cumulative Impact Assessment Summary ¹⁰

SPECIALIST REPORT	CUMULATIVE IMPACT SIGNIFICANT (PRE-MITIGATION)	CUMULATIVE IMPACT SIGNIFICANT (POST-MITIGATION)
Fauna: Ecology	MODERATE – MAJOR (-VE)	MODERATE-MINOR
Avifauna	MINOR	MINOR
Bats	MAJOR	MINOR
Visual	MODERATE	MODERATE
Agriculture and soils	MINOR	NEGLIGIBLE
Hydrology	MINOR	MINOR
Heritage	MODERATE	LOW

¹⁰ Table 9.2 pg285, Savannah Environmental, 2015 EIAR,

Socio-Economic	MAJOR (+VE) AND MAJOR (-VE)	MAJOR (+VE) AND	MODERATE (-VE)
Noise	MAJOR		NEGLIGIBLE

5.5 2022 SPECIALIST STUDIES

The specialists outlined in **Table 5-9** were appointed to undertake the necessary specialist reporting to determine and assess the potential impacts associated with the proposed amendments. Each of the specialists has reviewed the previous studies (2015 and 2018) and the proposed amendments to the projects and has provided a specialist statement as to whether the proposed amendment will change the impacts identified in the previous studies as well as to whether any additional mitigation measures will be required. The Specialist Declarations for the specialists are included in **Appendix C**. A summary of the findings of the 2022 statements are provided below in section 5.6 below.

Table 5-9: Specialists appointed to determine and assess the potential impacts

NR	ENVIRONMENTAL ASPECT	ASSESSED BY
1	Agricultural and Soil Specialist	Johan Lanz
2	Terrestrial Ecology & Biodiversity	Trusted Partners, Malcome Logie
3	Aquatic Specialist	Freshwater Ecologist Network (FEN) Consulting (Pty) Ltd, Christel du Preez and Stephan van Staden
4	Avifaunal Specialist	Birds and Bats Unlimited, Dr Rob Simmons
5	Bat Specialist	Animalia Consultants, Werner Marais
6	Heritage Specialist	CTS Heritage, Nicholas Wiltshire and Jenna Lavin
7	Noise Specialist	SafeTech, Dr Brett Williams
8	Social Specialist	Mr Tony Barbour
9	Traffic Specialist	JG Afrika, Avheani Ramawa
10	Visual Specialist	SLR Consulting, Kerry Schwartz
11	Geotechnical Specialist	JG Afrika, Keval Singh

5.6 2022 SPECIALIST FINDINGS

5.6.1 AGRICULTURE, SOIL AND LAND USE CAPACITY

Mr Jaco Jansen, a soil scientist from Savannah Environmental, undertook the 2015 agricultural assessment. No agricultural review was undertaken for the 2018 amendment application as the change in rotor diameter, hub height and the increase in generation capacity for each wind turbine were not expected to have an effect on the findings of the 2015 Assessment.

Subsequently, Johann Lanz was appointed in 2022 to review the previous study and consider the effect of the proposed amendments on the previous impacts with reference to the proposed changes and the final layout. The outcome of the assessment is outlined in a 2022 Specialist Statement included in **Appendix D**.

The specialist has noted the following in his Specialist Statement:

- There are no agricultural impacts related to the proposed amendment. It will not change the nature or significance of any of the agricultural impacts assessed in the original study. There are no agricultural advantages or disadvantages related to the amendment.
- No changes or additions to the mitigation measures for agricultural impacts that were recommended in the original assessment are required, and there are therefore no required changes to the EMPr.
- The agricultural impact of the amended project will therefore be identical to the impact that was assessed in the original specialist assessment report.

The agricultural impact ratings as reported above remain relevant without any change as long as mitigation measures as detailed and required in the EMPr (**Appendix Q**) are implemented. Given the above outcome, this Karreebosch Amendment is supported in terms of agricultural impacts.

5.6.2 BIODIVERSITY

Mr Simon Todd, an ecology specialist from 3Foxes Biodiversity Solutions, undertook the 2015 ecological assessment. No ecological review was undertaken for the 2018 amendment application as the change in rotor diameter, hub height and the increase in generation capacity for each wind turbine were not expected to have an effect on the findings of the 2015 Assessment.

Subsequently, Trusted Partners was appointed to review the previous studies and consider the effect of the proposed amendments on the previous impacts with reference to the final layout. The outcome of the assessment is outlined in the 2022 Specialist Statements included in **Appendix E, Appendix F and Appendix G**.

The ecologist made the following statements:

- Change to WTG Technology and Capacity:
The proposed technology changes will not have any additional impact on terrestrial biodiversity and ecological functionality than that previously identified in the original specialist reports and those identified by other specialists. A reduction in WTG number and the concomitant lesser ancillary infrastructure required, will lessen the overall impact of the KB-WEF on terrestrial biodiversity and ecological functioning.
- Change to Supporting Road Infrastructure:
The proposed alignment of internal KB-WEF roads and substitutions have been assessed within a 200 metre corridor/buffer. This has been done to facilitate necessary vertical and horizontal alignment required to facilitate safe vehicle movement on the internal roads and placement of the substations. Prior to construction of any road and substations, the final route and sites must be surveyed and demarcated with survey pegs, and a plant search and rescue (S&R) exercise implemented in accordance with necessary permits from the provincial authorities. Throughout the road network, attention should be given to effective management of stormwater as detailed in the Stormwater Management Plan, so as to prevent erosion. A detailed list of SCC has been identified which should be the focus for S&R efforts prior to construction commencing.

Development of internal roads and substations within the 200 metre corridors/buffers will not have any additional impact to the terrestrial biodiversity and ecological functionality that was not previously assessed or mitigation measures identified.

– Changes to Laydown Area Options:

Four laydown sites have been assessed. Laydown area Alternative 2 being the preferred area as development here will result in the lowest impact to terrestrial biodiversity and ecological functionality. This site also has few, if any, *Sensitive Species 142*.

– Removal of requirement for Non-Grazing plan as required by Condition 19.2 and 37 of the EA:

This recommendation was included in the 2016 EA after the initial assessment undertaken by Todd (2014) and suggested the establishment of a 1,300h exclusion area (restricting sheep grazing) and to maintain the area for a period of 20 years.

This recommendation was reviewed by two independent specialists (Balfour and Logie (Trusted Partners), 2022) and was found to be poorly justified and an impractical intervention for promoting conservation of biodiversity in response to perceived agricultural and grazing practices in the area (which found no indication of over-grazing, but presented under stocking) which also have no connection to the development of the WEF itself. Logie (2022) concludes that the recommendation by Todd (2014) has been founded on weak scientific evidence, if any at all, causing the non-grazing plan to be a fatally flawed mitigation strategy and ecological management philosophy. As such, it is the considered opinion of Logie (2022) that there are exceptionally strong grounds for the removal of the non-grazing plan requirement (as per conditions 19.2 and 37 of the EA - 14/12/16/3/3/2/807) from the EA in totality.

Balfour (2022) concludes that the recommendation to establish a 1,300h sheep fenced exclusion area and to maintain it for 20 years is a weakly justified and impractical intervention and that it should be removed from the Environmental Authorisation. The recommendation is based on weak evidence and scientific logic. As such it the opinion of the specialist that the requirement for a non-grazing plan should not form part of the EA (14/12/16/3/3/2/807) and that the following conditions (19.2 and 37) should be removed from said Environmental Authorisation in their totality.

These specialist opinions are included in **Appendix F** and **Appendix G**.

The biodiversity impact ratings as reported above remain relevant without any change as long as mitigation measures as detailed and required in the EMPr (**Appendix Q**) are implemented. It is therefore recommended that in terms of terrestrial biodiversity and ecological functionality, the amendment to change the WTG technology/infrastructure be approved. Given the above outcome, this Karreebosch Amendment is supported in terms of terrestrial ecology impacts. Mitigation measures recommended by the biodiversity specialist are detailed in Section 6.2 below.

5.6.3 AVIFAUNA

Dr. Anthony Williams, an avifauna specialist from African Insights, undertook the 2015 and 2018 avifauna assessments. In addition, Dr Rob Simmons and Marlei Martins of Birds and Bats Unlimited also provided additional specialist input into the 2015 assessment.

Subsequently, Birds and Bats Unlimited were appointed to review the previous studies and consider the effect of the proposed amendments on the previous impacts with reference to the final layout. The outcome of the assessment is outlined in a 2022 Specialist Statement included in **Appendix H**.

The anticipated impacts in relation to fatalities arising from increased turbine dimensions were assessed.

The general effects of increased turbine heights and blades (rotors) on avian collision-risk was assessed by Loss et al (2013), who re-analysed all data from turbines without the lattice towers (that have been discontinued) and found:

- A significant effect of hub height on the number of avian mortalities for 53 wind farm sites in the USA (Blade length could not be independently assessed because of statistical collinearity with hub height);
- In a model that included region and hub height, avian fatalities increased from about 2.0 birds/turbine/year at 40-m hub heights to 6.2 birds/turbine/year at 80-m hub height;
- This represents a ~3-fold increase in mortalities between 40-m and 80-m hub height.

Thaxter et al. (2017) undertaking a world-wide assessment of traits that influence wind farm fatalities found:

- more fatalities of birds (and bats) were associated with taller turbines world-wide.
- The highest fatality rates were found with more small turbines (rather than a few large turbines) to produce the same overall power output.
- This would depend on the capacity of each turbine (they modelled up to a power capacity of 2.5 MW per turbine). BBU carried out this exercise below based on turbine size and number.
- In total, 57 bird species (including 31 *Accipitriformes* – birds of prey) of 362 sampled were identified as threatened by ‘renewable energy’.

BBU combined the data from Loss et al. (2013) with that from 7 wind farms in South Africa with fatalities in relation to hub height provided in Ralston-Paton et al. (2017). The results of the modelling of fatalities in relation to hub heights (**Figure 5-2**) indicate that avian fatalities are expected to increase exponentially 1.5-fold from an average 18 fatalities/turbine (95% Confidence Intervals 11 to 35) at 125m hub height to 28 (CL 12 to 65) fatalities/turbine/year as at 140-m.

These figures indicate a 55% increase in fatalities is expected on average ($[(28-18)/18]$) per turbine. However, at the same time, the number of turbines will decrease from the authorised 65 to a maximum of 40 – a 38% reduction.

Table 5-10 outlines how this then offsets the expected increase in avian fatalities. The forecast of total avian fatalities is 1170 birds for the 65 shorter (125-m HH) turbines, but 1120 birds for the 40 taller (140-m HH), turbines. This is 4% decrease in avian fatalities over the larger number of shorter turbines. Confidence intervals are shown in **Figure 5-1** and indicate that the South African data (red circles) fall within the confidence limits of the USA data. Thus, the reduction in the number of turbines reduces the overall impact and likelihood of bird fatalities in this area and from an avifaunal perspective this change is not seen as a negative but overall positive.

