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VOLUME I

PART II AMENDMENT

of the

BANNA BA PIFHU WIND FARM ENVIRONMENTAL AUTHORISATION

On behalf of

Banna ba Pifhu Wind Farm (RF) (Pty) Ltd

DFFE Reference 12/12/20/2289; 12/12/20/2289/AM1 and 12/12/20/2289/AM2

DRAFT FOR PUBLIC COMMENT

JUNE 2022

Prepared by:

Arcus Consultancy Services South Africa (Pty) Ltd

240 Main Road
1st Floor Great Westerford
Rondebosch
7700

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

Registered in South Africa No. 2015/416206/07

PROJECT DETAILS

DFFE References	12/12/20/2289; 12/12/20/2289/AM1 and 12/12/20/2289/AM2		
Arcus Reference	3109 Banna ba Pifhu Wind Farm		
Title	Part II Amendment of the Banna ba Pifhu Wind Farm		
EAP	Ashlin Bodasing - Arcus Consultancy Services South Africa (Pty) Ltd		
EAP Assistant	Aneesah Alwie - Arcus Consultancy Services South Africa (Pty) Ltd		
Amendment Specialist Team	**Specialist Name**	**Specialist Company**	**Specialist Study**
	Johann Lanz	Independent Consultant	Soil and Agriculture
	Dr Brian Colloty	Enviro Sci. (Pty) Ltd	Aquatic and Freshwater
	Jamie Pote	Independent Consultant	Terrestrial Biodiversity
	Chris van Rooyen	Chris van Rooyen Consulting	Avifauna
	Craig Campbell	Arcus Consultancy Services South Africa (Pty) Ltd	Bats
	Caroline Lotter	Inkululeko Wildlife Services	External Bats Review
	Morné de Jager	Enviro Acoustics Research cc	Noise
	Dr Jayson Orton	ASHA Consulting	Heritage, Archaeology and Palaeontology
	Quinton Lawson and Bernard Oberholzer	Qarc and BOLA	Visual and Landscape
	Dr Hugo van Zyl	Independent Economic Researchers	Socio-Economic
Previous Specialists *(not working on the amendment application)*	Kate MacEwan	Natural Scientific Services	Bats
	Brett Williams	Safetech	Noise
	Dr Johan Binneman and Kobus Reichert	Eastern Cape Heritage Consultants cc	Heritage and Archaeology
	Dr John Almond	Naturaviva	Palaeontology
	Henry Holland	Independent Consultant	Visual, Landscape and Flicker
Project Applicant	Banna ba Pifhu Wind Farm (RF) (Pty) Ltd		
Report Status	Part II Amendment Report - DRAFT FOR PUBLIC COMMENT		

PUBLIC PARTICIPATION DETAILS

The Draft Part II Amendment Report, with the required application form, has been submitted to the Department of Forestry, Fisheries and the Environment (DFFE), acting as the Competent Authority (CA).

Members of the public, local communities, and stakeholders are invited to comment on the Draft Amendment Report available for public review and comment at the following locations.

Location	Physical Address	Contact person
Hard Copy and CD Location		
Humansdorp Municipal Office	19 Main Street, Humansdorp, 6300	Gayruhnesia Coenraad
Jeffreys Bay Municipal Office	33 Da Gama Rd, Jeffreys Bay, 6330	Gayruhnesia Coenraad
Electronic Copy Locations		
Arcus Website	https://arcusconsulting.co.za/projects/	Aneesah Alwie
Via E-mail	I&APs can request for copies to be sent via e-mail in zipped folders.	
Comment Submission		
Contact Person	Aneesah Alwie	
Company	Arcus Consultancy Services South Africa (Pty) Ltd	
Via Email	banna@arcusconsulting.co.za	
Via Post	240 Main Road, 1st Floor Great Westerford, Rondebosch, 7700	
Via Telephone	+27 (0) 21 412 1529 / +27 (0) 72 595 0104	

Notification of public review and comment period will be sent to all registered interested and affected parties.

ABBREVIATIONS, ACRONYMS AND UNITS

BESS	Battery Energy Storage System
CARA	Conservation of Agricultural Resources, 1983 (Act No. 43 of 1983)
CBA	Critical Biodiversity Area
DALRRD	Department of Agriculture, Land Reform and Rural Development
dB	Decibel
DFFE	Department of Forestry, Fisheries and the Environment (National)
DoE	Department of Energy
DHSWS	Department of Human Settlements and Water and Sanitation
EAP	Environmental Assessment Practitioner
ECA	Environment Conservation Act, 1989 No. 73 of 1989)
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme
ESA	Ecological Support Area
Eskom	Eskom Holdings SOC Limited
EWT	Endangered Wildlife Trust
GIS	Geographical Information Systems
GNR	Government Notice Regulation
GPS	Global Positioning System
HDI	Historically Disadvantaged Individuals
HIA	Heritage Impact Assessment
Hz	Hertz
I&AP	Interested and Affected Party
IDP	Integrated Development Plan
IEM	Integrated Environmental Management
IPP	Independent Power Producer
IRP	Integrated Resource Plan
kV	Kilovolt
kWh	Kilowatt Hours
MWh	Megawatt Hours
NCR	Noise Control Regulations
NDP	National Development Plan
NEMA	National Environmental Management Act, 1998 (Act No. 107 of 1998)
NFEPA	National Freshwater Ecosystem Priority Area
NHRA	National Heritage Resources Act, 1999 (Act No. 25 of 1999)
NSD	Noise-sensitive Developments
NWA	National Water Act, 1998 (Act No. 36 of 1998)
PES	Present Ecological State
PPA	Power Purchase Agreement
PPP	Public Participation Process
RE	Renewable Energy
REIPPPP	Renewable Energy Independent Power Producer Procurement Programme
RSH	Rotor Swept Height
SABAAP	South African Bat Assessment Advisory Panel
SABS	South African Bureau of Standards
SANBI	South African National Biodiversity Institute
SANRAL	South African National Roads Agency Limited
SANS	South African National Standards
SDF	Spatial Development Framework
SEA	Strategic Environmental Assessment
SIA	Social Impact Assessment
SKA	Square Kilometre Array
WEF	Wind Energy Facility
WHO	World Health Organisation
WTG	Wind Turbine Generator
WULA	Water Use License Application

TABLE OF CONTENTS

FIGURE LIST

TABLE LIST

PLATE LIST

1 INTRODUCTION

Banna ba Pifhu Wind Farm (RF) (Pty) Ltd (('BWF') – the applicant) intend to amend the valid environmental authorisation[1] (EA) of the Banna ba Pifhu Wind Farm (hereafter referred to as 'the development') through a Part II Amendment Application process. In terms of locality, the development is located approximately 3 km south of the town of Humansdorp in the Kouga Local Municipality and Sarah Baartman District Municipality in the Eastern Cape Province (Figure 1 – Site Locality).

The Part II amendment application has been submitted due to *substantive changes in the project scope*. These changes include: (1) amendments to the Wind Farm site layout, design and generation capacity; (2) turbine specifications, (3) a reduction in the number of wind turbines proposed; (4) inclusion of a Battery Energy Storage System (BESS); and (5) repositioning of the authorised substation. Going forward, the amendments above will be referred to as the 'proposed amendments'. The applicant is also requesting a validity period of 10 years for the EA, should it be authorised.

In terms of Chapter 5 of the National Environmental Management Act, 1998 (Act 107 of 1998 – NEMA), Environmental Impact Assessment (EIA) Regulations, 2014 (as amended), BWF appointed Arcus Consultancy Services South Africa (Pty) Ltd (Arcus), to act as the project manager and to undertake this Part II amendment process.

This amendment report includes specialist input to assess the consequences, if any, of the proposed amendments.

1.1 Environmental Authorisation Background

Following an Environmental Impact Assessment (EIA) process conducted by CSIR in December 2013, the Banna ba Pifhu Wind Farm application received EA, issued by the Department of Forestry, Fisheries and the Environment (DFFE), on 21 July 2014 (i.e., DFFE Reference 12/12/20/2289). Since the EA was received, Part I amendments were submitted and authorised by the DFFE, as below:

Development Name	DFFE Reference (as amended)	Date of EA	Expiry Date of EA
Banna ba Pifhu Wind Farm	12/12/20/2289/AM1	21 June 2017	21 July 2022
	12/12/20/2289/AM2	22 February 2022	21 July 2024

1.2 Purpose and Aim of the Report

The purpose of this report is to present an assessment of all potential impacts related to the proposed amendments, as well as assess the potential impacts, if any, of the inclusion of a BESS to the Wind Farm development. The changes in project scope and technical specifications were assessed by the specialists. This was compared to their findings of the previous Environmental Impact Assessment (CSIR, December 2013). The specialists' findings and assessments of the amendments are collated in this report. This report must be read together with the specialist studies to gain a complete understanding of the proposed amendments and the impacts thereof.

The aim of this report is to provide sufficient information to allow for transparent public review and comment, as well as for the Competent Authority to make an informed decision on the proposed amendments.

[1] DFFE Reference: 12/12/20/2289; 12/12/20/2289/AM1 and 12/12/20/2289/AM2.

1.3 Environmental Assessment Practitioner

The co-ordination and management of this amendment application process is being conducted by Arcus with the lead EAP being Ashlin Bodasing.

Refer to Appendix A for the EAP's Declaration of Interest and *Curriculum Vitae*.

Ashlin Bodasing (EAP)	
Qualifications	Bachelor of Social Science (Geography and Environmental Management). Registered EAP
Experience in Years	18
Experience	Ashlin Bodasing is the Technical Director at Arcus. Having obtained her Bachelor of Social Science Degree from the University of Kwa-Zulu Natal; she has over 18 years' experience in the environmental consulting industry in southern Africa. She has gained extensive experience in the field of Integrated Environmental Management (IEM) and Public Participation which includes the development of Environmental Impact Assessments, Basic Assessments, Environmental Management Plans and the monitoring of construction activities. Ashlin has been actively involved in a number of industrial and infrastructure projects, including electricity power lines and substations; road and water infrastructure upgrades and the installation of telecommunication equipment and as well green field coal mines. Her prior work experience included work within the parameters of the International Finance Corporation Performance Standards and World Bank Environmental Guidelines environmental reviews. Ashlin's current field of interest is within the Renewable Energy Sector, specifically Wind, Solar and Gas-to-Energy facilities. She has worked in Mozambique, Botswana, Lesotho and Zimbabwe.
Aneesah Alwie (EAP Assistant)	
Qualifications	Bachelor of Science (Environmental and Water Science)
Environmental Consultancy Experience in Years	3
Experience	Aneesah Alwie is an Environmental Consultant at Arcus. Having obtained her Bachelor of Science Degree (Environment and Water Science) from the University of the Western Cape; she has 3 years' experience as an environmental professional. She has also attended certified training courses in Environmental Law and Compliance. Aneesah manages the EIA processes for projects across South Africa and works alongside the EAP assisting in report writing and public participation processes and. She has a proven track record in producing work of quality standards, within timeframes and budgets. Her excellent organisational and project management skills enable a smooth flow of the assigned project duties and client relations. Starting off as administrator at Arcus over five years ago she still provides on-going administrative and technical support.

Arcus is a specialist environmental consultancy providing environmental services to the renewable energy market. Arcus has advised on over 250 renewable energy projects, including grid connections applications in the United Kingdom and South Africa, with environmental management and in-house specialist services.

2 TERMS OF REFERENCE AND LEGISLATIVE REQUIREMENTS

This report has been produced in compliance with the NEMA, 1998 (Act No. 107 of 1998) and the EIA Regulations 2014, as amended. BWF are applying for an amendment to the

EA[2] issued by the DFFE, in terms of Regulation 31 and 32 of the EIA Regulations, as amended.

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.'

A Part II amendment is applicable for this application because there is a *change of scope* and the *nature of impacts to the environment has changed*. Furthermore, this amendment includes adding, substituting, removing and changing conditions in the Environmental Authorisation, as per Section 3 of this report.

In compliance with Regulation 32 of the NEMA EIA Regulations 2014, as amended, this report reflects the potential impacts which have been reassessed by the specialists to ensure all impacts and significance ratings related to the proposed changes are relevant; highlights the advantages and disadvantages of the proposed amendments; provides further recommendations or mitigation measures if necessary; and discusses any changes to the EMPr. Table 2.1 below shows where in the report each item is included.

Table 2-1: Legislative Requirements of the Amendment Report

Legislative Requirements, EIA Regulations, as amended	**Reference in the Amendment Report Volume I and II**
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 –	
(a) A report, reflecting –	
(i) An assessment of all impacts related to the proposed change;	Section 5 - 7 Volume I: Appendix C
(ii) Advantages and disadvantages associated with the proposed change;	Section 8
(iii) Measures to ensure avoidance, management and mitigation of impacts associated with such proposed change; and	Section 5 – 7; and 12 Volume I: Appendix C Volume II: EMPr
(iv) Any changes to the EMPr. which report -	Section 9 Volume II: EMPr
(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 10 Volume I: Appendix B
(bb) Reflects the incorporation of comments received, including any comments of the competent authority.	Section 10 Volume I: Appendix B

[2] DFFE Reference: 12/12/20/2289; 12/12/20/2289/AM1 and 12/12/20/2289/AM2.

2.1 Authorised Listed Activities

It must be noted that the EA was prescribed by NEMA (Act 107 of 1998) and the EIA Regulations, 2010 (Government Notice (GN) R.543 in Government Gazette 33306 of 18 June 2010). The 2010 EIA Regulations comprised three listing notices (GN R.544, R.545 and R.546). Since the granting of original EA in 2014 (DFFE Reference 12/12/20/2289) the EIA Regulations, as amended (GN R.982 in Gazette No. 3822 of 4 December 2014), and the listing notices were amended (GN R.983, R.984 and R.985). The amended listing notices are prescribed in Government Notice No. R327 (Listing Notice 1 – Basic Assessment Process), R325 (Listing Notice 2 – Scoping & EIA Process) and R324 (Listing Notice 3 – Basic Assessment Process) of 7 April 2017.

No new listed activities have been triggered and / or are being applied for as part of this EA Amendment Application.

Table 2.2 provides a summary of the Authorised Listed Activities under GN R544, R545 and R546.

As per the pre-application meeting with the Department, Table 2.3 provides a comparison of the listed activities (i.e., between the 2010 NEMA EIA Regulations and the 2014 NEMA EIA Regulations, as amended) that are applicable to the Banna ba Pifhu Wind Farm EA.

Table 2-2: Summary of the Authorised Listed Activities of the Banna ba Pifhu Wind Farm EA

LISTING NOTICE (2010 EIA Regs)	ACTIVITIES
LN 1 GN R544[3]	10 (i); 11 (xi); 18 (i); 23 (ii)
LN 2 GN R545[4]	1
LN 3 GN R546[5]	4 (a)(ii)(ee); 12(a)(b); 13 (a); 14 (a)(i); 16 (iii)(iv) (a)(ii)(ff);

[3] "Listing Notice 1 of the EIA Regulations, promulgated under Government Notice R544 of 2010."
[4] "Listing Notice 2 of the EIA Regulations, promulgated under Government Notice R545 of 2010."
[5] "Listing Notice 3 of the EIA Regulations, promulgated under Government Notice R546 of 2010."

Table 2-3: Comparison between the Authorised 2010 NEMA EIA Regulations and the 2014 NEMA EIA Regulations Listed Activities relevant to the application for amendment of the authorised Banna ba Pifhu Wind Farm

2010 NEMA EIA Regulations			**2014 NEMA EIA Regulations, as amended**		
Activity No(s)	**Listed Activities**	**Project Description as per the EA**	**Activity No(s)**	**Listed Activities**	**Revised Project Description**
GN R.544 Activity 10	The construction of facilities or infrastructure for the transmission and distribution of electricity – (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kV.	A new 66 kV substation will be constructed.	GN R.983 Activity 11 (i)	The construction of facilities or infrastructure for the transmission and distribution of electricity – (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kV.	Electrical reticulation will be installed to transfer electricity from the turbines to a 66 kV substation which will be constructed on-site. Cables will be installed underground where feasible.
GN R.544 Activity 11 (xi)	The construction of: (xi) infrastructure or structures covering 50 m² or more; where such construction occurs within a watercourse or within 32 m of a watercourse, measured from the edge of a watercourse, excluding where such construction will occur behind the development setback line.	The final layout may result in turbines or other infrastructure encroaching within 32 m of a watercourse.	GN R.983 Activity 12 (ii) (a) (c)	The construction of- (ii) infrastructure or structures with a physical footprint of 100 square meters or more; where such development occurs – (a) within a watercourse; or (c) if no developments setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse.	Infrastructure is proposed within 32 m of a watercourse. The cumulative footprint of the development infrastructure within 32 m of a watercourse will exceed 100 square metres.
GN R.544 Activity 18 (i)	The infilling or depositing of any material of more than 5 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 5 cubic metres from - (i) a watercourse	The construction of supporting infrastructure (e.g. roads and power lines) could necessitate crossing of watercourses and thus, infilling of more than 5 cubic metres from - (i) a watercourse.	GN R.983 Activity 19	The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse	The construction of the WEF supporting infrastructure, e.g., overhead powerline and roads, will include the excavation of soil in watercourses/drainage line areas, and infilling / deposition of more than 5 cubic metres from a watercourse.

2010 NEMA EIA Regulations			2014 NEMA EIA Regulations, as amended		
Activity No(s)	**Listed Activities**	**Project Description as per the EA**	**Activity No(s)**	**Listed Activities**	**Revised Project Description**
GN R.544 Activity 23 (ii)	The transformation of undeveloped, vacant or derelict land to – (ii) residential, retail, commercial, recreational, industrial or institutional use, outside an urban area and where the total area to be transformed is bigger than 1 hectare but less than 20 hectares;	The total area to be transformed to commercial use may be bigger than 1 hectare but less than 20 hectares.	GN R983 Activity 27 (i) (ii)	The clearance of an area of 1 hectare or more but less than 20 hectares of indigenous vegetation, except where such clearance is required for (i) the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a maintenance management plan.	The total area to be transformed, largely within pastures, to commercial use will be bigger than 1 hectare but less than 20 hectares.
			GN R983 Activity 28 (ii)	Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture, game farming, equestrian purposes or afforestation on or after 01 April 1998 and where such development: (ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare.	Construction of the development will change the land. The development is outside an urban area and has a footprint that will exceed 1 ha.
GN R.545 Activity 1	The construction of facilities or infrastructure for the generation of electricity where the electricity output is 20 MW or more.	A facility of generating an electricity output of 30.6 MW from wind energy is proposed.	GN R.984 Activity 1	The development of facilities or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20 megawatts or more.	A facility of generating an electricity output of up to 40.5 MW from wind.
GN R.546 Activity 4	The construction of a road wider than 4 m with a reserve less than 13.5 m (a) in the Eastern Cape:	The project may entail the construction of new roads with a width greater than 4	GN R.985 Activity 4	The development of a road wider than 4 metres with a reserve less than 13.5 metres. (a) in Eastern	Internal and external access roads will be constructed, which are wider than 4 m. The

2010 NEMA EIA Regulations			2014 NEMA EIA Regulations, as amended		
Activity No(s)	**Listed Activities**	**Project Description as per the EA**	**Activity No(s)**	**Listed Activities**	**Revised Project Description**
(a) (ii) (ee)	(ii) All areas outside urban areas; in (ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans.	metres to provide access to the facility and between turbines.	(a) (i) (ee)	Cape: (i) areas outside urban areas; (ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans.	site falls outside of an urban area and part of it falls within a CBA 2 where watercourses are situated.
			GN R.985 Activity 18	The widening of a road by more than 4 metres, or the lengthening of a road by more than 1 kilometre. (a) Eastern Cape: (i) Outside urban areas; (ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans.	Existing roads will be widened by more than 4 m and lengthened by more than 1 km in areas containing indigenous vegetation within CBAs to provide access during construction.
GN R.546 Activity 12 (a) (b)	The clearance of an area of 300 m^2 or more of vegetation where 75% or more of the vegetative cover constitutes indigenous vegetation. (a) Within any critical endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004; (b) Within critical biodiversity areas identified in bioregional plans	This will depend on the area of indigenous vegetation to be cleared and whether it falls within the threatened Renosterveld vegetation on site (NEMBA listed – Endangered - Humansdorp Shale Renosterveld)	GN R.984 Activity 12 (a) (i) (ii)	The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan. (a) In Eastern Cape; (i) Within any critical endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004 (ii) Within critical biodiversity areas identified in bioregional plans.	The development will require the clearance of natural vegetation in excess of 300 m^2 in areas of natural vegetation. Parts of the site fall within a CBA 2.

