VOLUME I: PART II AMENDMENT REPORT

PROPOSED AMENDMENT OF THE AUTHORISED PAULPUTS WIND ENERGY FACILITY, NORTHERN CAPE PROVINCE

On behalf of

PAULPUTS WIND ENERGY FACILITY NORTH (RF) (PTY) LTD

JULY 2021

FOR PUBLIC COMMENT

Prepared By:

Arcus Consultancy Services South Africa (Pty) Limited

Office 607 Cube Workspace
Icon Building
Cnr Long Street and Hans Strijdom Avenue
Cape Town
8001

T +27 (0) 21 412 1529 l **E** paulputs@arcusconsulting.co.za
W www.arcusconsulting.co.za

Registered in South Africa No. 2015/416206/07

PROJECT INFORMATION

DFFE Reference No:	14/12/16/3/3/2/1120	
Arcus Reference No:	3944 Paulputs North WEF Amendment.	
Project Title:	Part II Amendment of the Authorised Paulputs Wind Energy Facility, Northern Cape Province.	
Project Director:	Ashlin Bodasing	- Arcus Consultancy Services South Africa (Pty) Ltd
Project Manager & EAP	Ashleigh von der Heyden	- Arcus Consultancy Services South Africa (Pty) Ltd
Specialist Project Team:	Dr Owen Davies	- Arcus Consultancy Services South Africa (Pty) Ltd
	Dr Brian Colloty	- Enviro Sci. (Pty) Ltd
	Jayson Orton	- ASHA Consulting (Pty) Ltd
	Johann Lanz	- Independent Consultant
	Jamie Pote	- Independent Consultant
	Stephen Fautley	- Techso (Pty) Ltd
	Alan Moore	- Arcus Consultancy Services South Africa (Pty) Ltd
	Leandri Kruger	- Independent Consultant
	Kerry Schwartz	- SiVEST SA (Pty) Ltd
	Michael Brits Jason Arnoson	- Arcus Consultancy Services South Africa (Pty) Ltd
Project Applicant:	Paulputs Wind Energy Facility North (RF) (Pty) Ltd	
Report Status:	Part II Amendment Report – Draft for Public Comment	

PUBLIC PARTICIPATION PROCESS: INVITATION TO COMMENT

Invitation to Comment: Members of the public, local communities, and stakeholders are invited to comment on the Amendment Report which is made available for public review and comment from **Friday, 30 July 2021 to Monday, 30 August 2021 (both days inclusive) at the following locations.**

Location	Physical Address	Contact person
Hard Copy Location:		
Pofadder Library	108 Water Street, Pofadder	J. Kamies – 054 933 0221
Electronic Copy Location		
Arcus Website	https://arcusconsulting.co.za/projects/	Ashleigh von der Heyden 021 412 1529
Comment Submission		
Comments can be submitted to: Arcus Consultancy Services South Africa (Pty) Ltd Office 607 Cube Workspace Icon Building Cnr Long Street and Hans Strijdom Avenue Cape Town 8001 T +27 (0) 21 412 1529 l E paulputs@arcusconsulting.co.za		

TABLE OF CONTENTS

VOLUME I: PART II AMENDMENT REPORT

PLATE LIST:

TABLE LIST:

ATTACHED FIGURE LIST:

ABBREVIATIONS, ACRONYMS AND UNITS

BESS	Battery Energy Storage System
CA	Competent Authority
CAA	Civil Aviation Authority
CARA	Conservation of Agricultural Resources, 1983 (Act No. 43 of 1983)
CBA	Critical Biodiversity Area
DFFE	Department of Environment Forestry and Fisheries (National)
DMRE	Department of Mineral Resources
DoE	Department of Energy
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
ECA	Environment Conservation Act, 1989 No. 73 of 1989)
EGI	Electricity Grid Infrastructure
EIA	Environmental Impact Assessment
EMF	Environmental Management Framework
EMPr	Environmental Management Programme
ESA	Ecological Support Area
ESA	Early Stone Age
ESKOM	Eskom Holdings SOC Limited
EWT	Endangered Wildlife Trust
ft	Measurement: foot
GN	Government Notice
GNR	Government Notice Regulation
Ha	Hectares
HIA	Heritage Impact Assessment
I&AP	Interested and Affected Party
IDP	Integrated Development Plan
IPP	Independent Power Producer
IRP	Integrated Resource Plan
kV	Kilovolt
kWh	Kilowatt Hours
Li-ion	Lithium Ion
LSA	Late Stone Age
MSA	Middle Stone Age
MTS	Main Transmission Substation
MW	Megawatt
NaS	Sodium Sulphur
NDP	National Development Plan
NEMA	National Environmental Management Act, 1998 (Act No. 107 of 1998)
NEMBA	National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)
NFEPA	National Freshwater Ecosystem Priority Area
NHRA	National Heritage Resources Act, 1999 (Act No. 25 of 1999)
NPAES	National Parks Area Expansion Strategy
NWA	National Water Act, 1998 (Act No. 36 of 1998)
PES	Present Ecological State
PGDS	Provincial Growth and Development Strategy
PPP	Public Participation Process
REIPPPP	Renewable Energy Independent Power Producer Procurement Programme
S&EIA	Scoping and Environmental Impact Assessment
SABAAP	South African Bat Assessment Advisory Panel
SAHRA	South African Heritage Resources Agency
SANBI	South African National Biodiversity Institute
SANRAL	South African National Roads Agency Limited
SANS	South African National Standards
SCADA	Supervisory Control and Data Acquisition
SDF	Spatial Development Framework
SEA	Strategic Environmental Assessment
SIA	Social Impact Assessment
WEF	Wind Energy Facility

EXECUTIVE SUMMARY

Paulputs Wind Energy Facility (RF) (Pty) Ltd ('PWEF'), a wholly owned subsidiary of WKN Windcurrent SA (Pty) Ltd, was granted environmental authorisation for the 300 MW (75 Turbine) Paulputs Wind Energy Facility (WEF) and its associated 132 kV grid connection on 11 December 2019 by the Department of Forestry, Fisheries and Environment (DFFE) (DFFE Reference No. 14/12/16/3/3/2/1120) (Figure 1). PWEF are proposing to give permission to Paulputs Wind Energy Facility North (RF) (Pty) Ltd and Paulputs Wind Energy Facility South (Pty) Ltd to **split and amend** the Environmental Authorisation (EA) into three amendment applications for EA.

The summary of each amendment application is defined below:

- **Paulputs North Amendment:** Paulputs Wind Energy Facility North (RF) (Pty) Ltd ('Paulputs North' – The Applicant) intents to construct and operate a 150MW WEF[1] (Paulputs North WEF) consisting of up to 40 turbines, with a hub height of up to 180m, blade length of up to 110m and a rotor diameter of up to 220m. This authorisation will also include the authorised Paulputs WEF preferred on-site substation and a proposed Battery Energy Storage Facility in the area authorised for temporary laydown. All infrastructure is to be located on the western side of the N14 Highway. This amendment application and report will be referred to as the 'proposed amendment';
- **Paulputs North Grid Connection Amendment**: PWEF give permission to Paulputs Wind Energy Facility North (RF) (Pty) Ltd to remove the authorised 132 kV Grid Connection (Option C) from its authorisation in favour of ownership by Paulputs Wind Energy Facility North (RF) (Pty) Ltd ('Paulputs North') for use at the Paulputs North WEF site. The approved grid connection will be taken over by Eskom in the future and thus requires its own Environmental Authorisation; and
- **Paulputs South Amendment:** Paulputs Wind Energy Facility South ('Paulputs South') intents to construct and operate a 150MW WEF (Paulputs South WEF) consisting of up to 35 turbines, with a hub height of up to 180m, blade length of up to 110m and a rotor diameter of up to 220m.

The focus of this amendment report is on the Paulputs North WEF Amendment.

This proposed amendment application will be submitted to the DFFE (the Competent Authority) and is summarised below:

Table I: Amendments Applicable to the Authorised 300MW Paulputs WEF

	Authorised	Amendment
Holder of Authorisation	Paulputs Wind Energy Facility (Pty) Ltd	Paulputs Wind Energy Facility North (RF) (Pty) Ltd
Name of Development	The 300 MW Paulputs Wind Energy Facility (WEF) and associated 132 kV grid connection, Northern Cape Province.	The 150 MW Paulputs North Wind Energy Facility (WEF), On-Site Substation and a Battery Energy Storage System, Northern Cape Province.
Authorised Scope	Megawatt Capacity of 300 MW	Reduced Megawatt capacity to 150 MW
	75 Turbine Wind Turbine Generators[2].	Reduced number of turbines to 40.

[1] Paulputs North WEF and Paulputs South WEF will be 150MW each. These WEF's are considered the 'split' of the authorised 300MW Paulputs WEF.

[2] Turbine specifications and proposed amendments given in Section 3.3

	Authorised	Amendment
	Grid Connection Infrastructure	Grid Connection Infrastructure
	Single Circuit, 132kV Grid Connection.	Removal of the Single Circuit, 132kV Grid Connection
	132kV on-site Substation	132kV on-site Substation
		Addition of Battery Energy Storage Facility

In terms of locality, the WEF, substation and BESS locations are provided below:

Table II: Co-ordinates of the Proposed Paulputs North WEF

Reference Point	Latitude	Longitude
WEF Development Area Co-ordinates		
A	28°52'58" S	19°41'30" E
B	28°54'45" S	19°47'05" E
C	28°59'38.21"S	19°41'56.37"E
D	28°57'14" S	19°39'29" E
E	28°55'39" S	19°40'44" E
Authorised On-Site Substation (Option A) Development Area Co-ordinates		
North Corner	28°56'25.66"S	19°42'7.13"E
West Corner	28°56'32.05"S	19°42'7.70"E
South Corner	28°56'32.24"S	19°42'16.53"E
East Corner	28°56'25.89"S	19°42'16.86"E
Battery Energy Storage		
Temporary Laydown	28°56'28.20"S	19°42'14.57"E

The Paulputs WEF is authorised for the maximum height to tip of the blade of 230m, with a hub height of up to 140m, a rotor diameter of up to 180m and a blade length of up to 90m. For the amendment, Paulputs North seek authorisation to amend the turbine specifications to allow for a 110 m blade length and a 180 m hub height. A high-level Battery Energy Storage System (BESS) risk assessment has been conducted. The findings of this assessment are contained in Section 9, whilst the conclusions of the assessment are provided in Section 10.

LEGSLATIVE REQUIREMENTS

To comply with regulation 32(1)aa of the NEMA, 1998 EIA regulations, 2014, as amended and Regulation 660 in terms of the disaster management act the following will be undertaken:

This amendment assessment report has been compiled to assess the impact of splitting and amending the turbine specifications of the authorised Paulputs WEF, and includes the addition of a Battery Energy Storage System (BESS) within the footprint authorised for temporary laydown. Key inclusions in this amendment assessment report are as follow:

1. Statements from specialists confirming whether or not the proposed amendments will change the nature or impact of any of the impacts that were assessed as part of specialist studies for the Authorised Paulputs WEF. *Included in Volume II.*

2. Statements from specialists to confirm whether or not the proposed amendments within the assessed footprint will result in any additional impacts. *Included in Volume II*.
3. Statements from specialists to confirm whether any additional management actions or mitigations are applicable to the proposed amendments. *Included in Volume II*
4. A BESS Technical Study. *Included in Section 3*.
5. A High-level BESS risk assessment. *Included in Section 8 and 9*.
6. A generic EMPr which includes additional management outcomes and actions associated with the BESS. *Included as Appendix B*.

Notification of the availability of the amendment assessment report (incorporating points 1-6 above) will be sent to the following parties:

(a) The Competent Authority;

(b) Each organ of state department that administers a law relating to a matter affecting the environment relevant to an application for the amendment of an environmental authorisation;

(c) all organs of state which have jurisdiction in respect of the activity to which the application for amendment relates;

(d) all I&AP's that were registered as part of the original EIA process;

(e) all I&AP's that were registered on other EIA's that took place on the same properties; and

(f) all neighbouring property owners.

PROJECT TEAM

Name of practitioner	**Ms Ashlin Bodasing**
Designation	Project Director
Tel no	+27 (0) 21 412 1529
E-mail address	paulputs@arcusconsulting.co.za
Name of practitioner	**Mrs Ashleigh von der Heyden**
Designation	Project Manager and EAP
Tel no	+27 (0) 21 412 1529
E-mail address	paulputs@arcusconsulting.co.za

The majority of the same specialists were commissioned for this amendment report, with exception of the Avifaunal study. The original Avifaunal study for the approved Paulputs WEF EIA was undertaken by Andrew Pearson whom is no longer an employee of Arcus.

Dr Owen Davies has replaced Andrew and undertook an additional site visit in February 2020 to verify the information contained in the approved Paulputs WEF Avifaunal specialist report. Dr Davies' avifaunal report and site verification report are contained in Volume II of this report.

SUMMARY OF SPECIALIST IMPACT STATEMENT

- **Aquatic Amendment Assessment** – No additional impacts. Further, no changes to the original mitigations or EMPr recommendations are required.

- **Avifaunal Amendment Assessment** - It is unlikely that the proposed amendments to the Paulputs WEF would result in a change in the significance of impacts as assessed for the authorised Paulputs WEF, including cumulative impacts. Impacts can be mitigated to acceptable levels provided the recommended mitigation measures of the original authorisation are implemented.
- **Terrestrial Ecology Amendment Assessment** – There are no changes in the overall post-mitigation impacts associated with Paulputs North WEF. The changes to the specifications of the wind turbines would not be significant in terms of terrestrial ecology as this would not increase the overall footprint of the development. Thus, overall, the split of the single 300MW development into two 150MW developments would not increase the overall ecological impacts associated with the WEF.
- **Bat Amendment Assessment** - It is unlikely that the proposed amendments would result in a change to the significance in impacts as assessed in the Final EIA – including cumulative impacts. Impacts can be mitigated to acceptable levels provided the recommended mitigation measures of the original authorisation are implemented.
- **Soil, Land Use and Agricultural Potential Amendment Assessment -** There are no agricultural impacts related to this proposed amendment. In addition, there are no agricultural advantages or disadvantages related to it. The proposed amendment does not require any changes or additions to the mitigation measures for agricultural impacts that were recommended for the authorised Paulputs WEF.
- **Heritage and Paleontology Amendment Assessment** - This amendment assessment found that no sites of very high cultural significance were located during the survey. Despite the permanence of impacts to archaeological sites, the low extent and probability of impacts combined to result in a low significance. With mitigation the intensity would become low and the resulting significance would remain low.
- **Visual Amendment Assessment –** There is no change in the impact rating from what was approved in the Visual Impact Assessment (VIA) for the Paulputs WEF. No additional recommendations or mitigation measures are proposed. All mitigation measures set out in the approved VIA remain valid.
- **Noise Amendment Assessment** - Overall, the changes proposed as part of the proposed amendment will not result in any changes to the findings of the authorised Paulputs WEF EIA.
- **Social Amendment Assessment** - The proposed amendment will not result in any additional impacts, cumulative impacts or residual impacts, nor will it change the significance of these impacts. Paulputs North must ensure compliance with the recommendations of Section 4 of the approved Social Impact Assessment for the Paulputs WEF.
- **Traffic Amendment Assessment –** The proposed amendment does not change the Traffic Specialist Report findings and recommendations as stated in the authorised Paulputs WEF EIA. A transport management plan must be compiled and must consider the logistics of transporting abnormal loads to site. This plan must be compiled after preferred bidder is awarded.
- **BESS High-Risk Assessment –** The installation of the BESS will result in negative impacts of a majority low significance. When managed and maintained correctly, impacts are expected to be low to very low. Positive impacts in terms of load variability stabalisation and energy storage will be realized with the installation and operation of a BESS at the Paulputs North WEF. The recommended plans and programmes outlined in Sections 9 and 11 must be implemented.

CONCLUSION

This amendment application is being undertaken to identify and assess environmental impacts, issues and concerns that may result from the proposed amendment to the Environmental Authorisation. The information contained in this report will enable the DFFE to make an informed decision to grant or deny the proposed Environmental Amendment Application.

It is the opinion of the EAP that the proposed project amendments will not affect any change in the impact ratings from those which were assessed during the Paulputs WEF EIA undertaken by Arucs in August 2019. The **proposed amendment can be authorised** subject to Paulputs North adhering to all mitigation and management measures outlined in this report, the approved Paulputs WEF EIA, the Paulputs WEF EMPr as well as the Generic EMPr.

