

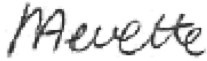


**KLIPKRAAL WIND ENERGY FACILITY 1 (PTY)  
LTD**

**Proposed Development of the Klipkraal  
Wind Energy Facility (WEF) 1 and  
Associated Infrastructure near  
Fraserburg in the Northern Cape  
Province**

**Draft Environmental Management  
Programme (EMPr)**

Issue Date: February 2023  
Revision no.: 1.0  
Project No. 16891  
DFFE Ref No.: 14/12/16/3/3/2/2202

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<b>Document Title:</b>	Proposed Development of the Klipkraal Wind Energy Facility 1 and Associated Infrastructure near Fraserburg in the Northern Province: Draft Environmental Management Programme (EMPr)
<b>Revision Number:</b>	1.0
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<b>Signature:</b>	
<b>Client:</b>	Klipkraal Wind Energy Facility 1 (PTY) LTD

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# KLIPKRAAL WIND ENERGY FACILITY 1 (PTY) LTD

## KLIPKRAAL WIND ENERGY FACILITY 1

### DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPR)

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# KLIPKRAAL WIND ENERGY FACILITY 1 (PTY) LTD

## KLIPKRAAL WIND ENERGY FACILITY 1

### DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPR)

#### 1. INTRODUCTION

Klipkraal Wind Energy Facility 1 (Pty) Ltd (The Applicant) is proposing to construct a wind energy facility (WEF), namely the Klipkraal Wind Energy Facility 1 and associated infrastructure approximately 30 km south east of Fraserburg in the Karoo Hoogland Local Municipality, in the Northern Cape. (**Figure 1**) (**DFFE Reference Number: 14/12/16/3/3/2/2202**). 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 300 megawatt (MWac).

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 Klipkraal WEF 1 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.



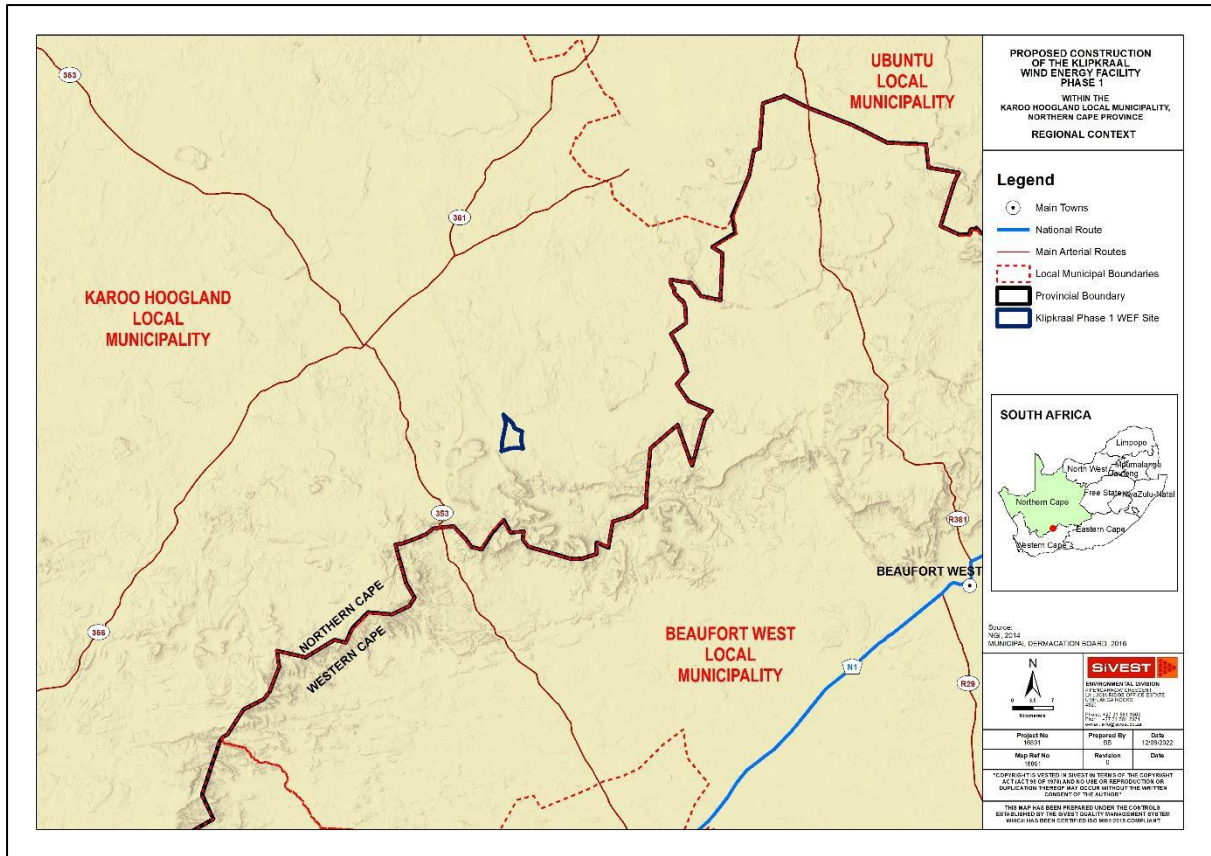


Figure 1: Regional Locality

### 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 (ii) The expertise of that EAP to prepare an EMPr, including a curriculum vitae.	Section 3.1 Section 3.2 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

2014 EIA Regulations, as amended.	Requirements for an EMPr	Location in this EMPr
Appendix 4, Section 1 (c)	a map at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that should be avoided, including buffers;	Figure 1 and Figure 5
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

2014 EIA Regulations, as amended.	Requirements for an EMPr	Location in this EMPr
		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**

<b>Business Name of Applicant</b>	Klipkraal Wind Energy Facility 1 (Pty) Ltd
<b>Physical Address</b>	22 Kildare Road, Newlands, Cape Town, South Africa
<b>Postal Address</b>	Same as physical address
<b>Postal Code</b>	7700
<b>Telephone</b>	083 499 0433
<b>Fax</b>	N/A
<b>Email</b>	<a href="mailto:terrence@eluenergy.co.za">terrence@eluenergy.co.za</a>

## 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**

<b>Business Name of EAP</b>	SiVEST SA (PTY) Ltd
<b>Name of Lead EAP</b>	Luvanya Naidoo
<b>Physical Address</b>	4 Pencarrow Crescent, La Lucia Ridge Office Estate
<b>Postal Address</b>	PO Box 1899, Umhlanga Rocks
<b>Postal Code</b>	4320
<b>Telephone</b>	031 581 1500
<b>Fax</b>	031 566 2371
<b>Email</b>	<a href="mailto:luvanyan@sivest.com">luvanyan@sivest.com</a>

### 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 the representative of the EAP	of	Educational Qualifications	Professional Affiliations	Experience (years)
Michelle Nevette ( <i>Cert.Sci.Nat.</i> )		MEnvMgt. (Environmental Management)	SACNASP Registration No. 120356 EAPASA Registration No. 2019/1560 IAIA	19
Luvanya Naidoo ( <i>Pr.Sci.Nat</i> )		BSc Hons Environmental Monitoring & Modelling	SACNASP Registration No. 126107 EAPASA Registration No. 2019/1404 IAIA	12
Michelle Guy ( <i>Pr.Sci.Nat</i> )		MSc Environmental Science	SACNASP Registration No. 126338 EAPASA Registration No. 2019/868 IAIA	9

CV's of SiVEST personnel and EAP declaration are attached in **Appendix 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**

<b>Company</b>	<b>Name of representative of the specialist</b>	<b>Specialist</b>	<b>Educational Qualifications</b>	<b>Experience (years)</b>
Johann Lanz	Johann Lanz	Agricultural	MSc Environmental Geochemistry Pr.Sci.Nat	24
GCS Water and Environment (Pty) Ltd	Magnus van Rooyen	Aquatic	MPhil Environmental Management Pr.Sci.Nat	18
Chris van Rooyen Consulting	Chris van Rooyen	Avifaunal	BA LLB	22
Animalia Consultants (Pty) Ltd	Werner Marais	Bat	MSc Biodiversity and Conservation Pr.Sci.Nat (Zoological Science)	
3Foxes Biodiversity	Simon Todd	Terrestrial Ecology	MSc (Conservation Biology) Pr.Sci.Nat 400425/11	20
PGS Heritage Pty Ltd	Nicole (Nikki) Mann	Heritage	MSc Archaeology Professional Archaeologist (ASAPA)	7
SAFETECH	Dr Brett Williams	Noise	PHD Registered Occupational Hygienist	26
SiVEST SA (Pty) Ltd	Merchandt Le Maitre	Transportation	BTech Civil Engineering ECSA Pr Tech Eng	16
Bapela Cave Klapwijk	Menno Klapwijk	Visual	BL Land Arch South African Council for the Landscape Architectural Professions	37
Synergy	Nondumiso Bulunga	Social	Masters in Geographical Information Systems	8

## 4. ACTIVITY INFORMATION

### 4.1 Project Description

The application site assessed (which incorporates the farm portions / properties listed above) is approximately 1362 hectares (ha) in extent. At this stage it is anticipated that the proposed Klipkraal WEF 1 will comprise up to sixty (60) wind turbines with a maximum total energy generation capacity of up to approximately 300 MWac. In summary, the proposed Klipkraal WEF 1 development will include the following components:

#### Wind Turbines:

- Approximately 60 turbines, between 5MWac and 8MWac, with a maximum export capacity of up to approximately 300MWac. This will be subject to allowable limits in terms of the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) or any other program.
- Each wind turbine will have a maximum hub height of up to approximately 200m;
- Each wind turbine will have a maximum rotor diameter of up to approximately 200m;
- Permanent compacted hardstanding areas / platforms (also known as crane pads) of approximately 100m x 100m (total footprint of approx. 10 000m<sup>2</sup>) per wind turbine during construction and for on-going maintenance purposes for the lifetime of the proposed wind farm projects. This will however depend on the physical size of the wind turbine;
- Each wind turbine will consist of a foundation (i.e. foundation rings) which may vary in depth, from approximately 3m and up to 10m or greater, depending on the physical size of each wind turbine. It should be noted that the foundation can be up to as much as approximately 700m<sup>3</sup>;

#### Electrical Transformers:

- Electrical transformers will be constructed near the foot of each respective wind turbine in order to step up the voltage to 66kV.
- The typical footprint of the electrical transformers is up to approximately 10m x 10m, but can be up to 20m x 20m at certain locations;

#### Step-up / Collector Substations:

- One 11-66/132-400kV step-up / collector substation, each occupying an area of up to approximately 2ha,
- The proposed substation will include an Eskom portion and an Independent Power Producer (IPP) portion, hence the substation has been included in this EIA and in the grid connection infrastructure BA (separate application - substations, switching stations and power lines) to allow for handover to Eskom.
- Following construction, the substation will be owned and managed by Eskom. The current applicant will retain control of the medium voltage components (i.e. 33kV components) of the substation, while the high voltage components (i.e. 400kV components) of the substation will likely be ceded to Eskom shortly after the completion of construction;

#### Main Transmission Substations (MTS):

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KLIPKRAAL WIND ENERGY FACILITY 1 (PTY) LTD

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- One (1) new 132/400kV Main Transmission Substation (MTS) is being proposed, occupying an area of up to approximately 120ha.
- The proposed MTS will include an Eskom portion and an IPP portion.
- Following construction, the substation will be owned and managed by Eskom. The current applicant will retain control of the 132-400kV and lower voltage components of each MTS, while the 132/400kV voltage components of the MTS will likely be ceded to Eskom shortly after the completion of construction;

#### **Electrical Infrastructure:**

- The wind turbines will be connected to the proposed substation via medium voltage (i.e. 33kV) cables.
- These cables will be buried along access roads wherever technically feasible, however, the cables can also be overhead (if required);
- Each WEF will then connect to the MTS via an up to 400kV powerline.

#### **Battery Energy Storage Systems (BESS):**

- One (1) Battery Energy Storage System (BESS) will be constructed for the wind farm and will be located next to the 33-66/132-400kV step-up / collector substations which form part of the respective wind farms, or in between the wind turbines.
- It is anticipated that the type of technology will be either Lithium Ion or Sodium-Sulphur (or as determined prior to construction).
- These batteries are not considered hazardous goods as they will be storing 'energy'.
- The size, storage capacity and type of technology will be determined / confirmed prior to construction. This information will be provided to I&AP's prior to the commencement of construction.

#### **Roads:**

- Internal roads with a temporary width of up to approximately 15m will provide access to the location of each wind turbine. These roads will be rehabilitated back to 8m once construction has been completed.
- Existing site roads will be used wherever possible, although new site roads will be constructed where necessary.
- Existing site roads may also be upgraded using temporary concrete stones in order to accommodate for the heavy loads.
- Turns will have a radius of up to 50m for abnormal loads (especially turbine blades) to access the various wind turbine positions.

#### **Site Access:**

- The proposed wind farm application site will be accessed via existing gravel roads from the R353 Regional Route;

#### **Temporary Staging Areas:**

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- A temporary staging area will be required for the wind farm and will be located both at the foot of each wind turbine and at the storage facility (i.e. turbine development area) to allow for working requirements.
- One (1) temporary staging area per wind turbine / range of wind turbines will be required.
- Temporary staging areas will cover an area of up to approximately 100m x 100m (10 000m<sup>2</sup> / 1ha) each;

#### **Temporary Construction Camps:**

- One (1) temporary construction camp will be required during the construction phase for the wind farm.
- This area will be used as a permanent maintenance area during the operational phase.
- The combined Temporary Construction Camp / Permanent Maintenance Area will cover an area of up to approximately 2.25ha.
- A cement batching plant as well as a chemical storage area will fall within the Temporary Construction Camp and Permanent Maintenance Area.
- The Temporary Construction Camp and Permanent Maintenance Area will be strategically placed within the proposed wind farm site and will avoid all high sensitivity and/or 'no-go' areas;

#### **Offices, Accommodation, a Visitors' Centre and Operation & Maintenance (O&M) Buildings:**

- An office (including ablution facilities), accommodation (including ablution facilities), a Visitors' Centre and an Operation & Maintenance (O&M) building will be required and will occupy areas of up to approximately 100m x 100m (i.e. 1ha).
- Each wind farm (i.e. each phase) will have its own O&M building and Office, however, the Accommodation and Visitors' Centre will be centralised locations which will be shared between certain wind farm projects (i.e. shared between certain phases which will be confirmed at a later stage);

#### **Septic Tank and Soak-Away Systems:**

- The proposed wind farm will consist of a septic tank and soak-away system.
- This will be required for construction as well as long term use.
- The septic tank and soak-away system will be placed 100m or more from water resource (which includes boreholes);

#### **Fencing:**

- Fencing will be required and will surround the wind farm.
- The maximum height of the fencing as well as the area which the fencing will cover will be confirmed during the detailed design phase, prior to construction commencing.
- Fences will however be constructed according to specifications recommended by the Ecologist and Avifauna specialist (and as per the EMP<sub>r</sub>);

#### **Temporary Infrastructure to Obtain Water from Available Local Sources:**

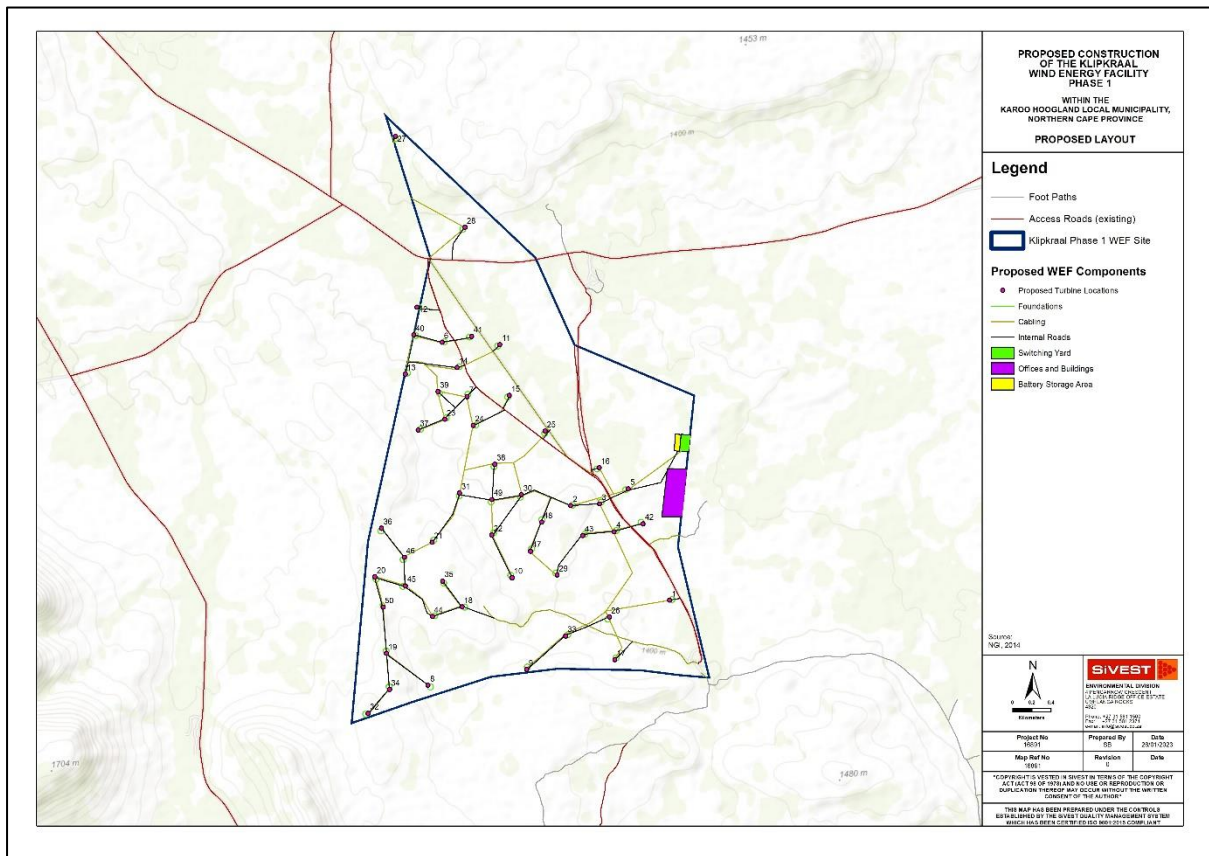


- Temporary infrastructure to obtain water from available local sources will be required. Water may also be obtained from onsite boreholes and from the town of Fraserburg.
- New or existing boreholes, including a potential temporary above ground pipeline (approximately 50cm in diameter) for each wind farm, to feed water to the sites are being proposed.
- Water will potentially be stored in temporary water storage tanks.
- The necessary approvals from the Department of Water and Sanitation (DWS) will be applied for separately (should this be required); and

**Temporary Containers:**

- Temporary containers of up to approximately 80m3 will be required for the storage of fuel on-site during the construction phase of the wind farm.
- The chemical storage area will fall within the Temporary Construction Camp and permanent Maintenance Area.

