GENESIS ENERTRAG KOUP 1 WIND FARM (PTY) LTD

Proposed Development of the Koup 1 Wind Energy Facility (WEF) and Associated Infrastructure near Beaufort West in the Western Cape Province

Draft Environmental Management Programme (EMPr)

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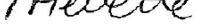
Signature:	
Client:	Genesis Enertrag Koup 1 Wind Farm (Pty) Ltd

Confidentiality Statement

GENESIS ENERTRAG KOUP 1 WIND FARM (PTY) LTD

KOUP 1 WIND ENERGY FACILITY (WEF)

DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPR)

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GENESIS ENERTRAG KOUP 1 WIND FARM (PTY) LTD

KOUP 1 WIND ENERGY FACILITY (WEF)

DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPR)

1. INTRODUCTION

Genesis Enertrag Koup 1 Wind Farm (Pty) Ltd (hereafter referred to as 'Genesis Koup 1 Wind Farm') is proposing to construct the Koup 1 Wind Energy Facility (WEF) and associated grid infrastructure near the town of Beaufort West in the Beaufort West and Prince Albert Local Municipalities, which falls within the Central Karoo District Municipality (***Figure 1***) (**DFFE Reference Number: 14/12/16/3/3/2/2120**). The overall objective of the proposed development is to generate electricity by means of renewable energy technologies capturing wind energy to feed into the national grid. The proposed development will have a maximum total generation capacity of up to 140 megawatt (MW).

SiVEST Environmental Division has subsequently been appointed as the independent Environmental Assessment Practitioner (EAP) to undertake the required Draft Environmental Management Programme (EMPr) (in line with the National Environmental Management Act, 1998 (Act 107 of 1998)) for the proposed construction of the Koup 1 WEF and associated grid infrastructure.

This EMPr provides a set of guidelines for the environmental management of all works executed by the Developer, Engineer, Contractor and Sub-contractor/s to have a minimum impact on the environment in accordance with all relevant legislation, policies and standards. In this context, it should be viewed as a dynamic or "living" document which may require updating or revision during the life-cycle of the development to address new circumstances as the need arises. It is essentially, a written plan of how the environment is to be managed in practical and achievable terms. The EMPr shall be deemed to have contractual standing on the developer and contractors onsite.

The effectiveness of the EMPr is limited by the level of adherence to the conditions set forth in this report by the Developer and the Contractor and Sub-contractors. It is further assumed that compliance with the EMPr will be monitored and audited on a regular basis as set out in the EMPr and contractual clauses.

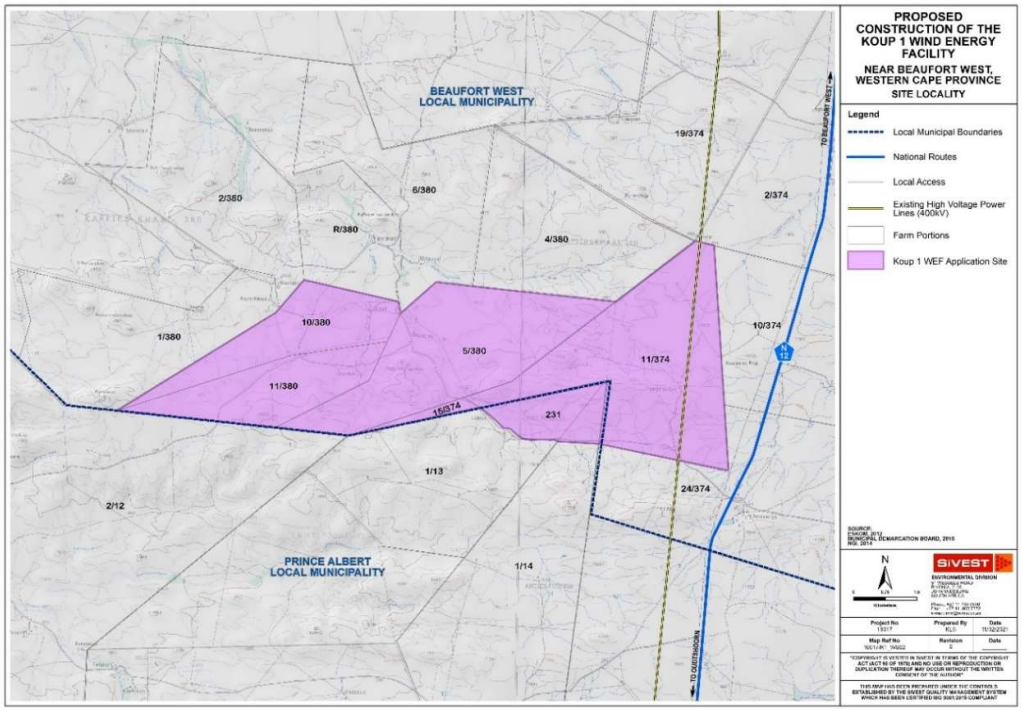


Figure 1: Site Locality

1.1 Content Requirements for an Environmental Management Programme (EMPr)

The content requirements for an EMPr (as provided in Appendix 4 of the EIA Regulations 2014, as amended), as well as details of which section of the report fulfils these requirements, are shown in **Table 1** below.

Table 1: Content requirements for a EMPr

2014 EIA Regulations, as amended.	Requirements for an EMPr	Location in this EMPr
Appendix 4, Section 1. (1)	An EMPr must comply with section 24N of the Act and include -	Refer to relevant reference sections below:
Appendix 4, Section 1 (a)	Details of –	-
	(i) The EAP who prepared the EMPr; and	Section 3.1 Section 3.2
	(ii) The expertise of that EAP to prepare an EMPr, including a curriculum vitae.	Section 3.2
Appendix 1, Section 3 (b)	a detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description;	Section 4.1
Appendix 4, Section 1 (c)	a map at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental	Figure 1 and Figure 5

2014 EIA Regulations, as amended.	Requirements for an EMPr	Location in this EMPr
	sensitivities of the preferred site, indicating any areas that should be avoided, including buffers;	
Appendix 4, Section 1 (d)	a description of the impact management outcomes, including management statements, identifying the impacts and risks that need to be avoided, managed and mitigated as identified through the environmental impact assessment process for all phases of the development including— (i) planning and design; (ii) pre-construction activities; (iii) construction activities; (iv) rehabilitation of the environment after construction and where applicable post closure; and (v) where relevant, operation activities;	Section 9
Appendix 4, Section 3 (f)	a description of proposed impact management actions, identifying the manner in which the impact management outcomes contemplated in paragraph (d) will be achieved, and must, where applicable, include actions to — (i) avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation; (ii) comply with any prescribed environmental management standards or practices; (iii) comply with any applicable provisions of the Act regarding closure, where applicable; and (iv) comply with any provisions of the Act regarding financial provision for rehabilitation, where applicable;	Section 9
Appendix 4, Section 3 (g)	the method of monitoring the implementation of the impact management actions contemplated in paragraph (f);	Section 9
Appendix 4, Section 3 (h)	the frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f);	Section 9
Appendix 4, Section 3 (i)	an indication of the persons who will be responsible for the implementation of the impact management actions;	Section 8 Section 9
Appendix 4, Section 3 (j)	the time periods within which the impact management actions contemplated in paragraph (f) must be implemented;	Section 9
Appendix 4, Section 3 (k)	the mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f);	Section 9
Appendix 4, Section 3 (l)	a program for reporting on compliance, taking into account the requirements as prescribed by the Regulations;	Section 9
Appendix 4, Section 3 (m)	an environmental awareness plan describing the manner in which— (i) the applicant intends to inform his or her employees of any environmental risk which may result from their work; and (ii) risks must be dealt with in order to avoid pollution or the degradation of the environment; and	Section 11
Appendix 4, Section 3 (n)	any specific information that may be required by the competent authority.	Section 7.3 Section 10
Appendix 4 Section 2	Where a government notice gazetted by the Minister provides for a generic EMPr, such generic EMPr as indicated in such notice will apply.	Generic EMPr has been compiled and included.

2. DETAILS OF APPLICANT

2.1 Name and contact details of the Applicant

Name and contact details of Applicant:

Table 2: Name and contact details of the applicant

Business Name of Applicant	Genesis Enertrag Koup 1 Wind Farm (Pty) Ltd
Physical Address	39 De Villiers Road, Kommetjie
Postal Address	PO Box 363, Newlands, Cape Town
Postal Code	7725
Telephone	083 460 3898
Fax	086 689 0583
Email	davin@genesis-eco.com

3. DETAILS AND EXPERTISE OF THE EAP

3.1 Name and contact details of the Environmental Assessment Practitioner (EAP)

The table below provides the name and contact details of the Lead EAP for the project:

Table 3: Name and contact details of the Environmental Consultant who prepared the report

Business Name of EAP	SiVEST SA (PTY) Ltd
Name of Lead EAP	Michelle Guy
Physical Address	4 Pencarrow Crescent, La Lucia Ridge Office Estate
Postal Address	PO Box 1899, Umhlanga Rocks
Postal Code	4320
Telephone	031 581 1500
Fax	031 566 2371
Email	michelleg@sivest.co.za

3.2 Names and expertise of the EAPs

The table below provides the names of the people who prepared this report and their expertise:

Table 4: Names and details of the expertise of the EAP's involved in the preparation of this report

Name of representative of the EAP	Educational Qualifications	Professional Affiliations	Experience (years)
Michelle Nevette *(Cert.Sci.Nat.)*	MEnvMgt. (Environmental Management)	SACNASP Registration No. 120356 EAPASA Registration No. 2019/1560 IAIAsa	19
Michelle Guy *(Pr.Sci.Nat.)*	MSc Environmental Science	SACNASP Registration No. 126338 EAPASA Registration No. 2019/868 IAIAsa	9

Name of representative of the EAP	Educational Qualifications	Professional Affiliations	Experience (years)
Katherine Wiles (*Cert.Sci.Nat*)	BSc (Geography and Environmental Management)	SACNASP Registration No. 300205/15 IAIAsa	11

CV's of SiVEST personnel and EAP declaration are attached in **Annexure A.**

3.3 Names and expertise of the specialists

Specialist studies have been conducted 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 the NEMA when applying for EA, as well as the EIA Regulations, 2014 (as amended). The table below provides the names of the specialists involved in the project:

Table 5: Names of specialists involved in the project

Company	Name of representative of the specialist	Specialist	Educational Qualifications	Experience (years)
SiVEST SA (Pty) Ltd	Kerry Schwartz	Visual Impact Assessment	BA (Geography) GTc GISc 1187	25
SiVEST SA (Pty) Ltd	Merchandt Le Maitre	Transportation Impact Assessment	N Dip: Civil Engineering B Tech: Civil Engineering Pr.Tech.Eng. (Reg. No. 2018300094)	16
PGS Heritage (Pty) Ltd	Wouter Fourie	Heritage Impact Assessment	Professional Archaeologist (ASPA) Accredited Professional Heritage Practitioner with the Association of Professional Heritage Practitioners (APHP)	22
	John Almond	Palaeontological Impact Assessment	PhD (Palaeontology) Palaeontological Society of South Africa, Associated of Professional Heritage (W Cape)	40
	Nikki Mann	Archaeological Assessment	Msc Archaeology Professional Archaeologist with the Associated of Southern African Professional Archaeologists (ASAPA)	7
	Emmylou Bailey	Cultural Landscape Assessment	MA Archaeology and Heritage Management APHP, ASAPA	15

Company	Name of representative of the specialist	Specialist	Educational Qualifications	Experience (years)
JG Afrika (Pty) Ltd	Khuthadzo Bulala	Desktop Geotechnical Assessment	BSc (Hons) (Geology)	5
Johann Lanz Consulting	Johann Lanz	Agriculture and Soils Impact Assessment (desktop)	M.Sc. (Environmental Geochemistry)	24
Enviro Acoustic Research	Morné de Jager	Noise Impact Assessment	B. Ing (Chemical) SAAI, ASA	14
Dr. Neville Bews & Associates	Dr Neville Bews	Social Impact Assessment (desktop)	D Litt et Phil	20
EnviroSci (Pty) Ltd	Dr Brian Colloty	Surface Water Impact Assessment	Ph D (Botany – Estuaries & Mangroves) Pr. Sci. Nat. 400268/07	25
3Foxes Biodiversity Solutions	Simon Todd	Biodiversity Impact Assessment	MSc (Conservation Biology) Pr.Sci.Nat 400425/11	20
Chris Van Rooyen Consulting	Chris van Rooyen	Avifaunal Impact Assessment	BA LLB	22
	Albert Froneman	Avifaunal Impact Assessment	MSc (Conservation)	22
Stephanie Dippenaar Consulting	Stephanie Dippenaar	Bat Impact Assessment	MEM (Masters in Environmental Management)	22

4. ACTIVITY INFORMATION

4.1 Project Description

The proposed Koup 1 WEF will comprise up to twenty-eight (28) wind turbines with a maximum total energy generation capacity of approximately 140MW. The electricity generated by the proposed WEF development will be fed into the national grid via a 132kV overhead power line. The 132kV overhead power line will however require a separate EA and is subject to a separate BA process, which is currently being undertaken in parallel to the EIA process. In summary, the proposed Koup 1 WEF will include the following components:

- Up to 28 wind turbines, each between 5.6MW and 6.6MW, with a maximum export capacity of approximately 140MW. This will be subject to allowable limits in terms of the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP). The final number of turbines and layout of the WEF will, however, be dependent on the outcome of the Specialist Studies conducted during the EIA process;
- Each wind turbine will have a hub height and rotor diameter of up to approximately 200m;
- Permanent compacted hard standing areas / platforms (also known as crane pads) of approximately 90m x 50m (total footprint of approx. 4 500m2) per turbine during construction and for on-going maintenance purposes for the lifetime of the proposed development;
- Each wind turbine will consist of a foundation of up to approximately 15m x 15m in diameter. In addition, the foundations will be up to approximately 3m in depth;
- Electrical transformers adjacent to each wind turbine (typical footprint of up to approximately 2m x 2m) to step up the voltage to 33kV;
- One (1) new 33/132kV on-site substation and/or combined collector substation, occupying an area of approximately 1.5 ha.
- The wind turbines will be connected to the proposed substation via medium voltage (33kV) cables. Cables will be buried along access roads wherever technically feasible.
- A Battery Energy Storage System (BESS) will be located next to the onsite 33/132kV substation. Up to 40MW of batteries using solid state / liquid flow batteries with hazardous material of more than 80m3 will be used, but most likely will comprise an array of containers, outdoor cabinets and/or storage tanks;
- Internal roads with a width of between 8m and 10m will provide access to each wind turbine. Existing site roads will be used wherever possible, although new site roads will be constructed where necessary. Turns will have a radius of up to 50m for abnormal loads (especially turbine blades) to access the various wind turbine positions. It should be noted that the proposed application site will be accessed via an existing gravel road from the N12 National Route;
- One (1) construction laydown / staging area of up to approximately 2.25ha. It should be noted that no construction camps will be required in order to house workers overnight as all workers will be accommodated in the nearby town;
- One (1) permanent Operation and Maintenance (O&M) building, including an on-site spares storage building, a workshop and an operations building to be located on the site identified for the construction laydown area.
- A wind measuring lattice (approximately 120m in height) mast has already been strategically placed within the wind farm application site in order to collect data on wind conditions;
- No new fencing is envisaged at this stage. Current fencing is standard farm fence approximately 1-1.5m in height. Fencing might be upgraded (if required) to be up to approximately 2m in height; and

- Water will either be sourced from existing boreholes located within the application site or will be trucked in, should the boreholes located within the application site be limited.

The Proposed Layout is reflected below in **Figure 2**.

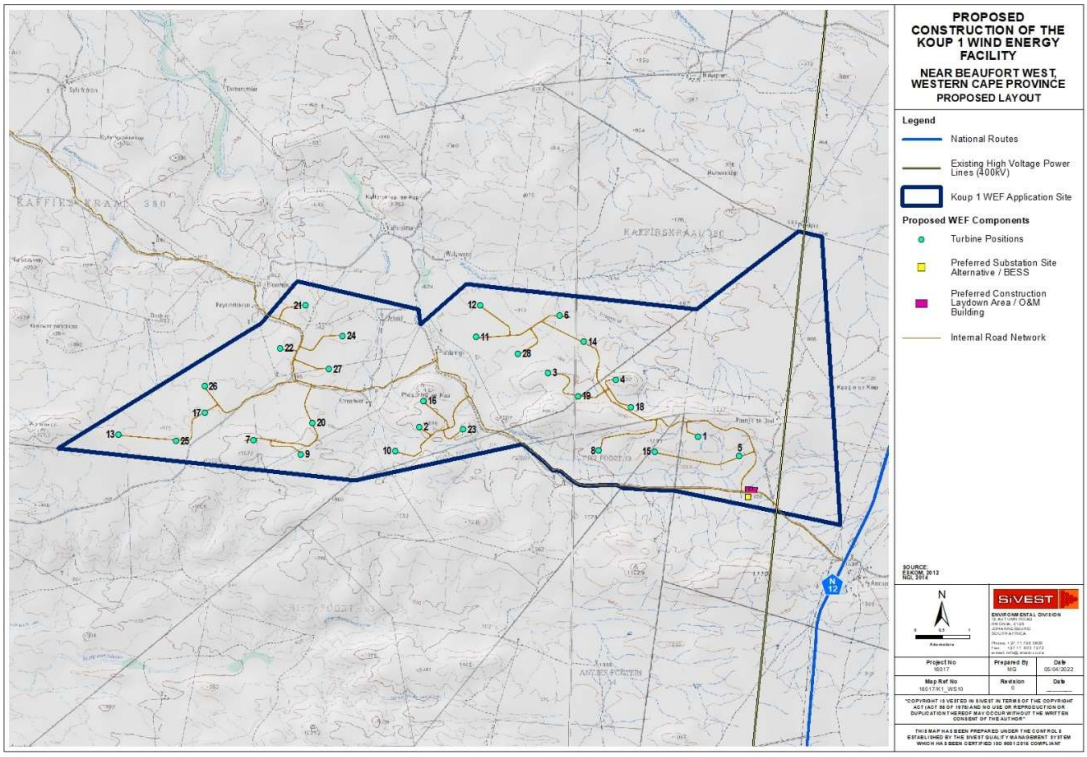
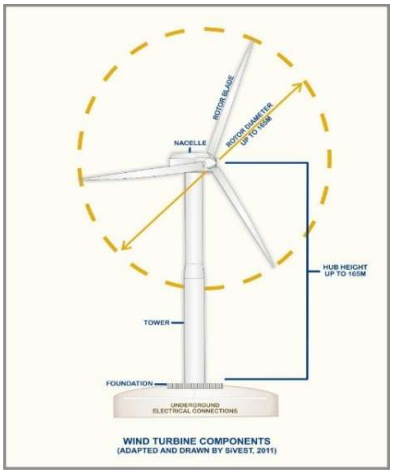


Figure 2: Preliminary layout showing proposed location of wind turbines



The wind turbines and all other project infrastructure will be placed strategically within the development area based on environmental constraints. The exact location of the turbines and associated infrastructure will be determined during the final design stages of the WEF design process.

Please refer to Error! Reference source not found. below for the typical components of a wind turbine.

A summary of the project technical details is provided in **Table 6** below.

Figure 3: Typical components of a Wind Turbine

Table 6: Technical Detail Summary

Component	Description / Dimensions
Location of site (centre point)	32°51'41.01"S 22°27'24.65"E
Application site area	4279,398492 ha
Turbine development area	Hard standing Area = 60m*30m*28 turbines = 5.4 Ha
SG codes	C06100000000023100000 C00900000000037400011 C00900000000037400015 C00900000000038000005 C00900000000038000010 C00900000000038000011
Export capacity	Up to 140MW
Proposed technology	Wind turbines and associated infrastructure
Hub height from ground	Up to 200m
Rotor diameter	Up to 200m
Substation and O&M building area	Approximately 2.25 hectare (ha)
Construction laydown area	Approximately 22 500m²
Permanent laydown area	To be determined based on final layout
Hard stand areas	Approximately 4 500m^2
Battery Energy Storage System (BESS)	A Battery Energy Storage System (BESS) will be located next to the onsite 33/132kV substation. Up to 40MW of batteries using solid state / liquid flow batteries with hazardous material of more than 80m^3 will be used, but most likely will comprise an array of containers, outdoor cabinets and/or storage tanks.
Width of internal access roads	Between approximately 8m and 10m
Length of internal access roads	To be determined based on final layout
Site Access	Access to the Koup 1 WEF site will be from the existing access, located ±1 430m west from the surfaced N12 National Road (Road No: TR03305) and falls under the jurisdiction of the Western Cape Provincial Administration. The existing access is located at Km 51.80 and provides access to the farms situated on both east and west of the N12 Freeway. The access to this development is towards the west from the N12 Freeway and traverses over the Remainder of Portion 4 of the farm 374 as a gravel access road up to the existing farm access.
Proximity to grid connection	Approximately 1km from application site
Height of fencing	Approximately 1m – 1.5m high
Type of fencing	Galvanized steel

4.2 NEMA Listed Activities

The amended EIA Regulations promulgated under Section 24(5) of the National Environmental Management Act, Act 107 of 1998 and published in Government Notice No. R. 326 list activities which may not commence without environmental authorization from the Competent Authority. The proposed activity is identified in terms of Government Notice No. R. 327, 325 and 324 for activities which must follow a full Environmental Impact Assessment Process. The project will trigger the following listed activities:

Table 7: Listed activities in terms of NEMA: EIA Regulations 2014 (as amended in 2017), applicable to the proposed project

Activity No(s):	Relevant activities as set out in Listing Notices 1, 2 and 3 of the EIA Regulations, 2014 as amended	Describe the portion of the proposed project to which the applicable listed activity relates.
Relevant Basic Assessment Activities as set out in Listing Notice 1		
11 (i)	**GN R. 327 (as amended) Item 11:** The development 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 kilovolts.	One (1) new on-site substation and/or collector substation will be constructed within the proposed application site as part of the proposed development. The proposed substation will be located outside urban areas and will have a capacity of 33/132kV (33kV yard subject to this EIA / application). In addition, the substation will occupy a footprint of up to approximately 1.5 hectares (ha). The proposed development will also involve the construction of medium voltage (i.e. 33kV) cables which will connect the wind turbines to the proposed substation. These cables will be located outside an urban area and will be buried along access roads, wherever technically feasible. The proposed substation will be a shared substation which will consist of a 33kV voltage yard which will be owned and operated by the Applicant as well as a 132kV yard which will be owned and operated by Eskom. The substation will therefore be included in the WEF EIA (this application) and in the associated grid connection infrastructure BA (part of separate application) to allow for handover of the 132kV yard to Eskom. The substation will be constructed by the Applicant, however, ownership of the 132kV yard portion will be ceded to Eskom after construction.
12 (ii) (a) (c)	**GN R. 327 (as amended) Item 12:** The development of:	The proposed development will entail the construction of a WEF and associated infrastructure (including an

Activity No(s):	Relevant activities as set out in Listing Notices 1, 2 and 3 of the EIA Regulations, 2014 as amended	Describe the portion of the proposed project to which the applicable listed activity relates.
	ii) infrastructure or structures with a physical footprint of 100 square metres or more; where such development occurs- (a) within a watercourse; (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse.	on-site substation and BESS) within the proposed application site which will have a physical footprint of approximately 100m^2 or more and will occur within some of the surface water features / watercourses identified within the application site or within 32m of some of the surface water features / watercourses identified within the application site. The infrastructure associated with the proposed development will avoid the surface water features / watercourses identified within the application site where possible, although some structures (such as internal site roads) will occur within some of the surface water features / watercourses identified within the application site and/or within 32m of some of the surface water features / watercourses identified within the application site.
14	**GN R. 327 (as amended) Item 14:** The development and related operation of facilities or infrastructure, for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80m^3 or more but not exceeding 500m^3.	The proposed development will include the construction of an on-site Battery Energy Storage System (BESS). Up to 40MW of batteries using solid state / liquid flow batteries with hazardous material of more than 80m^3 will be used during the development phase and will most likely comprise an array of containers, outdoor cabinets and/or storage tanks. The preferred technology is Lithium Ion. It should be noted that no stand-alone facilities for the storage of dangerous goods external to the BESS will be constructed as part of the proposed development.
19	**GN R. 327 (as amended) Item 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 proposed development involves the construction of a WEF as well as other associated infrastructure (including an on-site substation and BESS) within the proposed application site. The Surface Water Impact Assessment revealed that there are surface water features / watercourses located within the application site. As such, the proposed development will involve the infilling or depositing of any material of more than

Activity No(s):	Relevant activities as set out in Listing Notices 1, 2 and 3 of the EIA Regulations, 2014 as amended	Describe the portion of the proposed project to which the applicable listed activity relates.
		$10m^3$ into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than $10m^3$ from some of the identified surface water features / watercourses. Although the layout of the proposed development has been designed to avoid the identified surface water features / watercourses as far as possible, some of the internal site roads to be constructed (as required) will need to traverse some of the identified surface water features / watercourses. In addition, during construction of these roads (as required), soil will need to be removed from some of the identified surface water features / watercourses.
24 (ii)	**GN R. 327 (as amended) Item 24:** The development of a road - ii) with a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 metres.	Internal roads are required within the application site in order to provide access to each wind turbine, the on-site and/or collector substation and the BESS, as well as to facilitate access throughout the WEF. Existing site roads will be used wherever possible, although new site roads will be constructed where necessary. In addition, turns will have a radius of up to approximately 50m for abnormal loads (especially turbine blades) to access the various wind turbine positions. As such, the proposed development will involve the construction of new internal roads within the application site, as required. It is proposed that these new internal access roads will be between approximately 8m and 10m wide.
28 (ii)	**GN R. 327 (as amended) Item 28:** 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**;**	The proposed development site is currently zoned for agricultural land use, however, the property is no longer actively used for agricultural activities. The proposed development will result in special zoning being required, as an area greater than 1ha will be transformed into industrial / commercial use.
31 (i)	**GN R. 327 (as amended) Item 31**: The decommissioning of existing facilities, structures or infrastructure for -	Should the proposed development's Power Purchase Agreement (PPA) not be renewed after 20 years (anticipated operational lifespan of proposed

Activity No(s):	Relevant activities as set out in Listing Notices 1, 2 and 3 of the EIA Regulations, 2014 as amended	Describe the portion of the proposed project to which the applicable listed activity relates.
	(i) any development and related operation activity or activities listed in this Notice, Listing Notice 2 of 2014 or Listing Notice 3 of 2014;	development), the proposed development would need to be decommissioned. This would include the decommissioning of the entire WEF, including the medium voltage lines connecting the wind turbines to the on-site substation.
48 (i) (a) (c)	**GN R. 327 (as amended) Item 48:** The expansion of- (i) infrastructure or structures where the physical footprint is expanded by 100 square metres or more; where such expansion occurs— (a) within a watercourse; or (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse;	Internal roads are required within the application site in order to provide access to each wind turbine, the on-site and/or collector substation and the BESS, as well as to facilitate access throughout the WEF. Existing site roads will be used wherever possible, and will be upgraded and expanded where necessary. The Surface Water Impact Assessment revealed that there are surface water features / watercourses located within the application site. Although the layout of the proposed development has been designed to avoid the surface water features / watercourses identified within the application site as far as possible, some of the internal roads to be upgraded and expanded will need to traverse some of the surface water features / watercourses identified within the application site and construction will occur within some of the surface water features / watercourses identified within the application site and/or be within 32m of some of the surface water features / watercourses identified within the application site. As such, the proposed development will entail the expansion (upgrading) of roads and other infrastructure by 100m^2 or more within some of the surface water features / watercourses identified within the application site or within 32m from the edge of a surface water features / watercourses identified within the application site.
56 (ii)	**GN R. 327 Item 56**: The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre -	Internal roads are required within the application site in order to provide access to each wind turbine, the on-site and/or collector substation and the BESS, as well as to facilitate access

Activity No(s):	Relevant activities as set out in Listing Notices 1, 2 and 3 of the EIA Regulations, 2014 as amended	Describe the portion of the proposed project to which the applicable listed activity relates.
	(ii) where no reserve exists, where the existing road is wider than 8 metres –	throughout the WEF. Existing site roads will be used wherever possible, although new site roads will be constructed where necessary. It is proposed that these new internal access roads will be between approximately 8m and 10m wide. The existing internal roads will thus need to be upgraded by widening them more than 6m, or by lengthening them by more than 1km.
Relevant Scoping and EIA Activities as set out in Listing Notice 2 of the EIA Regulations, 2014 as amended		
1	**GN R. 325 (as amended) Item 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,	The proposed development will entail the development of a WEF, on-site substation and BESS with a maximum generation capacity of up to 140MW. In addition, the proposed development will be located outside an urban area.
15	**GN R. 325 (as amended) Item 15**: The clearance of an area of 20 hectares or more of indigenous vegetation.	The proposed WEF development will involve the clearance of more than 20ha of indigenous vegetation. Clearance will also be required for the proposed on-site substation, BESS, internal roads and other associated infrastructure. A Terrestrial Ecology Impact Assessment has been undertaken to assess the impacts of the proposed development on indigenous vegetation.
Relevant Basic Assessment Activities as set out in Listing Notice 3 of the EIA Regulations, 2014 as amended		
4 i. (ii) (aa)	**GN R. 324 (as amended) Item 4:** The development of a road wider than 4 metres with a reserve less than 13,5 metres. **i. Western Cape** ii. Areas outside urban areas; (aa) Areas containing indigenous vegetation;	Internal roads are required within the application site in order to provide access to each wind turbine, the on-site and/or collector substation and the BESS, as well as to facilitate access throughout the WEF. Existing site roads will be used wherever possible, although new site roads will be constructed where necessary. It is proposed that these new internal access roads will be between approximately 8m and 10m wide. In addition, turns will have a radius of up to approximately 50m for abnormal loads (especially turbine blades) to access the various wind turbine positions. The above-mentioned internal roads (existing and new roads to be constructed, where required) within the application site will occur within the

Activity No(s):	Relevant activities as set out in Listing Notices 1, 2 and 3 of the EIA Regulations, 2014 as amended	Describe the portion of the proposed project to which the applicable listed activity relates.
		Western Cape Province, outside urban areas. In addition, the proposed development site contains indigenous vegetation.
12	**GN R. 985 (as amended) Item 12:** 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. **i. Western Cape** ii. Within critical biodiversity areas identified in bioregional plans;	The proposed WEF development will involve the clearance of more than 300 square metres or more of indigenous vegetation. Clearance will also be required for the proposed on-site substation, BESS, internal roads and other associated infrastructure.
14	**GN R. 324 (as amended) Item 14: 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; (b) in front of a development setback; or (c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse; excluding the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour. **i. Western Cape** i. Outside urban areas: (ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;	The proposed energy facility will entail the development of roads and other infrastructure with a physical footprint of 10m2 or more within a watercourse or within 32m from the edge of a watercourse. Although the layout of the proposed development will be designed to avoid the identified surface water features as far as possible, some of the internal and access roads, will likely need to traverse the identified surface water features.
18 i. ii. (aa)	**GN R. 324 (as amended) Item 18:** The widening of a road by more than 4 meters, or the lengthening of a road by more than 1 kilometer- **i. Western Cape** ii. All areas outside urban areas: (aa) Areas containing indigenous vegetation	Internal roads are required within the application site in order to provide access to each wind turbine, the on-site and/or collector substation and the BESS, as well as to facilitate access throughout the WEF. Existing site roads will be used wherever possible, although new site roads will be constructed where necessary. It is proposed that these new internal access roads will be between approximately 8m and 10m wide.

Activity No(s):	Relevant activities as set out in Listing Notices 1, 2 and 3 of the EIA Regulations, 2014 as amended	Describe the portion of the proposed project to which the applicable listed activity relates.
		Existing internal roads will thus need to be upgraded as part of the proposed development (where required). Internal roads will be widened by more than 4m or lengthened by more than 1km. These roads located within the application site will occur within the Western Cape Province, outside urban areas. In addition, the proposed development site contains indigenous vegetation.
23	GN R. 324 (as amended) Item 23: The expansion of— (ii) infrastructure or structures where the physical footprint is expanded by 10 square metres or more; where such expansion occurs— (a) within a watercourse; (b) in front of a development setback adopted in the prescribed manner; or (c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse; excluding the expansion of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour. i. Western Cape i. Outside urban areas: (ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;	The proposed development will entail the development and expansion of roads and other infrastructure by 10m^2 or more within a watercourse or within 32m from the edge of a watercourse. Although the layout of the proposed development will be designed to avoid the identified surface water features as far as possible, some of the existing internal and access roads may likely need to traverse some of the identified surface water features. The proposed development occurs within CBAs, and is located outside an urban area. An ecological impact assessment was undertaken to assesses the impacts of the proposed development on CBAs. In addition, a surface water impact assessment was undertaken to assesses the impacts of the proposed development on the identified surface water features.

5. LOCATION OF THE ACTIVITY

5.1 Regional Locality

The proposed development is located approximately 55 km south of the town of Beaufort West, within the Beaufort West and Prince Albert Local Municipalities, in the Central Karoo District Municipality of the Western Cape Province (**Figure 4**).

A 132kV overhead power line is proposed to connect the Koup 1 WEF on-site switching substation / collector to the national grid either by way of an off-site collector substation, or via a direct tie-in to existing 400kV transmission lines that traverse the Koup 1 WEF project site.