1 INTRODUCTION

Paulputs Wind Energy Facility (Pty) Ltd ('PWEF'), a wholly owned subsidiary of WKN Windcurrent SA (Pty) Ltd, was granted environmental authorisation for the 300 MW (75 Turbine) Paulputs Wind Energy Facility (WEF) and its associated 132 kV grid connection on 11 December 2019 by the Department of Forestry, Fisheries and Environment (DFFE) (DFFE Reference No. 14/12/16/3/3/2/1120) (Figure 1). PWEF are proposing to give permission to Paulputs Wind Energy Facility North (RF) (Pty) Ltd and Paulputs Wind Energy Facility South (Pty) Ltd to **split and amend** the Environmental Authorisation (EA) into three amendment applications for EA.

The summary of each amendment application is defined below:

- **Paulputs North Amendment:** Paulputs Wind Energy Facility North (RF) (Pty) Ltd ('Paulputs North' – The Applicant) intents to construct and operate a 150MW WEF[3] (Paulputs North WEF) consisting of up to 40 turbines, with a hub height of up to 180m, blade length of up to 110m and a rotor diameter of up to 220m. This authorisation will also include the authorised Paulputs WEF preferred on-site substation and a proposed Battery Energy Storage Facility in the area authorised for temporary laydown. All infrastructure is to be located on the north west of the N14 Highway. This amendment application and report will be referred to as the 'proposed amendment';
- **Paulputs North Grid Connection Amendment**: PWEF give permission to Paulputs Wind Energy Facility North (RF) (Pty) Ltd to remove the authorised 132 kV Grid Connection (Option C) from its authorisation in favour of ownership by Paulputs Wind Energy Facility North (RF) (Pty) Ltd ('Paulputs North') for use at the Paulputs North WEF site. The approved grid connection will be taken over by Eskom in the future and thus requires its own Environmental Authorisation. This amendment application and report will be referred to as the 'proposed amendment'; and
- **Paulputs South Amendment:** Paulputs Wind Energy Facility South ('Paulputs South') intents to construct and operate a 150MW WEF (Paulputs South WEF) consisting of up to 35 turbines, with a hub height of up to 180m, blade length of up to 110m and a rotor diameter of up to 220m.

The focus of this amendment report is on the Paulputs North WEF Amendment.

As the proposed amendments require Environmental Authorisation (EA) from the Competent Authority (CA), Paulputs Wind Energy Facility North (RF) (Pty) Ltd ('Paulputs North') appointed Arcus Consultancy Services South Africa (Pty) Ltd ('Arcus') as the project manager and independent environmental consulting firm to undertake the necessary Part II EA Amendment Applications.

1.1 Objectives of this Amendment Report

The proposed amendment aims to identify and assess the potential increase or decrease of impacts associated with amending the specifications and approval of the authorised Paulputs WEF. The findings, including specialist findings, are used by the EAP, Applicant (Paulputs North) and Authorities to obtain an objective view of the potential environmental and social impacts that may/may not arise during the construction, operation and decommissioning of the proposed amendment and its associated infrastructure. Aligned to the '*One Environmental System'*, this amendment report has been compiled with the following objectives:

[3] Paulputs North WEF and Paulputs South WEF will be 150MW each. These WEF's are considered the 'split' of the authorised 300MW Paulputs WEF.

The Report Objectives	•To provide the project's I&APs, stakeholders, commenting authorities and the competent authority (CA), with a thorough project description and amendment process description. •To maintain cordial relationships with local residents, authorities and other stakeholders via sustained open communication. •To determine the policy and legislative context within which the proposed activity is undertaken and how the activity complies with and responds to the policy and legislative context. •To provide an objective assessment of the preferred amendment option/s. •To address the advantages and disadvantages of the proposed amendments through assessing the need and desiirability of the project as well as the proposed project impacts

1.2 Assumptions and Limitations

The following assumptions and limitations are applicable to the proposed amendment:

- The information on which this report is based (baseline studies and project information, as well as existing information) is accurate and correct.
- The assumptions and limitations presented in each specialist report (Volume II of this report) are noted for the amendment report.
- It is assumed that all information provided by Paulputs North WEF and I&APs to the project team was correct and valid at the time it was provided.
- The recommendations derived from this report would be included in all tender documentation/bidding documentation and the EMPr for implementation.
- It should be emphasised that information, as presented in this amendment report, only has reference to the study area (Paulputs North WEF) as indicated on the accompanying figures. Therefore, this information cannot be applied to any other area without detailed investigation.
- As the design of the project has not been finalised, and due to the dynamic nature of the planning environment, the dimensions and layout of the infrastructure may change from draft reporting to final reporting. Subsequent project modifications that emanate from discussions with the I&APs and further technical considerations will be conveyed to the public domain should the need arise.

1.3 Details of EAP and Specialists

As a specialist renewable energy consulting firm, Arcus is a leader in providing environmental and social consulting, advisory and management services. Arcus provides a turn-key consulting service and has considerable experience in renewable energy developments; from site identification and feasibility through to impact assessment and the construction and operational phases.

Based in the United Kingdom and South Africa (Cape Town), our teams have worked on more than 250 renewable energy projects across the world and are highly trained in various environmental disciplines, with significant hands-on experience in an array of projects across various industries.

Arcus focuses on collaborating with the developer to deliver the most cost effective and least impacting project design that meets the needs for future generations. Arcus adopt a communicative and quality-based approach for all projects and have been certified in terms of the Quality Management System ISO 9001 standard for the past four years. This system provides tools, control measures and guidelines for reporting, data management, equipment calibration and management, timeline management, map production and overall project management.

1.3.1 Expertise of the EAP

Ashlin Bodasing (Project Director) is a Technical Director at Arcus. Ashlin will act as Project Director and will be responsible for the overall direction of the project and ensure that all legal requirements are met. Ashlin is a registered EAP with EAPASA, (2020/780)

Having obtained her Bachelor of Social Science Degree (Geography and Environmental Management) from the University of Kwa-Zulu Natal; she has over 16 years' experience in the environmental consulting industry in southern Africa. Ashlin has excellent Project Management experience and has gained major project experience in the development of Environmental Impact Assessments, Environmental Management Plans and the monitoring of construction activities. Her areas of expertise include project management, environmental scoping and impact assessments, environmental management plans, environmental compliance monitoring and environmental feasibility studies, and environmental due diligence reviews.

Ashleigh von der Heyden (Project Manager and EAP) is a Senior Environmental Consultant at Arcus, Cape Town. She is a registered SACNASP Environmental Consultant with 5.5 years working experience in the environmental sector, namely the Renewable Energy and Mining sectors. In addition, she has international reporting experience for the International Finance Corporation (IFC) and Equator Principles (EP) Performance Standards and the World Bank Environmental Guidelines. Ashleigh has a proven track record in managing environmental projects to the required quality standards, timeframes and budgets. Her core responsibilities include client management and project implementation, reporting and execution. Her day-to-day responsibilities include report review, stakeholder engagement and business development.

Ashleigh completed her BSc (Hons) in Conservation Ecology at the University of Stellenbosch and is currently completing her MSc in Environmental Sciences. She is a member of the Soil Science Society of South Africa (SSSSA) and is completing her Project Management Professional (PMP) Certification through the Project Management Institute (PMI).

1.3.2 Specialist Team Members

The majority of the same specialists were commissioned for this amendment report, with exception of the Avifaunal study (Table 1-1). The original Avifaunal study for the approved Paulputs WEF EIA was undertaken by Andrew Pearson whom is no longer a bird specialist.

Dr Owen Davies has replaced Andrew and undertook an additional site visit in February 2020 to verify the information contained in the approved Paulputs WEF Avifaunal specialist report.

Table 1-1: Details of the Specialist Project Team

Technical Discipline	Lead Specialist	Specialist Organisation
Avifauna preconstruction monitoring and assessment	Dr Owen Davies	Arcus Consultancy Services SA Pty Ltd
Bat preconstruction monitoring and assessment	Michael Brits Jonathan Aronson	Arcus Consultancy Services SA Pty Ltd
Terrestrial ecology (flora and fauna)	Jamie Pote	Independent
Soil, land use and agricultural potential	Johann Lanz	Private Consultant
Aquatic / Freshwater	Brian Colloty	EnviroSci Pty Ltd
Heritage, archaeology and palaeontology	Jayson Orton	ASHA Consulting
Socio-Economic	Leandri Kruger	Private Consultant

Noise	Alan Moore	Arcus Consultancy Services SA Pty Ltd
Visual	Kerry Schwartz	SiVest
Traffic and transportation	Stephen Fautley	TechSO

2 DETAILS OF THE AUTHORISED PAULPUTS WEF AND GRID CONNECTION

The Paulputs WEF EIA was finalised and submitted to the DFFE in August 2019. Paulputs Wind Energy Facility (Pty) Ltd received a favourable EA, subject to various conditions. Energy storage in terms of the rechargeable lithium-ion battery pack cabinets are not approved as part of the development as they were not assessed as part of the EIA.

The authorised Paulputs WEF, grid connection and substation was proposed to be located approximately 35 km north-east of Pofadder and approximately 85 km north-west of Kakamas in the Northern Cape Province. The authorised Paulputs WEF was proposed to be situated in two district municipalities, the Namakwa District Municipality and the ZF Mgcawu District Municipality, and within the Khâi-Ma Local Municipality and the Kai !Garib Local Municipality (Figure 1):

Table 2-1: Development Area Co-ordinates Proposed as Part of The Authorised Paulputs WEF EIA

Reference Point	Latitude	Longitude
WEF Development Area Co-ordinates		
A	28°52'58" S	19°41'30" E
B	28°54'45" S	19°47'05" E
C	28°55'07" S	19°46'53" E
D	28°57'39" S	19°47'57" E
E	29°00'21" S	19°45'06" E
F	28°59'42" S	19°42'00" E
G	28°57'14" S	19°39'29" E
H	28°55'39" S	19°40'44" E
Grid Connection (Option C) Development Area Co-ordinates		
Option C - Start	28°58'21" S	19°45'33" E
Option C - Middle	28°53'24" S	19°41'27" E
Option C - End	28°50'45" S	19°41'43" E
On-Site Substation (Option A) Development Area Co-ordinates		
North Corner	28°56'25.66"S	19°42'7.13"E
West Corner	28°56'32.05"S	19°42'7.70"E
South Corner	28°56'32.24"S	19°42'16.53"E
East Corner	28°56'25.89"S	19°42'16.86"E

PWEF sought authorisation for the Paulputs 300 MW WEF (Figure 1 and Table 2-2), which included the following technical details – extracted from the authorised EIA report (Arcus, August 2019).

Table 2-2: Technical Details of the Authorised WEF and Grid Connection

Component	Description/Dimensions
Paulputs WEF	
Location of the site	35 km northeast of Pofadder, Northern Cape Province. Ward 1 of the Khai Ma Local Municipality of DC6 – Namakwa District Municipality.
Farm and SG Codes	Scuitklip 92/2 C03600000000009200002 Scuitklip 92/3 C03600000000009200003 Scuitklip 92/5 C03600000000009200005 Lucasvlei 93/1 C03600000000009300001 Lucasvlei 93/2 C03600000000009300002 Lucasvlei 93/4 C03600000000009300004
Facility Area	The proposed project site is approximately 10 000 hectares. This is the total area covered, in which all components will be located. The actual development footprint will be approximately 2 % of this.
Number of Turbines	Up to 75
Site Access	N14 (NW and SE access - including abnormal loads) and MN759 (NW access only - no abnormal loads)
Hub Height from ground level	Up to 140 m
Blade Length	Up to 90 m
Rotor Diameter	Up to 180 m
Area occupied by inverter transformer stations/substations	Approximately 4 hectares
Capacity of on-site substation	132 kV on-site substation
Authorised Paulputs Grid Connection	
Farm and SG Codes	Scuitklip 92/2 C03600000000009200002
Height of pylons	Maximum of 30 m high
Length of transmission line	Maximum 12.5 km
Types of poles used	Both monopoles and lattice structures are being considered
Area occupied by pylon servitude	Width 31 m x 12.5 km = 39 hectares
Transmission capacity	132 kV line, evacuating a maximum of 300 MW
Area occupied by both permanent and construction laydown areas	Laydown areas used are the same as for the WEF
Area occupied by buildings	The O&M complex will form part of the on-site 200 m x 200 m substation compound
Length of service road	26.8 km (worst case scenario)
Width of service road	3 – 6 m wide
Height of fencing	Maximum 3 m only around on-site substation and buildings
Type of fencing	Wired mesh / chain link fence not electrified

3 DETAILS OF THE PROPOSED PAULPUTS NORTH WEF AMENDMENT APPLICATION

This section provides the technical details and design parameters of the proposed amendment. Additionally, this chapter serves to provide insight on the choice of preferred location and feasible specifications for the construction, operation and decommissioning of Paulputs North WEF.

The proposed amendment will be submitted to the DFFE (the Competent Authority) and is summarised in Table 3-1 below as well as Figure 2 and Figure 3:

Table 3-1: Amendment Applicable to the Authorised 300 MW Paulputs WEF

	Authorised	**Amendment**
Holder of Authorisation	Paulputs Wind Energy Facility (Pty) Ltd	Paulputs Wind Energy Facility North (Pty) Ltd
Name of Development	The 300 MW Paulputs Wind Energy Facility (WEF) and associated 132 kV grid connection, Northern Cape Province.	The 150 MW Paulputs Wind Energy Facility (WEF) North, On-Site Substation and a Battery Energy Storage System, Northern Cape Province.
Authorised Scope	Megawatt Capacity of 300 MW	Reduced Megawatt capacity to 150 MW
	75 Turbine Wind Turbine Generators[4].	Reduced number of turbines to 40.
	Ancillary Infrastructure	Ancillary Infrastructure
	Single Circuit, 132kV Grid Connection.	Removal of the Single Circuit, 132kV Grid Connection
	132kV on-site Substation	132kV on-site Substation

The Paulputs WEF is authorised for the maximum height to tip of the blade will be 230m, with a hub height of up to 140m, a rotor diameter of up to 180m and a blade length of up to 90m. For the amendment, Paulputs North seek authorisation to amend the turbine specifications to allow for a 110 m blade length and a 180 m hub height.

Table 3-2: Co-ordinates of the Proposed Paulputs North WEF

Reference Point	**Latitude**	**Longitude**
WEF Development Area Co-ordinates		
A	28°52'58" S	19°41'30" E
B	28°54'45" S	19°47'05" E
C	28°59'38.21"S	19°41'56.37"E
D	28°57'14" S	19°39'29" E
E	28°55'39" S	19°40'44" E
Authorised On-Site Substation (Option A) Development Area Co-ordinates		
North Corner	28°56'25.66"S	19°42'7.13"E
West Corner	28°56'32.05"S	19°42'7.70"E
South Corner	28°56'32.24"S	19°42'16.53"E
East Corner	28°56'25.89"S	19°42'16.86"E

[4] Turbine specifications and proposed amendments given in Section 3.3

Battery Energy Storage		
Temporary Laydown	28°56'28.20"S	19°42'14.57"E

3.1 Activity Description, Applicant Details and Activity Location

The original specifications of the Paulputs 300 MW WEF Environmental Authorisation stated the following:

Amendment 1: Amendment to the Activity Description

The EA of 11 December 2019 has the following description (page 1):

Authorised:

Application for Environmental Authorisation in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended: The 300MW Paulputs Wind Energy Facility (WEF) and its associated 132kV Grid Connection, Northern Cape Province.

Amended to:

Application for Environmental Authorisation in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended: The 150MW Paulputs North Wind Energy Facility (WEF), On-site Substation and Battery Energy Storage System (BESS), Northern Cape Province.