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

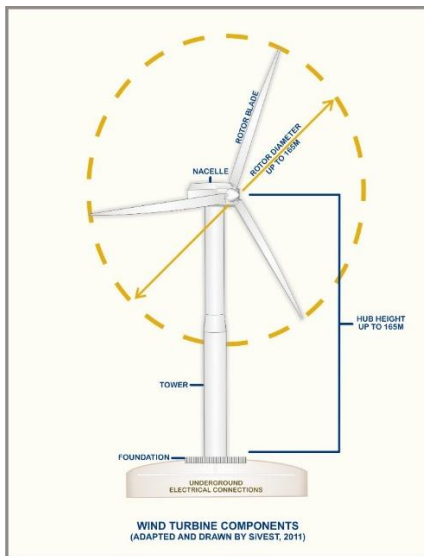


**Figure 2: Final layout showing proposed location of wind turbines**

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 **Figure 3** 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° 4'51.11"S 21° 46'1.91"E
Application site area	1362 ha
Total Klipkraal WEF area	Approximately 6507ha
Turbine development area	Turbine Foundation Area = 45m*32m*60 turbines = 8.6 Ha
SG codes	C02600000000040900000 C02600000000044700003 C02600000000044700001
Export capacity	Up to 300MWac
Proposed technology	Wind turbines and associated infrastructure
Hub height from ground	Up to 200 m
Rotor diameter	Up to 200 m (to differ based on site sensitivities)
Substation Area	Approximately 2 ha
O&M building area	Approximately 1 ha
Temporary staging area	Up to 1 ha
Permanent laydown area	To be determined based on final layout
Temporary site camp	Up to 2.25ha
Hard stand areas	700m <sup>3</sup> per turbine
Width of internal access roads	Approximately 15 m
Length of internal access roads	To be confirmed during the detailed design phase

Component	Description / Dimensions
Site Access	The Klipkraal WEF 1 development access point is from Road DR02312, bisecting the northern quadrant of the Farm Matjes Fontein No. 409. Road DR02312 is classified as a Class R4 in the RCAM Classification – Rural Collector Road with an average road reserve width of 20m, a gravel surface of ±6m wide, and an average speed of 80 km/h. The Farm Matjes Fontein No. 409 has one (1) existing access point emanating from Road DR02312 at Km 82.51. The access point is located on Road DR02312 within the first 10 m as the road enters the farm, travelling west to east.
Proximity to grid connection	Approximately 70km from application site
Height of fencing (for substation)	To be confirmed during the detailed design phase, Eskom specifications.
Type of fencing (for substation)	To be confirmed during the detailed design phase, Eskom specifications.

## 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 Basic Assessment Activity(ies) as set out in Listing Notice 1 of the EIA Regulations, 2014 as amended	Description
11 (i)	<b>GN R. 327 (as amended) Item 11:</b> 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.	New switching / collector substations and Main Transmission Substations (MTS) will be constructed as part of the proposed wind farm project. The proposed substations will be located outside urban areas. The switching / collector substations will have capacities of 33/132kV, while the MTS will have capacities of 132/400kV.
12 (ii) (a) (c)	<b>GN R. 327 (as amended) Item 12:</b> The development of:  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.	The proposed wind farm projects will entail the construction of WEF, buildings and other infrastructure (including the 11-66kv/132-400kv shared on-site substation and BESS) with physical footprints of approximately 100m <sup>2</sup> or more within a surface water feature / watercourse or within 32m of a surface water feature / watercourse. The infrastructure/structures associated with the proposed projects will

		most likely avoid the identified surface water features / watercourses where possible, although some infrastructure or structures will occur within a surface water feature / watercourse and/or within 32m of a surface water feature / watercourse.
19	<b>GN R. 327 (as amended) Item 19:</b> 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;	<p>The proposed wind farm project will likely involve the excavation, removal, infilling, depositing and moving of more than 10 cubic metres (m<sup>3</sup>) of soil, sand, pebbles or rock from some of the identified surface water features / watercourses.</p> <p>Although the layout of the proposed wind farm project will be designed to avoid the identified surface water features / watercourses as far as possible, some of the infrastructure, internal and/or access roads may need to traverse the identified surface water features / watercourses. In addition, during construction, soil may need to be removed from some of the identified surface water features / watercourses.</p>
28 (ii)	<b>GN R. 327 (as amended) Item 28:</b> 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;	<p>The proposed wind farm project sites are currently zoned for agricultural land use. The proposed wind farm projects will result in special zoning being required, as an area greater than 1ha outside an urban area, will be transformed into industrial / commercial use.</p>
48 (i) (a) (c)	<b>GN R. 327 (as amended) Item 48:</b> 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;	<p>The proposed wind farm projects will most likely entail the expansion (upgrading) of roads and other infrastructure by 100m<sup>2</sup> or more within a surface water feature / watercourse or within 32m from the edge of a surface water feature / watercourse.</p> <p>Although the layouts of the proposed wind farm projects will be designed to avoid the identified surface water features / watercourses as far as possible, some of the internal and access roads/services to be upgraded will likely need to traverse the identified surface water features / watercourses and construction will likely occur within some of the surface water features / watercourses and/or be within 32m of some of the surface water features / watercourses.</p>

56 (ii)	<p><b>GN R. 327 Item 56:</b> The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre -</p> <p>(i) where the existing reserve is wider than 13,5 metres; or</p> <p>(ii) where no reserve exists, where the existing road is wider than 8 metres –</p>	Internal access roads will be required to access the wind turbines as well as the respective substations. Existing roads will be used wherever possible, although new roads will be constructed where necessary. The existing access roads might thus need to be upgraded by widening them more than 6m, or by lengthening them by more than 1 kilometre (km).
<b>Activity No(s):</b>	<b>Relevant Scoping and EIA Activity(ies) as set out in Listing Notice 2 of the EIA Regulations, 2014 as amended</b>	<b>Description</b>
1	<p><b>GN R. 325 (as amended) Item 1:</b> The development of facilities or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20 megawatts or more, excluding where such development of facilities or infrastructure is for photovoltaic installations and occurs –</p> <p>(a) within an urban area; or</p> <p>(b) on existing infrastructure</p>	The proposed development will entail the construction of a WEF where the respective electricity output will be approximately 300MWac. In addition, the proposed WEF developments will be located outside urban areas.
15	<p><b>GN R. 325 (as amended) Item 15:</b> The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for —</p> <p>(i) the undertaking of a linear activity; or</p> <p>(ii) maintenance purposes undertaken in accordance with a maintenance management plan..</p>	The proposed WEF development will involve the clearance of more than 20ha of indigenous vegetation. Clearance will also be required for the proposed substations, internal access roads and other associated infrastructure and buildings.
<b>Activity No(s):</b>	<b>Relevant Basic Assessment Activity(ies) as set out in Listing Notice 3 of the EIA Regulations, 2014 as amended</b>	<b>Description</b>
4 (g) (ii) (ee)	<p><b>GN R. 324 (as amended) Item 4:</b> The development of a road wider than 4 metres with a reserve less than 13,5 metres.</p> <p><b>g. Northern Cape</b></p> <p>ii. Outside urban areas;</p> <p>(ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans.</p>	<p>The development of the WEF facilities and associated infrastructures will require the development of roads wider than 4m with a reserve of less than 13.5m within CBA 2 and an ESA.</p> <p>These roads will occur within the Northern Cape Province, outside urban areas.</p>
12 (g) (ii)	<p><b>GN R. 985 (as amended) Item 12:</b> 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.</p> <p><b>g. Northern Cape</b></p> <p>ii. Within critical biodiversity areas identified in bioregional plans;</p>	The proposed development will entail the construction of the WEF and associated infrastructure (cabling and roads) with physical footprints of approximately 300m <sup>2</sup> or more within CBA 2 and an ESA. As such, approximately 300m <sup>2</sup> or more of indigenous vegetation will be cleared as part of the respective proposed developments.
14 ii. (a) (c) g (ii) (ff)	<p><b>GN R. 324 (as amended) Item 14:</b> The development of—</p>	The proposed development will entail the development of infrastructure or structures with physical footprints of 10m <sup>2</sup> or more

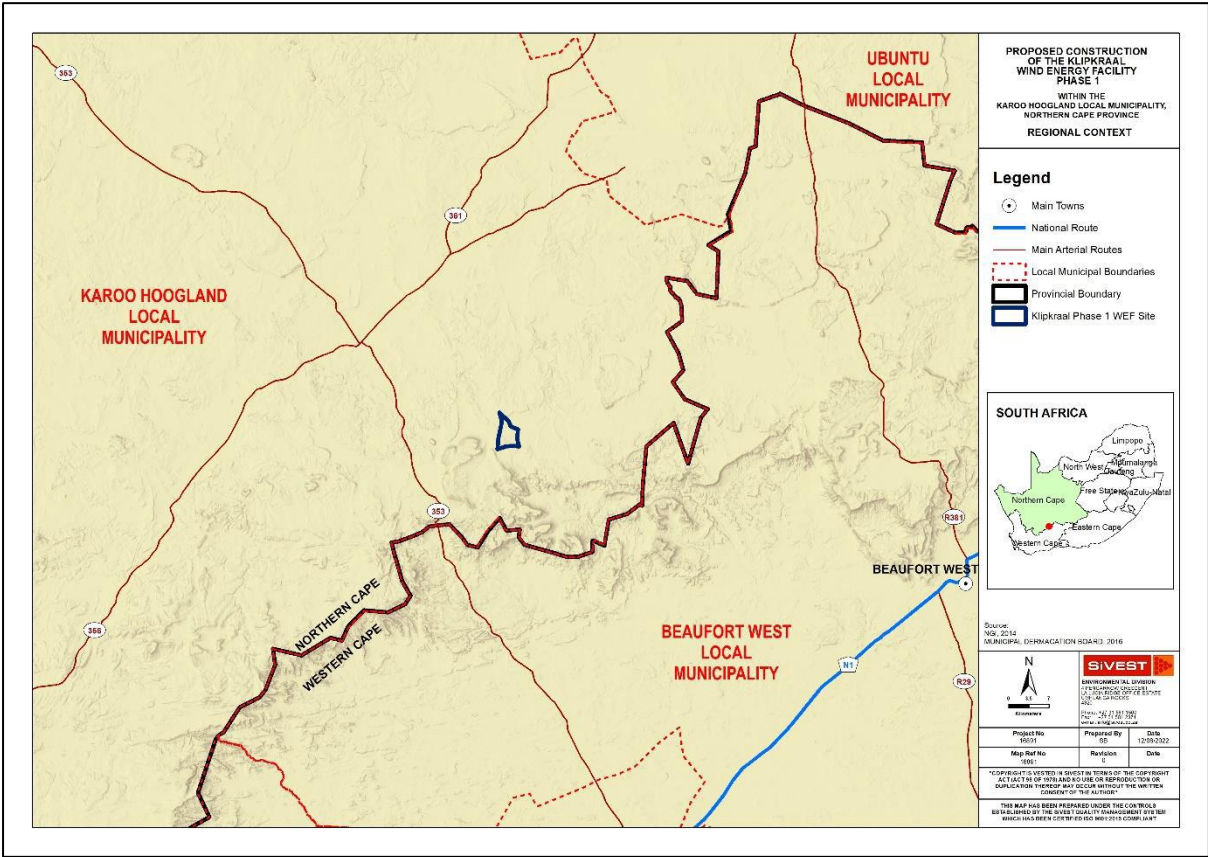
	<p>(ii) infrastructure or structures with a physical footprint of 10 square metres or more;</p> <p>where such development occurs—</p> <p>(a) within a watercourse;</p> <p>(b) in front of a development setback; or</p> <p>(c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse;</p> <p>excluding the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour.</p> <p><b>g. Northern Cape</b></p> <p>i. Outside urban areas:</p> <p>(ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;</p>	<p>within a watercourse / surface water feature or within 32m from the edge of a watercourse / surface water feature.</p> <p>Although the layouts of the respective proposed developments will be designed to avoid the identified surface water features / watercourse as far as possible, some of the infrastructure / structures will need to traverse the identified surface water features / watercourses.</p> <p>The construction of the infrastructure (MV cabling and roads) for the development will occur within Critical Biodiversity Areas (CBAs) located outside of urban areas.</p>
18 g (ii) (ee)	<p><b>GN R. 324 (as amended) Item 18:</b> The widening of a road by more than 4 meters, or the lengthening of a road by more than 1 kilometer-</p> <p><b>g. Northern Cape</b></p> <p>ii. Outside urban areas:</p> <p>(ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;</p> <p>(ii) Areas within a watercourse or wetland; or within 100m from the edge of a watercourse or wetland.</p>	<p>Internal access roads will be required to access the wind turbines as well as the respective substations. Existing roads will be used wherever possible. Internal access roads will thus be widened by more than 4m or lengthened by more than 1km. These roads will occur within the Northern Cape Province, outside urban areas. The widening of the roads will occur within CBAs and or within 100m from the edge of a watercourse or wetland.</p>
23 ii (a) (c) (g) (ii) (ee)	<p><b>GN R. 324 (as amended) Item 23:</b> The expansion of—</p> <p>(ii) infrastructure or structures where the physical footprint is expanded by 10 square metres or more;</p> <p>where such expansion occurs—</p> <p>(a) within a watercourse;</p> <p>(b) in front of a development setback adopted in the prescribed manner; or</p> <p>(c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse;</p> <p>excluding the expansion of infrastructure or structures within existing ports or harbours that will</p>	<p>The proposed development will entail the development and expansion of roads and other infrastructure or structures by 10m<sup>2</sup> or more within a surface water feature / watercourse or within 32m from the edge of a surface water feature / watercourse.</p> <p>Although the layout of the proposed development will be designed to avoid the identified surface water features / watercourses as far as possible, some of the existing internal and access roads will need to traverse some of the identified surface water features / watercourses.</p> <p>The proposed development occurs within CBA 2 and an ESA, and are located outside urban areas.</p>

	<p>not increase the development footprint of the port or harbour.</p> <p><b>g. Northern Cape</b></p> <p>ii. Outside urban areas:</p> <p>(ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;</p>	
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**5. LOCATION OF THE ACTIVITY**

**5.1 Regional Locality**

The proposed WEF is located approximately 30 km south-east of Fraserburg in the Northern Cape Province and is within the Karoo Hoogland Local Municipality, in the Namakwa District Municipality. (Figure 4).