2010 NEMA EIA Regulations			2014 NEMA EIA Regulations, as amended		
Activity No(s)	**Listed Activities**	**Project Description as per the EA**	**Activity No(s)**	**Listed Activities**	**Revised Project Description**
GN R.546 Activity 13 (a)	The clearance of an area of 1 Ha or more of vegetation where 75% or more of the vegetative cover constitutes indigenous vegetation (a) Critical biodiversity areas and ecological support areas as identified in systematic biodiversity plans adopted by the competent authority.	There are some Critical Biodiversity Areas along the northern boundary of the site, depending on the final site layout.	GN R.984 Activity 15 (a) (i)	The transformation of land bigger than 1000 square metres in size, to residential, retail, commercial, industrial or institutional use, where, such land was zoned open space, conservation or had an equivalent zoning, on or after 02 August 2010 (a) in Eastern Cape: (i) Outside urban areas.	Construction of the development will change the land use from agriculture to mixed - agriculture and electricity generation and transmission. The development is outside an urban area and has a footprint that will exceed 1 ha.
GN R.546 Activity 14 (a) (i)	The clearance of an area of 5 Ha or more of vegetation where 75% or more of the vegetative cover constitutes indigenous vegetation (a) Eastern Cape: (i) All areas outside urban areas.	This will depend on the area of indigenous vegetation to be cleared, the site falls outside of the urban edge. It is anticipated that the area to be cleared for turbine footprints, road and infrastructure will be greater than 5 Ha with more than 75 % consisting of indigenous vegetation.	-	-	-
GN R.546 Activity 16 (iii) (iv). (a) (ii) (ff)	The construction of: (iii) buildings with a footprint exceeding 10 m² in size; or (iv) infrastructure covering 10 m² or more; where such construction occurs within a watercourse or within 32 m of a watercourse, measured from the edge of a watercourse; (a) in the Eastern Cape: (ii) Outside urban areas, in: (ff) Critical biodiversity areas or ecosystem service areas as identified in systematic	This will apply depending on the location of the roads and electrical infrastructure which may cross one of the watercourses on the site.	GN R.984 Activity 14 (ii) (a) and (c). (a) (i) and (ff)	The development of (ii) infrastructure or structures with a physical footprint of 10 square metres or more; Where such development occurs – (a) within a watercourse and (c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse. (a) Easterm Cape: (i) outside urban areas, in: (ff) Critical biodiversity areas or ecosystem service areas as identified in	Infrastructure associated with the wind turbines will be constructed / developed within 32 m of a watercourse. The development site is within a CBA 2. The access road infrastructure will be upgraded resulting in a footprint of more than 10 square meters or more within a watercourse.

2010 NEMA EIA Regulations			2014 NEMA EIA Regulations, as amended		
Activity No(s)	**Listed Activities**	**Project Description as per the EA**	**Activity No(s)**	**Listed Activities**	**Revised Project Description**
	biodiversity plans adopted by the competent authority or bioregional plans.			systematic biodiversity plans adopted by the competent authority or in bioregional plans	Any new cabling will be built underground along the internal road network, where technically feasible to avoid any further crossings of vegetation and watercourses on the development site.

2.2 Environmental Screening Tool

In terms of the Government Gazette, published in the Government Notice (GN) No. 320, 20 March 2020 and Regulation 16 (3)(a) of the EIA Regulations 2014, as amended, a Screening Report, generated from the national web based environmental screening tool is required to accompany any application for Environmental Authorisation.

The Screening Report generated for the amendment application is included in Appendix C and in the application form submission to the DFFE. The screening report generated did not identify any Wind or Solar PV / CSP Developments which received environmental authorisation within a 30 km radius of the wind farm, furthermore, no intersections with Environmental Management Frameworks (EMF) were found. In terms of development incentives, restrictions, exclusions or prohibitions, the site falls within a South Africa Conservation Area and mitigation measures to reduce any impact against the conservation areas is recommended in this report.

Based on the selected classification to produce the screening tool report, and the environmental sensitivities of the development footprint, the screening report generates a list of specialist assessments identified for inclusion in the assessment report. It is the responsibility of the EAP to confirm this list and to motivate in the assessment report, the reason for not including any of the identified specialist study.

Table 2.4 provides a summary of the specialist assessments identified by the screening tool reports, and the response to each assessment in terms of the proposed amendments.

Specialist assessments (Appendix C) have considered the results of the DFFE Screening Tool in their terms of reference.

Table 2-4: Specialist assessments identified in terms of the national web-based screening tool for the proposed amendments

Identified Specialist Assessment	Assessment Protocol	Identified Sensitivity	
		By DFFE Screening Report	**By Specialist / EAP**
Agriculture Theme	Protocol for the Specialist Assessment and Minimum Report Content Requirements of Environmental Impacts on Agricultural Resources by Onshore Wind and/or Solar Photovoltaic Energy Generation Facilities where the Electricity Output is 20 MW or more, gazetted on 20 March 2020. This protocol replaces the requirements of Appendix 6 of the Environmental Impact Assessment Regulations.	**Very High Sensitivity**	**Very High Sensitivity (for the onsite pivots)**
	Comment: The agricultural sensitivity of the site, as identified by the screening tool, varies from low to very high across different parts of the site. The criteria for agricultural sensitivity in the screening tool are straightforward and are clearly defined in terms of cultivation status and land capability. The specialist assessment **confirms** the sensitivity as given by the screening tool (see Appendix C of this Report), except that there are four additional centre pivots, two to the east and two to the west of the high sensitivity centre pivot which are clearly visible as round circles in Figure 4. The agricultural sensitivity of all five centre pivot lands is very high. No wind farm infrastructure impinges on areas of very high agricultural sensitivity. All wind farm infrastructure is on land of high agricultural sensitivity. It is important to note that despite the high sensitivity, the agricultural impact is low (see Sections 5 and 7).		
Landscape / Visual Impact Assessment	Site Sensitivity Verification Requirements where a Specialist Assessment is required but no specific assessment protocol has been prescribed, gazetted on 20 March 2020.	**Very High Sensitivity**	**High Sensitivity**
	Comment: The visual specialist **disputes the very high sensitivity of the DFFE screening tool but confirms the high sensitivity identified during the original VIA**. The reduced number of wind turbines (a maximum of 7 turbines to be constructed), together with the increased hub height, rotor diameter and blade tip height would result in a similar overall visual impact significance rating for the construction and operational phases of the project. The increased visual effect of the marginally		

Identified Specialist Assessment	Assessment Protocol	Identified Sensitivity	
		By DFFE Screening Report	**By Specialist / EAP**
	expanded viewshed is offset by the reduced visual effect of having fewer wind turbines in the landscape, which rates high sensitivity with mitigation.		
Archaeological and Cultural Heritage Impact Assessment	Site Sensitivity Verification Requirements where a Specialist Assessment is required but no specific assessment protocol has been prescribed, gazetted on 20 March 2020.	**Low Sensitivity**	**Low Sensitivity**
	Comment: Parts of the development footprint is highlighted as high sensitivity in the screening report, this is identified as high due to the river, which would likely have a higher potential to find exposed Early Stone Age (ESA) artefacts. The ESA artefacts seen on site are of generally very low cultural significance so the majority low sensitivity identified on site is **confirmed**. There may be the exception of the buildings on site (medium to high sensitivity) but the layout avoids these areas.		
Palaeontology Impact Assessment	Site Sensitivity Verification Requirements where a Specialist Assessment is required but no specific assessment protocol has been prescribed, gazetted on 20 March 2020.	**Very High Sensitivity**	**Low Sensitivity**
	Comment: A palaeontological assessment was also carried out for the original assessment (Almond 2012) and has not been updated for the amendment. The nature of palaeontological resources is such that assessments usually apply fairly equally across a larger area, depending on the bedrocks present. In this instance rocks of the Ceres Subgroup of the Bokkeveld Formation underlie the entire study area. The extensive deformation and weathering present are expected to have destroyed the majority of the fossil content such that the study area can be considered to be of very low palaeontological sensitivity, which **disputes** the results of the screening report.		
Terrestrial Biodiversity Impact Assessment	Protocol for the Specialist Assessment and minimum report content requirements for Environmental Impacts on Terrestrial Biodiversity, gazetted on 20 March 2020.	**Very High Sensitivity**	**Medium Sensitivity**
	Comment:		

Identified Specialist Assessment	Assessment Protocol	Identified Sensitivity	
		By DFFE Screening Report	By Specialist / EAP
	The findings of this terrestrial biodiversity assessment **dispute** the very high sensitivity results as the areas designated ESA 2 are highly productive agricultural lands (dryland and irrigated pivot pastures), which are unlikely to be rehabilitated for this reason. They should have a designated transformed status.		
Aquatic Biodiversity Impact Assessment	Protocol for the Specialist Assessment and minimum report content requirements for Environmental Impacts on Aquatic Biodiversity, gazetted on 20 March 2020.	**Very High Sensitivity**	**Very High Sensitivity**
	Comment: The aquatic sensitivity of the site, as identified by the screening tool, varies from low to very high across different parts of the site. The specialist assessment **confirms** the sensitivity as given by the screening tool (see Appendix C). No wind farm infrastructure impinges on areas of very high aquatic sensitivity. Mainstem rivers and wetlands in particular, that do contain functioning aquatic environments been avoided. Any activities within the watercourses and pans, the buffers, or 500 m from the wetland boundary will require a Water Use license under Section 21 c and i of the National Water Act (Act 36 of 1998).		
Avian Impact Assessment	Protocol for the specialist assessment and minimum report content requirements for Environmental Impacts on Avifaunal Species by Onshore Wind Energy Generation Facilities where the electricity output is 20 MW or more, gazetted 20 March 2020.	**Low Sensitivity**	**High Sensitivity**
	Comment: The screening tool identifies / classifies the habitat at the site as low sensitivity from an avifaunal perspective, relative to wind energy development, this is **disputed**. The overall sensitivity should be classified as high sensitivity. The habitat is transformed, but the combination of irrigated and dryland pastures, grassland with shrub, dams and wetlands which have replaced the original Fynbos vegetation is highly suitable for a number of wind farm sensitive priority species, including some Red Listed species.		
Civil Aviation Assessment	Protocol for the specialist assessment and minimum report content requirements for Environmental Impacts on Civil Aviation Installations, gazetted on 20 March 2020.	**High Sensitivity**	**Low Sensitivity**

Identified Specialist Assessment	Assessment Protocol	Identified Sensitivity	
		By DFFE Screening Report	By Specialist / EAP
	Comment: Site verification analysis **disputes** the high sensitivity. During the original EA Application, the South African Civil Aviation Authority (SACAA) was consulted by BWF. SACAA confirmed that there is no impact to the airspace of the development area and immediate surrounds. Subsequent to the original EA Application, a private landing strip (Woodlands Farm Aerodrome) was registered on a neighbouring land portion approximately 2 km south of the nearest turbine (T1). BWF has engaged with the landowner regarding the landing strip and the landowner has confirmed no objection to the proposed wind farm turbine locations in the context of the Woodlands Farm Aerodrome. A compliance statement has been produced by the EAP which includes the comment received from SACAA. No further assessment is required for the application process as the development will not have an unacceptable impact on civil aviation installations. The SACAA will be requested to provide any further comment and will be kept on the database throughout the application process. Refer to Appendix C of this Report.		
Defence Assessment	Protocol for the specialist assessment and minimum report content requirements for Environmental Impacts on Defence Installations, gazetted on 20 March 2020.	**Medium Sensitivity**	**Low Sensitivity**
	Comment: Site verification analysis **disputes** the medium sensitivity. No negative impacts on the defence installation are expected as the area to be developed is not within the medium sensitive zones identified on the site. Request for comment will be submitted to the South African National Defence Force (SANDF) for confirmation of no objection and any correspondence will be appended to the Final Amendment Report. No further assessment requirements have been undertaken. See Appendix C of this Report.		
RFI Assessment	Site Sensitivity Verification Requirements where a Specialist Assessment is required but no specific assessment protocol has been prescribed, gazetted on 20 March 2020.	**High Sensitivity**	**Low Sensitivity**
	Comment: Site verification analysis **disputes** the high sensitivity. The area of the site within which the development will be constructed and will operate, is on land of low sensitivity. Only the edges of the development site overlaps with high sensitivity buffer. No construction will be taking place in these areas. Furthermore, no negative impacts to any radar stations are expected as the site is more than 60 km from any station. No further assessment and mitigation measures are required and thus no further assessment have been undertaken. See Appendix C of this Report.		
Noise Impact Assessment	Protocol for specialist assessment and minimum report content requirements	**Very High Sensitivity**	**Low Sensitivity**

Identified Specialist Assessment	Assessment Protocol	Identified Sensitivity	
		By DFFE Screening Report	By Specialist / EAP
	for Noise Impacts, gazetted on 20 March 2020.		
	Comment: Before assessment of the impact of noise on the potential receptors, the specialist **confirmed** the sensitivity rating and also noted that the screening tool report missed NSDs 02, 08, 09, 10 and 11 as illustrated on Plate 5.1 below. Full impact assessment was undertaken by the specialist to assess the ambient sound level and significance ratings which **reduces the impact** to low sensitivity.		
Flicker Assessment	Site Sensitivity Verification requirements where a specialist assessment is required but no Specific Assessment Protocol has been prescribed, gazetted 20 March 2020.	**Very High Sensitivity**	**Low Sensitivity**
	Comment: Although noise and flicker are two separate themes within the DFFE Screening Tool, the sensitive features (dwellings / receptors) are the same for both themes. In Arcus' experience, the noise sensitivities and buffers also provide sufficient setback to ensure shadow flicker effects will not be significant. Shadow flicker constraints are thus catered for to some degree by the noise related spatial constraints and buffers. Potential temporarily or permanently inhabited residence were buffered by the noise specialist for this amendment application. The screening tool report (Appendix C) shows areas of very high and low sensitivity across the site. The results of the sensitivity of very high is **disputed**. The Banna ba Pifhu infrastructure will be overlain on the low sensitive areas. NSD 09 and 10 were identified as high sensitivity in the flicker assessment conducted for the original assessment by the Applicant. It should be noted that NSD10 highlighted that he will be retiring by the end of 2013 and that the dwelling will no longer be occupied. The applicant confirmed that the dwelling (NSD10) is currently unused. Further communication with the applicant confirmed that NSD09 is currently used for residential purposes. It is the noise specialist opinion that as long as recommendations are adhered to, the sensitivity to these locations will be low and the EAP supports this assessment. No further flicker assessment was conducted or required during the application process as mitigation measures identified by the noise impact assessment applies to this theme. Refer to Appendix C of this Report.		
Traffic Assessment	Site Sensitivity Verification Requirements where a Specialist Assessment is required but no specific assessment protocol has been prescribed, gazetted on 20 March 2020.	**Not Determined**	**Low Sensitivity**

Identified Specialist Assessment	Assessment Protocol	Identified Sensitivity	
		By DFFE Screening Report	By Specialist / EAP
	Comment: Traffic assessment was identified as a required specialist assessment but no environmental sensitivity was determined by the screening report. No traffic impact assessment was conducted for the authorised Banna ba Pifhu WEF as this was not deemed high sensitivity by the EAP (CSIR, 2013). Following the initial assessment and verification for the amendment, the traffic theme is deemed low by the EAP (Arcus, 2022). As this is an amendment application a new specialist assessment report is not required. A compliance statement has been produced. Refer to Section 5 and Appendix C of this Report.		
Geotechnical Assessment	Site Sensitivity Verification Requirements where a Specialist Assessment is required but no specific assessment protocol has been prescribed, gazetted on 20 March 2020.	**Not Determined**	**Not Determined**
	Comment: Geotechnical assessment was identified as a required specialist assessment but no environmental sensitivity was determined by the screening report. The EAP is of the opinion that a Geotechnical Assessment for the development can and will only be undertaken once the final development design is confirmed, prior to the commencement of the construction phase. **The EAP has not included this assessment as part of the application process.**		
Socio-Economic Assessment	Site Sensitivity Verification Requirements where a Specialist Assessment is required but no specific assessment protocol has been prescribed, gazetted on 20 March 2020.	**Not Determined**	**Low Sensitivity**
	Comment: Socio-economic assessment was identified as a required specialist assessment but no environmental sensitivity was determined by the screening report. The impact assessment of the authorised Banna ba Pifhu WEF was undertaken prior to the protocols being gazetted, i.e., in 2012 by the same specialist and the reporting complied with Appendix 6 of the EIA Regulations, as amended. Following the initial assessment and verification for the amendment, the socio-economic theme is deemed low by the specialist. As this is an amendment application a new specialist assessment report is not required. An amendment letter has been produced to assess the impacts, if any the amendment would have on the respective study area.		
Plant Species Assessment	Protocol for specialist assessment and minimum report content requirements	**Medium Sensitivity**	**Low Sensitivity**

Identified Specialist Assessment	Assessment Protocol	Identified Sensitivity	
		By DFFE Screening Report	By Specialist / EAP
	for Environmental Impacts on Terrestrial Plant Species, gazetted on 20 March 2020.		
	Comment: The findings of this terrestrial biodiversity assessment **dispute** the results. While it is prudent to screen for potential species of conservation concern, none were found to be present during multiple survey periods within the site.		
Animal Species Assessment	Protocol for specialist assessment and minimum report content requirements for Environmental Impacts on Terrestrial Animal Species, gazetted on 20 March 2020.	**High Sensitivity**	**Medium to High Sensitivity**
	Comment: The findings of this terrestrial biodiversity assessment **may confirm** the results of the national environmental screening tool, although none of the species were found or likely to be found in the transformed areas where the project footprint is proposed, they may be present in the broader area, or as transient visitors, hence the screening tool results may be valid.		
Bats (Wind) Assessment	Site Sensitivity Verification Requirements where a Specialist Assessment is required but no specific assessment protocol has been prescribed, gazetted on 20 March 2020.	**High Sensitivity**	**Medium to High Sensitivity**
	Comment: The methodology used to determine the sensitivity of bats by the specialist **confirmed areas of high sensitivity**. The DFFE Screening Tool identified two sensitivity ratings within the development footprint, namely, high and medium. These high sensitivity ratings, in the specialist's opinion, are considered relevant going forward and should be considered as No-Go areas. The environmental sensitivity input assumed was taken forward and considered in the amendment recommendation for the Banna Ba Pifhu Wind Farm and appropriate layout and development restrictions were implemented.		

3 OVERVIEW OF THE AUTHORISED BANNA BA PIFHU WIND FARM AREA

The geology of the region is dominated by rocks of the Cape Supergroup which consist mainly of quartzite layers. These rocks tend to be erosion resistant, forming ridges and mountains, as well as rocky promontories which jut out into the sea such as at Seal Point and Shark Shack Point near Cape St Francis. The wind farm will be located on a relatively flat coastal plain. Foothills of Cape Fold Mountains rise towards the west and north of the wind farm site and palaeo-dunes of up to 100 m high can be seen south of the wind farm site near Thyspunt and Oyster Bay.

The wind farm will be introduced into an agricultural landscape with dairy farming as the main land use type. Fynbos on the hills with thicket along deeper river valleys (and among palaeo-dunes) cover areas which are not cultivated. Humansdorp is the largest in-land settlement in the region and an important service centre for the agricultural community. The coastline contains numerous towns and resorts which cater for seasonal visitors and tourists, such as St Francis Bay, Cape St Francis and Oyster Bay.

Properties affected by the wind farm remain unchanged from the EA and are listed in Table 3.1 below.

Table 3-1: Affected properties of the Banna ba Pifhu Wind Farm

Property Description	Owner	Area (ha)
Portion 1 of Farm Broadlands No. 868	David Masterson Family Trust	313.9
Remainder of Portion 2 of Farm Diep Rivier No. 689	Saragossa Farms (Pty) Ltd	297.3
Portion 15 of Farm Diep Rivier No. 689	Saragossa Farms (Pty) Ltd	167.0
Remainder of the farm Geelhouteboom No. 688	Saragossa Farms (Pty) Ltd	361.8
Total Area (ha)		**1140 ha**

Components authorised in the EA (2014, as amended) are reflected below.

- 13 turbines, with a maximum generation capacity of 30.6 MW;
- Expected hub height from 80 m to 105 m and blade diameter from 90 m to 117 m;
- Reinforced concrete foundation of approximately 20 m x 20 m at a maximum depth of 3 m;
- Gravel access roads of approximately 5 m wide;
- A laydown area of maxim area 10 000m^2;
- Fencing; and
- Existing building on site will be used as storage / maintenance and control / operations facility for the energy project.

Electrical infrastructure alongside turbines:

- Medium voltage cables buried approximately 1 m below ground;
- New substation on site to connect to the distribution transmission system (maximum size of 100 m x 100 m). The wind farm will connect to the existing 66 kV Melkhout / St Francis overhead powerline which passes through the site; and
- Connection to the Eskom grid line will be via underground cabling or overhead line supported on intermediate poles.

The grid connection to connect the Banna ba Pifhu wind farm to the national grid is subject to a separate application process.

The sub-sections below are provided to show the change of scope from what was authorised to what is proposed and requires authorisation.

3.1 Details of the Proposed Amendments

BWF is proposing amendments to the authorised project specifications as provided above and inclusion of a Battery Energy Storage System (Figure 2 – Site Development Plan). Each sub-section is hyperlinked in the table below for ease of reference.

No	Proposed Amendments and Inclusions	Section Reference
1	Authorised and Proposed Geographic Co-ordinates	3.1.1
2	Authorised and Proposed Project Specifications	3.1.2
3	Conditions of the Environmental Authorisation	3.1.3
4	Battery Energy Storage System	3.1.4

3.1.1 Authorised and Proposed Geographic Co-ordinates

Table 3.2 below shows the co-ordinates of the Wind Farm and Infrastructure as per the EA.