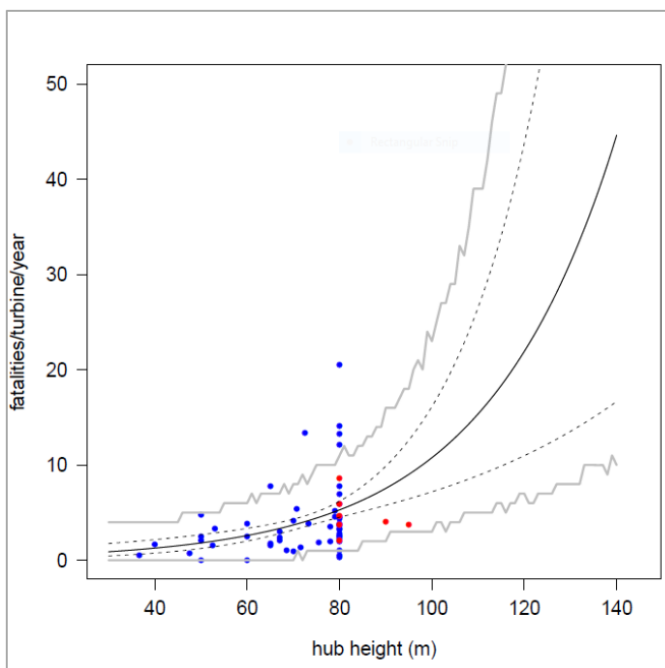


Figure 5-1: Modelled data of avian fatalities from the USA (Loss et al. 2013) in relation to that from South Africa (Ralston-Paton et al. 2017 = red dots) and their relationship with hub height. 95% confidence limits are shown as dotted lines. The combined data and 95% confidence limits predict that on average birds will be killed per year by 130-m-high turbines. This is about twice the number of birds predicted to be killed by 100-m-high turbines. This predicted 2.3-fold increase is critical in forecasting the number of birds killed by the proposed number of turbines. Jagged lines indicate simulations testing whether the SA data fall within confidence limits of the USA data

The presence of eight Priority including four Red Data bird species in the Karreebosch WEF area (particularly the breeding Verreux's Eagles) requires careful siting of the 40 proposed turbines.

The May 2021 monitoring revealed that:

- Passage Rates of the Priority birds in 2021 (at 0.20 birds/hour) were five-fold higher than in 2013/14 (0.04 birds/hour);
- Passage Rates for the Vulnerable Verreux's Eagles in 2021 (0.20 eagles/hour) were 6-fold higher than Passage Rates recorded in 2013/14 (0.03 eagles/hour: African Insights 2016);
- Modelling of fatalities of increased hub height (125m to up to 140 m) but decreased number of turbines (65 to 40) predicts that the number of possible fatalities will decrease over the authorised number of turbines;

All other changes to roads, tracks, location of the construction camp and substation alternatives and fences will have no foreseeable impact on birds in the Karreebosch environment.

The overall appraisal is that the proposed amendments, will thus not alter the previous avifauna impacts as long as mitigation measures as detailed and required in the EMPr (**Appendix Q**) are implemented. Given the above outcome, the Karreebosch Amendment is supported in terms of avifauna impacts. Mitigation measures recommended by the avifaunal specialist are detailed in Section 6.3 below.

5.6.4 BATS

Mr Werner Marais, a bat specialist from Animalia, undertook the 2015 and 2018 bat assessment.

Subsequently, the specialist has been appointed to review the previous studies and consider the effect of the proposed amendments on the previous impacts with reference to the final layout. The outcome of the assessment is outlined in a 2022 Specialist Statement included in **Appendix I**.

According to the passive bat activity data collected on site during the preconstruction study, bat activity at 50m height was significantly less than activity at a lower height of 10m. The proposed amendment will increase the minimum rotor swept height from 45m above ground to 55m above ground. This increase in the lowest rotor swept height can have a positive influence in lowering the probability of bats being impacted. However, it is not significant enough to influence the assessments of the impacts as identified in the EIA phase bat assessment report. Therefore, the impact assessments remain unchanged. Turbines are allowed inside moderate bat sensitivities and their buffers.

The proposed turbine layout respects the bat sensitivity map, it also respects the current guideline criteria which requires turbine blade length to be outside the high sensitivity buffers, except for Turbine 17.

Turbine 17 has been identified to have a proposed foundation position of 250m from a high bat sensitivity (**Figure 5-3**), which means that a blade overhang of 35m will be present if a minimum high sensitivity buffer of 200m is considered. However, when applying the spatial formula described in Section 3, and considering an elevation difference of 20m between the turbine base point and the high bat sensitivity, this turbine base point must be at least 235.8m from the high bat sensitivity (on a two-dimensional map plane) to allow for the blade tip to be 200m from the high bat sensitivity. Currently the turbine base point is 250m from the sensitivity, and therefore no further amendment is required to the location of Turbine 17 and it is considered acceptable.

The overall appraisal is that the proposed amendments, will thus not alter the previous bat impacts as long as mitigation measures as detailed and required in the EMPr (**Appendix Q**) are implemented. Given the above outcome, the Karreebosch Amendment is supported in terms of bat impacts. Mitigation measures recommended by the bat specialist are detailed in Section 6.4 below.

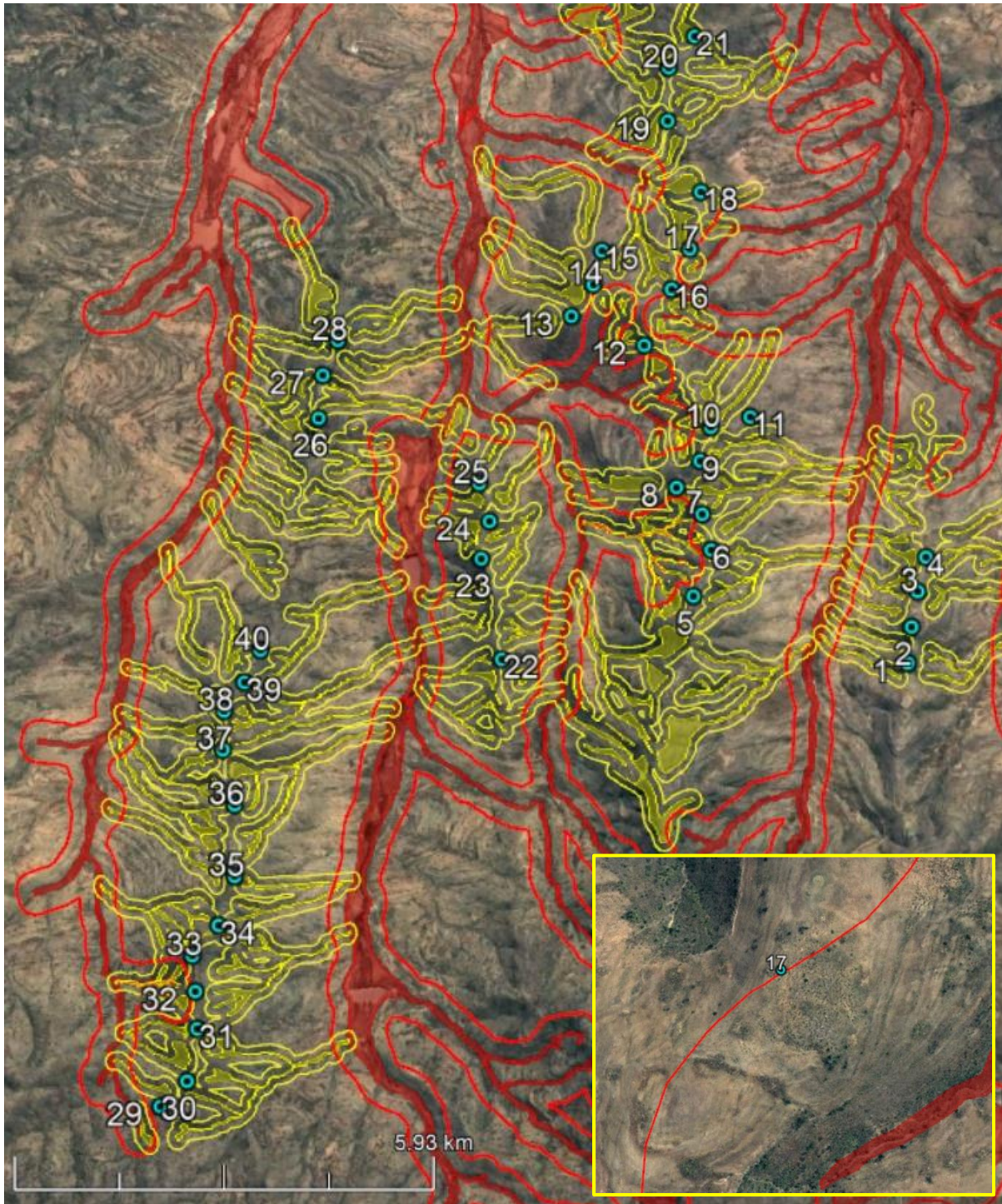


Figure 5-3: Bat sensitivity map in relation to the proposed turbine layout. Shaded red = high bat sensitivity; Red line = 250m High bat sensitivity buffer; Shaded yellow = Moderate bat sensitivity; Yellow line = moderate bat sensitivity buffer (Insert – close up of Turbine 17) (Animalia, 2022).

5.6.5 SURFACE WATER AND WETLAND

Dr Brian Colloty, an aquatic ecology specialist from Environmental and Scientific Assessment Services, undertook the 2015 aquatic assessment. No aquatic review was undertaken for the 2018 amendment application

as the change in rotor diameter, hub height and the increase in generation capacity for each wind turbine were not expected to have an effect on the findings of the 2015 Assessment.

Subsequently, FEN Consulting (Pty) Ltd has been appointed to review the previous studies and consider the effect of the proposed amendments on the previous impacts with reference to the final layout. The outcome of the assessment is outlined in a 2022 Specialist Statement included in **Appendix J**.

During the site visit undertaken in May 2021, several headwater episodic drainage lines (EDLs) without riparian vegetation which flow into larger ephemeral tributaries and rivers in the valley bottom position with riparian vegetation were identified. These watercourses form part of the Roggeveld, Kleinpoorts, Tankwa and Wilgebos River systems.

With the exception of watercourse road crossings, all other infrastructures (turbines and crane pads, substations, construction camps) are located outside the delineated extent of the watercourses. Due to the ecological sensitivity and importance of the watercourses, the upgrading of access roads directly adjacent to watercourses and the upgrading and development of watercourse crossings by means of installing formal through flow structure poses a Moderate risk significance to the watercourses, with the application of the recommended mitigation measures.

The proposed 33kV collector overhead powerlines will also traverse several watercourses; however, the powerline support structures will be constructed outside the delineated extent of the watercourses and as far as feasible, at least 32 m from the delineated extent of the watercourses. Should the recommended mitigation measures be implemented with specific mention of ensuring proper stormwater management practices during the construction and operational phases, the remainder of the infrastructure associated with the Karreebosch WEF including the 33kV Collector overhead powerlines and cables, turbines, crane pads, Construction Camp Options 1 to 4; and Substation Options 1 and 2 pose a Low risk significance.