**Figure 4: Regional Locality**

## 5.2 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
C03600000000040900000	THE FARM MATJESFONTEIN NO. 409 (RE/409)
C03600000000044700000	THE FARM KLIPFONTEIN NO. 447 (RE/44)
C03600000000044700001	THE FARM KLIPFONTEIN NO. 447 (1/447)

## 5.3 Coordinates of the site

The centre point coordinates for the sites are as follows:

- Latitude: 32°4'51.11"S
- Longitude: 21°46'1.91"E

The center coordinates for the Klipkraal WEF 1 have been included below:

**Table 9: Centre coordinates for the Klipkraal WEF 1 site boundary**

KLIPKRAAL WEF 1: APPLICATION SITE		
COORDINATES AT CORNER POINTS (DD MM SS.sss)		
POINT	SOUTH	EAST
1	32° 2' 31.740" S	21° 45' 13.504" E
2	32° 3' 21.633" S	21° 45' 26.419" E
3	32° 3' 54.892" S	21° 46' 20.466" E
4	32° 4' 54.566" S	21° 44' 52.199" E
5	32° 5' 55.486" S	21° 44' 39.559" E
6	32° 5' 43.813" S	21° 45' 36.500" E
7	32° 5' 42.999" S	21° 46' 2.836" E
8	32° 5' 45.977" S	21° 46' 35.192" E
9	32° 5' 48.890" S	21° 46' 51.068" E
10	32° 5' 50.353" S	21° 47' 2.594" E
11	32° 5' 5.545" S	21° 46' 54.549" E
12	32° 4' 15.073" S	21° 47' 6.391" E
13	32° 3' 24.744" S	21° 46' 8.190" E
COORDINATES AT CENTRE POINT (DD MM SS.sss)		
POINT	SOUTH	EAST
14	32° 4'51.11"S	21°46'1.91"E

**Table 10: Centre coordinates of the supporting infrastructure on Klipkraal WEF 1**

KLIPKRAAL WEF 1: SUBSTATION		
COORDINATES AT CORNER POINTS (DD MM SS.sss)		
POINT	SOUTH	EAST
1	32° 4'27.83"S	21°46'59.66"E
2	32° 4'28.43"S	21°47'3.43"E
3	32° 4'33.91"S	21°47'2.21"E



4	32° 4'33.52"S	21°46'58.26"E
<b>COORDINATES AT CENTRE POINT (DD MM SS.sss)</b>		
<b>POINT</b>	<b>SOUTH</b>	<b>EAST</b>
5	32° 4'31.09"S	21°47'0.87"E
<b>KLIPKRAAL WEF 1: BESS</b>		
<b>COORDINATES AT CORNER POINTS (DD MM SS.sss)</b>		
<b>POINT</b>	<b>SOUTH</b>	<b>EAST</b>
1	32° 4'27.49"S	21°46'57.32"E
2	32° 4'27.92"S	21°46'59.54"E
3	32° 4'33.41"S	21°46'58.35"E
4	32° 4'33.14"S	21°46'56.26"E
<b>COORDINATES AT CENTRE POINT (DD MM SS.sss)</b>		
<b>POINT</b>	<b>SOUTH</b>	<b>EAST</b>
5	32° 4'30.70"S	21°46'57.87"E
<b>KLIPKRAAL WEF 1: OFFICES AND BUILDINGS</b>		
<b>COORDINATES AT CORNER POINTS (DD MM SS.sss)</b>		
<b>POINT</b>	<b>SOUTH</b>	<b>EAST</b>
1	32° 4'38.85"S	21°46'52.98"E
2	32° 4'39.70"S	21°47'0.83"E
3	32° 4'55.41"S	21°46'57.51"E
4	32° 4'54.86"S	21°46'49.24"E
<b>COORDINATES AT CENTRE POINT (DD MM SS.sss)</b>		
<b>POINT</b>	<b>SOUTH</b>	<b>EAST</b>
5	32° 4'47.30"S	21°46'55.13"E

#### 5.4 Study Area Description

According to the South African National Land Cover dataset (2018), much of the assessment area is classified as "Bare / Barren Land", interspersed with areas of "Low shrubland (nama Karoo)". In most cases these patches of land are undisturbed areas with very sparse vegetation cover. The study area is an extensive flat plain with minimal relief.

The project site is located immediately north of the border between the Western Cape and the Northern Cape Provinces. The Klipkraal se Berg (altitude of 1 907m) and the Skurwekop (altitude 1 599m) are the two dominant topographical features in the area and are located to the south of the project site with an unnamed ridge line located at the northern extremity of the site which reaches a height of approximately 1 400m. The areas between these two high-lying features is relatively flat falling in a northerly direction.

The study site experiences low rainfall of approximately 110mm per annum, with the major rainfall months being in the summer months (December to April). The Koppen-Geiger Climate Zones (2071 – 2100) classifies the climate in the area as arid, desert, and cold. At Fraserburg, the summers are hot; the winters are cold; and it is dry, windy, and mostly clear year-round. Over the course of the year, the temperature typically varies from 1°C to 31°C and is rarely below -3°C or above 35°C.

The average hourly wind speed at Fraserburg experiences mild seasonal variation over the course of the year. The windier part of the year lasts for approximately 8 months, from May to January, with average wind speeds of more than 18km per hour. The windiest month of the year at Fraserburg is July, with an average hourly wind speed of approximately 20km per hour.

The calmer time of year lasts for approximately 3 months, from January to May. The calmest month of the year at Fraserburg is March, with an average hourly wind speed of approximately 16km per hour. (<https://weatherspark.com/y/150028/Average-Weather-at-Fraserburg-South-Africa-Year-Round>)

Refer to **Appendix F** for the summary of the specialist findings and recommendations for the Klipkraal WEF 1.

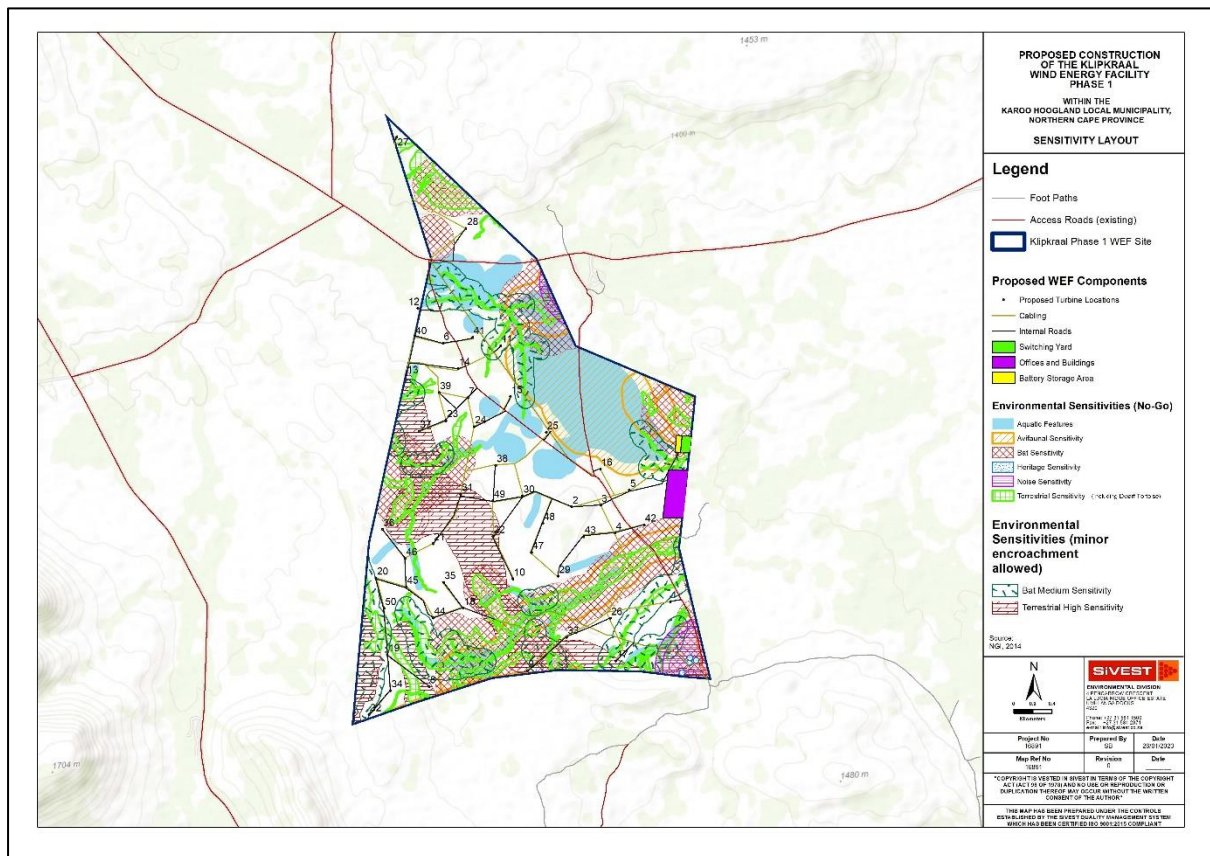


Figure 5: Final Layout with Sensitivity Overlay

## 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 REQUIREMENTS

### 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 Dust Control Regulations (GN No. R. 827 of 1 November 2013)
- 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 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 11** below provides a summary of the responsible parties and the auditing process to be carried out.

**Table 11: Responsible Parties and Auditing Process**

TITLE	PARTY	ROLE DURING CONSTRUCTION	ROLE DURING OPERATION
Project Developer (Proponent)	Klipkraal Wind Energy Facility 1 (Pty) Ltd	Assume ultimate responsibility	Assume ultimate responsibility
Project Manager	To be appointed by proponent	Project 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 12: Site preparation**

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Appointment of ECO	<ul style="list-style-type: none"> <li>Appoint an Environmental Control Officer.</li> <li>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.</li> </ul>	Holder of the EA	Undertake regular audits	<p>Avoid construction delays.</p> <p>Ensure the EMPr is adhered to.</p>	Continuous
Site demarcation	<ul style="list-style-type: none"> <li>Before construction begins, all areas to be developed must be clearly demarcated with fencing or orange construction barrier where applicable.</li> <li>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.</li> <li>Records of all environmental incidents (in line with Section 30 of NEMA, 1998) must be maintained and a copy of these records be made available to provincial department on request throughout the project execution.</li> </ul>	Contractor	Undertake regular audits	<p>Prevent unauthorized impact on the environment.</p> <p>Ensure safety of the workers, public and prevent loss/ damage to equipment</p> <p>Ensure the conditions of the EA are adhered to</p>	Continuous

KLIPKRAAL WIND ENERGY FACILITY 1 (PTY) LTD

Project No. 16891  
Description Klipkraal WEF 1 EMPr  
Revision No. 1.0

Prepared by:



Date: February 2023

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ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
				Compliance to all legislative requirements	
Site clearing	<ul style="list-style-type: none"> <li>Site clearing must take place in a phased manner, as and when required.</li> <li>Areas which are not to be constructed on within two months must not be cleared to reduce erosion risks.</li> <li>The area to be cleared must be clearly demarcated and this footprint strictly maintained.</li> <li>Spoil that is removed from the site must be removed to an approved spoil site or a licensed landfill site.</li> <li>The necessary silt fences and erosion control measures must be implemented in areas where these risks are more prevalent.</li> <li>Storm water must be managed in such a manner as to disperse runoff and to prevent the concentration of storm water flow.</li> <li>Storm water must be managed in such a manner as to disperse runoff and to prevent the concentration of storm water flow.</li> </ul>	Holder of the EA/Contractor	Undertake regular audits	<p>Site establishment undertaken responsibly</p> <p>Sensitive areas identified and avoided</p> <p>Erosion management plan implemented and hydrological measures in place.</p> <p>Appropriate stormwater structures as informed by the Storm Water Management Plan</p>	Once off
Construction Camp	<ul style="list-style-type: none"> <li>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.</li> <li>All construction equipment must be stored within the construction camp.</li> <li>All associated oil changes etc. (no servicing) must take place within the camp over a sealed surface such as a concrete slab.</li> </ul>	Contractor	Undertake regular audits	<p>Prevent unauthorized impact on the environment.</p> <p>Ensure safety of the public and prevent loss/ damage equipment</p>	Continuous

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ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	<ul style="list-style-type: none"> <li>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</li> <li>All Construction Camps shall be provided with portable fire extinguishing equipment, in accordance with all relevant legislation and must be readily accessible.</li> <li>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 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.</li> <li>The Contractor shall inform all site staff to make use of supplied ablution facilities and under no circumstances shall indiscriminate sanitary activities be allowed.</li> <li>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.</li> </ul>			<p>Ensure EMP is adhered to</p> <p>Compliance to all legislative requirements</p>	
Training of site staff	<ul style="list-style-type: none"> <li>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</li> </ul>	Contractor	Undertake regular audits	All staff members are aware of the EMP requirements relevant to them	Continuous

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ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	<p>pollution and litter control and identification of archaeological artefacts.</p> <ul style="list-style-type: none"> <li>• Staff operating equipment (such as loaders, etc.) shall be adequately trained and sensitised to any potential hazards associated with their tasks.</li> <li>• 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.</li> <li>• 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.</li> <li>• Staff must be trained in the hazards and required precautionary measures for dealing with these substances</li> <li>• Spillage packs must be available at construction areas.</li> </ul>			All waste managed according to approved the Method Statement compiled by the contractor and approved by the engineer and reviewed by ECO	

### 9.1.2 Consultation

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

**Table 13: Consultation**

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Consultation	<ul style="list-style-type: none"> <li>• Provide a mechanism through which information could be exchanged between the project proponent and stakeholders.</li> <li>• Identify relevant stakeholders and engage them at applicable stages of the process.</li> <li>• Inform the public about the proposed construction process.</li> <li>• Surrounding communities must be kept informed, through the identified and agreed consultation channels, of the commencement of construction.</li> </ul>	Holder of the EA/ Contractor	Clear communication channels established	Continuous

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	<ul style="list-style-type: none"> <li>• Work on site to be restricted to work hours.</li> <li>• Financial provision must be included for rehabilitation in terms of the Renewable Independent Power Producer Programme (REIPPP) financial model requirements.</li> <li>• An agreement/contract should be formalised between the landowner and the applicant, that will ensure that the rehabilitation does not leave any liability to future landowners.</li> </ul>			
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### 9.1.3 Heritage

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

**Table 14: Heritage**

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES /FREQUENCY
<b>Historical Structures</b> that were rated as low heritage significance ( <b>K-09, 0182, 0183</b> )	No mitigation required.	Holder of the EA	Appoint archaeologist to conduct survey well before construction.	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 36 and 38 of NHRA	Once -off during pre-construction
<b>Low density surface scatter</b> was rated as low heritage significance ( <b>0189</b> )	No mitigation required.	Construction Manager or Contractor / ECO	Inform staff and carry out inspections of new excavations.	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 36 and 38 of NHRA	Ongoing basis / whenever on site (at least weekly)

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<b>Findspots</b> that were rated as low heritage significance ( <b>0188, 0190, KKRL02, KKRL04</b> )	No mitigation required.			Ensure compliance with relevant legislation and recommendations from SAHRA under Section 36 and 38 of NHRA	
<b>Historical Farmsteads (incl. Klipkraal farmstead)</b> that were rated as medium heritage significance ( <b>K-10, 0191</b> )	<ul style="list-style-type: none"> <li>At this stage, the sites are more than 400m away from proposed infrastructure, thus no mitigation is required.</li> <li>In terms of general conservation of the historical sites, a 30m no-go buffer zone is recommended.</li> <li>If any development occurs within 30m of the sites, the structures will need to be satisfactorily studied and recorded before impact occurs.</li> <li>Recording of the structures i.e. (a) map indicating the position and footprint of all the structures (b) photographic recording of all the structures (c) measured drawings of the floor plans of the principal structures.</li> </ul>			Ensure compliance with relevant legislation and recommendations from SAHRA under Section 36 and 38 of NHRA	
<b>Palaeontological Finds</b>	<ul style="list-style-type: none"> <li>A pre-construction palaeontological heritage walkdown of the final WEF layout.</li> <li>The appointed Palaeontologist will also have to include a Chance Find Protocol for the Klipkraal WEF 1 development and training of accountable supervisory personnel by a qualified palaeontologist in the recognition of fossil heritage is necessary.</li> </ul>			Ensure compliance with relevant legislation and recommendations from SAHRA under Section 35 of NHRA.	

#### 9.1.4 Agriculture and Soils

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

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**Table 15: Agriculture**

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES /FREQUENCY
Protection of soil resources: Erosion	Design an effective system of stormwater 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.	Holder of the EA	Ensure that the stormwater 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.

### 9.1.5 Avifauna

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

**Table 16: Avifauna**

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES /FREQUENCY
Avifauna: Displacement due to disturbance and habitat transformation: Displacement of priority avifauna due to disturbance and habitat transformation	<ul style="list-style-type: none"> <li>All surface water (pans and dams) should be buffered by 200m and rivers by 150m (no turbine zones) to prevent displacement of priority avifauna.</li> </ul>	Project Developer	Design lay-out around the proposed buffer zones	Prevent mortality of priority avifauna	Once-off during the planning phase.

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	<ul style="list-style-type: none"> <li>No turbines should be located in the buffer zones around major drainage lines, waterpoints and dams.</li> <li>It is recommended that all turbines must have 1/3 of one blade painted in signal red as a pre-cautionary measure. It is acknowledged that blade painting as a mitigation strategy is still in an experimental phase in South Africa, but research indicates that it has a very good chance of reducing raptor mortality, based on research conducted in Norway. If this is done as part of the blade manufacturing process, the costs will be negligible.</li> </ul>	Project Developer	Design lay-out around the proposed buffer zones	Prevent mortality of priority avifauna	Once-off during the planning phase.
Avifauna: Mortality due to electrocution: Electrocution of raptors on the internal 33kV poles	<ul style="list-style-type: none"> <li>A raptor-friendly pole design must be used, and the pole design must be approved by the avifaunal specialist.</li> </ul>	Project Developer	Design engineers to consult with avifaunal specialist on the final design of the poles.	Prevent mortality of priority avifauna	Once-off during the planning phase.