Table 3.3 and Figure 3 shows the co-ordinates for the Wind Farm and Infrastructure for the Amended EA.

Table 3.4 shows the Turbine Layout Design Evolution. Following specialist assessments for this amendment the approved layout of 13 wind turbine generators (WTGs) has been reduced to 8 WTGs, with only 7 WTGs to be constructed. The reduction in number of turbines has reduced negative impacts and avoids social impacts related to the development.

Table 3-2: Co-ordinates of the Wind Farm and Infrastructure as per the Authorised EA

Preferred Alternative	Latitude	Longitude
Wind Farm		
Middle point of the facility	34° 4'10.81"S	24° 46'42.50"E
Grid Connection (Option 3)		
Start	34° 3'58.58"S	24° 47'15.27"E
Middle	34° 4'0.78"S	24° 47'31.10"E
End	34° 4'4.48"S	24° 47'56.74"E
On-site Substation		
Centre Co-ordinates	*Co-ordinates were not included in the EA.*	

Table 3-3: Co-ordinates of the Wind Farm and Infrastructure for the Amended EA

Preferred Alternative	Latitude	Longitude
Wind Farm (unchanged)		
Middle point of the facility	34° 4'10.81"S	24° 46'42.50"E
On-site Substation (updated)		
Centre Co-ordinates	34° 4'8.93"S	24°47'14.86"E

Preferred Alternative	Latitude	Longitude
Wind Farm (unchanged)		
Battery Energy Storage System (new component)		
Centre Co-ordinates	34° 4'11.99"S	24°47'14.84"E

Table 3-4: Turbine Layout Design Evolution

Authorised (13) Turbine Layout and Proposed (8) Turbine Layout				
WTGs	**Authorised Latitude**	**Authorised Longitude**	**Proposed Amendment Latitude**	**Proposed Amendment Longitude**
1	34° 4'20.25"S	24°45'21.51"E	34°04'04.877"S	24°46'19.390"E
2	34° 4'8.00"S	24°45'44.34"E	34°03'48.138"S	24°46'35.995"E
3	34° 3'46.47"S	24°45'41.71"E	34°04'05.191"S	24°46'59.239"E
4	34° 4'25.26"S	24°46'10.50"E	34°03'47.197"S	24°47'09.606"E
5	34° 4'18.39"S	24°46'32.31"E	34°04'23.390"S	24°47'7.470"E
6	34° 4'9.27"S	24°46'48.93"E	34°03'55.299"S	24°47'34.575"E
7	34° 3'54.73"S	24°46'40.03"E	34°04'13.758"S	24°47'37.543"E
8	34° 3'57.28"S	24°47'9.53"E	34°04'05.595"S	24°47'42.128"E
9	34° 3'58.48"S	24°47'34.89"E	*Removed*	
10	34° 4'16.13"S	24°47'18.00"E	*Removed*	
11	34° 4'29.38"S	24°47'0.54"E	*Removed*	
12	34° 4'49.28"S	24°47'7.67"E	*Removed*	
13	34° 4'58.80"S	24°47'24.86"E	*Removed*	

3.1.2 Authorised and Proposed Project Specifications

Table 3.5 below shows the change in technical details from authorised (old) specifications alongside proposed (new) specifications to be authorised.

Table 3-5: Authorised and Proposed Project Specifications

Aspect	Authorised Specification	Proposed Specification
Wind Farm		
Site Boundary	Portion 1 of Farm No. 868 Portion 2 of the farm Diep Rivier No. 689	No change

Aspect	Authorised Specification	Proposed Specification
Wind Farm		
	Portion 15 of the farm Diep Rivier No. 689 Remainder of the farm Geelhouteboom No. 688	
Size of Site (ha)	1140 ha	No change
Maximum Generation Capacity	30.6 MW	Up to 40.5 MW
Number of Turbines	13	Up to 8 to be authorised and up to 7 to be constructed
Hub Height	80 m - 105 m	Up to 150 m
Rotor Diameter	90 m - 117 m	Up to 190 m
Blade Length	Not specified in EA but can be calculated as 45 m – 58.5 m	Up to 95 m
Concrete Foundations	Approximately 20 m x 20 m at a maximum depth of 3 m	Approximately 1500 square meters in total and will be reinforced concrete foundations to support the turbine towers
Gravel Access Roads	Wider than 4 m	Approximately 12 m wide during construction and rehabilitated to approximately 6 m wide during operations
On-site Substation	On site (maximum size of 100 m x 100 m) to connect to the existing 66 kV Melkhout / St Francis overhead powerline which passes through the site	New location: On site (maximum size of 100 m x 100 m) to connect to the existing 66 kV Melkhout / St Francis overhead powerline which passes through the site
BESS	-	Footprint of approximately 100 m x 100 m (0.5 hectares)

3.1.3 Conditions of the Environmental Authorisation

Table 3.6 reflects the conditions of the EA to be changed, retained or removed. Any changes to conditions in the EA are reflected by being underlined and bold alongside what must be removed which has a strikethrough.

Table 3-6: Conditions of the Banna ba Pifhu Wind Farm EA to be Retained or Changed

Banna ba Pifhu WEF EA **DFFE Reference: 12/12/20/2289; 12/12/20/2289/AM1 and 12/12/20/2289/AM2**		
Condition in EA	**Change, Retained or Removed**	**Amended Condition / Reason for Condition to be Removed**
Scope of authorisation		
1.	Slight change.	The preferred site for the construction of a ~~30.6 MW~~ **40.5 MW** Banna ba Pifhu Wind Farm and its associated infrastructure, located on the Broadlands Farm (Remainder of Farm 688, Portion 2 of Farm 689, Portion 15 of Farm 689

Banna ba Pifhu WEF EA **DFFE Reference: 12/12/20/2289; 12/12/20/2289/AM1 and 12/12/20/2289/AM2**		
Condition in EA	**Change, Retained or Removed**	**Amended Condition / Reason for Condition to be Removed**
		and Portion 1 of Farm 868) near Humansdorp, as per the above mentioned geographic coordinates is approved.
2. – 5.	No changes. To be retained as is in new EA.	
6.	Slight change.	This activity must commence within a period of ~~three (03)~~ **ten (10)** years from the date of issue of this authorisation. If commencement of the activity does not occur within that period, the authorisation lapses and a new application for environmental authorisation must be made in order for the activity to be undertaken.
7. – 8.	No changes. To be retained as is in new EA.	
Notification of authorisation and right to appeal		
9.	Slight changes.	The holder of the authorisation must notify ~~every~~ all registered interested and affected party, in writing and within ~~12 (twelve) calendar~~ **14 (fourteen)** days of the date of this environmental authorisation, of the decision to authorise the activity.
10. – 10.1	No changes. To be retained as is in new EA.	
10.2	Slight change.	Inform the interested and affected party of the appeal procedure provided for in ~~Chapter 7 of the Environmental impact Assessment Regulations, 2010;~~ **Chapter 2 of the National Environmental Management Act, 1998 (Act No. 107 of 1998) National Appeals Regulations published under Government Notice R993 in Government Gazette No. 38303 dated 08 December 2014 (National Appeals Regulations, 2014), which prescribe the appeal procedure to be followed**.
10.3 – 10.4	No changes. To be retained as is in new EA.	
11. – 11.3	To be removed.	*No requirements in the NEMA EIA Regulations, as amended, for notices to be published during notification of EA decision. Registered I&APs will be informed as per the approved PP Plan.*
Management of the activity		
12. and 13.	No changes. To be retained as is in new EA.	
14. – 19.	*Change.*	*DFFE should reconsider these conditions as a new EMPr for approval is being submitted (Volume II).*
Environmental Control Officer (ECO) and duties		
20. – 25.	No changes. To be retained as is in new EA.	
Recording and reporting to the Department		
26. – 27.	No changes. To be retained as is in new EA.	
Environmental Audit Report		
28. – 29.	No changes. To be retained as is in new EA.	
Commencement of the activity		

Banna ba Pifhu WEF EA **DFFE Reference: 12/12/20/2289; 12/12/20/2289/AM1 and 12/12/20/2289/AM2**		
Condition in EA	**Change, Retained or Removed**	**Amended Condition / Reason for Condition to be Removed**
30. – 33.	No changes. To be retained as is in new EA.	
Notification to authorities		
34.	No changes. To be retained as is in new EA.	
Operation of the activity		
35.	No changes. To be retained as is in new EA.	
36. and 37.	*Change.*	*DFFE should reconsider this condition as a new EMPr for approval is being submitted (Volume II), which includes operational management measures.*
Site closure and decommissioning		
38.	No changes. To be retained as is in new EA.	
Specific Conditions		
Avifauna and bats		
39.	No changes. To be retained as is in new EA.	
40.	Slight change.	The results of the pre-construction bird monitoring programme completed in March and mid-April 2012 **and the additional site surveys/visits completed in September 2018 and January 2022** must inform the final layout and the construction schedule of the energy facility.
41. – 46.	No changes. To be retained as is in new EA.	
47.	Slight change.	All powerlines linking wind turbines to each other and to the internal substation must be buried**, where technically feasible**. ~~Only powerlines~~ Power lines linking the wind energy facility to the grid may be above the ground.
48.	No changes. To be retained as is in new EA.	
Vegetation, wetlands and water resources		
49. – 71.	No changes. To be retained as is in new EA.	
Roads and transportation		
72. – 82.	No changes. To be retained as is in new EA.	
Noise		
83.	Remove.	*NSD10 (NSA10 from the previous report compiled by Williams, 2013) is vacant and no longer used for residential purposes and / nor will be used in the future for residential purposes and is therefore not noise sensitive.*
84. – 90.	No changes. To be retained as is in new EA.	
Visual Resources		
91. – 95.	No changes. To be retained as is in new EA.	
Human health and safety		
96. – 103.	No changes. To be retained as is in new EA.	

Banna ba Pifhu WEF EA DFFE Reference: 12/12/20/2289; 12/12/20/2289/AM1 and 12/12/20/2289/AM2		
Condition in EA	**Change, Retained or Removed**	**Amended Condition / Reason for Condition to be Removed**
Hazardous materials and waste management		
104. – 114.	No changes. To be retained as is in new EA.	
Excavation of blasting activities		
114. – 118.	No changes. To be retained as is in new EA.	
Air emissions		
119. – 120.	No changes. To be retained as is in new EA.	
Historical / cultural / palaeontological resources		
121. – 126.	No changes. To be retained as is in new EA.	
Turbine position		
127. – 128.	No changes. To be retained as is in new EA.	
General		
129. – 131.	No changes. To be retained as is in new EA.	

3.1.4 Battery Energy Storage System

In addition to the technical project specification changes of the EA, BWF is requesting the inclusion of a Battery Energy Storage System (BESS) in the project scope and authorisation.

3.1.4.1 Overview of the BESS

The BESS would be designed and used to store electricity generated by the Banna ba Pifhu Wind Farm during high electricity generation periods. When there are constraints on electricity generation by the Wind Farm, the stored electricity is used as security for the Wind Farm to provide energy on demand at a reliable capacity to the national grid. The BESS can also be used to supply electricity to the national grid when there is a greater demand for rapid electricity distribution. Load shedding in South Africa could eventually be something of the past with the BESS's. The BESS can supply the electricity required to power parts of South Africa. In using the BESS, people would not need to source other means of generating heat or light during load shedding. The use of diesel, gas, and / or coal etc. is commonly used during load shedding which causes harm to the environment, and is not part of the governments transition from a carbon-intensive resource use economy to a sustainable low carbon footprint economy.

The details below will confirm that the inclusion of the BESS will not trigger any additional activities as it will not be used for the storage or handling of dangerous goods. Furthermore, a risk assessment for the BESS is included in Section 6 of this Report.

3.1.4.2 Technical Details of the BESS

BWF is proposing the inclusion of a BESS in the amendment authorisation of the Banna ba Pifhu Wind Farm, the specifications for the BESS are listed in Table 3.7 below:

Table 3-7: Proposed Technical Details of the BESS

Preferred Battery Type	Lithium-ion (Li-ion) Batteries

Alternative Battery Type	Sodium-sulphur, Vanadium Redox Flow (Solid Sate Battery and Flow Battery) or an alternative battery technology
Life span of BESS	Same duration as the Banna WEF ~ 20 years
Client	Banna ba Pifhu Wind Farm (RF) (Pty) Ltd
Footprint	Approximately 100 m x 100 m (up to 1 hectare)
System Power	with up to 243 MWh (6 hours of storage capacity)
Height of BESS	Approximately 8 m
Other infrastructure	Associated operational, safety and control infrastructure

The BESS will have the ability to reduce the impact caused by the variability and limited predictability of wind generation and national grid instability. Plate 3.1 provides a visual representation of a typical set up of an on-site substation and BESS. This proposed development will have similar project components with specifications as provided in this report.

Plate 3-1: SolarCity's Tesla Battery Storage Facility, Hawaii. [Source: https://www.pv-tech.org/news/solarcity-picks-tesla-for-52mwh-of-dispatchable-solar-plus-storage-in-hawai]

3.1.4.3 Benefits and Operation of the BESS for the Banna Wind Farm

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. As the BESS for the Banna Wind Farm is proposed to be built next to the on-site substation, it will avoid any visual effects.

The BESS offers a wide range of advantages to South Africa including renewable energy time shift, renewable capacity firming, electricity supply reliability and quality improvement, voltage regulation, electricity reserve capacity improvement, transmission congestion relief, load following and time of use. It will have the ability to reduce the impact caused by the variability and limited predictability of wind generation and national grid instability. In

essence, this technology allows renewable energy to enter the base load and peak power generation market and therefore can compete directly with fossil fuel sources of power generation and offer a truly sustainable electricity supply option.

Renewable energy stored by the development in the BESS will allow for an increased amount of energy to be supplied to the national grid. At times of shortage supplies from the Wind Farm, rapid release of electricity can be supplied to the national grid without any emissions to the air, and may in future reduce the need for new distribution substations to be constructed. The operation of the BESS and integration with the Banna ba Pifhu Wind Farm can be summarised as follow:

i. Electricity generated by the wind turbines is converted from direct current to alternating current.

ii. The electricity (33 kV) is then transferred to the battery energy storage facility where the plant controller will then determine whether the energy should be stored (when energy is not needed) or evacuated to the National Grid (when energy is needed).

iii. If the electricity is needed, the electricity will be transferred to the onsite substation where the voltage will be stepped up to 132 kV and evacuated to the National Grid.

3.1.4.4 BESS Components

The BESS will comprise of multiple battery units or modules housed in shipping containers and / or an applicable housing structure which is delivered pre-assembled to the project site. Supplementary infrastructure and equipment may include power cables, transformers, power converters, buildings and offices, HV/MV switch gear, inverters and temperature control equipment that may be positioned between the battery containers. Given the close proximity to the substation, ~20 m, lengthy transmission cables would not be required, which would minimise environmental disturbances.

The BESS will have a storage capacity of up to 243 Megawatt hours (MWh) and may comprise stacked containers with a maximum height of 8 m and covering an area of up to 1 hectare.

Battery Alternatives

The chemical composition of the battery alternatives under consideration includes Lithium Ion, Sodium Sulphur or Vanadium Redox Flow. The preferred battery technology being considered is Lithium Ion (Li-Ion) Batteries.

Table 3.8 describes the most widely used technologies available in the market, and the most feasible technology for large utilities projects. Due to rapidly changing preferences and improvements in technology, a decision on the preferred battery technology alternative will be taken during the detailed design stage and after the appointment of the battery supplier.

Table 3-8: BESS Technology Alternatives

Activity Alternative	Advantage	Disadvantage
Preferred Technology: **Li-Ion Batteries[6]**	• 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.	• Negative effects of overcharging / over discharging. • Volatility leading to Fire and Explosions.

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

Activity Alternative	Advantage	Disadvantage
	• High efficiency. • Produce the highest voltage compared to other batteries by driving high electron flow.	• Potential for issues associated with overheating (Certain Lithium chemistry's). • The Lithium element in this technology is considered hazardous / dangerous goods. • Lithium is a finite resource with concerns of its availability in the long term.
NaS Batteries[7]	• 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[8]	• 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.

Layout and Positioning

The layout of the BESS considered the specific onsite constraints and area of vegetation to be cleared. The land which the BESS will be located on is confined to non-irrigated agricultural land, which is used less intensively. The location was selected based on the proximity to the substation, ~20 m, to which it will connect. The BESS will avoid any visual effects which may cause a change in impact ratings after mitigation and it will not have any additional effect on the agricultural land.

The BESS will be housed in containers which will be secure and designed to protect the contents of the elements. They are purpose built and designed.

Access

As far as possible, existing gravel access roads will be utilised and where this is not possible, new roads will be constructed which will be approximately 12 m wide (i.e., wider than 4 m as authorised) during construction and rehabilitated to approximately 6 m wide during operation.

3.1.4.5 BESS in South Africa

The BESS is relatively new and will become an integral support to the development of renewable energy technologies in South Africa. The development of BESS associated with a WEF development will promote added socio-economic benefits. The construction and installation of the BESS will create employment opportunities and it will be encouraged that the developer sources local manufacturers and employees, with the support of a skilled worker. For the operational phase of the BESS, software is expected to play an essential role as decentralised and digitised systems will be used.

[7] Li-Ion Battery and Na-S Battery: https://ensia.com/features/battery-innovations-renewable-energy/
[8] Flow Battery: https://newatlas.com/energy/iron-aqds-flow-battery-usc/

As construction of a BESS being listed with the development of a WEF in South Africa is still not a common practice, the effect of this is that there is a major skills gap in our country regarding the BESS. It is important to ensure that the Applicant undertakes skills development to ensure that the processes, from installation, to use and disposal, will be effective and cause minimal environmental impact.

4 NEED AND MOTIVATION FOR THE PROPOSED AMENDMENT

The aim of the Banna Ba Pifhu Development is to generate renewable energy that that will be fed into the national grid. The authorised turbine model with specifications of 80 m - 105 m hub height and 90 m - 117 m rotor diameter is no longer the preferred wind turbine technology. Larger, more efficient wind turbines have become available subsequent to the Banna WEF EA being granted on 21 July 2014 (DFFE Reference 12/12/20/2289, as amended). The applicant is therefore applying for the turbine specifications to be amended and to change the hub height to up to 150 m and the rotor diameter to up to 190 m. The motivation for these changes is to facilitate the most efficient turbine model and to further future proof the project amidst rapid technology developments.

To counter the effects of the increased size of the turbines, the Applicant proposed to reduce the wind turbines numbers from 13 to 8 turbines, with a maximum of 7 turbines to be constructed if this amendment application is approved. The reduced number of turbines will also ensure that the turbines are located towards the eastern portion of the development site, which will reduce the potential visual impact of the facility on the surrounding landowners.

To obtain the maximum energy yield with least environmental impacts, the Applicant is proposing an increase in the total generation capacity of the WEF to up to 40.5 MW compared to the authorised 30.6 MW. The same wind resource will be harvested using fewer, more modern machines and generating more electricity. The increase in generation capacity does not trigger a new listed activity as the increase will be less than 10 MW and will not change the development footprint from what was authorised. Therefore, the change in generation capacity should only be considered a material change to the project scope rather considered as part of the application for amendment.

Following the proposed reduction in the number of turbines and change in layout, the authorised on-site substation has also been repositioned due to the WEF layout changes. Electricity generated by the WEF will be transferred into the national grid via the proposed on-site substation and 66 kV grid connection[9], to the existing 66 kV Melkhout / St Francis overhead powerline which passes on the east boundary of the site. Recent engagements with Eskom by the Applicant confirmed that there are grid constraints in the area and it may take some time before the development is able to connect to the national grid. The Applicant is therefore also requesting for this amendment EA to be granted for 10-years so that the EA will not lapse before the project can connect to the national grid. Eskom proposes to construct within the next 5 - 10 years, a large powerline, referred to as the Hlaziya 400 – 132 kV MTS Integration Project, from Thyspunt near Jeffreys Bay to Grassridge and the Dedisa Substation. The project is part of Eskom's program for improving electrical transmission in the area to accommodate increased renewable power generation[10]. Further engagements with Eskom will take place during this amendment process.

The Wind Farm EA Amendment (this report) has been compiled to assess, utilising specialist input, any potential change in the significance of impacts as well as the advantages and disadvantages of the proposed amendments (see Section 8 of this report). Micrositing of the turbines and preferential siting of the on-site substation and roads based on the

[9] The Grid Connection for the Banna ba Pifhu Wind Farm is subject to a separate application process.
[10] http://www.cesnet.co.za/proposed-hlaziya-400-132-kv-powerline-project.

amended wind turbine layout has been proposed. The amended layout avoids the environmental constraints and sensitive features identified through specialist input during the EIA process (CSIR 2013), any constraints identified during the public participation process of the original application, and the current EA Amendment application process.

Renewable energy 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. The National Climate Change Adaptation Strategy[11] (NCCAS) for The Republic of South Africa Version UE10, 13 November 2019, explains that the South African primary sectors, such as agriculture and mining, which are natural resource dependent are high consumption uses of energy. The NCCAS is adopting a cluster approach to assist with the changing climate conditions and the affect it has on various sectors. An action in support of this development is the approach to "create a more adaptive energy system to reduce dependence on a centralised system and increase distributed generation, especially in rural areas". "This will involve encouraging the development of an adaptive and decentralised energy system so that the system is more resilient to climate disruptions".

