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**DE AAR 2 SOUTH WIND ENERGY FACILITY  
SITUATED ON THE EASTERN PLATEAU  
(SOUTH) NEAR DE AAR, NORTHERN CAPE  
PROVINCE**

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**ENVIRONMENTAL MANAGEMENT PROGRAMME**

**DFFE REFERENCE NO.: 12/12/20/2463/1**  
**DENC REFERENCE NO.: NC/BA/14/PIX/EMT/DEA5/2014**

**NOVEMBER 2022**

**REVISION 1**

**Submitted in compliance with Conditions 13, 14, 15 and 16 of the Environmental**  
**Authorisation dated 1 March 2013, as amended**

**Revision 0 (dated April 2012): Life-Cycle Environmental Management Programme (EMPr) included in Final EIA Report dated April 2012 was prepared by:**  
**Aurecon South Africa (Pty) Ltd**



and

**Revision 1 (November 2022): Updates to the EMPr as part of the EMPr and Layout Plan finalisation process (2022) prepared by:**  
**Holland and Associates Environmental Consultants**



**Note:** Substantive updates that have been made by Holland & Associates Environmental Consultants to the EMPr that was included in the Final EIA Report (April 2012), compiled by Aurecon, are underlined for ease of reference.

The EMPr included in the Final EIA Report (April 2012) addressed both the De Aar 2 North Wind Energy Facility (WEF) and the De Aar 2 South WEF. All references to the De Aar 2 North WEF (which has its own Environmental Authorisation and approved EMPr) have been removed from this amended EMPr.

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## Abbreviations

<b>CEMP</b>	Construction Phase Environmental Management Programme
<b><u>BAR</u></b>	Basic Assessment Report
<b><u>DA2S WEF</u></b>	<u>De Aar 2 South Wind Energy Facility</u>
<b>DEA</b>	Department of Environmental Affairs
<b><u>DFFE</u></b>	<u>Department of Forestry, Fisheries and Environment</u>
<b><u>DENC</u></b>	<u>Department of Environment and Nature Conservation (now know as the Department of Agriculture, Environmental Affairs, Rural Development and Land Reform)</u>
<b><u>DAEARDLR</u></b>	<u>Department of Agriculture, Environmental Affairs, Rural Development and Land Reform (previously DENC)</u>
<b>DEA&amp;DP</b>	Department of Environmental Affairs and Development Planning
<b><u>DMRE</u></b>	<u>Department of Mineral Resources and energy</u>
<b>DWA</b>	Department of Water Affairs
<b><u>DWS</u></b>	<u>Department of Water and Sanitation</u>
<b>EA</b>	Environmental Authorisation
<b>EAP</b>	Environmental Assessment Practitioner
<b>ECO</b>	Environmental Control Officer
<b>EIA</b>	Environmental Impact Assessment
<b>EIAR</b>	Environmental Impact Assessment Reports
<b><u>EM</u></b>	<u>Environmental Manager</u>
<b><u>EMPr</u></b>	Environmental Management Programme
<b>LEMP</b>	Life-Cycle Environmental Management Programme
<b><u>MV</u></b>	<u>Medium Voltage</u>
<b>NEMA</b>	National Environmental Management Act (No. 107 of 1998)
<b>OHS</b>	Occupational Health and Safety Act (No. 85 of 1998)
<b>OEMP</b>	Operational Phase Environmental Management Programme
<b><u>SCC</u></b>	<u>Species of Conservation Concern</u>
<b>SDEMA</b>	Specification Data Environmental Management
<b><u>SDoD</u></b>	<u>Shut Down on Demand</u>
<b>SPEC EMA</b>	Specification Environmental Management
<b><u>WEF</u></b>	<u>Wind Energy Facility</u>

# 1 OVERVIEW

This document represents the Environmental Management Programme (EMPr) for the authorised Wind Energy Facility (WEF) situated on the Eastern Plateau (South) (also referred to as the “Mulilo De Aar 2 South Wind Energy Facility” or “De Aar 2 South WEF”) near De Aar, in the Northern Cape Province.

The project was granted an Environmental Authorisation (EA) from the Department of Environmental Affairs (DEA) (now known as the Department of Forestry, Fisheries and Environment (DFFE)) on 1 March 2013. Furthermore, on 24 July 2014, a further environmental authorisation for the project was granted by the Northern Cape Department of Environment and Nature Conservation (DENC) for activities that had not been applied for in the original EIA for the project. Following the receipt of the EA, the following amendments and approvals have been granted:

<u>Amendment / EA</u>	<u>Reference Number</u>	<u>Authorising Authority</u>	<u>Decision Date</u>
EA	<u>12/12/20/2463/1</u>	<u>Department of Environmental Affairs (DEA)</u>	<u>1 March 2013</u>
Amendment of EA	<u>12/12/20/2463/1</u>	<u>DEA</u>	<u>21 March 2013</u>
EA	<u>NC/BA/14/PIX/EMT/DEA5/2014</u>	<u>Northern Cape Department of Environment and Nature Conservation (DENC)</u>	<u>24 July 2014</u>
Amendment of EA	<u>12/12/20/2463/1</u>	<u>DEA</u>	<u>14 August 2014</u>
Amendment of EA	<u>12/12/20/2463/1/AM3</u>	<u>DEA</u>	<u>25 January 2016</u>
Amendment of EA	<u>12/12/20/2463/1/AM4</u>	<u>DEA</u>	<u>7 April 2016</u>
Amendment of EA	<u>NC/BA/14/PIX/EMT/DEA5/2014 (Amendment 1)</u>	<u>DENC</u>	<u>19 September 2017</u>
EA	<u>NC/BA/14/PIX/EMT/DEA5/2014 (Amendment 1)</u>	<u>DENC</u>	<u>27 February 2018</u>
Amendment of EA	<u>12/12/20/2463/1/AM5</u>	<u>DEA</u>	<u>5 July 2018</u>
Amendment of EA	<u>12/12/20/2463/1/AM6</u>	<u>DEA</u>	<u>6 September 2019</u>
Amendment of EA	<u>12/12/20/2463/1/AM7</u>	<u>DEA</u>	<u>24 August 2020</u>
Amendment of EA	<u>12/12/20/2463/1/AM8</u>	<u>DFFE</u>	<u>21 June 2021</u>
Amendment of EA	<u>12/12/20/2463/1/AM9</u>	<u>DFFE</u>	<u>TBC</u>

The EAs and amendment of the EAs are included in Appendix C in chronological order.