However, preference is given to Substation Option 1 and thus the associated 33kV collector overhead powerlines and cables (Option 1) and internal 4x4 access roads associated with it, and the proposed Construction Camp Options 1, 2 and 4, as these were determined to pose the least negative impacts where direct and indirect negative impacts can be reduced to an acceptable level and managed.

Despite direct negative impacts expected from the proposed development, with implementation and strict enforcement of cogent, well-developed mitigation measures as outlined in the surface water report, with specific mention of ensuring all instream construction footprints are rehabilitated and the watercourses monitored for any alien and invasive species establishment, no fatal flaws in terms of freshwater ecological aspects were identified and the proposed development can be considered acceptable.

The following aspects must be considered for the required approvals and/or permits by the relevant authorities:

- The watercourses are considered to be ‘no-go’ areas for building infrastructure components. Linear infrastructure (such as roads and underground cables) as provided, should only be planned within these areas if it is absolutely unavoidable to circumnavigate these watercourses;
- The proposed two eastern ridge access route alternatives are considered acceptable with the implementation of mitigation measures as outlined in this report, with specific mention of installing appropriately sized throughflow structures and construction preferably undertaken during the dry period when there is little to no flow within the watercourses and thus no flow diversion required;
- Development of access roads (new and existing) and the proposed 4x4 internal roads within the 200 m corridors will not have any additional impact to the watercourses and ecological functionality over and above what was previously assessed (as part of the Final EIA Report (2015)) or mitigation measures identified;
- Preference is given to Substation Option 1 and thus the associated 33kV collector overhead powerlines and cables (Option 1) and internal 4x4 access roads associated with it, since the proposed Substation Option 1 is located outside the 32 m NEMA ZoR (and GN509 ZoR), and no direct or indirect impacts from Substation Option 1 are expected, as opposed to Substation Option 2 that is located in very close proximity to a watercourse. In addition, Construction Camp Options 1, 2 and 4 are considered acceptable (with implementation of mitigation measures) from a freshwater management perspective considering their distance from the nearest watercourse (approximately at least 28 m from a watercourse), compared to the proposed Construction Camp Option 3 which is located directly outside the delineated boundary of a watercourse; and
- As part of the Part 2 EA amendment, Final layout and EMPr approval process to DFFE, all watercourse crossings and infrastructure within 32 m of a watercourse must be authorised. Based on the outcome of the

risk assessment, the proposed amendments and final layout of the Karreebosch WEF are not considered to be a fatal flaw and pose a Moderate to Low risk significance, with the application of the recommended mitigation measures (largely because of direct watercourse crossings from the proposed access roads and the underground cables on top of the ridges along the access roads that cannot practically avoid watercourses (i.e. EDLs)). As such, it is the opinion of the freshwater ecologist that the amendments proposed for the authorised Karreebosch WEF and its final layout be authorised.

The overall appraisal is that the proposed amendments, will thus not alter the previous surface water impacts as long as mitigation measures as detailed and required in the EMPr (**Appendix Q**) are implemented. Given the above outcome, this Karreebosch Amendment is supported in terms of aquatic impacts. Furthermore, provided that the recommended mitigation measures are applied, the proposed final layout for the authorised Karreebosch WEF is considered acceptable from a freshwater ecological perspective and should be approved. Mitigation measures recommended by the surface water specialist are detailed in Section 6.5 below

5.6.6 NOISE

Jongens Keet Associates (Acoustic Engineering Consultants) undertook the original 2015 noise assessment.

Subsequently, Dr Brett Williams (SafeTech) was appointed to undertake the assessment of the amendments to turbine specification during the 2018 amendment process.

Dr Brett Williams of SafeTech has been appointed to review the previous studies and consider the effect of the proposed amendments on the previous impacts with reference to the final layout. The outcome of the assessment is outlined in a 2022 Specialist Statement included in **Appendix K**.

The revised turbine specification (an increase in hub height and rotor diameter) necessitated the remodelling of noise impacts of the final layout (40 turbine locations). The 33 noise sensitive areas that were identified during the 2015 noise assessment were reused in the 2022 remodelling of the noise impact.

The wind turbine generator that was modelled is described in **Table 5-11**. This turbine was chosen to represent the worst-case scenario of a wind turbine up to 7.5 MW and 140m hub height. The modelled hub height (140m) is the same as the amendments proposed by the developer.

If a lower final hub height is chosen, the noise impacts could be reduced. Furthermore, if the final turbine that is chosen has a maximum sound power level that is similar or lower than the turbine modelled as part of the 2022 Specialist Statement, it can be assumed that the noise impacts will be similar or lower, irrespective of the turbine manufacturer.

Table 5-11: Turbine Specifications Used in the Noise Model

Manufacturer	Goldwind
Type / Version	GW165- 6.0MW
Rated Power	Up to 7.5 MW
Rotor Diameter	Up to 170m
Tower	Tubular
Grid Connection	50/60 Hz
Maximum Sound Power Level	Up to 113.0 dB
Hub Height	Up to 140m

The sound power levels at lower and higher wind speeds as stated above were interpolated from the developer's (Goldwind) acoustic performance report provided by the client. The stated sound power level provided in the acoustic report is 111.0dB(A) for a 6.0MW Wind Turbine. Should the developer wish to increase this rated power output to 7.5MW, it would be difficult to determine the exact sound power level as there is little precise information on turbines of this power rating. Therefore, an increase to 113.0dB(A) was also modelled to draw comparison on the noise impacts. **The actual sound power levels may thus be less than those stated when the final turbine is selected. The levels used in the re-modelling are thus a worst-case scenario.**

The masking effect of the wind noise will mitigate the noise impact. The results are based on NO wind noise masking, which in reality rarely occurs when the turbines are operational. The maximum noise rating limit as per the DEA Environmental Authorisation is 45 dB(A).

The proposed windfarm is located adjacent to several other windfarms. The Roggeveld, Karusa and Soetwater Wind Energy Facilities are currently operational. Due to technical constraints of the modelling software, only the nearest wind turbines were analysed. Other projects in the area will have less impact due to the distance from the noise sensitive areas and the noise attenuation. The details of the modelled turbines are as follows:

- Esizayo – 55 wind turbines
- Roggeveld – 47 wind turbines
- Rietkloof – 60 wind turbines¹¹
- Witberg – 28 wind turbines
- Brandvalley – 58 wind turbines¹²

The modelling results (outlined in Table 3 of the Noise Specialist Statement included in **Appendix K**) indicate that the Environmental Authorisation Limit and IFC Guideline of 45 dB(A) will be exceeded at NSA 27 for sound power levels of the turbines at 111.0dB(A) and 113.0dB(A). It must however be noted that the wind noise will provide a masking effect and the exceedance is only marginal (0.2 dBA and 2.2dBA). It is therefore unlikely that the receiver will be negatively impacted. Furthermore, the modelling assumes the receiver is outdoors at all times and therefore the indoor noise levels are likely to be lower.

The cumulative impact modelling results indicate that the Environmental Authorisation Limit of 45 dB(A) limit will be exceeded at NSA 27 by 0.2 dB(A). If the 113.0dB(A) sound power level is applied, the limit will be exceeded at NSA 27 by 2.2dB(A) due to the Karreebosch WEF. This includes the cumulative impacts from the other windfarms.

It is highly likely that the wind noise will provide a masking effect and the exceedance will therefore be negligible. Furthermore, the modelling assumes the receiver is outdoors at all times and therefore the indoor noise levels are likely to be lower.

The overall environmental noise impact significance remains low considering the changes to the turbine specifications.

The overall appraisal is that the proposed amendments, will thus not alter the previous noise impacts as long as mitigation measures as detailed and required in the EMP (**Appendix Q**) are implemented. Given the above outcome, this Karreebosch Amendment is supported in terms of noise impacts. Mitigation measures recommended by the noise specialist are detailed in Section 6.6 below

5.6.7 VISUAL

Mr Lourens du Plessis, a visual specialist from the then MetroGIS (Pty) Ltd, undertook the 2015 and 2018 visual assessments. Subsequently, Kerry Schwartz, from SLR Consulting (Pty) Ltd has been appointed to review the previous studies and consider the effect of the proposed amendments on the previous impacts with reference to the final layout. The outcome of the assessment is outlined in a 2022 Specialist Statement included in **Appendix L**.

The proposed new turbine specifications would allow for a hub height of up to 140m and a rotor diameter of up to 170m, resulting in a maximum height at the blade tip of 225m, some 20m higher than the height currently authorised. While an increase in the height of the turbines would increase the visibility of the WEF, a GIS-based visibility analysis has shown that, in this instance the increase in visibility would be marginal and the viewshed would not include any additional receptors. Visual impacts resulting from the larger turbines would be greatest within a 1km to 2km radius, from where the increased height of the structure would be most noticeable. However, all the potentially sensitive receptors identified within 2km of a wind turbine placement are in fact farmsteads

¹¹ The turbine numbers for the Rietkloof development are lower than that modelled (32 Turbines per development), it can therefore be inferred that the cumulative impacts of these two developments will be lower than that which was modelled.

¹² The turbine numbers for the Brandvalley development are lower than that modelled (32 Turbines per development), it can therefore be inferred that the cumulative impacts of these two developments will be lower than that which was modelled.

located within the Karreebosch WEF project area. As the occupants of these farmsteads are assumed to be involved in the development, they are less likely to perceive the WEF in a negative light. Hence the larger turbines as proposed are not expected to increase the impacts experienced by any of the identified receptors.

In addition, the change in the turbine specifications being proposed for the Karreebosch WEF has allowed for a reduction in the number of turbines required for the facility. Hence, a total of twenty-five (25) turbines have now been removed from the authorised layout. This has in turn resulted in a slight reduction in the area from which the turbines will be visible (viewshed). In addition, with fewer turbines in evidence, there will be less visual clutter in the landscape and the cumulative impacts would be slightly reduced.

In light of this, and the limited human habitation and relatively remote location of the proposed Karreebosch WEF, the proposed changes in the turbine specifications are not expected to result in any increased visual impacts on the identified receptors or affect any additional receptors in the surrounding area.

The proposed updates in the WEF layout as outlined above do not deviate significantly the previous layouts that were fully assessed in the VIA undertaken in July 2015, with further visual comment being provided in July 2018. In addition, it has been established, via desktop assessment using Google Earth imagery, that, although the landscape to the south of Karreebosch WEF is undergoing significant change as a result of the development of the Roggeveld WEF (which has been operational since 2022), there has been little change since 2018 in the baseline characteristics and the number of sensitive receptors across the remainder of the study area. As such, it is not anticipated that the final layout will result in any changes in the significance of the impacts identified in the VIA, nor will it result in any additional visual impacts.

Although the previous VIA considered a number of other existing and proposed renewable energy and electrical infrastructure developments in close proximity to the Karreebosch WEF, it should be noted that there have been some changes in the status of some of these projects in the interim. Construction has been completed in respect of three of the identified projects, namely Roggeveld, Karusa and Soetwater WEFs, all of which are now operational. Hence the landscape has already undergone noticeable change.