### 9.1.6 Visual

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

**Table 17: Visual**

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Visual intrusion and potential flicker effect by wind turbines and	Site turbines at least 2 km from any occupied homestead or hospitality/tourism facility, where possible to limit effect of shadow flicker.	Client/design team	Planning	Avoid effect of Flicker	Once

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ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
associated structures and infrastructure on visual receptors					
Visual intrusion by wind turbines and associated structures and infrastructure on visual and landscape receptors	<ul style="list-style-type: none"> <li>Mitigation will already have been implemented by the placement of turbines according to distance from visual receptors</li> <li>Limit area of disturbance for turbine footprint, access roads and construction camp or sites</li> <li>Site turbines at least 2 km from any occupied homestead hospitality/tourism facility, where possible</li> <li>Limit need for security lighting</li> <li>Use non-reflective materials</li> <li>Paint all other project infrastructure elements such as operational buildings, support poles etc. a dark colour</li> <li>Avoid bright colours/ patterns and logos</li> </ul>	Client/design team	Planning	Avoid visual intrusion on entities that rely on the visual environment	Once

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## 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 18: Construction Camp**

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAME
Construction Camp: Site of construction camp	<ul style="list-style-type: none"> <li>The size of the construction camp must be aligned to the approved laydown area.</li> <li>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.</li> <li>Suitable control measures over the Contractor's yard, plant and material storage to mitigate any visual impact of the construction activity must be implemented.</li> <li>No construction should occur in an area of high or unique agricultural value, or in an area under cultivation.</li> </ul>	Holder of the EA/Contractor	<p>Ensure the conditions of the EA are adhered to.</p> <p>Compliance to all legislative requirements.</p> <p>Impacts avoided or managed as per specialist recommendations.</p>	Once-off
Construction Camp: Storage of materials (including hazardous materials)	<ul style="list-style-type: none"> <li>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.</li> <li>Storage areas must be designated, demarcated and fenced if necessary.</li> <li>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.</li> <li>Fire prevention facilities must be present at all storage facilities.</li> <li>Storage areas containing chemical substances / materials must be clearly sign posted.</li> <li>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</li> </ul>	Holder of the EA/Contractor	<p>Choice of storage areas carefully considered to avoid impact to environment</p> <p>Correct handling, storage and/or disposal and/or cleanup of all materials to prevent impact to environment</p> <p>All hazardous substances managed according to</p>	Continuous

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ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAME
	<p>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.</p> <ul style="list-style-type: none"> <li>• 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.</li> <li>• All fuel storage areas must be roofed to avoid creation of dirty stormwater</li> <li>• 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.</li> <li>• Staff dealing with these materials / substances must be aware of their potential impacts and follow the appropriate safety measures.</li> <li>• 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.</li> <li>• All excess cement and concrete mixes are to be contained on the construction site prior to disposal off site.</li> <li>• 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.</li> </ul>		approved Method Statement.	

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAME
Construction Camp: Drainage of construction camp	<ul style="list-style-type: none"> <li>• Surface drainage measures must be established in the Construction Camps so as to prevent <ul style="list-style-type: none"> <li>○ Ponding of water;</li> <li>○ Erosion as a result of accelerated runoff; and,</li> <li>○ Uncontrolled discharge of polluted runoff.</li> </ul> </li> </ul>	Holder of the EA/Contractor	<p>Appropriate stormwater structures as informed by the Storm Water Management Plan</p> <p>Storm Water Management Plan implemented</p> <p>Erosion plan implemented and hydrological measures in place.</p>	Continuous

### 9.2.2 Environmental Education and Training

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

**Table 19: Environmental Education and Training**

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Environmental Education and Training: Environmental Training	<ul style="list-style-type: none"> <li>• 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: <ul style="list-style-type: none"> <li>○ What is meant by “Environment”</li> <li>○ Why the environment needs to be protected and conserved</li> <li>○ How construction activities can impact on the environment</li> <li>○ What can be done to mitigate against such impacts</li> <li>○ Awareness of emergency and spills response provisions</li> </ul> </li> </ul>	Contractor	Thorough induction to site.	Continuous

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ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	<ul style="list-style-type: none"> <li>○ Social responsibility during construction e.g. being considerate to local residents</li> <li>● 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.</li> <li>● Training should be provided to the staff members in the use of the appropriate fire-fighting equipment.</li> <li>● Use should be made of environmental awareness posters on site.</li> <li>● The need for a "clean site" policy also needs to be explained to the workers.</li> <li>● Staff operating equipment (such as loaders, etc.) shall be adequately trained and sensitized to any potential hazards associated with their tasks.</li> </ul>			
Environmental Education and Training: Monitoring of environmental training	<ul style="list-style-type: none"> <li>● 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.</li> </ul>	Contractor	Thorough induction to site.	Continuous

### 9.2.3 Waste Management

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

**Table 20: Waste Management**

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Waste Management: Litter	<ul style="list-style-type: none"> <li>● Refuse bins must be placed at strategic positions to ensure that litter does not accumulate within the construction site.</li> </ul>	Contractor	All waste managed according to approved Method Statement	Continuous

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IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
management/general waste	<ul style="list-style-type: none"> <li>• 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.</li> <li>• A housekeeping team should be appointed to regularly maintain the litter and rubble situation on the construction site.</li> <li>• 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.</li> <li>• Where vegetation is cleared and is suitable, chipping and/or mulching can be considered.</li> <li>• Littering by the employees of the Contractor shall not be allowed under any circumstances.</li> <li>• Skip waste containers should be maintained on site. These should be kept covered and arrangements made for them to be collected regularly.</li> <li>• Any putrescible waste must be stored in containers that can keep out scavengers such as baboons and birds to prevent the spread of litter.</li> <li>• 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.</li> <li>• Waste needs to be collected and disposed of at a registered municipal site during and after construction, and written agreement should be provided to the Northern Cape region Department of Water and Sanitation.</li> <li>• Storm water must be managed in such a manner as to disperse runoff and to prevent the concentration of storm water flow.</li> <li>• The Contractor shall provide a method statement with regard to waste management.</li> <li>• A certificate of disposal shall be obtained by the Contractor and kept on file, if relevant.</li> <li>• Under no circumstances may solid waste be burnt on site.</li> </ul>	The ECO shall monitor the neatness of the work sites as well as the Contractor campsite.		

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	<ul style="list-style-type: none"> <li>All waste must be removed promptly to ensure that it does not attract vermin or produce odours.</li> </ul>			
Waste Management: Hazardous waste	<ul style="list-style-type: none"> <li>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.</li> <li>Contaminants to be stored safely to avoid spillage.</li> <li>Machinery must be properly maintained to keep oil leaks in check</li> <li>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.</li> </ul>	Contractor	All waste managed according to approved Method Statement	Continuous
Waste Management: Sanitation	<ul style="list-style-type: none"> <li>The Contractor shall install mobile chemical toilets on the site.</li> <li>The construction of "Long Drop" toilets are forbidden. Rather, portable toilets are to be used.</li> <li>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.</li> <li>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.</li> <li>Toilets shall be serviced regularly and the ECO shall inspect toilets regularly.</li> <li>Potable water must be provided for all construction staff.</li> </ul>	Contractor	Staff members aware of EMPr requirements and ablutions used and maintained accordingly	Continuous
Waste Management: Remedial Actions	<ul style="list-style-type: none"> <li>In the event of an accidental spill or leakage of hazardous substances, such incident(s) must be reported to all relevant authorities, including the Directorate: Pollution and Chemicals Management, in accordance with section 30(5) of the NEMA, 1998 pertaining to the control of incidents.</li> </ul>	Contractor	All waste managed according to approved Method Statement	Continuous

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IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	<ul style="list-style-type: none"> <li>Depending on the nature and extent of the spill, contaminated soil must be either excavated or treated on-site.</li> <li>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.</li> <li>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.</li> <li>If a spill occurs on an impermeable surface such as cement or concrete, the surface spill must be contained using oil absorbent material.</li> <li>If necessary, oil absorbent sheets or pads must be attached to leaky machinery or infrastructure.</li> <li>Materials used for the remediation of petrochemical spills must be used according to product specifications and guidance for use.</li> <li>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.</li> </ul>			

#### 9.2.4 Heritage

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

**Table 21: Heritage**

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES /FREQUENCY

General project area	Implement a chance find procedures in case where possible heritage finds are uncovered.	Construction Manager or Contractor / ECO	Inform staff and carry out inspections of new excavations.	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 36 and 38 of NHRA	Ongoing basis / whenever on site (at least weekly)
Palaeontological Finds	The appointed Palaeontologist will also have to include a Chance Find Protocol for the Klipkraal WEF 1 development and training of accountable supervisory personnel by a qualified palaeontologist in the recognition of fossil heritage is necessary.	Construction Manager or Contractor / ECO	Monitoring of surface clearance relative to approved layout	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 35 of NHRA.	Ongoing basis / as required

### 9.2.5 Agriculture and Soils

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

**Table 22: Agriculture and Soils**

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES /FREQUENCY
Aspect: Protection of soil resources Erosion	<ul style="list-style-type: none"> <li>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.</li> </ul>	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	That disturbance and existence of hard surfaces causes no erosion on or downstream of the site.	Every 2 months during the construction phase

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ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES /FREQUENCY
			action must be implemented to the run-off control system in the event of any erosion occurring.		
Aspect: Protection of soil resources Erosion	<ul style="list-style-type: none"> <li>Maintain where possible all vegetation cover and facilitate re-vegetation of denuded areas throughout the site, to stabilize disturbed soil against erosion.</li> </ul>	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	<ul style="list-style-type: none"> <li>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.</li> </ul>	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.

## 9.2.6 Avifauna

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

**Table 23: Avifauna**

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES/ FREQUENCY
Avifauna: Displacement due to disturbance: The noise and movement	<ul style="list-style-type: none"> <li>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</li> </ul>	Contractor  The ECO shall monitor	1. Implementation of the CEMPr. Oversee activities to ensure that the CEMPr is implemented and enforced via site audits	Prevent unnecessary displacement of avifauna by ensuring that contractors are aware of the requirements of the	1. On a daily basis 2. Weekly 3. Weekly 4. Weekly

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associated with the construction activities at the development footprint will be a source of disturbance which would lead to the displacement of avifauna from the area	to the CEMPr and should apply good environmental practice during construction. The CEMPr must specifically include the following: <ul style="list-style-type: none"> <li>o No off-road driving;</li> <li>o Maximum use of existing roads, where possible;</li> <li>o Measures to control noise and dust according to latest best practice;</li> <li>o Restricted access to the rest of the property;</li> <li>o Strict application of all recommendations in the botanical specialist report pertaining to the limitation of the footprint.</li> </ul>		and inspections. Report and record any non-compliance. <ol style="list-style-type: none"> <li>2. Ensure that construction personnel are made aware of the impacts relating to off-road driving.</li> <li>3. Construction access roads must be demarcated clearly. Undertake site inspections to verify.</li> <li>4. Monitor the implementation of noise control mechanisms via site inspections and record and report non-compliance.</li> <li>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.</li> </ol>	Construction Environmental Management Programme (CEMPr.)	5. Weekly
Avifauna: Displacement due to habitat transformation Total or partial displacement of avifauna due to habitat transformation	<ul style="list-style-type: none"> <li>• Ensure that all the recommendations for mitigation from the biodiversity/vegetation specialist, including rehabilitation of disturbed areas, are strictly implemented</li> </ul>	Wind farm operator	Appointment of specialist to coordinate and monitor the rehabilitation of the vegetation.	Prevent unnecessary displacement of avifauna by ensuring that the rehabilitation of transformed areas is implemented according to the recommendations of the biodiversity/vegetation specialist..	Once-off

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associated with the vegetation clearance and the presence of the wind turbines and associated infrastructure.					

### 9.2.7 Bat

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

**Table 24: Bat**

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Loss of foraging habitat by clearing of vegetation.  Bat foraging habitat will be destroyed during construction, however the relative footprint is small.	<ul style="list-style-type: none"> <li>Adhere to the sensitivity map criteria. Rehabilitate cleared vegetation where possible at areas such as laydown yards. The ECO on site during construction must ensure that the sensitivity map is adhered to during construction.</li> </ul>	Developer Contractor	<ul style="list-style-type: none"> <li>Prevent loss of foraging habitat</li> </ul>	During construction Phase
Roost destruction during earthworks.  Bat roosts in rock crevices may be destroyed during construction, this can cause	<ul style="list-style-type: none"> <li>Avoid No-go areas by adhering to the sensitivity map. The ECO on site during construction must ensure that the sensitivity map is adhered to during construction.</li> </ul>	Applicant / Contractor	<ul style="list-style-type: none"> <li>Prevent roost destruction during earthworks</li> </ul>	During construction Phase

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bat mortalities or permanent disturbances to roosts.				

### 9.2.8 Aquatic

This section deals with the issues relative to aquatic and freshwater resources during the construction phase.

**Table 25: Aquatic**

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Water quality - Impact to the water quality in the aquatic feature because of inadequate stormwater management.	<ul style="list-style-type: none"> <li>The stormwater outlets associated with the watercourse crossing infrastructure as well as the turbine platforms must make provision for energy dissipators at the mouth of the outlets. This will reduce the risk of erosion and associated siltation which can contaminate the water quality.</li> </ul>	Applicant / Contractor	<ul style="list-style-type: none"> <li>All stormwater management structures must be designed by a qualified engineer in accordance with accepted stormwater design parameters.</li> </ul>	<ul style="list-style-type: none"> <li>Limit the impact on the <i>status quo</i> water quality on the project site.</li> </ul>	During the construction phase
Hydrology - Impact to the hydrological characteristics of the aquatic feature due to changes in the catchment.	<ul style="list-style-type: none"> <li>The provision for adequate stormwater management (as described above) as well as the hydraulic structures that have adequate sizes to prevent any damming of water upstream of the structure must be ensured.</li> </ul>	Applicant / Contractor	<ul style="list-style-type: none"> <li>All stormwater management structures must be designed by a qualified engineer in accordance with accepted stormwater design parameters.</li> </ul>	<ul style="list-style-type: none"> <li>Limit the impact on the <i>status quo</i> hydrology on the project site.</li> </ul>	During the construction phase
Water quality - Impact to the water quality in the aquatic features	The following management and mitigation measures must be included into the EMPr Report for the project to limit the potential impacts of leakages from the ablution facilities:	Applicant / Contractor	<ul style="list-style-type: none"> <li>Provision for the management and mitigation measures must be made by the</li> </ul>	<ul style="list-style-type: none"> <li>Limit the impact on the <i>status quo</i> water quality on the project site.</li> </ul>	During the construction phase

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because of the leakages from the portable chemical toilets that will be used during construction.	<ul style="list-style-type: none"> <li>No portable chemical toilets may be placed within 40m of any watercourse or 100m from the edge of any wetland area.</li> <li>Only portable chemical toilets with a sealed reservoir will be allowed on site.</li> <li>The capacity of the reservoirs in the portable chemical toilets must be monitored on a daily basis to ensure that they can be serviced timeously.</li> <li>All removal of the collected sewage waste from the portable chemical toilets must be conducted by a registered service provider for disposal at a municipal wastewater treatment facility.</li> </ul>		<p>appointed contractor before establishment of the contractor's camp.</p> <ul style="list-style-type: none"> <li>These measures must be included in the design specifications for the contractor's camp and included in the Tender Document.</li> </ul>		
Water quality - Impact to the water quality in the aquatic features because of petrochemical spillages from plant and equipment.	<p>The following management and mitigation measures must be included into the EMPr for the project:</p> <ul style="list-style-type: none"> <li>All plant and equipment that make use of petrochemical substances must be checked leakages daily before operations commence.</li> <li>All plant and equipment that are found to be leaking must be removed from the property and only returned once the leakages have been addressed.</li> <li>All refuelling of plant and equipment must be conducted over a drip-tray.</li> <li>If any plant or equipment is to be parked on the site, these must be parked at a designated parking area that is 40m away from any watercourse and 100m away from the delineated edge of a wetland.</li> </ul>	Applicant / Contractor	<ul style="list-style-type: none"> <li>Provision for the management and mitigation measures must be made by the appointed contractor before establishment of the contractor's camp.</li> <li>These measures must be included in the design specifications for the contractor's camp and included in the Tender Document.</li> </ul>	<ul style="list-style-type: none"> <li>Limit the impact on the <i>status quo</i> water quality on the project site.</li> </ul>	During the construction phase

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	<ul style="list-style-type: none"> <li>If any spillages from plant or equipment occur, the spill must be immediately contained, the contaminated soils must be collected and bagged in impermeable bags and stored on site to be removed and disposed of by a registered service provider. For this purpose, the presence of spill-kits on site for the duration of the construction phase is imperative.</li> </ul>				
<p>Water quality - Impact to the water quality in the aquatic features as a result of leaking petrochemical storage facilities.</p>	<p>It is assumed that all petrochemical storage facilities will be located within the construction camp, as such, the location of the construction camp may not be located within 40m of the edge of any watercourse or within a 100m of the delineated edge of a wetland. In addition, the following management and mitigation measures must be included in the EMP:</p> <ul style="list-style-type: none"> <li>All storage containers must be contained in a bunded area that has the capacity of 110% of the total volume of the storage containers.</li> <li>The bunded area must consist of an impermeable floor as well as walls and be fitted with a valve that can be used to drain any spillages.</li> <li>If the storage facility will be in use during the rainy season, the bunded area must be rooved to prevent any rainwater entering the bund and reducing its capacity.</li> <li>The filling of containers, plant, equipment or vehicles from these storage facilities must be</li> </ul>	<p>Applicant / Contractor</p>	<ul style="list-style-type: none"> <li>Provision for the management and mitigation measures must be made by the appointed contractor before establishment of the contractor's camp.</li> <li>These measures must be included in the design specifications for the contractor's camp and included in the Tender Document.</li> </ul>	<ul style="list-style-type: none"> <li>Limit the impact on the <i>status quo</i> water quality on the project site.</li> </ul>	<p>During the construction phase</p>

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	done on an impermeable surface to ensure the containment of any possible spillages.				
Hydrology - Impact to the flow of water in the watercourses that will be crossed by infrastructure.	<p>In the absence of any design drawings making provision for the watercourse crossing structures, the following recommendations are made:</p> <ul style="list-style-type: none"> <li>Where possible, all works in the watercourses must be conducted during the dry season to limit the potential flow of water in the watercourses.</li> <li>If the above is not possible, all efforts must be made during the construction phase to allow for unobstructed flow through the construction works.</li> </ul> <p>The crossing structures that will be put in place must all be size accordingly to ensure that all water that flows in the watercourse can pass unobstructed.</p>	Applicant / Contractor	<ul style="list-style-type: none"> <li>All stormwater management structures must be designed by a qualified engineer in accordance with accepted stormwater design parameters.</li> </ul>	<ul style="list-style-type: none"> <li>Limit the impact on the status quo hydrology on the project site.</li> </ul>	During the construction phase

### 9.2.9 Terrestrial Biodiversity

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

**Table 26: Terrestrial Biodiversity**

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Impacts on broad-scale ecological processes as a result of construction phase activities, including	<ul style="list-style-type: none"> <li>Minimise the development footprint as far as possible.</li> <li>Locate temporary-use areas such as construction camps and lay-down areas in low sensitivity or previously disturbed areas.</li> </ul>	Developer / Contractor Monitored by ECO/EO	<p>Contractor to demarcate no-go areas and sensitive areas.</p> <p>EMPr Training &amp; Inductions</p>	<ul style="list-style-type: none"> <li>To minimise impacts on the biophysical environment</li> </ul>	Prior to commencement of construction activities.