Amendment 2: Amendment of the Applicant and Project Location

The EA of 11 December 2019 has the following description (page 1):

Authorised:

Holder of the authorisation:

Paulputs Wind Energy Facility (RF) (Pty) Ltd

Location of Activity

Portion 2 of the Farm Scuitklip 92;

Portion 3 of the Farm Scuitklip 92;

Portion 5 of the Farm Scuitklip 92;

Portion 1 of the Farm Lucasvlei 93;

Portion 2 of the Farm Lucasvlei 93;

Portion 4 of the Farm Lucasvlei 93;

Khai-Ma and Kai !Garib Local Municipalities;

ZF Mgcawu and Namakwa District Municipalities;

Northern Cape

Amended to:

Holder of the Authorisation:

Paulputs Wind Energy Facility North (RF) (Pty) Ltd

Location of the Activity:

Portion 2 of the Farm Scuitklip 92;

Portion 3 of the Farm Scuitklip 92;

Portion 5 of the Farm Scuitklip 92; Portion 2 of the Farm Lucasvlei 93; Portion 4 of the Farm Lucasvlei 93; Khai-Ma and Kai !Garib Local Municipalities; ZF Mgcawu and Namakwa District Municipalities; Northern Cape
Amendment 3: Amendment of the Activity Description The EA of 11 December 2019 has the following description (page 7):
Authorised: - For the 300MW Paulputs Wind Energy Fcility (WEF) and its associated 132kV grid connection in the Northern Cape Province, hereafter referred to as "the property".
Amended to: For the 132kV Grid Connection for the Paulputs North Wind Energy Facility, in the Northern Cape, hereafter referred to as the "proposed development'

Refer to Figure 6 for a Landowner Map.

3.2 Listing Notice Activities

In terms of this Amendment, the authorised Listing Notice Activities will remain unchanged.

3.3 Technical Details:

For the 300 MW Paulputs Wind Energy Facility (WEF) and its associated 132 kV grid connection, the following was authorised:

Amendment 4: Amendment to the Technical Description The EA of 11 December 2019 has the following description (page 8):
Authorised: The WEF will comprise of the following: • A maximum of 75 turbines with a total generation capacity of 300 MW. • The maximum height to tip of the blade will be 230m, with a hub height of up to 140m, a rotor diameter of up to 180m and a blade length of up to 90m. • Foundations, hardstands and permanent laydown areas associated with the wind turbines of approximately 0.8Ha. • Internal access roads of approximately 80 km in length (mostly 6m wide but up to 12m, average 8m). • Medium voltage cabling between turbines and the switching station, to be laid underground where technically feasible. • Overhead medium voltage cables between onsite substations where necessary. • One onsite substation compound of approximately 4ha consisting of: onsite substation 1.1ha, offices of 0.5ha, permanent laydown 1ha, and temporary construction yard 1.5ha; and,

- An overhead 132kV power line will be constructed over a distance of approximately 12.5km (Option C).

Amended to:

The WEF will comprise of the following:

- A maximum of 40 turbines with a total generation capacity of 150 MW.
- The maximum height to tip of the blade will be 290m, with a hub height of up to 180m, a rotor diameter of up to 220m and a blade length of up to 110m.
- Foundations, hardstands and permanent laydown areas associated with each wind turbines base is approximately 0.8Ha.
- Internal access roads with a combined length of approximately 45 km in length (mostly 6m wide but up to 12m, average 8m).
- Medium voltage cabling between turbines and the switching station, to be laid underground where technically feasible.
- Overhead medium voltage cables between onsite substations where necessary.
- One onsite substation compound of approximately 4ha consisting of: onsite substation 1.1ha, offices of 0.5ha, permanent laydown 1ha, and temporary construction yard 1.5ha. A Battery Energy Storage is to be located on the area earmarked for temporary construction yard[5].

Amendment 5: Amendment of the WEF Technical Details

The EA of 11 December 2019 has the following description (page 8):

Authorised:

WEF Technical Details:

Component	Description / Dimensions
Location of the site	50 km northeast of Pofadder, Northern Cape Province.
Facility Area	The development site is approximately 10 000 hectares. This is the total area covered, in which all components will be located. The actual development footprint will be approximately 2 % of this.
Number of Turbines	Up to 75
Site Access	N14 (NW and SE access - including abnormal loads) and MN759 (NW access only - no abnormal loads)
Hub Height from ground level	Up to 140 m
Blade Length	Up to 90 m
Rotor Diameter	Up to 180 m
Area occupied by inverter transformer stations/substations	Approximately 4 hectares
Capacity of on-site substation	132 kV

[5] As mentioned, the approved 132kV grid Connection option (c) has been removed from this application and is being dealt with in a separate amendment application.

Amended to:

WEF Technical Details:

Component	Description / Dimensions
Location of the site	35 km northeast of Pofadder, Northern Cape Province. Ward 1 of the Khai Ma Local Municipality of DC6 – Namakwa District Municipality. Ward 9 of the Kai !Garib Local Municipality of DC8 – ZF Mcgawu District Municipality
Facility Area	The proposed amendment site is approximately 8 000 hectares. This is the total area covered, in which all components will be located. The actual development footprint will be approximately 1 % of this.
Number of Turbines	Up to 40 (T1-T40)
Site Access	N14 (NW and SE access - including abnormal loads) and MN759 (NW access only - no abnormal loads)
Hub Height from ground level	Up to 180 m
Blade Length	Up to 110 m
Rotor Diameter	Up to 220 m
Area occupied by inverter transformer stations/substations	Approximately 4 hectares
Capacity of on-site substation	132 kV on-site substation
Battery Energy Storage System (BESS)	Battery Energy Storage System to be installed on the area earmarked for Temporary Storage

Amendment 6: Amendment of the Grid Connection Technical Details

The EA of 11 December 2019 has the following description (page 9):

Authorised:

Grid Connection Technical Details:

Component	Description / Dimensions
Height of Pylons	Maximum of 30m high
Length of Transmission Line	Maximum of 12.5km
Type of Poles used	Both monopoles and lattice structures are being considered
Area to be occupied by pylon servitude	Width 31m x 12.5km = 39 Hectares
Transmission capacity	132kV line, evacuating a maximum of 300MW
Area occupied by both permanent and construction laydown areas	Laydown areas to be used are the same as the WEF
Areas occupied by buildings	The O&M complex will form part of the on-site 200m x 200m substation compound
Length of service road	26.8km (worst case scenario)

Width of service road	3 – 6m wide
Height of fencing	Maximum of 3m only around on-site substation and buildings
Type of fencing	Wire Mesh / Chain link fence not electrified.

Component must be removed from the EA as it is being applied for as part of a separate amendment application for environmental authorisation.

3.3.1 Additional Project Components: Battery Energy Storage System (BESS)

Unlike conventional energy storage facilities, such as pumped hydro, a BESS has the advantage of being flexible in terms of site location and sizing. Therefore, they can be incorporated into, and placed in close proximity, to a wind or solar facility. They also have the advantage of being easily scaled and designed to meet specific demands.

The function of the BESS will be to store peak kinetic energy produced by the Paulputs North for use in the following ways:

- To power the operation of the Paulputs North when the national grid is strained by high (or peak) demand, often resulting in load-shedding.
- To provide excess generation to the national grid which will assist with stabilizing electricity supply during peaks and troughs of demand.
- To reduce the impact caused by the variability and limited predictability of wind generation.

The battery technology being considered is Flow, Solid-State, Lithium Ion (Li-Ion) and/or Sodium Sulphur batteries. With uncertainty regarding the preferred battery technology of choice, the EAP has undertaken a high-level desktop study and risk assessment of the BESS for the proposed amendment. The battery technologies under consideration are explained further below, and compared in a table of advantages and disadvantages.

3.3.1.1 The NEMA and BESS

As discussed in the Pre-Application meeting held with DFFE on 14 August 2020, the BESS will not trigger any listed activities on its own due to the fact that is to be located on an area already authorised for storage related activity. Furthermore, activities relating to storage of dangerous goods, such as Activity 14 of Listing Notice 1 and Activity 10 of Listing Notice 3, will not be triggered by the proposed battery storage facility installation, due to the following:

- A battery is not deemed to be a container; and
- Electrolytes that are used within battery storage facilities: their function is deemed to be like transformers within substations: converting high voltage electricity to lower voltage electricity for further distribution. The function of the battery is not for “storage” or “storage and handling” of a dangerous good.

Battery storage does not trigger any listed activities relating to the generation of electricity as technology does not ‘generate’ electricity, it simply stores electricity generated by a renewable energy facility (Paulputs North WEF in this instance) and discharges the stored electricity as and when required by the grid

3.3.1.2 BESS Technologies under Consideration

Typically BESS consist of multiple battery cells that are assembled together to form modules. Each cell contains a positive electrode, a negative electrode and an electrolyte. A module may consist of thousands of cells working in conjunction. Modules are normally

packaged inside containers (similar to shipping containers) and these containers are delivered pre-assembled to the WEF site (Plate 3-1 shows the inside of one such container).

Paulputs North anticipates the placement of containers within the area currently authorised for temporary laydown. Ancillary (or associated) infrastructure will include (but not limited to):

- a battery room;
- inverters;
- switch gear room; and
- Supervisory Control and Data Acquisition (SCADA) equipment.

The containers will have approximate dimension ranges of: height 2 m - 5 m, width 1.5 m - 3 m, length 7 m - 20 m. The containers are raised slightly off the ground and are bunded to prevent possible environmental damage resulting from any equipment malfunction. The proposed development is considering the option of stacking these containers vertically to a maximum of two container layers or a height of 10m.

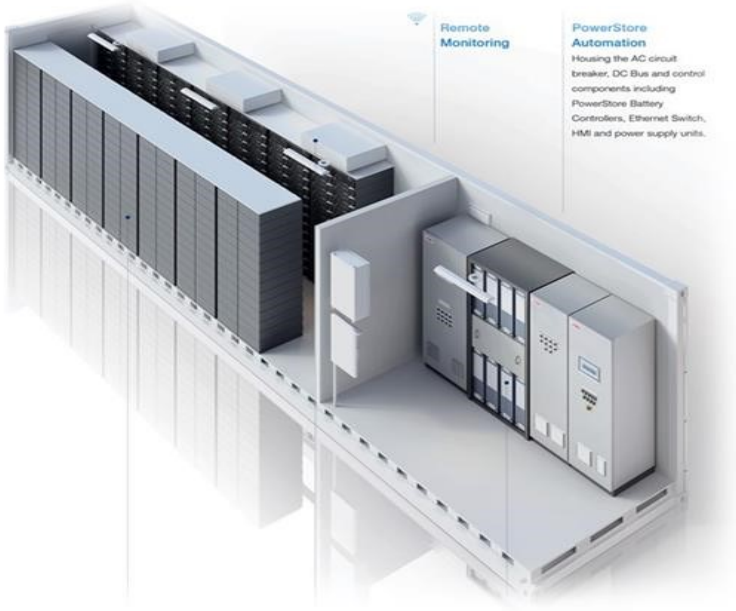

Plate 3-1: Typical representation of how batteries and battery modules are housed and assembled.

Lithium ion (Li-ion) batteries are the most common stationary battery in the market today. Simply put, the batteries consist of a graphite electrode and a lithium-based electrode immersed in a liquid. When the battery is in use, charged lithium atoms ions flow from the graphite electrode to the lithium-based electrode through the liquid, and that flow of charged particles is what generates electricity. When the battery is recharged the flow is reversed, sending the lithium ions back to the graphite anode where they are stored ready for discharge.

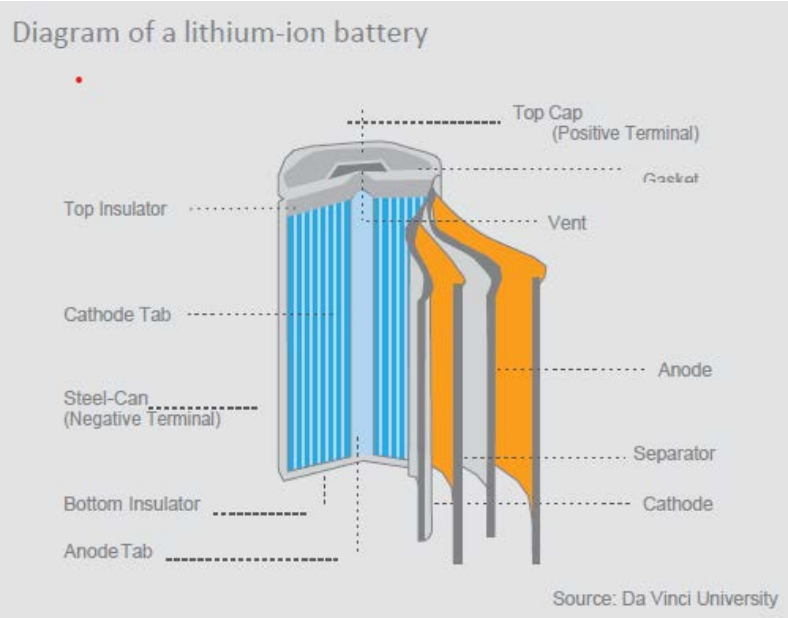

Plate 3-2: Diagram of a Lithium-Ion Battery

A sodium sulphur (NaS) battery is a molten state battery constructed from sodium (Na) and sulphur (S). The battery casing is the positive electrode while the molten core is the negative electrode. The battery operates at high temperatures of between 300-350 degrees Celsius (°C), while lower temperature versions are under development. In charging, the sodium ions are transported through the ion selective conductor to the anode reservoir. Discharge is the reverse of this process. Since sodium ions move easily across the ion selective conductor, electrons cannot, therefore there is no self-discharge. When not in use the batteries are typically left under charge so that they will remain molten and be ready for use when needed. If shut down and allowed to solidify, a reheating process is initiated before the batteries can be used again.

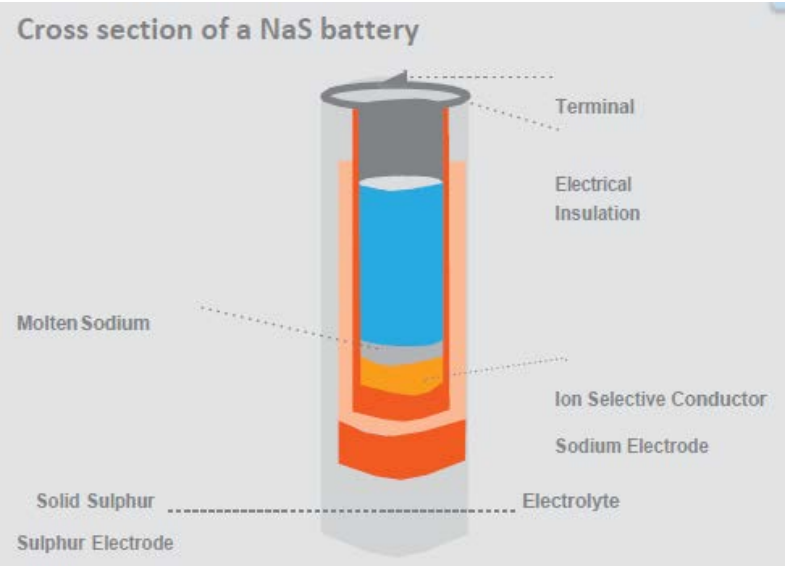

Plate 3-3: Diagram of a Sodium-Sulphur Battery

Solid State Battery is an acceptable solution to assist with reducing the fire risk Li-ion batteries pose. Unlike Li-Ion Batteries, Solid State Batteries have an ionic liquid made up of non-flammable molten salts with low melting points i.e. the electrolyte is considered a solid. Compared to Li-ion batteries with liquid electrolytes, SSBs offer an attractive option

owing to their potential in improving safety and achieving both higher power and high energy densities. The trade-off with this type of battery is that electrically charged atoms do not move as freely and easily through a solid as they do through a liquid, so thus making them less efficient at generating electricity.

Flow Batteries consist of two tanks of liquids that feed into electrochemical cells. The main difference between flow and conventional batteries is that flow batteries store the electricity in the liquid rather than in the electrodes. They're far more stable than Li-ion, they have longer lifespans, and the liquids are less flammable. Not only that, but a flow battery can be scaled up by simply building bigger tanks for the liquids. The most typical flow battery is vanadium flow battery.

Table 3-3 describes the most widely used technologies available in the market, and the most feasible technology for large utilities projects. It must be noted that the technology is constantly changing and evolving and as such the Applicant would utilise the best possible technology available at the time of placement.