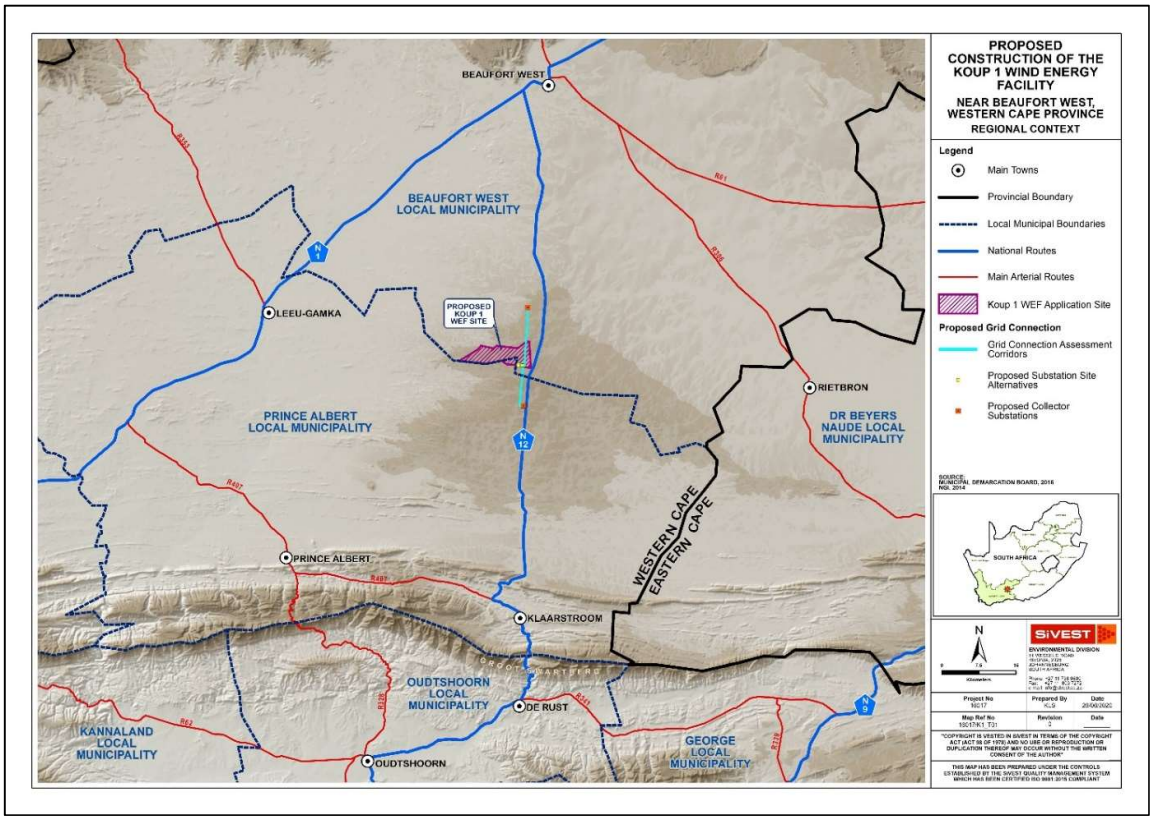


Figure 4: Regional Locality Map

5.2 Study Area Description

The study area is classified as “Bare / Barren Land”, interspersed with patches of low shrubland. While some of these bare / barren areas are representative of transformation due to human activity, in most cases these patches of land are merely undisturbed areas with very sparse vegetation cover. Small tracts of grassland and forested land occur along drainage lines throughout the study area.

Agricultural activity in the area is restricted by the arid nature of the local climate and areas of cultivation are largely confined to relatively limited areas distributed along drainage lines. As such, the natural vegetation has been retained across much of the study area. Livestock (mostly sheep) and game

farming is the dominant activity although the climatic and soil conditions have resulted in low densities of livestock and relatively large farm properties across the area. Thus the area has a very low density of rural settlement, with relatively few isolated farmsteads in evidence. Built form in much of the study area is limited to isolated farmsteads, including farm worker's dwellings and ancillary farm buildings, gravel access roads, telephone lines, fences and windmills.

The study area is characterized by a hot semi-arid climate with a "BSk" classification according to the Köppen-Geiger climate classification. Beaufort West receives a relatively low mean annual precipitation of 392 mm. The average lowest rainfall is received in June (15 mm) and the highest in March (57 mm), which is a seasonal variation of 42 mm. The maximum midday temperatures for Beaufort West ranges from 31.7°C in January to 18°C in July. The minimum temperatures for Beaufort West ranges from 16.6°C in February to 4.4°C in July. The average temperatures vary during the year by 12.9°C.

The site proposed for the Koup 1 WEF development is located in an area largely characterised by flat to gently undulating plains interspersed with low ridges and dry river courses. Areas of greater relief are largely concentrated to the south east of the study area. The site falls within the Gamka Karoo vegetation type and consists of open gravel plains and low hills dissected by numerous drainage lines. Vegetation cover is generally very low and dominated by low shrubs and scattered low trees.

In terms of fauna, the diversity of mammals, reptiles and amphibians is considered relatively low, even by Karoo standards. Although the site falls within the broad distribution of the Riverine Rabbit, the drainage lines of the site do not have extensive floodplains with dense riparian vegetation that represent the typical habitat of this species in the area. The Koup 1 site is therefore considered unsuitable for this species and the development is considered highly unlikely to have any impact on the Riverine Rabbit.

Based on the above, the specialist assessments conducted their assessment to address the potential impacts relating to the proposed development in order to ascertain the level of each identified impact, as well as mitigation measures which may be required. The results of the specialist assessments have indicated that all alternatives (including the preferred alternative) contain no fatal flaws that should prevent the proposed project from proceeding provided certain sensitive areas are avoided and where they can't be avoided that required mitigations are adopted. Specialist assessments have therefore informed the overall sensitivity of the site and the proposed layout has been superimposed with the resulting specialist sensitivities as depicted in **Figure 5** below. A summary of the specialist findings and recommendations is included in **Annexure H.**

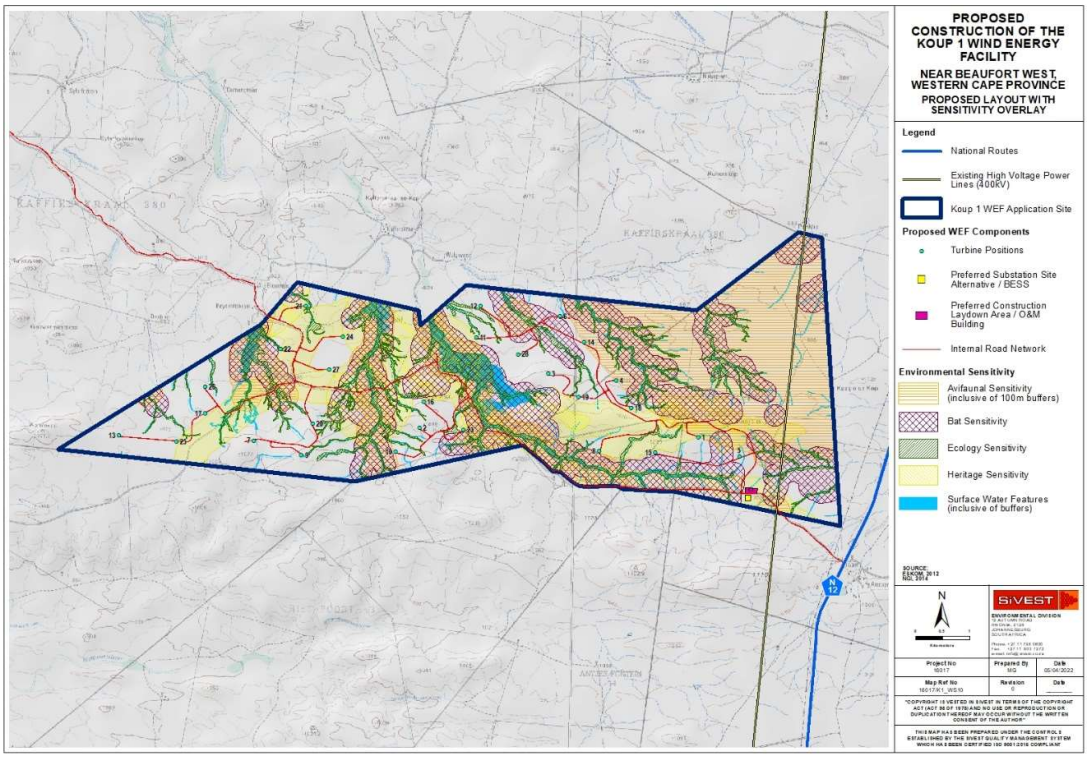


Figure 5: Proposed Layout with Sensitivity Overlay

5.3 Summary of affected properties (including SG codes and Farm Names)

Table 8: Summary of affected properties (including SG Codes and Farm Names)

SG CODE	DESCRIPTION
C06100000000023100000	FARM RIET POORT NO 231
C09000000000037400011	PORTION 11 OF THE FARM BRITS EIGENDOM NO 374
C09000000000037400015	PORTION 15 OF THE FARM BRITS EIGENDOM NO 374
C09000000000038000005	PORTION 5 OF THE FARM KAATJIES KRAAL NO 380
C09000000000038000010	PORTION 10 OF THE FARM KAATJIES KRAAL NO 380
C09000000000038000011	PORTION 11 OF THE FARM KAATJIES KRAAL NO 380

5.4 Coordinates of the site

The centre point coordinates for the sites are as follows:

- Latitude: 32°51'41.01"S
- Longitude: 22°27'24.65"E

All bend points have been included below:

Table 9: Coordinates at corner points

KOUP 1 WEF: APPLICATION SITE

COORDINATES AT CORNER POINTS (DD MM SS.sss)

POINT	SOUTH	EAST
1	S32° 50' 36.020"	E22° 26' 37.756"
2	S32° 50' 51.961"	E22° 28' 4.418"
3	S32° 51' 0.932"	E22° 28' 6.002"
4	S32° 50' 36.319"	E22° 28' 38.215"
5	S32° 50' 49.589"	E22° 31' 22.688"
6	S32° 50' 1.777"	E22° 32' 34.613"
7	S32° 50' 5.053"	E22° 32' 51.295"
8	S32° 52' 58.325"	E22° 33' 7.497"
9	S32° 52' 39.135"	E22° 31' 9.123"
10	S32° 52' 37.782"	E22° 30' 31.526"
11	S32° 52' 36.445"	E22° 30' 27.738"
12	S32° 52' 36.917"	E22° 30' 6.930"
13	S32° 52' 36.054"	E22° 30' 0.458"
14	S32° 52' 28.521"	E22° 29' 47.703"
15	S32° 52' 27.937"	E22° 29' 41.656"
16	S32° 52' 12.336"	E22° 29' 19.904"
17	S32° 52' 35.465"	E22° 27' 20.433"
18	S32° 52' 18.646"	E22° 23' 48.772"
19	S32° 51' 1.495"	E22° 26' 12.579"

6. ENVIRONMENTAL MANAGEMENT PROGRAMME

6.1 Introduction

The Environmental Management Programme (EMPr) has been prepared in order to comply with the requirements as stipulated in the National Environmental Management Act (No. 107 of 1998).

This EMPr includes:

- Details and expertise of the EAP who prepared the EMPr including curriculum vitae;
- Project Description;
- Facility Illustration Plans;
- Mitigation measures as contained in the Impact Assessment Report;
- Recommendations and conclusions emanating from the specialist studies;
- Impact Management Objectives and Actions; and
- A copy of the EA (if granted).

6.2 Aim and Objectives of the EMPr

The aim of the EMPr is to:

- Identify those construction activities identified for the proposed development that may have a negative impact on the environment;
- Outline the mitigation measures that will need to be taken and the steps necessary for their implementation;
- Describe the reporting system to be undertaken during construction.

The objectives of the EMP are to:

- Identify a range of mitigation measures which could reduce and mitigate the potential adverse impacts to minimal or insignificant levels.
- Provide a pro-active, feasible and practical working tool to enable the measurement and monitoring of environmental performance on site.
- Provide management structures that address the comments raised by I&APs pertaining to the development.
- Ensure that the environmental specifications are identified, effective and contractually binding so as to enable compliance on site.

6.3 Layout of the EMPr

The EMPr identifies the four phases of development as:

- Preconstruction Planning Phase Activities (Section 9.1)
- Construction Phase Activities (Section 9.2)
- Operation Phase Activities (Section 9.3)
- Decommissioning Phase Activities (Section 9.4)

The generic and specific provisions are included together under each phase for each environmental consideration. The generic provisions are the general environmental issues, procedures and controls that can be applied to the project and site as a whole. The specific provisions are those environmental issues, procedures and controls that are relevant to a particular section of the site. It should be understood that the EMP is considered an evolving document and may be amended at any time by the relevant authorities (DFFE, DWS etc.).

7. LEGAL AND OTHER REQURIEMENTS

7.1 Compliance with Applicable Laws

The supreme law of the land is "The Constitution of the Republic of South Africa", which states: "*Every person shall have the right to an environment which is not detrimental to his or her health or wellbeing*". Laws applicable to the protection of the environment in terms of Environmental Management (and relating to construction activities) include but are not restricted to:

- Animals Protection Act, Act No. 71 of 1962
- Astronomy Geographic Advantage (Act No. 21 of 2007)
- Civil Aviation Act (Act No.13 of 2009)
- Conservation of Agricultural Resources Act, Act No. 43 of 1983
- Development Facilitation Act No. 67 of 1995
- Environment Conservation Act, Act No. 73 of 1989
- Environmental Planning Act, Act No. 88 of 1967
- Hazardous Substances Act, Act No. 15 of 1973
- Land Survey Act, Act No. 9 of 1921
- Minerals Act, Act No. 50 of 1991
- National Environmental Management: Air Quality Act, Act No. 39 of 2004);
- National Environmental Management: Biodiversity Act, Act No. 10 of 2004, as amended)
- National Environmental Management Act, Act No.107 of 1998
- NEMA EIA Regulations, 2014 (as amended)
- National Environmental Management: Protected Areas Act (NEM: PAA) (Act No. 57 of 2003, as amended)
- National Environmental Management: Waste Act, Act No. 59 of 2008
- National Forests Act (NFA) (Act No. 84 of 1998)
- The National Heritage Resources Act, Act No. 25 of 1999
- National Water Act, Act No. 36 of 1998
- National Road Traffic (Act No. 93 of 1996, as amended)
- Occupational Health and Safety Act, Act No. 85 of 1993
- Provincial and Local Government Ordinances and Bylaws
- Soil Conservation Act, Act No. 76 of 1969
- Subdivision of Agricultural Land (Act No. 70 of 1970, as amended)
- Water Services Act, Act No. 108 of 1997

Several regulations will be applicable to the construction phase of the project. These guidelines are mentioned in the EMPr tables. The EMPr forms part of the Contract Documentation and is thus is a legally binding document.

7.2 Compliance with the Environmental Management Programme

A copy of the EMPr must be kept on site during the construction period at all times. The EMPr will be made binding on all contractors operating on the site and will be included within the Contractual Clauses. Non-compliance with, or any deviation from, the conditions set out in this document constitutes a failure in compliance with the Environmental Authorisation (EA) issued by DFFE.

It should be noted that in terms of Section 28 of the National Environmental Management Act (NEMA) Act No. 107 of 1998, those responsible for Environmental Damage must pay the repair costs both to the environment and human health and the preventative measures to reduce or prevent further pollution and/or environmental damage. (The polluter pays principle).

In terms of the EA, non-compliance of the EA may result in invalidation of the EA, criminal prosecution or other actions provided for in the NEMA (as amended) and associated regulations. Any non-compliance must result in an immediate stop to works being issued. The contractor and developer will be held liable for any damage and consequent rehabilitation to environmentally sensitive areas outside the site boundary. In the event of any dispute concerning the significance of a particular impact, the opinion of DFFE in respect of its significance will prevail.

National government, provincial government, local authorities or committees appointed in terms of the conditions of the EA or any other public authority shall not be held responsible for any damages or losses suffered by the authorisation holder or successor in title in any instance where construction or operation subsequent to construction is temporarily or permanently stopped for reasons of non-compliance by the authorisation holder with the conditions of authorisation as set out in this document or any subsequent document emanating from these conditions of authorisation.

7.3 Specific Conditions Pertaining to Authorisations

Should the Department of Forestry, Fisheries and the Environment (DFFE) issue an Environmental Authorisation (EA), this EMPr will be updated to include any additional pre-construction, construction, operation and decommissioning conditions stipulated in the EA not already included below.

A water use license will be applied for and may become applicable to the proposed project at a later stage.

Specific conditions pertaining to regulatory processes, or Licensee / Holder of the Authorisation requirements, have not been included within the EMPr and will only be included on finalization of the EMPr (pending decision). These conditions are to be undertaken by the Licensee / Holder of the Authorisation prior to the commencement of construction.

8. PROJECT RESPONSIBILITIES

8.1 Responsible Parties and associated roles

As described above, **Table 10** below provides a summary of the responsible parties and the auditing process to be carried out.

Table 10: Responsible Parties and Auditing Process

TITLE	PARTY	ROLE DURING CONSTRUCTION	ROLE DURING OPERATION
Project Developer (Proponent)	Genesis Enertrag Koup 1 Wind Farm (Pty) Ltd	Assume ultimate responsibility	Assume ultimate responsibility
Project Manager	To be appointed by proponent	Project management	N/A
Contractor's Project Manager	Balance of Plant Contractor	Construction management	N/A
Main Contractor/s	There will be multiple contracts placed for the construction phase. These will cover civil earthworks and concrete, structural mechanical and electrical / instrumentation. There could also be the construction camp management contract. These may be managed by the Contractor's Project Manager (or other).	Main Contractor will undertake day to day construction activities covering aspects such as civil earthworks and concrete, structural mechanical and electrical / instrumentation.	N/A
Environmental Officer	To be appointed by Main Contractors	Day to day environmental responsibility, point of contact for ECO	N/A
Environmental Control Officer	To be appointed by Project developer	Monthly audits	Annual audits
Competent Authority	National Department of Forestry, Fisheries and the Environment (DFFE)	Conduct site visits when necessary.	Conduct site visits when necessary

The above may be updated based on the outcome of the Environmental process should additional responsibilities be identified.

9. IMPACT MANAGEMENT ACTIONS AND OUTCOMES

9.1 Pre-construction Phase

9.1.1 Site preparation

This section deals with the issues relative to site preparation during the pre-construction phase.

Table 11: Site preparation

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Specialist Investigations	1. An avifaunal walk-through must be undertaken by the avifaunal specialist prior to the construction commencing, to confirm the location and status of all priority species nests within the area of influence of the wind farm. 2. Preconstruction biodiversity walk-through of the facility to micro-site roads and turbines. 3. A preconstruction micro-survey for access roads, substations, laydown areas and gridlines should be completed with CLA specialist to ensure appropriate buffers are maintained during operational activities. 4. Turbine layouts must adhere to the sensitivity areas and buffers, and the layout should be approved by a bat specialist upon finalisation of turbine specifications. 5. A pre-construction walkthrough with an aquatic specialist is recommended and they can assist with the development of the stormwater management plan and Aquatic Rehabilitation and Monitoring plan, coupled to micro-siting of the final layout. 6. Pre-construction walk down must be undertaken by the flora specialist in order to locate species of conservation concern that can be translocated as well as comply with the local permit conditions.	Holder of the EA/ Relevant specialists	As per specialist requirements.	Ensure the EMPr is adhered to.	Pre-construction

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	7. A walk down of the final approved layout by the Heritage specialist will be required before construction commences. 8. Any heritage features of significance identified during this walk down will require formal mitigation or where possible a slight change in design could accommodate such resources. 9. A pre-construction palaeontological heritage walkdown of the final WEF and grid connection layout by a suitably qualified palaeontologist is recommended here. The recommended palaeontological walkdown should involve the recording and judicious collection of valuable fossil material as well as relevant geological data (e.g. on stratigraphic context, preservation style / taphonomy) within or close to (within ~10 m) the project footprint. This mitigation phase is essential because all fossil heritage resources in the RSA are protected by law and it is illegal to disturb, damage or destroy fossils here without a permit from the relevant provincial heritage resources agency (South African Heritage Resources Act, Act No. 25 of 1999). The palaeontological heritage mitigation report would then make recommendations for further studies and mitigation (if any are necessary) during the construction phase of the renewable energy project. Since mitigation through recording and collection is almost invariably feasible, late-stage modifications to the final WEF / grid infrastructure layout (e.g. micro-siting changes to access roads, turbine or pylon locations) are not anticipated here. The palaeontologist responsible for the mitigation work will be required to submit a Work Plan for approval by Heritage Western Cape (HWC) and a Mitigation Report must be submitted to HWC for consideration. All fieldwork and				

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	reporting should meet the standards of international best practice as well as those developed for PIA reports by SAHRA (2013) and Heritage Western Cape (2021). Fossil material collected must be safeguarded and curated within an approved palaeontological repository (e.g. museum or university collection) with full collection data.				
Appointment of ECO	10. Appoint an Environmental Control Officer. 11. The Environmental Control Officer (ECO) or a responsible appointed person or site manager should contact a bat specialist before construction commences so that they know what to look out for during construction.	Holder of the EA	Undertake regular audits	Avoid construction delays. Ensure the EMPr is adhered to.	Continuous.
Site demarcation	12. Before construction begins, all areas to be developed must be clearly demarcated with fencing or orange construction barrier where applicable. 13. All Construction Camps are to be fenced off in such a manner that unlawful entry is prevented and access is controlled. All access points to the Construction Camp should be controlled by a guard or otherwise monitored, to prevent unlawful access. 14. Records of all environmental incidents must be maintained and a copy of these records be made available to provincial department on request throughout the project execution.	Contractor	Undertake regular audits	Prevent unauthorized impact on the environment. Ensure safety of the workers, public and prevent loss/ damage to equipment Ensure the conditions of the EA are adhered to Compliance to all legislative requirements	Continuous

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Site clearing	15. Site clearing must take place in a phased manner, as and when required. 16. Areas which are not to be constructed on within two months must not be cleared to reduce erosion risks. 17. The area to be cleared must be clearly demarcated and this footprint strictly maintained. 18. Spoil that is removed from the site must be removed to an approved spoil site or a licensed landfill site. 19. The necessary silt fences and erosion control measures must be implemented in areas where these risks are more prevalent.	Holder of the EA/Contractor	Undertake regular audits	Site establishment undertaken responsibly Sensitive areas identified and avoided Erosion management plan implemented and hydrological measures in place. Appropriate stormwater structures as informed by the Storm Water Management Plan	Once off
Construction Camp	20. Site establishment shall take place in an orderly manner and all required amenities shall be installed at camp sites before the main workforce move onto site. 21. All construction equipment must be stored within the construction camp. 22. All associated oil changes etc. (no servicing) must take place within the camp over a sealed surface such as a concrete slab. 23. An area for the storage of hazardous materials must be established that conforms to the relevant safety requirements and that provides for spillage prevention and containment 24. All Construction Camps shall be provided with portable fire extinguishing equipment, in accordance with all relevant legislation and must be readily accessible. 25. The Contractor must provide sufficient ablution facilities, in the form of portable / VIP toilets, at the Construction Camps, and shall conform to all relevant health and safety standards and	Contractor	Undertake regular audits	Prevent unauthorized impact on the environment. Ensure safety of the public and prevent loss/ damage equipment Ensure EMP is adhered to Compliance to all legislative requirements	Continuous

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	codes. No pit latrines, French drain systems or soak away systems shall be allowed and toilets may not be situated within 100 meters of any surface water body or 1:100-year flood line. A sufficient number of toilets shall be provided to accommodate the number of personnel working in the area. 26. The Contractor shall inform all site staff to make use of supplied ablution facilities and under no circumstances shall indiscriminate sanitary activities be allowed. 27. No fires will be allowed and the Contractor must make alternative arrangements for heating. LP Gas may be used, provided that all required safety measures are in place. The Contractor shall take specific measures to prevent the spread of fires, caused by activities at the campsites. These measures may include appropriate instruction of employees about fire risks and the construction of firebreaks around the site perimeter.				
Training of site staff	28. Environmental awareness training for construction staff, concerning at a minimum the general environmental awareness, conservation of fauna and flora, the prevention of accidental spillage of hazardous chemicals and oil; pollution of water resources (both surface and groundwater), air pollution and litter control and identification of archaeological artefacts. 29. Staff operating equipment (such as loaders, etc.) shall be adequately trained and sensitised to any potential hazards associated with their tasks. 30. No operator shall be permitted to operate critical items of mechanical equipment without having been trained by the Contractor and certified competent by the Project Manager.	Contractor	Undertake regular audits	All staff members are aware of the EMPr requirements relevant to them All waste managed according to approved the Method Statement compiled by the contractor and approved by the engineer and reviewed by ECO	Continuous

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	31. Staff should be educated as to the need to refrain from indiscriminate waste disposal and/or pollution of local soil and water resources and receive the necessary safety training. 32. Staff must be trained in the hazards and required precautionary measures for dealing with these substances 33. Spillage packs must be available at construction areas.				
SPECIFIC MITIGATION MEASURES					
Aspect: Protection of soil resources **Erosion**	34. Design an effective system of storm water run-off control, where it is required - that is at any points where run-off water might accumulate. The system must effectively collect and safely disseminate any run-off water from all accumulation points and it must prevent any potential down slope erosion.	Engineer/Contractor	Ensure that the storm water run-off control is included in the engineering design.	That disturbance and existence of hard surfaces causes no erosion on or downstream of the site.	Once-off during the design phase.
Visual: ▪ Potential alteration of the visual character and sense of place. ▪ Potential visual impact on receptors in the study area. ▪ Potential visual impact on the night time visual environment.	35. Ensure that wind turbines are not located within 1km of any farmhouses in order to minimise visual impacts on these dwellings. 36. Where possible, fewer but larger turbines with a greater output should be utilised rather than a larger number of smaller turbines with a lower capacity. 37. Where possible, the operation and maintenance buildings and laydown areas should be consolidated to reduce visual clutter. 38. Where possible, underground cabling should be utilised.	Holder of the EA/Contractor	Undertake regular audits	Ensure the EMPr is adhered to.	Continuous
Biodiversity: Vegetation and protected plant species	39. There should be no turbines within the Very High Sensitivity areas. 40. The footprint within drainage lines should be minimized as much as possible.	Holder of the EA/Contractor	Construction Monitoring and audit reports	Impacts avoided or managed as per specialist recommendations.	Continuous

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	41. Preconstruction walk-though of the approved development footprint to ensure that sensitive habitats and species are avoided where possible. 42. Ensure that lay-down and other temporary infrastructure is within low sensitivity areas, preferably previously transformed areas if possible. 43. Minimise the development footprint as far as possible and rehabilitate disturbed areas that are no longer required by the operational phase of the development. 44. A large proportion of the impact of the development stems from the access roads and the number of roads should be reduced to the minimum possible and routes should also be adjusted to avoid areas of high sensitivity as far as possible, as informed by a preconstruction walk-though survey. 45. Preconstruction environmental induction for all construction staff on site to ensure that basic environmental principles are adhered to. This includes topics such as no littering, appropriate handling of pollution and chemical spills, avoiding fire hazards, minimizing wildlife interactions, remaining within demarcated construction areas etc. 46. Demarcate all areas to be cleared with construction tape or other appropriate and effective means. However, caution should be exercised to avoid using material that might entangle fauna.			Alien Plant Management Plan Implemented Plant Rehabilitation Implemented Ensure the conditions of the EA are adhered to.	
Impact on aquatic systems through the possible increase in surface water runoff on form and function during the operational phase:	47. A stormwater management plan must be developed in the preconstruction phase, detailing the stormwater structures and management interventions that must be installed to manage the increase of surface water flows directly into any natural systems. This stormwater control systems must be inspected on an annual basis to ensure these are functional. Effective stormwater management must include effective	Holder of the EA/Contractor	All staff members are aware of the EMPr requirements relevant to them	Impacts avoided or managed as per specialist recommendations.	Continuous

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Increase in hard surface areas, and roads that require stormwater management will increase through the concentration of surface water flows that could result in localised changes to flows (volume) that would result in form and function changes within aquatic systems, which are currently ephemeral. This then increases the rate of erosions and sedimentation of downstream areas	stabilisation (gabions and Reno mattresses) of exposed soil and the re-vegetation of any disturbed riverbanks		Align to Strom Water Plan Ensure the EMPr is adhered to.	Ensure the conditions of the EA are adhered to.	
Surface Water Damage or loss of riparian and or drainage line systems i.e. disturbance of the waterbodies in the construction phase	48. A detailed monitoring plan must be developed in the pre-construction phase by an aquatic specialist, where any delineated system occurs within 50 m of existing crossings.	Holder of the EA to appoint aquatic specialist to implement	Construction Monitoring and audit reports	Impacts avoided or managed as per specialist recommendations. Ensure the conditions of the EA are adhered to.	Continuous

9.1.2 Consultation

This section deals with the issues relative to consultation during the pre-construction phase.

Table 12: Consultation

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Consultation	1. Provide a mechanism through which information could be exchanged between the project proponent and stakeholders. 2. Identify relevant stakeholders and engage them at applicable stages of the EIA process. 3. Inform the public about the proposed construction process. 4. Surrounding communities must be kept informed, through the identified and agreed consultation channels, of the commencement of construction. 5. Work on site to be restricted to work hours.	Holder of the EA/ Contractor	Clear communication channels established	Continuous
Noise	6. At all stages, surrounding receptors should be informed about the project, providing them with factual information without setting unrealistic expectations. 7. The developer must implement a line of communication (i.e. a help line where complaints could be lodged). All potential sensitive receptors should be made aware of these contact numbers. 8. The proposed WEF should maintain a commitment to the local community (people staying within 2,000 m from construction or operational activities) and respond to noise concerns in an expedient fashion. Sporadic and legitimate noise complaints could be raised. For example, sudden and sharp increases in sound levels could result from mechanical malfunctions or perforations or slits in the blades. Problems of this nature can be corrected quickly and it is in the developer's interest to do so	Holder of the EA	Clear communication channels established	Continuous

9.1.3 Avifauna

This section deals with the issues relative to avifauna during the pre-construction phase.

Table 13: Avifauna

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES /FREQUENCY
Avifauna: Mortality due to collisions with the turbines: Mortality of priority avifauna due to collisions with the wind turbines	1. The results of the pre-construction monitoring must guide the lay-out of the turbines, especially as far as proposed no-turbine zones are concerned. No turbines must be constructed in the buffer zones which were identified based on the results of the pre-construction monitoring, with a specific view to limiting the risk of collisions to a variety of birds, including several Red Data species.	Project Developer	1. Design the facility with 200m buffers around dams and water troughs, and 150m buffers around major drainage lines. 2. Implement a 5km no-turbine zone around the Martial Eagle nest on Tower 108 of the Droërivier Proteus 400kV HV line.	Prevent mortality of priority avifauna	Once-off during the planning phase.
Avifauna: Mortality due to electrocution: Electrocution of raptors on the internal 33kV poles	2. Use underground cabling as much as is practically possible. 3. Where the use of overhead lines is unavoidable due to technical reasons, the Avifaunal Specialist must be consulted to ensure that a raptor friendly pole design is used, and that appropriate mitigation is implemented pro-actively for complicated pole structures e.g. insulation of live components to prevent electrocutions on terminal structures and pole transformers.	Project Developer	1. Design the facility with underground cabling. 2. Consult with Avifaunal Specialist during the design phase of the overhead lines.	Prevent electrocutions	Once-off during the planning phase.

9.1.4 Bats

This section deals with the issues relative to bats during the pre-construction phase.

Table 14: Bats

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
DESIGN PHASE					
Future impacts on Bats	Mitigate impacts on Bat Habitat caused by destruction, disturbance, and displacement.	1. Ensure the design of the WEF takes the sensitivity mapping of the bat specialist into account to avoid and reduce impacts on bat species and bat important features. Maintain buffers around these sensitive areas. 2. A bat specialist should be appointed before construction, so as to provide advice concerning bats when needed.	Ensure that No Go and high sensitivity areas are identified and excluded from turbine placement during the planning and design phase.	Prior to construction during design and planning phase.	Project Developer
	Mitigate impacts leading to bat population decline in future project phases	3. One year of bat monitoring at height has already been completed.	Relevant SABAA bat guidelines (Sowler, et al, 2017)	Prior to construction	Project Developer
	Minimize footprint of the construction to an acceptable level i.e., no placement of turbines in sensitive areas as well as spacing of turbines.	4. Turbines need to be approximately 250 m apart from blade tip to blade tip.	Final layout design	During design and prior to construction.	Project Developer
	Avoid attracting bats to sensitive areas.	5. Plan to minimise artificial light at night.	Choice and light placement on turbines.	Final design	Project Developer

9.1.5 Heritage

This section deals with the issues relative to Heritage during the pre-construction phase.