In addition, Rietkloof and Brandvalley WEFs have both been awarded preferred bidder status and one new project in the broader area has been granted EA and awarded preferred bidder status. This project, namely Oya Energy Facility is a combined Wind, Solar PV and Fuel-based Generator Facility (FBGF), located some 25kms south-west of the proposed Karreebosch WEF. Although the different technologies are expected to have different impacts, all renewable energy developments and associated grid connection infrastructure are relevant as they contribute to the alteration of the visual character of the broader area. In this instance however, given the distance from the Karreebosch WEF and the hilly topography in the broader area which limits the visibility of the facility, it is not anticipated that this development will result in any significant increase in the cumulative impacts affecting the landscape or the visual receptors within the assessment area for the Karreebosch project.

Having considered the new information relating to renewable energy developments in the broader area, the overall significance of cumulative impacts remains as High Negative, with few mitigation measures available to reduce the impacts. As stated however, the proposed development is located within a designated renewable energy development zone (REDZ), and thus the relevant authorities support the concentration of renewable energy developments and associated transformation in this area.

The overall appraisal is that the proposed amendments and the final layout does not give rise to any additional impacts or exacerbate the impacts previously identified in the VIA for this development. No additional mitigation measures, other than those originally proposed, or specialist input into the EMP are deemed necessary. Given the low level of human habitation and the relative absence of sensitive receptors in the area, the site layout is deemed acceptable from a visual perspective and the amendment to the Environmental Authorisation (EA) should be granted. The impacts associated with the construction, operation and decommissioning phases can be mitigated to acceptable levels provided the recommended mitigation measures, as outlined in the original VIA and detailed and required in the original EMP (Appendix Q) are implemented. Given the above outcome, this Karreebosch Amendment is supported in terms of visual impacts. Mitigation measures recommended by the visual specialist are detailed in Section 6.7 below

5.6.8 TRAFFIC AND TRANSPORT

The 2015 and 2018 assessments did not include specialist traffic and transport assessments. Subsequently, JG Africa has been appointed to assess the impacts of the proposed development and to provide suggested mitigation

measures for inclusion in the EMPr (if necessary) which is to be submitted to DFFE for approval, associated with the final layout of the Karreebosch WEF. The outcome of the assessment is outlined in a 2022 Specialist Transport Impact Assessment in **Appendix M** and Traffic Management Plan included as Appendix J of the EMPr (**Appendix Q**).

The traffic impacts identified in the 2015 study were identified as part of the Social impact Assessment (SIA) and included impacts such as the impact of heavy vehicles, including damage to roads, safety and dust. Due to the nature of the proposed amendments.

The following conclusions and recommendations are applicable from the 2022 traffic and transport perspective:

— **Access and internal circulation**

- Two access points connecting with the R354 provide access to the project site.
- The main access (access 01) is located off an existing access point thus access spacing restrictions are not envisaged.
- An additional access point (access 02) is proposed south of the main access (access 01) to access the eastern turbine ridge. Two options are considered for access 02 (option 1 approximately 850m south of an existing farm gate and option 2 located approximately 1.5km south of the existing farm gate).

It is therefore noted that a 5km access spacing may not be feasible due to site boundaries and constraints imposed by land terrain. It is recommended that the approving authority consider a minimum 500m access spacing for the site in line with TRH17 access spacing recommendations between successive intersections. This is deemed viable due to the nature of the site (i.e., low operational traffic volumes) and the surrounding site environment (i.e., rural environment with low development densities).

- Access 01 and Access 02-option 2 are located off a straight horizontal curve with relatively flat terrain; therefore, sight line restrictions are not envisaged (i.e., sight lines are expected to meet the 300m minimum sight distance for a 100km/h posted speed). Access 02- Option 1 is located on a horizontal curve with an embankment to the north. Due to the horizontal alignment and roadside terrain of the road section, sight line limitations are envisaged at Access 02-Option 1. Access 02-Option 2 is therefore a more favourable access position to meet sight line requirements.
- It is recommended that appropriate signage is accommodated to warn road users of the access points and that the road reserve be maintained to prevent obstructions to sight lines.
- It needs to be noted that all access and internal roads should be investigated for their topographical suitability, i.e., feasibility for plant and truck access and height clearance for any Eskom lines, Telkom lines or similar.
- Staggered intersections should be avoided where possible.
- The access points to the site will need to be able to cater for construction and abnormal load vehicles.
- A minimum road width of 8m is recommended for the access points and the internal roads can have a minimum width of 5m.
- The radius at the access point needs to be large enough to allow for all construction vehicles to turn safely.
- It is recommended that the site access to the facility be access controlled. It is also recommended that security staff be stationed on site at the access during construction.
- A minimum stacking distance of 25m is recommended between the road edge of the external road and the access control.
- All road markings and signage need to be in accordance with the South African Road Traffic Signs Manual (SARTSM).

— **Haulage routes for wind turbine components**

- The proposed haulage route is outlined in Section 3.2 of the Transport Impact Assessment (TIA) report. The Port of Saldanha haulage route was chosen as the preferred route because it provides the shortest route to the wind farm site, utilises higher order routes as far as possible and minimises travelling through towns.
- It is recommended that the respective haulage company conducts a dry-run to determine the restrictions relevant to the haulage vehicle to be utilised. With some route's, road signs may need to be moved, overhead cables may need to be raised and bellmouths may need temporary widening to accommodate

abnormal loads. A dry-run will help establish relevant changes specific to the abnormal load truck used to deliver the components and materials.

– **Traffic impact**

- No capacity improvements are considered necessary based on the following:
- The site gains access of the R354, which is a Class 2 road designed to accommodate large traffic volumes.
- The only notable generated traffic would occur during the construction and decommissioning phases. The trips generated during these phases will only occur for short periods of time and the following mitigation measures are recommended for consideration:
 - The delivery of wind turbine components to the site can be staggered and trips can be scheduled to occur outside of peak traffic periods,
 - The use of mobile batching plants and any material sources in close proximity to the site would decrease the impact on the surrounding road network,
 - Staff and general trips can occur outside of peak traffic periods,
 - Staff can be shuttled on scheduled busses to minimise the number of trips and
 - Stagger the removal of turbines, foundations, crane pads etc during the decommissioning phase.

– **Assessment of traffic related environmental Impacts and Identification of Management Actions**

- The construction phase includes the construction of the Facility, including construction of the roads, excavations, trenching and ancillary construction works. This phase will temporarily generate the most development traffic. The nature of environmental impact expected with construction traffic is noise and dust pollution. It is estimated that the construction traffic will have a moderate significance rating pre mitigation and a low significance rating post mitigation.
- The operation and maintenance phase include the operation and maintenance of the WEF. The nature of environmental impact expected with operational traffic is noise and dust pollution. It is estimated that the operational traffic will have a low significance rating pre mitigation and post mitigation.
- The decommissioning phase will generate construction related traffic including transportation of people, construction materials, water and equipment (abnormal trucks transporting turbine components). It is therefore expected that the decommissioning phase will generate the same impact as that of the construction phase.

Therefore, the traffic and transport impact ratings previously reported in the SIA (and reassessed in the 2022 TIA) remain relevant without any change as long as mitigation measures as detailed and required in the EMPr (**Appendix Q**) are implemented. As such, this Karreebosch Amendment is supported in terms of the traffic and transport impacts. Mitigation measures recommended by the traffic specialist are detailed in Section 6.8 below.

5.6.9 HERITAGE

Tim Hart, a heritage specialist from ACO Associates, undertook the 2015 heritage and archaeological assessment. Dr John Almond, a palaeontology specialist from Natura Viva, undertook the 2015 palaeontology assessment. No heritage or palaeontological review was undertaken for the 2018 amendment application as the change in rotor diameter, hub height and the increase in generation capacity for each wind turbine were not expected to have an effect on the findings of the 2015 Assessment.

Subsequently, CTS Heritage has been appointed to review the previous studies (both heritage, archaeological and palaeontological) and consider the effect of the proposed amendments on the previous impacts with reference to the final layout. The outcome of the assessment is outlined in a 2022 Specialist Statement included in **Appendix N**.

The specialist confirmed that the amended layout dated July 2022 for the Karreebosch WEF does not impact any known heritage resources and adheres to the recommendations included in the CTS Heritage Walkdown report for this development (July 2022) (included as Appendix K of the EMPr attached as **Appendix Q**), which concludes that *“The final layout for the Karreebosch WEF avoids impact to all known significant heritage resources present within the development area. The walkdown of the final layout revealed no new significant heritage resources that are likely to be impacted. It is therefore recommended that this report is accepted as satisfying the following conditions of the Environmental Authorisation issued for the Karreebosch West WEF project:*

- *The final layout should be shown to the appointed archaeologist before implementation to confirm that all significant heritage resources have been adequately protected.*
- *All buffers and no-go areas stipulated in this (HIA) report must be adhered to for both the facilities and all roads and power lines.”*

Furthermore, there is no objection to the proposed amendments in terms of impacts to heritage resources. No deviations are required and the impacts to heritage resources are reduced compared to the impacts anticipated in the HIAs completed for the Karreebosch WEF (Kendrick and Hart, 2015) due to the reduced number of turbines. There are no preferred alternatives for the proposed access roads, construction camps or substations from a heritage perspective.

As such the heritage impact ratings remain relevant without any change as long as mitigation measures as detailed and required in the EMPr (**Appendix Q**) are implemented. Given the above outcome, this Karreebosch Amendment is supported in terms of heritage impacts.

5.6.10 SOCIO- ECONOMIC

Mr Tony Barbour, a social specialist from Tony Barbour Environmental Consulting and Research, undertook the 2015 socio-economic impact assessment. No social review was undertaken for the 2018 amendment application as the change in rotor diameter, hub height and the increase in generation capacity for each wind turbine were not expected to have an effect on the findings of the 2015 Assessment

Subsequently, Mr Tony Barbour has been appointed to review the amendments to the project in relation to the previous assessment undertaken and to consider the effect of the proposed amendments on the previous impacts with reference to the final layout. The outcome of the assessment is outlined in a 2022 Specialist Statement included in **Appendix O**.

Based on a review of the changes associated with the Part 2 Amendment, there are no changes to the significance ratings reflected in the Karreebosch WEF SIA (2015). In this regard:

- The final layout and reduction on the number of wind turbines from 65 to 40 and the increase in hub height and rotor diameter of the wind turbines associated with the Part 2 Amendment will not change the nature or significance of any of the social impacts previously assessed as part of the SIA (2015) for the Karreebosch WEF. The reduction in the number of turbines also has the potential to reduce the visual impact on the areas sense of place.
- The potential social impacts associated with the increase in the length of internal access roads from 40km to 77km will be negligible and does not have a bearing on the findings of the 2015 SIA.
- The reduction in the number of transformer stations / substations from two to one will not have a bearing on the findings of the 2015 SIA.
- The location of the construction camp and laydown areas and associated 14ha area that is affected will not have a bearing on the findings of the 2015 SIA.
- The mitigation measures for the construction and operational phase of the Karreebosch WEF listed in the SIA (2015) remain appropriate for the Part 2 Amendment. No additional management outcomes or mitigation measures in terms of social impacts are therefore required.