This EMPr has been updated to reflect the aforementioned amendments, the inclusion of the Final Layout Plan, and the recommendations of the specialists as part of the EMPr update and Layout Plan finalisation process, as required in terms of Conditions 13, 14, 15 and 16 of the EA dated 1 March 2013, as amended. Furthermore, the EMPr has been updated to meet the requirements of Appendix 4 of the EIA Regulations, 2014, as amended, and the inclusion of a *Generic Environmental Management Programme (EMPr) for the Development and Expansion*

of Substation Infrastructure for Transmission and Distribution of Electricity<sup>1</sup> (refer to Appendix O).

## 1.1 Purpose and Objectives of the EMPr

The EMPr (Revision 0) was compiled in the Environmental Impact Assessment process, in order to provide a link between the mitigation measures identified for the assessed project impacts in the EIA Process and the actual environmental management on the ground during project implementation and operation.

The purpose of this amended EMPr document is to provide for effective environmental management throughout the various life-cycle stages of the proposed development, including:

- Planning and design,
- Pre-construction and construction,
- Operation, and
- Decommissioning.

Furthermore, the EMPr aims for alignment and optimisation of environmental management processes with conditions of authorisation, thereby ensuring that identified environmental considerations are efficiently and adequately taken into account during all stages of development.

The broad objectives of the EMPr are to:

- Facilitate effective and appropriate environmental input and management during all phases of the project;
- Provide recommendations and specifications for the planning and design (pre-construction);
- Specify the framework within which the contractor must carry out operations/ activities during the construction phase, detail the environmental issues that must be taken cognisance of, and indicate specific actions that must be undertaken, so as to minimise and avoid potential negative impacts on the environment; and
- Ensure that all conditions of authorisation are complied with, and the project is monitored for possible environmental impacts.

The EMPr provides a clear indication of the environmental management requirements of each of the role players involved during the construction phase of the development. Guidance for the implementation of the EMPr is provided including the management of method statements which are required to be implemented to achieve compliance with the Environmental Specifications.

## 1.2 Legal requirements of Environmental Management Programmes

### 1.2.1 Background

The original EMPr (dated April 2012) was compiled to meet the requirements outlined in Section 24N (2) and (3) of the National Environmental Management Act (No. 107 of 1998)

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<sup>1</sup> as required in terms of the EIA Regulations (2014), as amended, and GN No. 435

(NEMA) (as amended) and Section 33 of the 2010 EIA Regulations (Government Notice Regulations (GN R. 543)).

The EMPr has now been updated (amended) to comply with the requirements of Appendix 4 of the EIA Regulations, 2014, as amended, as well as the Conditions of Authorisation.

The EMPr must address the potential environmental impacts of the proposed activities on the environment throughout the project life-cycle, including an assessment of the effectiveness of monitoring and management arrangements after implementation. Table 1 lists the updated requirements of an EMPr as stipulated by Appendix 4 of the EIA Regulations, 2014, as amended. Table 2 lists the requirements of an EMPr as stipulated by Section 24N (2) and (3) of the NEMA (as amended).

Table 1: Content requirements of EMPr's as per Appendix 4 of the EIA Regulations, 2014, as amended

<b>Content as required by Appendix 4 of the EIA Regulations 2014, as amended</b>	
<u>1 (1)</u>	<u>An EMPr must comply with section 24N of the Act and include -</u>
<u>1 (1) (a)</u>	<u>Details of-</u>
	<u>(i) The EAP who prepared the EMPr; and</u>
	<u>(ii) The expertise of the EAP, including a CV</u>
<u>1 (1) (b)</u>	<u>A detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description;</u>
<u>1 (1) (c)</u>	<u>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;</u>
<u>1 (1) (d)</u>	<u>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-</u>
	<u>(i) Planning and design</u>
	<u>(ii) Pre-construction activities</u>
	<u>(iii) Construction activities</u>
	<u>(iv) Rehabilitation of the environment after construction and where applicable post closure;</u> <u>and</u>
	<u>(v) Where relevant, operation activities;</u>
<u>1 (1) (f)</u>	<u>A description of proposed impact management actions, identifying the manner in which the impact management outcomes contemplated in (d) will be achieved, and must, where applicable, include actions to-</u>
	<u>(i) Avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation;</u>
	<u>(ii) Comply with any prescribed environmental management standards or practices;</u>
	<u>(iii) Comply with applicable provisions of the Act regarding closure, where applicable;</u>
	<u>(iv) Comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable;</u>
<u>1 (1) (g)</u>	<u>the method of monitoring the impact management actions contemplated in paragraph (f);</u>
<u>1 (1) (h)</u>	<u>the frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f);</u>
<u>1 (1) (i)</u>	<u>an indication of the persons who will be responsible for the implementation of the impact management actions;</u>
<u>1 (1) (j)</u>	<u>the time periods within which the impact management actions contemplated in paragraph (f) must be implemented;</u>
<u>1 (1) (k)</u>	<u>the mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f);</u>
<u>1 (1) (l)</u>	<u>a program for reporting on compliance; taking into account the requirements as prescribed by the Regulations;</u>

<b>Content as required by Appendix 4 of the EIA Regulations 2014, as amended</b>	
1 (1) (m)	<i>an environmental awareness plan describing manner in which-</i> (i) <i>the applicant intends to inform his or her employees of any environmental risk which may result from their work; and</i> (ii) <i>risks must be dealt with in order to avoid pollution or the degradation of the environment; and</i>
1 (1) (n)	<i>any specific information that may be required by the competent authority.</i>
2	<i>Where a government notice gazetted by the Minister provides for a generic EMPr, such generic EMPr as indicated in such notice will apply.</i>

The legislation hereby aims to ensure that effective environmental management is implemented throughout the life cycle of the project via the translation of EIA management actions into the EMPr.