Table 15: Heritage

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Damage to 2 sites containing graves (KO-06 and KO-09): The graves and burial grounds are mostly localised near farm roads within the proposed development area. The expansion of existing farm roads may impact these sites.	1. Demarcate sites as no-go areas (50m buffer) 2. Demarcate and fence during construction if construction activities area to happened within 50 meters from a site. 3. A management plan, after a walkdown of the final layout, for the heritage resources needs then to be compiled and approved for implementation during construction and operations.	Holder of the EA	Ensure the EMPr is adhered to.	Continuous
Damage to one historical structure (KO-05): One structure (KO-05) is located near farm roads within the proposed development area. The expansion of existing farm roads may impact the site	4. Demarcate sites as no-go areas (30m buffer) 5. Demarcate and fence during construction if construction activities area to happened within 30 meters from a site. 6. A management plan, after a walkdown of the final layout, for the heritage resources needs then to be compiled and approved for implementation during construction and operations.	Holder of the EA	Ensure the EMPr is adhered to.	Continuous
Unidentified heritage resources: Due to the size of the area assessed, there's a possibility of encountering heritage features in un-surveyed areas does exist.	7. A management plan, after a walkdown of the final layout, for the heritage resources needs then to be compiled and approved for implementation during construction and operations.	Holder of the EA	Ensure the EMPr is adhered to.	Continuous
Fossil heritage resources: Disturbance, damage or destruction of fossils at or beneath the ground surface due to surface clearance and bedrock excavations	8. Pre-construction walkdown (with fossil recording / collection) of final footprint by specialist palaeontologist.	Holder of the EA	Ensure the EMPr is adhered to.	Continuous

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Cultural landscape - Ecological	9. Critical Biodiversity Areas, and Ecological Support Areas (along drainage lines), should be protected from development of the wind turbines, grid infrastructure or any associated development during all phases. 10. No wind turbines should be placed within the 1:100-year flood line of the watercourses. In the context of the sensitivity to soil erosion in the area, as well as potential archaeological resources, it would be a risk to include any structures close to these drainage lines. 11. Identified medicinal plants used for healing or ritual purposes should be conserved during all phases if threatened for use and continued access to these resources be maintained. 12. Careful planning should incorporate areas for stormwater runoff where the base of the structure disturbed the natural soil. Local rocks found on the site could be used to slow stormwater (instead of concrete, or standard edge treatments), and prevent erosion that would be an unfortunate consequence that would alter the character of the site. By using rocks from site it helps to sensitively keep to the character.	Holder of the EA	Ensure the EMPr is adhered to.	Continuous
Cultural landscape - Aesthetic	13. Where additional infrastructure (i.e. roads) is needed, the upgrade of existing roads to accommodate the development should be the first consideration. 14. Avoid development of infrastructure (such as buildings, wind turbines and power lines), on crests or ridgelines due to the impact on the visual sensitivity of skylines. The visual impact of turbines can be reduced by distancing them from viewpoints such as roads and farmsteads, and placing them in lower lying plains to reduce their impact on the surrounding sensitive cultural landscape. 15. Significant and place-making viewsheds of surrounding ridgelines and distant mountain should be maintained by	Holder of the EA	Ensure the EMPr is adhered to.	Continuous

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	limiting the placement of turbines or associated infrastructure on opposing sides of any of the regional roads, so that at any time a turbine-free view can be found when travelling through the landscape or at the historic farmsteads. 16. Retain view-lines and vistas focused on prominent natural features such as mountain peaks or hills, such as Platdoring se Kop and the Koup 1 poort, as these are important place making and orientating elements for experiencing the cultural landscape. 17. Prevent the construction of new buildings/structures/ new roads on visually sensitive, steep, elevated or exposed slopes, ridgelines and hillcrests. 18. Turbine and new road placement to avoid slopes steeper than 10% with existing farm roads to be used for access to turbines as far possible. 19. Due to the scenic and historic significance of the regional road, a buffer of 1000m to either side of the N12 should be maintained for no development associated with the WEF other than sensitive road upgrades, which must not impact on the views from the road. The visual impact of the turbines will be 50% less at 1km distance and therefore this distance will greatly reduce the negative visual impact of the turbines on the experience of the historic road and the values that give it significance. 20. Due to the nature of the landscape being largely devoid of high vertical elements such as the proposed turbines, and the introduction of these turbines fundamentally altering the sense of place and character of the landscape for those living there, location of majority of turbines should be limited to an 800m buffer around the farmsteads. The current turbine layout			

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	supports this recommendation in that there is nowhere more than a single turbine at the edge of these buffer zones. 21. Due to the historic and local experience of the landscape from the farm roads, which link the historically significant farmsteads across the region, a buffer of 300m from the farm roads should be maintained for no development associated with the WEF other than sensitive road upgrades which must not impact on the views from the road. 22. Alternatives Option 1(sub1) for the grid corridor and Option 1 for the laydown area, are preferred in terms of cultural landscape assessment as they limit the construction to a smaller footprint on the landscape and locate the infrastructure far enough from the N12 and out of the Koup 1 landscape as far possible. They should be moved out of the historic farm road buffer without impacting on a riverine corridor flood line or a slope over 3%. 23. The substation location should be located on the same side as other development infrastructure and to the north of the farm road so as to limit the visual impact to one viewshed. As there is a ridge behind this development area, for which turbine placement is proposed, location of the substation to the north of the farm road contains the impact to one side of the road and the infrastructure will not interrupt view lines of the mountain ranges in the distance. 24. The impact of WEF turbine night lighting on the wilderness landscape is intrusive and overwhelms the rural character of the landscape, giving it an industrial sense of place after dark. Reduce the impact of turbine night lighting by minimizing the number of turbines with lighting to only those necessary for aviation safety, such as a few identified turbines on the outer periphery, or use aircraft triggered night lighting. Due to the			

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	reduced receptors on the roads at night, the impact of the lighting at night is reserved mainly for farmsteads and other places of overnight habitation such as the surrounding tourist facilities, which would be heavily impacted by the light pollution on a long term and ongoing basis.			
Cultural landscape - Historic	25. Due to the scenic and historic significance of the regional road, a buffer of 1000m to either side of the N12 should be maintained for no development associated with the WEF other than sensitive road upgrades, which must not impact on the views from the road. The visual impact of the turbines will be 50% less at 1000m distance and therefore this distance will greatly reduce the negative visual impact of the turbines on the experience of the historic road and the values that give it significance. 26. The integrity of the historic farmsteads and their associated cultivated areas and relationship to the riverine corridors and other natural elements, such as Platdoring se Kop, should be maintained and protected. Due to the nature of the landscape being largely devoid of high vertical elements such as the proposed turbines, the introduction of turbines will fundamentally alter the sense of place and character of the landscape for those living there. Location of proposed turbines should be limited to an 800m buffer around the farmsteads to limit impact to the farmsteads. The current turbine layout supports this recommendation in that there is nowhere more than a single turbine at the edge of these buffer zones. 27. Any development that impacts the inherent character of the werf component should be discouraged and a development buffer of 50m around the outer boundary of farm werfs and 200m around any graded heritage structure, must be maintained, including the associated cultivated areas,	Holder of the EA	Ensure the EMPr is adhered to.	Continuous

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	cemeteries and unmarked graves, for all new infrastructure. A preconstruction micro-survey for access roads, substations, laydown areas and gridlines should be completed with CLA specialist to ensure appropriate buffers are maintained. 28. No infrastructure or operational upgrades, such as boreholes, should impact negatively or reduce natural, on site water quality, quantity or access for the residents within or around the development site. Any borehole or other water resource upgrade should also be made freely accessible to the residents living on site. 29. Due to the historic and local experience of the landscape from the farm roads, which link the historically significant farmsteads across the region, a buffer of 300m from the farm roads should be maintained for no development associated with the WEF other than sensitive road upgrades which must not impact on the views from the road. A preconstruction micro-survey for access roads, substations, laydown areas and gridlines should be completed with CLA specialist to ensure appropriate buffers are maintained. 30. Buffers from identified stone markers and foundations should be in accordance with the AIA (PGS, 2021) where they are not directly associated with an historic farmstead. 31. The existing names of places, routes, watercourses and natural features in the landscape that are related to its use, history and natural character should be retained and used as heritage resources related to intangible heritage. 32. Burial grounds and places of worship are automatically regarded as Grade IIIa or higher. Any development that threatens the inherent character of family burial grounds must be assessed and should be discouraged. No development closer than 100m from the boundary of any burial grounds or			

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	unmarked graves. No turbines have been proposed for placement near known unmarked burials or family cemeteries. A preconstruction micro-survey for access roads, substations, laydown areas and gridlines should be completed with CLA specialist to ensure appropriate buffers are maintained. A preconstruction micro-survey of each turbine footprint should be conducted to ensure no further unmarked graves are threatened. 33. Commonages and outspans were located at water points, and these places were likely gathering points before the arrival of colonists and continued to provide communal resources. In the mid-20th century, many old commonages came under the ownership of the Municipality, and have since been rented out to private individuals or organisations. The Municipality should facilitate the use of common land in a way that promotes the well-being and quality of life of the public. These sites can play a restorative role within the community, for instance for those who have limited alternative opportunities for recreation. 34. Respect existing patterns, typologies and traditions of settlement-making by promoting the continuity of heritage features. These include: (a) indigenous; (b) colonial; and (c) current living heritage in the form of tangible and intangible associations to place. 35. Alterations and additions to conservation-worthy structures should be sympathetic to their architectural character and period detailing.			
Cultural landscape - Socio-economic	36. The findings of this report must be shared with identified interested and affected parties, including non-landowner residents on the development properties, in the EIA public participation process in order to further ascertain any intangible cultural resources that may exist on the landscape that have	Holder of the EA	Ensure the EMPr is adhered to.	Continuous

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	not been identified. A specialist qualified in recognising and discussing significance of intangible heritage resources should be present during the public meetings. The findings should inform the recommendations for appropriate mitigation for impacts to the cultural landscape. 37. The continued use of the landscape for human habitation and cultivation by historic residents of the area, should be retained and encouraged as far possible to sustain the continual use pattern and human-environment relationship which is the ultimate significance of this cultural landscape element. The WEF development must allow and support this, including financially, and not degrade this continued relationship. 38. The local community on and around the development should benefit from job opportunities created by the proposed development and the development should not cause reduction in economic viability of surrounding properties in excess of those offered by the development. Short-term job opportunities at the expense of long term economic benefit and local employment opportunities must be prevented. 39. Local residents must be offered employment on the construction/ decommissioning and operational phases before 'importing' staff from elsewhere. 40. Local residents must be offered employment training opportunities associated with WEF developments at all phases.			

9.2 Construction Phase

9.2.1 Construction Camp

This section deals with the issues relative to the construction camp during the construction phase.

Table 16: Construction Camp

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAME
Construction Camp: Site of construction camp	1. The size of the construction camp must be aligned to the approved laydown area. 2. Adequate parking must be provided for site staff and visitors. The Contractor must attend to drainage of the camp site to avoid standing water and / or sheet erosion. 3. Suitable control measures over the Contractor's yard, plant and material storage to mitigate any visual impact of the construction activity must be implemented. 4. No construction should occur in an area of high or unique agricultural value, or in an area under cultivation.	Holder of the EA/Contractor	Ensure the conditions of the EA are adhered to. Compliance to all legislative requirements. Impacts avoided or managed as per specialist recommendations.	Once-off
Construction Camp: Storage of materials (including hazardous materials)	5. Choice of location for storage areas must take into account prevailing winds, distances to water bodies, general onsite topography and water erosion potential of the soil. Impervious surfaces must be provided where necessary. 6. Storage areas must be designated, demarcated and fenced if necessary. 7. Storage areas should be secure so as to minimize the risk of crime. They should also be safe from access by unauthorised persons i.e. children / animals etc. 8. Fire prevention facilities must be present at all storage facilities. 9. Storage areas containing chemical substances / materials must be clearly sign posted. 10. Proper storage facilities for the storage of oils, paints, grease, fuels, chemicals and any hazardous materials to be used must be provided to prevent the migration of spillage into the ground and groundwater regime around the temporary storage area(s). These pollution prevention measures for storage	Holder of the EA/Contractor	Choice of storage areas carefully considered to avoid impact to environment Correct handling, storage and/or disposal and/or cleanup of all materials to prevent impact to environment All hazardous substances managed according to	Continuous

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAME
	must include a bund wall high enough to contain at least 110% of any stored volume, and this must be sited away from drainage lines in a site with the approval of the Project Manager. The bund wall must be high enough to contain 110% of the total volume of the stored hazardous material with an additional allocation for potential stormwater events. 11. These storage facilities (including any tanks) must be on an impermeable surface that is protected from the ingress of storm water from surrounding areas and that will not infiltrate into the ground in order to ensure that accidental spillage does not pollute local soil or water resources. 12. All fuel storage areas must be roofed to avoid creation of dirty stormwater 13. Material Safety Data Sheets (MSDSs) shall be readily available on site for all chemicals to be used on site. Where possible the available, MSDS's must additionally include information on ecological impacts and measures to minimise negative environmental impacts during accidental releases or escapes. 14. Staff dealing with these materials / substances must be aware of their potential impacts and follow the appropriate safety measures. 15. An approved waste disposal contractor must be employed to remove and recycle waste oil, if practical. The contractor must ensure that its staff is made aware of the health risks associated with any hazardous substances used and has been provided with the appropriate protective clothing/equipment in case of spillages or accidents and have received the necessary training. 16. All excess cement and concrete mixes are to be contained on the construction site prior to disposal off site. 17. All major spills as specified in the contractor emergency response procedure of any materials, chemicals, fuels or other potentially hazardous or pollutant substances must be cleaned immediately and the cause of the spill investigated. Preventative measures must be identified and submitted to the MC and ECO for information. Emergency response procedures to be followed and implemented.		approved Method Statement.	

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAME
Construction Camp: Drainage of construction camp	18. Surface drainage measures must be established in the Construction Camps so as to prevent • Ponding of water; • Erosion as a result of accelerated runoff; and, 19. Uncontrolled discharge of polluted runoff.	Holder of the EA/Contractor	Storm Water Management Plan provided and accepted prior to construction commencing Storm Water Management Plan implemented Erosion plan implemented and hydrological measures in place.	Continuous

9.2.2 Construction traffic and access

This section deals with the issues relative to construction traffic and access during the construction phase.

Table 17: Construction Traffic and Access

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Construction Traffic and Access: Construction Traffic	1. Construction routes and required access roads must be clearly defined. 2. Recommendations of the stormwater management plan must be implemented. 3. Delivery of equipment must be undertaken with the minimum amount of trips to reduce the carbon footprint of these activities 4. Access of all construction and material delivery vehicles should be strictly controlled, especially during wet weather to avoid compaction and damage to the topsoil structure.	Holder of the EA/Contractor	A traffic management strategy developed and implemented throughout the construction and operation phases. Storm Water Management Plan implemented	Continuous

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	5. Damping down of the un-surfaced roads must be implemented to reduce dust and nuisance. 6. Vehicles and equipment shall be serviced regularly to avoid the contamination of soil from oil and hydraulic fluid leaks etc. 7. Servicing must be done in dedicated service areas on site or else off site if no such area exists. 8. Oil changes must take place on a concrete platform and over a drip tray to avoid pollution. 9. Soils compacted by construction shall be deep ripped to loosen compacted layers and re-graded to even running levels.		Ensure the EMPr is adhered to	
Construction Traffic and Access: Access	10. The main routes on the site must be clearly sign posted and printed delivery maps must be issued to all suppliers and Sub-contractors. 11. Planning of access routes to the site for construction purposes shall be done in conjunction with the Contractor and the Landowner. All agreements reached should be documented and no verbal agreements should be made. The Contractor shall clearly mark all access roads. Roads not to be used shall be marked with a “NO ENTRY for construction vehicles" sign. 12. Access to the site must be via secondary roads as requested by SANRAL.	Holder of the EA/Contractor	A traffic management Strategy developed and Implemented throughout the construction and operation phases.	Continuous
Construction Traffic and Access: Road Maintenance	13. Where necessary suitable measures shall be taken to rehabilitate damaged areas. 14. Contractors should ensure that access roads are maintained in good condition by attending to potholes, corrugations and stormwater damages as soon as these develop. 15. If necessary, staff must be employed to clean surfaced roads adjacent to construction sites where materials have spilt. 16. Recommendations of the surface water report must be taken into consideration.	Holder of the EA/Contractor	A traffic management Strategy developed and Implemented throughout the construction and operation phases.	Continuous
Construction Traffic and Access: General	17. The contractor shall meet safety requirements under all circumstances. All equipment transported shall be clearly labelled as to their potential hazards	Holder of the EA	A traffic management Strategy developed and	Continuous

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	according to specifications. All the required safety labelling on the containers and trucks used shall be in place. 18. The Contractor shall ensure that all the necessary precautions against damage to the environment and injury to persons are taken. 19. Care for the safety and security of community members crossing access roads should receive priority at all times.		Implemented throughout the construction and operation phases. Adhere to Health and Safety Regulations	

9.2.3 Environmental Education and Training

This section deals with the issues relative to environmental education and training during the construction phase.

Table 18: Environmental Education and Training

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Environmental Education and Training: Environmental Training	1. Ensure that all site personnel have a basic level of environmental awareness training. The Contractor must submit a proposal for this training to the ECO for approval. Translators are to be used where necessary. Topics covered should include: • What is meant by "Environment" • Why the environment needs to be protected and conserved • How construction activities can impact on the environment • What can be done to mitigate against such impacts • Awareness of emergency and spills response provisions • Social responsibility during construction e.g. being considerate to local residents 2. It is the Contractor's responsibility to provide the site foreman with no less than 1 hour's environmental training and to ensure that the foreman has sufficient understanding to pass this information onto the construction staff.	Contractor	Thorough induction to site.	Continuous

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	3. Training should be provided to the staff members in the use of the appropriate fire-fighting equipment. 4. Use should be made of environmental awareness posters on site. 5. The need for a "clean site" policy also needs to be explained to the workers. 6. Staff operating equipment (such as loaders, etc.) shall be adequately trained and sensitized to any potential hazards associated with their tasks.			
Environmental Education and Training: Monitoring of environmental training	7. The Contractor must monitor the performance of construction workers to ensure that the points relayed during their introduction have been properly understood and are being followed. If necessary, the ECO and / or a translator should be called to the site to further explain aspects of environmental or social behaviour that are unclear. Toolbox talks are recommended.	Contractor	Thorough induction to site.	Continuous

9.2.4 Waste Management

This section deals with the issues relative to waste management during the construction phase.

Table 19: Waste Management

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Waste Management: Litter management/general waste	1. Refuse bins must be placed at strategic positions to ensure that litter does not accumulate within the construction site. 2. The Contractor shall supply waste collection bins where such is not available and all solid waste collected shall be disposed of at registered/licensed landfill. 3. A housekeeping team should be appointed to regularly maintain the litter and rubble situation on the construction site.	Contractor The ECO shall monitor the neatness of the work sites as well as the Contractor campsite.	All waste managed according to approved Method Statement	Continuous

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	4. If possible and feasible, all waste generated on site must be separated into glass, plastic, paper, metal and wood and recycled. An independent contractor can be appointed to conduct this recycling. 5. Littering by the employees of the Contractor shall not be allowed under any circumstances. 6. Skip waste containers should be maintained on site. These should be kept covered and arrangements made for them to be collected regularly. 7. All waste must be removed from the site and transported to a landfill site promptly to ensure that it does not attract vermin or produce odours. 8. The Contractor shall provide a method statement with regard to waste management. 9. A certificate of disposal shall be obtained by the Contractor and kept on file, if relevant. 10. Under no circumstances may solid waste be burnt on site. 11. All waste must be removed promptly to ensure that it does not attract vermin or produce odours.			
Waste Management: Hazardous waste	12. All waste hazardous materials, if present, must be carefully and appropriately stored, and then disposed of off-site at a licensed landfill site, where practical. 13. Contaminants to be stored safely to avoid spillage. 14. Machinery must be properly maintained to keep oil leaks in check 15. All necessary precaution measures shall be taken to prevent soil or surface water pollution from hazardous materials used during construction and any spills shall immediately be cleaned up and all affected areas rehabilitated.	Contractor	All waste managed according to approved Method Statement	Continuous
Waste Management: Sanitation	16. The Contractor shall install mobile chemical toilets on the site. 17. The construction of "Long Drop" toilets are forbidden. Rather, portable toilets are to be used.	Contractor	Staff members aware of EMPr requirements and ablutions used and maintained accordingly	Continuous

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	18. Staff shall be sensitised to the fact that they should use these facilities at all times. No indiscriminate sanitary activities on site shall be allowed. Under no circumstances may open areas, neighbours fences or the surrounding bush be used as a toilet facility. 19. Ablution facilities shall be within proximity from workplaces and not closer than 100m from any natural water bodies or boreholes. There should be enough toilets available to accommodate the workforce (minimum requirement 1: 15 workers). Male and females must be accommodated separately where possible. 20. Toilets shall be serviced regularly and the ECO shall inspect toilets regularly. 21. Potable water must be provided for all construction staff.			
Waste Management: Remedial Actions	22. Depending on the nature and extent of the spill, contaminated soil must be either excavated or treated on-site. 23. Excavation of contaminated soil must involve careful removal of soil using appropriate tools/machinery to storage containers until treated or disposed of at a licensed hazardous landfill site. 24. The precise method of treatment for polluted soil must be identified by a suitable specialist. This could involve the application of soil absorbent materials as well as oil-digestive powders to the contaminated soil. 25. If a spill occurs on an impermeable surface such as cement or concrete, the surface spill must be contained using oil absorbent material. 26. If necessary, oil absorbent sheets or pads must be attached to leaky machinery or infrastructure. 27. Materials used for the remediation of petrochemical spills must be used according to product specifications and guidance for use. 28. Contaminated remediation materials must be carefully removed from the area of the spill so as to prevent further release of petrochemicals to the environment and stored in adequate containers until appropriate disposal.	Contractor	All waste managed according to approved Method Statement	Continuous

9.2.5 Agriculture and Soils

This section deals with the issues relative to agriculture and soils during the construction phase.

Table 20: Agriculture and Soils

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES /FREQUENCY
Aspect: Protection of soil resources **Erosion**	1. Implement an effective system of storm water run-off control, where it is required - that is at any points where run-off water might accumulate. The system must effectively collect and safely disseminate any run-off water from all accumulation points and it must prevent any potential down slope erosion.	Engineer/Contractor	Undertake a periodic site inspection to verify and inspect the effectiveness and integrity of the storm water run-off control system and to specifically record the occurrence of any erosion on site or downstream. Corrective action must be implemented to the run-off control system in the event of any erosion occurring.	That disturbance and existence of hard surfaces causes no erosion on or downstream of the site.	Every 2 months during the construction phase
Aspect: Protection of soil resources **Erosion**	2. Maintain where possible all vegetation cover and facilitate re-vegetation of denuded areas throughout the site, to stabilize disturbed soil against erosion.	Engineer/Contractor	Undertake a periodic site inspection to record the occurrence of and re-vegetation progress of all areas that require re-vegetation.	That vegetation clearing does not pose a high erosion risk.	Every 4 months during the construction phase
Aspect: Protection of soil resources **Topsoil loss**	3. If an activity will mechanically disturb the soil below surface in any way, then any available topsoil should first be stripped from the entire surface to be disturbed and stockpiled for re-spreading during rehabilitation. During rehabilitation, the stockpiled topsoil must be evenly spread over the entire disturbed surface.	Engineer/Contractor	Record GPS positions of all occurrences of below-surface soil disturbance (e.g. excavations). Record the date of topsoil stripping and replacement. Check that topsoil covers the entire disturbed area.	That topsoil loss is minimised	As required, whenever areas are disturbed.
Removal of subsoils (soil, rock):	4. Identify protected areas prior to construction. 5. Construction of temporary berms and drainage channels to divert surface water.	Engineer/Contractor Holder of EA	Undertake regular audits	Erosion plan implemented and	Continuous

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES /FREQUENCY
Displacement of natural earth material and overlying vegetation.	6. Minimize earthworks and fills. 7. Use existing road network and access tracks. 8. Rehabilitation of affected areas (such as regrassing, mechanical stabilization). 9. Correct engineering design and construction of gravel roads and water crossings. 10. Correct construction methods for foundation installations and cut to fill configurations. 11. Vehicle repairs to be undertaken in designated areas. 12. Control stormwater flow			hydrological measures in place All waste managed according to approved Method Statement Ensure the EMPr is adhered to.	

9.2.6 Avifauna

This section deals with the issues relative to avifauna during the construction phase.

Table 21: Avifauna

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES/ FREQUENCY
Avifauna: Displacement due to disturbance: The noise and movement associated with the construction activities at the development	1. A site-specific CEMPr must be implemented, which gives appropriate and detailed description of how construction activities must be conducted. All contractors are to adhere to the CEMPr and should apply good environmental practice during construction. The CEMPr must specifically include the following:	Contractor The ECO shall monitor	1. Implementation of the CEMPr. Oversee activities to ensure that the CEMPr is implemented and enforced via site audits and inspections. Report and record any non-compliance. 2. Ensure that construction personnel are made aware of the impacts relating to off-road driving.	Prevent unnecessary displacement of avifauna by ensuring that contractors are aware of the requirements of the Construction Environmental Management Programme (CEMPr.)	1. On a daily basis 2. Weekly 3. Weekly 4. Weekly 5. Weekly

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES/ FREQUENCY
footprint will be a source of disturbance which would lead to the displacement of avifauna from the area	• No off-road driving; • Maximum use of existing roads, where possible; • Measures to control noise and dust according to latest best practice; • Restricted access to the rest of the property; • Strict application of all recommendations in the botanical specialist report pertaining to the limitation of the footprint. 2. Construction activity should be restricted to the immediate footprint of the infrastructure as far as possible. Access to the remainder of the area should be strictly controlled to prevent unnecessary disturbance of priority species. 3. Measures to control noise and dust should be applied according to current best practice in the industry.		3. Construction access roads must be demarcated clearly. Undertake site inspections to verify. 4. Monitor the implementation of noise control mechanisms via site inspections and record and report non-compliance. 5. Ensure that the construction area is demarcated clearly and that construction personnel are made aware of these demarcations. Monitor via site inspections and report non-compliance.		
Avifauna: Displacement due to habitat transformation Total or partial displacement of avifauna due to habitat transformation associated with the vegetation	4. Develop a Habitat Restoration Plan (HRP) and ensure that it is approved. 5. Monitor rehabilitation via site audits and site inspections to ensure compliance. Record and report any non-compliance. 6. Vehicle and pedestrian access to the site should be controlled and restricted to the facility footprint as much as possible to prevent unnecessary destruction of vegetation.	1. Operations Manager 2. SHE Manager 3. SHE Manager 4.	1. Appointment of rehabilitation specialist to develop Habitat Restoration Plan (HRP). 2. Site inspections to monitor progress of HRP.	Prevent unnecessary displacement of avifauna by ensuring that the rehabilitation of transformed areas is implemented by an appropriately qualified rehabilitation specialist, according to the recommendations of the botanical specialist study.	1. Once-off 2. Once a year

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES/ FREQUENCY
clearance and the presence of the wind turbines and associated infrastructure.	7. Removal of vegetation must be restricted to a minimum and must be rehabilitated to its former state where possible after construction. 8. Construction of new roads should only be considered if existing roads cannot be upgraded. 9. The recommendations of the ecological and botanical specialist studies must be strictly implemented, especially as far as limitation of the activity footprint is concerned				

9.2.7 Bats

This section deals with the issues relative to bats during the construction phase.

Table 22: Bats

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
CONSTRUCTION PHASE					
Avoid disturbance of foraging bats	Avoid Habitat loss and destruction caused by clearing vegetation for the working areas, construction and landscape modifications.	1. Avoid the removal of limited trees and large bushes as bats could potentially utilise these for roosting. 2. Construction activities to be kept out of all high bat sensitive areas.	• Monitor the efficiency of the EMPR. • Monitor whether proposed measures are adhered to.	• During construction phase. • ECO should be trained before construction commences.	• Project Developer • Construction manager • ECO

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		3. Rock formations should be avoided during construction, as these serve as roosting space for bats. 4. Care should be taken that there are no bat roosts if any telephone poles, dense bushes or rock formations are destroyed. The ECO should investigate before any of these features are destroyed.	• ECO should be trained to recognize bat species and roost locations before construction starts.	• Erosion and pollution monitoring during construction phase. • Monitoring of off-road driving during construction phase. • Monitor before anything is removed that could contain a bat roost.	
Active roost destruction and potential roost destruction and habitat loss	• Minimise impacts on bats during construction activities • Keep construction out of high bat sensitive areas • Avoid destruction of rock formations, trees, aardvark holes, derelict holes, excavations	5. Construction activities to be kept out of all high bat sensitive areas. 6. Rock formations occurring along the ridge lines should be avoided during construction, as these serve as roosting space for bats. 7. Destruction of limited trees and relative large bushes should be avoided as far as possible during construction. 8. Try to avoid the destruction of derelict holes such as aardvark holes and care should be taken in any fragmentation of woody habitat which includes dense bushes. 9. The ECO should verify that there are no bat roosts if any bat sensitive features are destroyed.	• Visual inspection and continuous monitoring of high sensitivity areas, erosion prevention, chemical pollution and vehicle activity to prevent habitat destruction. • Structures featuring potential roost to be investigated before it is demolished.	• Throughout construction • ECO to be present during all site clearance activities • Access to bat specialist if ECO needs information or confirmation concerning bat presence	• Project Developer • Construction site manager • ECO

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
Creating new habitat amongst the turbines that might attract bats.	• Prevent the creation of features that could attract bats to the terrain. • Prevent bats from roosting in high-risk areas close to turbines and infrastructure such as roofs.	10. Completely seal off roofs of new buildings (e.g., substations and site buildings). Note a small bat species could enter a hole the size of 1 cm2. 11. Roofs need to be regularly inspected during the lifetime of the wind farm and any new holes need to be sealed. 12. Excavation areas or artificial depressions should be filled and rehabilitated to avoid creating areas of open water sources which could attract bats during rainy spells.	• Continues inspection of sealed roofs – bats can move into holes as small as 1 X 1 cm. • Oversee the rehabilitation of any excavation areas.	Throughout construction phase, and during lifetime of wind farm.	• Project Developer, construction • site manager and ECO.
Construction noise, especially during night-time.	Prevent disturbance to bat activity and behaviour.	13. Nightly construction activities should be avoided, or if necessary, minimised to the shortest period possible. 14. Except for compulsory civil aviation lightning, artificial lightening during construction should be minimised, especially bright lights or spotlights. 15. Lights should avoid skyward illumination. Turbine tower lights should be switched off when not in operation, where possible.	• Monitor construction to reduce noise and minimise disturbance in bat sensitive areas. • Avoid construction activities at night, as far as possible.	Throughout construction phase.	▪ Project Developer ▪ Site manager ▪ ECO

9.2.8 Biodiversity

This section deals with the issues relative to biodiversity during the construction phase.

Table 23: Biodiversity

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES /FREQUENCY
Faunal disturbance and habitat loss: Increased levels of noise, pollution, disturbance and human presence during construction will be detrimental to fauna. Sensitive and shy fauna are likely to move away from the area during the construction phase as a result of the noise and	1. During construction any fauna directly threatened by the construction activities should be removed to a safe location by the ECO or other suitably qualified person. 2. The illegal collection, hunting or harvesting of any plants or animals at the site should be strictly forbidden. Personnel should not be allowed to wander off the construction site. 3. No fires should be allowed within the site as there is a risk of runaway veld fires. 4. No fuelwood collection should be allowed on-site. 5. If any parts of site such as construction camps must be lit at night, this should be done with low-UV type lights (such as most LEDs) as far as practically possible, which do not attract insects and which should be directed downwards. 6. All hazardous materials should be stored in the appropriate manner to prevent contamination of the site. Any accidental chemical, fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill. 7. No unauthorized persons should be allowed onto the site and site access should be strictly controlled 8. All construction vehicles should adhere to a low-speed limit (40km/h for cars and 30km/h for trucks) to avoid collisions with susceptible species such as snakes and tortoises and rabbits or hares. Speed limits should apply	Holder of the EA	Construction Monitoring and audit reports	Impacts avoided or managed as per specialist recommendations. Alien Plant Management Plan Implemented Plant Rehabilitation Implemented Ensure the conditions of the EA are adhered to.	Continuous

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES /FREQUENCY
human activities present, while some slow-moving species would not be able to avoid the construction activities and might be killed.	within the facility as well as on the public gravel access roads to the site. 9. All personnel should undergo environmental induction with regards to fauna and in particular awareness about not harming or collecting species such as snakes, tortoises and snakes which are often persecuted out of fear or superstition.				

9.2.9 Surface Water

This section deals with the issues relative to surface water during the construction phase.

Table 24: Surface Water

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES /FREQUENCY
Loss of aquatic species of special concern During construction activities within watercourses could result in the disturbance or destruction of any listed and or protected plant or animal species. However none of these aquatic obligate species	1. Develop and implement an Aquatic Rehabilitation and Monitoring plan post Environmental Authorisation. This must be developed following the finalisation of the turbine / road layout and a walk down has been completed.	Holder of the EA	Construction Monitoring and audit reports	Impacts avoided or managed as per specialist recommendations. Ensure the conditions of the EA are adhered to.	Continuous

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES /FREQUENCY
were observed during this assessment					
Damage or loss of riparian and or drainage line systems i.e. disturbance of the waterbodies in the construction phase Construction could result in the loss of drainage systems that are fully functional and provide an ecosystem services within the site especially where new access roads are required or road upgrades will widen any current bridges or drifts. Loss can also include a functional loss, through change in vegetation type via alien encroachment for example	2. All alien plant re-growth, which is currently low within the greater region must be monitored and should it occur, these plants must be eradicated within the project footprints and especially in areas near the proposed crossings. *Prosopis* (alien invasive riparian tree) is prevalent in areas to the north of the site, thus care in transporting any material, while ensuring that such materials is free of alien seed, coupled with pre and post alien clearing must be stipulated in the EMPr. Where roads and crossings are upgraded, the following applies: • Existing pipe culverts must be removed and replaced with suitable sized box culverts, especially where road levels are raised to accommodate any large vehicles. • River levels, regardless of the current state of the river / water course must be reinstated thus preventing any impoundments from being formed. The related designs must be assessed by an aquatic specialist during a pre-construction walkdown. • Where large cut and fill areas are required these must be stabilised and rehabilitated during the construction process, to minimise erosion and sedimentation. • Suitable stormwater management systems must be installed along roads and other areas and monitored during the first few months of use. Any erosion / sedimentation must be resolved	Holder of the EA	Construction Monitoring and audit reports	Impacts avoided or managed as per specialist recommendations. Ensure the conditions of the EA are adhered to.	Continuous

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES /FREQUENCY
	through whatever additional interventions maybe necessary (i.e., extension, energy dissipaters, spreaders, etc).				
Potential impact on localised surface water quality During construction earthworks will expose and mobilise earth materials, and a number of materials as well as chemicals will be imported and used on site and may end up in the surface water, including soaps, oils, grease and fuels, human wastes, cementitious wastes, paints and solvents, etc. Any spills during transport or while works area conducted in proximity to a watercourse has the potential to affect the surrounding biota. Leaks or spills from storage facilities also pose a risk and due consideration to the safe design and management of the 30 000l fuel storage facility must be given. Although unlikely, consideration must also be provided for the proposed Battery Energy Storage	3. All liquid chemicals including fuels and oil, including the BESS must be stored in with secondary containment (bunds or containers or berms) that can contain a leak or spill. Such facilities must be inspected routinely and must have the suitable PPE and spill kits needed to contain likely worst-case scenario leak or spill in that facility, safely. 4. Washing and cleaning of equipment must be done in designated wash bays, where rinse water is contained in evaporation/sedimentation ponds (to capture oils, grease cement and sediment). 5. Mechanical plant and bowsers must not be refuelled or serviced within 100m of a river channel. 6. All construction camps, lay down areas, wash bays, batching plants or areas and any stores should be more than 50 m from any demarcated water courses. Note comment regards Camp A that requires micro-siting. 7. Littering and contamination associated with construction activity must be avoided through effective construction camp management; 8. No stockpiling should take place within or near a water course 9. All stockpiles must be protected and located in flat areas where run-off will be minimised and sediment recoverable;	Holder of the EA/ Contractor	Construction Monitoring and audit reports	Impacts avoided or managed as per specialist recommendations. Ensure the conditions of the EA are adhered to.	Continuous

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES /FREQUENCY
System (BESS), with regard safe handling during the construction phase. This to avoid any spills or leaks from this system					

9.2.10 Noise

This section deals with the issues relative to noise during the construction phase.