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ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
disturbance and habitat loss.	<ul style="list-style-type: none"> <li>Minimise the development footprint in areas mapped as high sensitivity (i.e. near watercourses and other ecologically significant features).</li> <li>Clearly demarcate riparian areas near to the development footprint as No-Go areas with appropriate signage and barriers.</li> <li>Appropriate design of roads and other infrastructure to minimise faunal impacts and allow fauna to pass over, through or underneath these features as appropriate.</li> <li>The fencing around substations or other infrastructure should not have any electrified strands within 30cm of the ground as this may result in tortoises being electrocuted. Alternatively, guard wires or mesh can be placed outside of the fence to prevent tortoises from accessing the electrified fence.</li> <li>Monitoring of construction activities to ensure that the development footprint within sensitive areas is restricted to the authorised development footprint.</li> </ul>			<ul style="list-style-type: none"> <li>To prevent any residual or cumulative impacts arising.</li> </ul>	During Construction
Construction Phase impact on FEPA Subcatchments	<ul style="list-style-type: none"> <li>Disturbance within or near the drainage lines should be kept to a minimum and any disturbance in these areas should be rehabilitated as quickly as possible.</li> <li>An erosion monitoring programme should be put in place for at least 3 years after construction. Any problems observed should be rectified as soon as possible using the</li> </ul>	Developer Contractor Monitored ECO/EO	by Contractor to demarcate no-go areas and sensitive areas.  EMPr Training & Inductions	<ul style="list-style-type: none"> <li>To minimise impacts on FEPA subcatchments</li> <li>To prevent any residual or cumulative impacts arising.</li> </ul>	Prior to commencement of construction activities.  During Construction

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	appropriate revegetation and erosion control works.				
Construction Phase impact on the Karoo Dwarf Tortoise - Impacts on Karoo Dwarf Tortoise as a result of construction phase activities, including vehicle collisions, disturbance and habitat loss.	<ul style="list-style-type: none"> <li>No turbines to be placed in areas mapped as being of medium or high SEI for the Karoo Dwarf Tortoise.</li> <li>Any overhead grid lines with associated pylons required within the facility should be of a design that discourages the use of the pylons for nesting by crows.</li> <li>All vehicles should adhere to a low-speed limit on site. Heavy vehicles should be restricted to 30km/h and light vehicles to 40km/h.</li> <li>Construction staff should remain within the construction footprint and access routes and should not be allowed to wander into the veld.</li> <li>No fauna including tortoises should be disturbed or removed from the veld.</li> <li>No holes or trenches should be left open for extended periods as tortoises may fall in and become trapped. Trenches should have soils ramps present that allow for tortoises and other fauna to escape. Holes should also be checked regularly for tortoises and other fauna that may have fallen in.</li> <li>Search and Rescue before construction clearing of areas of high-quality habitat within the development footprint as identified and mapped during a preconstruction walk-through of the development footprint.</li> </ul>	Developer Contractor Monitored ECO/EO by	Contractor to demarcate no-go areas and sensitive areas.  EMPr Training & Inductions	Minimise impacts on Karoo Dwarf Tortoise as a result of construction phase activities, including vehicle collisions, disturbance and habitat loss.	Prior to commencement of construction activities.  During Construction



## 9.2.10 Transportation

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

**Table 27: Transportation**

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Additional Traffic Generation: Increase in Traffic	<ul style="list-style-type: none"> <li>Ensure staff transport is done in the 'off peak' periods and by bus.</li> <li>Stagger material, component and abnormal loads</li> <li>Construction of an on-site concrete batching plant to reduce trips.</li> </ul>	Holder of the EA/Contractor	<p>All staff members are aware of the EMPr requirements relevant to them</p> <p>Ensure the EMPr is adhered to.</p>	Continuous
Additional Traffic Generation: Increase of Incidents with pedestrians and livestock	<ul style="list-style-type: none"> <li>Upgrade of existing / new access points.</li> <li>Reduction in speed of vehicles</li> <li>Adequate enforcement of the law</li> <li>Implementation of pedestrian safety initiatives</li> <li>Regular maintenance of farm fences &amp; access cattle grids</li> <li>Construction of an on-site concrete batching plant to reduce trips.</li> </ul>	Holder of the EA/Contractor	<p>All staff members are aware of the EMPr requirements relevant to them</p> <p>Ensure the EMPr is adhered to.</p>	Continuous
Additional Traffic Generation: Increase in Dust from gravel roads	<ul style="list-style-type: none"> <li>Upgrade of existing / new access point.</li> <li>Reduction in the speed of the vehicles.</li> <li>Construction of gravel roads in terms of TRH20.</li> <li>Implement a road maintenance program under the auspices of the respective transport department.</li> <li>Possible use of approved dust suppressant techniques.</li> <li>Construction of an on-site batching plant and tower construction to reduce trips.</li> </ul>	Holder of the EA/Contractor	<p>All staff members are aware of the EMPr requirements relevant to them</p> <p>Ensure the EMPr is adhered to.</p>	Continuous
Additional Traffic Generation: Increase in Road Maintenance	<ul style="list-style-type: none"> <li>Implement a road maintenance program under the auspices of the respective transport department.</li> </ul>	Holder of the EA/Contractor	All staff members are aware of the EMPr	Continuous

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	<ul style="list-style-type: none"> <li>Construction of an on-site batching plant to reduce trips.</li> </ul>		<p>requirements relevant to them</p> <p>Ensure the EMPr is adhered to.</p>	
Additional Abnormal Loads	<ul style="list-style-type: none"> <li>Ensure abnormal vehicles travel to and from the proposed development in the 'off peak' periods or stagger delivery.</li> <li>Adequate enforcement of the law</li> </ul>	Holder of the EA/Contractor	<p>All staff members are aware of the EMPr requirements relevant to them</p> <p>Ensure the EMPr is adhered to.</p>	Continuous
Internal Access Roads: Increase in Dust from gravel roads	<ul style="list-style-type: none"> <li>Enforce a maximum speed limit on the development.</li> <li>Appropriate, timely and high-quality maintenance required in terms of TRH20.</li> <li>Possible use of approved dust suppressant techniques.</li> </ul>	Holder of the EA/Contractor	<p>All staff members are aware of the EMPr requirements relevant to them</p> <p>Ensure the EMPr is adhered to.</p>	Continuous
Internal Access Roads: New / Larger Access points	<ul style="list-style-type: none"> <li>Adequate road signage according to the SARTSM</li> <li>Approval from the respective roads department</li> </ul>	Holder of the EA/Contractor	<p>All staff members are aware of the EMPr requirements relevant to them</p> <p>Ensure the EMPr is adhered to.</p>	Continuous

### 9.2.11 Noise

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

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**Table 28: Noise**

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Reduce construction noise	Conduct noise sensitivity training for all construction staff. No construction piling should occur at night. Piling should only occur during the hottest part of the day to take advantage of unstable atmospheric conditions	Holder of the EA	Training	Reduction in Noise and thus reduction in chance of complaints arising	Before construction commences
Monitor construction noise	Ambient noise monitoring to be conducted.	Specialist noise consultant	As per the requirements of SANS 10103:2008	Validation of Noise Impact Assessment Findings to determine if further noise mitigation is required.	Three times during the construction phase

**9.2.12 Visual**

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

**Table 29: Visual**

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Visual intrusion by wind turbines and associated structures and infrastructure on visual and landscape receptors	<ul style="list-style-type: none"> <li>• Suppress dust during construction.</li> <li>• Locate construction camps and all related facilities such as stockpiles, lay-down areas, batching plants in areas already impacted such as existing farmyards or in unobtrusive locations away from the main visual receptors.</li> </ul>	Contractor	Site planning, supervision and Management	Avoid visual intrusion on entities that rely on the visual environment.	During construction phase

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	<ul style="list-style-type: none"> <li>Limit access tracks for construction and maintenance vehicles to existing roads where possible. Once established do not allow random access through the veld</li> <li>Blend edges of road and platforms with surrounding landscape</li> <li>Rehabilitate exposed disturbed areas.</li> <li>Avoid vegetation stripping in straight lines but rather non-geometric shapes that blend with the landscape.</li> </ul>			Avoid unnecessary visual scarring.	

### 9.2.13 Socio-Economic

This section deals with the issues relative to socio-economic during the construction phase.

**Table 30: Socio-Economic**

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Maximise local employment and skills development opportunities associated with the construction phase	The developer should aim to employ as many low-skilled and semi-skilled workers from the local area as possible. This should also be made a requirement for all contractors.	The Developer & EPC Contractors	<p>Employ local contractors that are compliant with Broad Based Black Economic Empowerment (BBBEE) criteria</p> <p>Adopt a local employment policy to maximise the opportunities made available to the local labour force as far</p>	<p>Employment and business policy document that sets out local employment and targets completed before construction phase commences;</p> <p>The majority of employed semi and</p>	Pre-construction and construction phase

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			<p>as possible (preference to Local Municipality)</p> <p>Consideration must be given to women during the recruitment process</p> <p>Set realistic local recruitment targets for the construction phase (preference to Local Municipality)</p> <p>Training and skills development programmes must be initiated prior to the commencement of the construction phase</p>	<p>unskilled labour are from the local area or local municipality; and</p> <p>Training and skills development programme undertaken prior to the commencement of the construction phase.</p>	
<p>Maximise local economic multiplier effect during the construction phase</p>	<p>Increase the procurement of goods and services, especially within the local economy</p>	<p>The Developer &amp; EPC Contractors</p>	<p>A local procurement policy to be adopted to maximise the benefit to the local economy, where feasible</p> <p>Develop a database of local companies, specifically Historically Disadvantaged (HD) companies which qualify as potential service providers (e.g. construction companies, security companies, catering companies, waste collection companies, transportation companies etc.) prior to the</p>	<p>Local procurement policy is adopted</p> <p>Local goods and services are purchased from local suppliers, where feasible (Local Municipality)</p>	<p>Pre-construction and construction phase</p>

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ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
			<p>tender process and invite them to bid for project-related work where applicable</p> <p>Source as many goods and services as possible from the local area ( Local Municipality). Engage with local authorities and business organisation to investigate the possibility</p>		
To avoid or reduce the possibility of the increase in crime and safety and security issues during the construction phase	To avoid or minimise the potential impact on local communities and their livelihoods	EPC Contractor	<p>Access in and out of the construction camp should be strictly controlled by a security company</p> <p>The appointed EPC contractor must appoint a security company and appropriate security procedures are to be implemented to limit access to the site and surrounding areas.</p> <p>Open fires on site for heating, smoking or cooking are not allowed, except in designated areas.</p> <p>The contractor must provide adequate firefighting equipment on site and</p>	<p>Employee induction programme, covering land access protocols, fire management and road safety</p> <p>The construction site is appropriately secured with a controlled access system</p> <p>Security company appointed and security procedures implemented</p>	Pre-construction and construction phase

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ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
			<p>provide firefighting training to selected construction staff.</p> <p>A comprehensive employee induction programme must be developed and utilised to cover land access protocols, fire management and road safety</p> <p>A grievance mechanism should be implemented whereby local landowners can express any complaints or grievances with the construction process</p>		
To avoid or reduce traffic disruptions and movement patterns of local community during the construction phase	To avoid or minimise the potential impacts associated with traffic and movement patterns on local communities	The Developer & EPC contractor	<p>All vehicles must be road worthy, and drivers must be qualified, obey traffic rules, follow speed limits and made aware of the potential road safety issues</p> <p>Heavy vehicles should be inspected regularly to ensure their road safety worthiness.</p> <p>Implement penalties for reckless driving for the drivers of heavy vehicles as a way to enforce compliance to traffic rules.</p>	<p>Vehicles are roadworthy, inspected regularly and speed limits are adhered to</p> <p>Traffic warning signs along regional and secondary roads, also illuminated at night appointed and security procedures implemented</p> <p>Community liaison officer available for</p>	Pre-construction and construction phase

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			<p>Any damage / wear and tear caused by construction related traffic to the roads must be repaired</p> <p>Provide adequate and strategically placed traffic warning signs and control measures along the regional and secondary roads to warn road users of the construction activities taking place, displaying road safety messages and speed limits for the duration of the construction phase. Traffic warning signs must also be well illuminated at night.</p> <p>A comprehensive employee induction programme that covers land access protocols and road safety must be prepared.</p> <p>Appoint a Community Liaison Officer and a create method of communication whereby local community members can express any complaints or grievances</p>	community grievances and communication channel	



ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Reduce the pressure on economic and social infrastructure and social conflicts from an influx of a non-local workforce and jobseekers during the construction phase	To avoid or minimise the potential impact on economic and social infrastructure and reduce/eliminate social conflicts	The Developer & EPC Contractor	<p>Where possible, make it a requirement for contractors to implement a 'locals first' policy. It is suggested that advertisement for construction employment opportunities be placed in a local newspaper, especially for semi and low-skilled job categories (preference to Municipality).</p> <p>Enhance employment opportunities for the immediate locals this is not possible, then the broader focus areas should be considered for sourcing workers such as the Local Municipality</p> <p>Prior to construction commencing, representatives from the local community e.g., ward councillor, surrounding landowners should be informed of details of the construction schedule and exact size of the workforce.</p> <p>Recruitment of temporary workers at the gates of the</p>	<p>Percentage of the workers employed during construction come from local communities</p> <p>Community liaison officer available for community grievances and communication channel</p>	Pre-construction and construction phase

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			<p>development should not be allowed. A recruitment office located in town with a Community Liaison officer should be established to deal with jobseekers.</p> <p>Have clear rules and regulations for access to the proposed site to control loitering.</p> <p>A Community Liaison Officer should be appointed. A method of communication should be implemented whereby procedures to lodge complaints are set out in order for the local community to express any complaints or grievances with the construction process</p>		
To avoid or minimise the potential impacts of noise and dust from construction activities during the construction phase	To avoid and or minimise the potential noise and dust impacts associated with construction activities	The Developer & EPC contractor	Implement dust suppression measures for heavy vehicles such as wetting the roads on a regular basis and ensuring that vehicles used to transport sand and building materials are fitted with tarpaulins or covers	Dust suppression measures implemented for all heavy vehicles that require such measures during the construction phase	Construction phase Pre-construction & construction phase

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ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
			<p>Ensure all vehicles are road worthy, and that drivers are qualified and are made aware of the potential noise and dust issues.</p> <p>Ensure that drivers adhere to speed limits.</p> <p>A Community Liaison Officer should be appointed. A method of communication should be implemented whereby procedures to lodge complaints are set out in order for the local community to express any complaints or grievances with the construction process</p>	<p>Enforcement of strict speeding limits</p> <p>Road worthy certificates in place for all vehicles</p> <p>Community liaison officer available for community grievances and communication channel</p>	

### 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 31: Construction Site Decommissioning**

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Construction Site Decommissioning: Removal of equipment	<ul style="list-style-type: none"> <li>All structures comprising the construction camp are to be removed from site.</li> <li>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.</li> <li>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.</li> </ul>	Holder of EA/Contractor	<p>Compliance to all legislative requirements.</p> <p>Ensure the EMPr is adhered to.</p>	Following construction
Construction Site Decommissioning: Temporary services	<ul style="list-style-type: none"> <li>The Contractor must arrange the cancellation of all temporary services.</li> <li>Temporary roads must be closed and access across these, blocked.</li> <li>All areas where temporary services were installed are to be rehabilitated to the satisfaction of the ECO.</li> </ul>	Holder of EA/Contractor	<p>Compliance to all legislative requirements.</p> <p>Ensure the EMPr is adhered to.</p>	Following construction
Construction Site Decommissioning: Associated infrastructure	<ul style="list-style-type: none"> <li>Surfaces are to be checked for waste products from activities such as concreting or asphaltting and cleared in a manner approved by the Engineer.</li> <li>All surfaces hardened due to construction activities are to be ripped and imported material thereon removed.</li> <li>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.</li> <li>The site is to be cleared of all litter.</li> <li>The Contractor is to check that all watercourses are free from building rubble, spoil materials and waste materials.</li> </ul>	Holder of EA/Contractor	All waste managed according to approved Method Statement	Following construction

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	<ul style="list-style-type: none"> <li>Fences, barriers and demarcations associated with the construction phase are to be removed from the site unless stipulated otherwise by the Engineer.</li> <li>All residual stockpiles must be removed to spoil or spread on site as directed by the Engineer.</li> <li>All leftover building materials must be returned to the depot or removed from the site.</li> <li>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.</li> </ul>			
Construction Site Decommissioning: Rehabilitation plan	<ul style="list-style-type: none"> <li>Rehabilitate and re-vegetate cleared areas with indigenous plant species.</li> </ul>	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 32: Operation and Maintenance**