Table 3-3: The technology options for the BESS[6][7][8]

Activity Alternative	Advantage	Disadvantage
Li-Ion Batteries	• Lithium ion has the smallest installation footprint when compared to the technologies for the similar energy capacity. • Li-ion batteries are able to tolerate more discharge cycles than other technologies • High efficiency	• Negative effects of overcharging/ over discharging • Potential for issues associated with overheating (Certain Lithium chemistry's) • The Lithium in this technology is considered hazardous / dangerous goods.
NaS Batteries	• Long life cycle • Able to tolerate a high number of charge/discharge cycles • ability to discharge fully with no effects to the performance	• low energy to size ratio • Heating may be required • Potential safety issues with the molten sodium • Has the potential to catch on fire.
Flow Batteries	• More stable than Li-Ion battery • Are known to have the longest lifespan • Less flammable liquids • Technology is scalable for large grid infrastructure and renewable energy project.	• the liquids can be costly, so there's a greater up-front cost for the batteries • Not as efficient as Li-Ion Battery
Steady State Battery	• Potential to substitute Lithium for another electrode material • Marked improvement in safety at cell and battery levels: solid electrolytes are non-flammable when heated, unlike their liquid counterparts. • It permits the use of innovative, high-voltage high-capacity materials, enabling denser, lighter batteries with better shelf-	• Reduced conductivity • Sourcing of a suitable electrolyte • Not as well researched and widely accepted as Li-Ion batteries • Narrow temperature range and cannot tolerate varying temperature

[6] Li-Ion Battery and Na-S Battery: https://ensia.com/features/battery-innovations-renewable-energy/

[7] Flow Battery: https://newatlas.com/energy/iron-aqds-flow-battery-usc/

[8] Solid State Battery: https://www.greentechmedia.com/articles/read/us-storage-companies-quietly-grow-bets-on-solid-state-batteries

Activity Alternative	Advantage	Disadvantage
	life as a result of reduced self-discharge • simplified mechanics as well as thermal and safety management	

No hazardous substances are expected to occur or be stored on site for the Paulputs North WEF, and no additional listing notice activities are triggered by the placement and operation of the BESS.

Plate 3-4 provide a visual representation of a typical set up of an on-site substation and BESS. Paulputs North WEF will have similar project components and will be designed in a similar manner. Figure 3 illustrated the ancillary project layout proposed for the Paulputs North WEF.

Plate 3-4: A stock image of a similar development with an on-site substation and BESS. Source [https://reneweconomy.com.au/why-grid-based-battery-storage-is-already-a-no-brainer-in-australia-85967/]

3.4 Conditions of the Environmental Authorisation to be Retained or Changed

This application intends to amend the details of the authorised Paulputs WEF EA. Paulputs North intends to split the authorised WEF as mentioned above.

3.4.1 Scope of the Authorisation

The proposed amendment to the Scope of the Authorisation are included in Table 5-4 for Paulputs North WEF.

Table 5-4: Conditions of the Authorised EA to be Retained or Changed

Condition in EA	Amended, Retained or Removed	Amended Condition and/or compliance statement
1.	Amended	The 150 MW Paulputs North Wind Energy Facility (WEF), on-site substation and battery energy storage system, as described above, is hereby authorised.

Condition in EA	Amended, Retained or Removed	Amended Condition and/or compliance statement
2 -3	No changes. To be retained as is in new EA.	The conditions and wording as per the original EA to be retained as is.
4	Amended	Activities authorised my only be carried out at the property as described in the amendment application.
5-13	No changes. To be retained as is in new EA.	
14	Remove	A new EMPr, in compliance with the approved Paulputs WEF EA (DEA Ref. No: 14/12/16/3/3/2/1120) has been submitted with this amendment report. In addition, a generic EMPr for the on-site substation will accompany this amendment application. Condition 14 will be subject to the CA decision on the provided EMPr's which have been subjected to 30-day Public Review periods.
15-23	Remove	A new EMPr, in compliance with the approved Paulputs WEF EA (DEA Ref. No: 14/12/16/3/3/2/1120) has been submitted with this amendment report. In addition, a generic EMPr for the on-site substation will accompany this amendment application. Condition 15 - 23 will be subject to the CA decision on the provided EMPr's which have been subjected to 30-day Public Review periods.
24-36.	No changes. To be retained as is in new EA.	The conditions and wording as per the original EA to be retained as is.
37	Slight Change	A construction and operational avifauna and bat monitoring plan must be developed and implemented according to the latest Birdlife South Africa/Endangered Wildlife Trust: Best practice guidelines for avian monitoring and impact mitigation at proposed wind energy development sites in Southern Africa and the latest South African Bat Assessment Advisory Panel's {SABAAP} guidelines. A Bat management plan must be developed and implemented.
38.	Slight change	As an absolute minimum, avifauna and bat monitoring, to survey impacts resulting from the infrastructure on the bird communities with focus on assessing the displacement and disturbance effects of the development on the bird communities, as well as bird collisions and continue to gather information on the bird communities present in the area and monitor the effectiveness of the mitigation measures, must occur during the construction period and continue for at least two years during the operation of the facility. The results of this monitoring must be made available to the Department of Environmental Affairs (DEA), Birdlife South Africa (BLSA) and the South African Bat Assessment Advisory Panel (SABAAP) and must further advise the EMPr and generic EMPr where necessary
39.	No changes. To be retained as is in new EA.	The conditions and wording as per the original EA to be retained as is.
40-41.	Removed	Not applicable to the amendment.
42-53.	No changes. To be retained as is in new EA.	The conditions and wording as per the original EA to be retained as is.

Condition in EA	Amended, Retained or Removed	Amended Condition and/or compliance statement
54.	Slight change.	The recommendations of the EAP in the EIAr dated August 2019 and the specialist studies attached must be adhered to, and this includes the recommendations of the EAP in the Amendment Report dated October 2020 and the specialist studies attached. In the event of any conflicting mitigation measures and conditions of the Environmental Authorisation, the specific condition of this Environmental Authorisation will take preference.
55-56.	No changes. To be retained as is in new EA.	The conditions and wording as per the original EA to be retained as is.

4 CHANGES TO THE ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPr)

This Section aims to detail the proposed amendments and/or additions to the EMPr submission as part of this amendment application and amendment report.

Although an EMPr was compiled as part of the authorised Paulputs WEF EIA (Arcus, August 2019), this EMPr was not authorised in the Environmental Authorisation. There was no EMPr authorised as part of the Paulputs WEF development, and as such, there will be no changes proposed.

An EMPr compiled by Arcus, and a generic environmental management programme (EMPr) for the development and expansion for overhead electricity transmission and distribution infrastructure is included as Appendix B.

The objective of the generic EMPr is to prescribe and pre-approve generally accepted impact management outcomes and impact management actions, which can commonly and repeatedly be used for the avoidance, management and mitigation of impacts and risks associated with the development or expansion of overhead electricity transmission and distribution infrastructure. The use of a generic EMPr is intended to reduce the need to prepare and review individual EMPrs for applications of a similar nature. The EMPr's can be found in Appendix B.

5 LEGISLATIVE REQUIREMENTS

Plate 5-1 below provides a brief summary of the methodology that is applied in conducting the amendment process.

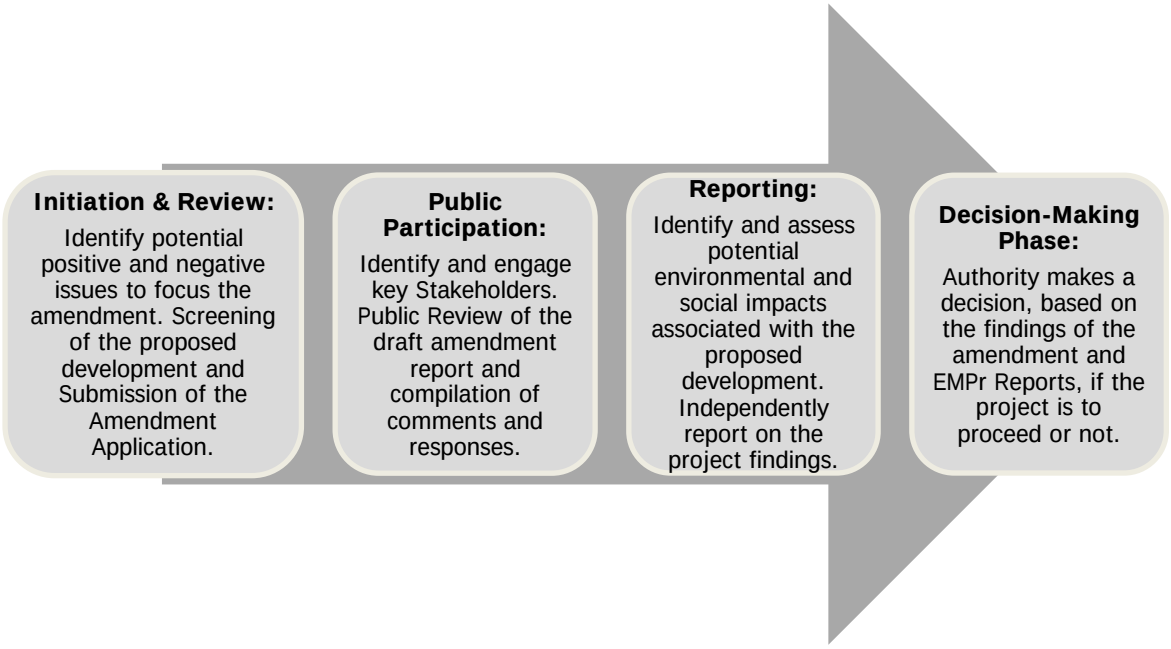

Plate 5-1: Summarised Methodology applied to conducting an amendment process

This EA Amendment Report has been compiled in compliance with the National Environmental Management, 1998 (Act No. 107 of 1998) (NEMA) EIA Regulations 2014, as amended. Paulputs Wind Energy Facility (Pty) Ltd are applying for an amendment to the EA issued by the DFFE (DFFE Reference No. 14/12/16/3/3/2/1120) in terms of Regulation 31 and 32 of the EIA Regulations. Regulation 31 of the EIA Regulations 2014 as amended states that:

'An environmental authorisation may be amended by following the process prescribed in this Part if the amendment will result in a change to the scope of a valid environmental authorisation where such change will result in an increased level or change in the nature of impact where such level or change in nature of impact was not-

(a) assessed and included in the initial application for environmental authorisation; or

(b) taken into consideration in the initial environmental authorisation;

and the change does not, on its own, constitute a listed or specified activity.'

In compliance with Regulation 32 of the NEMA EIA Regulations 2014, as amended, the specialists assessed the proposed changes to the authorised project description and highlighted the advantages and disadvantages of the proposed amendments, and provided further recommendations or mitigation measures if necessary.

Table 5-1: Legislative Requirements of the Amendment Report

CONTENTS OF THE AMENDMENT REPORT	
32 (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 -**	**Chapter**
(a) A report, reflecting –	
An assessment of all impacts related to the proposed change;	Section 10
Advantages and disadvantages associated with the proposed change;	Section 11
Measures to ensure avoidance, management and mitigation of impacts associated with such proposed change; and	Section 12

CONTENTS OF THE AMENDMENT REPORT	
Any changes to the EMP.	Section 4
Which report –	
aa. Had been subjected to a Public Participation Process (PPP), 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
bb. Reflects the incorporation of comments received, including any comments of the competent authority; or	Appendix C
~~(b) A notification in writing that the report will be submitted within 140 days of receipt of the 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 not contained in the report consulted on during the initial PPP contemplated in sub-regulation (1) (a) and that the revised report will be subjected to another PPP of at least 30 days.~~	Not applicable
~~32 (2) In the event where sub-regulation (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

In addition to the above, this report has taken cognisance of the following legislation.

Table 5-2: Additional Legislative Requirements of the Amendment Report

Applicable National Legislation and Guidelines used to compile the report
The Constitution of South Africa, 1996 (Act 108 of 1996).
National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA)
National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) (NEM: WA)
National Water Act, 1998 (Act No. 36 of 1998) (NWA)
National Environmental Management: Biodiversity Act, 2004 (Act No.10 of 2004) (NEM:BA)
National Environmental Management: Protected Areas Act, 2003 (Act No 57 of 2003 as amended) (NEM:PAA)
Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983)
The National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA)
National Road Traffic Act, 1996 (Act No. 93 of 1996) (NRTA)
National Forests Act, 1998 (Act No. 84 of 1998) (NFA)) and National Veld and Forest Fire Act, 1998 (Act No. 101 of 1998).
Hazardous Substances Act, 1973 (Act No. 15 of 1973) The Regulations for Hazardous Chemical Substances apply to an employer or a self-employed person who carries out work at a workplace which may expose any person to the intake of hazardous chemical substances at that workplace. Regulations 14 and 15 provide for the labelling, packaging, transportation and storage and the disposal of hazardous chemical substances respectively. These regulations set out specific requirements which form part of an employer's duty to provide and maintain, as far as reasonably practicable, a working environment that is safe and without risk to the health of his or her employees. No hazardous substances are expected to occur or be stored on site for this proposed development. Although a battery is not regarded as above, there may indeed be instances where a battery is not fully assembled and the electrolyte (or substances making up such electrolyte) intended for such battery, may potentially be stored on site, in a container (e.g. tanks), prior to filling. In this instance, should the electrolyte be stored in a container, such facility or infrastructure will indeed be regarded as a facility or infrastructure for the storage, or storage and handling of a dangerous good, as these would have as its purpose then, not the storage of energy, but indeed the storage of that substance (if indeed a dangerous good).

Applicable National Legislation and Guidelines used to compile the report
Promotion of Access to Information Act, 2000 (Act No. 2 of 2002) (PAIA)
National Dust Control Regulations, 2013
The National Development Plan, 2030
The Public Participation Guidelines in terms of the National Environmental Management Act, 1998 Environmental Impact Assessment Regulations, 2017
Integrated Environmental Management Guideline on Need and Desirability, 2017
South Africa's National Biodiversity Strategy and Action Plan
National Environmental Management Act; National Appeal Regulations, 2014
Applicable Provincial Legislation and Guidelines used to compile the report
The Nature and Environmental Conservation Ordinance No. 19 of 1974; and Northern Cape Nature Conservation Act, 2009 (Act No. 9 of 2009).
Northern Cape Provincial Spatial Development Framework (PSDF), 2012

In addition to the above, the renewable energy industry has substantial support in the South African planning context, which is detailed in the following national and provincial plans:

- National Development Plan;
- National Integrated Energy Plan (2016)
- Renewable Energy Development Zones (REDZ) as read in GNR 114 and GNR 113 of 16 February 2018;
- National Integrated Resource Plan for Electricity,2019 (2010-2013); and
- National Infrastructure Plan.

6 PUBLIC PARTICIPATION PROCESS

The Public Participation Process (PPP) has been designed to comply with the regulatory requirements set out in the EIA Regulations of 2014 (as amended). In addition, the public participation for this project has been aligned to the NEMA PPP Guidelines (2017) and is not intended to be a substitute for the provisions of the NEMA, the SEMAs or the Regulations, in any way.

Public Participation is an important part of any application and must be done appropriately to prevent the project being at risk from challenge that due process has not been followed.

The aim of PPP for the Amendment Process is outlined below:

- Facilitate I&APs to raise any issues of concern and/or suggestions for enhanced benefits;
- Verify that issues have been recorded and considered in the Amendment process by the project team;
- Host a facilitated public meeting, *if required*;
- Assist in identifying reasonable alternatives;
- Provide relevant local information and knowledge to the environmental assessment;
- Facilitate comment on the findings of the environmental assessments; and
- Obtain information on the outcome, i.e. the competent authority's decision, and how and by when the decision can be appealed.