Table 25: Noise

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Noise Special Conditions	1. The developer must investigate any reasonable and valid noise complaint if registered by a receptor staying within 2,000 m from the location where construction activities are taking place or operational wind turbine is present. A complaints register must be kept on site. 2. The developer must minimize night-time construction traffic if the access roads are closer than 150 m from any NSD, alternatively, the access road must be relocated further than 120 m from NSDs (night-time traffic passing occupied houses). 3. The developer must implement a noise monitoring program that will define the residual levels before the construction of the WEF, as well as to confirm noise levels once the WEF is operational.	Holder of EA/Contractor	Noise and lighting managed according to approved Method Statement Ensure the EMPr is adhered to.	Continuous

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Noise impacts during the day: Construction activities relating to hardstand areas, digging of foundations for wind turbines, civil works as well as erection of wind turbines	4. No specific mitigation measures recommended for construction activities at the WTG locations or for substations. 5. Continuing management objectives would be: • Ensure that total daytime construction noise levels are less than 52 dBA at all potential NSDs (dwellings used for residential purposes); • Ensure that total night-time construction noise levels are less than 45 dBA at all potential NSDs (dwellings used for residential purposes); • Ensure that total noise levels due to operational activities are less than 45 dBA at all potential NSDs (dwellings used for residential purposes); and • Prevent the generation of nuisance noises.	Holder of EA/Contractor	Noise and lighting managed according to approved Method Statement Ensure the EMPr is adhered to.	Continuous
Noise impacts at night: Construction activities relating to civil works as well as erection of wind turbines	6. Night-time construction activities closer than 1,000 m from and NSD to be minimized. Night-time construction activities (closer than 800 m) are not recommended and it should be minimized where possible. If construction activities take place closer than 800 m at night (such as the pouring of concrete), NSD should be notified of the activity that will be taking place at night.	Holder of EA/Contractor	Noise and lighting managed according to approved Method Statement Ensure the EMPr is adhered to.	Continuous
Noise impacts during the day: Construction of access roads	7. Access routes to be relocated further than 120 m from dwellings used for residential purposes at night. If access roads cannot be relocated close to residential dwellings, the projected noise levels must be discussed with potentially affected receptors.	Holder of EA/Contractor	Noise and lighting managed according to approved Method Statement Ensure the EMPr is adhered to.	Continuous

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Noise impacts during the day: Noises relating to construction traffic	8. Access routes to the relocated further than 120 m from dwellings used for residential purposes at night. 9. If access roads cannot be relocated close to residential dwellings, the projected noise levels must be discussed with potentially affected receptors.	Holder of EA/Contractor	Noise and lighting managed according to approved Method Statement Ensure the EMPr is adhered to.	Continuous

9.2.11 Heritage

This section deals with the issues relative to Heritage during the construction phase.

Table 26: Heritage

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Paleontology	1. During the construction phase the Chance Fossil Finds Protocol summarized in Annexure D should be fully implemented. 2. The Environmental Control Officer (ECO) / Environmental Site Officer (ESO) responsible for the development should be made aware of the possibility of important fossil remains (vertebrate bones, teeth, petrified wood, plant-rich horizons etc.) being found or unearthed during the construction phase of the development. Monitoring for fossil material of all major surface clearance and deeper (>1m) excavations by the Environmental Site Officer on an on-going basis during the construction phase is therefore recommended. Significant fossil finds should be safeguarded and reported at the earliest opportunity to Heritage Western Cape for recording and sampling by a professional paleontologist (Contact details: Heritage Western Cape. 3rd Floor Protea Assurance	Paleontologist/ECO	Ensure the EMPr is adhered to.	Continuous

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	Building, 142 Longmarket Street, Green Market Square, Cape Town 8000. Private Bag X9067, Cape Town 8001. Tel: 021 483 5959 Email: ceoheritage@westerncape.gov.za).			
Cultural landscape - Ecological	3. Critical Biodiversity Areas, and Ecological Support Areas (along drainage lines), should be protected from development of the wind turbines or any associated development during all phases. 4. No wind turbines should be placed within the 1:100-year flood line of the watercourses. In the context of the sensitivity to soil erosion in the area, as well as potential archaeological resources, it would be a risk to include any structures close to these drainage lines 5. Remaining areas of endemic and endangered natural vegetation should be conserved. 6. Areas of critical biodiversity should be protected from any damage during all phases; where indigenous and endemic vegetation should be preserved at all cost. 7. Areas of habitat are found among the rocky outcrops and contribute to the character, as well as biodiversity of the area. Care should be taken that habitats are not needlessly destroyed. 8. Identified medicinal plants used for healing or ritual purposes should be conserved during all phases if threatened for use. 9. Careful planning should incorporate areas for stormwater runoff where the base of the structure disturbed the natural soil. Local rocks found on the site could be used to slow stormwater (instead of concrete, or standard edge treatments), and prevent erosion that would be an	Holder of the EA/Contractor	Ensure the EMPr is adhered to.	Continuous

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	unfortunate consequence that would alter the character of the site. By using rocks from site it helps to sensitively keep to the character.			
Cultural landscape - Aesthetic	10. Encourage mitigation measures (for instance use of vegetation) to 'embed' or disguise the proposed structures within the surrounding tourism and agricultural landscape at ground level, road edges etc; 11. The continuation of the traditional use of material could be enhanced with the use of the rocks on the site as building material. This would also help to embed structures into the landscape and should not consist of shipping containers or highly reflective untreated corrugated sheeting that clutters the landscape and is exacerbates the foreign intrusion on the natural matte landscape. 12. Using material found on the site adds to the sense of place and reduces transportation costs of bringing materials to site. 13. The local material such as the rocks found within the area could be applied to address storm water runoff from the road to prevent erosion. 14. Duration and magnitude of construction/ decommissioning activity must be minimized to reduce the impact of heavy vehicles on the roads as well as the associated dust from the activity. Light vehicles should be used to reduce degradation to the farm roads and the need to upgrade roads to scale and extent that negatively impacts on the integrity of the historic farm roads. Construction/ decommissioning traffic must operate at speeds that reduce dust and noise. 15. Any new road network or widening must be returned to its original state at end of the operational time of the WEF, with	Holder of the EA/Contractor	Ensure the EMPr is adhered to.	Continuous

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	full environmental and aesthetic rehabilitation to the approval of a qualified cultural landscapes assessment specialist. 16. Turbine sites, substation and laydown areas should be returned to their original state at the end of the operational time of the WEF, with full environmental and aesthetic rehabilitation to the approval of a qualified cultural landscapes assessment specialist.			
Cultural landscape - Historic	17. Historic farmsteads must be protected from the impacts of heavy construction vehicles and increased numbers of people. No construction traffic should pass through or closer than 50m to the outer boundaries of a farm werf, or 200m from graded structures, which includes the associated historically cultivated lands, cemeteries, unmarked burials. The most appropriate use of existing farm roads must be found to avoid farm werfs as far as possible and reduce construction impact on these heritage features. 18. A preconstruction micro-survey for turbines, access roads, substations, laydown areas and gridlines should be completed with CLA specialist to ensure appropriate buffers are maintained. 19. Duration and magnitude of construction/ decommissioning activity must be minimized to reduce the impact of heavy vehicles on the roads as well as the associated dust from the activity. Light vehicles should be used to reduce degradation to the farm roads and the need to upgrade roads to scale and extent that negatively impacts on the integrity of the historic farm roads. Construction decommissioning traffic must operate at speeds that reduce dust and noise.	Holder of the EA/Contractor	Ensure the EMPr is adhered to.	Continuous

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	20. No infrastructure or operational upgrades, such as boreholes, should impact negatively or reduce natural, on site water quality, quantity or access for the residents within or around the development site. Preferably any borehole or other water resource upgrade should also be made freely accessible to the residents living on site. 21. Accommodation of construction staff must not negatively impact on existing farm residents or degrade the integrity of the farmstead complexes and should, without negative impact to ecological or aesthetic resources, be located outside of the farmstead complexes or site. Farm residents should be consulted on the preferable location for construction staff accommodation. 22. Traditional planting patterns should be protected by ensuring that existing trees are not needlessly destroyed, as these signify traces of cultural intervention in a harsh environment. These planting patterns include the trees planted around the werfs and along travel routes. Interpretation of these landscape features as historic remnants should occur. A buffer of 50m around such planting patters should be maintained. 23. Burial grounds and places of worship are automatically regarded as Grade IIIa or higher. Any development that threatens the inherent character of family burial grounds must be assessed and should be discouraged. No turbines have been proposed for placement near known unmarked burials or family cemeteries. A preconstruction micro-survey of each turbine footprint and any new access roads should be conducted to ensure no further unmarked graves are threatened. A preconstruction micro-survey for access roads, substations, laydown areas and gridlines should be			

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	completed with CLA specialist to ensure appropriate buffers are maintained. 24. Mountain slopes have been used for traditional practices for many years, and care should be taken that any significant cultural sites, such as burials and veldkos/medicinal plant resources, are not disturbed. 25. Farms in the area followed a system of stone markers to demarcate the farm boundaries in the area. Where these structures are found on the site, care should be taken that they are not needlessly destroyed, as they add to the layering of the area. A preconstruction micro-survey for access roads, substations, laydown areas and gridlines should be completed with CLA specialist to ensure appropriate buffers are maintained. 26. Roads running through the area have historic stone way markers. Where these are found care should be taken that they are left in tact and in place. Road upgrades must not move or threaten their position and they should be visible from the road they are related to by passing travellers. A preconstruction micro-survey for access roads, substations, laydown areas and gridlines should be completed with CLA specialist to ensure appropriate buffers are maintained. 27. Where the historic function of a building/site is still intact, the function has heritage value and should be protected. 28. Surviving examples (wagon routes, outspans, and commonage), where they are owned in some public or communal way (or by a body responsible for acting in the public interest) and where they are found to be actively operating in a communal way, will have cultural and heritage value and should be enhanced and retained. The historic route running through Koup 1 should be maintained and			

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	integrity as a communal road for farm residents must be retained.			
Cultural landscape - Socio-economic	29. An updated cultural landscapes impact assessment report must be completed should the WEF continue to be used after the term granted in this application. This report should include a detailed assessment of the socio-economic impacts to the cultural landscape and its outcomes and recommendations need to be considered in the decision for recommissioning and be implemented if recommissioning is approved. 30. The continued use of the landscape for human habitation and cultivation by historic residents of the area, should be retained and encouraged as far possible to sustain the continual use pattern and human-environment relationship which is the ultimate significance of this cultural landscape element. The WEF development must allow and support this, including financially, and not degrade this continued relationship. 31. The local community on and around the development should benefit from job opportunities created by the proposed development and the development should not cause reduction in economic viability of surrounding properties in excess of those offered by the development. Short-term job opportunities at the expense of long term economic benefit and local employment opportunities must be prevented. 32. Local residents must be offered employment on the construction/ decommissioning and operational phases before 'importing' staff from elsewhere. 33. Local residents must be offered employment training opportunities associated with WEF developments at all phases.	Holder of the EA/Contractor	Ensure the EMPr is adhered to.	Continuous

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	34. Sheep, cattle or game farming should be allowed to continue below the wind turbines, or be rehabilitated to increase biodiversity in the area.			

9.2.12Visual

This section deals with the issues relative to visual during the construction phase.

Table 27: Visual

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Potential alteration of the visual character and sense of place Potential visual impact on receptors in the study area	1. Carefully plan to mimimise the construction period and avoid construction delays. 2. Inform receptors within 1km of the WEF development area of the construction programme and schedules. 3. Minimise vegetation clearing and rehabilitate cleared areas as soon as possible. 4. Vegetation clearing should take place in a phased manner. 5. Maintain a neat construction site by removing rubble and waste materials regularly. 6. Position storage / stockpile areas in unobtrusive positions in the landscape, where possible. 7. Where possible, underground cabling should be utilised. 8. Make use of existing gravel access roads where possible. 9. Limit the number of vehicles and trucks travelling to and from the construction site, where possible. 10. Ensure that dust suppression techniques are implemented: • on all access roads;	Holder of the EA/Contractor	Ensure the EMPr is adhered to.	Continuous

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	• in all areas where vegetation clearing has taken place; • on all soil stockpiles.			
Potential alteration of the visual character and sense of place in the broader area. Potential visual impact on receptors in the study area. Potential visual impact on the night time visual environment.	11. Carefully plan to minimise the construction period and avoid construction delays. 12. Position laydown areas and related storage/stockpile areas in unobtrusive positions in the landscape, where possible. 13. Minimise vegetation clearing and rehabilitate cleared areas as soon as possible. 14. Vegetation clearing should take place in a phased manner. 15. Where possible, the operation and maintenance buildings should be consolidated to reduce visual clutter. 16. As far as possible, limit the number of maintenance vehicles which are allowed to access the facility. 17. Ensure that dust suppression techniques are implemented on all gravel access roads. 18. As far as possible, limit the amount of security and operational lighting present on site. 19. Light fittings for security at night should reflect the light toward the ground and prevent light spill. 20. Lighting fixtures should make use of minimum lumen or wattage. 21. Mounting heights of lighting fixtures should be limited, or alternatively foot-light or bollard level lights should be used. 22. If possible, make use of motion detectors on security lighting. 23. The operations and maintenance (O&M) buildings should not be illuminated at night.	Holder of the EA	Ensure the EMPr is adhered to.	Continuous

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	24. The O&M buildings should be painted in natural tones that fit with the surrounding environment.			

9.2.13 Social

This section deals with the issues relative to social during the construction phase.

Table 28: Social

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Incident register	1. A public grievance and incident register should be established and should be monitored internally by the developer and made available for public scrutiny if requested. Any incident should be immediately recorded and reported to management and all actions pertaining to that incident, as well as the final outcome of the complaint, should be recorded and signed off by management. If an independent environmental monitor is appointed, this register should be audited on at least a monthly basis.	Holder of the EA/Contractor	Clear communication channels maintained.	Continuous
Health and well-being: A**ir quality**	2. Where appropriate apply dust suppression measures on a regular basis. Ensure that vehicles used to transport sand and building materials are fitted with tarpaulins or covers. 3. Ensure that all vehicles are roadworthy and drivers are qualified and made aware of the potential noise and dust issues. 4. Appoint a community liaison officer to deal with complaints and grievances from the public.	Holder of the EA/Contractor	Clear communication channels maintained Compliance to all legislative requirements.	Continuous

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
			Ensure the EMPr is adhered to.	
Health and well-being: **Noise**	5. Refer to the mitigation measures suggested by the noise specialist.	Holder of the EA/Contractor	Clear communication channels maintained Compliance to all legislative requirements. Ensure the EMPr is adhered to.	Continuous
Health and well-being: **Increase in crime**	6. Ensure that construction workers are clearly identifiable. All workers should carry identification cards and wear identifiable clothing. 7. Fence off the construction sites and control access to these sites. 8. Appoint an independent security company to monitor the site; 9. Encourage local people to report any suspicious activity associated with the construction sites through the establishment of a community liaison forum. 10. Prevent loitering within the vicinity of the construction camp as well as construction sites.	Holder of the EA/Contractor	Clear communication channels maintained Compliance to all legislative requirements. Ensure the EMPr is adhered to.	Continuous
Health and well-being: **Increased risk of HIV infections**	11. Ensure that an onsite HIV Infections Policy is in place and that construction workers have easy access to condoms. 12. Expose workers to a health and HIV/AIDS awareness educational program. 13. Extend the HIV/AIDS program into the community with a specific focus on schools and youth clubs.	Holder of the EA/Contractor	Clear communication channels maintained	Continuous

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
			Compliance to all legislative requirements. Ensure the EMPr is adhered to.	
Health and well-being: **Influx of construction workers**	1. Communicate the limitation of opportunities created by the project through Community Leaders and Ward Councillors. 2. Draw up a recruitment policy in consultation with the 3. Community Leaders and Ward Councillors of the area and ensure compliance with this policy.	Holder of the EA/Contractor	Clear communication channels maintained Compliance to all legislative requirements. Ensure the EMPr is adhered to.	Continuous
Health and well-being : **Hazard exposure**	14. Ensure that all construction equipment and vehicles are properly maintained at all times. 15. Ensure that operators and drivers are properly trained and make them aware, through regular toolbox talks, of any risk they may pose to the community. Place specific emphasis on the vulnerable sector of the population such as children and the elderly. 16. Ensure that fires lit by construction staff are only ignited in designated areas and that the appropriate safety precautions, such as not lighting fires in strong winds and completely extinguishing fires before leaving them unattended, are strictly adhered to. 17. Make staff aware of the dangers of fire during regular toolbox talks.	Holder of the EA/Contractor	Clear communication channels maintained Compliance to all legislative requirements. Ensure the EMPr is adhered to.	Continuous

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Quality of the living environment: **Disruption of daily living patterns**	18. Ensure that, at all times, people have access to their properties as well as to social facilities.	Holder of the EA/Contractor	Clear communication channels maintained Compliance to all legislative requirements. Ensure the EMPr is adhered to.	Continuous
Quality of the living environment: **Disruptions to social and community infrastructure**	19. Regularly monitor the effect that construction is having on infrastructure and immediately report any damage to infrastructure to the appropriate authority. 20. Ensure that where communities' access is obstructed that this access is restored to an acceptable state.	Holder of the EA/Contractor	Clear communication channels maintained Compliance to all legislative requirements. Ensure the EMPr is adhered to.	Continuous
Economic: **Job creation and skills development**	21. Wherever feasible, local residents should be recruited to fill semi and unskilled jobs. 22. Women should be given equal employment opportunities and encouraged to apply for positions. 23. A skills transfer plan should be put in place at an early stage and workers should be given the opportunity to develop skills 24. which they can use to secure jobs elsewhere post construction.	Holder of the EA/Contractor	Clear communication channels maintained Compliance to all legislative requirements.	Continuous

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
			Ensure the EMPr is adhered to.	
Economic: **Socio-economic stimulation.**	25. A procurement policy promoting the use of local business 26. should, where possible, be put in place to be applied 27. throughout the construction phase.	Holder of the EA/Contractor	Clear communication channels maintained Compliance to all legislative requirements. Ensure the EMPr is adhered to.	Continuous

9.2.14 Transportation

This section deals with the issues relative to transportation during the construction phase.

Table 29: Transportation

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Additional Traffic Generation: **Increase in Traffic**	1. Ensure staff transport is done in the 'off peak' periods and by bus. 2. Stagger material, component and abnormal loads 3. Construction of an on-site concrete batching plant to reduce trips.	Holder of the EA/Contractor	All staff members are aware of the EMPr requirements relevant to them Ensure the EMPr is adhered to.	Continuous
Additional Traffic Generation: **Increase of Incidents with pedestrians and livestock**	4. Reduction in speed of vehicles 5. Adequate enforcement of the law 6. Implementation of pedestrian safety initiatives 7. Regular maintenance of farm fences & access cattle grids 8. Construction of an on-site concrete batching plant to reduce trips.	Holder of the EA/Contractor	All staff members are aware of the EMPr requirements relevant to them Ensure the EMPr is adhered to.	Continuous
Additional Traffic Generation: **Increase in Dust from gravel roads**	9. Reduction in speed of the vehicles 10. Use of dust suppressant techniques 11. Implement a road maintenance program under the auspices of the respective transport department. 12. Construction of an on-site concrete batching plant to reduce trips.	Holder of the EA/Contractor	All staff members are aware of the EMPr requirements relevant to them Ensure the EMPr is adhered to.	Continuous
Additional Traffic Generation: **Increase in Road Maintenance**	13. Implement a road maintenance program under the auspices of the respective transport department. 14. Construction of an on-site batching plant to reduce trips.	Holder of the EA/Contractor	All staff members are aware of the EMPr requirements relevant to them	Continuous

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
			Ensure the EMPr is adhered to.	
Additional Abnormal Loads	15. Ensure abnormal vehicles travel to and from the proposed development in the 'off peak' periods or stagger delivery. 16. Adequate enforcement of the law	Holder of the EA/Contractor	All staff members are aware of the EMPr requirements relevant to them Ensure the EMPr is adhered to.	Continuous
Internal Access Roads: **Increase in Dust from gravel roads**	17. Enforce a maximum speed limit on the development 18. Use of dust suppressant techniques 19. Adequate watering by means of water bowser	Holder of the EA/Contractor	All staff members are aware of the EMPr requirements relevant to them Ensure the EMPr is adhered to.	Continuous
Internal Access Roads: **New / Larger Access points**	20. Adequate road signage according to the SARTSM 21. Approval from the respective roads department	Holder of the EA/Contractor	All staff members are aware of the EMPr requirements relevant to them Ensure the EMPr is adhered to.	Continuous

9.3 Operation Phase

9.3.1 Construction Site Decommissioning

This section deals with the issues relative to construction site decommissioning during the operation phase.

Table 30: Construction Site Decommissioning

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Construction Site Decommissioning: Removal of equipment	1. All structures comprising the construction camp are to be removed from site. 2. The area that previously housed the construction camp is to be checked for spills of substances such as oil, paint, etc., and these shall be cleaned up. 3. All hardened surfaces within the construction camp area should be ripped, all imported materials removed, and the area shall be top soiled and regressed using the guidelines set out in the re-vegetation that forms part of this document.	Holder of EA/Contractor	Compliance to all legislative requirements. Ensure the EMPr is adhered to.	Following construction
Construction Site Decommissioning: Temporary services	4. The Contractor must arrange the cancellation of all temporary services. 5. Temporary roads must be closed and access across these, blocked. 6. All areas where temporary services were installed are to be rehabilitated to the satisfaction of the ECO.	Holder of EA/Contractor	Compliance to all legislative requirements. Ensure the EMPr is adhered to.	Following construction
Construction Site Decommissioning: Associated infrastructure	7. Surfaces are to be checked for waste products from activities such as concreting or asphalting and cleared in a manner approved by the Engineer. 8. All surfaces hardened due to construction activities are to be ripped and imported material thereon removed.	Holder of EA/Contractor	All waste managed according to approved Method Statement	Following construction

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	9. All rubble is to be removed from the site to an approved disposal site as approved by the Engineer. Burying of rubble on site is prohibited. 10. The site is to be cleared of all litter. 11. The Contractor is to check that all watercourses are free from building rubble, spoil materials and waste materials. 12. Fences, barriers and demarcations associated with the construction phase are to be removed from the site unless stipulated otherwise by the Engineer. 13. All residual stockpiles must be removed to spoil or spread on site as directed by the Engineer. 14. All leftover building materials must be returned to the depot or removed from the site. 15. The Contractor must repair any damage that the construction works has caused to neighbouring properties, specifically, but not limited to, damage caused by poor storm water management.			
Construction Site Decommissioning: Rehabilitation plan	16. Rehabilitate and re-vegetate cleared areas with indigenous plant species.	Holder of EA/Contractor	Alien Plant Management Plan Plant Rehabilitation implemented	Following construction

9.3.2 Operation and Maintenance

This section deals with the issues relative to operation and maintenance during the operation phase.

Table 31: Operation and Maintenance

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Operation and Maintenance: Maintenance	1. All applicable standards, legislation, policies and procedures must be adhered to during operation. 2. Regular ground inspection of the plants must take place to monitor their status.	Holder of the EA	Ensure the conditions of the EA are adhered to. Compliance to all legislative requirements	During operation
Operation and Maintenance: Public awareness	3. The emergency preparedness plan must be ready for implementation at all times should an emergency situation arise.	Holder of the EA	Adhere to Emergency Evacuation Plan	During operation

9.3.3 Waste Management

This section deals with the issues relative to waste management during the operation phase.

Table 32: Waste Management

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIME FRAME
Waste Management: Recycling and litter management	1. The site should be kept clear of litter at all times. 2. Solid waste separation and recycling should take place for the duration of the operational phase for the development at the administration block.	Holder of EA	All waste managed according to approved Method Statement	Continuous

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIME FRAME
	3. All waste must be removed promptly to ensure that it does not attract vermin or produce odours. 4. Solid waste should be collected on a regular basis.		Compliance to all legislative requirements.	

9.3.4 Agriculture and Soils

This section deals with the issues relative to agriculture and soils during the operation phase.

Table 33: Agriculture and Soils

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES/ FREQUENCY
Aspect: Protection of soil resources **Erosion**	1. Maintain the storm water run-off control system. Monitor erosion and remedy the storm water control system in the event of any erosion occurring.	Facility Environmental Manager	Undertake a periodic site inspection to verify and inspect the effectiveness and integrity of the storm water run-off control system and to specifically record the occurrence of any erosion on site or downstream. Corrective action must be implemented to the run-off control system in the event of any erosion occurring.	That existence of hard surfaces causes no erosion on or downstream of the site.	Bi-annually
Aspect: Protection of soil resources **Erosion**	2. Facilitate re-vegetation of denuded areas throughout the site.	Facility Environmental Manager	Undertake a periodic site inspection to record the progress of all areas that require re-vegetation.	That denuded areas are re-vegetated to stabilise soil against erosion	Bi-annually
Removal of subsoils (soil, rock):	3. Use of existing roads and tracks where feasible. 4. Rehabilitation of affected areas (such as erosion control mats).	Engineer/Contractor Holder of EA	Undertake regular audits	Erosion plan implemented and hydrological measures in place	Continuous

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES/ FREQUENCY
Displacement of natural earth material.	5. Correct engineering design and construction of roads and water crossings. 6. Vehicle repairs to be undertaken in designated areas. 7. Maintenance of stormwater system.			All waste managed according to approved Method Statement Ensure the EMPr is adhered to.	

9.3.5 Avifauna

This section deals with the issues relative to avifauna during the operation phase.

Table 34: Avifauna

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES /FREQUENCY
Avifauna: Mortality due to collisions with the wind turbines: Bird collisions with the wind turbines	1. No turbines should be located in the buffer zones around major drainage lines, waterpoints and dams. 2. A 5km circular No-Go (no turbines) buffer zone must be implemented around the Martial Eagle nest on Tower 108 of the Droërivier Proteus 1 400kV transmission line. 3. Formal live-bird monitoring and carcass searches should be implemented at the start of the operational phase, as per the most recent edition of the Best Practice Guidelines at the time (Jenkins *et al*. 2015) to assess collision rates. The exact time when operational monitoring should commence, will depend on the construction schedule, and	1. Operations Manager Avifaunal Specialist	1. Appoint Avifaunal Specialist to compile operational monitoring plan, including live bird monitoring and carcass searches. 2. Implement operational monitoring plan. 3. Design and implement mitigation measures if mortality thresholds are exceeded. 4. Compile quarterly and annual progress reports	Prevention of collision mortality on the wind turbines.	1. Once-off 2. Years 1,2, 5 and every five years after that for the duration of the operational lifetime of the facility.

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES /FREQUENCY
	should commence when the first turbines start operating. The Best Practice Guidelines require that, as an absolute minimum, operational monitoring should be undertaken for the first two (preferably three) years of operation, and then repeated again in year 5, and again every five years thereafter for the operational lifetime of the facility. 4. If estimated annual collision rates indicate unacceptable mortality levels of priority species, i.e if it exceeds mortality thresholds as determined by the avifaunal specialist in consultation with BLSA and other avifaunal specialists, additional measures will have to be implemented which could include shut down on demand or other proven measures.		detailing the results of the operational monitoring and progress with any recommended mitigation measures.		
Avifauna: Mortality due to collisions and electrocutions on the 33kV network: Bird electrocutions on the overhead sections of the internal 33kV cables	5. Underground cabling should be used as much as is practically possible. 6. If the use of overhead lines is unavoidable due to technical reasons, the Avifaunal Specialist must be consulted timeously to ensure that a raptor friendly pole design is used, and that appropriate mitigation is implemented pro-actively for complicated pole structures e.g., insulation of live components to prevent electrocutions on terminal structures and pole transformers. 7. Regular inspections of the overhead sections of the internal reticulation network must be conducted during the operational phase to look for carcasses, as per the most recent edition of the Best Practice Guidelines at the time (Jenkins et al. 2015).	Operations Manager	1. Carcass searchers under the supervision of the Avifaunal Specialist. 2. Design and implement mitigation measures if mortality thresholds are exceeded. 3. Compile quarterly and annual progress reports detailing the results of the operational monitoring and progress with any recommended mitigation measures.	Prevention of electrocution mortality on the overhead sections of the 33kV internal cable network.	At least once every two months.

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES /FREQUENCY
Avifauna: Mortality due to collisions with the overhead sections of the internal 33kV cables	8. Bird flight diverters should be installed on all the overhead line sections for the full span length according to Eskom guidelines - five metres apart. Light and dark colour devices must be alternated to provide contrast against both dark and light backgrounds respectively. These devices must be installed as soon as the conductors are strung.	Holder of the EA	1. Construction Monitoring and audit reports	Impacts avoided or managed as per specialist recommendations. Ensure the conditions of the EA are adhered to. Adhere to legislative requirements	Continuous

9.3.6 Bats

This section deals with the issues relative to bats during the operation phase.

Table 35: Bats

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
OPERATIONAL PHASE					
Fatality of resident bats through direct collision or barotrauma.	• Mitigate potential impacts on bats during operation of wind farm. • Reduce bat mortality during	1. Manage and mitigate fatality through direct collision or barotrauma of resident bats occupying the airspace amongst the turbines. The turning blades of the turbines during operation are the most important aspect of the project that would impact	• Regular bat monitoring reports, informed by the relevant SABAA operational bat monitoring guidelines.	• Throughout operation and during operational bat monitoring period.	• Site manager • Project developer • Bat specialist

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
	the operational lifetime of the wind farm.	negatively on bats. High flying species have predominantly been confirmed at the proposed Koup 1 WEF site. 2. No activities No-go areas. 3. All turbines and turbine components, including the rotor swept zone, should be kept out of all No-go and high bat sensitivity areas. 4. Mitigation as proposed in Annexure E should be applied as soon as the turbines blades start turning. 5. Mitigation as proposed in Annexure E, must be adhered to as soon as the turbine blades start turning. Close operational monitoring should inform whether mitigation for medium sensitivity zones, as described in Annexure E should be applied. 6. A bat specialist should be appointed before the turbines start to turn and operational bat monitoring should start immediately and implemented without delay. Where high bat mortality occurs, those turbines should be mitigated, using Annexure E as a starting point for discussions. 7. Mitigation measures must be adapted by a bat specialist as data is collected during the operational phase. 8. Where high bat mortality occurs, mitigation should be implemented without delay. Specific turbines should be mitigated, using	• Adhere to the mitigation measures as indicated by the EA and Section 9 of the Bat Monitoring report. • Maintain a register of bat mortality/injury. • Regular communication between bat specialist and site manager. • South Africa Good Practice Guidelines for Operational Monitoring for Bats at Wind Energy facilities (Aronson, et.al., 2020) or later versions of the guidelines valid at the time of monitoring, as well as other relevant South African guidelines as applicable during the monitoring period.		

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		Annexure E, as a starting point for discussions. 9. Freewheeling should be avoided, to a point where the turbines are not a threat to bats, when turbines do not generate power. 10. Except for compulsory lightning required in terms of civil aviation, artificial lightning should be minimised, especially bright lights. Lights should rather be turned downwards. Turbine tower lights should be switched off when not in operation, if possible. 11. At least two years of post-construction bat monitoring is to be conducted and must be performed according to the 12. Prolonged post construction mitigation, beyond the prescribed two years, might be necessary if advised by the operational bat specialist. 13. It is understood that static bat monitoring equipment on turbines has a cost implication. Although it is not a requirement at this stage, as it depends on whether the Met mast will be deployed for the life span of the turbines but having more refined static data from sampling points at height, would aid in interpreting future bat fatality records. 14. The use of ultrasound as a mitigation measure to deter bats should be investigated if necessary and as advised by a bat specialist.			

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
Bat fatality of migratory species.	• Mitigate potential impacts on bats during operation of wind farm. • Reduce bat mortality during the operational lifetime of the wind farm.	15. Bat fatality during migration. A limited number of calls like *Miniopterus natalensis* (Natal Long-fingered bat), a Near Threatened migration species, have been recorded. Not much research has been conducted on migration of bats in South Africa, and some of the other species occurring on site could also migrate. 16. Care should be taken during post construction monitoring to verify the activity of *M. natalensis*, especially within the rotor swept area of the turbine blades. 17. Carcasses should be identified to establish the fatality of this species. 18. All turbines and turbine components, including the rotor swept zone, should be kept out of all No-go and high bat sensitivity zones. 19. Mitigation as proposed in Annexure E and should be applied as soon as the turbines start turning. 20. Mitigation as proposed for High sensitivity zones proposed in Annexure E, must be adhered to as soon as the turbines start turning. Close operational monitoring should inform whether mitigation for medium sensitivity zones, as described in Annexure E, should be applied. 21. Careful observation should take place during the operational phase and mitigation should	• Regular bat monitoring reports, informed by the relevant SABAA operational bat monitoring guidelines. • Adhere to the mitigation measures as indicated by the EA and Section 9 of the Bat Monitoring report. • Maintain a register of bat mortality/injury. • Regular communication between bat specialist and site manager. • South Africa Good Practice Guidelines for Operational Monitoring for Bats at Wind Energy facilities (Aronson, et.al., 2020) or later versions of the guidelines valid at the time of monitoring, as well as other relevant South African guidelines as applicable during the monitoring period.	• Throughout operation and during operational bat monitoring period.	• Site manager • Project developer • Bat specialist

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		be adapted and implemented without delay. Where high bat mortality occurs, those turbines should be mitigated, using Section 9 as a starting point for discussions. 22. Except for compulsory civil aviation lightning, artificial lightning should be minimised, especially bright lights. Lights should rather be turned downwards. Turbine tower lights should be switched off when not in operation, if possible, depending on civil aviation laws. 23. At least two years of post-construction bat monitoring is to be conducted and must be performed. 24. The installation of more than one monitoring system at height need to be considered. 25. The use of ultrasound as a mitigation measure to deter bats should be investigated if necessary and as advised by a bat specialist.	•		
Loss of bats of conservation value.	• Mitigate potential impacts on bats during operation of wind farm. • Reduce bat mortality during the operational lifetime of the wind farm.	26. Loss of bats of conservation value. A limited number of calls like the red data *Miniopterus natalensis* have been recorded, as well as the endemic *Eptesicus hottentotus*. 27. Proven mitigation measures, such as curtailment, should be applied if high activity of bats of conservation value is recorded, or if high numbers of carcasses are collected, during post-construction. 28. All turbines and turbine components, including the rotor swept zone, should be	• Regular bat monitoring reports, informed by the relevant SABAA operational bat monitoring guidelines. • Adhere to the mitigation measures as indicated by the EA and Section 9 of the Bat Monitoring report	• Throughout operation and during operational bat monitoring period.	• Site manager • Project developer • Bat specialist

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		kept out of all the No-go and High sensitivity zones, and where possible out of the High-medium sensitivity. 29. Mitigation as proposed in Annexure E, should be applied for turbines situated in High-medium sensitivity zones as indicated. 30. Mitigation as proposed for medium sensitivity zones proposed in Annexure E, must be adhered to if bat fatality is high. The post construction bat specialist could adapt these as deemed necessary and as operational data becomes available. 31. Careful observation should take place during the operational phase and mitigation should be discussed between the bat specialist and developer. Mitigation should be adapted and implemented without delay. Where high bat mortality occurs, those turbines should be mitigated, with Annexure E as a starting point for discussions. 32. Except for compulsory lightning required in terms of civil aviation, artificial lightning should be minimised, especially bright lights. Lights should rather be turned downwards. Turbine tower lights should be switched off when not in operation, if possible. 33. At least two years of post-construction bat monitoring is to be conducted. 34. The use of ultrasound as a mitigation measure to deter bats is now being used at	• Regular communication between bat specialist and site manager. • South Africa Good Practice Guidelines for Operational Monitoring for Bats at Wind Energy facilities (Aronson, et.al., 2020) or later versions of the guidelines valid at the time of monitoring, as well as other relevant South African guidelines as applicable during the monitoring period.		