Both national and provincial policies and planning documents support the development of renewable energy facilities. The development of and investment in renewable energy is supported by the National Development Plan (NDP), New Growth Path Framework, Integrated Resource Plan (IRP) and National Infrastructure Plan. At a provincial level, the development of renewable energy is supported by the Eastern Cape Provincial Development Plan[12]. The Development Plan states that you should "promote renewable sources of energy and leverage a green agenda for new jobs and income for the poor". The 2019 IRP proposes that by 2030, wind energy should contribute 17.8% of total energy (from an installed capacity of 17,742 MW), solar should contribute 7% while coal contributes 59% (down from the current ~87%). Key outcomes of the 2021 IRP have a target for 90 % clean energy resources by 2040. Reaching these targets will require substantial investment in new renewables projects driven primarily by the Renewable Energy Independent Power Producers Procurement Programme (REIPPPP) which was introduced in 2011.

The need and desirability for renewable energy developments play a role in South Africa meeting its energy and climate change targets and provides a socio-economic boost at the local level in areas that are in need of it. The findings and assessment of the authorised Wind Farm has also indicated that renewable energy is strongly supported at a national, provincial and local level. Therefore, **the need and desirability of the Banna ba Pifhu Wind Farm (CSIR, 2013) remain valid**.

Aside from environmental considerations, investment in renewables have been driven by dramatic reductions in their costs. Plate 4.1 shows this trend and that in the six years between bid windows 4 and 5, the average price of electricity purchased through the REIPPPP fell by 54% (Magoro, 2021).

[11] https://www.environment.gov.za/sites/default/files/docs/nationalclimatechange_adaptationstrategy_ue10november2019.pdf
[12] https://www.ecsecc.org/documentrepository/informationcentre/ec-vision-2030-planoctober-post-exco_14935.pdf

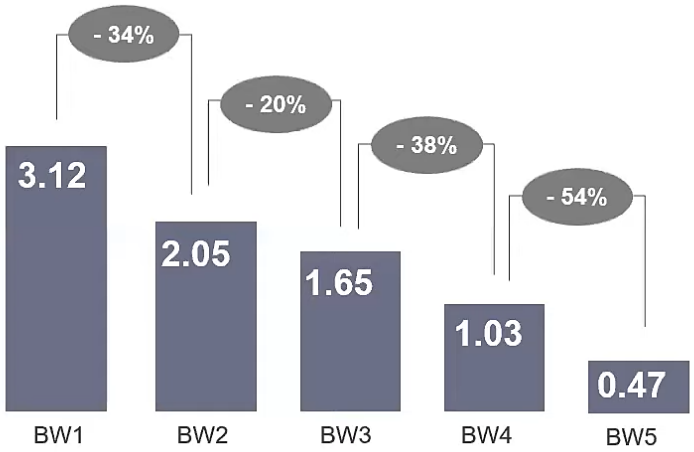

Plate 4-1: REIPPP average bid prices in April 2021 terms (Magaro, 2021)

Should the amendment application not receive a favourable decision, the development will not be using the latest, most efficient turbines. If the inclusion of the BESS is rejected, the advantage of energy on demand by the BESS would not be realised.

5 IMPACT ASSESSMENT

The EIA that was conducted by CSIR in November 2012, and resubmitted in December 2013, assessed the potential impacts of developing the Banna ba Pifhu Wind Farm using specialist input.

The CSIR Final EIA Report (December 2013) concluded that no negative impacts were identified that could be considered as fatal flaws from an environmental perspective, and that the iterative process followed during the 2012 / 2013 EIA had successfully mitigated most impacts. Significant negative residual impacts were those on bats, birds and landscape character (visual), while significant positive residual impacts were those related to socio-economic benefits during operation. The CSIR further concluded that the benefits of developing the Banna ba Pifhu Wind Farm outweigh the costs, provided that specialist mitigation measures are successfully implemented.

The amended site development layout and technical specifications were assessed by the specialists. Specialists were requested to identify changes, if any, to the impact significance ratings, recommendations and mitigation measures contained in the previous EIA conducted by CSIR in 2012/2013. Specialists were also required to include potential cumulative impacts associated with the Banna ba Pifhu development and include any additional information required to comply with the specified theme as reflected in the DFFE Screening Report (Appendix C) generated for the amended layout.

The amendments as listed below were assessed by specialists:

- Change in turbine specification, including increase to the total generation capacity;
- Reduction in the number of wind turbines proposed, which includes amendments to the site layout and design, and increase in generation capacity;
- Change in location of the on-site substation; and
- Inclusion of a Battery Energy Storage System (BESS).

Specialists did not identify any impacts associated with the increase in total generation capacity from the authorised 30.6 MW to the proposed 40, 5 MW. Furthermore, specialists found that the significance rating of impacts identified and assessed in the previous EIA (CSIR, 2013) remain almost the same, even with the addition of the BESS.

Specialist field of study, name and organisation utilised for the proposed amendment assessment are provided in Table 5.1 below.

Table 5-1: List of Specialist Investigations

Discipline	Specialist	Specialist Organisation
Soil and Agricultural Potential	Johann Lanz	Independent Consultant
Terrestrial Biodiversity (Flora and Fauna)	Jamie Pote	Independent Consultant
Aquatics and Freshwater	Dr Brian Colloty	EnviroSci (Pty) Ltd
Avifauna	Chris van Rooyen	Chris van Rooyen Consulting
Bats	Craig Campbell	Arcus Consultancy Services SA (Pty) Ltd
	Caroline Lötter	On behalf of Inkululeko Wildlife Services and the South African Bat Assessment Association
Visual / Landscape	Quinton Lawson and Bernard Oberholzer	Qarc and BOLA
Noise	Morné de Jager	Enviro Acoustics Research
Socio-economic	Dr Hugo van Zyl	Independent Economic Researchers
Heritage and Archaeology	Dr Jayson Orton	Eastern Cape Heritage Consultants

Extracts and summaries from specialist letters and reports provided during this EA Amendment application process are provided below. Specialist EA Amendment letters and reports are provided in Appendix C of this Report. Where no specialist was commissioned, EAP compliance statements has been produced and is provided in Appendix C of this Report.

5.1 Specialist Assessment Methodology

The same impact assessment methodology was utilised during this Amendment process. The approach by specialists during the original application process and for this amendment was to identify potential impacts, including impacts that may occur during all phases of the development, i.e., from design to decommissioning phase, as well as cumulative impact assessment. In order to identify potential impacts (both positive and negative) it is important that the nature of the proposed activity is well understood so that the impacts associated with the activity can be understood.

The process of identification and assessment of impacts included:

- Determining the current environmental conditions in sufficient detail so that there is a baseline against which impacts can be identified and measured;
- Determining future changes to the environment that will occur if the activity does not proceed;
- An understanding of the activity in sufficient detail to understand its consequences; and
- The identification of significant impacts which are likely to occur if the activity is undertaken.

The following methodology was applied to the predication and assessment of impacts. Potential impacts were rated in terms of the direct, indirect and cumulative:

- Direct impacts are impacts that are caused directly by the activity and generally occur at the same time and at the place of the activity. These impacts are usually associated with the construction, operation or maintenance of an activity and are generally obvious and quantifiable.
- Indirect impacts of an activity are indirect or induced changes that may occur as a result of the activity. These types of impacts include all the potential impacts that do not manifest immediately when the activity is undertaken, or which occur at a different place as a result of the activity.
- Cumulative impacts are impacts that result from the incremental impact of the proposed activity on a common resource when added to the impacts of other past, present or reasonably foreseeable future activities. Cumulative impacts can occur from the collective impacts of individual minor actions over a period of time and can include both direct and indirect impacts.

- Spatial extent – The size of the area that will be affected by the impact:
  - Site specific
  - Local (<2 km from site)
  - Regional (within 30 km of site)
  - National.

- Intensity –The anticipated severity of the impact:
  - High (severe alteration of natural systems, patterns or processes)
  - Medium (notable alteration of natural systems, patterns or processes)
  - Low (negligible alteration of natural systems, patterns or processes).

- Duration –The timeframe during which the impact will be experienced:
  - Temporary (less than 1 year)
  - Short term (1 to 6 years)
  - Medium term (6 to 15 years)
  - Long term (the impact will cease after the operational life of the activity)
  - Permanent (mitigation will not occur in such a way or in such a time span that the impact can be considered transient).

Using the criteria above, the impacts were further assessed in terms of the following:

- Probability –The probability of the impact occurring:
  - Improbable (little or no chance of occurring)
  - Probable (<50% chance of occurring)
  - Highly probable (50 – 90% chance of occurring)
  - Definite (>90% chance of occurring).

- Significance – Will the impact cause a notable alteration of the environment?
  - Low to very low (the impact may result in minor alterations of the environment and can be easily avoided by implementing appropriate mitigation measures, and will not have an influence on decision-making)
  - Medium (the impact will result in moderate alteration of the environment and can be reduced or avoided by implementing the appropriate mitigation measures, and will only have an influence on the decision-making if not mitigated)
  - High (the impacts will result in major alteration to the environment even with the implementation on the appropriate mitigation measures and will have an influence on decision-making).

- Status - Whether the impact on the overall environment will be:
  - positive - environment overall will benefit from the impact
  - negative - environment overall will be adversely affected by the impact

- neutral - environment overall not be affected.

- Confidence – The degree of confidence in predictions based on available information and specialist knowledge:
  - Low
  - Medium
  - High.
- Management Actions and Monitoring of the Impacts (EMPR).
- Where negative impacts are identified, mitigatory measures will be identified to avoid or reduce negative impacts. Where no mitigatory measures are possible this will be stated.
- Where positive impacts are identified, augmentation measures will be identified to potentially enhance positive impacts.
- Quantifiable standards for measuring and monitoring mitigation measures and enhancements will be set. This will include a programme for monitoring and reviewing the recommendations to ensure their ongoing effectiveness.

5.2 Soil and Agricultural Potential

The specialist soil and agricultural report for the previous EIA (CSIR, 2013) was completed by Johann Lanz in 2012. This specialist was also appointed to review the proposed amendment application with regards to any potential changes against the agricultural report for the previous EIA.

A desk-based assessment was conducted, and as part of the amendment application review, a new land capability[13] evaluation was conducted for this site, as the Department of Agriculture, Land Reform and Rural Development (DALRRD) released updated and refined land capability mapping across the whole of South Africa in 2017. The new land capability mapping divides land capability into 15 different categories with 1 being the lowest and 15 being the highest. Values of below 8 are generally not suitable for production of cultivated crops. The evaluation showed that the project area is classified with land capability evaluation values of predominantly 8 to 9, although the steeper land along the river gorge in the north is classified as 5 to 7, because of its steep slope. The land capability of the site is limited by the shallow effective depth of the soils as well as their drainage limitations.

The Protocol for Specialist Assessment and Minimum Report Content Requirements for the Environmental Impacts on Agricultural Resources (Government Gazette 43110, 20 March 2020) was also adhered to. Portions of the development area was rated as Very High sensitivity as per the DFFE Screening Tool.

Recommendations and Conclusions

The specialist concluded that the proposed amendments have no bearing on any agricultural impacts, including cumulative impacts. Changes to the turbine and substation location, as well as road widths, and the addition of the battery storage do not change the significance of any agricultural impacts, including cumulative impacts. All amended infrastructure locations (most of which were approved) are still not on irrigated land which is intensively used and has very high agricultural sensitivity. All wind farm infrastructure is confined to non-irrigated land, which is used less intensively and is classified by the screening tool as high agricultural sensitivity. It is important to note that despite the high sensitivity, the agricultural impact is low.

[13] Land capability is defined as the combination of soil, climate and terrain suitability factors for supporting rainfed agricultural production.

The reduction in the number of turbines reduces the already negligibly small area of land that is no longer available to agricultural production as a result of occupation by wind farm infrastructure. Because the total amount of this land is negligibly small, the reduction does not significantly change the original assessment of this impact as being of low significance. Likewise, the addition of the BESS is also insignificant.

Further specialist studies by this author in the area since 2012 have added to the understanding of the agricultural impacts of wind farms in the Humansdorp area. Production provides a composite measure for any agricultural impact. If there is no change in production, other than changes that are the result of other influencing factors, it is reasonable to conclude that there is no wind farm impact.

The original assessment did not identify the positive impact of increased financial security for farming operations, due to reliable income from turbine rental. Farmers perceive the positive impact of increased financial security for farming operations, due to reliable income from turbine rental, to be of significant benefit to their farming operations, and perceive it to result in increased agricultural production. The majority of them also perceive the turbine access roads on their farms to be of benefit to their farming operations. This impact has become evident through further study, and has been added as an update in this Report.

Given the above outcome, this amendment is supported in terms of agricultural impacts.

5.3 Aquatics and Freshwater

Scherman Colloty and Associates appointed Dr Brian Colloty as the Aquatic specialist to compile the aquatic impact assessment for the previous EIA. The same specialist (now at Enviro Sci. Pty Ltd) was appointed to review the proposed amendment application with regards to any potential changes against the aquatic impact assessment for the previous EIA.

A site visit was undertaken in January 2022 and the specialist report was produced and considered the changes to the national wetland inventories, wetland / aquatic buffer decision tools and the assessment protocols which have altered since the approval of the project was received. The Protocol for Specialist Assessment and Minimum Report Content Requirements for the Environmental Impacts on Aquatic Biodiversity (Government Gazette 43110, 20 March 2020) was also adhered to. Portions of the site was rated as Very High sensitivity as per the DFFE Screening Tool.

Recommendations and Conclusions

The findings of the aquatic assessment for the previous EIA can be upheld and in conclusion the final overall impact of the proposed layout on the aquatic environment, with the listed mitigations, will remain low for the impacts that were assessed previously, this includes the internal roads proposed that would need to cross some of these systems, namely:

- Loss of wetland habitat, ecosystem services and biodiversity services;
- Loss of species of special concern;
- Habitat fragmentation – loss of ecological corridors; and
- Sedimentation and erosion.

In addition to the impacts as originally assessed, the impact on localised surface water quality during the construction and decommissioning phases was assessed for this amendment due to the inclusion of the BESS. Furthermore, the No-Go and Cumulative impacts were also assessed. All impacts added were found to be low, due to the current state of the surrounding environment and the overall avoidance of any sensitivity aquatic habitats by the revised layout.

The proposed layout for the facility would have no detrimental impact on any of the Very High sensitivity areas identified by the DFFE Screening Tool as they been excluded from the development footprint; and /or mainstem rivers and wetlands in particular, that do contain functioning aquatic environments, have been avoided.

Any activities within 500 m of a watercourse or pan, the aquatic buffers or 500 m from a wetland boundary will require a Water Use license under Section 21 c and i of the National Water Act (Act 36 of 1998). Furthermore, recommendations as originally provided remains, and it is further recommended that a comprehensive rehabilitation plan be implemented from the project onset within watercourse areas (including buffers) to ensure a net benefit to the aquatic environment. These recommendations are included in the EMPr (Volume II) to form part of the suggested walk down as part of the preconstruction preparation.

Given the above outcome, this amendment is supported in terms of aquatic impacts.

5.4 Ecology

The Fauna and Flora (Ecology) report for the previous EIA (CSIR, 2013) was completed by Jamie Pote, an independent consultant in 2012. This specialist was also appointed to review the proposed amendment application with regards to any potential changes against the fauna and flora report for the previous EIA.

For the assessment of the amendments, a site visit was undertaken in December 2021 and as the site falls within a summer/winter rainfall area a single site visit was deemed adequate, specifically due to the purpose of the site visit, i.e., to assess the proposed amendments and due to the disturbed nature of the site and low conservation priority of the project footprint. The site assessment was also undertaken to physically screen for the presence of species and sensitivities identified in the screening tool, and other possible species or sensitivities that were not identified in the screening tool.

The specialist report was compiled to fulfil the requirement for a Terrestrial Biodiversity Assessment as per the 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 NEMA (GNR 320), as gazetted on 20 March 2020. The report also includes the requirements in terms of the 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 NEMA, gazetted on 30 October 2020, relating to the Terrestrial Plant and Animal (species) themes.

While some impacts have increased or decreased slightly compared to the impact scoring system used in 2011, overall, all impacts are medium before mitigation and low after mitigation, which are considered to be acceptable. Since the turbine footprints and substation location, including a new BESS, are now situated entirely within transformed cultivated lands and pastures, the overall impact will be negligible. The resulting loss of habitat will be proportional to the area of vegetation clearing required to construct the access roads, cabling and turbine sites with associated hard-standing surfaces.

Recommendations and Conclusions

Overall impact will be significantly lower than the previously approved options. Furthermore,

- No turbine footprints are situated within indigenous vegetation, and all are located within transformed pastures.
- Fewer turbine sites are present, reducing the overall footprint of turbines and access roads and cabling.
- Impacts to highly sensitive areas will be negligible compared to the original layout.

- Cumulative impacts because of the development of the site, are negligible, providing recommendation and mitigation measures are adhered to, due to the limited disturbance area.

The proposed activity can be undertaken within acceptable terrestrial biodiversity impact limits. It is recommended that clearing within high sensitivity areas are kept to the minimum required to construct access roads and the implementation of the management actions relating to flora and fauna as well as post construction rehabilitation will minimise biodiversity impacts. Updates to the management plans and mitigation measures as recommended has been included in the EMPr (Volume II).

Given the above outcome, this amendment is supported in terms of ecological impacts.

5.5 Avifauna

A 24-month avifaunal pre-construction monitoring was conducted by Chris van Rooyen in 2011 / 2012 for the previous EIA (CSIR, 2013). Chris van Rooyen was approached to reassess the potential impact on avifauna based on the proposed changes.

Although the pre-construction monitoring had already been completed at the proposed WEF in 2012, the latest edition of the avifauna guidelines (2015)[14] state as follows:

"*If there is a significant gap (i.e., more than three years) between the completion of the initial pre-construction monitoring and impact assessment, and the anticipated commencement of construction, it may be advisable to repeat the pre-construction monitoring (or parts thereof) to assess whether there has been any change in species abundance, movements and/or habitat use in the interim*."

In view of the above requirement, the specialist has completed the following additional site visits:

- Surveys were conducted in spring - September 2018 - to search for raptor nests, Blue Crane roosts and Denham's Bustard leks in and around the site.
- An important issue previously identified was potential raptor (especially Amur Falcon) and White Stork collisions in summer. Therefore, one full summer survey, which included transect counts and vantage point watches, was conducted in December 2018 as these species are summer migrants and were likely to be present in greatest numbers at this time.

Another site visit was conducted in January 2022 to assess if the habitat at the site has changed in any material manner, and to investigate whether there were any new avifaunal sensitivities that had not been recorded before. A full 12-month monitoring was not deemed necessary for the following reasons:

- Since 2012, several post-construction reports became available of existing wind farms in the greater Kouga area. These reports provided data on the species which are typically impacted by wind turbines in the region.
- Wessel Rossouw, the field monitor who was designated to conduct the monitoring by the specialist, lives in Jeffreys Bay, and had been actively involved for several years in the road counts in the area with the St Francis Bay Bird Club. His intimate knowledge of the location, abundance and diversity of the avifauna in the area could act as an additional supplementary source of information.

[14] Jenkins, A.R., van Rooyen, C.S., Smallie, J.J., Harrison, J.A., Diamond, M., Smit-Robinson, H.A. Ralston, S. 2015. Bird and Wind-Energy Best-Practice Guidelines. Best-Practice Guidelines for assessing and monitoring the impact of wind-energy facilities on birds in southern Africa. Third Edition (previous versions 2011 and 2012). BirdLife South Africa and Endangered Wildlife Trust, Johannesburg, South Africa.

- The St Francis Bay Bird Club seasonal road count data for the BWF site from 2011 to 2018 (eight years) was made available. This data provided comprehensive background information on the numbers and variety of avifauna at the site.
- The habitat at the site and immediate surroundings had not changed in any substantial manner since the original pre-construction monitoring was completed in 2011 - 2012.

Below is a summary of the latest specialist findings from surveys/site visits conducted 2018 and 2022:

Habitat

- Physical inspection of the site in 2018 and 2022 revealed that the habitat and land-use have remained essentially the same since the original pre-construction monitoring was completed in 2012. The data collected during those surveys therefore remain relevant and can be considered for this assessment as well.
- This is particularly relevant for the migratory Amur Falcon which were recorded in large numbers during the original surveys, but not in 2018. The fact that Amur Falcons were not recorded in December 2018 cannot be linked to changes in the habitat, but rather to other environmental conditions, most likely rainfall, or timing of the surveys. In January 2022, a small number of Amur Falcons were again recorded at the site during the site inspection.