Arcus encourages stakeholder involvement throughout the project process. Stakeholders can become involved in the project in the following ways:

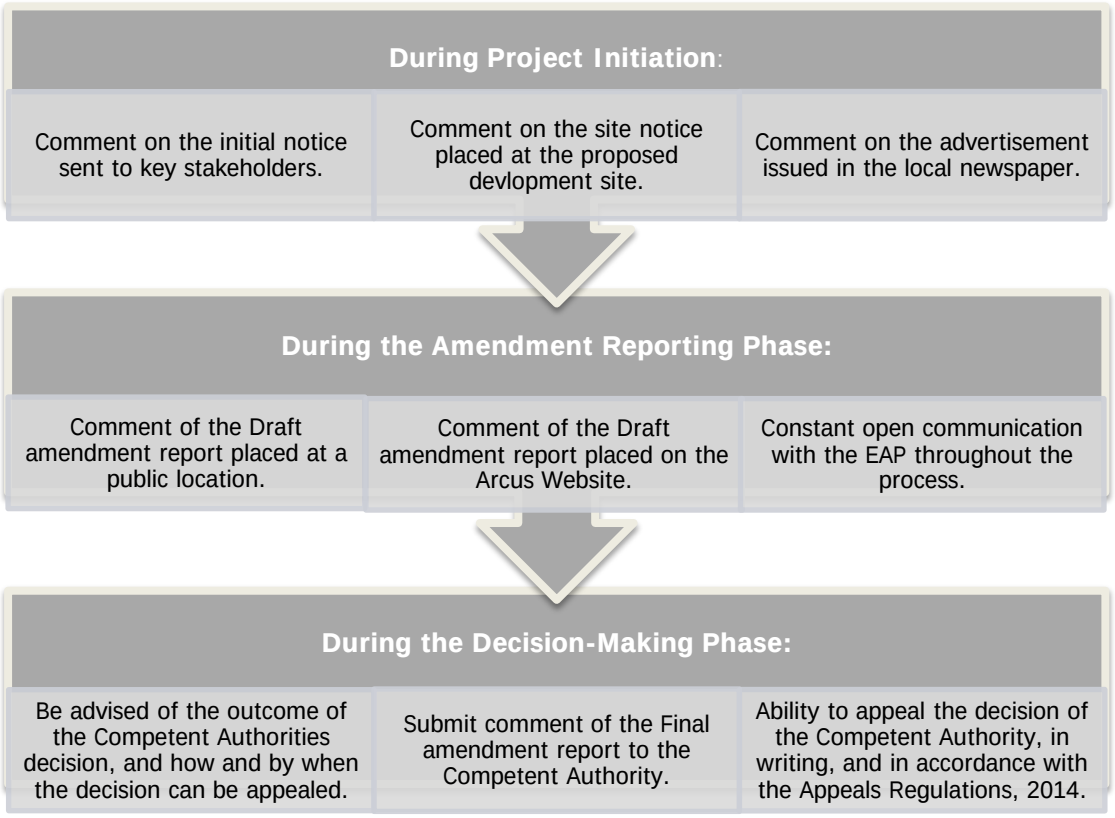

Plate 6-1: Phases in the project where stakeholders are able to be involved in the proposed amendment

A public participation plan (PP Plan) was compiled and submitted to the CA on the 26 August 2020. This plan was submitted in compliance with regulation GNR660 published on 05 June 2020 in terms of the Disaster Management Act (57/2002) and titled: Directions Regarding Measures to Address, Prevent and Combat the Spread of COVID-19 Relating to National Environmental Management Permits and Licences. In compliance with Section 5.1 and Annexure 2 of these regulations, a public participation plan must be presented to the competent authority for approval prior to implementation.

The plan was not granted written approval for the following reason:

> "Please note that the Department has no mandate to approve the Public Participation Plan during alert level 2 of Covid-19. The direction that required submission of PPP during level 3 is no longer applicable in level 2. However, you are required to ensure that the EIA Regulations 2014 as amended are strictly followed and ensure that the disaster management directions which are still applicable are considered"

Despite the above, Arcus have taken the decision to continue to follow the PP Plan that was submitted on 26 August 2020.

This application is for a Part 2 Amendment of an existing EA and is submitted in terms of Regulation 31. The public participation requirements for a Part 2 Amendment are contained in Regulation 32(1)(aa), which requires that the amendment report be 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 interested and registered interested and affected parties, including organs of state, which have jurisdiction in respect of the relevant activity and the competent authority.

In terms of the above, and in accordance with the submitted Public Participation Plan, the following actions in Section 3.1.1 and Section 3.1.2 will be/have been undertaken for this amendment report.

6.1.1 Identification of Key Stakeholders

The I&AP database of the authorised Paulputs WEF EIA (Arcus, 2019) process was used as a baseline for this amendment application.

The Department of Forestry, Fisheries and Environment (DFFE) will act as the CA on the proposed amendment. A stakeholder database has been compiled and will be updated throughout the environmental regulatory process (Appendix C).

Registration of I&APs will continue throughout the process, and the I&AP database will be updated accordingly, based on comments received and included in the final amendment report.

All comments are included in the Comments and Responses Table, and responded to and addressed by the project team, i.e. EAP, Applicant and Specialists as applicable. The Comments and Responses Report will be provided in Final EA Amendment Report.

6.1.2 Public Participation Materials

Considering the legislative and good practice requirements, the following have been developed and distributed to stakeholders. The various PPP information materials which were used as part of the Amendment process are included in Appendix C.

- Distribution of the Initial Notification: Letters announcing the Amendment process and inviting I&APs to register on the project database were sent on 21 July 2021.
- Background Information Document (BID): The BID was distributed on 21 July 2021.
- Newspaper Advertisement: Advertisements were placed in the Gemsbok and Die Burger newspapers on 13 November 2020.
- Site Notice: Site notices and posters were erected around the site as well as in the town of Pofadder and Kakamas in February 2020.
- Notification Letter of Draft Report Availability: Notification letters announcing the availability of the amendment report were sent to the I&AP Database on the 30 July 2021.

Invitation to Comment: Members of the public, local communities, and stakeholders are invited to comment on the Amendment Report which is made available for public review and comment from **Friday, 30 July 2021 to Monday, 30 August 2021 (both days inclusive)** at the following locations.

Location	Physical Address	Contact person
Hard Copy Location:		
Pofadder Library	108 Water Street, Pofadder	J. Kamies – 054 933 0221
Electronic Copy Location		
Arcus Website	https://arcusconsulting.co.za/projects/	Ashleigh von der Heyden 021 412 1529
Comment Submission		
Comments can be submitted to: Arcus Consultancy Services South Africa (Pty) Ltd Office 607 Cube Workspace Icon Building Cnr Long Street and Hans Strijdom Avenue		

Location	Physical Address	Contact person
Cape Town 8001 T +27 (0) 21 412 1529 I E paulputs@arcusconsulting.co.za		

Registration of I&APs will continue throughout the amendment application process, and the I&AP database will be updated accordingly, based on comments received and included in the final Amendment Report.

6.1.2.1 Comment and Responses

Comments received throughout the application process will be captured in a Comments and Reponses Report (CRR) to form part of the PPP Appendix C.

Comments received before finalisation of this draft amendment report have been included in the Comments and Response trail, and responded to and addressed by the project team, i.e. EAP, Applicant and Specialists as applicable. The Comments and Response Trail will be updated throughout the process as comments are received and will be included in Appendix C of the final Amendment Report.

7 MOTIVATION FOR UNDERTAKING THE PROPOSED AMENDMENTS

The authorised turbine model with specifications of 140 m hub height and 180 m rotor diameter is no longer the preferred wind turbine technology. Paulputs North therefore, wishes to amend the authorised turbine specifications and change the hub height to up to 180 m and the rotor diameter to up to 220 m to facilitate the most efficient turbine model and to further future proof the project amidst rapid technology developments. In addition, the advantages of the proposed amendment relate to the increase in the individual generating capacity of the turbines allowing for a potential reduction in the total number of turbines required to achieve the maximum generation capacity of the facility.

Included in this amendment is the split of the authorised turbine numbers from 75 to 40 turbines for this application.

From the authorised application, Paulputs Wind Energy Facility North (RF) (Pty) Ltd intends to bid and develop the Paulputs North WEF under the Department of Energy's REIPPPP. For Paulputs North to meet the bidding requirements, the applicant proposed to split the authorised Paulputs WEF along the N14 into two smaller wind farms (namely Paulputs North WEF and Paulputs South WEF).

The authorised layout has been updated due to the project split (Figure 3).

The findings and assessment of the authorised Paulputs WEF (Arcus, August 2019) indicated that renewable energy is strongly supported at a national, provincial and local level. Therefore, the need and desirability of the authorised Paulputs WEF (Arcus, August 2019) remain valid for this amendment application.

The need for the proposed amendment is supported in terms of meeting the country's climate change goals, and in terms of reducing the country's dependence on fossil fuels as the main source of meeting the country's electricity requirements. National, provincial and local policies and planning documents support the development of renewable energy facilities, and the associated socio-economic boost at the local level in an area that is in need of it.

The establishment of the proposed Paulputs North WEF will create direct jobs largely during the construction period. Indirect jobs in accommodation, catering and other services that would support a wind farm as well as training, business and skill development opportunities will be realised. REIPPPP local economic development requirements are expected to

enhance these positive benefits. Several other renewable energy facilities located nearby will result in further enhancement of the positive socio-economic benefits.

The proposed amendment site is currently used for low intensity grazing and has little potential for other types of land use. Grazing could continue on the site during the construction and operation of the development. Cumulatively the proportion of land potentially occupied by renewable energy facilities within a 35 km radius of the site is approximately 1 % (Figure 4). In an area of low agricultural or other land use potential, and considering the need to meet South Africa's renewable energy generation targets, the proposed amendment is desirable at this time and place.

A requirement of the REIPPPP is that in the development of any WEF, the local economy must benefit through employment opportunities, skills development, and the development or enhancement of community infrastructure. The cumulative effect of the proposed amendment and other developments in the area has the potential to result in highly significant positive socio-economic opportunities for the region.

The development of an additional operational BESS as part of the Paulputs North WEF is desirable for a several reasons. These are:

- The BESS will diminish the invariability of energy supply into grid – thus making power supply into the national Eskom grid more reliable.
- The REIPPPP has requirements for '*key principles for the design*' of the Independent Power Producers (IPP) Request for Qualification and Proposal (RFP). If Paulputs North cannot construct an independent on-site substation with a BESS (i.e. the No-Go alternative is preferred and the project is not approved), the Paulputs North WEF project may be limited in its capacity to be a competitive bidder within the REIPPP or any programmes going forward.
- Lastly, should the no-go alternative be implemented (the project is not approved) for the proposed development, there could be a reduced efficiency of the Paulputs North WEF and potential operational interruptions of the WEF as a result of an unstable grid or reduced wind resource

8 RECEIVING ENVIRONMENT

As the proposed amendment falls within the northern portion previously assessed as part of the authorised footprint of the Paulputs WEF EIA, the site description and attributes associated with this amendment remain unchanged from what was presented in the original environmental assessment.

9 SPECIALIST ASSESSMENT OF THE PROPOSED AMENDMENT

The EIA conducted by Arcus in 2019 for the authorised Paulputs WEF assessed the potential impacts of the proposed amendment by using specialist input. The same specialists were commissioned during this EA Amendment process.

The Paulputs WEF Final EIA Report (Arcus, August 2019) concluded that there are no negative high residual impacts, including potential cumulative impacts associated with the proposed amendment.

As agreed with the competent authority during the pre-application meeting, this amendment assessment is supplemented with statements from the specialists outlined in Table 1-1. The findings of each of these specialists relating to the potential impacts of the proposed amendments are summarised in the following sections.

9.1 Environmental Screening Tool

In terms of GN R960 (promulgated on 5 July 2019), and Regulation 16 (1)(b)(v) of the EIA Regulations, 2014 (as amended), the submission of a Screening Report generated from the national web based environmental screening tool is compulsory for the submission of BA, Part II and EIA applications in terms of Regulation 19 and 21 of EIA Regulations, 2014 (as amended).

Arcus finalised the screening tool assessment on 23 July 2021 (Volume II). The tool found that 7 Solar Development Applications have been authorised within a 30km radius of the proposed development Environmental Management Frameworks (EMF). The majority of these are Concentrated Solar Power (CSP) projects. A portion of the project falls within the Olifants EMF in the ZF Mgcawu District Municipality EMF. In terms of development incentives, restrictions, exclusions or prohibitions, the tool concluded that the site falls within the Strategic Transmission Corridor – specifically the Northern Corridor.

Based on the identified footprint sensitivities of the proposed development, the requirements for submission of the screening tool report is applicable as it triggers Regulation 19 of the NEMA EIA Regulations, 2014 (as amended). Table 9-1 provides a summary of the specialist assessments identified by the tool, and the response to each assessment in terms of the proposed development.

Table 9-1: Specialist assessments identified in terms of the national web based screening tool for the proposed development

Identified Specialist Assessment	Identified Screening Tool Sensitivity		Site Verification Statement	Specialist Opinion (Agree with Screening tool or Disagree with Screening tool)
	WEF	Substation		
Agricultural Impact Assessment	**Medium Sensitivity**	**Medium Sensitivity**	The significance of all agricultural impacts is kept low by two important factors. The first is that the actual footprint of disturbance of the wind farm constitutes only a very small proportion of the available grazing land. The second is the fact that the proposed site is on land of very limited agricultural potential that is only viable for grazing. The motivation and evidence for confirming the sensitivity is that the low land capability of the area is predominantly a function of the arid climate. The aridity of the climate is entirely beyond dispute, and there is no particular evidence needed to show this. The differences between medium and low sensitivity on this site are largely insignificant and are more a result of the way the land capability data is generated per pixel, than any practical, on the ground differences in agricultural potential. The BESS facility should be appropriately designed to ensure that no hazardous or harmful substances can leak into the environment. Such design may include specific safety design features built into the battery modules and containers themselves, or where hazardous liquids are present, suitable, large enough bunds to contain any leaks should they occur.	Disagree
Archaeological and Cultural Heritage Impact Assessment	**High Sensitivity**	**Low Sensitivity**	The majority of the site is of low sensitivity with only small pockets (where archaeological resources were found) considered to be of medium sensitivity. Since none of the sites were of high cultural significance, these can all be considered as medium sensitivity areas.	Disagree
Palaeontology Impact Assessment	**Medium Sensitivity**	**Medium Sensitivity**	The screening tool report contains no palaeontological map which indicates 100% low sensitivity. This is in line with the specialist study conducted during the impact assessment phase.	Disagree

Identified Specialist Assessment	Identified Screening Tool Sensitivity		Site Verification Statement	Specialist Opinion (Agree with Screening tool or Disagree with Screening tool)
	WEF	Substation		
Flicker and Landscape (Visual) Assessment	**Very High Sensitivity**	**N/A**	An overall impact rating was also conducted as part of the scoping phase in order to allow the visual impact to be assessed alongside other environmental parameters. The assessment revealed that impacts associated with the proposed WEF, associated on-site infrastructure and grid connection infrastructure will be of moderate significance during construction. This could however be reduced to low with the implementation of mitigation measures. During operation, visual impacts from the WEF would be of moderate significance with relatively few mitigation measures available to reduce the visual impact. Visual impacts associated with the WEF on-site infrastructure and the grid connection infrastructure during operation would be of low significance. This original Visual Impact Assessment (VIA) was based on a desktop-level assessment supported by field-based observation. The sensitivities identified have been considered in relation to the sensitivities identified in terms of the Landscape and Flicker Themes of the National Environmental Screening Tool and, based on the findings of the site verification exercise, the findings of the sensitivity analysis undertaken in the original VIA are considered to still be valid.	Disagree
Noise Assessment	**Very High Sensitivity**	**N/A**	Noise due to the construction and operation of the proposed Development has been determined at the closest, and therefore most noise-sensitive developments, in accordance with internationally recognised methodologies. The predicted noise levels have then been assessed against a number of criteria incorporating South African and international guidance. The worst-case level of impact was found to be Low at the closest noise-sensitive development, with no impacts anticipated for more distant noise-sensitive developments. No significant impacts are therefore anticipated due to the proposed Development The proposed Amendments will not result in a greater level of noise impact that originally assessed for the Paulputs WEF. The amendments are therefore considered to be acceptable without the requirement for further noise studies to be undertaken.	Disagree

Identified Specialist Assessment	Identified Screening Tool Sensitivity		Site Verification Statement	Specialist Opinion (Agree with Screening tool or Disagree with Screening tool)
	WEF	Substation		
Terrestrial Biodiversity Impact Assessment	**Very High Sensitivity**	**Low Sensitivity**	Terrestrial Biodiversity Theme is Very High, with Critical Biodiversity Area 1 & 2, Ecological Support Area, FEPA quinary catchments and Focus Areas for land-based protected areas expansion (NPAES) indicated as being present by the Screening tool. The site verification thus confirms that the terrestrial biodiversity screening tool correctly identifies Critical Biodiversity Area 1 & 2 as well as Ecological Support Area as being within the project footprint. No Focus Areas for land-based protected areas expansion are directly affected, but several are located in the vicinity. The amended layout of the Paulputs North WEF is located in a similar area to the original footprint and there are no turbines in High or Very High sensitivity areas, which is in-line with the recommendations of the original EIA study.	Agree
Plant Species Assessment	**Medium Sensitivity**	**Medium Sensitivity**	Plant Species Theme is Medium with two flora species *conservation* concern (*Crotalaria pearsonii* & *sensitive species 144*) indicated as possibly *occurring* in the vicinity of the site. The screening tool correctly identifies a single species (Sensitive species 144) as possibly being present, as it is in the general area. Sensitive Species 144 is a widespread species - Nieuwoudtville eastwards to Olifantsfontein and northwards to the Brandberg in Namibia. It was found to not be present in abundance in the immediate site area. Some individuals may be present along the Paulputs North Grid Connection. However, risk to this species is negligible, as it can be easily avoided during powerline micro-siting and construction. *Crotalaria pearsonii* are unlikely to occur on the project site. Records suggest it occurs in rocky hill areas, which are generally absent on site or will be avoided	Agree
Animal Species Assessment	**High Sensitivity**	**Medium Sensitivity**	Animal Species Theme is Medium/High with possibly species including a single bird, *Neotis ludwigii*. The bird species *Neotis ludwigii* is not included in the terrestrial biodiversity assessment, as it is assessed independently in the Avifaunal assessment undertaken by Dr Owen Davies. Avian sensitivity as identified by the screening tool is of low sensitivity. No other faunal sensitivities are indicated. No mammals, reptiles, amphibians, or invertebrate species are listed	Disagree