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		two WEFs in South Africa. This should be investigated for use at turbines displaying high mortality at the Koup 1 WEF site.			
Bat fatality due to the attraction of bats to turbine blades.	• Avoid activities that will attract bats to turbines.	35. Bat mortality due to the attraction of bats to wind turbines (Horn, et al. 2008). Bats have been shown to sometimes be attracted to wind turbines out of curiosity or reasons still under investigation. 36. Except for compulsory lightning required in terms of civil aviation, artificial lightning should be minimised, especially bright lights. Little is known about this impact and mitigation could be adapted if more research becomes available.	• Reduce lights as far as possible.	• Ongoing	• Site manager
Loss of habitat and foraging space during operation of the wind turbines.	• Mitigate the loss of habitat and foraging space.	37. All components should be kept out of No-go areas. 38. All turbines and turbine components, including the rotor swept zone, should be kept out of all the High sensitivity zones, and, if possible, out of the High-medium sensitivity. 39. Mitigation as proposed in Section 9.2, should be applied for turbines situated in High-medium sensitivity zones as indicated. 40. Mitigation as proposed for medium sensitivity zones proposed in Section 9.2, Table 8, must be adhered to if bat fatality is high. The post construction bat specialist could adapt these as deemed necessary and as operational data becomes available.	• Adhere to the mitigation measures as indicated by the EA and Section 9 of the Bat Monitoring report • South Africa Good Practice Guidelines for Operational Monitoring for Bats at Wind Energy facilities (Aronson, et.al., 2020) or later versions of the guidelines valid at the time of monitoring, as well as other relevant	• During operations.	• Site manager/ • Project Developer and ECO

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		41. At least two years of post-construction bat monitoring is to be conducted.	South African guidelines as applicable during the monitoring period.		
Reduction in the genetic pool of bats.	• Mitigate potential impacts on bats during operation of wind farm. • Reduce bat mortality during the operational lifetime of the wind farm.	42. Reduction in the size, genetic diversity, resilience and persistence of bat populations. Bats have low reproductive rates and populations are susceptible to reduction by fatalities other than natural death. Furthermore, smaller bat populations are more susceptible to genetic inbreeding. 43. All turbines and turbine components, including the rotor swept zone, should be kept out of all the High sensitivity zones, and preferably out of the High-medium sensitivity. 44. Mitigation as proposed in Section 9.2, should be applied for turbines situated in High-medium sensitivity zones as indicated. 45. Mitigation as proposed for medium sensitivity zones proposed in Section 9.2, Table 8, must be adhered to if bat fatality is high. The post construction bat specialist could adapt these as deemed necessary and as operational data becomes available. 46. Careful observation should take place during the operational phase and mitigation should be discussed between the bat specialist and developer. Mitigation should be adapted and	• Regular bat monitoring reports, informed by the relevant SABAA operational bat monitoring guidelines. • Adhere to the mitigation measures as indicated by the EA and Section 9 of the Bat Monitoring report • Regular communication between bat specialist and site manager. • South Africa Good Practice Guidelines for Operational Monitoring for Bats at Wind Energy facilities (Aronson, et.al., 2020) or later versions of the guidelines valid at the time of monitoring, as well as other relevant	• During operations.	• Project Developer/Site manager and ECO.

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		implemented without delay. Where high bat mortality occurs, those turbines should be mitigated, with Section 9.2 as a starting point for discussions. 47. Except for compulsory lightning required in terms of civil aviation, artificial lightning should be minimised, especially bright lights. Lights should rather be turned downwards. Turbine tower lights should be switched off when not in operation, if possible. 48. At least two years of post-construction bat monitoring is to be conducted and must be performed according to the South Africa Good Practice Guidelines for Operational Monitoring for Bats at Wind Energy facilities (Aronson, et.al., 2020) or later versions of the guidelines valid at the time of monitoring, as well as other relevant South African guidelines as applicable during the monitoring period. 49. Although it is not a requirement at this stage, as it depends on whether the Met mast will be deployed, for the life span of the turbines but having more refined static data from sampling points at height, would aid in interpreting future bat fatality records of the Koup 1 WEF; therefore, the installation of more than one monitoring system at height, will be recommended.	South African guidelines as applicable during the monitoring period.		

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		50. The use of ultrasound as a mitigation measure to deter bats is now being used at two WEFs in South Africa. This should be investigated for use at turbines displaying high mortality at the Koup 1 WEF site.			

9.3.7 Biodiversity

This section deals with the issues relative to biodiversity during the operation phase.

Table 36: Biodiversity

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES /FREQUENCY
Faunal disturbance and habitat degradation Fauna will be negatively affected by the operation of the wind farm due to the human disturbance, the presence of vehicles on the site and possibly	1. Management of the site should take place within the context of an Open Space Management Plan. 2. No unauthorized persons should be allowed onto the site. 3. Any potentially dangerous fauna such snakes or fauna threatened by the maintenance and operational activities should be removed to a safe location. 4. The collection, hunting or harvesting of any plants or animals at the site should be strictly forbidden by anyone except landowners or other individuals with the appropriate permits and permissions where required. 5. If any parts of the site need to be lit at night for security purposes, this should be done with downward-directed low-UV type lights (such as most LEDs or HPS bulbs) as far as possible, which do not attract insects.	Holder of the EA/Contractor	Construction Monitoring and audit reports	Impacts avoided or managed as per specialist recommendations. Ensure the conditions of the EA are adhered to. Alien Plant Management Plan Implemented Open Space Management Plan Plant Rehabilitation Implemented	Continuous

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES /FREQUENCY
by noise generated by the wind turbines as well.	6. All hazardous materials should be stored in the appropriate manner to prevent contamination of the site. Any accidental chemical, fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill. 7. All vehicles accessing the site should adhere to a reduced speed limit (30km/h for heavy vehicles and 40km/h for light vehicles) to avoid collisions with susceptible species such as snakes and tortoises. 8. If parts of the facility such as the substation are to be fenced, then no electrified strands should be placed within 30cm of the ground as some species such as tortoises are susceptible to electrocution from electric fences as they do not move away when electrocuted but rather adopt defensive behaviour and are killed by repeated shocks. Alternatively, the electrified strands should be placed on the inside of the fence and not the outside.				
Increased potential for soil erosion Following construction, the site will remain vulnerable to soil erosion for some time due to the disturbance created by site clearing and likely low natural	9. Erosion management at the site should take place according to an Erosion Management Plan and Rehabilitation Plan. 10. All roads and other hardened surfaces should have runoff control features which redirect water flow and dissipate any energy in the water which may pose an erosion risk. 11. Regular monitoring for erosion post construction to ensure that no erosion problems have developed as result of the disturbance, as per the Erosion Management and Rehabilitation Plans for the project. Monitoring should take place every 6 months in the first year after construction and annually thereafter.	Holder of the EA/Contractor	Construction Monitoring and audit reports	Impacts avoided or managed as per specialist recommendations. Erosion Management Plan and Rehabilitation Plan Implemented Ensure the conditions of the EA are adhered to.	Continuous

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES /FREQUENCY
revegetation of disturbed areas thereafter. It is important to note that while the site is arid, such areas can experience significant soil erosion as plant cover is low and occasional heavy showers generate large amounts of runoff.	12. All erosion problems observed should be rectified as soon as possible, using the appropriate erosion control structures and revegetation techniques. 13. All cleared areas should be revegetated with indigenous perennial shrubs and succulents from the local area. Dead material from site clearing can be used to encourage this process and can be set aside during clearing and later placed on the cleared areas to encourage recovery.				
Ecological degradation due to alien plant invasion.	14. There should be regular monitoring for alien plants within the development footprint as well as adjacent areas which receive runoff from the facility as there are also likely to be prone to invasion problems. Monitoring every 6 months for the first 2 years post-construction is recommended, followed by annual monitoring thereafter. 15. Regular alien clearing should be conducted using the best-practice methods for the species concerned. The use of herbicides should be avoided as far as possible.	Holder of the EA/Contractor	Construction Monitoring and audit reports	Impacts avoided or managed as per specialist recommendations. Alien Plant Management Plan Implemented Plant Rehabilitation Implemented Ensure the conditions of the EA are adhered to.	Continuous
Negative impact on ESAs, CBAs and broad-	16. Minimise the development footprint within the high sensitivity areas.	Holder of the EA/Contractor	Construction Monitoring and audit reports	Impacts avoided or managed as per specialist recommendations.	Continuous

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES /FREQUENCY
scale ecological processes. Transformation and presence of the facility will contribute to cumulative habitat loss within CBAs and impacts on broad-scale ecological processes such as fragmentation.	17. There should be an integrated management plan for the development area during operation, which is beneficial to fauna and flora. 18. All disturbed areas that are not used such as excess road widths, should be rehabilitated with locally occurring shrubs and grasses after construction to reduce the overall footprint of the development. 19. Noise and disturbance on the site should be kept to a minimum during operation and maintenance activities.			Alien Plant Management Plan Implemented Plant Rehabilitation Implemented Ensure the conditions of the EA are adhered to.	

9.3.8 Surface Water

This section deals with the issues relative to security during the operation phase.

Table 37: Surface Water

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Impact on aquatic systems through the possible increase in surface water	1. A stormwater management plan must be developed in the preconstruction phase, detailing the stormwater structures and management interventions that must be installed to manage the increase of surface water flows directly into any natural systems.	Holder of the EA/Contractor	All staff members are aware of the EMPr requirements relevant to them	Continuous

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
runoff on form and function during the operational phase Increase in hard surface areas, and roads that require stormwater management will increase through the concentration of surface water flows that could result in localised changes to flows (volume) that would result in form and function changes within aquatic systems, which are currently ephemeral. This then increases the rate of erosions and sedimentation of downstream areas.	This stormwater control systems must be inspected on an annual basis to ensure these are functional. Effective stormwater management must include effective stabilisation (gabions and Reno mattresses) of exposed soil and the re-vegetation of any disturbed riverbanks		Align to Strom Water Plan Ensure the EMPr is adhered to.	

9.3.9 Heritage

This section deals with the issues relative to Heritage during the operation phase.

Table 38: Heritage

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Cultural landscape - Ecological	1. Areas of endemic and endangered natural vegetation should be conserved. 2. Critical Biodiversity Areas, and Ecological Support Areas (along drainage lines), should be protected.	Holder of the EA/Contractor	Ensure the EMPr is adhered to.	Continuous

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	3. Areas of habitat are found among the rocky outcrops and contribute to the character, as well as biodiversity of the area. Care should be taken that habitats are not needlessly destroyed. 4. Identified medicinal plants used for healing or ritual purposes should be conserved during all phases if threatened for use. Access to these resources should be made available to those who have had historic access to them.			
Cultural landscape - Aesthetic	5. Infrastructure improvement or maintenance work, including new roads and upgrades to the road network, should be appropriate to the rural context (scale, material etc.) and avoid steep slopes over 10% as well as ridges. 6. Prevent the construction of new buildings/structures on visually sensitive, steep (over 10%), elevated or exposed slopes, ridgelines and hillcrests or within 800m of the farmsteads and N12 and 300m of the farm roads. 7. Avoid visual clutter in the landscape by intrusive signage, and the intrusion of commercial, corporate development along roads. 8. Duration and magnitude of operational activity must be minimized to reduce the impact of heavy vehicles on the roads as well as the associated dust from the activity. Light vehicles should be used to reduce degradation to the farm roads and the need to upgrade roads to scale and extent that negatively impacts on the integrity of the historic farm roads. Operational traffic must operate at speeds that reduce dust and noise. 9. The impact of WEF turbine night lighting on the wilderness landscape is intrusive and overwhelms the rural character of the landscape, giving it an industrial sense of place after dark. Reduce the impact of turbine night lighting by minimizing the number of turbines with lighting to only those necessary for aviation safety, such as a few identified turbines on the outer periphery, or use aircraft triggered night lighting. Due to the reduced receptors on the roads at night, the impact of the lighting at night	Holder of the EA/Contractor	Ensure the EMPr is adhered to.	Continuous

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	is reserved mainly for farmsteads and other places of overnight habitation such as the surrounding tourist facilities, which would be heavily impacted by the light pollution on a long term and ongoing basis.			
Cultural landscape - Historic	10. Historic farmsteads must be protected from the impacts of operational facility vehicles and increased numbers of people. No WEF operations traffic should pass through or closer than 50m to the outer boundaries of a farm werf, or 200m from graded structures, which includes the associated historically cultivated lands, cemeteries, unmarked burials. The most appropriate use of existing farm roads must be found to avoid farm werfs as far as possible and reduce construction impact on these heritage features. 11. No infrastructure or operational upgrades, such as boreholes, should impact negatively or reduce natural, on site water quality, quantity or access for the residents within or around the development site. Preferably any borehole or other water resource upgrade should also be made freely accessible to the residents living on site. 12. Traditional planting patterns should be protected by ensuring that existing trees are not needlessly destroyed, as these signify traces of cultural intervention in a harsh environment. These planting patterns include the trees planted around the werfs and along travel routes. Interpretation of these landscape features as historic remnants should occur. 13. Burial grounds and places of worship are automatically regarded as Grade IIIa or higher. Any development that threatens the inherent character of family burial grounds must be assessed and should be discouraged and a buffer of 100m around all burial ground or unmarked graves should be in place. No turbines have been proposed for placement near known unmarked burials or family cemeteries. A preconstruction micro-survey of each turbine footprint and any new access roads should be conducted to ensure no further unmarked graves are threatened.	Holder of the EA/Contractor	Ensure the EMPr is adhered to.	Continuous

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	14. Mountain slopes have been used for traditional practices for many years, and care should be taken that any significant cultural sites, such as burials and veldkos/medicinal plant resources, are not disturbed. 15. Farms in the area followed a system of stone markers to demarcate the farm boundaries in the area. Where these structures are found on the site, care should be taken that they are not needlessly destroyed, as they add to the layering of the area. 16. Roads running through the area may have historic stone way markers. Where these are found care should be taken that they are left in tact and in place. Road upgrades must not move or threaten their position and they should be visible from the road they are related to by passing travellers. 17. Where the historic function of a building/site is still intact, the function has heritage value and should be protected. 18. Surviving examples (wagon routes, outspans, and commonage), where they are owned in some public or communal way (or by a body responsible for acting in the public interest) and where they are found to be actively operating in a communal way, will have cultural and heritage value and should be enhanced and retained. The historic route running through Koup 1 should be maintained and integrity as a communal road for farm residents must be retained. 19. Accommodation of WEF staff must not negatively impact on existing farm residents or degrade the integrity of the farmstead complexes and should, without negative impact to ecological or aesthetic resources, be located outside of the farmstead complexes or site. Farm residents should be consulted on the preferable location for construction staff accommodation. 20. Light vehicles should be used to reduce degradation to the farm roads and the need to upgrade roads to scale and extent that negatively impacts on the integrity of the historic farm roads. Operational traffic must operate at speeds that reduce dust and noise.			

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Cultural landscape - Socio-economic	21. The local community on and around the development should benefit from job opportunities created by the proposed development and the development should not cause reduction in economic viability of surrounding properties in excess of those offered by the development. Short-term job opportunities at the expense of long term economic benefit and local employment opportunities must be prevented. 22. The continued use of the landscape for human habitation and cultivation by historic residents of the area, should be retained and encouraged as far possible to sustain the continual use pattern and human-environment relationship which is the ultimate significance of this cultural landscape element. The WEF development must allow and support this, including financially, and not degrade this continued relationship. 23. No infrastructure or operational upgrades, such as boreholes, should impact negatively or reduce natural, on site water quality, quantity or access for the residents within or around the development site. Preferably any borehole or other water resource upgrade should also be made freely accessible to the residents living on site. 24. The local community on and around the development should benefit from job opportunities created by the proposed development and the development should not cause reduction in economic viability of surrounding properties in excess of those offered by the development. Short-term job opportunities at the expense of long term economic benefit and local employment opportunities must be prevented. 25. Local residents must be offered employment on the construction/ decommissioning and operational phases before 'importing' staff from elsewhere. 26. Local residents must be offered employment training opportunities associated with WEF developments at all phases. 27. Crop cultivation, sheep, cattle or game farming should be allowed to continue below the wind turbines, or be rehabilitated to increase biodiversity in the area.	Holder of the EA/Contractor	Ensure the EMPr is adhered to.	Continuous

9.3.10 Visual

This section deals with the issues relative to visual during the operation phase.

Table 39: Visual

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Potential alteration of the visual character and sense of place. Potential visual impact on receptors in the study area. Potential visual impact on the night time visual environment.	1. Turbine colours should adhere to CAA requirements. Bright colours and logos on the turbines should be kept to a minimum. 2. Inoperative turbines should be repaired promptly, as they are considered more visually appealing when the blades are rotating (or at work) (Vissering, 2011). 3. If turbines need to be replaced for any reason, they should be replaced with the same model, or one of equal height and scale to lessen the visual impact. 4. As far as possible, limit the number of maintenance vehicles which are allowed to access the site. 5. Ensure that dust suppression techniques are implemented on all gravel access roads. 6. As far as possible, limit the amount of security and operational lighting present on site. 7. Light fittings for security at night should reflect the light toward the ground and prevent light spill. 8. Lighting fixtures should make use of minimum lumen or wattage. 9. Mounting heights of lighting fixtures should be limited, or alternatively foot-light or bollard level lights should be used. 10. If possible, make use of motion detectors on security lighting. 11. Where possible, the operation and maintenance buildings should be consolidated to reduce visual clutter. 12. The operations and maintenance (O&M) buildings should not be illuminated at night.	Holder of the EA/Contractor	Noise and lighting managed according to approved Method Statement All waste managed according to approved Method Statement Plant Rehabilitation Implemented	During operation

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	13. The O&M buildings should be painted in natural tones that fit with the surrounding environment.			

9.3.11 Social

This section deals with the issues relative to social during the operation phase.

Table 40: Social

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Incident register	1. A public grievance and incident register should be established and should be monitored internally by the developer and made available for public scrutiny if requested. Any incident should be immediately recorded and reported to management and all actions pertaining to that incident, as well as the final outcome of the complaint, should be recorded and signed off by management. If an independent environmental monitor is appointed, this register should be audited on at least a monthly basis.	Holder of the EA/Contractor	Clear communication channels maintained.	Continuous
Health and social Wellbeing: Noise WEF Only	2. Refer to the mitigation measures suggested by the noise specialist.	Holder of the EA/Contractor	Clear communication channels maintained.	Continuous
Health and social Wellbeing: Shadow Flicker	3. Identifying receptor points and applying appropriate technical measures such as computer modelling in siting the wind turbines to limit the effect of shadow flicker. 4. Where necessary and appropriate apply tracking technology that will automatically shutoff and restart the affecting wind turbine to eliminate shadow flicker. 5. Consider the application of appropriate screening measures to reduce the effect of shadow flicker.	Holder of the EA/Contractor	Clear communication channels maintained Social Responsibility Programme implemented	Continuous

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Health and social Wellbeing: Blade glint	6. Calculate and factor in the risk of blade glint in siting the wind turbines. 7. Coat wind turbine blades with non-reflective coating to reduce blade glint. 8. Where appropriate adjust the angle of turbine blades to reduce blade glint.	Holder of the EA/Contractor	Clear communication channels maintained Social Responsibility Programme implemented	Continuous
Health and social Wellbeing: Electromagnetic field and RF interference	9. Wind turbine mechanisms will be elevated and the risk of EMFs will be minimal. Notwithstanding this, it would be pertinent to regularly monitor the levels of EMFs emitted by the turbines and, if necessary, make the appropriate adjustments to ensure that these levels remain within acceptable parameters. 10. Ensure that power lines are not routed in close proximity (with 300 meters) of residential areas to limit the effect off EMFs. 11. Consult with the appropriate telecommunication authorities to ensure that the telecommunication installations identified within the vicinity of the project are not compromised through RFI.	Holder of the EA/Contractor	Clear communication channels maintained Social Responsibility Programme implemented	Continuous
Health and social Wellbeing: Hazard exposure	12. Install early detection techniques to avoid or reduce structural damage.	Holder of the EA/Contractor	Clear communication channels maintained Social Responsibility Programme implemented	Continuous
Quality of the living Environment: Transformation of the sense of place	13. Apply the mitigation measures suggested in the Visual Impact Assessment Report. 14. Communicate the benefits associated with renewable energy to the broader community. 15. Ensure that all affected landowners and tourist associations are regularly consulted. 16. A Grievance Mechanism should be put in place and all grievances should be dealt with transparently.	Holder of the EA/Contractor	Clear communication channels maintained Social Responsibility Programme implemented	Continuous

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	17. The mitigation measures recommended in the Heritage and Palaeontology Impact Assessment should be followed.			
Economic: Job creation and skills development	18. Implement a training and skills development programme for locals. 19. Work closely with the appropriate municipal structures regarding establishing a social responsibility programme.	Holder of the EA/Contractor	Clear communication channels maintained Social Responsibility Programme implemented	Continuous
Economic: Socio-economic stimulation.	20. Ensure that the procurement policy supports local enterprises. 21. Establish a social responsibility programme either in line with the REIPPP BID guidelines or equivalent. 22. Work closely with the appropriate municipal structures regarding establishing a social responsibility programme. 23. Ensure that any trusts or funds are strictly managed in respect of outcomes and funds.	Holder of the EA	Clear communication channels maintained Social Responsibility Programme implemented	Continuous

9.3.12 Transportation

This section deals with the issues relative to transportation during the operation phase.

Table 41: Transportation

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Additional Traffic Generation: **Increase in Traffic**	1. The increase in traffic for this phase of the development is negligible and will not have a significant impact	Holder of the EA/Contractor	All staff members are aware of the EMPr requirements relevant to them Ensure the EMPr is adhered to.	Continuous
Additional Traffic Generation: **Increase of Incidents with pedestrians and livestock**	2. The increase in traffic for this phase of the development is negligible and will not have a significant impact	Holder of the EA/Contractor	All staff members are aware of the EMPr requirements relevant to them Ensure the EMPr is adhered to.	Continuous
Additional Traffic Generation: **Increase in Dust from gravel roads**	3. The increase in traffic for this phase of the development is negligible and will not have a significant impact	Holder of the EA/Contractor	All staff members are aware of the EMPr requirements relevant to them Ensure the EMPr is adhered to.	Continuous
Additional Traffic Generation: **Increase in Road Maintenance**	4. The increase in traffic for this phase of the development is negligible and will not have a significant impact	Holder of the EA/Contractor	All staff members are aware of the EMPr requirements relevant to them	Continuous

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
			Ensure the EMPr is adhered to.	
Additional Abnormal Loads	5. The increase in traffic for this phase of the development is negligible and will not have a significant impact	Holder of the EA/Contractor	All staff members are aware of the EMPr requirements relevant to them Ensure the EMPr is adhered to.	Continuous
Internal Access Roads: **New / Larger Access points**	6. Adequate road signage according to the SARTSM.	Holder of the EA/Contractor	All staff members are aware of the EMPr requirements relevant to them Ensure the EMPr is adhered to.	Continuous

9.4 Decommissioning Phase

9.4.1 On-going Stakeholder involvement

This is the process that is recommended when the proposed wind farms are decommissioned.

Table 42: On-going Stakeholder involvement

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT ACTIONS	TIME FRAME
Ongoing Stakeholder Involvement	1. Community to be notified, as culturally appropriate, timeously of the planned decommissioning, e.g.: • Proposed decommissioning start date; and • Process to be followed. 2. Recommend that a meeting with community leader(s) be held before decommissioning commence to inform them: • What activities will take place during the decommissioning phase. • How these activities will impact upon the communities and/or their properties. • Regarding the timeframes of scheduled activities 3. Regular interaction between the client and community leader(s) during the decommissioning phase 4. A reporting office/ channel to be established should community members experience problems with contractors/ sub-contractors during the decommissioning phase. 5. A register to be kept of problems reported by community members and the steps taken to address / resolve it.	Holder of the EA	Clear communication channels maintained	During decommissioning

9.4.2 Waste Management

This section deals with the issues relative to waste management during the decommissioning phase.

Table 43: Waste Management

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT ACTIONS	TIME FRAME
MITIGATION	1. All decommissioned equipment must be removed from site and disposed of at a registered land fill. Records of disposal must be kept. 2. Wind turbines must be returned to the manufacturer or relevant recycling agent to be recycled.	Holder of the EA	All waste managed according to approved Method Statement	During decommissioning

9.4.3 Agriculture and Soils

This section deals with the issues relative to agriculture and soils during the decommissioning phase.

Table 44: Agriculture and Soils

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES/ FREQUENCY
Aspect: Protection of soil resources **Erosion**	1. Implement an effective system of storm water run-off control, where it is required - that is at any points where run-off water might accumulate. The system must effectively collect and safely disseminate any run-off water from all accumulation points and it must prevent any potential down slope erosion.	Engineer /Contractor	Undertake a periodic site inspection to verify and inspect the effectiveness and integrity of the storm water run-off control system and to specifically record the occurrence of any erosion on site or downstream. Corrective action must be implemented to the run-off control system in the event of any erosion occurring.	That disturbance and existence of hard surfaces causes no erosion on or downstream of the site.	Every 2 months during the decommissioning phase, and then every 6 months after completion of decommissioning, until final sign-off is achieved.

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES/ FREQUENCY
Aspect: Protection of soil resources **Erosion**	2. Maintain where possible all vegetation cover and facilitate re-vegetation of denuded areas throughout the site, to stabilize disturbed soil against erosion.	Engineer /Contractor	Undertake a periodic site inspection to record the occurrence of and re-vegetation progress of all areas that require re-vegetation.	That vegetation clearing does not pose a high erosion risk.	Every 4 months during the decommissioning phase, and then every 6 months after completion of decommissioning, until final sign-off is achieved.
Aspect: Protection of soil resources **Topsoil loss**	3. If an activity will mechanically disturb the soil below surface in any way, then any available topsoil should first be stripped from the entire surface to be disturbed and stockpiled for re-spreading during rehabilitation. During rehabilitation, the stockpiled topsoil must be evenly spread over the entire disturbed surface.	Engineer /Contractor	Record GPS positions of all occurrences of below-surface soil disturbance (e.g. excavations). Record the date of topsoil stripping and replacement. Check that topsoil covers the entire disturbed area.	That topsoil loss is minimised	As required, whenever areas are disturbed.
Removal of subsoils (soil, rock): **Decommissioning of the structure will disturb the geological environment**.	4. Use of temporary berms and drainage channels to divert surface water were feasible. 5. Minimize earthworks and demolish footprints. 6. Use of existing roads and tracks were feasible. 7. Rehabilitation of affected areas (such as regrassing). 8. Develop a chemical spill response plan. 9. Develop dust and demolition fly suppression plan.	Engineer /Contractor	Undertake regular audits	Erosion plan implemented and hydrological measures in place All waste managed according to approved Method Statement Ensure the EMPr is adhered to.	Continuous

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES/ FREQUENCY
	10. Vehicle repairs to be undertaken in designated areas. 11. Reinstate channelized drainage features.				

9.4.4 Avifauna

This section deals with the issues relative to avifauna during the decommissioning phase.

Table 45: Avifauna

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES/ FREQUENCY
Avifauna: Displacement due to disturbance: The noise and movement associated with the de-commissioning activities at the WEF footprint will be a source of disturbance which would lead to the displacement of avifauna from the area	1. A site-specific EMPr must be implemented, which gives appropriate and detailed description of how construction activities must be conducted. All contractors are to adhere to the EMPr and should apply good environmental practice during construction. The EMPr must specifically include the following: • No off-road driving; • Maximum use of existing roads, where possible; • Measures to control noise and dust according to latest best practice; • Restricted access to the rest of the property; • Strict application of all recommendations in the botanical	Contractor and ECO	1. Implementation of the EMPr. Oversee activities to ensure that the EMPr is implemented and enforced via site audits and inspections. Report and record any non-compliance. 2. Ensure that construction personnel are made aware of the impacts relating to off-road driving. 3. Construction access roads must be demarcated clearly. Undertake site inspections to verify. 4. Monitor the implementation of noise	Prevent unnecessary displacement of avifauna by ensuring that contractors are aware of the requirements of the Environmental Management Programme (EMPr.)	1. On a daily basis 2. Weekly 3. Weekly 4. Weekly 5. Weekly

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES/ FREQUENCY
	specialist report pertaining to the limitation of the footprint.		control mechanisms via site inspections and record and report non-compliance. 5. Ensure that the construction area is demarcated clearly and that construction personnel are made aware of these demarcations. Monitor via site inspections and report non-compliance.		
Avifauna: Displacement due to disturbance associated with the dismantling of the wind turbines and associated infrastructure.	1. Dismantling activity should be restricted to the immediate footprint of the infrastructure as far as possible. Access to the remainder of the area should be strictly controlled to prevent unnecessary disturbance of priority species. 2. Measures to control noise and dust should be applied according to current best practice in the industry.	Contractor and ECO Holder of EA	Construction Monitoring and audit reports	Impacts avoided or managed as per specialist recommendations. Ensure the conditions of the EA are adhered to. Adhere to legislative requirements	Continuous

9.4.5 Bats

This section deals with the issues relative to bats during the decommissioning phase.

Table 46: Bats

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
DECOMMISSIONING PHASE					
Decommissioning activities and noise, especially at night- time.	Minimum disturbance due to decommissioning activities.	1. Bat disturbance due to decommissioning activities and associated noise, especially during night-time. 2. Develop a decommissioning and remedial rehabilitation plan and adhere to compliance monitoring plan.	Implement a de-commissioning and rehabilitation plan to reduce the development footprint.	During decommissioning phase.	Site manager ECO

9.4.6 Biodiversity

This section deals with the issues relative to biodiversity during the decommissioning phase.

Table 47: Biodiversity

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES/ FREQUENCY
Faunal disturbance and habitat loss Fauna will be negatively	1. Any potentially dangerous fauna such as snakes or fauna threatened by the decommissioning activities should be removed to a safe location prior to the commencement of decommissioning activities. 2. All hazardous materials should be stored in the appropriate manner to prevent contamination of the site. Any accidental chemical, fuel and oil spills that	Holder of the EA/Contractor	Construction Monitoring and audit reports	Impacts avoided or managed as per specialist recommendations.	Continuous

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES/ FREQUENCY
affected by the decommissioning of the wind farm due to the human disturbance, the presence and operation of vehicles and heavy machinery on the site and the noise generated.	occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill. 3. All vehicles accessing the site should adhere to a low-speed limit (40km/h max) to avoid collisions with susceptible species such as snakes and tortoises. 4. No excavated holes or trenches should be left open for extended periods as fauna may fall in and become trapped. 5. All above-ground infrastructure should be removed from the site. Below-ground infrastructure such as cabling can be left in place if it does not pose a risk, as removal of such cables may generate additional disturbance and impact, however, this should be in accordance with the facilities' decommissioning and recycling plan, and as per the agreements with the land owners concerned.			Alien Plant Management Plan Implemented Plant Rehabilitation Implemented Ensure the conditions of the EA are adhered to.	
Increased potential for soil erosion Following decommissioning, the site will be highly vulnerable to soil erosion due to the disturbance created by the removal of	6. Any roads that will not be rehabilitated should have runoff control features which redirect water flow and dissipate any energy in the water which may pose an erosion risk. 7. There should be regular monitoring (annual) for erosion for at least 5 years after decommissioning by the applicant to ensure that no erosion problems develop as a result of the disturbance, and if they do, to immediately implement erosion control measures. 8. All erosion problems observed should be rectified as soon as possible, using the appropriate erosion control structures and revegetation techniques. 9. All disturbed and cleared areas should be revegetated with indigenous perennial shrubs and grasses from the local area.	Holder of the EA/Contractor	Construction Monitoring and audit reports	Impacts avoided or managed as per specialist recommendations. Alien Plant Management Plan Implemented Plant Rehabilitation Implemented Ensure the conditions of the EA are adhered to.	Continuous

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES/ FREQUENCY
infrastructure from the site					
Ecological degradation due to alien plant invasion.	10. Wherever excavation is necessary for decommissioning, topsoil should be set aside and replaced after construction to encourage natural regeneration of the local indigenous species. 11. Due to the disturbance at the site alien plant species are likely to be a long-term problem at the site following decommissioning and regular control will need to be implemented until a cover of indigenous species has returned. 12. Annual monitoring for alien plants within the disturbed areas for at least three years after decommissioning or until alien invasives are no longer a problem at the site. 13. Regular alien clearing should be conducted using the best-practice methods for the species concerned. The use of herbicides should be avoided as far as possible.	Holder of the EA/Contractor	Construction Monitoring and audit reports	Impacts avoided or managed as per specialist recommendations. Alien Plant Management Plan Implemented Plant Rehabilitation Implemented Ensure the conditions of the EA are adhered to.	Continuous

9.4.7 Surface Water

This section deals with the issues relative to surface water during the decommissioning phase.