The findings of the SIA undertaken in 2015 and associated enhancement and mitigation measures therefore remain valid and no further mitigation measures are required for the EMPr. In addition, as indicated above, the Karreebosch WEF is located within the Komsberg REDZ. The area has therefore been identified as suitable for the establishment of renewable energy facilities and associated infrastructure.

It can be concluded that the findings of the previous assessment therefore remains unchanged and valid subject to the implementation of the recommended mitigation measures and management actions contained in the EMPr (**Appendix Q**). Given the above outcome, this Karreebosch Amendment is supported in terms of socio-economic impacts.

5.6.11 GEOTECHNICAL INPUT

In September 2021, JG Afrika undertook a desktop geotechnical assessment for the Karreebosch WEF, for the previous 65 turbine layout. Following the submission of the geotechnical report, new specifications were received for the generation infrastructure, electrical infrastructure, overhead powerline, civil infrastructure and construction camps. In August 2022, JG Afrika undertook a revised desktop geotechnical assessment for the proposed 40 turbine layout and associated amendments for the Karreebosch WEF (**Appendix P**). The aim of the 2021 study was to assess the geological and geotechnical conditions across the study area, and to provide information on the topographical feasibility of the site for the proposed project, as well identify the geological and geotechnical influences and/or constraints on the construction structures.

The slope gradient map indicates that the turbines, substation and the construction camp site alternatives are located on gentle terrain. The majority of the internal access roads are characterised by flat to gentle slope along the lower lying valley areas and steep terrain characterises the slope sides.

Competent, founding conditions for the turbines, substations, crane pads and the construction camps are anticipated at relatively shallow depths in slightly weathered bedrock, which will have to be assessed during the detailed (geotechnical) investigation stage of the project prior to construction.

No fatal flaws from a preliminary geotechnical perspective were identified during the desktop study.

The proposed site is considered suitable for the proposed development. It recommended that a detailed geotechnical investigation be undertaken during the detailed design phase of the project. JG Africa's 2022 statement concludes the changes to the generation infrastructure (specifically the 40 wind turbines), electrical infrastructure (including IPP substation options 1 and 2), the 33kV overhead powerline (including options 1 and 2), the civil infrastructure (including the internal access roads and 4x4 access road options) and construction camp alternatives (including alternatives 1 to 4), will not alter the findings as detailed in the original geotechnical report (2021), and that the recommendations are still valid.

It can be concluded that the findings of the previous assessments in terms of geology, therefore remain unchanged and valid subject to the implementation of the recommended mitigation measures and management actions contained in the EMPr (**Appendix Q**). Given the above outcome, this Karreebosch Amendment is supported in terms of geotechnical impacts. Mitigation measures recommended by the geotechnical specialist are detailed in Section 6.11 below

5.7 2022 CUMULATIVE IMPACT

The existing surrounding projects of varying approval status have been detailed in **Table 2-3** and **Figure 2-2**.

Of the 24 surrounding projects, 10 have been awarded PB status under the REIPPP Bid Window 4, 5 or RMIPPPP. The remaining 14 proposed WEFs secured EAs several years ago, but have not obtained PB status (or a private off taker agreement) and as such have not been developed. These surrounding projects are still subject to the REIPPPP bidding process or subject to securing an off taker of electricity through an alternative process.

Cumulative biodiversity impacts because of the development of the site, are regarded as being low due to the widespread nature of the vegetation unit and the low impact of the proposed activity which is unlikely to pose significant risk to potential localised populations of species of conservation concern.

Although the previous VIA considered a number of other existing and proposed renewable energy and electrical infrastructure developments in close proximity to the Karreebosch WEF, it should be noted that there have been some changes in the status of some of these projects in the interim. Construction has been completed in respect of three of the identified projects, namely Roggeveld, Karusa and Soetwater WEFs, all of which are now operational. Hence the landscape has already undergone noticeable change.

In addition, Rietkloof and Brandvalley WEFs have both been awarded preferred bidder status and one new project in the broader area has been granted EA and awarded preferred bidder status. This project, namely Oya Energy Facility is a combined Wind, Solar PV and Fuel-based Generator Facility (FBGF), located some 25kms south-west of the proposed Karreebosch WEF. Although the different technologies are expected to have different impacts, all renewable energy developments and associated grid connection infrastructure are relevant as they contribute to the alteration of the visual character of the broader area. In this instance however, given the distance

from the Karreebosch WEF and the hilly topography in the broader area which limits the visibility of the facility, it is not anticipated that this development will result in any significant increase in the cumulative impacts affecting the landscape or the visual receptors within the assessment area for the Karreebosch project.

Having considered the new information relating to renewable energy developments in the broader area, the overall significance of cumulative impacts remains as High Negative, with few mitigation measures available to reduce the impacts. As stated however, the proposed development is located within a designated renewable energy development zone (REDZ), and thus the relevant authorities support the concentration of renewable energy developments and associated transformation in this area.

The cumulative impact noise modelling results indicate that the Environmental Authorisation Limit of 45 dB(A) limit will be exceeded at NSA 27 by 0.2 dB(A). If the 113.0dB(A) sound power level is applied, the limit will be exceeded at NSA 27 by 2.2dB(A) due to the Karreebosch Wind Energy Project. This includes the cumulative impacts from the other windfarms.

It is highly likely that the wind noise will provide a masking effect and the exceedance will therefore be negligible. Furthermore, the modelling assumes the receiver is outdoors at all times and therefore the indoor noise levels are likely to be lower.

Watercourses within the region are under continued threat due to rapid land use transformation in the surrounding landscape, with specific mention of renewable energy facilities (REF) and associated grid infrastructure.

Direct and indirect impacts identified within the assessed watercourses can predominantly be attributed to the upgrading of extensive sections of access roads directly adjacent to the Wilgebos river and an ephemeral tributary of the Wilgebos River and formalising watercourse road crossings the disturbance to the hydrological connectivity and functioning of the watercourses and alien and invasive species establishment. Although mitigation measures are provided to limit the significance of the direct negative impacts to the watercourses, considering the proposed development and other proposed renewable energy facilities in the catchment of the identified watercourses, a cumulative negative impact to the biophysical environment is expected. With management and mitigation measures implemented during the construction phase and monitoring of all stated development infrastructure for any erosion during the operational phase, the direct and indirect negative impacts can be reduced to an acceptable level and managed.

No additional cumulative impacts were noted in terms of the heritage, agriculture, avifauna, bats, traffic and socio-economic specialists. The 2015 cumulative impacts remain unchanged for these aspects.

The overall appraisal is that the proposed amendments, will thus not alter the previous cumulative impacts as long as mitigation measures as detailed and required in the EMPr (**Appendix Q**) are implemented. Given the above outcome, this Karreebosch Amendment is supported in terms of cumulative impacts.

5.8 2022 SENSITIVITY MAP

The overall environmental sensitivity of the Karreebosch WEF is show in **Figure 5-4** below based on the final layout.

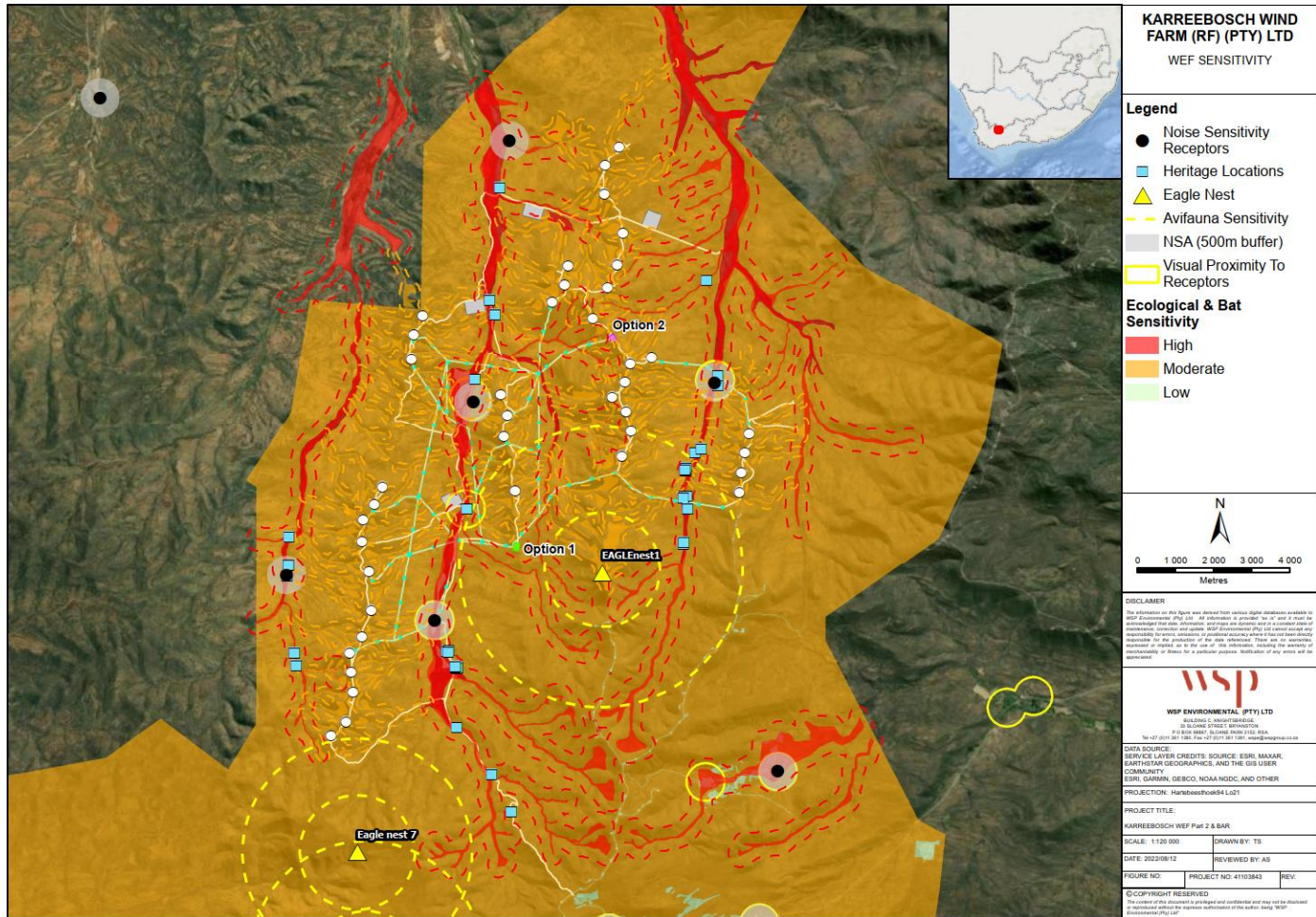


Figure 5-4: Environmental sensitivity map overlain over the Final Karreebosch WEF Layout

6 ENVIRONMENTAL MANAGEMENT PROGRAMME

The EMPr was originally compiled by Savannah Environmental (Pty) Ltd as part of the 2015 EIA. Due to the fact that no additional environmental impacts were identified during the 2018 amendment process, the original 2015 EMPr did not require any amendment.