Identified Specialist Assessment	Identified Screening Tool Sensitivity		Site Verification Statement	Specialist Opinion (Agree with Screening tool or Disagree with Screening tool)
	WEF	Substation		
Avian Assessment	**Low Sensitivity**	**N/A**	The assessment concluded that the WEF site itself appears to be well suited for wind energy development from an avifaunal perspective. The site visit did not result in any additional features that would result in increased avifauna sensitivity. The sensitivity map resulting from the specialist assessment will be of greater accuracy, resolution and therefore utility in reducing the risk and impacts to avifauna than the map provided by the national web-based screening tool. The sensitivity of the areas around the Greater Kestrel nests are considered to be high sensitivity. The sensitivity of drainage lines and waterbodies is considered to be elevated to high sensitivity. The remaining areas are confirmed to be low sensitivity.	Agree
Bats Assessment	**High Sensitivity**	**N/A**	It is unlikely that the amendments to the turbine dimensions proposed at the Paulputs WEF would result in a change in impacts as assessed in the authorised Paulputs WEF FEIR – including cumulative impacts. Impacts may be slightly lower for some species as the turbines would reach higher above the ground based on the maximum dimensions being applied for, and this is an advantage of the proposed amendments. However, for high flying species, the higher tip height may result in a greater impact, which is a disadvantage. In terms of this amendment report, the potential collision impact to bats is currently rated as high before, and low after mitigation with adherence to the sensitivity buffers being the major mitigation measure proposed.	Agree
Aquatic Biodiversity Impact Assessment	**Very High Sensitivity**	**Low Sensitivity**	The site is drained by several non-perennial watercourses, hence would be considered to be within FEPA quaternary catchments. Wetland and River features are confirmed to be present. In general aquatic features are avoided as far as possible and are limited to road crossings where necessary. The significance of the impact would remain low after mitigation during the construction, operation and decommissioning phases of the Paulputs North WEF project, as the with the exception of road crossings all the delineated systems with a High Sensitivity as is required by the Biodiversity Assessment Protocols – Aquatic Theme will be avoided.	Agree but avoided

Identified Specialist Assessment	Identified Screening Tool Sensitivity		Site Verification Statement	Specialist Opinion (Agree with Screening tool or Disagree with Screening tool)
	WEF	Substation		
Civil Aviation	**Low Sensitivity**	**Low Sensitivity**	CAA Theme was listed as having a low sensitivity and no specific assessment protocol has been prescribed. In this instance, as no specific assessment protocol has been prescribed, the required level of assessment must be based on the findings of the Initial Site Sensitivity Verification and must comply with Appendix 6 of the Environmental Impact Assessment Regulations promulgated under sections 24(5) and 44 of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (The Act), where a specialist assessment is required. The CAA was notified during the initial notification period, and has been provided with the opportunity to comment on the amendment report. Comments received during this review period will be captured in the comments and responses report, to be submitted with the final amendment report. Should permits be required, these will be applied for accordingly in terms of a Civil Aviation Assessment, no assessment is required.	Agree
Defence	**Low Sensitivity**	**Low Sensitivity**	Defence Theme was listed as having a low sensitivity and no specific assessment protocol has been prescribed. In this instance. As no specific assessment protocol has been prescribed, the required level of assessment must be based on the findings of the Initial Site Sensitivity Verification and must comply with Appendix 6 of the Environmental Impact Assessment Regulations promulgated under sections 24(5) and 44 of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (The Act), where a specialist assessment is required. Defence (through the CAA) was notified during the initial notification period, and has been provided with the opportunity to comment on the amendment report. Comments received during this review period will be captured in the comments and responses report, to be submitted with the final amendment report.	Agree

Further, GN R320, promulgated 20 March, states that *'specific procedures for the assessment and minimum criteria for reporting on identified environmental themes in terms of sections 24(5)(a) and (h) and 44 of the NEMA must be included/considered when applying for Environmental Authorisation.*'

GN R320 prescribes the general requirements for undertaking a site sensitivity verification, describes certain protocols for the assessment and minimum report content requirements of environmental impacts for environmental themes for activities requiring environmental authorisation.

9.2 Aquatic Amendment Assessment

A copy of both the Paulputs WEF EIA specialist report and Impact statement are contained in Volume II.

It was found that the proposed amendment has little bearing on the aquatic environment as the footprint of the Paulputs North WEF site would not result in any changes to the impacts previous assessed for the authorised Paulputs WEF EIA.

Therefore the significance of the impact would remain low after mitigation during the construction, operation and decommissioning phases of the project as the with the exception of road crossings all the delineated systems with a High Sensitivity as is required by the Biodiversity Assessment Protocols – Aquatic Theme will be avoided.

9.3 Avifaunal Amendment Assessment

A copy of both the Paulputs WEF EIA specialist report and Impact statement are contained in Volume II.

The activity and abundance of priority species and red data species were found to be very low to low by the pre-construction monitoring conducted by Arcus between Autumn 2018 to the end of Summer 2019. The diversity of these species recorded was also low. Abundances and diversity of small passerines was found to be low as well.

Verreaux's Eagle were confirmed breeding 1.8 km outside of the Paulputs North WEF site boundary, however the species was not recorded flying on site. The Paulputs North WEF site does not contain any important Verreaux's Eagle habitat, even though they may traverse the site or forage there occasionally.

Impacts

The impact assessment identified aquatic features as being high avifaunal sensitivity features and a 200 m buffer is therefore advised. Three types of raptor nests were identified within the vicinity of the Paulputs North WEF site. Suitable buffers have been recommended as read below.

The proposed amendment to the turbines at the Paulputs North WEF site would result in a greater per turbine rotor swept area (RSA) and therefore a potentially greater likelihood that birds would collide with turbine blades. The maximum RSA per turbine in the original authorisation is 25449 m^2 but based on the amendment being applied for, this would increase to up to 38014 m^2. This translates into an increase in RSA of approximately 49 % associated with the proposed amendment.

The initial four seasons of monitoring conducted for the authorised Paulputs WEF EIA recorded a very low number of flights, therefore the likelihood that an increase in RSA would have a significantly higher negative impact on avifauna than the original authorisation is considered to be low.

Mitigation / Recommendations

The main mitigation measure to protect avifauna at the Paulputs North WEF site is to adhere to the sensitivity map in the final authorised Paulputs WEF EIA report. Three types of raptor nests were identified within the vicinity of the Paulputs North WEF site and buffered according to the sensitivity of the species to collisions and standard best practise. These buffers have been used to inform the project layout of the Paulputs North WEF. These buffers are:

- Verreaux's Eagle (3 km);
- Pale Chanting Goshawk (500 m); and
- Greater Kestrel Nest (500 m).

The buffer distances are dependent on size of the turbine being used and to account for this, an additional 110 m buffer (the maximum blade length being considered) was added to all buffers mentioned above. This will ensure that the blades do not sweep into any of the above allocated buffers.

In addition to the above, birds must be dissuaded from nesting within the substation and BESS facility through the use of bird spikes or other suitable deterrents on a case-by-case basis as it is impossible to predict where such nests may be constructed.

9.4 Terrestrial Ecology Amendment Assessment

Mr Jamie Pote has been appointed to compile an Amendment Statement, on behalf of the applicant, regarding the potential implications of the proposed amendments on Terrestrial Biodiversity. Simon Todd of 3Foxes Biodiversity Solutions compiled the original Fauna & Flora Specialist Study for the Paulputs WEF EIA, which was authorised on 11 December 2019 by the Department of Environment, Forestry and Fisheries (DEFF, Ref No. 14/12/16/3/3/2/1120). This Amendment Statement will assess the amendment in relation to the impacts as originally undertaken by 3Foxes Biodiversity Solutions.

A copy of both the Paulputs WEF EIA specialist report and Impact statement are contained in Volume II.

Assessment Findings

With reference to Plate 9-1 below, the following can be deduced regarding the split of the Paulputs WEF into Paulputs North and Paulputs South components as well as the revised layout (red) compared to the original layout (yellow):

1. The minor road and turbine footprint alignment changes will not result in a significant change to the overall impact to terrestrial biodiversity and can be considered to be a slight improvement as it will slightly reduce the width of crossings over drainage line features.
2. The layout changes will not encroach on any areas having an elevated sensitivity, as identified, and mapped by Todd (August 2019).
3. The inclusion of a BESS in the amended layout will have no additional terrestrial biodiversity impact, as it is sited on a temporary laydown area that was included in the original layout. The permanent change will also not be significant in terms of overall impact significance.
4. In terms of the overall impact, there are no changes in the impacts associated with the single Paulputs WEF and the impacts associated with the combined split North and South WEFs.

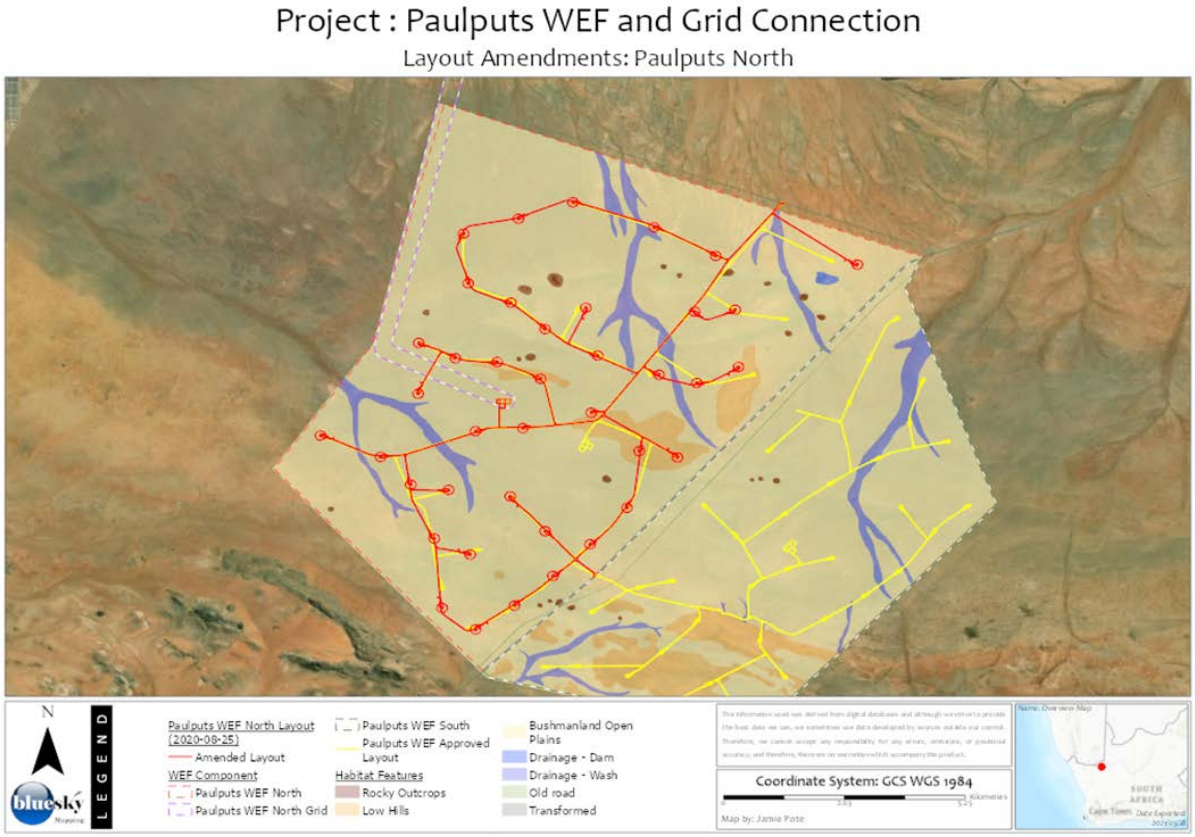

Plate 9-1: Habitat Mapping (as per Todd, 2019) with amended layout (Paulputs North WEF).

The changes to the specifications of the wind turbines would not be significant in terms of terrestrial ecology as this would not increase the overall footprint of the development. The amendment does not result in an overall change in the nature of impacts, nor in the significance of direct, indirect, or cumulative impacts, as assessed in for the authorised facility. No additional impacts as a result of the amendments are anticipated and the amendments are not anticipated to require any additional management actions or mitigation measures, inclusive of changes to the EMPr.

When the original project plan for the combined layout is compared to that of the project being split into two components, it can be concluded that the split, from a terrestrial biodiversity perspective, has no significant change in the terrestrial biodiversity risks from that of the original layout.

Mitigation / Recommendations

The amended layout of the Paulputs North WEF is located in a similar area to the original footprint and there are no turbines in High or Very High sensitivity areas, which is in-line with the recommendations of the original EIA study. As such, there are no additional changes to the mitigation and avoidance measures that were recommended and in the EIA study. In addition, the cumulative impacts associated with the amendment are considered to be similar to those as assessed in the EIA and thus there would no changes to the overall cumulative impacts associated with the split of the wind farm from a single to two facilities. All of the mitigation and avoidance measures as recommended in the EIA are still valid for this report as well as layouts.

It is recommended that in terms of terrestrial biodiversity that the amendment be approved, subject to implementation of all recommendations in the original assessment

inclusive of the Environmental Management Programme (EMPr) and the conditions of the Environmental Authorisation (EA).

9.5 Bat Amendment Assessment

A copy of both the Paulputs WEF EIA specialist report and Impact statement are contained in Volume II.

Assessment Findings

Bat activity on the Paulputs North WEF site was dominated by the Egyptian free-tailed bat. Their activity was found to be lower at height and greater near trees, shrubs and aquatic habitats as these provide a more suitable foraging habitat in an otherwise arid landscape.

Based on the pre-construction monitoring data undertaken as part of the authorised Paulputs WEF EIA, two thirds of the sample nights had low to moderate activity. During summer and spring the activity was higher accounting for ca. 40 % and 30 % of total activity respectively. There was no available bat activity data in the area for heights of 12 m and 100 m, or over 100 m.

Despite the lower activity at height, increasing evidence suggests that bats actively forage around wind turbines (Cryan et al. 2014; Foo et al. 2017). Therefore, the installation of turbines in the landscape may alter bat activity patterns by either increasing activity at height and/or increasing the diversity of species making use of higher airspaces.

Impacts

Of the impacts identified in the authorised Paulputs WEF EIA, only mortality of species due to collision with turbine blades or due to barotrauma was identified. This amendment study concurs with the authorised EIA findings, impacts and cumulative impacts, as there remain relevant for the amendment application.

In terms of this amendment report, the potential collision impact to bats is currently rated as high before, and low after mitigation with adherence to the sensitivity buffers being the major mitigation measure proposed.

Mitigation / Management Measures

The first mitigation measure would be to adhere to the sensitivity map included in the authorised Paulputs WEF EIA report. This report contained buffers for several important bat features.

The DEA screening tool suggests a high sensitivity buffer of 500 m around wetlands and rivers. In line with the South African Bat Assessment Association it is the specialist's opinion to buffer hydrological features such as wetlands, rivers and farm dams by 200 m while drainage lines can be buffered by 100 m. Potential roosts such as rocky crevices, trees and buildings have been buffered by 200m. No parts of the turbines, including the blade tips, should enter these buffers. These buffer distances are also dependant on size of the turbine being used. For example, if the turbine blades sweep close to ground level, the turbine base would need to be moved further from the buffer edge. To account for this, a 110 m buffer (the maximum blade length being considered) was added to all buffers to ensued that the blades do not sweep into any bat buffers.

Secondly, bat activity is higher closer to ground level, thus it would be preferential to maximize the distance between the ground and blade tips by using turbines with the shortest possible blades and the highest possible hub height. Additionally, it is beneficial to use shorter blades which do not intrude into higher airspaces, thereby reducing the potential impact to high flying species such as free-tailed bats which dominated activity on site.