Table 48: Surface Water

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES /FREQUENCY
Loss of aquatic species of special concern	1. Develop and implement an Aquatic Rehabilitation and Monitoring plan post Environmental Authorisation. This must be developed following the finalisation of the turbine / road layout and a walk down has been completed.	Holder of the EA/Contractor	Decommissioning Monitoring	Impacts avoided or managed as per specialist recommendations.	Continuous

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES /FREQUENCY
During decommissioning activities within watercourses could result in the disturbance or destruction of any listed and or protected plant or animal species. However none of these aquatic obligate species were observed during this assessment			and audit reports	Ensure the conditions of the EA are adhered to.	
Damage or loss of riparian and or drainage line systems i.e. disturbance of the waterbodies in the decommissioning phase Decommissioning could result in the loss of drainage systems that are fully functional and provide an ecosystem services within the site especially where new access roads are required or road upgrades will widen any current bridges or drifts. Loss can also include a functional loss, through change in vegetation type via alien encroachment for example	2. All alien plant re-growth, which is currently low within the greater region must be monitored and should it occur, these plants must be eradicated within the project footprints and especially in areas near the proposed crossings. *Prosopis* (alien invasive riparian tree) is prevalent in areas to the north of the site, thus care in transporting any material, while ensuring that such materials is free of alien seed, coupled with pre and post alien clearing must be stipulated in the EMPr. Where roads and crossings are upgraded, the following applies: • Existing pipe culverts must be removed and replaced with suitable sized box culverts, especially where road levels are raised to accommodate any large vehicles. • River levels, regardless of the current state of the river / water course must be reinstated thus preventing any impoundments from being formed. The related designs must be assessed by an aquatic specialist during a pre-decommissioning walkdown.	Holder of the EA/Contractor	Decommissioning Monitoring and audit reports	Impacts avoided or managed as per specialist recommendations. Ensure the conditions of the EA are adhered to.	Continuous

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES /FREQUENCY
	• Where large cut and fill areas are required these must be stabilised and rehabilitated during the decommissioning process, to minimise erosion and sedimentation. • Suitable stormwater management systems must be installed along roads and other areas and monitored during the first few months of use. Any erosion / sedimentation must be resolved through whatever additional interventions maybe necessary (i.e., extension, energy dissipaters, spreaders, etc).				
Potential impact on localised surface water quality During decommissioning earthworks will expose and mobilise earth materials, and a number of materials as well as chemicals will be imported and used on site and may end up in the surface water, including soaps, oils, grease and fuels, human wastes, cementitious wastes, paints and solvents, etc. Any spills during transport or while works area conducted in proximity to a watercourse has the potential to affect the surrounding biota. Leaks or	3. All liquid chemicals including fuels and oil, including the BESS must be stored in with secondary containment (bunds or containers or berms) that can contain a leak or spill. Such facilities must be inspected routinely and must have the suitable PPE and spill kits needed to contain likely worst-case scenario leak or spill in that facility, safely. 4. Washing and cleaning of equipment must be done in designated wash bays, where rinse water is contained in evaporation/sedimentation ponds (to capture oils, grease cement and sediment). 5. Mechanical plant and bowsers must not be refuelled or serviced within 100m of a river channel. 6. All construction camps, lay down areas, wash bays, batching plants or areas and any stores should be more than 50 m from any demarcated water courses. Note comment regards Camp A that requires micro-siting.	Holder of the EA/ Contractor	Decommissioning Monitoring and audit reports	Impacts avoided or managed as per specialist recommendations. Ensure the conditions of the EA are adhered to.	Continuous

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES /FREQUENCY
spills from storage facilities also pose a risk and due consideration to the safe design and management of the 30 000l fuel storage facility must be given. Although unlikely, consideration must also be provided for the proposed Battery Energy Storage System (BESS), with regard safe handling during the decommissioning phase. This to avoid any spills or leaks from this system	7. Littering and contamination associated with construction activity must be avoided through effective construction camp management; 8. No stockpiling should take place within or near a water course 9. All stockpiles must be protected and located in flat areas where run-off will be minimised and sediment recoverable;				

9.4.8 Heritage

This section deals with the issues relative to Heritage during the decommissioning phase.

Table 49: Heritage

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Cultural landscape - Ecological	35. Critical Biodiversity Areas, and Ecological Support Areas (along drainage lines), should be protected from development of the wind turbines or any associated development during all phases. 36. No wind turbines should be placed within the 1:100-year flood line of the watercourses. In the context of the sensitivity to soil erosion in the area, as well as potential archaeological resources, it would be a risk to include any structures close to these drainage lines 37. Remaining areas of endemic and endangered natural vegetation should be conserved. 38. Areas of critical biodiversity should be protected from any damage during all phases; where indigenous and endemic vegetation should be preserved at all cost. 39. Areas of habitat are found among the rocky outcrops and contribute to the character, as well as biodiversity of the area. Care should be taken that habitats are not needlessly destroyed. 40. Identified medicinal plants used for healing or ritual purposes should be conserved during all phases if threatened for use. 41. Careful planning should incorporate areas for stormwater runoff where the base of the structure disturbed the natural soil. Local rocks found on the site could be used to slow stormwater (instead of concrete, or standard edge treatments), and prevent erosion that would be an unfortunate consequence that would alter the character of the site. By using rocks from site it helps to sensitively keep to the character.	Holder of the EA/Contractor	Ensure the EMPr is adhered to.	Continuous

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Cultural landscape - Aesthetic	42. Encourage mitigation measures (for instance use of vegetation) to 'embed' or disguise the proposed structures within the surrounding tourism and agricultural landscape at ground level, road edges etc; 43. The continuation of the traditional use of material could be enhanced with the use of the rocks on the site as building material. This would also help to embed structures into the landscape and should not consist of shipping containers or highly reflective untreated corrugated sheeting that clutters the landscape and is exacerbates the foreign intrusion on the natural matte landscape. 44. Using material found on the site adds to the sense of place and reduces transportation costs of bringing materials to site. 45. The local material such as the rocks found within the area could be applied to address storm water runoff from the road to prevent erosion. 46. Duration and magnitude of construction/ decommissioning activity must be minimized to reduce the impact of heavy vehicles on the roads as well as the associated dust from the activity. Light vehicles should be used to reduce degradation to the farm roads and the need to upgrade roads to scale and extent that negatively impacts on the integrity of the historic farm roads. Construction/ decommissioning traffic must operate at speeds that reduce dust and noise. 47. Any new road network or widening must be returned to its original state at end of the operational time of the WEF, with full environmental and aesthetic rehabilitation to the approval of a qualified cultural landscapes assessment specialist. 48. Turbine sites, substation and laydown areas should be returned to their original state at the end of the operational time of the WEF, with full environmental and aesthetic rehabilitation to the approval of a qualified cultural landscapes assessment specialist.	Holder of the EA/Contractor	Ensure the EMPr is adhered to.	Continuous

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Cultural landscape - Historic	49. Historic farmsteads must be protected from the impacts of heavy construction vehicles and increased numbers of people. No construction traffic should pass through or closer than 50m to the outer boundaries of a farm werf, or 200m from graded structures, which includes the associated historically cultivated lands, cemeteries, unmarked burials. The most appropriate use of existing farm roads must be found to avoid farm werfs as far as possible and reduce construction impact on these heritage features. 50. A preconstruction micro-survey for turbines, access roads, substations, laydown areas and gridlines should be completed with CLA specialist to ensure appropriate buffers are maintained. 51. Duration and magnitude of construction/ decommissioning activity must be minimized to reduce the impact of heavy vehicles on the roads as well as the associated dust from the activity. Light vehicles should be used to reduce degradation to the farm roads and the need to upgrade roads to scale and extent that negatively impacts on the integrity of the historic farm roads. Construction decommissioning traffic must operate at speeds that reduce dust and noise. 52. No infrastructure or operational upgrades, such as boreholes, should impact negatively or reduce natural, on site water quality, quantity or access for the residents within or around the development site. Preferably any borehole or other water resource upgrade should also be made freely accessible to the residents living on site. 53. Accommodation of construction staff must not negatively impact on existing farm residents or degrade the integrity of the farmstead complexes and should, without negative impact to ecological or aesthetic resources, be located outside of the farmstead	Holder of the EA/Contractor	Ensure the EMPr is adhered to.	Continuous

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	complexes or site. Farm residents should be consulted on the preferable location for construction staff accommodation. 54. Traditional planting patterns should be protected by ensuring that existing trees are not needlessly destroyed, as these signify traces of cultural intervention in a harsh environment. These planting patterns include the trees planted around the werfs and along travel routes. Interpretation of these landscape features as historic remnants should occur. A buffer of 50m around such planting patters should be maintained. 55. Burial grounds and places of worship are automatically regarded as Grade IIIa or higher. Any development that threatens the inherent character of family burial grounds must be assessed and should be discouraged. No turbines have been proposed for placement near known unmarked burials or family cemeteries. A preconstruction micro-survey of each turbine footprint and any new access roads should be conducted to ensure no further unmarked graves are threatened. A preconstruction micro-survey for access roads, substations, laydown areas and gridlines should be completed with CLA specialist to ensure appropriate buffers are maintained. 56. Mountain slopes have been used for traditional practices for many years, and care should be taken that any significant cultural sites, such as burials and veldkos/medicinal plant resources, are not disturbed. 57. Farms in the area followed a system of stone markers to demarcate the farm boundaries in the area. Where these structures are found on the site, care should be taken that they are not needlessly destroyed, as they add to the layering of the area. A preconstruction micro-survey for access roads, substations, laydown areas and gridlines should be completed with CLA specialist to ensure appropriate buffers are maintained.			

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	58. Roads running through the area have historic stone way markers. Where these are found care should be taken that they are left in tact and in place. Road upgrades must not move or threaten their position and they should be visible from the road they are related to by passing travellers. A preconstruction micro-survey for access roads, substations, laydown areas and gridlines should be completed with CLA specialist to ensure appropriate buffers are maintained. 59. Where the historic function of a building/site is still intact, the function has heritage value and should be protected. 60. Surviving examples (wagon routes, outspans, and commonage), where they are owned in some public or communal way (or by a body responsible for acting in the public interest) and where they are found to be actively operating in a communal way, will have cultural and heritage value and should be enhanced and retained. The historic route running through Koup 1 should be maintained and integrity as a communal road for farm residents must be retained.			
Cultural landscape - Socio-economic	61. An updated cultural landscapes impact assessment report must be completed should the WEF continue to be used after the term granted in this application. This report should include a detailed assessment of the socio-economic impacts to the cultural landscape and its outcomes and recommendations need to be considered in the decision for recommissioning and be implemented if recommissioning is approved. 62. The continued use of the landscape for human habitation and cultivation by historic residents of the area, should be retained and encouraged as far possible to sustain the continual use pattern and human-environment relationship which is the ultimate significance of this cultural landscape element. The WEF	Holder of the EA/Contractor	Ensure the EMPr is adhered to.	Continuous

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	development must allow and support this, including financially, and not degrade this continued relationship. 63. The local community on and around the development should benefit from job opportunities created by the proposed development and the development should not cause reduction in economic viability of surrounding properties in excess of those offered by the development. Short-term job opportunities at the expense of long term economic benefit and local employment opportunities must be prevented. 64. Local residents must be offered employment on the construction/ decommissioning and operational phases before 'importing' staff from elsewhere. 65. Local residents must be offered employment training opportunities associated with WEF developments at all phases. 66. Sheep, cattle or game farming should be allowed to continue below the wind turbines, or be rehabilitated to increase biodiversity in the area.			

9.4.9 Visual

This section deals with the issues relative to visual during the decommissioning phase.

Table 50: Visual

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Potential visual intrusion resulting from vehicles and equipment involved in the decommissioning process; Potential visual impacts of increased dust emissions from decommissioning activities and related traffic; and Potential visual intrusion of any remaining infrastructure on the site.	1. All infrastructure that is not required for post-decommissioning use should be removed. 2. Carefully plan to minimize the decommissioning period and avoid delays. 3. Maintain a neat decommissioning site by removing rubble and waste materials regularly. 4. Ensure that dust suppression procedures are maintained on all gravel access roads throughout the decommissioning phase. 5. All cleared areas should be rehabilitated as soon as possible. 6. Rehabilitated areas should be monitored post-decommissioning and remedial actions implemented as required.	Holder of the EA/Contractor	Noise and lighting managed according to approved Method Statement All waste managed according to approved Method Statement Plant Rehabilitation Implemented	During decommissioning

9.4.10 Transportation

This section deals with the issues relative to transportation during the decommissioning phase.

Table 51: Transportation

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Additional Traffic Generation: **Increase in Traffic**	1. Ensure staff transport is done in the 'off peak' periods and by bus. 2. Stagger material, component and abnormal loads. 3. Construction of an on-site concrete batching plant to reduce trips.	Holder of the EA/Contractor	All staff members are aware of the	Continuous

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
			EMPr requirements relevant to them Ensure the EMPr is adhered to.	
Additional Traffic Generation: **Increase of Incidents with pedestrians and livestock**	4. Reduction in speed of vehicles 5. Adequate enforcement of the law 6. Implementation of pedestrian safety initiatives 7. Regular maintenance of farm fences & access cattle grids 8. Construction of an on-site concrete batching plant to reduce trips.	Holder of the EA/Contractor	All staff members are aware of the EMPr requirements relevant to them Ensure the EMPr is adhered to.	Continuous
Additional Traffic Generation: **Increase in Dust from gravel roads**	9. Reduction in speed of the vehicles 10. Use of dust suppressant techniques 11. Implement a road maintenance program under the auspices of the respective transport department. 12. Construction of an on-site concrete batching plant to reduce trips.	Holder of the EA/Contractor	All staff members are aware of the EMPr requirements relevant to them Ensure the EMPr is adhered to.	Continuous
Additional Traffic Generation: **Increase in Road Maintenance**	13. Implement a road maintenance program under the auspices of the respective transport department. 14. Construction of an on-site batching plant to reduce trips.	Holder of the EA/Contractor	All staff members are aware of the EMPr requirements relevant to them Ensure the EMPr is adhered to.	Continuous
Additional Abnormal Loads	15. Ensure abnormal vehicles travel to and from the proposed development in the 'off peak' periods or stagger delivery. 16. Adequate enforcement of the law	Holder of the EA/Contractor	All staff members are aware of the EMPr requirements relevant to them	Continuous

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
			Ensure the EMPr is adhered to.	
Internal Access Roads: **Increase in Dust from gravel roads**	17. Enforce a maximum speed limit on the development 18. Use of dust suppressant techniques 19. Adequate watering by means of water bowser	Holder of the EA/Contractor	All staff members are aware of the EMPr requirements relevant to them Ensure the EMPr is adhered to.	Continuous
Internal Access Roads: **New / Larger Access points**	20. Adequate road signage according to the SARTSM 21. Approval from the respective roads department	Holder of the EA/Contractor	All staff members are aware of the EMPr requirements relevant to them Ensure the EMPr is adhered to.	Continuous

10. AMENDMENTS TO THE EMPR

The Environmental Control Officer (ECO) has the right to request (in writing) a method statement to be compiled by the contractor in cases where the Construction EMPr may not adequately address the issue or nature of the activity/site warrants the need thereof. The method statement must be approved in writing by the ECO prior to carrying out the activity.

Any major issues not covered in the EMPr as submitted as well as any layout changes, will be addressed as an addendum to the EMPr and must be submitted for approval prior to implementation.

Authorised officials of the Department reserve the right to review the approved EMPr during the construction and operational phases of the above-mentioned activity and amend/add any condition as it is deemed necessary. Authorised officials also reserve the right to inspect the project during both construction and operational phase of development.

11. ENVIRONMENTAL AWARENESS PLAN

Appendix 4 of GN R326 EIA Regulations 2014 (as amended) requires that and Environmental Awareness Plan describes the manner in which "*the applicant intends to inform his or her employees of any environmental risk which may result from their work; and risks must be dealt with in order to avoid pollution or the degradation of the environment*". In recognition of the need to protect our environment, environmental management should not only be seen as a legal obligation but also as a moral obligation.

This Environmental Awareness Plan is intended to create the required awareness and culture with personnel and contractor's / service providers on environmental safety and health issues associated with the development activities.

11.1 Policy on Environmental Awareness

This Environmental Awareness Plan must serve as the basis for the induction of all new employees (as well as contractors depending on the nature of their work on site) on matters as described herein and read in conjunction with the EMPr. The Plan will also be used to hone awareness of all employees on a continuous basis.

Specific environmental awareness performance criteria will also form part of the job descriptions of employees, to ensure diligence and full responsibility at all levels of the organisational work force.

11.2 Implementation of Environmental Awareness

General environmental awareness will be fostered among the project's workforce to encourage the implementation of environmentally sound practices throughout the project's duration. This will ensure that environmental accidents are minimised and environmental compliance maximised.

Environmental awareness will be fostered in the following manner:

- Induction course for all workers on site, before commencing work on site;

- Refresher courses as and when required;
- Daily toolbox talks with all workers on the site at the start of each day, where workers can be alerted to particular environmental concerns associated with their tasks for that day or the area/habitat in which they are working; and
- Displaying of information posters and other environmental awareness material at the general assembly points.

11.3 Training and awareness

The main contractor is to take responsibility for the management of their staff and subcontractors on the project site during the construction phase and supervise them closely at all times. The onus is on the contractor to make sure that all their staff and subcontractors fully comprehend the contents of the EMPr. The contractor must organise environmental awareness training programmes, which should be targeted at the two levels of employee: management and labour.

11.4 Training of construction workers

All construction staff must receive basic training in environmental awareness, including the storage and handling of hazardous substances, minimisation of disturbance to sensitive areas, management of waste, and prevention of water pollution. They must be informed of how to recognise historical / archaeological artefacts that may be uncovered. They must also be apprised of the EMPr's requirements. Environmental awareness training programmes need to be formulated for these employee levels and must comprise:

- A record of all names, positions and duties of staff to be trained;
- A framework for the training programmes;
- A summarised version of the training course(s); and
- An agenda for the delivery of the training courses.

Such programmes will set out the training requirements, which need to be conducted prior to any construction works occurring and will include:

- Acceptable behaviour with regard to flora and fauna;
- Management and minimising of waste, including waste separation;
- Maintenance of equipment to prevent the accidental discharge or spill of fuel, oil, lubricants, cement, mortar and other chemicals;
- Responsible handling of chemicals and spills;
- Environmental emergency procedures and incident reporting; and
- General code of conduct towards I&APs.

12. CONCLUSION

The environmental and social impacts of the project were identified through the four project phases (pre-construction, construction, operation and decommissioning). The following section briefly describes some of the major impacts and proposed mitigation measures within each of the project phases.

12.1 Pre-Construction Phase

The first site activities before mobilization of equipment will be a survey, required for final design of wind farm foundations. There will be negative impacts on land associated with the construction of camps (temporary loss) and storage of construction materials, and foundations for the buildings (permanent loss) and wind turbines. Expectations of improvement in livelihood among locals should be addressed through public participation. Construction contracts will include environmental monitoring and management procedures and requirements. These must be in place prior to the commencement of any construction activities. Avifauna and Bat Monitoring programmes have been initiated to document the current baseline of avifauna and bat activity on the site and the area surrounding the site. Once the final site has been selected for the wind farm and the layouts plans have been finalised a detailed geotechnical investigation should be undertaken.

12.2 Construction Phase

This phase of the activity will have both positive and negative impacts. The positive impacts are employment opportunities offered to the construction workers and any other labourer who will be hired to provide their services during the construction phase. The negative impacts would include wastes generated, accidents, air, dust and noise pollution, vegetation clearance, soil erosion, socio-environmental issues, loss of vegetation, and compaction of soil. Most of the negative impacts are minor and temporary and the significance of the impacts can be greatly reduced by the implementation of mitigation measures, which are outlined in this EMPr. The contractor shall ensure that all staff have adequate protective clothing and are adequately trained. Avifauna and Bat Monitoring should be initiated to document the impact of the construction phase on Avifauna and bat activity on the site and the area surrounding the site.

12.3 Operational Phase

The proposed project will have minimal negative effects which mainly relates to loss of aesthetic value and habitat. The habitat that will be lost is not regarded as pristine and therefore, is not viewed as significant. Most of the negative impacts are minor and the significance of the impacts can be greatly reduced by the implementation of mitigation measures, which are outlined in this EMPr.

12.4 Decommissioning Phase

As with any project, the facilities used in this project will have a lifetime after which they may no longer be cost effective to continue with operation. At that time, the project would be decommissioned, and the existing equipment removed.

Potential environmental impacts caused during decommissioning are those, which will be mitigated as provided by the Environmental Management Programme. These include: noise and emissions to the

surrounding environment, removal of hazardous waste and substances, fire, oil spills, wastes and public safety.

The disposal of materials from the decommissioned plant is not viewed as high risk. Much of the material would be recyclable (steel structures and turbine engines etc.) or inert (concrete foundations, etc.). These materials would however, need to be disposed of at a formal waste disposal or recycling centre.

Based on the above information, it is unlikely that the Project will have significant adverse social and environmental impacts. Most adverse impacts will be of a temporary nature during the construction phase and can be managed to acceptable levels with implementation of the recommended mitigation measures for the Project such that the overall benefits from the Project will greatly outweigh the few adverse impacts.

All the negative impacts could be easily mitigated and will either be moderate or less in rating. Generally, the proposed wind farm will result in appreciable benefits to the people in the project area of influence and bring opportunities for development to the country.

Annexure A:

Curriculum Vitae

Annexure B:

Environmental Incidents

LOG Environmental Incident Log

ENVIRONMENTAL INCIDENT LOG				
Date	Env. Condition	Comments *(Include any possible explanations for current condition and possible responsible parties. Include photographs, records etc. if available)*	Corrective Action Taken (*Give details and attach documentation as far as possible)*	*Signature*

Annexure C:

Complaints Record Sheet

Complaints Record Sheet

COMPLAINTS RECORD SHEET	File Ref: Page …. of ….	DATE: ……
COMPLAINT RAISED BY:		
CAPACITY OF COMPLAINANT:		
COMPLAINT RECORDED BY:		
COMPLAINT:		
PROPOSED REMEDIAL ACTION:		
EO: _____ Date: _____		
NOTES BY ECO:		
EO: _____ Date: _____ Site Manager: _____ Date: _____		

Annexure D:

Heritage Requirements

General Recommendations and Mitigation Measures

Construction phase

The project will encompass a range of activities during the construction phase, including vegetation clearance, excavations and infrastructure development associated with the project.

It is possible that cultural material will be exposed during construction and may be recoverable, keeping in mind delays can be costly during construction and as such must be minimised. Development surrounding infrastructure and construction of facilities results in significant disturbance, however foundation holes do offer a window into the past, and it thus may be possible to rescue some of the data and materials. It is also possible that substantial alterations will be implemented during this phase of the project, and these must be catered for. Temporary infrastructure developments are often changed or added to the project as required. In general, these are low impact developments as they are superficial, resulting in little alteration of the land surface, but still need to be catered for.

During the construction phase, it is important to recognize any significant material being unearthed, making the correct judgment on which actions should be taken. It is recommended that the following chance find procedure should be implemented.

Chance find procedure

- A heritage practitioner / archaeologist should be appointed to develop a heritage induction program and conduct training for the ECO as well as team leaders in the identification of heritage resources and artefacts.
- An appropriately qualified heritage practitioner / archaeologist must be identified to be called upon if any possible heritage resources or artefacts are identified.
- Should an archaeological site or cultural material be discovered during construction (or operation), the area should be demarcated, and construction activities halted.
- The qualified heritage practitioner / archaeologist will then need to come out to the site and evaluate the extent and importance of the heritage resources and make the necessary recommendations for mitigating the find and the impact on the heritage resource.
- The contractor therefore should have some sort of contingency plan so that operations could move elsewhere temporarily while the materials and data are recovered.
- Construction can commence as soon as the site has been cleared and signed off by the heritage practitioner / archaeologist.

Possible finds during construction

The study area occurs within a greater historical and archaeological site as identified during the desktop and fieldwork phase. Soil clearance for infrastructure as well as the proposed development activities, could uncover the following:

- High density concentrations of stone artefact
- unmarked graves

Timeframes

It must be kept in mind that mitigation and monitoring of heritage resources discovered during construction activity will require permitting for collection or excavation of heritage resources and lead times must be worked into the construction time frames. **The** table below gives guidelines for lead times on permitting.

Lead times for permitting and mobilisation

Action	Responsibility	Timeframe
Preparation for field monitoring and finalisation of contracts	The contractor and service provider	1 month
Application for permits to do necessary mitigation work	Service provider – Archaeologist and SAHRA	3 months
Documentation, excavation and archaeological report on the relevant site	Service provider – Archaeologist	3 months
Handling of chance finds – Graves/Human Remains	Service provider – Archaeologist and SAHRA	2 weeks
Relocation of burial grounds or graves in the way of construction	Service provider – Archaeologist, SAHRA, local government and provincial government	6 months

Heritage Management Plan for EMPr implementation – Archaeological, BGG and Built Environment structures

Heritage Management Plan for EMPr implementation

Area and site no.	Mitigation measures	Phase	Timeframe	Responsible party for implementation	Monitoring Party (frequency)	Target	Performance indicators (monitoring tool)
General project area	• Implement a chance find procedures in case where possible heritage finds are uncovered.	Construction and operation	During construction and operation	Applicant ECO Heritage Specialist	ECO (monthly / as or when required)	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 34-36 and 38 of NHRA	ECO Monthly Checklist/Report
Graves and Burial grounds (KO-06 and KO-09)	• The sites should be demarcated with a 50-meter no-go-buffer-zone and the graves should be avoided and left in situ. • A Grave Management Plan should be developed for the graves, to be implemented during the construction and operation phases (which needs approval by HWC. • If the site is going to be impacted directly and the graves need to be removed a grave relocation process for these sites is recommended as a mitigation and management measure. This will involve the necessary social consultation and public participation process before grave relocation permits can be applied for with the HWC under the NHRA and National Health Act regulations.	Construction	Prior to and during construction	Applicant ECO	Applicant ECO	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 36 and 38 of NHRA	ECO Monthly Checklist/Report
Possible graves (KO-08 and KO-09)	• The site should be demarcated with a 50-meter buffer and the grave should be avoided if any construction is to happen close to it.	Construction through to Operational	During Construction and Operation	Applicant ECO Environmental Control Officer (ECO) Heritage specialist	Monthly	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 36 and 38 of NHRA	ECO Monthly Checklist/Report
Historical Structures that were rated as	• No mitigation required	Pre-construction	Pre-construction and during construction	Applicant ECO Archaeologist	None	Ensure compliance with relevant legislation and recommendations from	ECO Monthly checklist/report

Area and site no.	Mitigation measures	Phase	Timeframe	Responsible party for implementation	Monitoring Party (frequency)	Target	Performance indicators (monitoring tool)
NCW (**KO-01** and **KO-04**)						HWC under Section 36 and 38 of NHRA	
Historical Structures that were rated as low and medium heritage significance (**KO-02 and KO-03**) but don't fall within proposed development area.	• As KO-02 and KO-03 are located more than 100m adjacent to an existing farm road, it is unlikely that it will be impacted.	Pre-construction	Pre-construction and during construction	Applicant ECO Archaeologist	None	Ensure compliance with relevant legislation and recommendations from HW under Section 36 and 38 of NHRA	ECO Monthly checklist/report
Historical Farmsteads that were rated as medium heritage significance (**KO-05**)	• In terms of general conservation of the historical farmsteads, a 30m no-go buffer zone is recommended. • If development occurs within 30m of the farmsteads, the buildings will need to be satisfactorily studied and recorded before impact occurs. • Recording of the buildings i.e. (a) map indicating the position and footprint of all the buildings and structures (b) photographic recording of all the buildings and structures (c) measured drawings of the floor plans of the principal buildings.	Pre-construction	Pre-construction	Applicant ECO Archaeologist	None	Ensure compliance with relevant legislation and recommendations from HWC under Section 36 and 38 of NHRA	ECO Monthly checklist/report
Archaeological site that was rated as low heritage significance (**KO_018**)	• No mitigation required	Pre-construction	Pre-construction	Applicant ECO Archaeologist	None	Ensure compliance with relevant legislation and recommendations from HWC under Section 36 and 38 of NHRA	ECO Monthly checklist/report

HERITAGE MANAGEMENT PLAN FOR EMPR IMPLEMENTATION – PALAEONTOLOGY

Aspect	Mitigation measures	Phase	Target
General project area	• A pre-construction palaeontological heritage walkdown of the final WEF and grid connection layout • Implement a Chance Fossil Finds Protocol as described in the PIA	Pre-Construction Construction	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 35 of NHRA

HERITAGE MANAGEMENT PLAN FOR EMPR IMPLEMENTATION – CULTURAL LANDSCAPE

Aspect	Mitigation measures	Phase	Target
Ecological	• Critical Biodiversity Areas, and Ecological Support Areas (along drainage lines), should be protected from development of the wind turbines or any associated development during all phases. • No wind turbines should be placed within the 1:100-year flood line of the watercourses. In the context of the sensitivity to soil erosion in the area, as well as potential archaeological resources, it would be a risk to include any structures close to these drainage lines. • Identified medicinal plants used for healing or ritual purposes should be conserved during all phases if threatened for use and continued access to these resources be maintained. • Careful planning should incorporate areas for stormwater runoff where the base of the structure disturbed the natural soil. Local rocks found on the site could be used to slow stormwater (instead of concrete, or standard edge treatments), and prevent erosion that would be an unfortunate consequence that would alter the character of the site. By using rocks from site, it helps to sensitively keep to the character.	Planning/ pre-construction	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 38 of NHRA
	• Critical Biodiversity Areas, and Ecological Support Areas (along drainage lines), should be protected from development of the wind turbines or any associated development during all phases. • No wind turbines should be placed within the 1:100-year flood line of the watercourses. In the context of the sensitivity to soil erosion in the area, as well as potential archaeological resources, it would be a risk to include any structures close to these drainage lines • Remaining areas of endemic and endangered natural vegetation should be conserved. • Critical Biodiversity Areas, and Ecological Support Areas (along drainage lines), should be protected from development of the wind turbines or any associated development during all phases. • Areas of critical biodiversity should be protected from any damage during all phases, where indigenous and endemic vegetation should be preserved at all cost. • Areas of habitat are found among the rocky outcrops and contribute to the character, as well as biodiversity of the area. Care should be taken that habitats are not needlessly destroyed. • Identified medicinal plants used for healing or ritual purposes should be conserved during all phases if threatened for use. • Careful planning should incorporate areas for stormwater runoff where the base of the structure disturbed the natural soil. Local rocks found on the site could be used to slow stormwater (instead of concrete, or standard edge treatments), and prevent erosion that would be an unfortunate consequence that would alter the character of the site. By using rocks from site, it helps to sensitively keep to the character.	Construction/ decommissioning	

Aspect	Mitigation measures	Phase	Target
	• Areas of endemic and endangered natural vegetation should be conserved. • Critical Biodiversity Areas, and Ecological Support Areas (along drainage lines), should be protected. • Areas of habitat are found among the rocky outcrops and contribute to the character, as well as biodiversity of the area. Care should be taken that habitats are not needlessly destroyed. • Identified medicinal plants used for healing or ritual purposes should be conserved during all phases if threatened for use. Access to these resources should be made available to those who have had historic access to them.	Operational	

Aesthetic	• Where additional infrastructure (i.e. roads) is needed, the upgrade of existing roads to accommodate the development should be the first consideration.
	• Avoid development of infrastructure (such as buildings, wind turbines and power lines), on crests or ridgelines due to the impact on the visual sensitivity of skylines. The visual impact of turbines can be reduced by distancing them from viewpoints such as roads and farmsteads, and placing them in lower lying plains to reduce their impact on the surrounding sensitive cultural landscape.
	• Significant and place-making viewsheds of surrounding ridgelines and distant mountain should be maintained by limiting the placement of turbines or associated infrastructure on opposing sides of any of the regional roads, so that at any time a turbine-free view can be found when travelling through the landscape or at the historic farmsteads.
	• Retain view-lines and vistas focused on prominent natural features such as mountain peaks or hills, such as Platdoring se Kop and the Koup 1 poort, as these are important place making and orientating elements for experiencing the cultural landscape.
	• Prevent the construction of new buildings/structures/ new roads on visually sensitive, steep, elevated or exposed slopes, ridgelines and hillcrests.
	• Turbine and new road placement to avoid slopes steeper than 10% with existing farm roads to be used for access to turbines as far possible.
	• Proposed turbines 4, 5 and 8 **are not feasible** in their current proposed locations due to steep slope gradients and high and visually prominent ridge lines in these locations which will have an overwhelming negative impact on the historic farm road.
	• Proposed turbine 9 is **not feasible** in the current proposed location due to a combination of factors that cumulatively overwhelm the cultural landscape:
	  o Prominent location in relation to the Koup 1 landscape poort.
	  o Location at the top of a steep slope classified as 10% and higher.
	  o Location at one of the highest points in the Koup 1 landscape at close to 1050masl.
	• Due to the scenic and historic significance of the regional road, a buffer of 1000m to either side of the N12 should be maintained for no development associated with the WEF other than sensitive road upgrades, which must not impact on the views from the road. The visual impact of the turbines will be 50% less at 1km distance and therefore this distance will greatly reduce the negative visual impact of the turbines on the experience of the historic road and the values that give it significance.
	• Due to the nature of the landscape being largely devoid of high vertical elements such as the proposed turbines, and the introduction of these turbines fundamentally altering the sense of place and character of the landscape for those living there, location of majority of turbines should be limited to a 1km buffer around the farmsteads. The current turbine layout supports this recommendation in that there is nowhere more than a single turbine at the edge of these buffer zones.
	• Due to the historic and local experience of the landscape from the farm roads, which link the historically significant farmsteads across the region, a buffer of 300m from the farm roads should be maintained for no development associated with the WEF other than sensitive road upgrades which must not impact on the views from the road.
		Planning/ pre-construction	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 38 of NHRA