Breeding

- The only priority nest which was positively identified in 2018 was that of a Blue Crane which is situated off-site. In 2018 the closed turbine was 800 m from the nest, with this amended layout, the closest proposed turbine is approximately 2 km from the nest. No Blue Crane nests or breeding pairs were observed during the site inspection in January 2022.
- Potential breeding of White-bellied Korhaan is suspected in the shrub area in the south-eastern corner of the WEF area, but no turbines are planned in that area. This was confirmed during the site visit in January 2022 when several birds were observed in this area.
- Two Black-winged Lapwing nests were recorded during the original surveys in 2011/12. From experiences with lapwings in general, it seems that they are highly adaptable to potential human disturbance, it is therefore not expected that the construction activities at the WEF will displace breeding birds.

Displacement

- The transect counts produced evidence of priority species diversity and abundance very similar to the original monitoring done in 2011/12, thereby further reinforcing the impression that the habitat has not changed in any significant way.
- The one notable difference between the original monitoring done in 2011/12 and the one season done in December 2018 is the presence of Amur Falcons during the former. In 2011/12 they were recorded as the second most abundant priority species after Blue Cranes. The possible reasons for their absence this time round could likely be due to environmental conditions, most likely rainfall, or timing of the surveys.
- In view of the expected habituation, the small number of turbines and the fact that no evidence of breeding was found at the site, the potential displacement impact on Denham's Bustard is likely to be low and restricted to the construction phase.
- Blue Cranes are proving to be relatively unaffected by wind farm developments in the wheat growing Overberg region as far as displacement is concerned, with birds breeding on operational wind farms (Chris van Rooyen Consulting unpublished data). Blue Cranes are not expected to be displaced by the activities of the WEF, except perhaps temporarily during the construction phase.

Collisions

- The passage rate for priority species recorded at the WEF area (all flight heights) in December 2018 was 4.04 birds/hour. At that time, it was the 7th highest passage rate recorded among 41 potential wind farms sites where pre-construction monitoring was performed by these consultants. It is very similar to the 4.89 recorded over four seasons of monitoring in 2011/12.
- The species-specific collision risk index calculated in 2018 for priority species at the proposed WEF resulted in Blue Crane emerging with the highest risk rating, followed by African Fish Eagle, White Stork and then Jackal Buzzard. In 2011/12, the order was Amur Falcon, Blue Crane, Denham's Bustard, African Fish Eagle and Jackal Buzzard.
- While concerns were voiced that wind farms with high populations of Blue Cranes will lead to significant mortalities, the emerging evidence so far points to the contrary. No Blue Crane fatalities were reported in the first year of operational monitoring at 8 wind farms in South Africa, all of which reported the presence of the species at the site (Ralston - Patton et al. 2017). By October 2019, a total of 9 Blue Crane mortalities had been reported to BirdLife South Africa at 22 wind farms (Ralston-Patton & Camagu 2019). However, Banna ba Pifhu may be unique due to the presence of a major roost at the Grassmere Large Dam within 1.6 km of the closest turbine. This implies the potential of nocturnal flight activity over the WEF area, which heightens the collision risk significantly.
- The African Fish Eagle is a large, soaring raptor, with flight activity recorded mostly at the Broadlands and Du Toitsvlakte dams, and along the Seekoei River. However, the species was also recorded flying at turbine height over the wind farm area. Potential mortalities of this species can therefore not be excluded in the operational phase of the wind farm.
- White Storks were recorded in low numbers both in 2011/12 and in December 2018 at the WEF site, but numbers can vary considerably from year to year. The possibility of occasional mortalities from turbine collisions cannot be excluded.
- At this stage of wind farm development in South Africa, it can be confidently stated that the Jackal Buzzard is undeniably highly vulnerable to turbine collisions. While the species was not recorded in high numbers at the proposed WEF site, its vulnerability to turbine collisions makes the possibility of collision mortality probable.
- The fact that Amur Falcons were not recorded in December 2018 cannot be linked to changes in the habitat, but rather to other environmental conditions, most likely rainfall. This species emerged with the highest collision risk rating in 2011/12. It could be that the species could still arrive in the area later in the summer season. Occasional mortalities due to turbine collisions in the operational phase are to be expected. The species was again recorded at the site in January 2022 in low numbers.
- Other species which were recorded flying over the site are Secretarybird, White-bellied Korhaan, African Marsh-Harrier, African Harrier-Hawk and Denham's Bustard. While these species were not recorded in large numbers, this does not rule out the potential for collision mortality, except for Denham's Bustard. African Marsh-Harrier and Secretarybird on the other hand are both candidates for collision, although the majority of flight activity for the African Marsh-Harrier is expected to be outside the turbine zone at the wetland area just north of the Grassmere Large Dam.

The new proposed turbine dimensions necessitated a re-assessment of the potential risk of collisions. The proposed changes, with authorised up to 8 and if a maximum of 7 turbines are constructed, will result in an increase of 42 % in the maximum rotor swept area at each turbine, compared to the original authorised specifications, and an overall reduction of 46 % in the number of turbines. Based on the most recent research on this topic, it is concluded that the reduction in the number of turbines should reduce the overall risk of collision to birds, despite the increase in the rotor swept area of individual turbines.

Recommendations and Conclusions

Based on the results of the additional site surveys/site visits the following mitigation measures, as read below, have been recommended. These mitigation measures supersede the mitigation measures as proposed in the EIA (2013).

- Restrict the construction activities to the construction footprint area.
- Do not allow any access to the remainder of the property during the construction period.
- Measures to control noise and dust should be applied according to current best practice in the industry.
- Maximum use should be made of existing access roads and the construction of new roads should be kept to a minimum.
- Following construction, rehabilitation of all areas disturbed (e.g. temporary access tracks and laydown areas) must be undertaken and to this end a habitat restoration plan is to be developed by a rehabilitation specialist.
- The recommendations of the specialist ecological study must be strictly adhered to.
- A no turbine circular buffer zone of at least 1.6 km, measured from the northern shore of the Grasmere Large Dam (-34.080135°S, 24.764032°E), should be implemented around the Grasmere roost site.
- Additional monitoring of the Grasmere Large Dam Blue Crane roost site needs to be implemented over four seasons before the wind farm becomes operational, to gain additional information on flight activity to and from the roost. This is necessary to establish if a curtailment regime is required for periods of high risk i.e., that period when the birds arrive to roost and leave again to forage elsewhere.
- Once the turbines have been constructed, post-construction monitoring should be implemented to compare actual collision rates with predicted collision rates.
- Should mortality of priority species be recorded, the avifaunal specialist, in consultation with external experts and relevant NGO's such as BLSA, must determine annual mortality thresholds for those priority species killed by turbine collisions.
- If the annual projected (adjusted) collision rate exceeds the pre-determined threshold level, shutdown on demand (SDoD) must be implemented for high risk priority species.

The proposed changes to the authorised turbine layout, turbine dimensions; grid connection route; cumulative impacts and the addition of the Battery Energy Storage System (BESS) will not change the conclusions of the original bird specialist study conducted in 2011/12 and significance is low with mitigation. The changes are considered advantageous to avifauna due to the reduction in the number of turbines. **Provided the recommendations are implemented, there is no objection to the implementation of the proposed amendment from an avifaunal impact perspective.**

5.6 Bats[15]

In carrying out this assessment, the specialist conducted a literature review on bats and wind energy impacts with a focus on the relationship between turbine size and bat fatality. The literature review was carried out using the Web of Science® and Google Scholar using the following search terms:

bat OR fatality OR wind energy OR turbine OR wind turbine OR fatalities OR mortality OR mortalities OR kill* OR tower height OR height OR rotor swept zone OR rotor zone OR rotor swept area OR blades OR turbine blades OR influence OR increase* OR trend OR positive OR decrease* OR relation* OR wind farm OR wind energy facility OR carcass* OR chiroptera OR rotor diameter OR correlate* OR size*

[15] Original bat assessment was completed by Natural Scientific Services. Arcus was appointed to complete the additional monitoring and assessment. A peer review of the amendment letter is appended to the Bat Amendment Report.

In addition to the outputs from the above search, the following documentation were reviewed and used to provide context for the impact assessment:

- Environmental Authorisation (DFFE REF 12/12/20/2289 and 12/12/20/2289/1, and amendments); and
- Environmental Impact Assessment for the proposed Banna ba Pifhu Wind Energy Project near Humansdorp, Eastern Cape: Final Environmental Impact Assessment Report. Chapter 7: Impacts on Bats (Natural Scientific Services July 2013).

In addition, data on current bat activity were recorded on site between 10 September 2018 and 14 October 2019 to provide supporting data to this report. The data were collected from the same four locations used during the original pre-construction monitoring using the same model of equipment. At H3, while an Anabat was used during the original monitoring, a SM2Bat was used for additional monitoring. Data from this location are therefore not directly comparable between the two datasets.

The core issues relevant to the assessment undertaken was the impact to bats due to increasing the size of the turbines. The proposed amendment to the turbines at the wind farm would result in a greater rotor swept area per turbine and hence a potentially greater likelihood that bats would collide with turbine blades. The inclusion of a battery storage facility and the substation amendment will not have a major impact on bats and was therefore not assessed further.

Numerous studies support the hypothesis that taller wind turbines are associated with higher numbers of bat fatalities. Rydell et al. (2010) found a significant positive correlation between bat mortality with both turbine tower height and rotor diameter in Germany. However, there was no significant relationship between bat mortality and the minimum distance between the rotor and the ground. The maximum tower height in their study was 98 m and data on rotor diameter were not given. In addition, there was no relationship between bat fatality and the number of turbines at a wind energy facility.

In South Africa, simultaneous acoustic monitoring at ground level and at height is a minimum standard for environmental assessments at proposed wind energy facilities. Based on unpublished data from sites Arcus has worked at, bat activity and species diversity is greater near 10 m than at height (above 45 m). Therefore, even though bats are recorded at heights that would put them at risk from taller turbines, the proportion of bats that would be at risk might be less. Further, the number of species that might be impacted would decrease because not all bat species use the airspace congruent with the rotor swept area of modern turbines owing to morphological adaptations related to flight and echolocation. Bats that are adapted to use open air space, such as free-tailed, sheath-tailed bats and fruit bats, would be more at risk.

Based on the original pre-construction monitoring data, bat activity at the site is considered high. The additional data recorded for this amendment also suggests that bat activity at the site is high. The composition of species recorded at the site has not changed since the original monitoring, with activity still dominated by the Egyptian free-tailed bat. Bat activity patterns have therefore not changed significantly since the original monitoring was completed. The original dataset, combined with the updated dataset, is therefore sufficient and still valid to be used to assess impacts to bats.

While the magnitude of activity is similar overall, there were differences in the timing of bat activity across species. For example, most species were recorded more often in spring during the additional monitoring compared to the same period during the original monitoring. Only the Egyptian free-tailed bat was recoded less frequently during spring during the additional monitoring.

These differences would not change the original impact assessment rating but do highlight that bat activity can be variable between years and that mitigation plans need to be

adaptive to respond to temporal changes in bat activity. The original impact assessment flagged spring as a period with elevated activity, but during that year, spring activity was higher at the end of August and beginning of September. The additional monitoring showed that the spring peak occurred during September and October. The timing of peak bat activity is therefore variable and the application of curtailment would need to be adaptive in response to this variability.

The following impacts to bats were identified during the 2012/2013 pre-construction bat monitoring:

1. Bat roost disturbance and/or destruction due to construction activities;
2. Fragmentation to and displacement from foraging habitat due to wind turbine construction and operation;
3. Bat fatalities due to collision or barotrauma due to attraction of bats to towers for roosting or out of curiosity;
4. Bat fatalities due to collision or barotrauma during foraging activity;
5. Bat fatalities due to collision or barotrauma during migration;
6. Bat fatalities due to electrocution from overhead power lines;
7. Loss of Conservation Important Bat Species from the area due to construction and operation activities;
8. Reduction of ecosystem services; and
9. Reduction in the size, genetic diversity, resilience and persistence of bat populations.

The original assessment stipulated a buffer of 50 m for water bodies, and a 200 m buffer for roosts (buildings and vegetation). This assessment was done in accordance with the guidelines available at the time (Sowler and Stoffberg, 2012), which did not provide guidance on the buffer distances that should be applied to important bat features. The current guidelines (MacEwan et al. 2020) do provide such guidance and recommend a minimum buffer of 200 m to blade tip from such features. The application of a 200 m buffer to the aquatic habitats on the site would not impact any turbine locations as no turbines are located within any high sensitivity buffers. Similarly, a 50 m buffer was applied to riparian habitats on the site. While the guidelines also recommend a 200 m buffer of such features, based on our assessment of the habitats on site, the original 50 m buffer is sufficient. This is because the site is largely transformed due to commercial agricultural practices and the remaining natural riparian vegetation is limited. In addition, the increase of the aquatic buffers from 50 m to 200 m will also result in an increase in riparian areas buffered for some parts of the site.

Both the 200 m aquatic buffer, the 200 m roost buffer, and the 50 m riparian zone buffer for bats are to blade tip. The exact turbine dimensions being applied for are up to 150 m for the hub height, and up to 190 m for the rotor diameter. Within this range being applied for, the impacts to bats and associated buffer zones needed to limit impacts will vary depending on the size of the actual turbines used. To determine the distance of the turbine base from bat buffers required to ensure that no turbine blades enter the bat buffers, the following formula was used (Mitchell-Jones and Carlin 2014):

$$b = \sqrt{(bd + bl)^2 - (hh - fh)^2}$$

Where: bd = buffer distance, bl = blade length, hh = hub height and fh = feature height (zero in this instance)

As the exact turbine dimensions to be constructed are not known, a worst case scenario was used to update the bat buffer areas. A turbine with a low hub height (95 m) and with the maximum blade length being applied for (95 m) was used. Such a turbine would have a ground clearance of 0 m which is unlikely to be used but would represent a worst case scenario for bats. Based on this, the turbine base must be 279 m from the water bodies and roosts (only building roosts and not roosts in vegetation as these are likely to be used

more) to limit impacts to bats. Turbines with a lower ground clearance will need their bases placed further away from buffers than turbines with a higher ground clearance. Therefore, in addition to the buffers, it would be preferential to maximise the distance between the ground and blade tips. This would reduce the diversity of species potentially impacted upon during the operational phase, as well as limit impacts to lower flying species.

From a cumulative impact perspective, the receiving environment has changed since the completion of the original pre-construction monitoring. Several wind energy facilities have been constructed and are commercially operating namely the Kouga, Tsitsikamma, Gibson Bay, Jeffreys Bay and Oyster Bay wind farms which are between approximately 6 km and 25 km away from the proposed Banna ba Pifhu Wind Farm. Bat fatalities have been reported for the Jeffreys Bay facility (MacEwan 2016). In the original EIA assessment the cumulative impact of impacts 7, 8 and 9 in the above list are rated as high, medium and medium respectively before mitigation and low for each after mitigation. These significance ratings will not change due to the proposed amendments, especially since unpublished reports from nearby wind farms suggests impacts to bats are high. The original mitigation measures must all be adhered to.

5.6.1 Updated Bat Curtailment Plan

The original curtailment plan designed based on the 2012/2013 pre-construction bat monitoring results has been updated by Inkululeko Wildlife Services (Table 5.2). This reflects greater understanding of bat-wind energy impacts in South Africa, and supersedes the original plan created by Natural Scientific Services (NSS) at the time. No turbines can be located in High or Medium to High bat sensitive areas, which has been adhered to. For all remaining turbines, initial curtailment as per Table 5.2 must be implemented. Operational monitoring must be conducted for at least the first two years of operation and curtailment assessed on an on-going basis (e.g. monthly) against threshold levels and updated as needed.

Table 5-2: Updated Bat Curtailment Plan for the Banna Ba Pifhu Wind Farm

1 October - 30 November			
Curtailment Start Time	**Curtailment Finish Time**	**Cut-in Wind Speed**	**Min. Temp. Celcius**
18h30 in the evening	21h00 the same evening	5 m/s	13.5°C
1 December - 30 January			
Curtailment Start Time	**Curtailment Finish Time**	**Cut-in Wind Speed**	**Min. Temp. Celcius**
19h30 in the evening	22h00 the same evening	4.5 m/s	13.5°C
02h30 in the morning	04h30 the same morning	4.5 m/s	13.5°C
1 - 28 February			
Curtailment Start Time	**Curtailment Finish Time**	**Cut-in Wind Speed**	**Min. Temp. Celcius**
19h00 in the evening	21h30 the same evening	5 m/s	13.5°C
1 March - 15 April			
Curtailment Start Time	**Curtailment Finish Time**	**Cut-in Wind Speed**	**Min. Temp. Celcius**
18h00 in the evening	21h00 the same evening	5 m/s	13.5°C
15 June - 15 July (for fruit bats)			
Curtailment Start Time	**Curtailment Finish Time**	**Cut-in Wind Speed**	**Min. Temp. Celcius**
17h30 in the evening	20h30 the same evening	5 m/s	13.5°C

Recommendations and Conclusions

The proposed amendments to the project would not result in any changes to the significance ratings originally attributed to bat impacts even though the number of turbines has been reduced. While having less turbines could be a positive element of the proposed amendments, our literature review showed that the number of turbines at a facility does not appear to influence bat mortality, or at least that evidence for this is uncertain. Research and evidence of this is generally lacking, especially in South Africa, so it is unclear if this potentially positive impact (i.e. having fewer turbines) would be realised for bats.

Compared to the previous impact assessment undertaken in 2013, the previous impacts are appropriately rated and would remain the same. The original mitigation measures proposed are also thorough and must be adhered to. Based on the amendment assessment, the following additional mitigation measures are recommended:

- Adhere to the 200 m aquatic buffer, 200 m roost buffer, and the 50 m riparian zone buffer, all to blade tip, during all phases of the development;
- Maximise the distance between the ground and blade tips. This would reduce the diversity of species potentially impacted upon during the operational phase, as well as limit impacts to lower flying species; and
- Finally, a possible additional mitigation measure that can be considered is the use of acoustic deterrents. These devices may reduce bat fatalities by discouraging bats from approaching sound sources, and hence the turbines they are attached to (Arnett et al. 2013). Preliminary test of this technology in South Africa has showed positive results (MacEwan pers. comm.) but additional testing needs to occur before this can be relied on as a mitigation measure to reduce bat fatalities. Therefore, deterrents are not required as a primary mitigation option, but they can be investigated as an alternative to curtailment. Deterrents and curtailment could be used and tested together to determine which is the most effective.

The substation and Battery Energy Storage System infrastructures have also been considered in the overall conclusion of impact. It is however noted that neither of these infrastructures have been anticipated to have major impacts on bats, and were therefore not assessed further.

There are no objections to the approval of the amendments being proposed for Banna ba Pifhu wind farm provided the mitigation measures presented in the original pre-construction monitoring study, and the additional mitigations, are adhered to.

5.7 Noise

Mr Brett Williams was appointed as the Noise Specialist to compile the noise impact assessment report for the previous EIA. Enviro-Acoustic Research cc was commissioned to review the changes in the layout and wind turbine details for the Amendment Application. This review considered the previous report and both local and international guidelines, using the terms of reference (ToR) as proposed by SANS 10328:2008.

The area has been visited previously where a number of ambient baseline sound levels were measured. The data indicates that the area has the potential to be quiet at night, though ambient sound levels increases as the wind speed increases. The visual character of the area is rural and it was accepted that the SANS 10103 noise district classification could be rural for the study area (during periods of low winds).

Furthermore, the project site was assessed in terms of the Noise Sensitivity Theme using the Environmental Screening Tool. The output of the Screening Tool highlighted a number of areas on the development site with a high noise sensitivity. The screening tool, however missed Noise Sensitive Developments (NSDs) 02, 08, 09, 10 and 11 (Plate 5.1). These

receptors would also be highly sensitive to increased noise levels with the noise impact assessed for all the previously identified. It should be noted that NSD10 (NSA10 from the previous report compiled by Williams, 2013) highlighted that he will be retiring by the end of 2013 and that the dwelling will no longer be occupied. The developer confirmed that the dwelling is currently unused and will not be used for residential purposes at any stage in the future. Communication with the developer confirmed that NSD09 is currently used for residential purposes.

Plate 5-1: Aerial Image indicating Noise-Sensitive Developments (NSDs) and proposed WTG locations

The potential noise impact was evaluated using a sound propagation model. As the noise propagation modelling required the details of a wind turbine, the sound power emission levels of the Acciona AW132/3.3 WTG was selected, which allowed the evaluation of a worst-case scenario. Conceptual scenarios were developed for construction and operational phases. It was determined that the potential significance of noise impacts at the Banna Ba Pifhu Wind Farm, would be:

- Low for daytime construction of access roads;
- Low for the construction traffic passing NSDs in the surrounding area and on site;
- Low for increased daytime construction activities (hard standing areas, excavation and concreting of foundations and the erection of the wind turbines); and
- Low for the day-time period of the operational phase, and medium for the night-time operational periods. Mitigation to reduce the significance of the noise impact for the night-time period to low is required and recommended; and
- The significance of potential cumulative noises will be low.

When considering the impacts of the BESS, noise produced by the climate control system of a typical BESS is minimal (see Plate 5.2 below). While certain components may generate a slight hum under load, the dominant source of noise is from the fans or climate control system used to manage heat in the system and/or to maintain the BESS within its optimal operating temperature range. The specialist assessed that noise from the BESS should be inaudible at distances further than 200 m.