In line with Condition 16 and 18 of the EA, the previous EMPr was not approved and required amendment. The EMPr has been amended, as required, taking the final layout and relevant specialist walkdowns into consideration and is appended to this report (**Appendix Q**) for approval.

It must be noted that the outline below takes into account the limited additional mitigation measures required as a result of the proposed amendments as well as the additional mitigation measures proposed as a result of the final layout and walkdowns undertaken by the relevant specialists.

6.1 AGRICULTURE, SOIL AND LAND USE CAPACITY ADDITIONAL OR AMENDED MITIGATION MEASURES

No additional or amended mitigation measures have been recommended by the specialist. The existing mitigation measures included within the EMPr remain valid. No changes have therefore been made to the EMPr as a result of the Agriculture, Soil and Land Use 2022 findings.

6.2 BIODIVERSITY ADDITIONAL OR AMENDED MITIGATION MEASURES

No additional or amended mitigation measures have been recommended by the specialist with regards to the proposed amendments.

Several Species of Conservation Concern (SCC), in addition to those identified during the initial ecological assessment, were identified during the specialist walkdown. These species are classified as either Critically rare (CR), Vulnerable (VU), Near Threatened (NT), Rare (R), or Endangered (E). The identified floral species of conservation concern include *Antimima androsacea* (CR), *Antimima loganii* (VU), *Brunsvigia josephinae* (VU), *Euryops sulcatus* (VU), *Geissorhiza karooica* (NT), *Indigofera hantamensis* (R), *Lotononis venosa* (E), *Romulea eburne* (VU), *Romulea hallii* (VU), *Romulea syringodeoflora* (NT).

Sensitive areas identified either during the initial ecological assessment and/or observed during the 2021 walkdown include the following (a summary of which is detailed in Table 9 of the Terrestrial Ecology & Biodiversity Walkdown Report (included in Appendix D of the EMPr – **Appendix Q**):

- Rocky Outcrops and Ridges on slopes and mountain peaks;
- Rivers, seeps, wetlands and pans; and
- Sub-population of flagged species of conservation concern.

The applicable recommendations made based on the findings of the walkdown, have been included in the amended EMPr (**Appendix Q**). These recommendations include *inter alia*:

- With particular reference to *Sensitive Species 142* situated within the alignment of any 33kV OHP, and inasmuch that Sensitive Species 142 is a subterranean geophyte:
 - The 4x4 tracks supporting the 33kV OHPs must be developed to follow a ‘path of least resistance’ and without the use of bulldozers or other earth moving equipment, as much as practically possible.

- Vegetation and any *Sensitive Species 142* should not be removed/relocated to create the 4x4 track but rather left in situ (i.e., create the track by simply driving repeatedly over the same route). If any Sensitive Species 142 clumps are within the 4x4 track route it would be recommended to divert slightly to avoid if possible. This will achieve the following:
 - Improved survival of *Sensitive Species 142* (and other geophytic plants) by leaving them in situ rather than relocating them;
 - Retention of topsoil and the seed bank in situ improves rehabilitation/regeneration of vegetation; and
 - Keeping a natural/endemic vegetative embedded into the soil decreases local erosion and topsoil loss from high wind.
- Where bulldozers or other earth moving equipment are used, then permits must be obtained for prior rescue and relocation of *Sensitive Species 142* and any other protected species.
- All protected species within any 33kV pylon footprint must be rescued and relocated
- Turbines 6, 8, 25, 27, 33, 34 and 38 are located adjacent to outcrops. The outcrops should be avoided as far as possibly during final surveying and pegging out.
- The existing access road also passes through seep area (9) near site laydown area; and must not encroach closer to stream than existing access track.
- Where there are further major changes/updates to the vertical and horizontal alignments of the WEF road network outside the 200m road corridor and site laydown area, such sections/areas must be reassessed in order to determine any further risks and impacts to the ecology and/or species.
- Laydown Area Alternative 2 is the preferred option as development here will result in the lowest impact to terrestrial biodiversity and ecological functionality. This site also has few, if any, Sensitive Species 142.
- Substation Option 1 is the preferred options as described in Trusted Partners Report: TP220511-01A: Karreebosch Wind Energy Facility: Biodiversity & Terrestrial Ecology Assessment – Karreebosch 132kV Powerline and Substation, 2022/08/15; and hence the 33kV Collector System associated with Substation Option 1 is the preferred option.
- A flora and fauna search and rescue (relocation) in terms of NEM:BA Threatened or Protected Species (ToPS) and Northern Cape Nature Conservation Act (Act no. 9 of 2009) - must be undertaken before commencement of vegetation clearing. A more comprehensive list of species for which permits will be required is provided in Appendix 1: Plant Species of Conservation Concern (Red listed) and Appendix 2: Flora Protected in Terms of Provincial of the Ordinance(s) of the Ecology & Biodiversity Walkdown Report (both Appendix 1 and Appendix 2 are included in Appendix D of the EMPr - **Appendix Q**).

The applicable recommendations made based on the findings of the walkdown, have been included the amended EMPr (**Appendix Q**).

6.3 AVIFAUNA ADDITIONAL OR AMENDED MITIGATION MEASURES

The final layout takes cognisance of the previous avian assessments as well as the results of the additional pre-construction monitoring.

The previously known Verreaux's Eagle nest (no. 1) was given a nest buffer of 1.3-km when first located by African Insights (2016). G7 Renewable Energies (Pty) Limited moved all turbines outside a 1.5-km buffer, and they were then granted Environmental Authorisation for 65 turbines. A new 3 km buffer around the VE nest#1 was instituted in the proposed revision of the (40) larger turbine positions. All turbines now lie outside this 3-km buffer thereby complying with the avian specialists' recommendations. This will reduce the risk inherent in the high flight activity and high Passage Rates recorded here in 2020 (including two pairs of Verreaux's Eagles interacting).

Note that two turbines (T5 and T22) do still occur within the revised Verreaux's Eagle draft guideline of 3.7 km buffers (Ralston Paton and Murgatroyd in press). Thus, ideally these turbines should be mitigated too. The

specialist suggested blade-painting or Shut-down-on-demand (SDOD) for these and other turbines (detailed below).

In summary, the specialists propose the following mitigations:

- A 3.0-km buffer –is installed around VE nest #1 based on existing Verreux’s Eagle guidelines (Ralston Paton 2017) – all six turbines have been removed from within this 3km buffer. This has been incorporated into the revised final Karreebosch WEF layout.
- BBU also recommends that all turbines within the 5.2km Verreux’s Eagle precautionary buffer are erected with one blade painted with “signal red” paint in two broad stripes to increase blade visibility (or as accepted by the CAA at the time) (McIsaac 2001, May et al. 2020). This recommendation is subject to CAA approval of blades painting and colouring and the selected turbine supplier accepting the warranties of blades being painted. This must include the two turbines (T5 and T22) that lie within the 3.7 km buffer that will be recommended in the draft Verreux’s Eagle guidelines (Ralston Paton and Murgatroyd in press). BBU have recommended this mitigation to accommodate the precautionary buffer of 5.2 km that the revised Birdlife’s guidelines suggest where multiple flights or eagles are known to occur. Not only is this more cost-effective to instal during construction than other on-turbine mitigations, but it has no operational costs as would SDOD or even curtailment at high-risk flight times of day.
- Should these two tiers of mitigation prove insufficient to prevent eagle fatalities (i.e., > 1 eagle death per year post-construction), BBU suggests an adaptive response in the form of a third tier of automated shut-down on demand (e.g., DT-bird or BioSeco) technology to reduce the risk to the eagles.

This order of mitigations:

- (1) place all turbines outside 3-km buffer (Avoidance);
- (2) red-blade mitigation (Increased blade visibility); and
- (3) SDOD (Shut down where necessary), is proposed as the optimal combination.

The number of avian fatalities at all painted-blade turbines within the 5.2km VE buffer can then be compared with all un-painted turbines to test the effectiveness of the painted vs non-painted turbines. This maximises the likelihood that eagles will not be killed. According to experience in Norway where painted blades were first tested the painted blades had no post-construction costs (as does SDOD) and thus is the optimal mitigation in high use bird areas (B Iuell, Environmental Advisor at Smøla wind farm, Norway).

The advantages of this two-step mitigation is that¹³:

- (a) raptors see best in colour and, thus, red-blade mitigation is preferred.
- (b) ‘signal red’ is already approved by South African Civil Aviation for towers and other tall structures (but has yet to be approved specifically for turbine blades);
- (c) blade manufacturers such as Siemens and Vestas already produce painted blades in Europe; and
- (d) this mitigation has no running costs.

In addition, automatic shut-down on demand (or any other adaptive mitigation measures deemed appropriate by an avifaunal specialist) be installed with systems such as DT-Bird and/or BioSeco. This two-step process ensures that if the eagles don’t see the painted blade, technology can detect the eagles and shut down the turbine, reducing the possibility of fatalities.

This suite of amendments and re-location and reduction in number of turbines is thus acceptable from an avian risk perspective with the recommended mitigations detailed above implemented.

¹³ www.engineeringnews.co.za/article/opinion-black-blade-mitigation-a-new-and-exciting-mitigation-for-wind-turbines-to-reduce-impacts-to-birds-of-prey-2020-10-09/

A full 24-month post-construction monitoring must be undertaken and if that reveals that one or more Endangered or Vulnerable Red Data species are killed at any one turbine, then an adaptive management plan must be initiated within two months to reduce further fatalities.

Mitigations during construction-phase should include avoiding the construction of roads or powerlines within 500-m of active nests of Red Data species during the early breeding season. For Verreux's Eagles, this is May-July and again in August-September when small vulnerable nestlings are present (Simmons 2005). Should Endangered Black Harriers be found breeding, the recommendations in the Black Harrier guidelines (Simmons et al. 2020) will have to be consulted and enacted. Construction should be avoided in August-September-October for this Endangered species.

The specialist suggests that the Karreebosch wind farm proceeds with caution given the possibility of avian fatalities, and:

- (i) an additional 12-months of construction monitoring, and
- (ii) 24 months of post-construction monitoring be undertaken in the Karreebosch WEF;
- (iii) Both avian monitoring stages to be carried out under the guidance and recommendation of the Birdlife South Africa guidelines (Jenkins et al. 2015)
- (iv) all mitigation detailed above be implemented

The applicable recommendations made based on the findings of the walkdown, have been included the amended EMPr (**Appendix Q**).

6.4 BAT ADDITIONAL OR AMENDED MITIGATION MEASURES

The final layout takes cognisance of the previous bat assessments as well as the results of the pre-construction monitoring. The available options to minimise bat mortalities, include:

- Minimisation of light pollution;
- Curtailment to prevent freewheeling; and
- Curtailment that increases the cut-in speed.