Aspect	Mitigation measures	Phase	Target
	• Alternatives Option 1(sub1) for the grid corridor and Option 1 for the laydown area, are preferred in terms of cultural landscape assessment as they limit the construction to a smaller footprint on the landscape and locate the infrastructure far enough from the N12 and out of the Koup 1 landscape as far possible. They should be moved as far away from the farm road as possible without impacting on a riverine corridor flood line or a slope over 3%. • The substation location should be located on the same side as other development infrastructure and to the north of the farm road so as to limit the visual impact to one viewshed. As there is a ridge behind this development area, for which turbine placement is proposed, location of the substation to the north of the farm road contains the impact to one side of the road and the infrastructure will not interrupt view lines of the mountain ranges in the distance. • The impact of WEF turbine night lighting on the wilderness landscape is intrusive and overwhelms the rural character of the landscape, giving it an industrial sense of place after dark. Reduce the impact of turbine night lighting by minimizing the number of turbines with lighting to only those necessary for aviation safety, such as a few identified turbines on the outer periphery, or use aircraft triggered night lighting. Due to the reduced receptors on the roads at night, the impact of the lighting at night is reserved mainly for farmsteads and other places of overnight habitation such as the surrounding tourist facilities, which would be heavily impacted by the light pollution on a long term and ongoing basis.		
Aesthetic	• Encourage mitigation measures (for instance use of vegetation) to 'embed' or disguise the proposed structures within the surrounding tourism and agricultural landscape at ground level, road edges etc; • The continuation of the traditional use of material could be enhanced with the use of the rocks on the site as building material. This would also help to embed structures into the landscape and should not consist of shipping containers or highly reflective untreated corrugated sheeting that clutters the landscape and is exacerbates the foreign intrusion on the natural matte landscape. • Using material found on the site adds to the sense of place and reduces transportation costs of bringing materials to site. • The local material such as the rocks found within the area could be applied to address storm water runoff from the road to prevent erosion. • Duration and magnitude of construction/ decommissioning activity must be minimized as far possible to reduce the impact of heavy vehicles on the roads as well as the associated dust from the activity. Lightest vehicles possible should be used to reduce degradation to the farm roads and the need to upgrade roads to scale and extent that negatively impacts on the integrity of the historic farm roads. Construction/ decommissioning traffic must operate at speeds that reduce dust and noise as far possible.	Construction/ decommissioning	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 38 of NHRA
Aesthetic	• Infrastructure improvement or maintenance work, including new roads and upgrades to the road network, should be appropriate to the rural context (scale, material etc.) and avoid steep slopes over 10% as well as ridges. • Prevent the construction of new buildings/structures on visually sensitive, steep (over 10%), elevated or exposed slopes, ridgelines and hillcrests or within 800m of the farmsteads and N12 and 300m of the farm roads. • Avoid visual clutter in the landscape by intrusive signage, and the intrusion of commercial, corporate development along roads. • Duration and magnitude of operational activity must be minimized as far possible to reduce the impact of heavy vehicles on the roads as well as the associated dust from the activity. Lightest vehicles possible should be used to reduce degradation to the farm roads and the need to upgrade roads to scale and extent that negatively impacts on the integrity of the historic farm roads. Operational traffic must operate at speeds that reduce dust and noise as far possible. • The impact of WEF turbine night lighting on the wilderness landscape is intrusive and overwhelms the rural character of the landscape, giving it an industrial sense of place after dark. Reduce the impact of turbine night lighting by minimizing the number of turbines with lighting to only those necessary for aviation safety, such as a few identified turbines on the outer periphery, or use aircraft triggered night	Operational	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 38 of NHRA

Aspect	Mitigation measures	Phase	Target
	lighting. Due to the reduced receptors on the roads at night, the impact of the lighting at night is reserved mainly for farmsteads and other places of overnight habitation such as the surrounding tourist facilities, which would be heavily impacted by the light pollution on a long term and ongoing basis.		
Historic	• Due to the scenic and historic significance of the regional road, a buffer of 1000m to either side of the N12 should be maintained for no development associated with the WEF other than sensitive road upgrades, which must not impact on the views from the road. The visual impact of the turbines will be 50% less at 1000m distance and therefore this distance will greatly reduce the negative visual impact of the turbines on the experience of the historic road and the values that give it significance. • The integrity of the historic farmsteads and their associated cultivated areas and relationship to the riverine corridors and other natural elements, such as Platdoring se Kop, should be maintained and protected. Due to the nature of the landscape being largely devoid of high vertical elements such as the proposed turbines, the introduction of turbines will fundamentally alter the sense of place and character of the landscape for those living there. Location of proposed turbines should be limited to a 800m buffer around the farmsteads as far possible to limit impact to the farmsteads. The current turbine layout supports this recommendation in that there is nowhere more than a single turbine at the edge of these buffer zones. • Any development that impacts the inherent character of the werf component should be discouraged and a development buffer of 50m around the outer boundary of farm werfs and 200m around any graded heritage structure, must be maintained, including the associated cultivated areas, cemeteries and unmarked graves, for all new infrastructure. • Due to the historic and local experience of the landscape from the farm roads, which link the historically significant farmsteads across the region, a buffer of 300m from the farm roads should be maintained for no development associated with the WEF other than sensitive road upgrades which must not impact on the views from the road. • The existing names of places, routes, watercourses and natural features in the landscape that are related to its use, history and natural character should be retained and used as heritage resources related to intangible heritage. • Burial grounds and places of worship are automatically regarded as Grade IIIa or higher. Any development that threatens the inherent character of family burial grounds must be assessed and should be discouraged. No development closer than 100m from the boundary of any burial grounds or unmarked graves. No turbines have been proposed for placement near known unmarked burials or family cemeteries. A preconstruction micro-survey of each turbine footprint and any new access roads should be conducted to ensure no further unmarked graves are threatened. • Commonages and outspans were located at water points, and these places were likely gathering points before the arrival of colonists and continued to provide communal resources. In the mid-20th century, many old commonages came under the ownership of the Municipality, and have since been rented out to private individuals or organisations. The Municipality should facilitate the use of common land in a way that promotes the well-being and quality of life of the public. These sites can play a restorative role within the community, for instance for those who have limited alternative opportunities for recreation. • Respect existing patterns, typologies and traditions of settlement-making by promoting the continuity of heritage features. These include: (a) indigenous; (b) colonial; and (c) current living heritage in the form of tangible and intangible associations to place. • Alterations and additions to conservation-worthy structures should be sympathetic to their architectural character and period detailing.	Planning/ pre-construction	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 38 of NHRA
Historic	• Historic farmsteads must be protected from the impacts of heavy construction vehicles and increased numbers of people. No construction traffic should pass through or closer than 50m to the outer boundaries of a farm werf, or 200m from graded structures, which includes the associated historically cultivated lands, cemeteries, unmarked burials. The most appropriate use of existing farm roads must be found to avoid farm werfs as far as possible and reduce construction impact on these heritage features.	Construction/ decommissioning	Ensure compliance with relevant legislation and recommendations

Aspect	Mitigation measures	Phase	Target
	• Duration and magnitude of construction/ decommissioning activity must be minimized as far possible to reduce the impact of heavy vehicles on the roads as well as the associated dust from the activity. Lightest vehicles possible should be used to reduce degradation to the farm roads and the need to upgrade roads to scale and extent that negatively impacts on the integrity of the historic farm roads. Construction decommissioning traffic must operate at speeds that reduce dust and noise as far possible. • Accommodation of construction staff must not negatively impact on existing farm residents or degrade the integrity of the farmstead complexes and should, without negative impact to ecological or aesthetic resources, be located outside of the farmstead complexes or site. Farm residents should be consulted on the preferable location for construction staff accommodation. • Traditional planting patterns should be protected by ensuring that existing trees are not needlessly destroyed, as these signify traces of cultural intervention in a harsh environment. These planting patterns include the trees planted around the werfs and along travel routes. Interpretation of these landscape features as historic remnants should occur. A buffer of 50m around such planting patters should be maintained. • Burial grounds and places of worship are automatically regarded as Grade IIIa or higher. Any development that threatens the inherent character of family burial grounds must be assessed and should be discouraged. No turbines have been proposed for placement near known unmarked burials or family cemeteries. A preconstruction micro-survey of each turbine footprint and any new access roads should be conducted to ensure no further unmarked graves are threatened. • Mountain slopes have been used for traditional practices for many years, and care should be taken that any significant cultural sites, such as burials and veldkos/medicinal plant resources, are not disturbed. • Farms in the area followed a system of stone markers to demarcate the farm boundaries in the area. Where these structures are found on the site, care should be taken that they are not needlessly destroyed, as they add to the layering of the area. • Roads running through the area have historic stone way markers. Where these are found care should be taken that they are left in tact and in place. Road upgrades must not move or threaten their position and they should be visible from the road they are related to by passing travellers. • Where the historic function of a building/site is still intact, the function has heritage value and should be protected. • Surviving examples (wagon routes, outspans, and commonage), where they are owned in some public or communal way (or by a body responsible for acting in the public interest) and where they are found to be actively operating in a communal way, will have cultural and heritage value and should be enhanced and retained. The historic route running through Koup 1 should be maintained and integrity as a communal road for farm residents must be retained. •		from SAHRA under Section 38 of NHRA
Historic	• Historic farmsteads must be protected from the impacts of operational facility vehicles and increased numbers of people. No WEF operations traffic should pass through or closer than 50m to the outer boundaries of a farm werf, or 200m from graded structures, which includes the associated historically cultivated lands, cemeteries, unmarked burials. The most appropriate use of existing farm roads must be found to avoid farm werfs as far as possible and reduce construction impact on these heritage features. • Traditional planting patterns should be protected by ensuring that existing trees are not needlessly destroyed, as these signify traces of cultural intervention in a harsh environment. These planting patterns include the trees planted around the werfs and along travel routes. Interpretation of these landscape features as historic remnants should occur. • Burial grounds and places of worship are automatically regarded as Grade IIIa or higher. Any development that threatens the inherent character of family burial grounds must be assessed and should be discouraged and a buffer of 100m around all burial ground or unmarked graves should be in place. No turbines have been proposed for placement near known unmarked burials or family cemeteries. A	Operational	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 38 of NHRA

Aspect	Mitigation measures	Phase	Target
	preconstruction micro-survey of each turbine footprint and any new access roads should be conducted to ensure no further unmarked graves are threatened. • Mountain slopes have been used for traditional practices for many years, and care should be taken that any significant cultural sites, such as burials and veldkos/medicinal plant resources, are not disturbed. • Farms in the area followed a system of stone markers to demarcate the farm boundaries in the area. Where these structures are found on the site, care should be taken that they are not needlessly destroyed, as they add to the layering of the area. • Roads running through the area may have historic stone way markers. Where these are found care should be taken that they are left in tact and in place. Road upgrades must not move or threaten their position and they should be visible from the road they are related to by passing travellers. • Where the historic function of a building/site is still intact, the function has heritage value and should be protected. • Surviving examples (wagon routes, outspans, and commonage), where they are owned in some public or communal way (or by a body responsible for acting in the public interest) and where they are found to be actively operating in a communal way, will have cultural and heritage value and should be enhanced and retained. The historic route running through Koup 1 should be maintained and integrity as a communal road for farm residents must be retained. • Accommodation of WEF staff must not negatively impact on existing farm residents or degrade the integrity of the farmstead complexes and should, without negative impact to ecological or aesthetic resources, be located outside of the farmstead complexes or site. Farm residents should be consulted on the preferable location for construction staff accommodation. • Lightest vehicles possible should be used to reduce degradation to the farm roads and the need to upgrade roads to scale and extent that negatively impacts on the integrity of the historic farm roads. Operational traffic must operate at speeds that reduce dust and noise as far possible.		
Socio-economic	• The findings of this report must be shared with identified interested and affected parties, including non-landowner residents on the development properties, in the EIA public participation process in order to further ascertain any intangible cultural resources that may exist on the landscape that have not been identified. A specialist qualified in recognising and discussing significance of intangible heritage resources should be present during the public meetings. The findings should inform the recommendations for appropriate mitigation for impacts to the cultural landscape. • The continued use of the landscape for human habitation and cultivation by historic residents of the area, should be retained and encouraged as far possible to sustain the continual use pattern and human-environment relationship which is the ultimate significance of this cultural landscape element. The WEF development must allow and support this, including financially, and not degrade this continued relationship. • The local community on and around the development should benefit from job opportunities created by the proposed development and the development should not cause reduction in economic viability of surrounding properties in excess of those offered by the development. Short-term job opportunities at the expense of long term economic benefit and local employment opportunities must be prevented. • Local residents must be offered employment on the construction/ decommissioning and operational phases before 'importing' staff from elsewhere. • Local residents must be offered employment training opportunities associated with WEF developments at all phases.	Planning/ pre-construction	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 38 of NHRA
	• An updated cultural landscapes impact assessment report must be completed should the WEF continue to be used after the term granted in this application. This report should include a detailed assessment of the socio-economic impacts to the cultural landscape and its	Construction/ decommissioning	Ensure compliance with relevant legislation and recommendations

Aspect	Mitigation measures	Phase	Target
	outcomes and recommendations need to be considered in the decision for recommissioning and be implemented if recommissioning is approved. • The continued use of the landscape for human habitation and cultivation by historic residents of the area, should be retained and encouraged as far possible to sustain the continual use pattern and human-environment relationship which is the ultimate significance of this cultural landscape element. The WEF development must allow and support this, including financially, and not degrade this continued relationship. • The local community on and around the development should benefit from job opportunities created by the proposed development and the development should not cause reduction in economic viability of surrounding properties in excess of those offered by the development. Short-term job opportunities at the expense of long term economic benefit and local employment opportunities must be prevented. • Local residents must be offered employment on the construction/ decommissioning and operational phases before 'importing' staff from elsewhere. • Local residents must be offered employment training opportunities associated with WEF developments at all phases. • Sheep, cattle or game farming should be allowed to continue below the wind turbines, or be rehabilitated to increase biodiversity in the area.		from SAHRA under Section 38 of NHRA
	• The local community on and around the development should benefit from job opportunities created by the proposed development and the development should not cause reduction in economic viability of surrounding properties in excess of those offered by the development. Short-term job opportunities at the expense of long term economic benefit and local employment opportunities must be prevented. • The continued use of the landscape for human habitation and cultivation by historic residents of the area, should be retained and encouraged as far possible to sustain the continual use pattern and human-environment relationship which is the ultimate significance of this cultural landscape element. The WEF development must allow and support this, including financially, and not degrade this continued relationship. • Local residents must be offered employment on the construction/ decommissioning and operational phases before 'importing' staff from elsewhere. • Local residents must be offered employment training opportunities associated with WEF developments at all phases. • Crop cultivation, sheep, cattle or game farming should be allowed to continue below the wind turbines, or be rehabilitated to increase biodiversity in the area.	Operational	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 38 of NHRA

Chance Find Protocol

<table>
<tr><th colspan="3">KOUP 1 & 2 WIND ENERGY FACILITIES and GRID CONNECTIONS south of Beaufort West</th></tr>
<tr><td>Province & region:</td><td colspan="2">Western Cape (Central Karoo District): Beaufort West and Prince Albert Local Municipalities</td></tr>
<tr><td>Responsible Heritage Resources Agency</td><td colspan="2">Heritage Western Cape (Contact details: Heritage Western Cape. 3rd Floor Protea Assurance Building, 142 Longmarket Street, Green Market Square, Cape Town 8000. Private Bag X9067, Cape Town 8001. Tel: 021 483 5959 Email: ceoheritage@westerncape.gov.za)</td></tr>
<tr><td>Rock unit(s)</td><td colspan="2">Abrahamskraal & Teekloof Formations (Lower Beaufort Group), Late Caenozoic alluvium</td></tr>
<tr><td>Potential fossils</td><td colspan="2">Fossil vertebrate bones, teeth, trace fossils, trackways, petrified wood, plant-rich beds in the Lower Beaufort Group bedrocks.
Fossil mammal bones, teeth, horn cores, freshwater molluscs, plant material in Late Caenozoic alluvium.</td></tr>
<tr><td rowspan="5">ECO protocol</td><td colspan="2">1. Once alerted to fossil occurrence(s): alert site foreman, stop work in area immediately (N.B. safety first!), safeguard site with security tape / fence / sand bags if necessary.</td></tr>
<tr><td colspan="2">2. Record key data while fossil remains are still in situ:
• Accurate geographic location – describe and mark on site map / 1: 50 000 map / satellite image / aerial photo
• Context – describe position of fossils within stratigraphy (rock layering), depth below surface
• Photograph fossil(s) in situ with scale, from different angles, including images showing context (e.g. rock layering)</td></tr>
<tr><td>3. If feasible to leave fossils in situ:
• Alert Heritage Resources Agency and project palaeontologist (if any) who will advise on any necessary mitigation
• Ensure fossil site remains safeguarded until clearance is given by the Heritage Resources Agency fo work to resume</td><td>3. If not feasible to leave fossils in situ (emergency procedure only):
• Carefully remove fossils, as far as possible still enclosed within the original sedimentary matrix (e.g. entire block of fossiliferous rock)
• Photograph fossils against a plain, level background, with scale
• Carefully wrap fossils in several layers of newspaper / tissue paper / plastic bags
• Safeguard fossils together with locality and collection data (including collector and date) in a box in a safe place for examination by a palaeontologist
• Alert Heritage Resources Agency and project palaeontologist (if any) who will advise on any necessary mitigation</td></tr>
<tr><td colspan="2">4. If required by Heritage Resources Agency, ensure that a suitably-qualified specialist palaeontologist is appointed as soon as possible by the developer.</td></tr>
<tr><td colspan="2">5. Implement any further mitigation measures proposed by the palaeontologist and Heritage Resources Agency</td></tr>
<tr><td>Specialist palaeontologist</td><td colspan="2">Record, describe and judiciously sample fossil remains together with relevant contextual data (stratigraphy / sedimentology / taphonomy). Ensure that fossils are curated in an approved repository (e.g. museum / university / Council for Geoscience collection) together with full collection data. Submit Palaeontological Mitigation report to Heritage Resources Agency. Adhere to best international practice for palaeontological fieldwork and Heritage Resources Agency minimum standards.</td></tr>
</table>

Annexure E:

Specific Bat Mitigations

Turbine positions

The first step in mitigating the potential negative impacts of a proposed WEF on bats is to site turbines outside of sensitive areas. It is therefore recommended that the applicant reconsider turbine positions situated within High-sensitivity areas, and where possible, High-medium sensitivity areas, see Table 6. To avoid mitigation measures, the applicant might also consider shifting turbines situated outside medium sensitive zones. Many of these turbines might not actually be situated within the sensitivity zone, but as turbine specifics are not available yet, it appears as if they are. With fine scale placing and more information regarding turbine specifications, little mitigation might be necessary.

Turbine numbers or turbine components situated within sensitivity zones.

High Sensitivity	High-medium Sensitivity	Medium Sensitivity
4	10	1
6	11	2
7	16	3
9		5
14		8
15		21
17		27
19		
26		

Curtailment at specific turbines

Currently, the most reliable and effective mitigation is curtailment (Arnett and Alay, 2016; Hayes, 2019). Curtailment entails locking or feathering the turbine blades during high bat activity periods to reduce the risk of bat mortality via collision with blades and barotrauma. This results in a reduction of the power generation during conditions when electricity would usually be supplied. Curtailment regimes are developed by examining the relationship between relative bat activity levels and weather conditions. Bat activity is typically reduced at higher wind speeds and lower temperatures, although experience and unpublished data in South Africa indicate that *Molossidae* bats fly at higher wind speeds than originally expected. Lower wind speeds and warmer temperatures typically correlate with higher bat activity levels. This relationship is used to inform curtailment schedules that should be applied when bat activity is high to try to reduce potential encounters of bats with wind turbine blades. A summary of

weather conditions and bat activity is presented in Section 6.7 of this report and was used, amongst others, to compile the below curtailment schedule.

Apart from System D, the other monitoring systems indicated low bat activity for the Nama Karoo during the monitoring period. Interviews with Koup 1 landowners as well as bordering farms, indicate that they frequently experience bat presence along the riverbeds. Systems at the proposed Koup 2, bordering Koup 1 towards the west, also recorded high bat activity. Therefore, following the precautionary principle, one cannot ignore the possibility that there will be periods when higher bat activity might occur on the terrain, especially after periods of good rainfall. It is recommended that turbines will be shifted from High sensitivity areas and that curtailment is applied to the turbines situated in the High-medium sensitivity zone as well as the Medium sensitivity if turbines cannot be moved out of these zones. Close observation during the bat monitoring to be conducted during the post-construction phase, should inform the curtailment schedule and apply it to more turbines, as necessary. Should curtailed turbines show consistent low activity through static recordings, as well as mortality in the low threshold range, the bat specialist could adapt curtailment again.

It is recommended that curtailment be applied during the specified time periods when the relevant temperatures and wind speeds prevail (Table 7 and 8) for the turbines situated in the High-medium sensitivity zone and Medium sensitivity zones. If the developer decides to reduce the number of turbines, the first option, after the wind regime has been considered, should be to reduce the turbines in the High-medium sensitivity zone.

Due to a very weak relationship shown between humidity and bat activity, wind and temperature have mainly been used to develop the mitigation scheme. The following curtailment is recommended:

High-medium Sensitivity zones

Fatality risk at the high mast indicate curtailment is required under the following conditions for the High-medium sensitivity zone:

- Between September and May;
- From one hour after sunset, between approximately 18:00 and 19:00, up to seven hours after sunset, between approximately 1:00 and 02:00;
- Temperatures above 10^{o}C;
- Wind speed between 0 m/s and 10 m/s;
- No freewheeling of turbines when power is not generated.

Time periods and weather conditions (as measured at approximately 114m height) at the proposed Koup 1 WEF site. Highlighted months indicate periods when turbines situated in high sensitivity zones must be curtailed immediately after installation.

CURTAILMENT FOR TURBINES IN HIGH-MEDIUM SENSITIVITY ZONES			
Months	**Time periods**	**Temperature (°C)**	**Wind speed (m/s)**
September to May	One hour after sunset up to 7 hours after sunset	Between 10 °C and 25 °C	Between 0 m/s and 10 m/s

Medium Sensitivity zones

The bat monitoring undertaken at the proposed Koup 1 indicate, apart from Sensitivity zones, a low bat activity. Therefore, curtailment is not necessary for Medium Sensitivity zones at the start of the project. It is recommended, as far as possible, that turbines are moved out of Medium Sensitivity zones. The operational bat monitoring should inform the approach and confirm if further mitigation is required. Should medium to high estimated true bat mortality be experienced during these months, curtailment needs to be applied immediately to those turbines situated within the Medium Sensitivity zone, as indicated during the periods and weather conditions specified in Table 8. This curtailment plan must be updated based on additional bat data collected during the operational monitoring programme to be undertaken at the proposed Koup 1 WEF.

Time periods and weather conditions (as measured at approximately 114m m height) at the proposed Koup 1 WEF site. Highlighted months indicate periods when turbines situated in Medium sensitivity zones must be curtailed immediately after installation.

CURTAILMENT FOR TURBINES IN MEDIUM SENSITIVITY ZONE			
Months	**Time periods**	**Temperature (°C)**	**Wind speed (m/s)**
September to December, April to May	One hour after sunset up to 7 hours after sunset	Between 12°C and 20 °C	Between 0 m/s and 7 m/s

Any curtailment plan should be continuously refined and adapted based on incoming bat fatality data and the applicant must budget beforehand for the possibility of increasing the curtailment period or installing bat deterrents, as required.

Feathering of all turbines below cut-in speed.

Normally operating turbine blades are at right angles to the wind. To avoid bat fatality at areas highly sensitive to bat activity, feathering as a mitigation measure is applied and the angle of the blades is pitched parallel with the wind direction so that the blades only spin at very low rotation and that there is no risk to bats. The turbines will not come to a complete standstill, but the movement of the turbines would be minimal to prevent bat fatalities during conditions when power is not generated.

The cut-in speed is the lowest wind speed at which turbines generate power. Freewheeling occurs when turbine blades are allowed to rotate below the cut-in speed and thereby increase the risk of collision at areas already highly sensitive to bat activity. Freewheeling should be prevented as much as possible,

and to an extent that bat mortality is avoided below cut-in speed and should commence immediately after installation for the duration of the project, to prevent bat mortality. Feathering of turbines blades are usually around 90 degrees to prevent freewheeling, but the angle will depend on the turbine make and model.

Bat deterrents

Bat deterrent suppliers indicate that *Molossidae* bats react well to deterrents. This could be an option for mitigation and must be discussed with a bat specialist and the applicant. Deterrents are now deployed at two operational wind farms in South Africa and the current bat specialist, Stephanie Dippenaar, is managing one of these WEFs. They are awaiting bat monitoring information to determine the effectiveness of deterrents.

Annexure F:

Operational Bird Monitoring Plan

INTRODUCTION

The avifaunal post-construction monitoring at the proposed WEF must be conducted in accordance with the latest version (2015) of the *Best practice guidelines for avian monitoring and impact mitigation at proposed wind energy development sites in southern Africa* (Jenkins *et al*. 2011)[1].

AIM OF POST-CONSTRUCTION MONITORING

The avifaunal post construction monitoring aims to assess the impact of the WEF by comparing pre- and post- construction monitoring data and to measure the extent of bird fatalities caused by the WEF. Post-construction monitoring is therefore necessary to:

- Confirm as far as possible what the actual impacts of the WEF are on avifauna; and
- Determine what mitigation is required if need be (adaptive management).

The proposed post-construction monitoring can be divided into three categories:

- Habitat classification;
- Quantifying bird numbers and movements (replicating baseline pre-construction monitoring)
- Quantifying bird mortalities.

Post-construction monitoring will aim to answer the following questions:

- How has the habitat available to birds in and around the WEF changed?
- How has the number of birds and species composition changed?
- How have the movements of priority species changed?
- How has the WEF affected priority species' breeding success?
- How many birds collide with the turbines? And are there any patterns to this?
- What mitigation is necessary to reduce the impacts on avifauna?

[1] Jenkins, A.R., Van Rooyen, C.S., Smallie, J.J., Anderson, M.D., & A.H. Smit. 2015. Best practice guidelines for avian monitoring and impact mitigation at proposed wind energy development sites in southern Africa. Produced by the Wildlife & Energy Programme of the Endangered Wildlife Trust & BirdLife South Africa.

TIMING

Post-construction monitoring should commence as soon as possible after the first turbines become operational to ensure that the immediate effects of the facility on resident and passing birds are recorded, before they have time to adjust or habituate to the development. However, it should be borne in mind that it is also important to obtain an understanding of the impacts of the facility as they would be over the lifespan of the facility. Over time the habitat within the WEF may change, birds may become habituated to, or learn to avoid the facility. It is therefore necessary to monitor over a longer period than just an initial one year.

DURATION

Monitoring should take place in Year 1 and 2 of the operational phase, and then repeated in Year 5 and every five years after that. After the first year of monitoring, the programme should be reviewed in order to incorporate significant findings that have emerged. This may entail the revision of the number of turbines to be searched, and the size of the search plots, depending on the outcome of the first year of monitoring. If significant impacts are observed, i.e. exceeding predetermined thresholds, and mitigation is required, the matter should be taken up with the operator to discuss potential mitigation. In such instances the scope of monitoring could be reduced to focus only on the impacts of concern.

HABITAT CLASSIFICATION

Any observed changes in bird numbers and movements at a WEF may be linked to changes in the available habitat. The avian habitats available must be mapped at least once a year (at the same time every year), using the same methods which were used during pre-construction.

BIRD NUMBERS AND MOVEMENTS

In order to determine if there are any impacts relating to displacement and/or disturbance, all methods used to estimate bird numbers and movements during baseline monitoring must be applied as far as is practically possible in the same way to post-construction work in order to ensure maximum comparability of these two data sets. This includes sample counts of small terrestrial species, counts of large terrestrial species and raptors, focal site surveys and vantage point surveys according to the current best practice.

COLLISIONS

The collision monitoring must have three components:

- Experimental assessment of search efficiency and scavenging rates of bird carcasses on the site.
- Regular searches in the immediate vicinity of the wind farm turbines for collision casualties.
- Estimation of collision rates.

SEARCHER EFFICIENCY AND SCAVENGER REMOVAL

The value of surveying the area for collision victims is only valid if some measure of the accuracy of the survey method is developed. The probability of a carcass being detected and the rate of removal/decay

of the carcass must be accounted for when estimating collision rates and when designing the monitoring protocol. This must be done in the form of searcher and scavenger trails at least twice a year.

COLLISION VICTIM SURVEYS

Aligning search protocols

The search protocol must be agreed upon between the bat and bird specialists to constitute an acceptable compromise between the current best practice guidelines for bird and bat monitoring.

Searches must begin as early in the mornings as possible to reduce carcass removal by scavengers. A carcass searcher must walk in straight line transects, 6 m apart, covering 3 m on each side. A team of searchers and one supervisor must be trained to implement the carcass searches. The searchers must have a vehicle available for transport per site. The supervisor must assist with the collation of the data at each site and to provide the data to the specialist in electronic format on a weekly basis. The specialists must ensure that the supervisor is completely familiar with all the procedures concerning the management of the data. The following must be sent to the specialist on a weekly basis:

- Carcass fatality data (hardcopy and scans as well as data entered into Excel spreadsheets);
- Pictures of any carcasses, properly labelled;
- GPS tracks of the search plots walked; and
- Turbine search interval spreadsheets.

When a carcass is found, it must be bagged, labeled and kept refrigerated for species confirmation when the specialist visits the site.

Estimation of collision rates

Observed mortality rates need to be adjusted to account for searcher efficiency and scavenger removal. There have been many different formulas proposed to estimate mortality rates. The available methodologies must be investigated, and an appropriate method will be applied. The current method which is used widely is the GenEst method.

DELIVERABLES

Annual report

An operational monitoring report must be completed at the end of each year of operational monitoring. As a minimum, the report must attempt to answer the following questions:

- How has the habitat available to birds in and around the WEF changed?
- How has the number birds and species composition changed?
- How have the movements of priority species changed?
- How has the WEF affected priority species' breeding success?
- What are the likely drivers of any changes observed?
- How many, and which species of birds collided with the turbines and

- associated infrastructure? And are there any patterns to this?
- What is the significance of any impacts observed?
- What mitigation measures are required to reduce the impacts?

Quarterly reports

Concise quarterly reports must be provided with basic statistics and any issues that need to be adressed.

Annexure G:

Environmental Noise Monitoring Plan

Environmental Noise Monitoring can be divided into two distinct categories, namely:

- Passive monitoring – the registering of any complaints (reasonable and valid) regarding noise; and
- Active monitoring – the measurement of ambient sound (or noise) levels at identified locations.

While the total projected noise levels are less than 45 dBA, active noise monitoring is recommended because the projected noise levels are higher than 42 dBA (which is 7 dB higher than the night-time rural rating level). In addition, should a reasonable and valid noise complaint be registered, the WEF developer should investigate the noise complaint as per the guidelines below. These guidelines should be used as a rough guideline as site specific conditions may require that the monitoring locations, frequency or procedure be adapted.

Measurement Localities and Frequency

The developer should implement ambient sound level measurements once before the operational phase starting as well as once during the first year of operation. The measurements should take place close to the dwellings of NSDs 1, 2 and 3.

Should there be a noise complaint, once-off noise measurements must be conducted at the location of the person that registered a valid and reasonable noise complaint. The measurement location should consider the direct surroundings to ensure that other sound sources cannot influence the reading.

Measurement Procedures

Ambient sound measurements should be collected as defined in SANS 10103:2008, though the protocols as defined by ETSU-R97 (see section 4.5.1) are recommended. Due to the variability that naturally occurs in sound levels at most locations, it is recommended that semi-continuous measurements are conducted over a period of at least 48 hours, covering at least a full day- (06:00 – 22:00) and night-time (22:00 – 06:00) periods. Spectral frequencies should also be measured to define the potential origin of noise. When a noise complaint is being investigated, measurements should be collected during a period or in conditions similar to when the receptor experienced the disturbing noise event (the WEF should be fully operational).

Annexure H:

Summary of Specialist Findings and Recommendations

Specialist Study	Findings	Recommendations
Agricultural Assessment	The site has low agricultural potential because of, predominantly, rainfall constraints, but also due to soil constraints. It is totally unsuitable for cultivation, and agricultural land use is limited to low density grazing. The land is predominantly of low agricultural sensitivity. Three potential negative agricultural impacts were identified, loss of agricultural land use, land degradation, and the impact of dust. One positive agricultural impact was identified, namely increased financial security for farming operations. All of the impacts are of low significance. The proposed development will not have an unacceptable negative impact on the agricultural production capability of the site. The proposed development is therefore acceptable. This is substantiated by the facts that the land is of very low agricultural potential, the amount of agricultural land loss is well within the allowable development limits, the proposed development poses a low risk in terms of causing soil degradation, and the development offers some positive impact on agriculture as well as wider, societal benefits.	The recommended mitigation measures are implementation of an effective system of storm water run-off control; maintenance of vegetation cover; and stripping, stockpiling and re-spreading of topsoil. From an agricultural impact point of view, it is recommended that the development be approved. The conclusion of this assessment on the acceptability of the proposed development and the recommendation for its approval is not subject to any conditions.