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Operation and Maintenance: Maintenance	<ul style="list-style-type: none"> <li>All applicable standards, legislation, policies and procedures must be adhered to during operation.</li> <li>Regular ground inspection of the plants must take place to monitor their status.</li> </ul>	Holder of the EA	Ensure the conditions of the EA are adhered to.	During operation

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ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	<ul style="list-style-type: none"> <li>• Compile and adhere to a procedure for the safe handling of battery cells.</li> <li>• Lithium-ion batteries must have battery management systems (containment, automatic alarms, and shut-off systems) to monitor and protect cells from overcharging or damaging conditions, such as temperature extremes.</li> <li>• Compile an Emergency Response Plan for implementation in the event of a spill or leakage.</li> <li>• Record and report all significant fuel, oil, hydraulic fluid, or electrolyte spills or leaks so that appropriate clean-up measures can be implemented. A copy of these records must be made available to authorities on request throughout the project lifecycle.</li> <li>• Frequent and appropriate disposal of both general and hazardous waste must be undertaken to prevent pollution of soil and groundwater.</li> <li>• Install leak detection monitoring systems where possible.</li> <li>• On-site battery maintenance should only be undertaken on impermeable surfaces with secondary containment measures. Any resulting hazardous substances must be disposed of appropriately.</li> <li>• Provide for suitable emergency and safety signage on site, and demarcation of any areas which may pose a safety risk (including hazardous substances). Emergency numbers for the local police, fire department and Eskom must be placed in a prominent clearly visible area on-site</li> </ul>		Compliance to all legislative requirements	
Operation and Maintenance: Public awareness	<ul style="list-style-type: none"> <li>• The emergency preparedness plan must be ready for implementation at all times should an emergency situation arise.</li> </ul>	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 33: Waste Management**

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIME FRAME
Waste Management: Recycling and litter management	<ul style="list-style-type: none"> <li>The site should be kept clear of litter at all times.</li> <li>Solid waste separation and recycling should take place for the duration of the operational phase for the development at the administration block.</li> <li>Where vegetation is cleared and is suitable, chipping and/or mulching can be considered.</li> <li>Any putrescible waste must be stored in containers that can keep out scavengers such as baboons and birds to prevent the spread of litter.</li> <li>All waste must be removed promptly to ensure that it does not attract vermin or produce odours.</li> <li>Solid waste should be collected on a regular basis</li> <li>Waste needs to be collected and disposed of at a registered municipal site during and after construction, and written agreement should be provided to the Northern Cape region Department of Water and Sanitation.</li> </ul>	Holder of EA	All waste managed according to approved Method Statement Compliance to all legislative requirements.	Continuous

### 9.3.4 Heritage

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

**Table 34: Heritage**

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ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES /FREQUENCY
General project area	<ul style="list-style-type: none"> <li>Implement a chance find procedures in case where possible heritage finds are uncovered.</li> </ul>	Developer / Facility Manager	Adhere to Chance find procedure.	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 34-36 and 38 of NHRA	During operational phase / as required

### 9.3.5 Agriculture and Soils

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

**Table 35: Agriculture and Soils**

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES/ FREQUENCY
Aspect: Protection of soil resources <b>Erosion</b>	<ul style="list-style-type: none"> <li>Maintain the storm water run-off control system. Monitor erosion and remedy the storm water control system in the event of any erosion occurring.</li> </ul>	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/ IMPACT	IMPACT ACTIONS	MANAGEMENT	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES/ FREQUENCY
Aspect: Protection of soil resources <b>Erosion</b>	<ul style="list-style-type: none"> <li>Facilitate re-vegetation of denuded areas throughout the site.</li> </ul>		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

### 9.3.6 Avifauna

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

**Table 36: 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	<ul style="list-style-type: none"> <li>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 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.</li> </ul>	<ol style="list-style-type: none"> <li>Wind farm operator</li> <li>Wind farm operator</li> <li>Wind farm operator</li> <li>Wind farm operator/avifaunal specialist.</li> <li>Wind farm operator/avifaunal specialist</li> </ol>	<ol style="list-style-type: none"> <li>Appoint Avifaunal Specialist to compile operational monitoring plan, including live bird monitoring and carcass searches.</li> <li>Implement operational monitoring plan.</li> <li>Engage with the landowner to design and implement an effective system to locate a carcass promptly and ensure the immediate removal</li> </ol>	Prevention of collision mortality on the wind turbines.	<ol style="list-style-type: none"> <li>Once-off</li> <li>Years 1,2, 5 and every five years after that for the duration of the operational lifetime of the facility.</li> <li>Before the first turbines start turning.</li> </ol>

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ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES /FREQUENCY
	<ul style="list-style-type: none"> <li>A procedure for the immediate removal of carcasses within the development area must be implemented to prevent vultures from being attracted to the area where they could be at risk of collision with the turbines.</li> <li>Shutdown on demand (SDoD) must be implemented on all turbines for White-backed Vulture, Lappet-faced Vulture, Martial Eagle, Verreaux's Eagle and Lanner Falcon, coupled with a carcass removal programme, to limit the risk of collisions with the turbines. The SDoD must be implemented for the first two years of the operational phase to assess the dynamics of the situation, whereafter a decision whether to continue must be taken, based on the frequency of shutdown events.</li> </ul>		<p>of the carcass before it can attract vultures.</p> <p>4. Appoint a team of suitably qualified, trained, dedicated, and resourced team of observers to be present on site for all daylight hours throughout the year. It is absolutely essential that passionate, hardworking staff are hired for this role. This team must be stationed at observation points with full visible coverage of all turbine locations. The observers must detect incoming priority bird species, track their flights, judge when they enter a turbine proximity threshold, and alert the control room to shut down the relevant turbine until the risk has reduced.</p>		<p>4. As and when required, within six months of threshold having been exceeded.</p> <p>5. Quarterly and annually.</p>

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES /FREQUENCY
			<p>5. A full detailed method statement must be designed by an avifaunal specialist prior to the commercial operations date (COD) and must be in place by the time that the wind farm starts operating.</p> <p>6. Compile quarterly and annual progress reports detailing the results of the operational monitoring and progress with any recommended mitigation measures.</p>		
<p>Avifauna: Mortality due to collisions and electrocutions on the 33kV network: Bird electrocutions on the overhead sections of the</p>	<ul style="list-style-type: none"> <li>Conduct regular inspections of the overhead sections of the internal reticulation network to look for carcasses.</li> </ul>	<p>Operations Manager  Avifaunal specialist</p>	<ol style="list-style-type: none"> <li>Carcass searchers under the supervision of the Avifaunal Specialist.</li> <li>Design and implement mitigation measures if mortality thresholds are exceeded.</li> <li>Compile quarterly and annual progress reports detailing the results of the operational monitoring and progress</li> </ol>	<p>Prevention of electrocution mortality on the overhead sections of the 33kV internal cable network.</p>	<ol style="list-style-type: none"> <li>At least once every two months.</li> <li>As and when required, within six months of threshold having been exceeded.</li> <li>Quarterly and annually</li> </ol>

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internal 33kV cables			with any recommended mitigation measures.		

### 9.3.7 Bat

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

**Table 37: Bat**

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
<p>Bat mortalities during foraging - Foraging bats can be killed by colliding with turbine blades, or by suffering barotrauma.</p> <p>Bat mortalities during migration - Migrating bats influence several ecosystems since they are cave dwelling species, also over a larger area due to the distances that may be travelled. If turbines are placed within a migration path, a larger</p>	<ul style="list-style-type: none"> <li>A minimum of two years of bat mortality monitoring must be undertaken during the operational phase</li> <li>Freewheeling occurs when the turbine blades are rotating in wind speeds below the generator cut-in speed (also called the manufacturer's cut-in speed), thus no electricity is being produced and only some blade momentum is maintained.</li> <li>Since bat activity tends to be negatively correlated with wind speed, it means that high numbers of bats are likely to be flying and impacted on in low wind speeds where freewheeling may occur. If turbine blades are feathered below the generator cut-in speed to prevent freewheeling, it can result in a very significant reduction of bat mortalities with minimal energy production loss.</li> <li>The activity levels of South African bats generally decrease in weather conditions with increased wind speeds. However, in scenarios where above</li> </ul>	<p>Developer</p> <p>WEF Facility Manager</p>	<ul style="list-style-type: none"> <li>Curtailement to prevent freewheeling</li> <li>Curtailement that increases the cut-in speed</li> <li>Acoustic bat deterrents</li> </ul>	<ul style="list-style-type: none"> <li>Prevent bat mortalities during foraging.</li> </ul>	<p>During Operation Phase</p>

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ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
<p>area and higher diversity of ecosystems may be impacted.</p>	<p>sustainable numbers of bats are being killed, and these bats fly in wind speeds above the turbine manufacturer's cut-in speed, the turbine's computer control system (referred to as the Supervisory Control and Data Acquisitions or SCADA system) can be programmed to a cut-in speed higher than the manufacturer's set speed. The new cut-in speed will then be referred to as the mitigation cut-in speed and can be determined from studying the relationship between long term (12-month) bat activity patterns on site and wind speed. This sustainable threshold of bat mortalities will be calculated according to the South African Bat Fatality Threshold Guidelines (MacEwan, et al., Edition 2, October 2018). Turbines are curtailed in this manner by means of blade feathering, to render the blades motionless in wind speeds below the mitigation cut-in speed.</p> <ul style="list-style-type: none"> <li>• This technology is developed well enough to be tested on site and may be recommended during operational monitoring, if mortality data indicate bat mortalities above the sustainable threshold for the wind farm. This threshold will be calculated according to the South African Bat Fatality Threshold Guidelines (MacEwan, et al., Edition 2, October 2018). Initial experiments with this technology on wind farms in South Africa are yielding positive results that may indicate the effectiveness of the devices in the correct scenarios.</li> </ul>				

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	<ul style="list-style-type: none"> <li>Current data on the South African trials is still limited to a small sample set, and the technology will not necessarily be effective in all mitigation scenarios and for all bat species. Therefore, it should be considered and tested on a case-by-case basis if possible, and it is highly recommended that adequate monitoring continues concurrently, to assess the effectiveness of the devices in reducing bat mortalities.</li> </ul>				
<p>Increased bat mortalities due to light attraction and habitat creation.</p> <p>Floodlights and other lights at turbine bases or nearby buildings, will attract insect eating bats and therefore significantly increase the likelihood of these bats being impacted on by moving turbine blades. Habitat creation in the roofs of nearby buildings can cause a similar increased risk factor.</p>	<ul style="list-style-type: none"> <li>A minimum of two years of bat mortality monitoring must be undertaken during the operational phase. Avoid No-go areas by adhering to the sensitivity map. Where needed, if indicated through operational monitoring, reducing blade movement at selected turbines and high-risk bat activity times/weather conditions. Acoustic deterrents are developed well enough to be trialled and may be recommended during operational monitoring. Each WEF in a migration path should apply appropriate mitigation measures to ensure that each facility's bat mortalities are below a sustainable threshold.</li> <li>During the planning phase for wind farm it must become mandatory to only use lights with low sensitivity motion sensors that switch off automatically when no persons are nearby, to prevent the creation of regular insect gathering pools. This applies to the turbine bases (if applicable) and other infrastructure/buildings.</li> </ul>	<p>Developer</p> <p>WEF Facility Manager</p>	<ul style="list-style-type: none"> <li>Minimisation of light pollution and artificial habitat creation</li> </ul>	<ul style="list-style-type: none"> <li>Reduce bat mortalities due to light attraction</li> </ul>	<p>During operation Phase</p>

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	<p>Aviation lights should remain as required by aviation regulations. Floodlights should be down-hooded and where possible, lights with a colour (lighting temperature) that attract less insects should be used.</p> <ul style="list-style-type: none"> <li>• Bi-annual visits to the facility at night must be conducted for the operational lifetime of the facility, to assess the lighting setup and whether the passive motion sensors are functioning correctly. The bat specialist conducting the operational bat mortality monitoring must conduct these visits to site during night-time to assess the placement and setup of outside lights on the facility. When lights are replaced and maintenance on lights is conducted, these mitigation measures must be consulted.</li> <li>• A mitigation to consider in the design of Klipkraal WEF 1 is to keep artificial lighting to a minimum on the infrastructure (O&amp;M buildings and on wind turbines), while still adhering to safety and security requirements. For example, this can be achieved by having floodlights down-hooded, installing passive motion sensors onto lights around buildings and possibly utilising lights with lighting colours (also referred to as lighting temperatures) that attract fewer insects. Light pollution will impact bat feeding habits and species compositions negatively, by artificially discouraging photophobic (light averse) species</li> </ul>				

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	<p>and favouring species that readily forage around insect-attracting lights.</p> <ul style="list-style-type: none"> <li>Stormwater management should also avoid creating artificial wetlands and open water sources in the turbine zones (less than 300m from any turbine base), as this will increase insect and bat activity around turbines.</li> </ul>				

### 9.3.8 Aquatic

This section deals with the issues relative to aquatic and freshwater resources during the operation phase.

**Table 38: Aquatic**

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Hydrology - Impact to the hydrological characteristics of the aquatic feature due to changes in the catchment	<p>The stormwater outlets associated with the infrastructure associated with the Klipkraal WEF must make provision for energy dissipators at the mouth of the outlets. This will reduce the risk of erosion and associated siltation which can contaminate the water quality.</p> <ul style="list-style-type: none"> <li>In addition, provision must be made for adequate stormwater management (as described above) as well as the adequate sizing of the hydraulic structures that will be used for the watercourse crossings to prevent any upstream damming by the structure. These hydraulic structures will also need to</li> </ul>	Applicant	<ul style="list-style-type: none"> <li>Regular monitoring of stormwater structures to ensure that they are free draining.</li> <li>Monitoring of the stormwater drainage structures must be a key item on the audit checklist for the operations.</li> </ul>	<ul style="list-style-type: none"> <li>Limit the impact on the <i>status quo</i> water quality on the project site.</li> </ul>	During the operational phase



ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	be monitored on a regular basis to ensure that they are free draining and have no blockages that can cause damming on the upstream side.				
Water quality - Impact to the water quality in the aquatic features because of inadequate stormwater management.	<p>The stormwater outlets associated with the infrastructure associated with the Klipkraal WEF must make provision for energy dissipators at the mouth of the outlets. This will reduce the risk of erosion and associated siltation which can contaminate the water quality.</p> <ul style="list-style-type: none"> <li>In addition, provision must be made for adequate stormwater management (as described above) as well as the adequate sizing of the hydraulic structures that will be used for the watercourse crossings to prevent any upstream damming by the structure. These hydraulic structures will also need to be monitored on a regular basis to ensure that they are free draining and have no blockages that can cause damming on the upstream side.</li> </ul>	Applicant	<ul style="list-style-type: none"> <li>Regular monitoring of stormwater structures to ensure that they are free draining.</li> <li>Monitoring of the stormwater drainage structures must be a key item on the audit checklist for the operations.</li> </ul>	<ul style="list-style-type: none"> <li>Limit the impact on the <i>status quo</i> water quality on the project site.</li> </ul>	During the operational phase
Water quality - Impact to the water quality in the aquatic features as a result of leakages from vehicles and plant moving on the site.	<ul style="list-style-type: none"> <li>As the majority of the vehicles, plant and equipment that will travel within the site will be associated with the Klipkraal WEF, the regular management and maintenance of these vehicles, plant and equipment must be ensured to limit the risk of any leakages.</li> </ul>	Applicant	<ul style="list-style-type: none"> <li>Regular management, maintenance and monitoring of vehicles, plant and equipment must be conducted to ensure that no leakages from these items are present.</li> </ul>	<ul style="list-style-type: none"> <li>Limit the impact on the <i>status quo</i> water quality on the project site.</li> </ul>	During the operational phase

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Water quality - Impact to the water quality in the aquatic features because of petrochemical spillages from petrochemical storage areas within the site.	<p>It is assumed that all petrochemical storage facilities will be located within the operational facility, as such, the location of this facility may not be located within 40m of the edge of any watercourse or within a 100m of the delineated edge of a wetland. In addition, the following management and mitigation measures must be included in the EMP:</p> <ul style="list-style-type: none"> <li>All storage containers must be contained in a bunded area that has the capacity of 110% of the total volume of the storage containers.</li> <li>The bunded area must consist of an impermeable floor as well as walls and be fitted with a valve that can be used to drain any spillages.</li> <li>If the storage facility will be in use during the rainy season, the bunded area must be rooved to prevent any rainwater entering the bund and reducing its capacity.</li> <li>The filling of containers, plant, equipment or vehicles from these storage facilities must be done on an impermeable surface to ensure the containment of any possible spillages.</li> </ul>	Applicant	<ul style="list-style-type: none"> <li>The design layout of the operational facility and the location of the petrochemical storage area must comply with the Impact Management and Actions and approved by the Applicant before construction can commence.</li> <li>Monitoring of these storage areas must be a key item on the audit checklist for the operations.</li> </ul>	<ul style="list-style-type: none"> <li>Limit the impact on the <i>status quo</i> water quality on the project site.</li> </ul>	During the operational phase