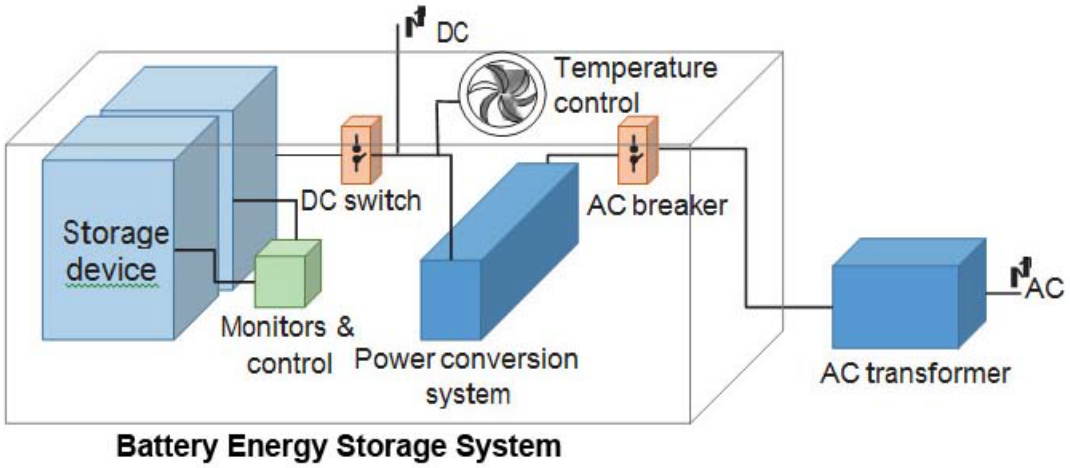

Plate 5-2: Conceptual BESS components

Mitigation options proposed in the previous EIA Noise Impact Assessment (Brett Williams 2012) included both management measures as well as technical changes. General measures – including the recommendations of the previous EIA Noise Impact Assessment (Brett Williams 2012) - that should be applicable for the construction phase of this development are:

- No night-time construction activities are recommended closer than 1,000 m from any NSD;
- Access roads that are located closer than 250 m from NSDs, should not be used at night;
- Notify the Noise-Sensitive Receptors (NSRs) about potential night-time activities, outlining the proposed activities and the estimated duration;
- Ensure a good working relationship between the developer/contractor and all potentially NSRs. Communication channels should be established to ensure prior notice to the sensitive receptor if work is to take place close to them (especially if work is to take place within 500 m from them at night). Information that should be provided to potentially sensitive receptor(s) includes:
  - Proposed working dates, the duration that work will take place in an area and working times;
  - The reason why the activity is taking place;
  - The construction methods that will be used; and
  - Contact details of a responsible person where any complaints can be lodged should there be an issue of concern.
- Ensure that equipment is well maintained and fitted with the correct and appropriate noise abatement measures if available. Engine bay covers over heavy equipment could be pre-fitted with sound absorbing material. Heavy equipment that fully encloses the engine bay should be considered, ensuring that the seam gap between the hood and vehicle body is minimised.
- Incorporating a component covering environmental noise in the induction programme for employees and contractors. This is to create sensitivity for potential noise impacts created by the project and the potential effect on NSDs.

Recommendations and Conclusions

Mitigation measures to be included in the EMPr:

- The developer must investigate any reasonable and valid noise complaint if registered by a receptor staying within 2000 m from location where construction activities are taking place or from an operational wind turbine.
- The developer must implement a noise monitoring programme to collect ambient sound measurements prior to the construction of, and at least once during the operational phase, to confirm that the noise levels are less than 45 dBA at NSDs 01, 09 and 11.
- The potential noise impact must again be evaluated should the layout be changed where any additional WTG are located closer than 1000 m from a confirmed NSD, or the layout are changed where any WTG are moved closer to an NSD (within 2000 m from an NSD).
- The applicant should implement a noise monitoring programme, to measure the ambient sound levels prior to the development of the WEF, as well as measurements when the WEF is operational. Measurements should be collected at a minimum at NSDs 01, 09 and 11.
- The developer must ensure that no receptor is subjected to total noise levels exceeding 45 dBA at night due to the development of the wind energy facility by means of long-term (at least one night-time period while the WTGs are operating) noise measurements at night.

This assessment determined that the proposed amendment of the layout and wind turbine could have an insignificant noise impact on the surrounding environment. While the noises from the WTG will increase the ambient sound levels, the projected noise levels will be less than 45 dBA at all NSD. It is recommended that the applicant use WTGs with a sound power emission level that is less than 105.5 dBA (re 1 pW) within 1000 m from NSD 09, alternatively only construct either one of turbines 6 or 8.

No additional noise studies are required, but it is recommended that the developer implement a noise monitoring programme prior to the construction of, and at least once during the operational phase of the development. Therefore, considering the findings of this assessment, subject to the implementation of the mitigation measures, the increase in noise levels is not considered to be a fatal flaw and **the proposed application for amendment of the Banna Ba Pifhu Wind Farm can be authorised from a noise perspective.**

5.8 Visual

The original Visual Impact Assessment (VIA) for the Banna ba Pifhu WEF (December 2013), was prepared by Henry Holland, an independent consultant, for the CSIR, and was based on 13 wind turbines with a hub height of 80 - 105 m and a rotor diameter of 90 - 117 m. The visual impact assessment for the amendment application was prepared by Bernard Oberholzer, Landscape Architect / Environmental Planner and in association with Quinton Lawson, Architect.

The same methodology as that for the original VIA Report was used to provide a comparison between the previous and the amended layouts, as well as a comparison of the viewsheds. In addition, more site-specific detail was added for 'Visual Constraints' and 'Visual Sensitivity' as an overlay on the proposed amended layout. The visual montages were based on Google street view, which provide a reasonably good indication of the potential visibility of the proposed WEF. These maps are included in the visual amendment report in Appendix C of this Report.

The number of turbines has been reduced from 13 to 7, with a revision to the design layout. Although an 8th turbine is indicated on the layout as an alternative position for authorisation, a maximum of 7 turbines would be constructed.

The reduced number of wind turbines, together with the increased hub height, rotor diameter and blade tip height would result in a similar overall visual impact significance

rating of high for the operational phase of the project as determined in the original VIA. The addition of the relatively small Banna ba Pifhu Wind Farm is likely to only affect sensitive viewers nearby, and the cumulative effect in the region is considered to be medium. Although the proposed WEF is not within a REDZ, it forms part of an existing wind farm node.

The viewshed analysis indicated that with the proposed amendments, the viewshed would be similar, but would extend slightly further out, because of the higher turbines being potentially more visible from a distance. However, at distances beyond 10 km the increase in visibility of the wind farm would in any case be marginal and taper off. At closer distances the reduced number of turbines would tend to reduce the visual clutter effect of the proposed wind farm, particularly when seen on the skyline, helping to balance out any difference in the overall visual impact. The current amendments will therefore have no, or negligible, effect on the significance of visual impacts identified in the original VIA Report and will therefore result in no change in the overall visual impact significance ratings from the approved layout.

The proposed battery energy storage system would be located adjacent to the substation, and due to its relatively small height (8 metres), would have little visual significance compared to the much larger proposed wind turbines. The battery energy storage system and substation are located in a low visual sensitivity area with no important visual constraints, and would furthermore be about 1 km from the nearest arterial road, and therefore unlikely to be visible at this distance.

Recommendations and Conclusions

The change in layout of the internal access roads would also be insignificant in visual terms compared to the visual prominence of the proposed wind turbines. The access roads are similarly located in a low visual sensitivity area with no important visual constraints.

Additional visual mitigations for the Banna ba Pifhu wind farm include the following:

- Where fewer turbines are required, consideration should be given to removing Turbines T08 and T07;
- Where further micro-siting is possible, turbines T02 and T03 should be moved slightly southward;
- The location of the substation and BESS facilities to be as indicated on the layout plan, to avoid being visible from sensitive receptors and arterial routes;
- Reflective finishes to structures, such as the BESS, should be avoided and only muted colours to limit visibility and blend with the landscape should be used; and
- Strategic tree planting should be implemented to further screen visually obtrusive structures.

Provided that the visual mitigations listed above and in the original visual impact study (including post-construction rehabilitation of the site) are adhered to, **the amendments to the Environmental Authorisation for the amendment project can be approved from a visual perspective.**

5.9 Heritage and Cultural Landscape

After commencement of the amendment process in 2019, the applicant elected to alter the project description further. The initial archaeological study was completed by Binneman, 2019 for the amendment. With due reason, the specialist was unable to continue the project and update the report to assess the most recent (2022) project amendments. The original report was conducted by the same specialist (Binneman, 2012). A palaeontological assessment was also carried out by Mr John Almond (2012) for the original assessment, this report remains relevant for this amendment. Asha Consulting was commissioned to

conduct a new site visit and review the existing heritage reports (Binneman, 2012 and 2019; and Almond 2012) to determine whether the impact assessment ratings are appropriate to the final project description; provide new ratings if required; and formulate consolidated recommendations pertaining to all heritage resources as necessary.

5.9.1 Impacts to Heritage and Graves

Several farm buildings occur in the vicinity of the study area with a few being within its boundary. Additionally, the central street grid of the town of Humansdorp (established in 1849; Fransen 2006) lies just 3.3 km from the nearest turbine. Although no direct impacts to any structures would occur, contextual impacts to significant historical structures, i.e. structures more than 60 years old, can be an issue in some instances. As impacts to graves and built heritage on and around the site was not assessed before, structures and buildings which were in very close proximity to the turbines were all visited during the recent site inspection. Impacts to heritage and graves on the development site and within the surrounding area would only be contextual and are considered to be of low significance. No direct impacts will occur and no mitigation measures would be required other than the reporting of any accidentally discovered subsurface finds (considered extremely unlikely). The rating table for archaeology in the Binneman (2012 and 2019) report thus applies equally to graves and built heritage.

5.9.2 Cultural Landscape

Coastal landscapes are considered to have a higher cultural significance than areas more than 5 km in land, such as the development site. The cultural landscape of the baseline environment has been impacted by agriculture in the past and more recently by the construction of several renewable energy developments in the surrounding area, compromising the cultural landscape and 'sense of place'. Although Binneman assessed the potential impacts to the cultural landscape as being of medium significance both before and after mitigation, based on the large number of wind turbines that have subsequently been constructed in the wider area, this impact is considered low significance.

5.9.3 Archaeology

Further archaeological survey work of the updated layout conducted in December 2021 support the conclusion of the earlier work in that only scattered stone artefacts pertaining to the Early Stone Age (ESA) and/or Middle Stone Age (MSA) were located. The proposed amendments to the specifications and the updated layout of the turbine locations will not increase the archaeological significance of the impacts originally identified. The changes and updated layout are therefore considered as having a low archaeological significance. No mitigation was proposed in the original assessment, however the specialist recommended that should any archaeological materials or human remains be discovered during development, then work should cease and the find be reported for further study as may be required.

5.9.4 Palaeontology

The specialist confirmed that the original assessment (Almond 2012) of the project remains unchanged and remain sufficient for the amendment assessment.

'*The Banna ba Pifhu Wind Energy Project study area is entirely underlain by Devonian marine rocks of the Lower Bokkeveld Group (Ceres Subgroup). These shallow marine sediments are potentially highly fossiliferous, but in practice on the southern coastal plain their fossil content has been largely or completely obliterated by high levels of deformation (e.g. cleavage development, especially within mudrocks) and by deep chemical weathering. Their effective palaeontological sensitivity is consequently very low and developments here*

are rated as of low significance in fossil heritage terms. No specialist palaeontological mitigation is regarded as necessary for this wind energy project.

Should substantial fossil remains be exposed (e.g. fossil moulds of invertebrate shells) at any stage during development, these should be safeguarded - in situ, if feasible – and recorded by the responsible ECO (photos, GPS readings). ECPHRA should be alerted as soon as possible so that appropriate mitigation measures may be considered' (Almond, 2012).

The operational and decommissioning phases of the Banna ba Pifhu Wind Farm are unlikely to have any significant impacts on local fossil heritage.

Recommendations and Conclusion

This assessment applies equally to the different layout options for the wind turbines, substation, and access roads under consideration. Because no culturally significant heritage resources will be directly impacted and the contextual impacts are limited, the overall impact significance is low negative. Cumulative impact is also assessed as overall impact significance of low negative as the wind farm will only add a very modest number of turbines to the landscape.

No areas, aside from buildings on site require avoidance and no specific pre-construction mitigation measures for any heritage resources are warranted. The only recommendation made which should be included in the EA and EMPr is the below:

- 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/or the project archaeologist and may require inspection and/or mitigation. Such heritage is the property of the state and may require excavation and curation in an approved institution.

As no significant heritage concerns were identified for this revised assessment for the new, reduced proposal with new substation location and new BESS it is the opinion of the heritage specialist that the **amended project as currently proposed be authorised in full**.

5.10 Social

Dr Hugo van Zyl of Independent Economic Researchers completed the economic specialist study to form part of this EIA and submitted it to CSIR in 2012 (see Van Zyl, 2012). The same specialist was appointed to review the impacts of the project amendments.

The approach adopted to update the original socio-economic specialist assessment, conducted in 2012 involved the following steps:

1. Consider the current socio-economic context within which the project would be established and highlight key changes relative to the context described in the original 2012 assessment.
2. In light of any changes to the context and amendments, re-assess impacts and outline how they may differ from the 2012 assessment. Include a consideration of wider socio-economic impact (i.e. not only economic impacts).

The socio-economic context within which the project would be established has been characterised by steady population and economic growth since 2012. In this time, the renewable energy sector in the form of wind farms has gradually increased in importance alongside agriculture and tourism. Depending on future energy planning, it recognises that there may also be potential for the nuclear energy sector to develop in the event that the

Thyspunt reactor[16] goes ahead. Land uses surrounding the site have remained largely similar.

Consultation and interviews with I&APs and other key informants or stakeholders were necessary in order to assess impacts. Table 5.3 provides a list of people who were interviewed in person, per telephone and via email during the amendment assessment:

Table 5-3: List of parties interviewed during the assessment

Name	Affiliation
Gert Greeff	Regional Manager, Land Management, Eskom
Anené Jonck	Mayor's Office, Kouga Municipality
Japie Kritzinge	Neighbouring landowner
Fezeka Mabusela	Director, Kouga Municipality Planning, Development and Tourism Directorate
Andreas van Onselen	Neighbouring landowner
Henri Pretorius	Neighbouring landowner
Bull van Rensburg	Partner, Groenwei Boerdery
Ben Rheeder	Councillor, Kouga Municipality Ward 12
Revell Saint	Neighbouring landowner and partner, Groenwei Boerdery
John Stergianos	Neighbouring landowner
Mari du Toit	Land Management, Kouga Municipality
Hantie van der Westhuizen	Manager, St Francis Tourism

The discussion on financial viability and risks in the 2012 assessment remains valid and does not require any substantive changes for the amended project. As in 2012, while financial risks cannot be ignored, viability risks are considered low, assuming the project can secure a long term REIPPPP contract that secures payment for the electricity generated. The project will, however, have to compete with other wind energy projects in order to secure a contract. The balance between financial benefits and costs are thus likely to be positive for the applicant and landowner partners. These financial returns that motivate developments such as the BWF are necessary as the potential for returns is what fuels much of our economy. Aside from financial viability (and associated risks) and compatibility with planning, the following impacts were assessed in the original 2012 assessment:

1. Impacts on landowners within the site boundaries;
2. Impact on surrounding land owners;
3. Impacts on tourism;
4. Impacts associated with expenditure linked to the construction and operation of the project; and
5. Cumulative impacts.

These impacts were primarily of an economic nature but also had socio-economic elements. The findings of the original assessment were re-visited in light of the changes to the project and the updated socio-economic context. It was confirmed that the above impact categories are still valid and one additional impact category was added namely, impacts associated primarily with the influx of people.

Impacts associated with the influx of people

[16] Eskom Nuclear Power Station: https://www.thyspunt.com/.

Community concerns are common especially in smaller communities regarding the negative impacts associated with an influx of outside workers particularly during the construction of large projects. These concerns include those associated with negative impacts on social structures and increased 'social ills' such as increased crime levels, increased alcohol and drug use, increased teenage and unwanted pregnancies, increased prostitution and increases in sexually transmitted diseases (STDs). These types of impacts are more commonly associated with the influx of people looking for work without success, but can also be associated with workers that do find work.

It is expected that a significant proportion of workers would be sourced locally especially low and medium skilled workers. These workers would already be part of the local community and its social structures thereby reducing the risk posed by influx.

It is anticipated that, with the effective implementation of mitigation measures, the significance of impacts associated with the possible influx of people would be of a low negative significance before and after mitigation during construction and operation phases of the development. This comes with the caveat that the impact on individual affected community members has the potential to be high (for example, for an individual being affected by crime). Decommissioning would entail a similar impact to the construction phase as workers are brought in for decommissioning.

The following mitigation measures are recommended:

- Develop a 'locals first' policy with regard to construction and operational labour needs.
- A Community Liaison Officer should be nominated whom the community will be able to contact to report any issues which they may have. The Community Liaison Officer should be stationed within the area and will therefore be available on hand to deal with and address any concerns which may be raised.
- Have a complaints register available on site to any individual who may have a particular complaint with regards to the construction or operations processes.
- Establish a Monitoring Forum for the project. The Forum should be established before the construction phase commences and should include key stakeholders, including representatives from the local community, local councillors, farmers, and the contractor. The role of the Forum would be to monitor the project and the implementation of the recommended mitigation measures.
- The applicant and the contractors should, in consultation with representatives from the Monitoring Forum, develop a Code of Conduct for the project. The code should identify what types of behaviour and activities by workers are not permitted in agreement with surrounding landowners. For example, access on land that is not part of the development will not be allowed (no short cuts by workers going from home to site over land that is not part of the project).
- Workers should be allowed to return home during construction, upon approval by the Contractor.

The impacts associated with *expenditure linked to the construction and operation of the project* was elaborated on in the Socio-Economic Amendment Report. Following interviews with the local municipality the specialist has pointed out the following objectives, additional to the previous EIA Economic Impact Assessment Report (Van Zyl, 2012), which should be considered by the developer:

- Setting up a skills and services database in partnership with the local municipality and civil society for the local area before any hiring or contracting decisions are made. This can help to ensure fairness and limit potential interference in hiring processes. The local ward councillor has indicated that there is ample labour available locally and is willing to help with compiling a skills and services database for the use of the applicant (B Rheeder, Ward 12 Councillor, pers com).

- An effective employee induction programme is essential to ensuring that new employees, some of whom will be unfamiliar with the responsibilities of maintaining employment, are adequately prepared and motivated to adjust to the lifestyle required of them. This programme should incorporate life skills training as well as basic financial literacy training.
- Counselling services should be made available to employees to ensure that they have adequate guidance throughout their careers.
- Avoiding potential service provider decisions that may lead to abuse or local dissatisfaction. For example, only appointing one accommodating rental agent or one catering supplier may lead to local dissatisfaction regarding the spreading of project benefits.
- As far as possible, avoid significant variation in salaries between contractors for the same types of jobs. When variations are too high, the likelihood of dissatisfaction increases.
- Close liaison with local municipal managers, local councillors and other stakeholders involved in socio-economic development is required to ensure that the project is integrated into wider strategies and plans with regard to socio-economic development. This is particularly important given that local government representatives have expressed concern on this point with regards to existing renewable energy facilities in the area.
- Other IPPs in the area already have a wide array of socio-economic development projects as outlined above. The applicant should actively seek to collaborate with other IPPs to ensure synergies between projects and to explore joint projects aimed at maximising beneficial impacts.
- It is also important to anticipate that there are likely to be people whose (potentially unrealistic) expectations will not be met leading to dissatisfaction. This is difficult to avoid and can affect community relations. However, its impacts can be lessened by ensuring that all local benefits are carefully monitored and also communicated to local communities.

Recommendations and Conclusions

The growth of the wind energy industry in the area should mean that mitigation and benefit enhancement measures are more effective than may have been anticipated in 2012. The post mitigation impacts are therefore likely to be greater but should still remain of a medium significance overall as assessed in 2012.

The proposed amendments to the project would be of minimal significance overall from a socio-economic perspective. Expenditure on the project and the job opportunities it would create would be the same although opportunities for benefit enhancement should be greater relative to 2012. Risk factors for tourism and surrounding landowners driven by visual and noise impacts should also be similar.

When considering the overall costs and benefits of the amended project it was found that the latter should remain more prominent resulting in an overall net benefit as was the case in 2012.

The authorisation of the project in terms of the socio-economic impacts assessed in this report is therefore supported.

5.11 Traffic

The roads that may be affected will be the R330 between St Francis Bay and Humansdorp, the R102 between Humansdorp and Jeffrey's Bay and the N2. The R330 passes the project site to the east, this road would provide access to the development site. A potential access

road off the R330 to site may bisect NSD09. The National Roads are located further than 500 m away from the development site.

It is estimated that construction activities will take approximately 18 - 24 months', subject to the final design of the WEF, weather and ground conditions, including time for testing and commissioning.