The following mitigation action plan is applicable:

- Step 1: Minimisation of light pollution
 - During the planning phase for the Karreebosch WEF it must become mandatory to only use lights with low sensitivity motion sensors that switch off automatically when no persons are nearby, to prevent the creation of regular insect gathering pools, where practically possible without compromising security requirements. This applies to the turbine bases (if applicable) and other infrastructure/buildings. Aviation lights should remain as required by aviation regulations. Floodlights should be down-hooded and where possible, lights with a colour (lighting temperature) that attract less insects should be used. This mitigation step is a simple and cost-effective strategy to effectively decrease the chances of bat mortality on site.
 - Bi-annual visits to the facility at night must be conducted for the operational lifetime of the facility by operational staff of the facility, to assess the lighting setup and whether the passive motion sensors are functioning correctly. The bat specialist conducting the operational bat mortality monitoring must conduct at least one visit to site during nighttime to assess the placement and setup of outside lights on the facility. When lights are replaced and maintenance on lights is conducted, this Mitigation Action Plan must be consulted.
- Step 2: Appointment of bat specialist to conduct operational bat mortality monitoring
 - As soon as the Karreebosch WEF facility becomes operational, a bat specialist must be appointed to conduct a minimum of 2 years of operational bat mortality monitoring. The methodology of this monitoring must comply with the South African Good Practice Guidelines for Operational Monitoring

for Bats at Wind Energy Facilities - 2nd Edition June 2020 (Aronson et al. 2020), or any newer version of the applicable guidelines that may be in force at the start of operation of the facility.

- The results of the bat mortality study may be used to develop mitigation measures focused on specific problematic turbines. The results of the operational monitoring must be made available, on request, to other bat specialists conducting operational and preconstruction monitoring on WEF's in South Africa.
- Step 3: Curtailment to prevent freewheeling
 - Based on high bat activity detected during the 12-month preconstruction study, from 15 November to 31 March every night for the lifetime of the facility, curtailment must be applied to all turbines by ninety-degree feathering of blades when operating below the manufacturer's cut-in speed, so it is exactly parallel to the wind direction and minimises freewheeling blade rotation as much as possible without locking the blades. This can significantly lower probability of bat mortalities. Influence on productivity is minimal since no power is generated when below the manufacture's cut-in speed.
- Step 4: Additional mitigation by curtailment or acoustic deterrents
 - If mitigation steps 1 – 3 are followed, and the bat mortality monitoring study detects bat mortalities that are above the sustainable threshold for the Karreebosch WEF, then additional mitigation will need to be implemented to bring bat mortalities to or below the sustainable threshold. Such additional mitigation measures may be to curtail problematic turbines according to the mitigation cut-in speed, and/or to utilise acoustic deterrents on problematic turbines.
 - Preliminarily, it is advised that any additional mitigation measures that may be required be applied during the months of November to March, and must be applied to any turbines or group of turbines identified as causing the wind farm's mortalities to be above the sustainable threshold levels. This time period is based on high bat activity months as detected during the 12-month preconstruction study.
 - The bat specialist conducting the operational bat monitoring may recommend other time periods for additional mitigation, based on robust mortality data. If required, the bat specialist may make use of climatic data to allow for an active and adaptable mitigation schedule.
- Step 5: Auditing of bat mortalities for the lifetime of the facility
 - During the implementation of mitigation Steps 1 – 4, it is crucial for the facility to determine and monitor bat mortalities in order to implement, maintain and adapt mitigations as efficiently as possible. For the duration of the lifetime of the facility, the impacts on bats must be audited/monitored by reliable methods of carcass searching and/or electronic devices capable of automatically counting bat mortalities. Such auditing should occur every 5 years (after the end of the initial 2-year operational study) for all turbines on site, and continuously for turbines where mitigations discussed in Step 4 are implemented.

The additional measures have been incorporated into the updated EMP_r (**Appendix Q**).

6.5 SURFACE WATER AND WETLAND ADDITIONAL OR AMENDED MITIGATION MEASURES

Provided that the recommended mitigation measures are applied, the proposed final layout for the authorised Karreebosch WEF is considered acceptable from a freshwater ecological perspective and should be approved. The recommended mitigation measures in the surface water report (**Appendix J**) should be considered as comprehensive as they also take into consideration those listed in the previously submitted EMP_r as part of the Final EIA Report (2015).

The mitigation measures recommended in **Appendix J** have been incorporated into the updated EMP_r (**Appendix Q**).

6.6 NOISE ADDITIONAL OR AMENDED MITIGATION MEASURES

The following additional mitigation measures have been recommended by the 2022 noise assessment (**Appendix K**):

- Impact rating for Wind Turbines at 111.0dB(A):
 - Conduct Noise Monitoring at NSA 27 if complaints arise.
 - Ensure all wind turbines are placed at least 500m from the nearest Noise Sensitive Area.
- Impact rating for Wind Turbines at 113.0dB(A):
 - Conduct Noise Monitoring at NSA 27 during the operational phase.
 - Ensure all wind turbines are placed at least 500m from the nearest Noise Sensitive Area.

The mitigation measures recommended in **Appendix K** have been incorporated into the updated EMPr (**Appendix Q**).

6.7 VISUAL ADDITIONAL OR AMENDED MITIGATION MEASURES

No additional or amended mitigation measures have been recommended by the specialist. The mitigation measures included within the EMPr remain valid. No changes have therefore been made to the EMPr as a result of the 2022 findings.

6.8 TRAFFIC AND TRANSPORT ADDITIONAL OR AMENDED MITIGATION MEASURES

The following additional mitigation measures are applicable to traffic and transport:

- **Access and internal circulation**
 - It is recommended that appropriate signage is accommodated to warn road users of the access points and that the road reserve be maintained to prevent obstructions to sight lines.
 - It needs to be noted that all access and internal roads should be investigated for their topographical suitability, i.e., feasibility for plant and truck access and height clearance for any Eskom lines, Telkom lines or similar.
 - Staggered intersections should be avoided where possible.
 - The access points to the site will need to be able to cater for construction and abnormal load vehicles.
 - A minimum road width of 8m is recommended for the access points and the internal roads can have a minimum width of 5m.
 - The radius at the access point needs to be large enough to allow for all construction vehicles to turn safely.
 - It is recommended that the site access to the facility be access controlled. It is also recommended that security staff be stationed on site at the access during construction.
 - A minimum stacking distance of 25m is recommended between the road edge of the external road and the access control.
 - All road markings and signage need to be in accordance with the South African Road Traffic Signs Manual (SARTSM).
- **Haulage routes for wind turbine components**

- It is recommended that the respective haulage company conducts a dry-run to determine the restrictions relevant to the haulage vehicle to be utilised. With some route's road signs may need to be moved, overhead cables may need to be raised and bellmouths may need temporary widening to accommodate abnormal loads. A dry-run will help establish relevant changes specific to the abnormal load truck used to deliver the components and materials.
- **Traffic impact**
 - The delivery of wind turbine components to the site can be staggered and trips can be scheduled to occur outside of peak traffic periods,
 - The use of mobile batching plants and any material sources in close proximity to the site would decrease the impact on the surrounding road network,
 - Staff and general trips can occur outside of peak traffic periods,
 - Staff can be shuttled on scheduled busses to minimise the number of trips and
 - Stagger the removal of turbines, foundations, crane pads etc during the decommissioning phase.
- **Assessment of traffic related environmental Impacts and Identification of Management Actions**
 - Construction and Decommissioning phase:
 - The delivery of components to the site can be staggered and trips can be scheduled to occur outside of peak traffic periods.
 - Dust suppression of gravel roads as required.
 - Regular maintenance of site gravel roads by the Contractor when needed.
 - The use of mobile batch plants and quarries near the site would decrease traffic on the surrounding road network.
 - Staff and general trips should occur outside of peak traffic periods as far as possible.
 - The Operation and Maintenance phase:
 - Consider scheduling shift changes to occur during off peak hours.
 - Regular maintenance of site gravel roads by the Owner/Facility Manager when needed.

A Traffic Management Plan (TMP) has also been developed and has been included as Appendix J of the updated EMPr (**Appendix Q**) and in **Appendix M** of this report.

6.9 HERITAGE AND PALAEOLOGICAL ADDITIONAL OR AMENDED MITIGATION MEASURES

No additional or amended mitigation measures have been recommended by the specialists with regards to the proposed amendments. The mitigation measures included within the EMPr remain valid.

6.10 SOCIO- ECONOMIC ADDITIONAL OR AMENDED MITIGATION MEASURES

No additional or amended mitigation measures have been recommended by the specialist with regards to the proposed amendments. The mitigation measures included within the EMPr remain valid. No changes have therefore been made to the EMPr as a result of the 2022 findings.

6.11 GEOTECHNICAL ADDITIONAL OR AMENDED MITIGATION MEASURES

Mitigation measures specific to geology and geotechnical aspects are noted to already be included in the EMPr, however, any recommendations over and above those already included have been added in the EMPr as recommended. These include:

- A detailed geotechnical investigation be undertaken during the detailed design phase of the project
- Construction of temporary berms and drainage channels to divert surface water; and
- Minimize earthworks and fills.

The detailed geotechnical investigation must entail the following:

- Profiling and sampling exploratory of trial pits to determine founding conditions for the turbine modules, substation and pylons.
- An investigation to determine the subgrade conditions for internal roads and a materials investigation (if required).
- Thermal resistivity and electrical resistivity geophysical testing for electrical design and ground earthing requirements.
- Groundwater sampling of existing boreholes to establish a baseline of the groundwater quality for construction purposes.
- Dynamic Probe Super Heavy (DPSH) tests and rotary core drilling may be required depending on the soil profiles and imposed loads of the structures.

These measures have been incorporated into the EMPr (**Appendix Q**).

6.12 CONCLUSION

The 2018 EMPr has been updated as required in Condition 16 and 18 of the EA. The updates are based on the authorised infrastructure, proposed amendments and 2022 specialist recommendations and is appended to this report (**Appendix Q**). Please note that this is the **final EMPr which is being submitted to DFFE for approval in line with Condition 16 and 18 of the EA.**

7 PUBLIC PARTICIPATION

7.1 PURPOSE OF PUBLIC PARTICIPATION PROCESS

Public participation is understood to be a series of inclusive and culturally appropriate interactions aimed at providing I&APs with opportunities to express their views, so that these can be considered and incorporated into the decision-making process, if required. Effective public participation requires the prior disclosure of relevant and adequate project information to enable I&APs to understand the risks, impacts, and opportunities of the project.

The following was undertaken as part of the Public Participation Process for the amendment:

Basic reasons why the involve public should get involved in the Amendment Process:

- The environment is held in public trust, therefore use of environmental resources is everyone's concern – in line with the Constitution.
 - Public participation is proper, fair conduct in public decision-making activities. Focus on vulnerable and disadvantaged person and offer equitable participation due to historical issues.
 - A way to ensure that projects meet the citizens' needs and are suitable to the affected public.
 - Finally, the final decision is informed when local knowledge and values are included and when expert knowledge is publicly examined.
-

7.1.1 OBJECTIVES

The objectives of the public participation process can be summarised as follows:

- Identify relevant individuals, organisations and communities who may be interested in or affected by the authorised project;
 - Clearly outline the scope of the project, including the scale and nature of the existing and proposed activities;
 - Identify viable project alternatives that will assist the relevant authorities in making an informed decision;
 - Identify shortcomings and gaps in existing information;
 - Identify key concerns, raised by I&APs;
 - Highlight the potential for environmental impacts, whether positive or negative; and
 - To inform and provide the public with information and an understanding of the project, issues and solutions.
-

7.1.2 WHAT IS AN INTERESTED AND AFFECTED PARTY?

An I&AP is defined as any person, group of persons or organisations interested in or affected by an activity, and any organ of state that may have jurisdiction over any aspect of the activity.