The Department of Environmental Affairs & Development Planning (DEA&DP)'s<sup>2</sup> *Guideline for Environmental Management Plans* (2005) aims to inform and guide the preparation and implementation of EMPrs. The guideline defines EMPrs as:

*“an environmental management tool used to ensure that undue or reasonably avoidable adverse impacts of the construction, operation and decommissioning of a project are prevented; and that the positive benefits of the project are enhanced”.*

The guideline further provides *“situations [that] could trigger the need for an EMP requiring authority approval”*. One such trigger is:

*“EMPs covering specific activities assessed through an over-arching EIA and incorporated into a Strategic Environmental Management Plan. A tiered system of EIA leading to a [Strategic EMP] and multiple EMPs may apply to large-scale complex developments with several sub-projects. In this case, an over-arching EIA may serve as the basis for environmental approval for the overall development. This may be supported by a [Strategic EMP] that is approved by the authorities. However, one or more EMPs may be required for the specific activities that form part of the larger development”.*

**Table 2:** Section 24N (2) and (3) of the NEMA (as amended) listing the requirements of an EMPr

<b>24N.(2)</b>	<i>the environmental management programme must contain-</i>
(a)	<i>information on any proposed management, mitigation, protection or remedial measures that will be undertaken to address the environmental impacts that have been identified in a report contemplated in subsection 24(1A), including environmental impacts or objectives in respect of –</i> (i) <i>planning and design;</i> (ii) <i>pre-construction and construction activities;</i> (iii) <i>the operation or undertaking of the activity in question;</i> (iv) <i>the rehabilitation of the environment; and</i> (v) <i>closure, where relevant.</i>
(b)	<i>details of –</i> (i) <i>the person who prepared the environmental management programme; and</i> (ii) <i>the expertise of that person to prepare an environmental management programme</i>
(c)	<i>a detailed description of the aspects of the activity that are covered by the draft environmental management plan;</i>

<sup>2</sup> Please note that DEA&DP's guideline is used even though the proposed project is based in the Northern Cape, as DFFE has not issued a guideline on EMPrs as yet.

- (d) *information identifying the persons who will be responsible for the implementation of the measures contemplated in paragraph (a);*
- (e) *information in respect of the mechanisms proposed for monitoring compliance with the environmental management programme and for reporting on the compliance.*
- (f) *as far as is reasonable practicable, measures to rehabilitate the environment affected by the undertaking of any listed activity or specified activity to its natural or predetermined state or to a land use which conforms to the generally accepted principle of sustainable development; and*
- (g) *a description of the manner in which it intends to-*
  - (i) *modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation;*
  - (ii) *remedy the cause of pollution or degradation and mitigation of pollutants; and*
  - (iii) *comply with any prescribed environmental management standards or practices.*
- (3)** *the environmental management programme must, where appropriate-*
  - (a) *set out time periods within which the measures contemplated in the environmental management programme must be implemented;*
  - (b) *contain measures regulating responsibilities for any environmental damage, pollution, pumping and treatment of extraneous water or ecological degradation as a result of prospecting or mining operations or related mining activities which may occur inside and outside the boundaries of the prospecting area or mining area in question; and*
  - (c) *develop 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.*

The EMP<sub>r</sub> aims to meet the EMP<sub>r</sub> requirements as legislated by the NEMA Regulations, 2014 (as amended) as well as falling in line with the DEA&DP guideline document for an Environmental Management Plan<sup>3</sup>. It should however be noted that no guideline or guidance exists in terms of best practice approach to EMP<sub>r</sub>s. This document should thus be seen in an iterative context allowing for amendments throughout the life-cycle of the project, allowing for adjustments as new information is made available.

### **1.2.2 Update of the EMP<sub>r</sub> and Layout Plan finalisation, as required in terms of Condition 13, 14, 15 and 16 of the EA dated 1 March 2013, as amended**

This update of the EMP<sub>r</sub> and Layout Plan Finalisation process is being undertaken in compliance with the requirements of Conditions 13, 14, 15 and 16 of the EA (DFFE Ref: 12/12/20/2463/1) dated 1 March 2013, as amended.

Table 3 below outlines how the Conditions of Authorisation of the EA relating to the Layout Plan and EMP<sub>r</sub> have been addressed in this amended EMP<sub>r</sub> and Layout Plan finalisation process.

<sup>3</sup> Lochner, P. 2005. *Guideline for Environmental Management Plans*. CSIR Report No ENV-S-C 2005-053 H. Republic of South Africa, Provincial Government of the Western Cape, Department of Environmental Affairs & Development Planning, Cape Town.

Table 3: How Conditions of Authorisation relating to the Finalisation of the Layout Plan and update of the EMPr have been addressed