### 9.3.9 Terrestrial Biodiversity

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

**Table 39: Terrestrial Biodiversity**

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ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Operational Phase impact on broad-scale ecological processes Impacts on broad-scale ecological processes as a result of operational phase activities, including disturbance turbine noise.	<ul style="list-style-type: none"> <li>All service vehicles on site should adhere to a low speed limit on site. Heavy vehicles should be restricted to 30km/h and light vehicles to 40km/h.</li> <li>Service staff should remain within the wind farm footprint areas and access routes and should not be allowed to wander into the veld.</li> <li>No fauna including tortoises should be disturbed or removed from the veld.</li> <li>A log should be kept detailing and fauna-related incidences or mortalities that occur on site, including roadkill, electrocutions etc. These should be reviewed annually by the Environmental Officer and used to inform operational management and mitigation measures.</li> </ul>	Developer  WEF Facility Manager	<ul style="list-style-type: none"> <li>Management and monitoring of site</li> </ul>	Prevent impacts on broad-scale ecological processes as a result of operational phase activities, including disturbance turbine noise.	During Operation Phase
Operational Phase impact on FEPA Subcatchments  Impacts on ecosystem services within FEPA Priority Subcatchments as a result of operational phase activities, including disturbance and soil erosion.	<ul style="list-style-type: none"> <li>Erosion management at the site should take place according to the Erosion Management Plan and Rehabilitation Plan. This should make provision for annual monitoring and rehabilitation.</li> <li>All erosion problems observed should be rectified as soon as possible, using the appropriate erosion control structures and revegetation techniques.</li> <li>There should be follow-up rehabilitation and revegetation of any remaining bare areas with indigenous perennial shrubs, grasses and trees from the local area.</li> <li>Alien management at the site should take place according to the Alien Invasive Management Plan.</li> </ul>	Developer  WEF Facility Manager	<ul style="list-style-type: none"> <li>Management and monitoring of site</li> </ul>	Prevent impacts on ecosystem services within FEPA Priority Subcatchments as a result of operational phase activities, including disturbance and soil erosion.	During Operation Phase

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	<ul style="list-style-type: none"> <li>Regular (annual) monitoring for alien plants during operation to ensure that no alien invasive problems have developed as result of the disturbance, as per the Alien Management Plan for the project.</li> <li>Woody aliens should be controlled on at least an annual basis using the appropriate best-practice alien control techniques as determined by the species present.</li> <li></li> </ul>				
<p>Operational Phase impact on the Karoo Dwarf Tortoise</p> <p>There would potentially be impact on Karoo Dwarf Tortoises at the site during operation due to operational activities (vehicles/disturbance) as well as predation by crows.</p>	<ul style="list-style-type: none"> <li>Crow nests along any overhead lines within the site, identified during annual surveys and located within 1km of suitable Karoo Dwarf Tortoise habitat should be removed.</li> <li>Apply additional mitigation in consultation with a terrestrial ecologist to prevent roadkill mortalities and / or discourage predation of Karoo Dwarf Tortoise by crows if monitoring demonstrates these aspects to be the cause of persistent impacts on this species.</li> <li>Conduct annual surveys along any overhead lines within the site to census crow nesting sites, and log tortoise carcasses observed along the powerline and especially under any crow nests if present.</li> <li>If any Dwarf Tortoise mortalities within the site are confirmed it is recommended that structured monitoring of the local Dwarf Tortoise population within the site is initiated using mark-recapture and similar techniques to monitor population</li> </ul>	<p>Developer WEF Facility Manager</p>	<ul style="list-style-type: none"> <li>Management and monitoring of site</li> </ul>	<p>To minimise potential impacts on Karoo Dwarf Tortoises at the site during operation due to operational activities (vehicles/disturbance) as well as predation by crows.</p>	<p>During Operation Phase</p>

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	stability and structure. Should further declines become evident, then the wind farm should contribute towards active conservation of this species within the site and in the broader area.				

### 9.3.10 Transportation

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

**Table 40: Transportation**

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Additional Traffic Generation: Increase in Traffic	<ul style="list-style-type: none"> <li>The increase in traffic for this phase of the development is negligible and will not have a significant impact</li> </ul>	Holder of the EA/Contractor	<p>All staff members are aware of the EMPr requirements relevant to them</p> <p>Ensure the EMPr is adhered to.</p>	Continuous
Additional Traffic Generation: Increase of Incidents with pedestrians and livestock	<ul style="list-style-type: none"> <li>The increase in traffic for this phase of the development is negligible and will not have a significant impact</li> </ul>	Holder of the EA/Contractor	<p>All staff members are aware of the EMPr requirements relevant to them</p> <p>Ensure the EMPr is adhered to.</p>	Continuous
Additional Traffic Generation: Increase in Dust from gravel roads	<ul style="list-style-type: none"> <li>The increase in traffic for this phase of the development is negligible and will not have a significant impact</li> </ul>	Holder of the EA/Contractor	<p>All staff members are aware of the</p>	Continuous

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IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
			EMPr requirements relevant to them  Ensure the EMPr is adhered to.	
Additional Traffic Generation: Increase in Road Maintenance	<ul style="list-style-type: none"> <li>The increase in traffic for this phase of the development is negligible and will not have a significant impact</li> </ul>	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	<ul style="list-style-type: none"> <li>The increase in traffic for this phase of the development is negligible and will not have a significant impact</li> </ul>	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	<ul style="list-style-type: none"> <li>Adequate road signage according to the SARTSM.</li> <li>Approval from the respective roads department.</li> </ul>	Holder of the EA/Contractor	All staff members are aware of the EMPr requirements relevant to them  Ensure the EMPr is adhered to.	Continuous

### 9.3.11 Noise

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

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**Table 41: Noise**

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Reduce operational noise	Ambient noise monitoring to be conducted at NSA 40 and NSA 41 when operations commence to verify the noise emissions meet the night time noise rating limit. Mitigation measures to be implemented if the noise impact exceeds the 35dB(A) night noise rating limit such as running the turbines in low power mode at certain wind speeds at night.	Specialist noise consultant	As per the requirements of SANS 10103:2008	Reduction in Noise and thus reduction in chance of complaints arising	Once off during project operations

**9.3.12 Visual**

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

**Table 42: Visual**

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Visual intrusion and potential flicker effect by wind turbines and associated structures and infrastructure on visual receptors	<ul style="list-style-type: none"> <li>Mitigation will already have been implemented by the placement of turbines according to distance from visual receptors.</li> </ul>	Client/design team	Planning	Avoid visual intrusion on entities that rely on the visual environment.	Once
Visual intrusion by wind turbines and associated structures and infrastructure on landscape receptors	<ul style="list-style-type: none"> <li>Manage need for top of turbine red hazard lighting to only when a plane enters the affected airspace rather than be permanently lit.</li> <li>Limit need for security lighting.</li> </ul>	Operator	Switch on only when a plane is approaching the area and off after it have passed. This is done remotely	Avoid night time visual intrusion.	Only when a plane is approaching the area

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
			Implement alternative security measures that do not require lighting		
Visual intrusion by Access Road, Substations and Associated structures and infrastructure on visual and landscape receptors	<ul style="list-style-type: none"> <li>Maintain rehabilitated disturbed areas</li> </ul>	Operator	Ensure vegetation is in a healthy state and not exposed to erosion.	Avoid night time visual intrusion.	Continuous.

### 9.3.13 Socio-Economic

This section deals with the issues relative to socio-economic during the operation phase.

**Table 43: Socio-Economic**

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Maximise local employment and skills development opportunities associated with the construction phase	Maximise local community employment benefits in the local economy .	The Developer & Operator	<ul style="list-style-type: none"> <li>Adopt a local employment policy to maximise the opportunities made available to the local labour force (preference to Local Municipality)</li> <li>The recruitment selection process should seek to</li> </ul>	<ul style="list-style-type: none"> <li>The majority of workers are employed from local communities ( Local Municipality)</li> <li>A number of people</li> </ul>	Operation phase

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ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
			<p>promote gender equality and the employment of women, wherever possible</p> <ul style="list-style-type: none"> <li>Establish vocational training programs for the local labour force to promote the development skills</li> </ul>	attending vocational training throughout the operation phase	
Reduce the visual and sense of place impacts associated with the operation phase of the project	Reduce the visual disturbances to minimise the loss of the sense of place	Operator	<ul style="list-style-type: none"> <li>Vegetation screening to be placed between the site and adjacent properties, if required.</li> </ul>	Vegetation screening if required/necessary	Operation phase
Wind turbine mechanisms that may cause electromagnetic interference from the infrastructure	Ensure wind turbines are elevated and risk of electromagnetic interference will be minimal.	The Developer	Consult with the appropriate telecommunication authorities to ensure that the telecommunication installations identified within the vicinity of the project are not comprised through RFI	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.	Operation phase

## 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 44: On-going Stakeholder involvement**

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT ACTIONS	TIME FRAME
Ongoing Stakeholder Involvement	<ul style="list-style-type: none"> <li>• Community to be notified, as culturally appropriate, timeously of the planned decommissioning, e.g.:               <ul style="list-style-type: none"> <li>○ Proposed decommissioning start date; and</li> <li>○ Process to be followed.</li> </ul> </li> <li>• Recommend that a meeting with community leader(s) be held before decommissioning commence to inform them:               <ul style="list-style-type: none"> <li>○ What activities will take place during the decommissioning phase.</li> <li>○ How these activities will impact upon the communities and/or their properties.</li> <li>○ Regarding the timeframes of scheduled activities</li> </ul> </li> <li>• Regular interaction between the client and community leader(s) during the decommissioning phase.</li> <li>• A reporting office/ channel to be established should community members experience problems with contractors/ sub-contractors during the decommissioning phase.</li> <li>• A register to be kept of problems reported by community members and the steps taken to address / resolve it.</li> </ul>	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.

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**Table 45: Waste Management**

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT ACTIONS	TIME FRAME
Waste Management	<ul style="list-style-type: none"> <li>All decommissioned equipment must be removed from site and disposed of at a registered land fill. Records of disposal must be kept.</li> <li>Any putrescible waste must be stored in containers that can keep out scavengers such as baboons and birds to prevent the spread of litter.</li> <li>Wind turbines must be returned to the manufacturer or relevant recycling agent to be recycled.</li> </ul>	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 46: Agriculture and Soils**

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES/ FREQUENCY
Aspect: Protection of soil resources Erosion	<ul style="list-style-type: none"> <li>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.</li> </ul>	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	<ul style="list-style-type: none"> <li>Maintain where possible all vegetation cover and facilitate re-vegetation of denuded areas throughout the site, to stabilize disturbed soil against erosion.</li> </ul>	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	<ul style="list-style-type: none"> <li>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.</li> </ul>	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.

#### 9.4.4 Avifauna

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

**Table 47: Avifauna**

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES/ FREQUENCY
Avifauna: Displacement	<ul style="list-style-type: none"> <li>A site-specific EMPr must be implemented, which gives appropriate and detailed description of how</li> </ul>	Contractor and ECO	1. Implementation of the EMPr. Oversee activities to ensure that the EMPr is	Prevent unnecessary displacement of avifauna by ensuring that contractors are	1. On a daily basis 2. Weekly

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ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES/ FREQUENCY
<p>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</p>	<p>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:</p> <ul style="list-style-type: none"> <li>○ No off-road driving;</li> <li>○ Maximum use of existing roads, where possible;</li> <li>○ Measures to control noise and dust according to latest best practice;</li> <li>○ Restricted access to the rest of the property;</li> <li>○ Strict application of all recommendations in the botanical specialist report pertaining to the limitation of the footprint.</li> </ul>		<p>implemented and enforced via site audits and inspections. Report and record any non-compliance.</p> <ol style="list-style-type: none"> <li>2. Ensure that construction personnel are made aware of the impacts relating to off-road driving.</li> <li>3. Access roads must be demarcated clearly. Undertake site inspections to verify.</li> <li>4. Monitor the implementation of noise control mechanisms via site inspections and record and report non-compliance.</li> <li>5. Ensure that the footprint area is demarcated and that construction personnel are made aware of these demarcations. Monitor via site inspections and report non-compliance.</li> <li>6. Monitor via site inspections and report non-compliance.</li> </ol>	<p>aware of the requirements of the Environmental Management Programme (EMPr.)</p>	<ol style="list-style-type: none"> <li>3. Weekly</li> <li>4. Weekly</li> <li>5. Weekly</li> </ol>

### 9.4.5 Terrestrial Biodiversity

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

**Table 48: Terrestrial Biodiversity**

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Decommissioning Phase impact on the Karoo Dwarf Tortoise  Impacts on Karoo Dwarf Tortoise because of decommissioning phase activities, including vehicle collisions, disturbance.	<ul style="list-style-type: none"> <li>All vehicles should adhere to a low-speed limit on site. Heavy vehicles should be restricted to 30km/h and light vehicles to 40km/h.</li> <li>Decommissioning staff should remain within the power line footprint areas and access routes and should not be allowed to wander into the veld.</li> <li>No fauna including tortoises should be disturbed or removed from the veld.</li> <li>No holes or trenches should be left open for extended periods as tortoises may fall in and become trapped. Trenches should have soils ramps present that allow for tortoises and other fauna to escape. Holes should also be checked regularly for tortoises and other fauna that may have fallen in.</li> <li>No litter or other material from the power line or decommissioning activity should be left lying around as tortoises and other fauna may become trapped in fibres, plastic and other waste material.</li> </ul>	Contractor/ECO/EO	Management and monitoring during decommissioning	To minimise impacts on Karoo Dwarf Tortoise because of decommissioning phase activities, including vehicle collisions, disturbance.	During decommissioning phases

### 9.4.6 Transportation

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

**Table 49: Transportation**

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Additional Traffic Generation: Increase in Traffic	<ul style="list-style-type: none"> <li>• Ensure staff transport is done in the 'off peak' periods and by bus.</li> <li>• Stagger material, component and abnormal loads.</li> <li>• Construction of an on-site concrete batching plant to reduce trips.</li> </ul>	Holder of the EA/Contractor	<p>All staff members are aware of the EMPr requirements relevant to them</p> <p>Ensure the EMPr is adhered to.</p>	Continuous
Additional Traffic Generation: Increase of Incidents with pedestrians and livestock	<ul style="list-style-type: none"> <li>• Reduction in speed of vehicles</li> <li>• Adequate enforcement of the law</li> <li>• Implementation of pedestrian safety initiatives</li> <li>• Regular maintenance of farm fences &amp; access cattle grids</li> </ul>	Holder of the EA/Contractor	<p>All staff members are aware of the EMPr requirements relevant to them</p> <p>Ensure the EMPr is adhered to.</p>	Continuous
Additional Traffic Generation: Increase in Dust from gravel roads	<ul style="list-style-type: none"> <li>• Reduction in the speed of the vehicles.</li> <li>• Appropriate, timely and high-quality maintenance required in terms of TRH20.</li> <li>• Possible use of approved dust suppressant techniques.</li> <li>• Implement a road maintenance program under the auspices of the respective transport department.</li> <li>• Construction of an on-site sorter and pressing machine to reduce trips.</li> </ul>	Holder of the EA/Contractor	<p>All staff members are aware of the EMPr requirements relevant to them</p> <p>Ensure the EMPr is adhered to.</p>	Continuous
Additional Traffic Generation: Increase in Road Maintenance	<ul style="list-style-type: none"> <li>• Implement a road maintenance program under the auspices of the respective transport department.</li> </ul>	Holder of the EA/Contractor	<p>All staff members are aware of the EMPr requirements relevant to them</p>	Continuous

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ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
			Ensure the EMPr is adhered to.	
Additional Abnormal Loads	<ul style="list-style-type: none"> <li>• Ensure abnormal vehicles travel to and from the proposed development in the 'off peak' periods or stagger delivery.</li> <li>• Adequate enforcement of the law</li> </ul>	Holder of the EA/Contractor	<p>All staff members are aware of the EMPr requirements relevant to them</p> <p>Ensure the EMPr is adhered to.</p>	Continuous
Internal Access Roads: Increase in Dust from gravel roads	<ul style="list-style-type: none"> <li>• Enforce a maximum speed limit on the development.</li> <li>• Appropriate, timely and high-quality maintenance required in terms of TRH20.</li> <li>• Possible use of approved dust suppressant techniques.</li> </ul>	Holder of the EA/Contractor	<p>All staff members are aware of the EMPr requirements relevant to them</p> <p>Ensure the EMPr is adhered to.</p>	Continuous
Internal Access Roads: New / Larger Access points	<ul style="list-style-type: none"> <li>• Adequate road signage according to the SARTSM</li> <li>• Approval from the respective roads department</li> </ul>	Holder of the EA/Contractor	<p>All staff members are aware of the EMPr requirements relevant to them</p> <p>Ensure the EMPr is adhered to.</p>	Continuous



### 9.4.7 Visual

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

**Table 50: Visual**

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Visual intrusion by wind turbines and associated structures and infrastructure on visual and landscape receptors	<ul style="list-style-type: none"> <li>Remove all project components from site</li> <li>Rip all compacted hard surfaces such as platforms, roads areas, access and service roads etc. and reshape to blend with the surrounding landscape</li> <li>Rehabilitate/revegetate all disturbed areas to visually the original state by shaping and planting.</li> </ul>	Decommissioning Contractor	Mechanical removal  Mechanical equipment  Hydroseeding and planting	To remove all visible evidence of previous development.	<ul style="list-style-type: none"> <li>Once</li> <li>Once</li> <li>Continuous until vegetation has established</li> </ul>

## 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 an 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). All general and site specific specialist mitigation measures have been included.

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.



**Appendix A:**  
**Curriculum Vitae**





# Appendix C:

## Complaints Record Sheet

*Complaints Record Sheet*

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



**Appendix D:**

**Avifaunal Operational Monitoring Plan**



# AVIFAUNAL OPERATIONAL MONITORING PLAN – WEF

## 1 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.* 2015)<sup>1</sup>.

## 2 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?

## 3 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.

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<sup>1</sup> 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.

## **4 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.

## **5 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.

## **6 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.

## **7 COLLISIONS**

The collision monitoring must have three components:

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

## **8 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.

## **9 COLLISION VICTIM SURVEYS**

### **9.1 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 loaded on a cloud server on a weekly basis for the avifaunal specialist to access:

- 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, labelled, and kept refrigerated for species confirmation when the specialist visits the site.