All components will be brought to site in sections by means of flatbed trucks. Additionally, components of various specialized construction and lifting equipment are required on site to erect the wind turbines and will need to be transported to site. The typical civil engineering construction equipment will need to be brought to the site for the civil works (e.g. excavators, trucks, graders, compaction equipment, cement trucks, etc.). The transportation of ready-mix concrete to site or the materials for onsite concrete batching will result in temporary increase in heavy traffic (one turbine foundation up to 100 concrete trucks, and is undertaken as a continuous pour).

Construction traffic is expected to be generated throughout the entire construction period, however, the volume and type of traffic generated will be dependent upon the construction activities being conducted, which will vary during the construction period.

The only operational related activities on-site will be routine servicing (access roads and light traffic) and unscheduled maintenance.

The noise specialist assessed traffic passing NSDs in the surrounding area and on site as low significance during construction period. This is directly related to the relatively small wind farm and number of turbines proposed to be authorised, i.e., maximum of 8 turbines and proposed to be constructed, i.e., maximum of 7 turbines.

The impact of traffic on the receiving environment during all phases of the development is medium without mitigation and low with mitigation. The EAP recommends the following mitigation measures to reduce the overall impact:

- A Traffic Management Plan (TMP) should be designed by a transport and traffic specialist during the design phase. This plan should document important details pertaining to transporting of goods and movement of vehicles on site, such as the estimation of abnormal load trips, if required, will be made to site; approved routes for access to site; areas to erect signage along major and minor roads etc.
- Reduce traffic routing through community areas where possible.
- NSDs should be notified of peak traffic times, especially considering NSD09 which the access road may bisect if access to site is from the R330 to the east of the development site.
- Where possible, transportation of construction material should be planned in such a way that delivery occurs at the same time as that of the WEF material.
- Speed restrictions should be implemented, especially for heavier vehicles passing by NSDs on site or surrounding landowner properties.
- If any existing gravel roads will be used, document the condition of the existing roads prior to construction. This will provide support if held liable to repair or upgrade roads claimed to be damaged during construction of the development.
- If the development will construct any new minor roads, best practice would be to carry out regular maintenance of the new roads to ensure that its condition is maintained or improved.

6 BESS RISK ASSESSMENT

The risks associated with BESS are typically well researched and documented in other parts of the world. The BESS is relatively new and will become an integral support to the development of renewable energy technologies in South Africa. With the correct

management plans and protocols in place, the BESS will not pose major risks to the environment.

Construction Phase

It is proposed that the BESS will be delivered to the development site in the proposed containers and ready for connection to the Wind Farm electrical connection.

Operation Phase

There are two main concerns related to a BESS once operational, i.e. fire hazards and the potential for a condition known as '*thermal runaway*'[17].

Replacement / Decommissioning Phase

If batteries are replaced and / or once decommissioned, the disposal of the BESS may pose a risk to the environment.

The risk assessment mitigation measures provided below can be incorporated into a Battery Safety Management Plan and has also been included in the EMPr (Volume II). 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[18];
- National Fire Protection Association (NFPA) 855, Standard for the Installation of Stationary Energy Storage Systems, (2020 edition currently under development and not yet available)[19;]
- UL 9540, Standard for Energy Storage Systems and Equipment[20];
- Consolidated Edison and New York State Energy Research and Development Authority - Considerations for ESS Fire Safety (February 2017)[21.]
- The Energy Operators Forum "Good Practice Guide" (December 2014)[22];
- Institute of Engineering and Technology - Code of Practice for Electrical Energy Storage Systems (August 2017)[23]; and
- The Energy Institute: Battery Storage Guidance Note 1 - Battery Storage Planning (August 2019)[24].

The above standards and legislations are not specifically applicable to the proposed BESS for the Banna Development, but notwithstanding, has provided valuable guidance for the preparation of this risk assessment.

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

[17] Thermal runaway is a situation where the current flowing through the battery causes the temperature to rise, which increases the current with a further rise in temperature.
[18] https://www.aqcs.allianz.com/news-and-insights/risk-advisory/tech-talk-volume-26-bess-english.html
[19] https://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=855
[20] https://standardscatalog.ul.com/standards/en/standard_9540_1
[21] https://www.nyserda.ny.gov/-/media/Files/Publications/Research/Energy-Storage/20170118-ConEd-NYSERDA-Battery-Testing-Report.pdf
[22] https://www.eatechnology.com/engineering-projects/electrical-energy-storage/
[23] https://shop.theiet.org/code-of-practice-for-electrical-energy-storage-systems
[24] 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

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.

The BESS has been considered by Specialists and is proposed to be located adjacent to the on-site substation within the development footprint.

Table 6-1: 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**	Over and above the Management actions already included in the EMPr: - Training of all staff and employees on how to handle spillages, fires and electrocutions; - Keeping records for well managed operations and maintenance; - Bunding of containers; - Installation of leak detection monitoring systems, where possible; - Implementation of spill handling and management in line with the EMPr and generic EMPr; - Provision of spill kits on site for clean-up of spills and leaks; - Immediate clean-up of spills and disposal of contaminated absorbents and materials or soil at a licensed hazardous waste disposal facility; - Demarcate all no-go and sensitive areas; - Avoid the placement of batteries near watercourses and sensitive features; - All storm water runoff must be controlled to ensure that on-site activities do not culminate in possible off-site pollution; - Material Safety Data Sheet (MSDS) Records to be kept, as well as incidents reporting register; - Recording and reporting of all significant fuel, oil, hydraulic fluid or electrolyte spills or leaks so that appropriate clean-up measures can be implemented. A copy of these records must be made available to respective provincial authorities (on request throughout the project lifecycle). - Source batteries from reputable suppliers; - Battery inspection prior to installation; - Maintenance of the BESS; - Appropriate battery design and venting control; - Source from reputable manufacturers;

			- Lithium-ion batteries must have battery management systems (containment, automatic alarms and shut-off systems) to monitor and protect cells from overcharging or damaging conditions, such as temperature extremes; - Safe and appropriate storage in line with the above and the EMPr; - Frequent and appropriate disposal of both general and hazardous waste to prevent pollution of soil and groundwater; - On-site battery maintenance should only be undertaken on impermeable surfaces with secondary containment measures. Any resulting hazardous substances must be disposed of appropriately; - Development and implementation of an Emergency Response Plan in the event of a spill or leakage; - Provision of suitable emergency and safety signage on site, and demarcation of any areas which may pose a safety risk (including hazardous substances). Emergency numbers for the local police, fire department, Eskom and Kouga Municipality must be placed in a prominent clearly visible area on the site; - Safe handling which must include battery inspection prior to installation; - Development and implementation of Thermal Management Plan prior to installation/construction; and - The Department of Forestry, Fisheries and the Environment and provincial authorities: Pollution and Chemicals Management are to be duly notified immediately of any incident in terms of section 30 of the National Environmental Management Act, 1998 (Act No. 107 of 1998) ("NEMA").
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; - 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; and - Work with first responders and relevant personally 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**	Over and above the Management actions already included in the EMPr: - Training of all staff and employees on how to handle spillages, fires and electrocutions; - Keeping records for well managed operations and maintenance; - Bunding of containers; - Implementation of spill handling and management in line with the EMPr; - Demarcate all no-go and sensitive areas; - Avoid the placement of batteries near watercourses and sensitive features; - Material Safety Data Sheet (MSDS) Records to be kept, as well as incidents reporting register; - Source batteries from reputable suppliers; and - 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 Banna Development, first responders from the nearest major town (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.	**Medium**	- The recycling of batteries and their potential use as e-waste. - Disposal at a licensed hazardous waste site. - Prior to construction of the Banna Development, the Applicant is to develop a dedicated Battery Recycling Programme to be adopted on-site.

	- 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 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.		- Records of disposal at a licensed facility must be kept.

6.1 Fire Risk Management

To minimise the fire risk within the BESS and relevance to the substation site, Table 6.2 provides proposed design and implementation recommendations should be considered prior to installation and / or construction of the BESS. These recommendations should form part of a Tactical Fire Response Plan where applicable and has also been included in the EMPr (Volume II).

Table 6-2: Proposed Design and Implementation Recommendations for the BESS

Initial Design Recommendations

1. Contact with the Fire department
• Invite the fire department to the project site to discuss the BESS hazards. An adequate emergency response is the key to avoiding an uncontrolled fire. Ensuring the fire department is aware of and understands the type of battery which will be used and it hazards.
• 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 of the BESS • Install the BESS outdoors, a minimum of 20 m from important buildings or equipment. Maintain a minimum of 3 m separation from property 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 of the BESS

Initial Design Recommendations
• BWF 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[25]. 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 a capacitor, transformer, and switch gear in separate rooms according to best engineering practices.
4. Ventilation and Temperature Control • 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. 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.

[25] https://www.ul.com/news/ul-9540a-battery-energy-storage-system-ess-test-method

Initial Design Recommendations
▪ Check for fluid leakage. ▪ Implement electric terminal torqueing procedures to maintain connection integrity.

7 IMPACT ASSESSMENT SUMMARY

Specialists have confirmed that the findings of the previous EIA are still valid. Based on the specialist assessments, impact significance ratings which were revised or where any new impacts were identified during this amendment application process, are listed below.

One Avifauna impact significance ratings was revised during this Amendment process:

1. The construction phase Avifaunal impact '*Displacement of priority species due to disturbance*' was reduced from High Significance without mitigation to Medium Significance but remains at Medium Significance with mitigation. While the reduction in the number of turbines and roads will have some mitigating effect, it will not be enough to reduce the significance rating.

Five additional or new impacts were identified and assessed during this EA Amendment application process, relating to Soil, Aquatic, Socio-economic and Traffic:

1. Positive Soil / Agricultural operation phase impact of '*Increased financial security for farming operations, due to reliable income from turbine rental* with a Medium positive Significance rating with or without enhancement.
2. Aquatic construction and decommissioning phase impact of '*Potential impact on localised surface water quality'*. This potential impact was assessed due to the inclusion of the BESS and would be of Medium Significance without mitigation and Low Significance after with the implementation of mitigation measures.
3. Socio-economic construction phase impact of '*Impacts associated with the influx of people*'. This potential impact would be of Medium Significance without mitigation and Low Significance with the effective implementation of mitigation measures.
4. Socio-economic operation phase impact of '*Impacts associated with the influx of people*'. This potential impact would be of Medium Significance without mitigation and Low Significance with the effective implementation of mitigation measures.
5. Traffic impacts relevant to construction, operation and decommissioning of '*Additional traffic on major and minor roads*'. This potential impact was assessed by the EAP based on the outcome of the screening tool report and would be of Medium Significance without mitigation and Low Significance after with the implementation of mitigation measures.

Any amendments to impacts identified during this 2022 Amendment application process, namely Avifaunal, Soil, Social, Aquatic and Traffic impacts are included in Table 7.1. Table 7.2 and 7.3 contains the impact summary data extracted from the previous EIA - CSIR Updated Final EIA Report, December 2013 which are still valid.

Table 7.1 below provides additional impacts identified as well as impacts where a change in significance rating of impacts were identified during the amendment process.

Table 7.2 provides a summary of the pre-mitigation and post-mitigation significance ratings for all impacts during the construction phase.

Table 7.3 below provides a summary of the pre-mitigation and post-mitigation significance ratings for all impacts during the operational phase.

Table 7-1: Impacts Amended or Added

Impact	Pre-mitigation Significance	Post-mitigation Significance
Construction		
Socio-Economic Amendment Assessment		
Impacts associated with the influx of people *(impact added)*	M	L
Avifauna Amendment Assessment		
Displacement of priority species due to disturbance *(impact amended)*	M *(from H)*	M
Aquatic Amendment Assessment		
Impact on localized surface water quality *(impact added)*	M	L
Traffic Assessment		
Additional traffic on major and minor roads *(impact added)*	M	L
Operation		
Soil Amendment Assessment		
Increased financial security for farming operations, due to reliable income from turbine rental *(impact added)*	M+	M+
Socio-Economic Amendment Assessment		
Impacts associated with the influx of people *(impact added)*	M	L
Aquatic Amendment Assessment		
Impact on localized surface water quality *(impact added)*	M	L
Traffic Assessment		
Additional traffic on major and minor roads *(impact added)*	M	L
Decommissioning		
Aquatic Amendment Assessment		
Impact on localized surface water quality *(impact added)*	M	L
Traffic Assessment		
Additional traffic on major and minor roads *(impact added)*	M	L

Table 7-2: Summary of Impacts during Construction Phase

Impact	Pre-mitigation Significance	Post-mitigation Significance
Construction Phase		
Flora and Fauna		
Loss of vegetation habitat on:		

Impact	Pre-mitigation Significance	Post-mitigation Significance
Construction Phase		
Humansdorp Shale Renosterveld	H	L
Gamtoos Thicket	L	VERY L
Riparian and Wetland Vegetation	H	L
Reduction or changes to ecological processes and functioning in:		
Humansdorp Shale Renosterveld	M	L
Gamtoos Thicket	L	VERY L
Riparian and Wetland Vegetation	M	L
Temporary fragmentation of habitats	M	L
Increased risk of invasion by alien plants in drainage lines and disturbed areas	M	L
Changes in natural fire regime	M	L
Reduction of ecosystem functioning	M	L
Loss of species of special concern and SSC habitat:		
Humansdorp Shale Renosterveld	M	L
Gamtoos Thicket habitat	L	VERY L
Loss of floral SSC	M	L
Habitat destruction may affect faunal diversity and composition:		
Reptiles	M	L
Amphibians	M	L
Mammals	M	L
Road mortality from truck/vehicle and other service vehicles:		
Reptiles	H	L
Amphibians	H (when raining) L (when not raining)	L
Mammals	M	L
Poaching of Mammals	M	L
Fauna harmed by fences (reptiles and mammals)	H	M
Corridor disruptions as a result of habitat fragmentation for:		

Impact	Pre-mitigation Significance	Post-mitigation Significance
Construction Phase		
Reptiles	M	L
Amphibians	M	L
Mammals	M	L
Avifauna		
Displacement of priority species due to disturbance *(impact amended)*	M *(from H)*	M
Displacement of priority species due to habitat destruction	L	L
Bats		
Bat roost disturbance and/or destruction due to construction activities	M	VERY L
Fragmentation to and displacement from foraging habitat due to wind turbine construction.	M	L
Loss of Conservation Important Bat Species from the area due to construction activities	M	M
Visual		
Impact on agricultural/coastal resort landscape character types	H	H
Impact on sensitive visual receptors due to the construction of a wind farm	H	H
Intrusion of a wind farm on the views of sensitive visual receptors	H	H
Impact of night lighting of wind farm on sensitive viewers	M	M
Noise		
Impact of the construction noise on the Noise Sensitive Areas (NSAs)	L	L
Socio-Economic		
Impacts on land owners and land uses on the site	L	L
Impacts on surrounding land users	L	L
Impacts associated with project investment / expenditure	M	M
Impacts associated with the influx of people *(impact added)*	M	L
Archaeology		
Impacts to the pre-colonial archaeology	L	L

Impact	Pre-mitigation Significance	Post-mitigation Significance
Construction Phase		
Impacts to the pre-colonial cultural landscape	M	M
Palaeontology		
Destruction, disturbance or sealing-in of buried fossils during bedrock excavations and construction work	L	L
Wetlands and other Aquatic Ecosystems		
Physical destruction of aquatic habitat	M	L
Loss of wetland habitat, ecosystem services and biodiversity services	M	L
Loss of species of special concern	H	L
Habitat fragmentation – loss of ecological corridors	M	L
Sedimentation and erosion	M	L
Impact on localized surface water quality *(impact added)*	M	L
Soil		
Loss of agricultural land	L	L
Disturbance of run-off and resultant potential impact on erosion	L	L
Disturbance of existing contour banks	n/a	n/a
Soil profile disturbance and resultant decrease in soil agricultural capability	L	L
Prevention of crop spraying by aircraft over land occupied by turbines	L	L
Disturbance of cultivation practices due to the division of existing camps by turbines and access roads	L	L
Placement of spoil material generated from excavations	L	L
Yield reduction	L	L
Prevention of possible future agricultural activities on land occupied by turbines	L	L

Table 7-3: Summary of Impacts during Operational Phase

Impact	Pre-mitigation Significance	Post-mitigation Significance
Operational Phase		
Flora and Fauna		
Reduction or changes to ecological processes and functioning in:		

Impact	Pre-mitigation Significance	Post-mitigation Significance
Operational Phase		
Humansdorp Shale Renosterveld	H	L
Gamtoos Thicket	L	VERY L
Riparian and Wetland Vegetation	H	M
Increased risk of alien invasion in drainage lines and disturbed areas	M	L
Changes in natural fire regime	M	L
Reduction of ecosystem functioning	M	L
Habitat destruction may affect faunal diversity and composition:		
Reptiles	L	L
Amphibians	L	L
Mammals	L	L
Road mortality from truck/vehicle and other service vehicles:		
Reptiles	H	L
Amphibians	H (when raining) L (when not raining)	L
Mammals	H	L
Poaching of Mammals	L	L
Fauna harmed by fences (reptiles and mammals)	M	L
Corridor disruptions as a result of habitat fragmentation for:		
Reptiles	M	L
Amphibians	H (when raining) L (when not raining)	M
Mammals	L	L
Avifauna		
Displacement of priority species due to disturbance caused by the operation of the wind farm	M-H	M-L
Collisions of priority species with the turbines *(impact amended)*	M	L
Collisions with the associated power line	M	L

Impact	Pre-mitigation Significance	Post-mitigation Significance
Operational Phase		
Bats		
Bat fatalities due to collision or barotrauma due to attraction of bats to towers for roosting or out of curiosity	M	L
Bat fatalities due to collision or barotrauma during foraging activity	H	L
Bat fatalities due to collision or barotrauma during migration	H	L
Bat fatalities due to electrocution from overhead powerlines	M	L
Loss of Conservation Important Bat Species from the area due to operation activities	H	M
Loss of bats providing important ecosystem services	H	L
Visual		
Impact on agricultural/coastal resort landscape character types	H	H
Impact on sensitive visual receptors due to the construction of a wind farm	H	H
Intrusion of a wind farm on the views of sensitive visual receptors	H	H
Impact of night lighting of wind farm on sensitive viewers	M	M
Noise		
Impact of the operational noise on the Noise Sensitive Areas (NSAs) using the Vestas V100 WTG	L	L
Increased noise levels at NSD day- and night-time operation of WTG	L	L
Socio-Economic		
Impacts on land owners and land uses on the site	L – M	M
Impacts on surrounding land users	L	L
Impacts on tourism	M	M
Impacts associated with project investment / expenditure	L – M	M
Impacts associated with the influx of people *(impact added)*	M	L
Wetlands and other Aquatic Ecosystems		

Impact	Pre-mitigation Significance	Post-mitigation Significance
Operational Phase		
Loss of wetland habitat, ecosystem services and biodiversity services	M	L
Loss of species of special concern	M	L
Habitat fragmentation – loss of ecological corridors	M	L
Sedimentation and erosion	M	L
Impact on localized surface water quality *(impact added)*	M	L
Soil		
Loss of agricultural land	L	L
Prevention of crop spraying by aircraft over land occupied by turbines	L	L
Disturbance of cultivation practices due to the division of existing camps by turbines and access roads	L	L
Yield reduction	L	L
Prevention of possible future agricultural activities on land occupied by turbines	L	L
Increased financial security for farming operations, due to reliable income from turbine rental *(impact added)*	M+	M+

7.1 Cumulative Assessment

Implementation of renewable energy in the Kouga Local Municipality (KLM) is guided by the Renewable Energy Land Use Policy in the Spatial Development Framework (SDF). The Local Economic Development (LED) Department of the KLM works with the wind energy facilities on their social economic development projects as well as preparing the youth for careers in the sector. It also assists in facilitating training for Small, Medium and Micro Enterprises (SMME's) in preparation and anticipation of services needed in wind farm development. When considering the key economic growth opportunities for Humansdorp, the SDF notes that it provides the potential opportunity to be a gateway to the district's renewable energy industry (KLM, 2015).

In accordance with the EIA Regulations, consideration is also given to 'cumulative impacts'. By definition, cumulative impacts are those that result from incremental changes caused by past, present or reasonably foreseeable future actions together with the development. Cumulative impacts are the combined impacts of several developments that are different to the impacts from the developments on an individual basis. For example, the landscape impact of one WEF may be insignificant, but when combined with another it may become significant. In line with best practice, the scope of the assessment included all operational, approved or current and planned renewable energy applications (including those sites under appeal), within a 35 km radius of the site (as a minimum). The WEF sites included in the assessment of cumulative impacts are as reviewed on the most current DFFE

database of renewable applications (at the time of writing the report, REEA_OR_2021_Q4.shp[26]) (Figure 5).

A number of renewable facilities have been constructed and others have been authorised by the Department of Forestry, Fisheries and the Environment within the Cacudu and Sarah Baartman District Municipality, Eastern Cape Province. There are currently five wind farms facilities operating in the wider Humansdorp, Oyster Bay, St Francis Bay and surrounds, which are between approximately 6 km and 25 km away from the Banna ba Pifhu wind farm, namely:

- Jeffrey's Bay Wind Farm to the north east of Humansdorp;
- Kouga Wind Farm to the north east of Oyster Bay;
- Tsitsikamma Wind Farm to the north west of Oyster Bay;
- Gibson Bay Wind Farm to the west of Oyster Bay; and
- Oyster Bay Wind Farm near Oyster Bay.