Lastly, should residual impacts exceed bat fatality thresholds, the use of curtailment (which is provided for in the EIA) must be considered. Curtailment would initially be limited to February, August and October (Table 9-2).

Even though the cumulative impacts will be higher, the impact rating for cumulative impacts will remain medium before and low after mitigation. Curtailment is the remaining mitigation measure to reduce residual impacts during operation and must be continuously refined and adapted based on incoming bat fatality data.

Table 1-2: Curtailment Parameters for the Paulputs North Wind Farm

	February	August	October
Time Period	Between 4 and 5 hours after sunset	1 hour after sunset	Between 4 and 5 hours after sunset
Temperature (°C)	11 – 27	10 – 27	16 – 27
Wind Speed (ms^{-1})	4 – 11	4 – 13	5 – 13
Relative Humidity (%)	20 – 40	5 – 25	10 – 30
For example, in February curtailment should be applied between four and five hours after sunset when the temperature is between 11 °C and 27 °C, or wind speed is between 4 ms^{-1} and 11 ms^{-1}, or relative humidity is between 20 % and 40 % if fatality threshold were exceeded.			

9.6 Soil and Agricultural Amendment Assessment

A copy of both the Paulputs WEF EIA specialist report and Impact statement are contained in Volume II.

Plate 9-1 shows the uniform landscape of the proposed development site. There are no agricultural impacts related to this proposed amendment. In addition, there are no agricultural advantages or disadvantages related to it. The proposed amendment does not require any changes or additions to the mitigation measures for agricultural impacts that were recommended for the authorised Paulputs WEF, therefore no required changes to the EMPr will be required.

The agricultural impact of the amended project will therefore be identical to the impacts recommended in the authorised Paulputs WEF EIA.

Plate 9-1: Paulputs North WEF Site

9.7 Heritage and Palaeontology Amendment Assessment

A copy of both the Paulputs WEF EIA specialist report and Impact statement are contained in Volume II.

Assessment Findings

The turbine layout is only slightly changed from that which was authorised as part of the authorised Paulputs WEF.

Impacts

Several heritage sites are present within the Paulputs North WEF. These sites have all been considered and avoided in the project design and, because it is still possible that other sites might occur within the road footprint, no change in the impact assessment ratings is needed from what was originally assessed in the authorised Paulputs WEF EIA. The ratings to all other aspects of heritage similarly remain unchanged.

Paulputs North are required to conduct a pre-construction archaeological survey of the road layout to determine whether any other archaeological sites might be present in open areas not covered during the original survey.

Mitigation / Recommendations

The recommendations to be carried forward for the proposed amendment are as follows:

- The final authorised layout for the WEF, all internal roads (including the above rerouted section), internal power lines, substation and any other areas to be disturbed must be surveyed by an archaeologist prior to construction in order to identify any remaining potential impacts that may need mitigation;
- Identified sensitive sites must be treated as no-go areas throughout the lifetime of the project;
- If any turbines are removed as a result of the use of larger turbines at a later stage then priority should be given to removing turbines close to the N14; and
- If any archaeological material or human burials are uncovered during the course of development then work in the immediate area should be halted. The find would need to be reported to the heritage authorities and may require inspection by an archaeologist. Such heritage is the property of the state and may require excavation and curation in an approved institution.

9.8 Visual Amendment Assessment

A copy of both the Paulputs WEF EIA specialist report and Impact statement are contained in Volume II.

Assessment Finding

The overall impact rating conducted for the authorised Paulputs WEF revealed that impacts associated with the authorised WEF and associated infrastructure will be of moderate significance during construction. It was found that this could however be reduced to low with the implementation of mitigation measures. During operation, visual impacts from the WEF would be of moderate significance with relatively few mitigation measures available to reduce the visual impact.

Impacts

The proposed new turbine specifications would allow for a maximum height (at blade tip) of 290m, some 60m higher than the height currently authorised. The significance of this change from a visual perspective is assessed below.

- The increased height as proposed will increase the visibility of the turbines and extend the area from which the turbines will be visible (viewshed). This will be exacerbated by the lack of any natural screening elements in the broader study area resulting from relatively flat terrain and the prevalence of low shrubland vegetation cover. It is however important to note that visual impacts are only experienced when there are receptors present to experience this impact. The original VIA for this

development found that the broader study area is not typically valued for its tourism significance and there is limited human habitation resulting in relatively few potentially sensitive receptors in the area. In light of this and given the relatively remote location of the proposed Paulputs North WEF, the extended viewshed will not affect any additional receptors within the 10km assessment zone.

- Visual impacts resulting from the larger turbines would be greatest within a 1 to 2km radius, from where the increased height of the structure would be most noticeable. Only two (2) potentially sensitive receptors are less than 2km from a possible turbine placement, these being the farmsteads located on Portion 5 of the Farm Scuit Klip No 92 and Portion 4 of the Farm Lucas Vlei No 93 respectively. The original VIA for Paulputs WEF determined that these receptors would experience high levels of visual impact as a result of the WEF development, largely as a result of their proximity to the nearest proposed turbine placement. Hence the larger turbines as proposed would not increase the impacts experienced by these receptors. In addition, no concerns were raised by the owners of these properties during the Public Participation Process conducted for the Paulputs WEF EIA and it is therefore possible that the proposed development is not perceived in a negative light.
- The remaining potentially sensitive receptors are all more than 2kms from the nearest turbine placement and, while the increased turbine height would make the turbines more visible from these receptors, the overall impact is expected to remain largely unchanged from this distance. It should be noted that although the larger turbines may be visible from some farmhouses outside the 10km assessment zone, at this distance it is likely that the turbines will merge to some degree with the surrounding landscape and as such impacts resulting from the increased turbine height will be minimal.

It is noted that the presence of the KaXu, !Xina and Konkoonies Solar Energy Facilities, the Paulputs substation and the existing high voltage power lines in close proximity to the Paulputs North WEF application site has resulted in a significant level of transformation of the natural environment in this area which will reduce the significance of visual impacts resulting from the proposed amendments.

Mitigation / Recommendations

Several turbine placements are within 1km of the N14 National Route and although the larger turbines will be more visible motorists travelling along this route, this section of the N14 does not form part of a designated tourism route and as such, visual impacts will remain as moderate. In addition, visual impacts will be transient and motorists are unlikely to be adversely affected by the presence of turbines as proposed and the 500m buffer recommended in the scoping phase VIA for the Paulputs WEF will be sufficient to mitigate the impacts of shadow flicker.

9.9 Noise Amendment Assessment

A copy of both the Paulputs WEF EIA specialist report and Impact statement are contained in Volume II.

The authorised 75 turbine Paulputs WEF was assessed as a whole in the original assessment, and the principle of splitting the WEF into two individual developments (40-turbine Paulputs WEF North, and 35-turbine Paulputs WEF South) has no effect on wind turbine noise levels.

The proposed alterations to some turbine locations are very minor (approximately 20 metres), and will have no effect on the predicted noise levels assessed in the original assessment. The proposed increase in rotor diameter and hub height of the turbines does not in itself result in increased noise levels; the turbine type selected for consideration in the authorised Paulputs WEF EIA (Acciona AW132-3300) is a worst-case in terms of noise,

with a wide range of turbines available with equal or lower noise emission levels. Providing the actual turbine selected for construction has maximum noise emission levels equal to or lower than those originally assessed, there will be no additional impact.

Noise from the inclusion of a BESS will be limited to a small number of air-conditioning units to regulate the temperature of the batteries. Given the substantial separation distance from the temporary laydown area to residential dwellings (approximately 4.7 km from the closest residential dwelling), noise from the inclusion of a BESS will have no impact and therefore not be significant.

9.10 Social Amendment Assessment

A copy of both the Paulputs WEF EIA specialist report and Impact statement are contained in Volume II.

Assessment Findings

The identification and assessment of the key social impacts related the proposed amendment were assessed in detail and included in Section 4 of the full SIA report that formed part of the authorized Paulputs WEF EIA that already received EA by the DEA.

Therefore, the social impacts that were identified and assessed in the full SIA report (that formed part of the full EIA report that was authorised), as well as the mitigation and enhancement measures included in the full SIA report and any social aspects included in the authorised EMPr, are still relevant and valid for this proposed amendment.

Impacts

The findings of the full SIA report demonstrated that the proposed establishment of the WEF is supported as it creates a positive social benefit for society.

Mitigation / Recommendations

Paulputs North are required to implement the suggested enhancement and mitigation measures contained in Section 4 of the full SIA report, as well as inputs from other specialist studies for the authorised Paulputs WEF EIA.

9.11 Traffic Amendment Assessment

A copy of both the Paulputs WEF EIA specialist report and Impact statement are contained in Volume II

It is noted that the total number of wind turbines, from a traffic perspective, remains unchanged as 75 turbines will still be transported to site regardless of the Paulputs WEF being split. Thus, the findings, recommendations and management measures as contained in the authorised Traffic Impact Assessment (TIA) (11 July 2019) are still valid.

It is also noted that only slight changes have been made to the internal access roads. As such, the above changes do not impact on the Traffic Specialist Report findings and recommendations as stated in the authorised Paulputs WEF EIA.

A transport management plan must be compiled and must consider the logistics of transporting abnormal loads to site. This plan must be compiled after preferred bidder is awarded.

9.12 Cumulative Impact

The cumulative impact of the facility as a whole was considered and assessed in detail in the authorised Paulputs WEF EIA. The authorised EIA concluded that there are no negative high residual impacts, including potential cumulative impacts associated with the proposed development of the WEF, grid connection option and substation options.

The creation of local employment and business opportunities, skills development and training which can be associated with cumulative impacts, was rated as high positive. With mitigation all potential negative cumulative impacts are reduced to medium or low significance. Potential cumulative negative impacts that remain medium significance after mitigation were identified by the bird, heritage, social and visual specialists while a potential cumulative positive impact of high significance after enhancement was identified by the social specialist. The negative impacts associated with the proposed Paulputs WEF are considered acceptable by the specialists

10 HIGH-LEVEL BESS RISK ASSESSMENT

The risks associated with battery technologies are typically well researched and documented. The main concerns relating to a BESS are fire hazards and the potential for a condition known as '*thermal runaway*'. Thermal runaway occurs in situations where an increase in temperature changes the conditions in a way that causes a further increase in temperature, often leading to a destructive result. As far as general environmental risks, the main concerns are surrounding the disposal of the batteries at end of their life.

The Risk Assessment mitigation measures provided below can be incorporated into a Battery Safety Management Plan, which is to be kept in both electronic and hard copy format on the project site. This Risk Assessment has been prepared to ensure that safety risks related to the BESS are understood, accounted for and mitigated as far as practicable.

The following international guidance has been considered during the preparation of this Risk Assessment:

- Allianz Risk Consulting (ARC), Tech Talk Volume 26 (2019). Battery Energy Storage Systems (BESS) using Li-ion batteries[9];
- National Fire Protection Association (NFPA) 855, Standard for the Installation of Stationary Energy Storage Systems, (2020 edition currently under development and not yet available)[10];
- UL 9540, Standard for Energy Storage Systems and Equipment[11]; and
- Consolidated Edison and New York State Energy Research and Development Authority - Considerations for ESS Fire Safety (February 2017)[12].
- The Energy Operators Forum "Good Practice Guide" (December 2014)[13];
- Institute of Engineering and Technology - Code of Practice for Electrical Energy Storage Systems (August 2017)[14]; and
- The Energy Institute: Battery Storage Guidance Note 1 - Battery Storage Planning (August 2019)[15].

At the time of writing, the above standards and legistlation is not specifically applicable to the proposed BESS, but notwithstanding provided valuable guidance for the preparation of this Risk Assessment.

[9] https://www.agcs.allianz.com/news-and-insights/risk-advisory/tech-talk-volume-26-bess-english.html

[10] https://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=855

[11] https://standardscatalog.ul.com/standards/en/standard_9540_1

[12] https://www.nyserda.ny.gov/-/media/Files/Publications/Research/Energy-Storage/20170118-ConEd-NYSERDA-Battery-Testing-Report.pdf

[13] https://www.eatechnology.com/engineering-projects/electrical-energy-storage/

[14] https://shop.theiet.org/code-of-practice-for-electrical-energy-storage-systems

[15] https://eur03.safelinks.protection.outlook.com/?url=https%3A%2F%2Fpublishing.energyinst.org%2Ftopics%2Fpower-generation%2Fbattery-storage%2Fbattery-storage-guidance-note-1-battery-storage-planning&data=01%7C01%7C%7Cfbce9f4783304951211308d72af01893%7C6b5953be6b1d4980b26b56ed8b0bf3dc%7C0&sdata=%2FgEjqDC2nzzxcKTWFaKkUEiiTiiOzTamrAsxsMz9Y4M%3D&reserved=0

The Risk Assessment Matrix below assesses several potential situations which could result in a possible detrimental environmental hazard. These are:

1. The actual **risks** associated with the delivery, connection, operation, maintenance, disconnection and disposal of the batteries.
2. The **likelihood** of these actual risks occurring.
3. The **significance** of the impacts should these risks take place.
4. Appropriate and practical **mitigation** measures and/or management actions to reduce likelihood of the risk occurring and/or the impact.

Table 10-1: High-Level BESS Risk Assessment

Possible Risk	Resultant Impact Significance	Likelihood of occurrence	Management / Mitigation
Spillages **Thermal Runaway** **Poor Maintenance**	- Electrocution - Potential spillage of electrolytes or refrigerant - Vented gasses - Staff and personal injury - Contaminated Runoff - Soil and microbe contamination - Groundwater seepage - Downstream effects on the current terrestrial ecosystem.	**Low**	- Training of all staff and employees on how to handle spillages, fires and electrocutions - Records kept for well managed operations and maintenance. - Bunding of containers - Implementation of spill handling and management in line with the generic EMPr - Demarcate all no-go and sensitive areas - Avoid the placement of batteries near watercourses and sensitive features - MSDS Records to be kept, as well as incidents reporting register. - Source batteries from reputable suppliers - Battery inspection prior to installation. - Maintenance. - Appropriate battery design and venting control - Source from reputable manufacturers. - Safe and appropriate storage in line with the above and the generic EMPr. Safe handling which must include battery inspection prior to installation. - Development and implementation of Thermal Management Plan prior to installation/construction.
Fire Risk	- On-Site Fire - Fire Spread - Staff and personal injury	**Medium**	- Procuring components and using construction techniques which comply with all relevant legislation; - Including automatic fire detection systems in the development design; - Including automatic fire suppression systems in the development design; - Including redundancy in the design of the BESS to provide multiple layers of protection;

			- Designing the BESS and substation yard to contain and restrict the spread of fire through the use of fire-resistant materials, and adequate separation between elements of the BESS; and - Ensuring that Staff appointed to work within the BESS and substation area, as well as First Responders receive adequate emergency response training to a fire. - Work with first responders and relevant Personnel to develop a Tactical Fire Response Plan in case of an incident
Inappropriate Storage	- On site fires. - Electrical failure - Electrocution - Potential spillage of electrolytes or refrigerant - Vented gasses - Staff and personal injury - Contaminated Runoff - Soil and microbe contamination - Groundwater seepage - Downstream effects on the current terrestrial ecosystem.	**Low**	- Training of all staff and employees on how to handle spillages, fires and electrocutions - Records kept for well managed operations and maintenance. - Bunding of containers - Implementation of spill handling and management in line with the generic EMPr - Demarcate all no-go and sensitive areas - Avoid the placement of batteries near watercourses and sensitive features - MSDS Records to be kept, as well as incidents reporting register. - Source batteries from reputable suppliers - Battery inspection prior to installation.
Limited Employee Training and Experience	- Time lag for first respondent - Inability to contain spillage - Fire - Electrocution - Damage to exiting/surrounding infrastructure	**Low**	- During the construction phase of Paulputs North WEF, first responders from the nearest major center (such as fire fighters and paramedics) must be given appropriate training on dealing with any emergency situation that may occur as a result of the BESS. Such training must be provided by the technology suppliers or an appointed service provider.
Inappropriate disposal at the end of life	- Potential scenario of fluids from the batteries leaking into environment. The release of such chemicals through leaching, spills or air emissions can harm communities, ecosystems and food production. - The potentially toxic materials contained in batteries means that they are classified as hazardous materials in terms of NEM:WA. There are only a few licensed hazardous waste	**Medium**	- The recycling of batteries and their potential use as e-waste. - Disposal at a licensed hazardous waste site. - Prior to construction of the Paulputs North WEF, the Applicant is to develop a dedicated Battery Recycling Programme to be adopted on-site. - Records of disposal at a licensed facility must be kept.

	sites in South Africa and recycling of batteries and e-waste has been identified as a sure way of improving the lifespans of such sites.		