<b>EA Condition</b>	<b>Section Reference in EMPr</b>
13. A copy of the final site layout plan must be submitted with the amended EMPr to the Department for written approval prior to commencement of the activity. The site layout plan must indicate the following:	The draft Final Layout Plan has been submitted to DFFE and made available to registered I&APs for a 30 day I&AP comment period, i.e. from 14 November – 14 December 2022. The Final Site Layout Plan will be submitted to DFFE for written approval once the PPP has been concluded.
13.1. Turbine positions;	The turbine positions are included in the Final Layout Plan (refer to Final Layout Plan in Figure 1 and repeated in Appendix D).
13.2. The preferred substation position;	The substation position is indicated in the Final Layout Plan (refer to Figure 1 and Appendix D).
13.3. Foundation footprint;	Refer to Final Layout Plan in Appendix D. (Note: Given the scale of the Final Layout Map, and that the foundation footprints are not easily seen, the Final Layout Plan includes an inset, zoomed in image of two turbines showing the foundation footprint, by way of example, and all turbines have a foundation footprint).
13.4. Internal roads indicating width (construction period width and operational period width) and with numbered sections between the other site elements which they serve (to make commenting on sections possible);	Refer to Final Layout Plan in Figure 1 and Appendix D. (Note that it is difficult to indicate the internal width of access roads on the layout map. However, the width of roads are indicated in the amended EMPr (refer to Section 2.2). Gravel surface access roads would be approximately 6m wide (i.e. 10m working width during construction, rehabilitated to 6m width during operations) between each turbine. (V drains will run on either side of the road as required). Turbine numbers are included in the Final Layout Plan and could be used for reference purposes (to make commenting on sections possible).
13.5. Wetlands, drainage lines, rivers, stream and water crossing of roads and cables indicating the type of bridging structures that will be used;	Refer to Environmental Sensitivity Map in Figure 2 (and repeated in Appendix D), and to Appendix Q for conceptual bridging structures for watercourse crossings.
13.6. The location of heritage sites;	Refer to Final Layout Plan in Appendix D. (heritage buffers and heritage “no go” areas are indicated on the Environmental Sensitivity map)
13.7. Sub-station(s) and/or transformer(s) sites including their entire footprint;	Refer to Final Layout Plan in Appendix D.
13.8. Connection routes (including pylon positions) to the distribution/transmission network;	Refer to Final Layout Plan in Appendix D.
13.9. All existing infrastructure on the site, especially roads;	Refer to Final Layout Plan in Appendix D.



<u>13.10. Buildings including accommodation;</u>	<u>Refer to Final Layout Plan in Appendix D.</u>
<u>13.11. All “no-go” areas.</u>	<u>Refer to Environmental Sensitivity Map in Figure 2 (and repeated in Appendix D).</u>
<u>13.12. A map combining the final layout plan superimposed (overlain) on the environmental sensitivity map. This map must reflect the proposed location of turbines as stated in the EIR dated April 2012 and this authorisation</u>	<u>Refer to Appendix D.</u>
<u>14. The final layout plan must also be superimposed (overlain) over an environmental sensitivity map to be submitted to the department.</u>	<u>Refer to Environmental Sensitivity Map in Appendix D.</u>
<u>15. The Environmental Management Plan (EMPr) submitted as part of the application for environmental authorisation must be amended and submitted with the abovementioned layout plan to the Department for written approval prior to commencement of the activity.</u>	<u>The amended EMPr and proposed Final Layout Plan will be finalised after the 30 day I&amp;AP comment period, and will be submitted to DFFE thereafter for approval.</u>
<u>16. The EMPr amendments must include the following:</u>	<u>N/A</u>
<u>16.1. The requirements and conditions of this authorisation.</u>	<u>Refer to Appendix C.</u>
<u>16.2. A plant rescue and protection plan which allows for the maximum transplant of conservation important species from areas to be transformed.</u>	<u>Refer to Appendix F.</u>
<u>16.3. An open space management plan to be implemented during the construction and operation of the facility.</u>	<u>Refer to Appendix J.</u>
<u>16.4. A re-vegetation and habitat rehabilitation plan to be implemented during the construction and operation of the facility including timeframes for restoration which must indicate rehabilitation within the shortest possible time after completion of construction activities to reduce the amount of habitat converted at any one time and to speed up the recovery to natural habitats.</u>	<u>Refer to Appendix H</u>
<u>16.5. A storm-water management plan to be implemented during the construction and operation of the facility.</u>	<u>Refer to Appendix M</u>
<u>16.6. An effective monitoring system to detect any leakage or spillage of all hazardous substances during their transportation, handling, use and storage.</u>	<u>Refer to SDEM 3.2 and Appendix B Subclause 2.4.9.3</u>
<u>16.7. An erosion management plan for monitoring and rehabilitating erosion events associated with the facility.</u>	<u>Refer to Appendix L</u>
<u>16.8. A transportation plan for the transport of turbine components, main assembly cranes and other large pieces of equipment.</u>	<u>Refer to Appendix K</u>
<u>16.9. An environmental sensitivity map indicating environmental sensitive areas and features identified during the EIA process.</u>	<u>Refer to Environmental Sensitivity May in Appendix D, which indicates the latest sensitivity information provided by the specialists to inform the finalisation</u>

	<u>of the Layout Plan and EMPr update process.</u>
<u>16.10. Measures to protect hydrological features such as streams, rivers, pans, wetlands, dams and their catchments, and other environmental sensitive areas from construction impacts including the direct or indirect spillage of pollutants.</u>	<u>Refer to Appendix B 2.5.1.2, and SDEM 3.2, 3.3, 4.1, 4.3, and 4.11.</u>

Details of specialists who provided input for the update of the EMPr and Finalisation of the Layout Plan are as follows:

<b><u>Specialist field</u></b>	<b><u>Specialist</u></b>
<u>Ecology</u>	<u>Dr David Hoare (David Hoare Consulting (Pty) Ltd)</u>
<u>Freshwater ecology</u>	<u>Ms Toni Belcher</u>
<u>Avifauna</u>	<u>Chris Van Rooyen (Chris Van Rooyen Consulting)</u>
<u>Bats</u>	<u>Werner Marais (Animalia)</u>
<u>Noise</u>	<u>Morne de Jager (EARES Enviro Acoustic Research)</u>
<u>Visual</u>	<u>Quinton Lawson and Bernard Oberholzer</u>
<u>Agriculture/ Soils</u>	<u>Johann Lanz</u>
<u>Transport</u>	<u>Christoff Krogscheepers, Pieter Arangie (ITS)</u>
<u>Heritage (Archaeology)</u>	<u>John Gribble (ACO Associates)</u>
<u>Palaeontology</u>	<u>Prof Marion Bamford (Marion Bamford Consulting)</u>

Refer to Appendix E for the specialists' inputs and Walk-Through Reports that informed the finalisation of the Layout Plan and update of the EMPr, and confirmation of acceptance of the Final Layout.

### **1.3 Applicable legislation**

Obligations imposed by the EMPr are legally binding in terms of environmental statutory legislation (i.e. the National Environmental Management Act No. 107 of 1998, as amended), the conditions associated with the Environmental Authorisation(s) for the project, and in terms of amendments to the particular conditions of contract that pertain to this project.