## 9.2 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.

# 10 DELIVERABLES

## 10.1 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?

## 10.2 Quarterly reports

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



## **Appendix E:**

# **Summary of Specialist Findings and Recommendations**

## SUMMARY OF SPECIALIST FINDINGS AND RECOMMENDATIONS

Specialist Study	Findings	Recommendations
<p>Aquatic / Freshwater</p>	<p>The Klipkraal WEF phase 1 has a small footprint spread over a large area, allowing for the retention of a much of the natural system so that the system should remain largely unaffected. A variety of aquatic features, mostly ephemeral in nature were observed within the study area and were mapped and buffered as necessary for their protection and handed over as constraints to inform the design of the project layout.</p> <p>The field assessment of the property has identified a number of additional artificial and natural aquatic features. The three aquatic features identified in the NFEPA Database were found to be farm dams and therefore artificial in nature, while a number of natural Depression wetlands (or pans) were identified within the study area. The Depression wetlands are ephemeral in nature with water accumulating in these features during rainfall events. No water flows out of these features with the primary water loss being as a result of evaporation.</p> <p>A number of seasonal watercourses were also identified within the study area. These watercourses predominantly form unnamed tributaries of the Damfontainspruit and drains towards this feature (to the east). These watercourses are very seasonal in nature and will only have flow during heavy rainfall events. Years might pass between flow events in these watercourses.</p> <p>The impact assessment was conducted in consideration of the provision of these buffers providing for management and mitigation for potential impacts.</p> <p>The final layout (revised by the screening and pre-application scoping phase inputs) has, to a large degree, avoided any sensitive aquatic features and associated buffer areas, significantly reducing the potential</p>	<p>The assessment report makes a recommendation for the implementation of a 40m buffer around any watercourse and a buffer of 100m from any of the ephemeral wetlands that have been identified as well as any of the farm dams on the property.</p> <p>Adherence to these buffers as prescribed further limits the potential impact on the aquatic environment of the study site.</p> <p>Where watercourses must be crossed by access roads or cable infrastructure, the design of these crossings must make provision for adequate hydraulic sizing to prevent any damming on the upstream side of these structures. Furthermore, the functionality of these structures must be monitored to ensure that they are kept fully functional.</p>

Specialist Study	Findings	Recommendations
	<p>overall impact and risk to aquatic resources on the study site. The assessment of the potential impacts associated with the project were completed where avoidance of aquatic features was not possible, or the nature of the activities involve a potential risk to aquatic features even at great distance. Overall, it is expected that the impact on the aquatic environment would be Low Negative.</p>	
<p>Terrestrial Ecology</p>	<p>The Klipkraal 1 WEF is mapped as falling primarily within the Eastern Upper Karoo and Western Upper Karoo vegetation types. However, the site verification and field assessment confirmed the presence of Upper Karoo Hardeveld and Southern Karoo Riviere within the site as well. All of these vegetation types have only been impacted to a limited extent by transformation, and are classified as Least Threatened.</p> <p>In terms of fauna, there are several listed fauna which occur in the area and which would potentially be impacted by the development. Of greatest concern would be the Riverine Rabbit and Karoo Dwarf Tortoise, neither of which were observed within the Klipkraal 1 site but are known from the immediate area. There are no areas of habitat within the site that are considered highly suitable for this species and the extent of habitat loss for this species within the site would be minimal. There are confirmed areas of Karoo Dwarf Tortoise within the site that have been classified in the sensitivity mapping as high or very high sensitivity and in response to this mapping the developer has ensured that there are no turbines in these areas. Consequently, there would be a low impact on this species as a result of habitat loss.</p> <p>There are no CBAs within the development footprint, with the result that an impact on CBAs and ESAs as a result of the development is considered unlikely. There are however some areas of FEPA Subcatchment along the western boundary of the site that would be impacted to some degree by the development as there are two turbines located within this area. The overall footprint within the FEPA Subcatchment would be less than 2ha and is not considered significant. A number of avoidance and mitigation measures have however been</p>	<p>The major sensitive features of the site including Riverine Rabbit habitat and Karoo Dwarf Tortoise habitat have been mapped as high or very high sensitivity and would not be impacted by turbine footprint areas. Some impact to these areas from limited amounts of overhead cabling or turbine access roads are considered acceptable.</p> <p>There are no CBAs within the development footprint, with the result that an impact on CBAs and ESAs as a result of the development is considered unlikely. There are however some areas of FEPA Subcatchment along the western boundary of the site that would be impacted to some degree by the development as there are two turbines located within this area. The overall footprint within the FEPA Subcatchment would be less than 2ha and is not considered significant. A number of avoidance and mitigation measures have however been recommended which would reduce impacts on the FEPA Subcatchments to a low level.</p>

Specialist Study	Findings	Recommendations
	recommended which would reduce impacts on the FEPA Subcatchments to a low level.	
Agricultural	<p>None of the land is classified as cropland, agricultural sensitivity is purely a function of land capability. The land capability of the site on the screening tool is predominantly 4 to 5, but varies from 2 to 6. The small scale differences in the modelled land capability across the project area are not very accurate or significant at this scale and are more a function of how the data is generated by modelling, than actual meaningful differences in agricultural potential on the ground. Values of 2 to 5 translate to a low agricultural sensitivity and values of 6 translate to a medium agricultural sensitivity, although there is little real difference between low and medium agricultural sensitivity on the ground.</p> <p>The climate data (low rainfall of approximately 168 to 179 mm per annum and high evaporation of approximately 1,320 to 1,360 mm per annum) (Schulze, 2009) proves the area to be very arid, and therefore of limited land capability.</p> <p>The land capability value is in keeping with the climate limitations that make the site totally unsuitable for dryland crop production.</p>	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.
Avifauna	<p>The proposed Klipkraal WEF 1 will have several potential impacts on priority avifauna. These impacts are the following:</p> <ul style="list-style-type: none"> <li>• Displacement of priority species due to disturbance linked to construction activities in the construction phase - The impact is rated as medium but could be mitigated to low levels.</li> <li>• Displacement due to habitat transformation in the construction phase - The impact is rated as low both pre- and post-mitigation.</li> <li>• Collision mortality caused by the wind turbines in the operational phase - The impact is rated as medium pre-mitigation and low post-mitigation.</li> <li>• Electrocutation on the 33kV MV overhead lines (if any) in the operational phase - The impact is rated as medium pre-mitigation and low post-mitigation.</li> </ul>	<p><u>High sensitivity no-turbine buffer</u></p> <p>Included in this category are areas within 200m of pans and earth dams, and 150m from all major drainage lines. Surface water in this arid habitat is crucially important for priority avifauna, including several Red Data species such as Martial Eagle, Lanner Falcon, Black Stork, Blue Crane and Verreaux's Eagle, and many non-priority species, including several waterbirds. Drainage lines when flowing attract waterbirds on occasion, as do the large pools that remain in the channel after the flow has stopped. Wind turbines that are placed near these sources of surface water pose a collision risk to birds using the water for drinking and bathing, and drainage lines, when flowing, are natural flight paths for birds.</p>

Specialist Study	Findings	Recommendations
	<ul style="list-style-type: none"> <li>• Collisions with the 33 kV MV overhead lines (if any) in the operational phase - The impact is rated as medium pre-mitigation and low post-mitigation.</li> <li>• Displacement of priority species due to disturbance linked to dismantling activities in the decommissioning phase.</li> </ul>	
Bat	<p>Information from literature as well as available bat activity data from site confirms that seven bat species occur on the site and another three species are likely to occur. Of this total of ten species, six have a Medium – High or High likelihood to be negatively impacted by wind energy due to their foraging and behavioural patterns.</p>	<p>Buffers have been placed around key habitat features as per best practice resulting in the identification of several No-Go areas for turbine placement.</p> <p>Bat fatality must be monitored for a minimum of two years from commencement of operation and estimated fatality levels compared to the thresholds set for the project. If these thresholds are exceeded, an adaptive management plan for bats must be developed which will outline the use of curtailment and/or acoustic deterrents to reduce fatality to below threshold levels.</p>
Social	<p>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.</p> <p>The initiative to address these cumulative impacts lies at a far higher level than at an individual project level. In this regard conclusions are drawn to the findings of this assessment conducted for the proposed Klipkraal Wind Energy Facility 1 which indicates that during the construction and the operational phase of the proposed development, various employment opportunities, with different levels of skills will be created. In addition this will create local business opportunities benefitting the socio-economic development of the local community of Fraserburg.</p>	<p>The proposed project and associated infrastructure will create a number of potential socio-economic opportunities and benefits and is unlikely to result in permanent damaging social impacts. From a social perspective it is concluded that the project is acceptable subject to the implementation of the recommended mitigation and enhancement measures and management actions identified for the project. Considering the findings of the report and potential for mitigation it is the reasoned opinion of the specialist that the project can be authorised from a social perspective.</p>
Heritage	<p>The fieldwork conducted in 2021 within the Klipkraal WEF 1 study area identified two (2) heritage resources that were classified as structures (incl. historical farmstead).</p> <ul style="list-style-type: none"> <li>• 1 stone ruin farmstead (K-10) was rated as having medium heritage significance.</li> </ul>	<p>The calculated impact confirms the impact of the new Klipkraal WEF 1 will be reduced with the implementation of the mitigation measures. This finding in addition to the implementation of a chance finds procedure, as part of the EMP, will mitigate possible impacts on unidentified heritage resources. The following mitigation measures will be required if associated infrastructure does encroach upon the identified heritage sites:</p>



Specialist Study	Findings	Recommendations
	<ul style="list-style-type: none"> <li>1 stone shepherds shelter (K-09) was rated as having low heritage significance.</li> </ul> <p>The pre-construction and construction phase of the proposed WEF will entail extensive surface clearance as well as excavations into the superficial sediment cover and underlying bedrock (e.g., for widened or new access roads, wind turbine foundations, hardstanding areas, on-site substation, underground cables, construction laydown area, O&amp;M building and BESS).</p> <p>Construction of the facility may adversely affect potential archaeological and fossil heritage within the development footprint by damaging, destroying, disturbing or permanently sealing-in fossils preserved at or beneath the surface of the ground that are then no longer available for scientific research or other public good.</p> <p>The possible pre-construction impacts calculated on the tangible cultural heritage resources is overall VERY HIGH to MODERATE NEGATIVE rating but with the implementation of the recommended buffers and management guidelines will be reduced to a MEDIUM - LOW NEGATIVE impact.</p>	<ul style="list-style-type: none"> <li>30m buffer zone around historical structures</li> <li>It is essential that a walk down survey of the final footprint of the new Klipkraal WEF 1 and associated grid connection infrastructure be conducted.</li> <li>A management plan for the heritage resources then needs to be compiled and approved for implementation during construction and operations.</li> </ul>
Heritage (Palaeontology)	<p>The Palaeontological Impact assessment (PIA) conducted by Butler (2022) determined that the Jurassic Dolerite underlies a small portion of the proposed Klipkraal WEF 1 while the rest of the footprint is underlain by the Adelaide Subgroup (Beaufort Group). The PalaeoMap of the South African Heritage Resources Information System (SAHRIS) indicates that the Palaeontological Sensitivity of the Jurassic Dolerite is Zero as it is igneous in origin and thus unfossiliferous while that of the Adelaide Subgroup is Very High (Almond and Pether, 2009; Almond et al., 2013). Large areas of the development on the PalaeoMap are underlain by white, indicating that these areas have not been allocated so a specific Palaeontological Sensitivity. The updated Geology (Council of Geosciences, Pretoria); refines the geology of the 1983 Geological Map and indicates that the north-eastern portion is underlain by Jurassic dolerite, the most significant portion of the development is underlain by</p>	<p>It is recommended that a Palaeontological Walkdown of the development is conducted prior to the commencement of construction.</p> <p>The appointed Palaeontologist will also have to include a Chance Find Protocol for the Klipkraal WEF 1 development and training of accountable supervisory personnel by a qualified palaeontologist in the recognition of fossil heritage is necessary.</p>

Specialist Study	Findings	Recommendations
	<p>the Middleton Formation with the south western portion underlain by the Balfour Formation. Both the Middleton and Balfour Formations forms part of Adelaide Subgroup (Beaufort Group).</p> <p>In the last few decades extensive research and collecting have been conducted by palaeontologists in this part of the basin and the Fraserburg area was found to be highly fossiliferous. A two day-site-specific field survey of the development footprint was conducted on foot 24-26 September 2021. Various fossiliferous sites, where fossils were found to be well-preserved, has been identified in the development footprint.</p>	
Noise	<ul style="list-style-type: none"> <li>• There will be a short-term increase in noise in the vicinity of the site during the construction phase.</li> <li>• The area surrounding the construction sites will be affected for short periods of time in all directions, should numerous construction equipment be used simultaneously.</li> <li>• The day time SANS 10103:2008 noise limit of 45dB(A) will not be exceeded at any of the noise sensitive areas.</li> <li>• The night-time outdoor guideline noise rating limit of 35dB(A) will not be exceeded at any of the noise sensitive areas, except at two noise sensitive areas (NSA 2 and NSA 8) when the windspeed is above 10m/s. There will most likely be wind noise masking at this windspeed that will mitigate the impact. On site monitoring at these two noise sensitive areas is recommended during the operational phase. Mitigation measures to be considered if the noise impact exceeds the 35dB(A) night noise rating limit, include running the turbines in low power mode at certain wind speeds at night. It is unlikely that the indoor limit will be exceeded as the residents' buildings will attenuate some sound.</li> <li>• The cumulative impacts will not exceed the day time SANS 10103:2008 noise limit of 45dB(A).</li> <li>• The cumulative impacts will exceed the night time SANS 10103:2008 noise limit of 35dB(A) at NSA 2 and NSA 8. There will most likely be wind noise masking at this windspeed that will mitigate the effect.</li> </ul>	<p>Due to the potential low noise impacts associated with the construction and operational phases of the proposed project, it is recommended the project receive Environmental Authorisation, from a noise impact perspective.</p>

Specialist Study	Findings	Recommendations
	<ul style="list-style-type: none"> <li>The construction phase and operational phase will have a low noise impact on the noise sensitive receptors.</li> </ul>	
Visual	<p>The project will exert a negative influence on the visual environment. This is largely due to the:</p> <ul style="list-style-type: none"> <li>high visibility of the wind turbines which can be 180-200m high (300 to tip of the blade), within the study area.</li> <li>the high visibility of construction and operation activity within the low growing, uniform open Karoo veld of uniform visual pattern;</li> <li>the low VAC of the area due to the low and uniform visual pattern of vegetation which does not allow for the project to be visually accommodated within the landscape as a result of the high visual contrast and absent screening;</li> <li>the scale of the project in a rural setting;</li> <li>the introduction of an extensive project within a rural setting that will be brightly lit by security lighting including red flashing aviation warning/hazard lights on the top of the turbines throughout the night.</li> </ul> <p>However, due to the low relative visual quality of the area the overall significance of the visual impact is regarded as Moderate.</p>	<p>Based on the field observations and the studies herein and with the implementation of the mitigation measures, it is the Visual Specialist's opinion the visual impact of the wind farm layout does not present a potential fatal flaw provided that the recommended mitigation measures are implemented.</p>
Traffic	<p>The development is in close proximity to an existing road network with minor upgrades proposed on the gravel roads between Fraserburg and the development. The current access point on Road DR2312 has an insufficient sight distance of 240 m; therefore, we propose the access position be moved towards the east at Km 89.55. Before work commences, external road upgrades require approval and a wayleave application from the Northern Cape Department of Public Works &amp; Roads (NCdr&amp;pw).</p> <p>The construction / balance of plant phase of this development will typically generate the highest number of additional vehicles. However, it will be temporary, and impacts are considered nominal.</p> <p>Abnormal loads have been presumed from the Port of Saldanha through Moorreesburg, Wolseley and Worcester towards Matjiesfontein on the</p>	<p>Mitigation measures to be included in the construction phase:</p> <ul style="list-style-type: none"> <li>Ensure staff transport is done in the 'Off Peak' period and by bus to reduce impact in the peak periods.</li> <li>Stagger material, component, and abnormal loads deliveries.</li> <li>Adequate road signage on all external roads carrying development traffic according to the South African Road Traffic Sign Manual (SARTSM).</li> <li>Reduction in the speed of vehicles.</li> <li>Adequate enforcement of the law.</li> <li>Implementation of pedestrian safety initiatives.</li> <li>Regular maintenance of farm fences &amp; access cattle grids.</li> <li>Construction of gravel roads in terms of Technical Recommendations for Highways (TRH20).</li> </ul>

Specialist Study	Findings	Recommendations
	<p>N001 Freeway. The section from Matjiesfontein to Fraserburg would require passing over the Theekloofpas and could pose problems for the transportation of rotor blades. Our recommendation is to route through Sutherland with minor deviations in places; however, a more comprehensive route analysis will be required before construction better to understand the required works and the potential risks.</p> <p>Several mitigation measures are proposed to accommodate the development and reduce the impact on the surrounding road network.</p>	<ul style="list-style-type: none"> <li>• Implement a road maintenance program under the auspices of the respective transport department; and</li> <li>• Possible use of approved dust suppressant techniques.</li> </ul> <p>It is the traffic specialist opinion that the Klipkraal WEF 1 will have a nominal impact on the existing traffic network. The project is therefore deemed acceptable from a transportation perspective, provided the recommendations and mitigation measures in this report are implemented. Hence, Environmental Authorisations (EAs) should be granted for the EIA applications.</p>



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