In terms of minimising fire risk within the BESS and Substation site, the following design and implementation recommendations are proposed and should be considered prior to installation/construction of the BESS. These recommendations should form part of the Tactical Fire response plan where applicable.

Table 10-2: Proposed Design and Installation Considerations for the BESS

Initial Design Recommendations:
1. Fire department • Invite the fire department to the project site to discuss BESS hazards. An adequate emergency response is the key to avoiding an uncontrolled fire. Keep in mind that some fire fighters will not fully understand the hazards and may assume that lithium-ion batteries are the same as lithium batteries. • Key questions to discuss with the fire department include: – What is the main difference between extinguishing and cooling? – How to handle a damaged battery? – How to manage the flammable and toxic gases? • Plan training exercises with the fire department when the system is commissioned. • Standard Operating Procedures (SOP) & Standard Operating Guidelines (SOG) are of major importance and should be updated and tested on a regular basis.
2. Construction and location • Install the BESS outdoors, a minimum of 20 m from important buildings or equipment. Maintain a minimum of 3 m separation from lot lines, public ways and other exposures. • Within the module, maintain a minimum of 1 m separation distance between enclosures for all units up to 50 kWh when not listed, or up to 250 kWh when listed. • Install a thermal barrier where the minimum space separation cannot be provided. • If the BESS must be located indoors, install in a 2-hour fire rated cut-off room, which is accessible directly outdoors for manual firefighting. • Restrict the access to competent employees or sub-contractors. • Ensure enclosures are non-combustible.
3. Material, equipment and design • Paulputs North should consider a 'Testing Method' for Evaluating Thermal Runaway Fire Propagation in Battery Energy Storage Systems. A possible international standard to consider would be UL 9540A. This standard evaluates thermal runaway, gas composition, flaming, fire spread, re-ignition and the effectiveness of fire protection systems. Data generated can be used to determine the fire and explosion protection requirements for a BESS. • Place capacitor, transformer, and switch gear in separate rooms according to best engineering practices.
4. Ventilation and temperature control

Initial Design Recommendations:
• Install adequate ventilation or an air conditioning system to control the temperature. Maintaining temperature control is vital to the battery's longevity and proper operation as they degrade exponentially at elevated temperatures. • Ensure ventilation is provided in accordance with the manufacturer's recommendations. • Install and maintain the ventilation during all stages of a fire. Ventilation is important since batteries will continue to generate flammable gas as long as they are hot. Also, carbon monoxide will be generated until the batteries are completely cooled through to their core.
5. Gas detection and smoke detection • Install a very early warning fire detection system, such as aspirating smoke detection. • Install carbon monoxide (CO) detection within the container or BESS room.
6. Fire protection and water supply • Investigate the possibility of installing a sprinkler protection system within the BESS containers. The sprinkler system should be designed to provide (at a minimum) 12.2 l/min/m² over 232 m². Water has been proven to be the best agent to fight a fire involving lithium-Ion batteries. It is important to note that other extinguishing agents, such as aerosols or gaseous extinguishing systems, will extinguish the fire, but they do not provide cooling like water. Insufficient cooling allows a hot and deep-seated core to remain. The heat will rapidly spread back through the battery and reignite remaining active sections. • Implement a procedure for battery submersion in the Tactical Fire Reponses Plan, as well as the WEF Emergency Response Plan to be performed by the fire department. Submerging batteries in water (preferably outdoors) after they burn has proven to be effective at cooling the batteries and neutralizing the thermal threat. They will continue to release gases, mostly carbon monoxide, but also flammable gas such as hydrogen. Therefore, it is not recommended to submerge several batteries in a confined space without adequate ventilation. • Ensure that sufficient water is available for manual firefighting. The ability of the fire department to control a fire involving a BESS depends on the presence of an adequate water supply and their knowledge of the hazards. The following should be considered: – An external fire hydrant should be located within 100 m of the BESS room or containers. – The water supply should be able to provide a minimum of 1,900 l/min (500 gpm) for at least 2 hours.
7. Maintenance • Follow original equipment manufacturer recommendations for the inspection, testing and maintenance of the BESS. In addition, ensure that the following (at a minimum) is completed: – Measure the internal resistance of the battery cells. Replace the cells when a dramatic drop is detected. This will provide a good gauge of predictable battery life. – Perform infrared scanning at least once per year. – Check for fluid leakage. – Implement electric terminal torqueing procedures to maintain connection integrity.

11 SPECIALIST IMPACT STATEMENT

Section 11.1 to 11.11 provides a summary of the advantages and disadvantages of the proposed amendment in terms of the impacts assessed. Overall, the advantages of the proposed development in terms of this amendment outweighs the disadvantages. The proposed amendment is thus seen as favourable and no additional impacts are expected.

Figure 5 includes a sensitivity map of the proposed amendment development.

11.1 Aquatic Amendment Assessment

The impact of the proposed amendment on the aquatic ecological environment, with mitigation, will remain unchanged from the original impact assessment, i.e. it will remain of low significance. Similarly, in the assessment of potential cumulative impacts, no additional impacts or changes to the previously assessed impacts would be required due to the proposed amendment. Further, no changes to the original mitigations or EMPr recommendations are required.

Thus, there are no advantages or disadvantages related to this proposed amendment from an Aquatic perspective.

11.2 Avifaunal Amendment Assessment

It is unlikely that the proposed amendments to the Paulputs WEF would result in a change in impacts as assessed for the authorised EIA – including cumulative impacts. The key initial mitigation measure that should be implemented at the Paulputs North WEF would be adherence to the revised buffer distances in this report.

In conclusion, impacts associated with the construction, operation and decommissioning phases of the proposed amendment can be mitigated to acceptable levels provided the recommended mitigation measures of the original authorisation are implemented.

Advantage	Disadvantage
Impacts remain unchanged from the original impact assessment.	
No additional cumulative impacts have been identified	
Applicant to has amended the layout to account for a 110m blade buffer	Applicant to has amended the layout to account for a 110m blade buffer

11.3 Terrestrial Ecology Amendment Assessment

The amendment requires the split of the 300MW Paulputs WEF into the 150MW Pauputs South WEF and the 150MW Paulputs North WEFs. As the overall footprint of the split facilities would be similar to the original single facility, the proposed changes would not increase the assessed impacts. Further, the proposed changes to the turbine specifications would not increase the footprint of the Paulputs North WEF development. In addition, the split of the wind farm into two applications, the addition of the battery storage and the changes to the turbine specifications would not increase cumulative impacts. No additional mitigation or avoidance measures, beyond those already recommended in the EIA study are required for the amendment.

Thus, there are no advantages or disadvantages related to this proposed amendment from a terrestrial ecology perspective.

11.4 Bat Amendment Conclusion

It is unlikely that the proposed amendments would result in a change the significance in impacts as assessed in the FEIR – including cumulative impacts. Impacts may be slightly lower for some species as the turbines would be elevated from ground level, and based on the maximum dimensions being applied for, this is considered an advantage of the proposed amendments. However, for high flying species the higher tip height may result in a greater impact, which is disadvantageous.

Paulputs North must adhere to buffer distances in the recommended buffer distances to ensure impacts are minimised. Residual impacts that could occur will need to be evaluated during the operational phase using carcass searches to monitor actual impacts and assess these against published thresholds. If thresholds are exceeded, curtailment will need to be applied according to the parameters in the authorised Paulputs WEF FEIR and in this report (Table 8-1). Any further mitigation measures recommended by the appointed operational specialist must be adhered to by Paulputs North.

Advantage	Disadvantage
Impacts remain unchanged from the original impact assessment. Impacts may be slightly lower for some species as the turbines would be elevated from ground level, and based on the maximum dimensions being applied for, this is considered an advantage of the proposed amendment.	The amended turbine layout could impact high flying species as the higher tip height may result in a greater impact, which is disadvantageous
No additional cumulative impacts have been identified	Potential for residual impacts.
Appropriate buffers have been implemented. The applicant has needed to amend the layout of the WEF to account for the required buffers.	

11.5 Soil and Agricultural Amendment Assessment

There are no agricultural impacts related to this proposed amendment. In addition, there are no agricultural advantages or disadvantages related to it. The proposed amendment does not require any changes or additions to the mitigation measures for agricultural impacts that were recommended for the authorised Paulputs WEF, therefore no required changes to the EMPr will be required.

The agricultural impact of the amended project will therefore be identical to the impacts recommended in the authorised Paulputs WEF EIA.

11.6 Heritage and Palaeontology Amendment Assessment

This amendment assessment found that no sites of very high cultural significance were located during the survey. Despite the permanence of impacts to archaeological sites, the low extent and probability of impacts combined to result in a low significance. With mitigation the intensity would become low and the resulting significance would remain low.

Thus, there are no advantages or disadvantages related to this proposed amendment from a Heritage, Archaeological or paleontological perspective.

11.7 Visual Amendment Assessment

The overall impact rating conducted for the authorised Paulputs WEF VIA revealed that the WEF is expected to have a moderate negative visual impact rating during both construction and operation, with relatively few mitigation measures available.

In light of the above, the increase in the proposed turbine rotor diameter will not change this impact rating. Furthermore, no additional recommendations or mitigation measures will be required and all of the mitigation measures set out in the VIA remain valid

Further, given the low level of human habitation and the relative absence of sensitive receptors in the area, the increased turbine height is deemed acceptable from a visual perspective.

Thus, there are no advantages or disadvantages related to this proposed amendment from a visual perspective.

11.8 Noise Amendment Assessment

Overall, the changes proposed as part of the proposed amendment will not result in any changes to the findings of the authorised Paulputs WEF EIA, and are therefore not significant in terms of the EIA Regulations.

Thus, there are no advantages or disadvantages related to this proposed amendment from a noise perspective.

11.9 Social Amendment Assessment

The proposed amendment will not result in any additional impacts, cumulative impacts or residual impact, nor will it change the significance of these impacts.

However, this recommendation is still made subject to Paulputs North ensuring compliance with the mitigation measures contained in Section 4 of the full SIA report, as well as inputs from other specialist studies for the authorised Paulputs WEF EIA.

Thus, there are no advantages or disadvantages related to this proposed amendment from a social perspective.

11.10 Traffic Amendment Assessment

It is noted that the total number of Wind Turbines, from a traffic perspective, remains unchanged as 75 turbines will still be transported to site. It is also noted that only slight changes have been made to the internal access roads. As such, the above changes do not impact on the Traffic Specialist Report findings and recommendations as stated in the authorised Paulputs WEF EIA.

Thus, there are no advantages or disadvantages related to this proposed amendment from a Traffic perspective.

A transport management plan must be compiled and must consider the logistics of transporting abnormal loads to site. This plan must be compiled after preferred bidder is awarded.

11.11 High-Level BESS Risk Assessment

A comprehensive operations and maintenance programme is necessary to ensure that all management and mitigation measured listed above and included in the generic EMPr are adopted and implemented as well as to ensure that all monitoring and protective devices are in good working order.

Regular inspections should be undertaken to ensure the battery systems are not overheating or showing signs of malfunction. Annual thermographic scanning can help ensure the BESS is operating within normal parameters.

This high-level risk assessment must be replaced with a detailed technology specific risk assessment once the final equipment suppliers have been identified during the detailed design and procurement stage.

Advantage	Disadvantage
Cost of setup, construction, operation and disposal are born by the Applicant.	Potential for various environmental hazards (fire, thermal runway, spillages etc.) if the recommended mitigation measures are not adhered to.
The BESS will diminish the invariability of energy supply into grid – thus making power supply into the national Eskom grid more reliable.	
The REIPPPP has requirements for '*key principles for the design*' of the Independent Power Producers (IPP) Request for Qualification and Proposal (RFP). If Paulputs North cannot construct an independent on-site substation with a BESS (i.e. the No-Go alternative is preferred and the project is not approved), the Paulputs North WEF project may be limited in its capacity to be a competitive bidder within the REIPPP or any programmes going forward.	
Improved efficiency of the Paulputs North WEF and reduction in operational interruptions of the WEF as a result of an unstable grid or reduced wind resource	

12 CONCLUSION AND RECOMMENDATIONS

The EAP is of the opinion that the information contained in this amendment report, and the documentation attached, present a suitable independent evaluation of the proposed amendment and is sufficient in providing registered and potential I&APs with a transparent and objective assessment report.

Based on the outcome of this amendment assessment, it is recommended that the following mitigation measures be included as conditions of authorisation of the amendment decision:

- As per the findings and recommendations made in EIA report and EMPr for the Authorised Paulputs WEF EA, the following avifaunal buffers remain valid and must be adhered to during construction, operation and decommissioning:[16]
  - Verreaux's Eagle (3 km);
  - Pale Chanting Goshawk (500 m); and
  - Greater Kestrel Nest (500 m).
- Adhere to the bat and bird buffers outlined in the sensitivity map contained within the authorized Paulputs WEF EIA
- Hydrological features such as wetlands, rivers and farm dams within, and in close proximity to, the Paulputs North WEF footprint are to be buffered by 200 m, while drainage lines can be buffered by 100 m.
- The final authorised layout for the WEF, all internal roads (including the above rerouted section), internal power lines, substation and any other areas to be disturbed must be surveyed by an archaeologist prior to construction in order to identify any remaining potential impacts that may need mitigation;
- Identified sensitive heritage sites must be treated as no-go areas throughout the lifetime of the project;
- If any turbines are removed as a result of the use of larger turbines at a later stage then priority should be given to removing turbines close to the N14;
- If any archaeological material or human burials are uncovered during the course of development then work in the immediate area should be halted. The find would need to be reported to the heritage authorities and may require inspection

[16] These buffers have already been considered in the design and layout of the facility.

by an archaeologist. Such heritage is the property of the state and may require excavation and curation in an approved institution.
- A 500m visual buffer to the N14 national highway.
- A long-term monitoring programme should be developed and initiated before construction. The programme should, at minimum, include the following parameters and activities:
    - Size and GPS location of all *Aloidendron dichotomum* plants found on site. Photographs of all individuals present is also recommended for documentation purposes.
    - Annual monitoring of size-class structure, including any new deaths, disappearances, and seedlings that have appeared.
    - If any seedlings and young plants disappear, then the local populations should be supplemented with seedlings cultured from seed collected on-site.
    - There should be signage present at all entrances to the site warning against the illegal collection of any fauna and flora.
- It is important to note that a permit from DFFE would be required for any impacts on nationally protected tree species, while a permit from DENC would also be required for general clearing and any clearing or removal of provincially protected species. These permits would be informed by a preconstruction walk-through of the final development footprint.
- Implement the suggested enhancement and mitigation measures contained in Section 4 of the full SIA report approved as part of the Paulputs WEF EIA.
- A transport management plan must be compiled and must consider the logistics of transporting abnormal loads to site. This plan must be compiled after preferred bidder is awarded.

Over and above the mitigation and design measures suggested in Table 10-1 and 10-2 of the high-level BESS risk assessment, the following conditions of authorisation are proposed:

- Birds must be dissuaded from nesting within the substation and BESS facility through the use of bird spikes or other suitable deterrents on a case-by-case basis.
- The applicant must compile and implement the following additional programs to be submitted as part of the EMPr to the Competent Authority prior to the commencement of installation of the BESS:
    - Tactical Fire Response Plan;
    - Lifecycle Battery Recycling programme; and
    - First Responder Training manual;
- The applicant must compile and implement the following additional programs to be submitted as part of the EMPr to the Competent Authority prior to the operation of the BESS:
    - Thermal management and monitoring programme; and
    - BESS operations and maintenance programme.

It is the opinion of the EAP that the proposed project amendments will not affect any change in the impact ratings from those which were assessed during the Paulputs WEF EIA undertaken by Arucs in August 2019.

The **proposed amendment can be authorised** subject to Paulputs North adhering to all mitigation and management measures outlined in this report, the approved Paulputs WEF EIA, the Paulputs WEF EMPr as well as the Generic EMPr.

APPENDIX A: EAP DECLARATION OF INDEPENDENCE AND CV

APPENDIX B: ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

APPENDIX C: PUBLIC PARTICIPATION