The requirements of this EMPr do not release the Developer/ holder of the EA from the requirements of any legislation that may be applicable to the project. The following list of legislation is included for indicative and guidance purposes, but should not be considered to be exhaustive:

- Constitution of the Republic of South Africa, 1996 (No. 108 of 1996);
- National Environmental Management Act (No. 107 of 1998);
- Environmental Impact Assessment (EIA) Regulations, 2010 (in terms of which the project was authorised)
- EIA Regulations, 2014, as amended
- National Heritage Resources Act (No. 25 of 1999);
- National Water Act (No. 36 of 1998);
- Occupational Health and Safety Act (No. 385 of 1993);
- Hazardous Substances Act (No. 15 of 1973);
- Conservation of Agricultural Resources Act, 1983 (No. 43 of 1983);
- The Environment Conservation Act, 1989 (No. 73 of 1989).

- The National Noise Control Regulations: GN R154 of 1992;
- Western Cape Provincial Noise Control Regulations: PN 200 of 2013;
- National Environmental Management: Air Quality Act (No. 39 of 2004);
- National Environmental Management: Biodiversity Act (No. 10 of 2004) – Threatened or Protected Species List;
- National Environmental Management: Waste Act (No. 59 of 2008) and its regulations;
- National Roads Act (No. 7 of 1998);
- Mineral and Petroleum Resources Development Act (No. 28 of 2002);
- National Forests Act (No. 84 of 1998);
- National Environmental Management: Protected Areas Act (No. 57 of 2003) and its Regulations;
- Relevant provisions of the Civil Aviation Act (Act No. 13 of 2009); and
- All outdoor advertising i.e. signage boards associated with this proposed activity must be below the thresholds stipulated in the NEMA EIA Regulations. Furthermore, all outdoor advertising associated with this project, whether on or off the property concerned, must comply with the applicable Local Authority By-Law for the control of Outdoor Advertising or in the absence of local legislative controls, must comply with the South African Manual for Outdoor Advertising Control (SAMOAC).
- Northern Cape Nature Conservation Act (No. 9 of 2009)

Kindly note that South African Legislation is subject to regular change, and the list above should therefore be treated as indicative, and checked against the latest prevailing legal requirements at the time of project implementation.

#### **1.4 Structure of the EMP<sub>r</sub>**

As discussed above, the EMP<sub>r</sub> aims to address environmental management throughout the project life-cycle, from planning and design, through construction, to operation and potential decommissioning. The EMP<sub>r</sub> has been structured to include the following sections:

1. An overview, including the purpose and objectives of the EMP<sub>r</sub>, the legal requirements of the EMP<sub>r</sub>, and applicable legislation, as well as the expertise of the EAPs who prepared the EMP<sub>r</sub> (Chapter 1)
2. Background information, including the project description of the Final Layout Plan (Chapter 2)
3. Discussion summarising environmental management influencing the planning and design of the proposed project (Chapter 3);
4. Outline of the roles and responsibilities of the EMP<sub>r</sub> and compliance thereof (Chapter 4);
5. Construction EMP based on identified impacts and mitigation measures (Chapter 5);
6. Operational Framework EMP based on identified impacts and mitigation measures (Chapter 6); and
7. Decommissioning Framework providing guidance on key considerations to be considered during decommissioning/closure (Chapter 7).

Although sections 3, 5, 6 and 7 of this EMP<sub>r</sub> are implemented at different stages of the project, the sections of this EMP<sub>r</sub> cannot be read in isolation to one another. The document must therefore be distributed and viewed as a whole and in its entirety.

### 1.5 Details of the Holder of the Environmental Authorisation

<b><u>Holder of EA</u></b>	Mulilo De Aar 2 South (Pty) Ltd
<b><u>Company Registration</u></b>	2012/041424/07
<b><u>Contact Person</u></b>	Mr John Hamilton Cullum/ Mr Andrew Pearson
<b><u>Physical Address</u></b>	Top Floor, Golf Park 4, Raapenberg Rd, Mowbray, Cape Town, 7700
<b><u>Postal Address</u></b>	Post Net Suite #53, Private Bag X21, Howard Place 7450
<b><u>Telephone</u></b>	(021) 685 3240
<b><u>Email</u></b>	johnny@mulilo.com / andrew@mulilo.com

### 1.6 Details and Expertise of Environmental Assessment Practitioners who prepared the EMPr

The details of the EAP's who prepared the EMPr and amendments thereto are provided in the "Document Control Record" (refer to page iii), and in the *Curriculum Vitae* of the Environmental Assessment Practitioners included in **Appendix A**.

## 2 BACKGROUND INFORMATION

### 2.1 Project Location

The WEF would be located on the following properties: Slingers Hoek (Farm No. 2 Remainder of Portion 2 and Remainder); Slingers Hoek (Farm No. 2 Portion 4); Knapdaar (Farm No. 8 Portion 1); Maatjes Fountain (Farm No. 1 Portion 5); Vendussie Kuil (Farm No. 165 Remainder of Portion 2, and Portion 7); Vendussie Kuil (Farm No. 165 Portion 11 and Remainder), and Vendussie Kuil (Farm No. 165 Portion 7) within the Emthanjeni Local Municipality and Renosterberg Local Municipality, approximately 20km east of De Aar, in the Northern Cape Province. Refer to Appendix P.

### 2.2 Overview of the Project

The original EA (dated 1 March 2013) for the project authorised the construction of approximately 103 wind turbines, with an overall potential generation capacity of 155 – 258 MW, and associated infrastructure. A Part 2 EA amendment process was undertaken in 2015, which included a reduction in the number of turbines at the WEF (i.e. reduced from 103 turbines to a maximum of 61 turbines), as well as amendments to the turbine specifications. The number of turbines has been further reduced, to a maximum of 26 turbines.