Specialist Study	Findings	Recommendations
Avifaunal Assessment	The proposed Koup 1 WEF will have several potential impacts on priority avifauna. These impacts are the following: • Displacement of priority species due to disturbance linked to construction activities in the construction phase. • Displacement due to habitat transformation in the construction phase. • Collision mortality caused by the wind turbines in the operational phase. • Electrocution on the 33kV MV overhead lines (if any) in the operational phase. • Collisions with the 33kV MV overhead lines (if any) in the operational phase. • Displacement of priority species due to disturbance linked to dismantling activities in the decommissioning phase.	The proposed Koup 1 WEF will have a moderate impact on avifauna which, in most instances, could be reduced to a low impact through appropriate mitigation. The alternative substation and laydown locations are all situated in essentially the same habitat, i.e. Karoo scrub. The habitat is not particularly sensitive, as far as avifauna is concerned, therefore any of the alternative locations will be acceptable. No fatal flaws were discovered in the course of the onsite investigations. The development is therefore supported, provided the mitigation measures listed in this report are strictly implemented.
Bat Assessment	Bats are adversely affected by the wind turbines that encroach on air space where bats forage and commute. The most important aspect of the project that would affect bat populations adversely is the wind turbines themselves, through direct collisions and barotrauma. Other potential impacts to bats due to WEF developments include loss of existing and potential roosts. Bat droppings of insectivorous bats were found at all the farm dwellings and one small roost with less than 20 bats was identified. Derelict buildings, koppies with rocky ridges, low trees with associated denser vegetation along the riverbeds and livestock water points, could potentially attract bats to the study area. The sporadic rainfall seasons that sometimes occur in arid areas like the Karoo reflect on periods of insect emergence and accompanying higher bat activity. One should bear in mind that we are in a dry spell at present and that this could change during higher precipitation in future. These changes could result in changes in the bat activity and occurrence which have not been accounted for in this report. Bat occurrence between ground level and approximately 30 m altitude are alike, although a higher activity was recorded in the north-western part of the wind farm. This part of the wind farm has not been grazed much before the bat monitoring started. The abundance of veld flowers might attract more insects, which subsequently attract more bats. The highest likelihood of fatality at Koup 1, as indicated through the present data in this report, is *T. aegyptiaca* (Egyptian free-tailed bat). The Koup 1 site is covered by distribution map overlays of five families and approximately 12 bats species. Four species have conservation status of Near Threatened, one is Vulnerable and three Near Threatened. Eptesicus hottentotus (the Long-tailed serotine) and Cistugo seabrae (the Angolan wing-gland bat) are endemic to Southern Africa (Monadjem et al, 2010).	During April 2022, an updated layout was provided. After the layout changes, only four turbines are still situated within sensitivity zones, two in High-medium and two in Medium sensitivity zones. Operational monitoring and mitigation need to be implemented upon construction of the WEFs to try to curb the high collected impact and turbines need to be controlled below cut in speed and freewheeling not be allowed from onset of operations. Curtailment to be implemented as specified in Section 9.2, Table 7 immediately from the onset of the turbines situated within the High-medium sensitivity zone, thus the moment the turbines start to turn. Curtailment should be refined as more data becomes available during the operational bat monitoring. If the number of turbines is reduced, the developer could consult with the operational bat specialist as to whether curtailment could also be reduced, after more data becomes available. Curtailment as specified in Section 9.2, Table 8, for those turbines situated in the medium zone, if necessary and with the advice of the operational bat specialist. Freewheeling: The cut-in speed is the lowest wind speed at which turbines generate power. Freewheeling should be prevented to an extent that bat mortality is avoided below cut-in speed, and feathering applied to all turbine

<table>
<tr><th>Specialist Study</th><th>Findings</th><th>Recommendations</th></tr>
<tr>
<td></td>
<td>51% of the recorded activity represents the clutter-edge forager Neoromicia capensis, which is the dominant species on site. The second highest percentage of calls (48%) represents the Molossidae family, namely 44% calls like Tadarida aegyptiaca and 4% Sauromy petrophilus. Both these are high-risk species, physiologically adapted to fly at medium or high altitudes, in the vicinity of the turbine blades, so that the risk of collision and barotrauma is high. The endangered Miniopterus natalensis comprises 1% of the activity. The species diversity is generally higher at lower altitudes.
Mast D, the 10 m mast situated towards the western centre of the terrain, recorded the highest bat activity, with an exceptionally high activity of N. capensis. System A, at 110 m on the Met mast, recorded 89% activity belonging to the family Molossidae, the high-flying T. aegyptiaca, true to its narrow wing morphology adapted for open air.
The table below summarises the overall significance rating of the impacts of the Koup 1 WEF on bats.
<table>
<tr><th>Phase</th><th>Impact before mitigation (negative)</th><th>Impact after mitigation (negative)</th></tr>
<tr><td>Construction</td><td>23 (5-23) Low</td><td>7 (5-23) Low</td></tr>
<tr><td>Operation</td><td>35 (24-42) Medium</td><td>25 (24-42) Medium</td></tr>
<tr><td>Decommissioning</td><td>8 (5-23) Low</td><td>5 (5-23) Low</td></tr>
<tr><td>Cumulative impact</td><td>47 (43-61) High</td><td>32 (24-42) Medium</td></tr>
<tr><td>Combined for the site</td><td>28 (24-42) Med</td><td>17 (5-23) Low</td></tr>
</table>
Although the overall significance rating for Construction is rated as low before mitigation, the impact of clearing and excavation of natural habitat is rated medium, whereas the other two impacts rate low. The overall significance rating for Operation is medium, although three impacts rate high before mitigation. These impacts are direct collision and barotrauma, loss of airspace due to the turning of turbine blades and the impact on the genetic pool.
Cumulative impacts before mitigation rates high due to the cumulative impact on bat mortality due to direct collision and barotrauma and the impact on bat populations. After mitigation, the impact decreases to a medium cumulative impact. For the cumulative effect, the total output of approximately 560 MW for approved WEFs within a 35km radius of (and including) Koup 1 and Koup 2 WEFs, was considered. Nama-Karoo bat thresholds (Sowler, *et al.* 2017), the combined yearly hourly bat activity of Koup 1, namely 0,48 bats per hour, categorises Koup 1 as Low. The</td>
<td>blades during periods when no power is generated for the duration of the project to prevent bat mortality.
Bat deterrents could be an option for mitigation but will have to be investigated. Operational monitoring should inform the extent of mitigation required.
Alternatives have been provided, with the preferred option 1 for both the proposed on-site substation and Battery (BESS) complex laydown areas.
It should be noted that 12 months pre-construction bat monitoring is required in terms of the latest Bat Good Practice Guidelines (Sowler, *et al*. 2017), but the semi-desert Succulent Karoo environment is subjected to erratic climate conditions which vary from year to year.
According to the SiVest significance rating, the construction phase is rated as medium before mitigation and low after mitigation. The highest rating before mitigation is the impact of clearing and excavation of bat habitat. The operational phase is rated as medium before and after mitigation. Three significant ratings are high before mitigation and are reduced to medium after mitigation. These include direct collision and barotrauma, the foraging space occupied by turbine blades and the impact on bat populations. More research is needed concerning fatal curiosity due to bats being attracted to turbines, so this component has a low significant rating before and after mitigation during operations. The impact of the decommissioning phase where turbines are removed after the lifespan of the WEF, rates low before and after mitigation. The cumulative impact rating before mitigation is high before mitigation and medium after mitigation. Cumulative bat mortality due to direct collision or barotrauma during foraging of resident bats is rated high before mitigation (51 in range 43 to 61) and decreases to borderline medium/high after mitigation (42 in range 24 to 42). The potential cumulative reduction in bat population size remains high before and after mitigation. The cumulative impacts on migratory bats and habitat loss are reduced from high before mitigation to medium after mitigation. **The overall significance rating before mitigation is Medium and Low after mitigation.**

If the applicant adheres to the proposed mitigation measures, the potential impact on bats from the proposed Koup 1 Wind Farm is therefore predicted to</td>
</tr>
</table>

Specialist Study	Findings	Recommendations
	collective Bat Index, thus the mean number of bats per hour per year, using Beaufort West and Trakas WEFs, is calculated at 2.1 bats per hour for Nama-Karoo, which is High. The cumulative impact significance rating at Koup 1 fall into the same category as the surrounding WEFs with a high negative (47) before mitigation and medium negative (32) after mitigation.	be Negative Low. **Considering the findings of the one-year pre-construction monitoring undertaken at the proposed Koup 1 WEF site, this specialist is of the opinion that no fatal flaws exist, and environmental authorisation may be granted.**
Biodiversity Assessment	The Koup 1 site falls entirely within the Gamka Karoo vegetation type and consists of open gravel plains and low hills dissected by numerous drainage lines. Vegetation cover is generally very low and dominated by low shrubs and scattered low trees. In general, the vegetation of the Koup 1 site is considered low sensitivity and there are few species of concern present. In terms of fauna, the diversity of mammals, reptiles and amphibians is considered relatively low, even by Karoo standards. Although the site falls within the broad distribution of the Riverine Rabbit, the drainage lines of the site do not have extensive floodplains with dense riparian vegetation that represent the typical habitat of this species in the area. The Koup 1 site is therefore considered unsuitable for this species and the development is considered highly unlikely to have any impact on the Riverine Rabbit. The site also falls within the range of the Karoo Padloper and if present it would be associated with the hills of the site with sufficient loose rock and coarse rubble to provide shelter. The low vegetation cover and paucity of such habitat suggests that the site is not an important area for this species and no evidence of this species was observed on the site. While the smaller drainage features of the site are classified as Ecological Support Areas, there is only one small area of CBA in the east of the site that not be directly impacted by the development. As such impacts on CBAs are considered acceptable for the wind farm and the Grid Connection. In terms of cumulative impacts, the wider area currently has a low development impact from renewable energy and the contribution of the Koup 1 WEF to cumulative impact at less than 50ha is considered relatively low and would not generate significant broad-scale impact. The contribution of the grid connection to cumulative impact would be low and considered acceptable.	In terms of the sensitivity mapping and the set limits of acceptable change, the development is within the limits of acceptable change for all of the sensitivity categories. Consequently, the development is considered to meet the proposed limits of acceptability in terms of the distribution of impact across the different sensitivity categories of the site and there are no fatal flaws in this regard. There are no impacts associated with the Koup 1 Wind Energy Facility that cannot be mitigated to an acceptable level. With the application of relatively simple mitigation and avoidance measures, the impact of the Koup 1 Wind Farm on the local environment can be reduced to a low and acceptable magnitude. The contribution of the Koup 1 Wind Farm development to cumulative impact in the area would be low and is considered acceptable. Overall, there are no specific long-term impacts likely to be associated with the development of the Koup 1 wind farm that cannot be reduced to a low significance. As such, there are no fatal flaws associated with the development and no terrestrial ecological considerations that should prevent it from proceeding.
Geotechnical Assessment	The foregoing report presents the findings concluded from a desktop study undertaken for the proposed Koup 1 Wind Energy Facility and associated grid infrastructure. The site is anticipated to be underlain by shallow bedrock conditions. It is recommended that the turbines be constructed on relatively flat to gentle, open areas (0-8.7˚ slopes) in areas with maximum wind exposure.	It recommended that a detailed geotechnical investigation be undertaken during the detailed design phase of the project. The detailed geotechnical investigation must entail the following: • Profiling and sampling exploratory trial pits to determine founding conditions for the substation, the construction laydown area and the

Specialist Study	Findings	Recommendations
	No fatal flaws, from a geotechnical perspective, were identified during this desktop study. Conclusions presented in this report will have to be more accurately confirmed during the detailed geotechnical investigation phase. The impact of the WEF was found to be "Negative low impact - The anticipated impact will have negligible negative effects and will require little to no mitigation." Given the amendments to the original layout, the site from a desktop level geotechnical study is considered suitable for the proposed WEF.	BESS. An investigation for determining the subgrade conditions for internal roads and a materials investigation (if required) is also recommended; • Profiling rotary core to determine foundation conditions for the turbines. • Geotechnical investigation for construction material – gravel and rock. • Thermal resistivity and electrical resistivity geophysical testing for electrical design and ground earthing requirements; • Groundwater sampling of existing boreholes to establish a baseline of the groundwater quality for construction purposes; • Dynamic Probe Super Heavy (DPSH) tests and rotary core drilling may be required depending on the soil profiles and imposed loads of the structures.
Archeological Impact Assessment	Heritage resources are unique and non-renewable and as such any impact on such resources must be seen as significant. The fieldwork conducted for the evaluation of the possible impact of the new Koup 1 WEF and associated grid connection infrastructure has revealed the presence of 18 heritage resources. One archaeological site (**KO_18**) was rated as having low heritage significance. Four graves, burial grounds and possible graves (**KO-06 – KO-09**) were rated as having high heritage significance. Two structures (**KO-03**, **KO-05**) were rated as having medium heritage significance, 1 structure (**KO-02**) was rated as having low heritage significance and 2 structures (**KO-01; KO-04**) were rated as having no heritage significance. Eight find spots (**KO_10 – KO_17**) comprise several low-density Stone Age surface artefact scatters and were rated as having low heritage significance. These are primarily from the MSA, although both LSA and earlier ESA material was identified. All of the artefact assemblages (**including KO-18**) occur in heavily deflated and eroded areas, so their scientific potential and heritage significance is somewhat lowered. Based on findings from a range of other heritage reports in the area, these types of sites are to be expected in this region.	The calculated impact confirms the impact of the new Koup 1 WEF and associated grid connection infrastructure will be reduced from negative medium to negative low with the implementation of the mitigation measures. This finding in addition to the implementation of a chance finds procedure, as part of the EMPr, will mitigate possible impacts on unidentified heritage resources. The finalised layout has considered the sensitivities identified during the field assessment. By selecting the Grid Option 2, the possible pre-construction impacts calculated on the tangible cultural heritage resources is overall reduced to a **LOW NEGATIVE** impact after the recommendations have been implemented. This finding in addition to the implementation of a chance finds procedure, as part of the EMPr, will mitigate possible impacts on unidentified heritage resources. **The following mitigation measures will be required:**

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		▪ 50m buffer zones around grave sites ▪ 30m buffer zone around farmsteads ▪ 30m buffer zone around historical structures ▪ Monitor find spot areas if construction is going to take place through them. ▪ A management plan, after a walkdown of the final layout, for the heritage resources then needs to be compiled and approved for implementation during construction and operations. In the event that heritage resources are discovered during site clearance, construction activities must stop in the vicinity, and a qualified archaeologist must be appointed to evaluate and make recommendations on mitigation measures. The overall impact of the Koup 1 WEF, on the heritage resources, is seen as acceptably **low** after the recommendations have been implemented and therefore, impacts can be mitigated to acceptable levels allowing for the development to be authorised.
Paleontological Impact Assessment	The combined Koup 1 WEF and grid connection project area is underlain by continental (fluvial / lacustrine) sediments of the Abrahamskraal and Teekloof Formations (Lower Beaufort Group, Karoo Supergroup) which are of Middle to Late Permian age. These bedrocks contain sparse, unpredictable to locally concentrated vertebrate fossils as well as rare trace fossils (*e.g.* tetrapod burrows) and plant material of scientific and conservation value. A substantial number of new fossil vertebrate sites (cranial and post-cranial material of large-bodied dinocephalians, small dicynodonts, rare tetrapod burrow casts) have been recorded during within the WEF project area during the short site visit, while several more sites have previously been mapped shortly outside its margins. These palaeontological sites, together with their sedimentological context, provide important data for on-going research into the pattern and causes of the Middle Permian Mass Extinction Event on land around 260 million years ago. Scientifically-valuable and legally-protected fossil heritage resources preserved at or beneath the ground surface within the project footprint are potentially threated by clearance and bedrock excavations during the construction phase of the WEF and grid connection (*e.g.* for access roads, wind turbine foundations). The majority of the recorded fossil sites lie outside the project footprint but most of the WEF and grid connection footprint has yet to be palaeontologically	Recommended mitigation comprises (1) a specialist palaeontological walk-down of the final WEF and grid connection project areas in the pre-construction phase and (2) implementation of a Chance Fossil Finds Protocol (See **Annexure D**) by the ECO / ESO during the construction phase. The palaeontologist responsible for the mitigation work will be required to submit a Work Plan for approval by Heritage Western Cape (HWC) The proposed WEF and grid connection developments are not fatally flawed and, on condition that the recommended mitigation measures are included within the relevant EMPrs and implemented in full, there are no objections on palaeontological heritage grounds to their authorization. In terms of palaeontological heritage resources, the proposed Koup 1 WEF and associated grid connection developments are assigned a similar overall impact significance rating (Construction Phase) of NEGATIVE MEDIUM without mitigation and NEGATIVE MEDIUM following mitigation. No significant further impacts on fossil heritage resources are anticipated in the planning, operational

Specialist Study	Findings	Recommendations
	surveyed on foot. A significant number of unrecorded sites almost undoubtedly lies within of very close to the project footprint. No Very High Sensitivity or No-Go palaeontological sites or areas have been identified within the Koup 1 WEF or grid connection project areas. Since all known fossil sites can be readily mitigated through professional recording and collection of fossil material in the pre-construction phase, no recommendations for micro-siting of infrastructure such as wind turbine, pylon positions or access roads are therefore made here. There are no preferences on palaeontological heritage grounds for specific site options for the Koup 1 WEF on-site substation and construction laydown area. Grid Option 1 (either alternative) was originally preferred for the grid connection since, being much shorter that Options 2 and 3, it is least likely to impact potential fossil sites. However, there are no objections to authorization of the chosen Option 2 grid corridor. The proposed Koup 1 WEF and associated grid connection developments are assigned a similar overall impact significance rating (Construction Phase) of NEGATIVE MEDIUM without mitigation and NEGATIVE LOW following mitigation. No significant further impacts on fossil heritage resources are anticipated in the planning, operational and decommissioning phases. The No-Go Option might have a NEGATIVE LOW or perhaps neutral impact significance; fossils will continue to be exposed and destroyed by natural weathering processes while the positive benefits of professional mitigation (*viz*. improved palaeontological database) will be lost. Anticipated cumulative impacts in the context of several planned or authorized renewable energy projects in the region are assessed as NEGATIVE MEDIUM before mitigation and NEGATIVE LOW after mitigation.	and decommissioning phases. The No-Go Option might have a NEGATIVE LOW impact significance. Anticipated cumulative impacts in the context of several planned or authorized renewable energy projects in the region are assessed as NEGATIVE MEDIUM without mitigation and NEGATIVE LOW after mitigation. The proposed WEF and grid connection developments are not fatally flawed and, on condition that the recommended mitigation measures are included within the EMPr and implemented in full, there are no objections on palaeontological heritage grounds to their authorization.
Cultural Landscape Assessment	The Koup region is a significant cultural landscape that reflects the relationship between man and nature over a period of time. This relationship has generally been sustainable, where biodiversity and ecological systems have been maintained in the utilisation of the landscape expressed in specific land use patterns. The surrounding land use indicates a social appreciation of the natural environment with low impact stock farming with limited farmstead crop cultivation. The vastness and relative homogenous nature of the cultural landscape is, however, often undervalued. If careful contextual planning is not followed, it will rapidly result in a cluttered wasteland. This does not mean	The conclusion of this CLA study has culminated in a map showing location of proposed turbines and WEF infrastructure with the following heritage indicators and development buffers: • A 1000m buffer to either side of the N12 for turbine and infrastructure placement (pink buffer);

Specialist Study	Findings	Recommendations
	that development is discouraged, but rather that the implementation of wind and solar energy farms should be planned holistically. It is the duty of the planning department to consider this application in terms of other renewable energy developments that are planned/proposed for the Koup area, notably the proposed RE developments included in the cumulative impact section of this report. • Conservation: to protect the natural resources (water, air, land, sand, fishes, etc.), ecosystems (reefs, fynbos), biological abundance (flora and fauna), landscapes and the local culture. • Development: to protect social and economic progress, without damaging or depleting the natural resources (sustainable development). The findings of this report, coupled with the proposed layout for development of wind turbines, which considers appropriate placement in terms of wind energy capacity, concludes that the development can be permitted within the site if the report's recommendations are followed. The mitigating recommendations in this report consider the ecological, aesthetic, historic and socio-economic value lines that underpin the layers of significance that combine to create the character of the place and the cultural landscape of the Koup. These recommendations include road and farmstead complex buffers which incorporate cultivated areas and graves, steep slope and ridgeline no-go areas as well as consideration of the unique land form of the site, CBA and ESA no-go areas, as well as mechanisms to support the non-landowner residents that live on the site in being bale to continue their indigenous land use patterns, knowledge and social systems. These mitigations will reduce the impact on the surrounding landscape and heritage resources but due to the high visual impact of the turbines, largely a result of their height, the negative impact to the cultural landscape cannot be removed, only reduced from very high to moderate.	• 300m buffer to either side of identified significant historic farm roads (pink) for turbine placement, substation and laydown area (buffer not shown in map, only roads identified); • 800m buffer around historic farmsteads (red circles) for turbine placements; and • 50m outer boundary buffer for roads and infrastructure around farmsteads including cultivated areas and graves – integrity of farmstead complex as a whole should be retained and no WEF roads running through farmstead complexes; • 200m freestanding graded heritage structure buffer for new roads and infrastructure, including road upgrades; • 100m buffer from cemetery or unmarked burial for all development; • existing roads to be used with minimal upgrade as far as possible; • no-go areas on mountain ridges and steep slopes (over 10%) for all infrastructure; • riverine corridors 100yr flood line buffer (ecological) or 100m buffer (archeological) whichever is further (buffers not indicated). • CBA and ESA no-go areas for all development (green shading) • Koup poort buffer (light blue shading) included in the 300m farm road buffer. • A preconstruction micro-survey for turbines, access roads, substations, laydown areas and gridlines should be completed with CLA specialist to ensure appropriate buffers are maintained. Further, the following changes to the current proposed layout is recommended:

Specialist Study	Findings	Recommendations
		• Turbine 11 must be relocated outside of the historic farmstead buffer; • the proposed substation should be located to the north of the farm entrance road; • the laydown area and substation should be located outside the 300m farm road buffer without impacting on the riverine corridor flood line and slopes over 3%; • new access roads must be relocated to avoid slopes over 10% and visually sensitive slopes impacting on the views from the historic farm roads. From this study it is recommended that only 1 of turbines is not feasible in their current proposed locations for the proposed Koup 1 WEF when taking into consideration impacts to cultural landscapes. The substation and laydown area locations require some layout alteration to accommodate the farm road buffer. The access roads need to avoid slopes over 10% and visually sensitive slopes impacting on the historic farm roads. The collector substation for proposed Gridline Option 2 requires relocation out of the N12 scenic road buffer and the CBA. With these buffers in place and all other recommendations followed, the overall impact to the cultural landscape for the proposed Koup 1 WEF and associated grid connection and infrastructure can be reduced from very high to moderate. There are no fatal flaws and the development can proceed with CLA recommendations and mitigation in place.
Noise Impact Assessment	The potential noise impact of the proposed Koup 1 WEF was evaluated using a sound propagation model. Conceptual scenarios were developed for the construction and operation phases. With the modelled input data as used, this assessment indicated that: • **low significance** for daytime activities related to the construction of the substation, hardstanding areas, digging foundations, civil work as well as the erection of the wind turbines;	Considering the **low** significance of the potential noise impacts (with mitigation, inclusive of cumulative impacts) for the proposed WEF and associated infrastructure, there is no reason that the proposed Koup 1 WEF should not be authorized.

Specialist Study	Findings	Recommendations
	• **medium significance** for night-time activities relating to the construction of civil work as well as the erection of the wind turbines. Mitigation is proposed to reduce the significance to **low**; • **medium significance** for activities relating to the construction of access roads. Mitigation is proposed to reduce the significance to **low**; • **medium significance** for activities relating to construction traffic passing the dwellings of NSD. Mitigation is proposed to reduce the significance to **low**; • **low significance** for both day- and night-time operational activities. The potential noise impact of the decommissioning phase is based on the potential noise impact during daytime construction activities (**low significance**). The development of the Koup 1 WEF will not increase cumulative noises in the area and the significance of the noise impact will be **low**.	
Social Impact Assessment	While the project will create employment for local communities during the construction and operational phases, the more significant positive impact of the project will be the contribution it will make towards renewable energy infrastructure. Research recently published by Meridian Economics, in collaboration with the CSIR, indicates that "[i]*n all realistic mitigation scenarios, the majority of new build capacity is wind and solar PV*" (Roff, et al., 2020, p. 52), and highlights an urgent need for the country to accelerate the RE build pathway. In addition, the South African Climate Change Coordinating Commission, is considering a more ambitious emissions target and is suggesting changes to the country's energy plan (Paton, 2021). Considering the impacts discussed above, it is evident that the cumulative impacts associated with changes to the social environment of the region are more significant than those attached to any one project. On a negative front, there are two issues associated with developments in the region that are of most concern. 1. The first of these issues is the change to the sense of place of an area that was once considered a pristine region of South Africa. 2. The second is the potential, through an influx of labour and an increase in transportation to construction sites, of the risk for the prevalence of HIV increasing in an area that, at 8.7% in 2017, had the second lowest HIV prevalence rate in the country.	The sensitive areas associated with the layout have been identified by various specialists and adjustments have been made to the Koup 1 layout by withdrawing all turbines associated with sensitive areas. Subsequently, the Grid Option 2 has been chosen as the proposed layout to be forwarded for approval. The Grid Option 1 was not feasible as Eskom won't permit two collectors within a small radius and Grid Option 3 is ruled out as a result of bird nests. Considering these adjustments, and that the positive social impacts associated with the project outweigh the negative, with a significant social benefit at a national level, the project is supported on a social basis.

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	The initiative to address these cumulative impacts lies at a far higher level than at an individual project level. In this regard, the Western Cape Government has undertaken an exercise to address intergovernmental readiness for the large development scenarios in the Central Karoo; which is a positive step towards addressing the cumulative impact of these developments (Western Cape Government Environmental Affairs and Development Planning, 2019).	
Surface Water Assessment	The nature of the wind farm is such that it carries a low intensity impact on aquatic resources. A wind farm typically targets the higher lying areas where wind resources are best, thus keeping the turbines away from freshwater resources for the most part, however, the associated roads, cables and other infrastructures must cross the site, and these come in more frequent contact with the drainage lines and associated features. The project also has a small footprint spread out over a large area, allowing for retention of much of the natural environment so that the systems should remain largely unaffected. A variety of aquatic features, mostly ephemeral in nature were observed within the study area and these were mapped and buffered as necessary for their protection. The current layout has, to a large degree, avoided these sensitive features and buffer areas, greatly reducing the potential overall impact and risk to Aquatic resources. The overall and cumulative impacts, as assessed, are linked to instances where complete avoidance was not possible, or the nature of the activities involve a potential risk to aquatic resources even at great distance. Overall, it is expected that the impact on the aquatic environment would be Low (-). Noteworthy areas, that should be avoided, include the Very High Sensitivity areas as show in this report. Existing crossings may be used and/or upgraded that intersect these systems however, but these crossings, detailed monitoring plan must be developed in the pre-construction phase.	Based on the findings of this study, the specialist finds no reason to withhold to an authorisation of any of the proposed activities, assuming that key mitigations measures are implemented. Lastly no preference is provided with regard the grid connections, as it assumed based on the characteristics of the site, that all the aquatic systems could be spanned, while making use of existing tracks, however technical considerations have resulted in Option 2 being selected. Therefore, based on the refinement of the Substation / Laydown positioning not direct impacts on the aquatic environment are anticipated
Transportation Impact Assessment	Based on the information received and the foregoing results concluded, our summary of conclusions are as follows: o The Koup WEF development consists of two separate EIA applications namely; - Koup 1 & Koup 2. Although this report only focuses on the Koup	Mitigation measures to be included in the construction phase: • Ensure staff transport is done in the 'off peak' periods and by bus. • Stagger material, component and abnormal loads • Construction of an on-site concrete batching plant to reduce trips.

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	1 WEF, both developments are taken into account for this study as they share a common access point from the N12 Freeway. o The construction phase of this development will typically generate the highest number of additional vehicles. It will however be temporary and impacts are considered to be minimal / low. o During the operation phase, it is expected that the facility will accommodate ±35 employees which will generate an additional ±10 trips / day in the morning and afternoon peak period. This impact is considered to be minimal / low. o The Existing access from the N12 Freeway has sufficient sight distance in both directions and hence an upgrade of the existing access will be required from the Western Cape Department of Transport & Public Works. o The gravel road between the N12 Freeway and the development will require upgrades. We also recommend a review of the agreement between the developer and the owner of REM of Portion 4 of the farm 374. o The 'No Go' alternative would result in there being no transportation impacts. o No fatal flaws or preferences were identified for any of the proposed site alternatives for construction laydown areas or substation locations. o No environmentally sensitive areas are required and therefore no areas are to be avoided from a Transportation perspective.	• Adequate road signage according to the SARTSM • Reduction in speed of vehicles • Adequate enforcement of the law • Implementation of pedestrian safety initiatives • Implement a road maintenance program under the auspices of the respective transport department. • Regular maintenance of farm fences & access cattle grids • Use of dust suppressant techniques With reference to this report, associated assessment and the findings made within, it is SiVEST's opinion that the Koup 1 Wind Energy Facility and associated infrastructure will have a nominal impact on the existing traffic network. The project is therefore deemed acceptable from a transport perspective, provided the recommendations and mitigations measures in this report are implemented, and hence the Environmental Authorisation (EA) should be granted for the EIA application.
Visual Impact Assessment	A scoping level visual study was conducted to assess the magnitude and significance of the potential visual impacts associated with the development of the proposed Koup 1 WEF and associated grid connection infrastructure near Beaufort West in the Western Cape Province. Overall, sparse human habitation and the predominance of natural vegetation cover across much of the study area would give the viewer the general impression of a largely natural setting with some pastoral elements. As such, a WEF development with associated grid connection infrastructure would alter the visual character and contrast significantly with the typical land use and/or pattern and form of human elements present across the broader study area. The level of contrast will however be reduced by the presence of the N12 national route and existing high voltage power lines traversing the study area.	It is SiVEST's opinion that the potential visual impacts associated with the proposed Koup 1 WEF and associated grid infrastructure development are negative and of moderate significance. Given the low level of human habitation and the absence of sensitive receptors however, the project is deemed acceptable from a visual perspective and the EA should be granted. SiVEST is of the opinion that the impacts associated with the construction, operation and decommissioning phases can be mitigated to acceptable levels provided the recommended mitigation measures are implemented.

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	A broad-scale assessment of visual sensitivity, based on the physical characteristics of the study area, economic activities and land use that predominates, determined that the area would have a **low to moderate** visual sensitivity. However, an important factor contributing to the visual sensitivity of an area is the presence, or absence of visual receptors that may value the aesthetic quality of the landscape and depend on it to produce revenue and create jobs. The area is not typically valued for its tourism significance and there is limited human habitation resulting in relatively few sensitive or potentially sensitive receptors in the area. A total of forty-six (46) potentially sensitive receptors were identified in the combined study area, three (3) of which are considered to be sensitive receptors as they are linked to leisure/nature-based tourism activities in the area. None of the sensitive receptors are however expected to experience high levels of visual impact from either the proposed WEF facility or the grid connection infrastructure. The remaining forty three (43) identified receptors are all assumed to be farmsteads which are regarded as potentially sensitive visual receptors as they are located within a mostly rural setting and the proposed development will likely alter natural vistas experienced from these locations. Only seven (7) of these receptors are expected to experience high levels of visual impact as a result of the WEF development. This sensitivity rating relates largely to the fact that these receptors are located in in close proximity to the boundary of the Koup 1 WEF application site and they are in zones of high contrast, with little natural screening present. Two of these receptors, namely VR12 and VR31 are in fact located within the proposed Koup 1 WEF development area and as such, these properties form part of the WEF project. Thus it is assumed that the owners have a vested interest in the WEF development and would not perceive the development in a negative light. Furthermore, none of these receptors are tourism-related facilities and as such they are not considered to be Sensitive Receptors. Thirty-two (32) potentially sensitive receptor locations would be subjected to moderate levels of visual impact as a result of the proposed Koup 1 WEF development, while the remaining two (2) receptor locations will be subjected to low levels of visual impact. Two (2) potentially sensitive receptor locations are expected to experience high levels of visual impact as a result of the proposed power line. The high sensitivity rating relates largely to the fact that these receptors are very close to the proposed power assessment corridors. Both of	

Specialist Study	Findings	Recommendations
	these receptors are in fact also located close to existing 400kV power lines this factor is expected to reduce the level of visual impact resulting from new power lines. Nine (9) potentially sensitive receptor locations would be subjected to moderate levels of visual impact as a result of the proposed power line, while the remaining two (2) would be subjected to low levels of visual impact. Although the N12 receptor road traverses the study area, motorists travelling along this route are only expected to experience moderate impacts from the proposed Koup 1 WEF and from the grid connection infrastructure associated with the project. An overall impact rating was also conducted as part of the scoping phase in order to allow the visual impact to be assessed alongside other environmental parameters. The assessment revealed that impacts associated with the proposed Koup 1 WEF and associated grid connection infrastructure will be of low significance during both construction and decommissioning phases. During operation, visual impacts from the WEF would be of medium significance with relatively few mitigation measures available to reduce the visual impact. Visual impacts associated with the grid connection infrastructure during operation would be of low significance. Although other proposed renewable energy developments and infrastructure projects were identified within a 35km radius of the Koup 1 WEF project, it was determined that six (6) of these would have any significant impact on the landscape within the visual assessment zone, namely Beaufort West WEF, Trakas WEF, Kwagga 1, 2 and 3 WEFs and Koup 2 WEF. These proposed WEFs, in conjunction with the associated grid connection infrastructure, will inevitably introduce an increasingly industrial character into a largely natural, pastoral landscape, thus giving rise to significant cumulative impacts. It is however anticipated that these impacts could be mitigated to acceptable levels with the implementation of the recommendations and mitigation measures stipulated for each of these developments by the visual specialists. In light of this and the relatively low level of human habitation in the study area however, cumulative impacts have been rated as medium. A comparative assessment of site alternatives for the on-site WEF infrastructure and also for the grid connection alternatives was undertaken in order to determine which of the alternatives	

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	would be preferred from a visual perspective. No fatal flaws were identified in respect of any of the alternatives for the proposed on-site substation / BESS facilities or for the construction laydown and O&M areas and all alternatives were found to be favourable. No fatal flaws were identified for any of the grid connection infrastructure alternatives. Power Line Corridor Option 1 was identified as the Preferred Alternative, while Power Line Corridor Options 2 and 3 were found to be favourable.	

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