Table 7-4: List of Renewable Energy Projects within up to 35 km of the Banna ba Pifhu Wind Farm

No.	DFFE Reference	Technology	Status of Project	Local Municipality (LM)	District Municipality (DM)
1	12/12/20/1585	Onshore Wind	Approved	Kouga LM	Cacudu DM
2	12/12/20/1718	Onshore Wind	Approved	Kouga LM	Cacudu DM
3	12/12/20/1752	Onshore Wind	Approved	Kouga LM	Cacudu DM
4	12/12/20/1756/2	Onshore Wind	Approved	Kouga LM	Cacudu DM
5	12/12/20/1861	Onshore Wind	Approved	Kouga LM	Cacudu DM
6	12/12/20/2209	Onshore Wind	Approved	Kou-Kamma LM	Cacudu DM
7	14/12/16/3/3/2/572	Solar PV	In process	Kou-Kamma LM	Cacudu DM
8	12/12/20/1863	Onshore Wind	Approved	Kou-Kamma LM	Cacudu DM
9	14/12/16/3/3/2/1102/AM1	Onshore Wind	Approved	Kou-Kamma LM	Sarah Baartman DM
10	14/12/16/3/3/2/1103	Onshore Wind	Approved	Kou-Kamma LM	Sarah Baartman DM
11	14/12/16/3/3/2/1104	Onshore Wind	Approved	Kou-Kamma LM	Sarah Baartman DM

From the already constructed and proposed renewable facilities, the maximum number of wind turbines proposed around the project site is 367. These wind farms will stretch from Oyster Bay to Jeffrey's Bay, resulting in a regional wind energy landscape. One hundred and sixty (160) turbines have been constructed to date. Each of the remaining planned projects must still be subject to a competitive bidding process where only the most competitive projects will obtain a power purchase agreement required for the project to proceed to construction. The Banna ba Pifhu wind farm is applying for authorisation for up to 8 turbines with up to 7 proposed for construction, which brings the total number of potential turbines within the 35 km radius to 374. The 7 turbines of Banna ba Pifhu constitute 1.9 % of the total number of planned turbines. As such, its contribution to the

[26] South African Renewable Energy EIA Application Database (http://egis.environment.gov.za/frontpage.aspx?m=27)

total number of turbines, and by implication to the cumulative impact of all the planned turbines on the avifaunal species are low.

The addition of the relatively small Banna ba Pifhu Wind Farm is likely to only affect sensitive viewers nearby, and the cumulative effect in the region is expected to be minimal. Furthermore, the increase in size of the turbines and the construction activities will have a general cumulative visual impact on the area but this will not affect the nearby coastal pre-colonial archaeological landscape.

The soil and agricultural specialist analysed data from seven impacted wind farms in the area to determine if wind farms impact agricultural potential and production. Production data shows a general upward trend over time and there is no evidence in the data in a decrease in production as a result from the operating wind farms. It is likely that the positive financial benefits of having wind turbines outweigh the potential negative impacts and wind farms have benefitted agriculture and agricultural production.

The aquatic cumulative impacts were assessed and were found to be low, due to the current state of the surrounding environment and the overall avoidance of any sensitivity aquatic habitats by the revised layout. Limited cumulative impacts are expected on the fauna and flora because of the expansion of the site, due to the limited disturbance area. These include regional loss of vegetation and species of special concern.

From a cumulative noise perspective, the edge of the proposed Kouga WEF is approximately 2,000 m south-east of the closest WTG and there is a slight potential for a cumulative noise impact, mainly on NSDs 07 and 08. The noise level from the Banna Ba Pifhu Wind Farm was calculated at 27 and 35 dBA respectively at NSDs 07 and 08 and the contribution to the cumulative noise level from Banna Ba Pifhu Wind Farm will be less than 2 dB. Any potential noise impact on these receptors will be from the Kouga WEF and not the Banna Ba Pifhu Wind Farm. Therefore, there is a low potential for a cumulative impact if both the Kouga and Banna Ba Pifhu WEFs are constructed and operating and the significance of potential cumulative noise impacts from the Banna Ba Pifhu Wind Farm will be low.

From a cumulative bat perspective, the receiving environment has changed since the completion of the original pre-construction monitoring. Bat fatalities have been reported for the Jeffreys Bay facility (MacEwan 2016). In the original EIA assessment, the cumulative bat impact of impacts 7, 8 and 9 in the list provided in Section 5.5 are rated as high, medium and medium respectively before mitigation and low for each after mitigation. These significance ratings will not change due to the proposed amendments, especially since unpublished reports from nearby wind farms suggests impacts to bats are high.

As per the original assessment, the key source of potential negative cumulative socio-economic impacts remains the proposed project's risk to tourism and surrounding landowners when combined with other wind farm projects in the area. These impacts are expected to be of a low significance particularly in light of (1) the number of new wind farms already established in the area since 2012, (2) the international literature on the subject outlined in the impacts on tourism section and (3) the findings of the revised visual and noise studies. The visual study observed that the project is one of many wind farms proposed for the coastal plain of the Kouga Municipality. In addition, a number of wind farms have already been constructed and still others have received environmental authorisation from Oyster Bay to Jeffrey's Bay, resulting in "a regional wind energy landscape". "The addition of the relatively small Banna ba Pifhu wind farm is therefore likely to only affect sensitive viewers nearby, and the cumulative effect in the region is expected to be minimal" (Oberholzer and Lawson, 2022). The noise study also found that cumulative impacts would remain of a low significance with mitigation (M. de Jager, 2022). The cumulative effect of potential impacts associated with the influx of people should also have a low significance given the nature of the project.

Positive cumulative socio-economic impacts are also likely as the project should set a positive precedent for further investment in the area. By committing to a large investment, the applicant would be casting a strong 'vote of confidence' in the local economy. This has the potential to influence other investors (including locals) to also act with greater confidence thereby resulting in cumulative impacts on overall investment levels. In a sense, the project and other wind energy projects, have the potential to lead to the 'crowding in' of further investment. As the wind energy industry grows in size (aided by projects such as Banna Ba Pifhu) it should be able provide further opportunities for manufacturing and servicing at scale and the additional, cumulative benefit that would flow from this.

8 ADVANTAGES AND DISADVANTAGES

Table 8.1 below provides a comparative assessment of the advantages and disadvantages of the proposed amendment to the authorised Banna ba Pifhu Wind Farm.

Table 8-1: Advantages and Disadvantages of the Amendment

Advantages	Disadvantages
A reduction in the number of turbines means a smaller footprint is required and therefore less vegetation clearance and habitat loss.	The reduced number of turbines and the associated implications in terms of capital expenditure, employment (construction and operational phase), and the impact of construction workers.
All turbines are located away from highly sensitive areas, and no turbines are located in no–go areas or buffers.	In terms of the Community Trust, the potential changes would be linked to the reduced revenue.
Bat activity and species diversity are greater at ground level than at height. Therefore, even though bats are recorded at heights that would put them at risk from taller turbines, the proportion of bats that would be at risk might be less.	It is possible that some bat species, particularly those not adapted to use open-air spaces, are being killed at the lower sweep of the turbine blades so increasing the blade length and having a shorter distance between the ground and the lowest rotor point may have a negative impact and potentially place a greater diversity of species at risk.
The number of bat species that might be impacted would decrease because not all bat species use the airspace congruent with the rotor swept area of modern turbines owing to morphological adaptations related to flight and echolocation.	Increased hub height increases visual screening.
The reduction in the number of turbines is an advantage as it reduces the potential for impacts on any type of heritage resource.	Proposed wind turbines are located closer to the scenic Seekoei River to the north and R330 arterial road to the east.
The revised layout of the WEF has the advantage of generally increasing the distance between the identified heritage sites and WEF infrastructure, thereby ensuring that no impacts will occur.	
The proposed changes, if a maximum of 7 turbines are constructed, will result in an increase of 42 % in the maximum rotor swept area at each turbine compared to the original authorised specifications, and an overall reduction of 46 % in the number of turbines.	
Based on the most recent research on this topic, it is concluded that the reduction in the number of turbines should reduce the overall risk of	

Advantages	Disadvantages
collision to birds, despite the increase in the rotor swept area of individual turbines.	
A reduction in the number of turbines will reduce the overall visual clutter and impact on identified sensitive receptors, specifically to the south and west.	
The amendment allows for the inclusion of a Battery Energy Storage System, which will allow for increased amount of energy to be supplied to the national grid by the Banna WEF and contributes to positive socio-economic impacts.	
Increased financial security for farming operations, due to reliable income from turbine rental.	

9 CHANGES TO THE EMPR

The EMPr for the original Banna ba Pifhu Wind Farm prepared by CSIR, 2013 was updated to reflect the revised mitigation measures recommended by specialists and to include any revisions based on legislation. The EMPr has also been updated to include management plans and recommendations for the inclusion of the BESS. Refer to Volume II of this Report for the updated EMPr.

10 PUBLIC PARTICIPATION PROCESS

The Public Participation Process follows the requirements of Section 24 (5) and Chapter 6 (41, 42, 43, and 44) of GN R. 326 of NEMA EIA Regulations, 2014 (as amended), as well as the Public Participation Guidelines in terms of NEMA, 1998 EIA Regulations, 2014.

During Alert Level 3 of the COVID-19 Pandemic, the DFFE published Government Notice 43412 on 5 June 2020[27] (*These Regulations have since been repealed but the application will still follow the approved public participation process*). Included in this notice was the requirement to submit a Public Participation (PP) Plan to the DFFE prior to the commencement of a PP Process (PPP). The plan was designed to show how the EAP aims to provide sufficient and accessible information to all Interested and Affected Parties (I&APs) in a safe manner during COVID-19 Pandemic. The Plan was submitted and approved by the DFFE on 11 August 2020 and a copy of the approved plan is included in Appendix B 1.

A PPP is an important part of any application. The aim of PPP is:

- To inform I&APs of the proposed amendments;
- To identify and respond to issues, comments and concerns as raised by I&APs;
- To promote transparency of the project and its potential consequences and ensure I&APs understanding of the proposed amendments;
- To facilitate open dialogue and liaise with all I&APs;
- To assist in identifying potential environmental (biophysical and socio-economic) impacts associated with the proposed amendment; and
- To ensure that all I&AP issues and comments are accurately recorded, addressed and documented in a Comments & Response Report.

[27] Directions regarding measures to address, prevent and combat the spread of Covid-19 relating to National Environmental Management Permits and Licences.

10.1 Initial Notification Phase

The initial notification phase gives opportunity to the public to register as an I&AP and receive all correspondence and notification regarding the application process. During this phase the following was conducted:

- The socio-economic specialist study included consultation and interviews with I&APs and other key informants or stakeholders as necessary in order to assess social impacts;
- Site notices were erected on the site boundary in June 2019 and March 2022, respectively (see Appendix B);
- Poster notices were erected in the town of Humansdorp and St Francis Bay in June 2019 and March 2022, respectively (see Appendix B);
- Advertisements were placed in the *Our Times* and *The Herald* newspapers (in English and Afrikaans) on the 05 June 2019 and in the *Eastern Cape Kouga Express* and *The Herald* newspapers on the 10 March 2022 (see Appendix B); and
- Initial notification e-mails were distributed on to all pre-identified I&APs from the existing database[28], including the affected landowner and occupiers of the site, municipal councillor(s), ratepayers in the area, affected district and local municipalities, and organs of state. I&APs who responded to the newspaper and notices were also sent an initial notification email (see Appendix B).

10.2 Draft Amendment Phase

I&APs are able to register throughout the duration of the process and all registered I&APs are kept informed about the progress of the application.

The following tasks are undertaken during the Amendment process:

- Notification letters are sent to registered I&APs, key stakeholders, and organs of state to inform them of the availability of the Draft Amendment Report (DAR) for review and comment (30 days);
- During the availability of the DAR, a public and/or focus group meeting may be held virtually, however, the need for this will only be determined if requested;
- A Comment and Reponses Report, recording comments and/or queries received and the responses provided will be kept up to date throughout the application process (see Appendix B of this Report);
- Notification letters will be sent to all registered I&APs, key stakeholders, and organs of state to inform them of the submission of the Final Amendment Report (FAR) to the DFFE for decision, which will include responses to comments made during the PP period;
- Notification letters will be sent to all registered I&APs, key stakeholders, and organs of state to inform them of the decision by the DFFE and the appeal procedure; and
- Placement of advertisements in the same local and regional newspapers, if required, (in English and Afrikaans) to inform I&APs of the decision taken by the DFFE.

10.3 Summary of Issues Raised

A Comments and Response Table reflects the comments received before finalisation of this draft amendment report. The Comments and Response Table will be updated throughout the process as comments are received, and responded to and addressed by the project team, i.e., EAP, Applicant and Specialists as applicable and will be included in Appendix B of the final amendment report. To date, correspondence received from I&APs was requests to be registered on the I&AP database and follow up on the commencement of PPP (Appendix B: Public Participation Report).

[28] The latest I&AP database of the authorised Banna Wind Farm was reviewed and updated to be used as the pre-identified I&APs list.

11 CONDITIONS TO BE ADDED TO THE EA

Based on the assessment conducted by specialists for the proposed project amendments, the following conditions are recommended to be included in the amended EA:

Avifauna

- Restrict the construction activities to the construction footprint area.
- Do not allow any access to the remainder of the property during the construction period.
- Measures to control noise and dust should be applied according to current best practice in the industry.
- Maximum use should be made of existing access roads and the construction of new roads should be kept to a minimum.
- Following construction, rehabilitation of all areas disturbed (e.g. temporary access tracks and laydown areas) must be undertaken and to this end a habitat restoration plan is to be developed by a rehabilitation specialist.
- The recommendations of the specialist ecological study must be strictly adhered to.
- A no turbine circular buffer zone of at least 1.6 km, measured from the northern shore of the Grasmere Large Dam (-34.080135°S, 24.764032°E), should be implemented around the Grasmere roost site.
- Additional monitoring of the Grasmere Large Dam Blue Crane roost site needs to be implemented over four seasons before the wind farm becomes operational, to gain additional information on flight activity to and from the roost. This is necessary to establish if a curtailment regime is required for periods of high risk i.e., that period when the birds arrive to roost and leave again to forage elsewhere.
- Once the turbines have been constructed, post-construction monitoring should be implemented to compare actual collision rates with predicted collision rates.
- Should mortality of priority species be recorded, the avifaunal specialist, in consultation with external experts and relevant NGO's such as BLSA, must determine annual mortality thresholds for those priority species killed by turbine collisions.
- If the annual projected (adjusted) collision rate exceeds the pre-determined threshold level, shutdown on demand (SDoD) must be implemented for high risk priority species.

Bats

- 200 m blade tip buffer from aquatic features.
- 200 m roost buffer (buildings and vegetation – in line with the environmental sensitivity map, Figure 4).
- 50 m riparian habitats.
- Maximising the ground clearance and minimising the tip height (i.e. the distance between the ground and the blade tip at its highest point).
- Operation activity monitoring and carcass searches, in line with the latest best practice guidelines.
- No turbines can be located in High or Medium to High bat sensitive areas (as per Figure 4).
- Curtailment, as per the updated table provided in the Amendment Report (Arcus, June 2022) must be implemented from the start of operation of the facility.

Noise

- The developer must investigate any reasonable and valid noise complaint if registered by a receptor staying within 2000 m from location where construction activities are taking place or from an operational wind turbine.
- The developer must implement a noise monitoring programme to collect ambient sound measurements prior to the construction of, and at least once during the operational phase, to confirm that the noise levels are less than 45 dBA at NSDs 01, 09 and 11.

- The potential noise impact must again be evaluated should the layout be changed where any additional WTG are located closer than 1000 m from a confirmed NSD, or the layout are changed where any WTG are moved closer to an NSD (within 2000 m from an NSD).
- The applicant should implement a noise monitoring programme, to measure the ambient sound levels prior to the development of the WEF, as well as measurements when the WEF is operational. Measurements should be collected at a minimum at NSDs 01, 09 and 11.
- The developer must ensure that no receptor is subjected to total noise levels exceeding 45 dBA at night due to the development of the wind energy facility by means of long-term (at least one night-time period while the WTGs are operating) noise measurements at night.

Archaeology / Heritage

- 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/or the project archaeologist and may require inspection and/or mitigation. Such heritage is the property of the state and may require excavation and curation in an approved institution.

12 CONCLUSION AND IMPACT STATEMENT

Banna ba Pifhu Wind Farm (RF) Pty Ltd are proposing the amendment to the already authorised Banna ba Pifhu Wind Farm, and inclusion of a BESS. The motivation for these changes is to facilitate the most efficient turbine model and to further future proof the project amidst rapid technology developments. To counter the effects of the increased size of the turbines, the Applicant proposed reducing the number of wind turbines from 13 to 8 turbines, with a maximum of 7 turbines to be constructed if this amendment application is approved. The reduced number of turbines will also ensure that the turbines are located towards the eastern portion of the development site, which will reduce the potential impact of the turbines on the views of the surrounding landowners. Modern technology enables a reduction in the number of turbines for the same energy yield. Corresponding to this reduction in number of turbines was an increase in hub height, from 80 - 105 m to up to 180 m, in rotor diameter, from 90 - 117 m to up to 200 m and an increase to the maximum generation capacity from 30.6 MW to up to 40,5 MW.

The applicant is also requesting a validity period of 10 years for the EA, should it be authorised. The amended site development layout and technical specifications were assessed by the specialists. Specialists conducted site visits and submitted amendment reports which assessed the level of impacts the proposed amendments will have on the environment and provided updated constraints and recommendations. Any changes to the baseline environment assessed by the specialists has been included in this report. An environmental sensitivity map illustrates the proposed layout superimposed by the environmental constraints and No-Go Areas (Figure 4 – Environmental Sensitivity Map).

Minimal change to significance ratings of the previously assessed impacts resulted from this amendment. Based on specialist input during this EA Amendment application process, it can be concluded that the increase in size of the turbines does not lead to additional impacts or an increase in the post-mitigation significance rating of impacts previously identified and assessed. The Avifaunal impact related to collision risk increased from Low to Medium Significance with mitigation however this was due to expanded knowledge on the collision risk of priority species that occurred between 2012 and 2019, not due to the proposed amendments. The proposed amended layout avoids all sensitive environmental features and places the turbines, substation and the BESS in largely transformed inclusion areas. The proposed amendments comply with specialist recommendations and existing EA

conditions (DFFE Reference 12/12/20/2289; 12/12/20/2289/AM1; and 12/12/20/2289/AM2).

Advantages associated with the proposed amendments include that the more modern turbine technology allows a reduction in the number of turbines required to meet the additional proposed generation capacity. As confirmed by all specialists, no increase in negative impacts post-mitigation are anticipated due to this turbine specification amendment. As mentioned above, the Avifauna impact of collision risk increased in significance however this is attributed to additional knowledge gained subsequent to the previous EIA, not due to the proposed amendments. The slight increase of the visual impacts of taller turbines is offset due to a significant reduction in the number of turbines from 13 to up to 8 (proposed for up to 7 to be constructed). Given South Africa's need for additional electricity generation and the need to decrease the country's dependency on coal-based power, renewable energy has been identified as a national priority, with wind energy identified as one of the readily available, technically viable and commercially cost-effective sources of renewable energy. Wind energy provides further positive externalities in the form of socio-economic benefits and cheaper tariffs.

The fewer, larger turbines will not result in an increase in collision risk for birds and bats according to the respective specialists. Disadvantages of the development are that there will be negative environmental impacts associated with the project. However, the negative environmental impacts identified and assessed as part of the previous EIA were found to be mitigatable or acceptable, and Environmental Authorisation was granted for the project to proceed. Negative environmental impacts were reassessed within this EA Amendment Report and all impacts were once again found to be mitigatable or acceptable by the specialists. Operational bird and bat monitoring data will be shared by the developer in the hope that this data will contribute to research into mitigation of the impacts of wind farms on birds and bats. The updated bat curtailment plan would also contribute to research into mitigation of the impacts of wind farms on bats. Operational monitoring will need to be carried out based on the latest version of the Best Practice Guidelines available at the time of commencement.

As required in terms of Regulation 32(1)(a)(iii), consideration was given to the requirements for additional measures to ensure the avoidance, management and mitigation of impacts associated with the proposed amendments. Specialist input to assess the impacts of the Banna ba Pifhu Wind Farm and the inclusion of the BESS has concluded that the negative impacts of the development have either been avoided through the iterations of the previous EIA and current EA Amendment application process or are within acceptable limits.

It is the opinion of the EAP that the amendments to the authorised Banna ba Pifhu wind farm **should be approved** as the development will offer a new environmental best-case scenario in terms of turbine specification, the reduction in number of turbines, changes to the site layout, and the inclusion of battery energy storage system. Furthermore, the conclusion of the previous EIA - specifically that there is no fatal flaw preventing the development from proceeding is still valid. With the implementation of all mitigation measures recommended, the Banna ba Pifhu wind farm will be able to use the latest, most efficient turbines to obtain maximum energy yield with least the environmental impacts.