The proposed final layout of the WEF comprises up to 28 possible Wind Turbine Generator (WTG) positions, of which a maximum of 26 WTGs would be developed, including the following:

<b><u>Component</u></b>	<b><u>Description/ Dimensions</u></b>
<u>Maximum number of turbines</u>	<u>Up to 26</u>
<u>Hub height from ground level</u>	<u>Up to 120m</u>
<u>Rotor diameter</u>	<u>Up to 165m</u>
<u>Permanent affected areas (foundation size)</u>	<u>Foundations up to maximum 24 m diameter at lowest point and up to 12 m diameter at surface.</u>
<u>Maximum Output of the Wind Energy Facility</u>	<u>140MW</u>

In addition, the associated infrastructure includes:

- A permanent hard standing made of compacted gravel with approximate footprint up to 0.47 ha per WTG, adjacent to and surrounding each turbine. Total hard stand footprint for WEF would be up to maximum of 12.2 ha.
- A total of three construction laydowns (including construction office/ yard, WTG component laydown area, and on-site concrete batching plant), each having a footprint of approximately 200m x 400m.

- Gravel surface access roads of approximately 6m wide (i.e. 10m working width during construction, rehabilitated to 6m width during operations) between each turbine. (V drains will run on either side of the road as required).
- Upgrade sections of an existing private farm road from estimated 4m to 6m final width during operations.
- Cables connecting each turbine would interconnect with 33kV overhead powerlines that will follow straight line routes adjacent to internal roads. Each turbine would have a transformer that steps up the voltage from 690V to 33kV. This transformer is housed within each turbine tower or immediately outside the turbine.
- The cabling and overhead powerlines from the turbines would traverse the site back to the substation, where the power from all the turbines would be metered.
- The proposed substation and associated control buildings would have a footprint of approximately 200 x 100m (2ha). (Note: A *Generic Environmental Management Programme (EMPr) for the Development and Expansion of Substation Infrastructure for Transmission and Distribution of Electricity*<sup>4</sup> is attached in Appendix O, and must be implemented and complied with).

As indicated above, the wind turbine generators would be connected via a 33kV reticulation network to the onsite substation, which is also connected with a new Eskom switching station. This new Eskom switching station will connect to the existing transmission network via a new 132kV overhead line. The new Eskom switching station and 132 kV grid connection line are subject to a separate EA application process (DFFE Ref: 14/12/16/3/3/1/2595).

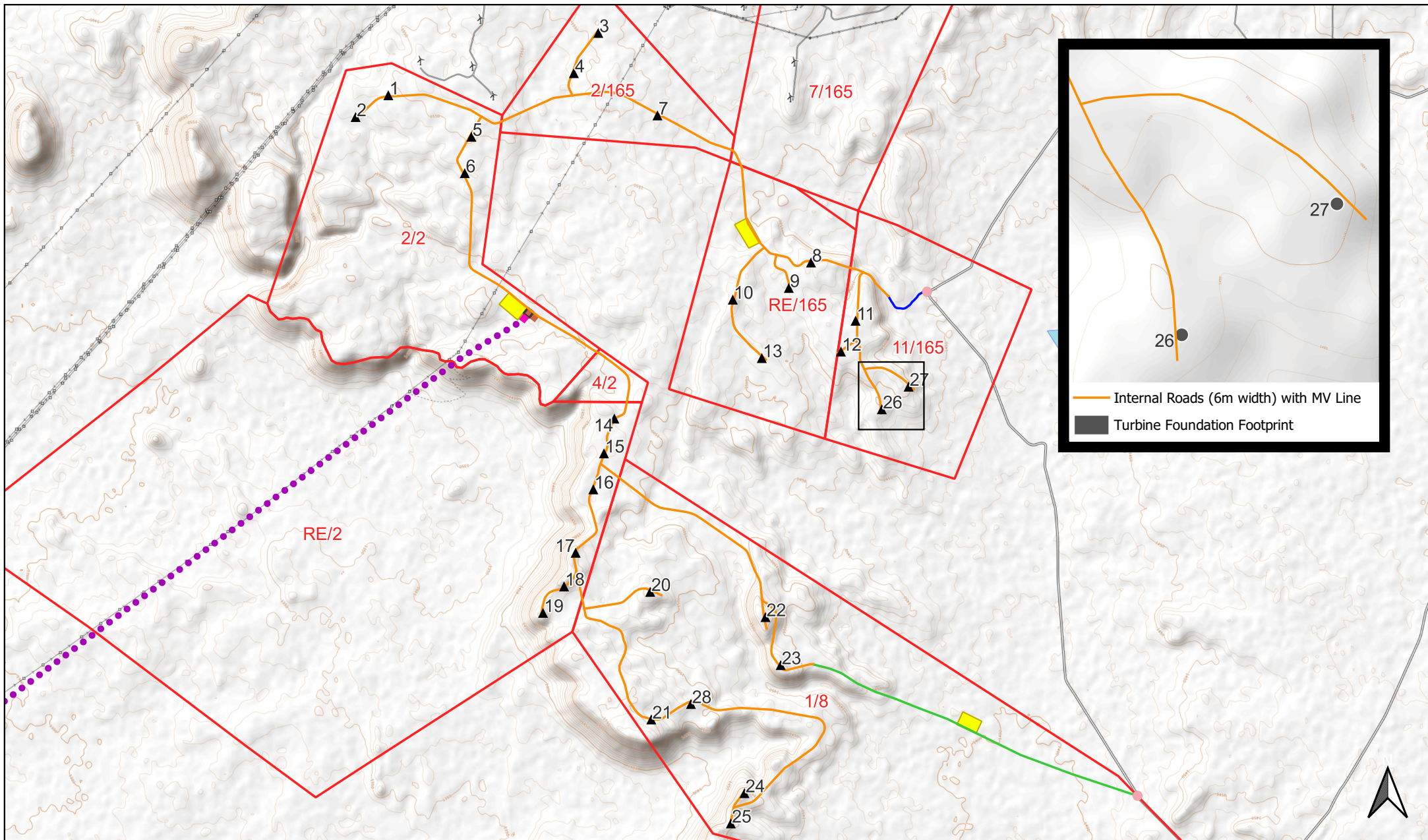
Access to the site is proposed via the existing gravel Kranskop Road off the R389.