RIGHTS, ROLES AND RESPONSIBILITIES OF THE I&AP

In terms of Chapter 6, specifically Section 43(1) of the NEMA EIA Regulations 2014, as amended registered I&APs have the right to bring to the attention of the CA any issues that they believe may be of significance to the consideration of the application. The rights of I&AP are qualified by certain obligations, namely:

- I&APs must ensure that their comments are submitted within the timeframes that have been approved by the Department of Environmental Affairs (DEA), or within any extension of a timeframe agreed by the applicant, Environmental Assessment Practitioner (EAP) or CA; and
- Disclose to the EAP any direct business, financial, personal or other interest that they might have in the approval or refusal of the application.

In order to participate effectively, I&APs should:

- Become involved in the process as early as possible;
- Register as a I&AP;
- Advise the EAP of other I&APs who should be consulted;
- Follow the process once it has been concluded;
- Read the material provided and actively seek to understand the issues involved;
- Give timeous responses to correspondence;
- Be respectful and courteous towards other I&APs;
- Refrain from making subjective, unfounded or ill-informed statements; and
- Recognise that the process is confined to issues that are directly relevant to the application.

7.2 PUBLIC PARTICIPATION TO DATE

7.2.1 PRE-APPLICATION CONSULTATION

A pre-application meeting was held on 02 August 2022 with the DFFE in order to discuss the proposed Project. The minutes of this meeting are included in **Appendix R-1**.

7.2.2 IDENTIFICATION OF KEY STAKEHOLDERS

Section 41 of the EIA Regulations (2014, as amended) states that written notices must be given to identified stakeholders as outlined in **Table 7-1**.

Relevant authorities (Organs of State) have been automatically registered as I&APs. In accordance with the EIA Regulations, 2014 (as amended), all other persons must request in writing to be placed on the register, submit written comments, or attend meetings to be registered as stakeholders, and included in future communication regarding the Project.

Table 7-1: Interested and Affected Parties Table

NEMA REQUIREMENT	DISCUSSION
<i>(i) the owner or person in control of that land if the applicant is not the owner or person in control of the land</i>	The project activity is located on 13 portions of privately-owned land. All 13 the landowners have been included on the I&AP database.
<i>(ii) the occupiers of the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken</i>	All landowners have been contacted to confirm whether there are any occupiers on the land portions. Occupiers have been included on the database (Appendix R-2).
<i>(iii) owners and occupiers of land adjacent to the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken</i>	Adjacent landowner and occupier details were collected, and the landowners were notified via a project notification letter via email and/or SMS notification.
<i>(iv) the municipal councillor of the ward in which the site or alternative site is situated and any organisation of ratepayers that represent the community in the area</i>	Ward Councillors have been included on the I&AP database, including: <ul style="list-style-type: none"> – Ward 1 (Laingsburg Local Municipality); – Ward 4 and 12 (Witzenberg Local Municipality); and – Ward 3 (Karoo Hoogland Local Municipality).

NEMA REQUIREMENT	DISCUSSION
<i>(v) the municipality which has jurisdiction in the area</i>	The Laingsburg, Witzenburg, and Karoo Hoogland Local Municipalities which are located in the Central Karoo, Winelands and Namakwa District Municipalities have been included on the I&AP database.
<i>(vi) any organ of state having jurisdiction in respect of any aspect of the activity</i>	The DFFE has been identified as the competent authority. The Western Cape Department Environmental Affairs and Development Planning (DEA&DP) and Northern Cape Department of Northern Cape Department: Agriculture, Environmental Affairs, Rural Development and Land Reform (NC DAEARD&LR) are included on the I&AP database as a commenting authorities.
<i>(vii) any other party as required by the competent authority.</i>	<p>All tiers of government, namely, national, provincial, local government and parastatals have been included on the I&AP database. Inclusive of:</p> <ul style="list-style-type: none"> — DFFE — DFFE: Biodiversity Conservation Unit — DFFE: Protected Areas — Department of Water and Sanitation (DWS) — Department of Mineral Resources and Energy (DMRE) — Department of Transport — National Energy Regulator of South Africa (NERSA) — Air Traffic and Navigation Services (ATNS) — South African Civil Aviation Authority (SACAA) — South African Heritage Resources Agency (SAHRA) — South African National Roads Agency SOC Ltd (SANRAL) — Western Cape Department of Environmental Affairs and Development Planning (DEA&DP) — Western Cape Department of Agriculture (DoA) — Western Cape Department of Transport and Public Works — Heritage Western Cape (HWC) — Northern Cape Department of Agriculture, Environmental Affairs, Rural Development and Land Reform (DAEARDLR) — Northern Cape Department of Transport, Safety & Liaison — Northern Cape Provincial Heritage Authority — Eskom — CapeNature — BirdLife — Department of Defence — Endangered Wildlife Trust (EWT) — Southern African Large Telescope (SALT) — South African Astronomical Observatory (SAAO) — South African Radio Astronomy Observatory (SARAO) — Laingsburg, Witzenburg and Karoo Hoogland Local Municipalities — Central Karoo, Winelands and Namakwa District Municipalities

Appendix R-2 provides a list of stakeholders registered on the Project database. The stakeholder database will be updated throughout the Amendment process.

7.2.3 NOTIFICATION PROCEDURES

DIRECT NOTIFICATION

Notification of the proposed Amendment Application will be issued to potential Stakeholders, via direct correspondence (i.e. site notices and e-mail) on **23 August 2022**. The notification letter to be circulated is included in **Appendix R-3** of this report. Proof of notification will be included in the Final Amendment Report (FAR).

ADVERTISEMENT

Notification of the proposed Project was issued to the general public via an advertisement on **19 August 2022**. The purpose of the advertisement was to notify the general public of the proposed application and provide an opportunity to register on the Project database and provide input into the process. A copy of the advertisement is included as **Appendix R-4**. The advertisement publication details are provided in **Table 7-2**. Proof of placement of the advertisements will be included in the FAR.

Table 7-2: Dates on which the advert was published

NEWSPAPER	PUBLICATION DATE
Die Burger	19 August 2022
Die Noordwester	19 August 2022

SITE NOTICES

In accordance with GNR 326 Section 41(2)(a-b) site notices were developed (see **Appendix R-5**) and placed at two (2) strategic points along the boundary of the WEF that are accessible by the public, as well as in public places within the town of Laingsburg and Sutherland. Site notices were placed on site on **19 August 2022**.

Proof of display and the mapped locations of the site notice placements along the route will be included in the Final Amendment Report.

AVAILABILITY OF THE DRAFT AMENDMENT REPORT

The DAR will be placed on public review for a period of 30 days from **23 August 2022** to **23 September 2022**, at the venues as follows:

- Hard Copy: Sutherland – Sutherland Public Library (Sarel Celliers Street, Tel: 023 571 1429);
- Hard Copy: Laingsburg Public Library, Van Riebeeck Street, Laingsburg, 6900 (Tel: 023 551 1019);
- Electronic Version: G7 Website: <https://ppp.q7energies.com/KWEF6v78!>
- Electronic Version: [Available on request from WSP \(the EAP\)](#).

7.2.4 STAKEHOLDER REGISTRATION

All stakeholders that either call in or send written correspondence, such as emails, fax, or post, to the EAP will be added to the database and their comments and/or queries will be responded to.

7.3 COMMENTS RECEIVED

Comments received from registered stakeholders will be captured and responded to within the comments and response report, which will form part of the FAR.

8 ENVIRONMENTAL IMPACT STATEMENT

This DAR is submitted in support of the application for amendment of the EA issued to Karreebosch for the operation of the 140 MW WEF, located approximately 40km North of Matjiesfontein, in the Western Cape Province, and approximately 40km South of Sutherland in the Northern Cape Province.

Due to the fact that the proposed amendments constitute a change of scope, a Part 2 Amendment Process in terms of Regulation 31 of the EIA Regulations (2014), as amended is required.

WSP were appointed to undertake the amendment process in terms of Regulation 31 and 32 of the EIA Regulations (2014), as amended. In addition, various specialists were appointed to assess the proposed amendments to the EA.

The advantages and disadvantages for the proposed amendments are outlined in the **Table 4-1**. It can be noted that no disadvantages have been identified.

All of the specialists concluded that the proposed amendments are acceptable with limited additional mitigation required. Where specialists made recommendations, these have been taken into account and accommodated in the final layout and the final EMPr.

Additional mitigations as a result of the amendments and as a result of the specialist walkdowns of the final layout have been included in the updated EMPr.

The updated EMPr is appended to this report (**Appendix Q**). The updated EMPr, appended to this report **is the final EMPr which is being submitted to DFFE for approval in line with Condition 16 and 18 of the EA**. The amended EMPr also includes the Generic EMPr for substations which is applicable to the Independent Power Producers' portion of the onsite substation.

It can be confirmed that public participation in being undertaken in terms of Chapter 6 of the NEMA EIA Regulations 2014, as amended.

This report was provided to potentially interested and affected parties for a 30-day review period from **23 August 2022 to 23 September 2022**. All comments received will be used to update the FAR which will be submitted to the competent authority, the DFFE. The DFFE is tasked with making a decision on the amendment application.

Based on the findings of the specialists, the EAP recommends that DFFE amends the EA as requested in **Table 4-1**.

APPENDIX

A

EAP CV



APPENDIX

B

EAP DECLARATION OF INTEREST



APPENDIX

C

SPECIALIST DECLARATIONS



APPENDIX

D

AGRICULTURAL STATEMENT



APPENDIX

E ECOLOGY STATEMENT



APPENDIX

F

NON-GRAZING PLAN OPINION –
TRUSTED PARTNERS



APPENDIX

G

NON-GRAZING PLAN OPINION – DR
D BALFOUR



APPENDIX

H

AVIFAUNA STATEMENT



APPENDIX



BAT STATEMENT



APPENDIX

J

AQUATIC STATEMENT



APPENDIX

K

NOISE STATEMENT



APPENDIX

L VISUAL STATEMENT



APPENDIX

M

TRAFFIC STATEMENT



APPENDIX

N

HERITAGE STATEMENT



APPENDIX

O

SOCIAL STATEMENT



APPENDIX

P

GEOTECHNICAL STATEMENT



APPENDIX

Q

AMENDED ENVIRONMENTAL
MANAGEMENT PROGRAMME



APPENDIX

R

PUBLIC PARTICIPATION



APPENDIX

R-1 *PRE-APPLICATION MEETING MINUTES*

APPENDIX

R-2 *I&AP DATABASE*

APPENDIX

R-3 NOTIFICATION LETTER

APPENDIX

R-4 *ADVERT*

APPENDIX

R-5 *SITE NOTICE*