The Final Layout Plan has taken into consideration the mitigation measures proposed for the planning and design phases as indicated in Section 3, as well as sensitive onsite environmental features. Refer to Figure 1 for the Final Layout Plan, and to Appendix E for the specialist inputs which informed the finalisation of the Layout Plan and update of the EMPr.

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<sup>4</sup> as required in terms of the EIA Regulations (2014), as amended, and GN No. 435





- Affected Farm Portions
- ▲ Proposed Turbine
- Access Points
- Internal Roads (6m width)
- Access Road (to be upgraded)
- Substation & Building Complex

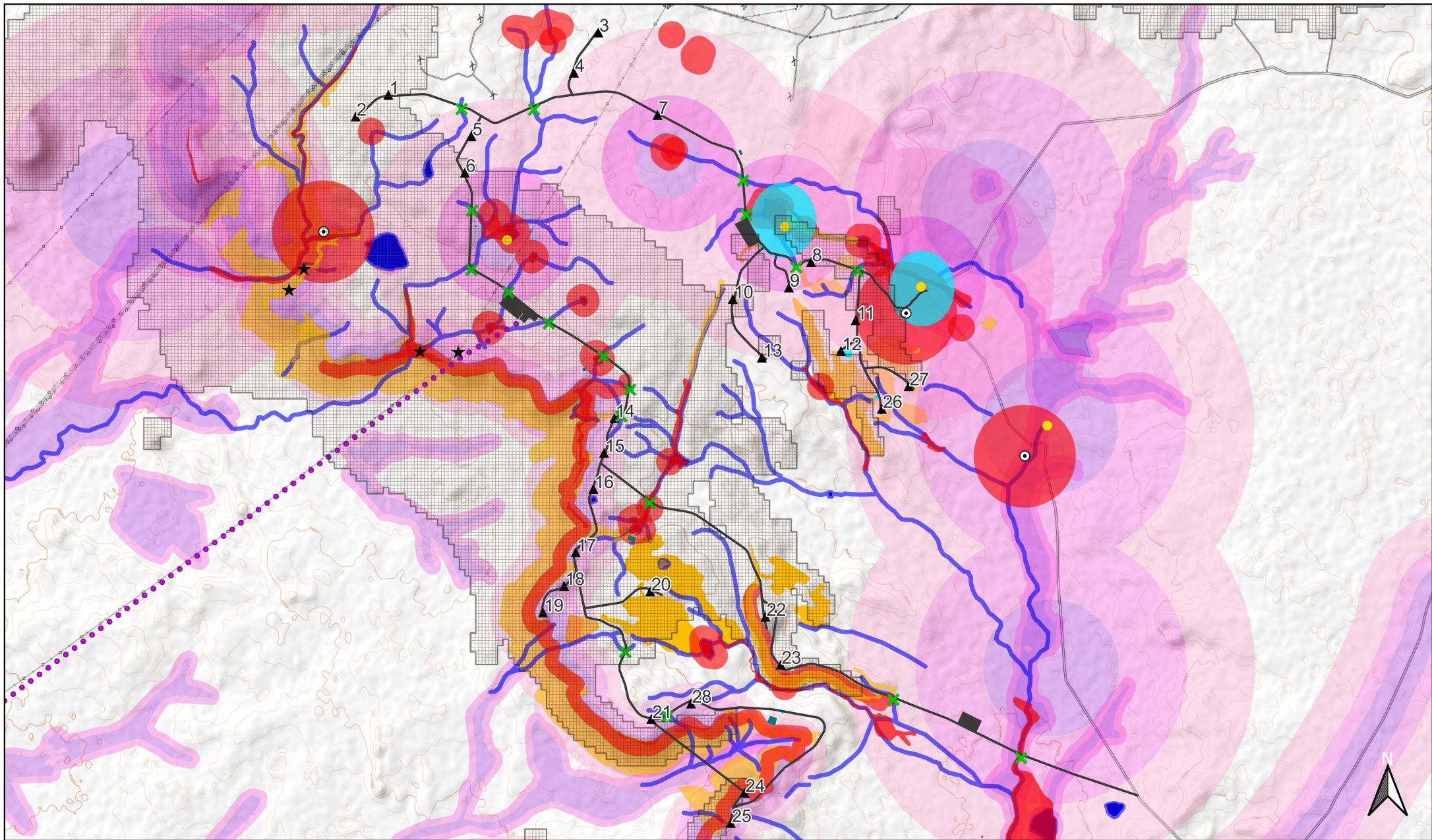
- Substation & Building Complex
- Temporary Laydown Areas
- Access Road (Separate BAR Process)
- Switching Station (Separate BAR Process)
- 132 kV Grid Connection (Separate BAR Process)



Scale 1:85000

Figure 1: Final Layout Plan  
De Aar 2 South WEF





- ▲ Proposed Turbine
- Proposed Infrastructure
- ⋯ Grid Connection
- ✕ Watercourse crossings

- Turbine Exclusion Areas**
- High Sensitivity (Fauna & Flora)
  - Heritage Buffer
  - Heritage No Go
  - Aquatic Buffer

- Environmental Sensitivities**
- Medium Sensitivity (Fauna & Flora)
  - VERA\* Model (High)
  - Jackal Buzzard Nest
  - ★ Verreaux's Eagle Nest
  - Noise Sensitive Receptor

- Visual Sensitivity**
- Very High
  - High
  - Medium

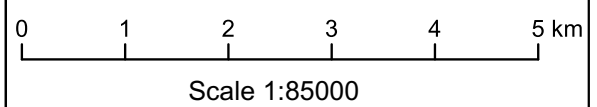


Figure 2: Environmental Sensitivity Map  
De Aar 2 South WEF



## **3 PLANNING AND DESIGN (PRE-CONSTRUCTION)**

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### **3.1 Scope**

This section outlines the recommendations that must be considered in the planning and design (pre-construction) phase of the project, and provides a list of recommendations and requirements to be considered and implemented by the Developer, planning and design team, prior to commencement of the construction phase of the project.

### **3.2 Application**

The Planning, Design and Pre-construction EMP is a list of recommendations and requirements to be considered and implemented by the developer, planning and design team.

### **3.3. Impact Management Outcomes for the Planning, Design and Pre-Construction Phase**

The objectives (impact management outcomes) for the planning and design phase are to ensure that the final detailed design of the project takes account of all relevant impact management actions (mitigation measures) put forward through the EIA process, pre-construction bird and bat monitoring studies, EA Amendment Applications, specialist walkthrough reports, and/or stipulated in Authority Requirements. The Pre-Construction EMP also helps to ensure that all Conditions of Authorisation relevant to the pre-construction and design phase of the project, are complied with. Compliance with the mitigation measures will ensure that the final detailed design of the project avoids impacts on the environment as far as possible, and where such impacts cannot be avoided, that they are minimized to within acceptable levels. For the planning and design phase, such potential impacts on the environment, as identified through the EIA process for the project, include: ecological impacts; aquatic (freshwater) impacts; impacts on avifauna and bats; impacts on heritage resources (archaeology, palaeontology and cultural heritage); visual impacts; noise impacts, and agriculture/ soils impacts.

The final design for the proposed development should respond to the identified environmental constraints and opportunities. The following mitigation measures related to the planning and design for the proposed development have been recommended to reduce the environmental impacts.

### **3.3 Planning & Design (Pre-Construction) Requirements**

#### **3.3.1 Project Design**

- The Developer shall ensure that the final detailed design of the project is compliant with the description of the project contained within the Environmental Authorisation.
  - Before construction commences, all identified 'No-Go' areas must be clearly demarcated and these areas avoided.
-

- Any changes to, or deviations from, the project description set out in the Environmental Authorisation must be approved, in writing, by the competent authority before such changes or deviations may be effected.
- A copy of the final site layout plan must be submitted with the amended EMPr to DFFE for written approval prior to commencement of the activity.

### **3.3.2 Tender Documentation**

- The Developer shall ensure that this EMPr is included within the tender documents for all contractors tendering to undertake any aspects of the construction phase of the project.
- In the adjudication of any tenders to undertake any aspect of the construction of the proposed project, the applicant (or the Applicants' agent in this regard) must ensure that the costs of compliance with the EMPr have been adequately allowed for within the winning tender.

### **3.3.3 Additional Pre-construction Requirements**

#### General

- Buffers (applicable for turbines) of 200 m buffer on either side of the 400 kV powerline servitudes, and 500 m buffer on either side of the 220 kV powerline servitudes shall be maintained. Turbines in close proximity to Eskom Microwave radio sites and substations shall also not be placed within the line of site of the antennae on such sites and towers.
- The Developer must appoint a suitably experienced independent Environmental Control Officer (ECO) for the construction phase of the development, that will have the responsibility to ensure that the mitigation/rehabilitation measures and recommendations referred to in the EA are implemented and to ensure compliance with the provisions of the EMPr.
- The ECO must be appointed before commencement of any authorised activity.
- Once appointed, the name and contact details of the ECO must be submitted to the Director: Compliance Monitoring of the Department.
- Fourteen (14) days written notice must be given to the Department (DFFE) and DENC that the activity will commence. Commencement includes site preparation. The notice must include a date on which it is anticipated that the activity will commence. (The notification period may coincide with the notice of intent to appeal period).
- The activities may not commence without the necessary permits/licenses/approvals and/or service agreements, where it is relevant, from or with the relevant regulatory authorities whether national, provincial or local (these include but are not limited to DFFE, National Department of Agriculture, Department of Housing & Local Government, Department Water and Sanitation, Department of Minerals Resources, Department of Transport, Roads & Public Works, Department of Arts, Sports & Culture, South African Heritage Resources Agency, South African Civil Aviation Authority).
- No activities may commence without the appropriate approvals/ authorisations where needed from any competent authority. The onus remains with the Developer to confirm adherence to any relevant legislation.
- No additional use of surface/ ground water is permitted, unless the Applicant has formally obtained a license in terms of Section 41 of the National Water Act, 36 of 1998 and/or formal

authorisation in terms of General Authorisations issued under Section 39 as per Government Notice 399 dated 26 March 2004, where applicable, thereto.

- Bird flappers and/or diverters must be installed at all points where powerlines cross avifaunal corridors, wetlands, drainage line and pans.
- As per Condition 42 of the EA, a 100 m buffer zone must be implemented from the edge of all cliffs, scarps and around rocky outcrops. No wind turbines must be erected within this buffer zone.
- As per Condition 43 of the EA, as amended, no wind turbines must be erected within 800 m radius of the Booted Eagle and the Verreaux's Eagle nests at:
  - Nest 1 Booted Eagle: 30°34'47.15"S 24°15'0.52"E;
  - Nest 2 Booted Eagle: 30°34'47.03"S 24°15'10.23"E;
  - Nest 3 Booted Eagle: 30° 34'36.09"S 24°14'55.49"E;
  - Nest 5 Verreaux's Eagle: 30°35'5.26"S 24°14'49.55"E; and,
  - Nest 6 Verreaux's Eagle: 30°35'41.56"S 24°15'50.57"E
- No wind turbines must be erected within 500 m of the Vendussiekuil farm dam.
- All plant species of concern must be identified during siting of the wind turbines and a search and rescue must be undertaken for such plants (where deemed necessary by the ecological specialist). Refer to Plant Rescue and Protection Plan in Appendix F.
- There must be no construction of access roads through wetlands and pans.
- As per Condition 52 of the EA, no wind turbines, pylons, substations and construction camps must be erected within 32m of wetlands and drainage lines, and within 75m of pans and dams.
- Lay down areas and stockyards should be located in low visibility areas.
- Liaison with landowners/farm managers is to be done prior to construction in order to provide sufficient time for them to plan agricultural activities.
- A 500 m buffer zone must be implemented around farm buildings which are older than 60 years.
- All rock kraals on site must be demarcated and labelled as no go areas. No wind turbine must be erected within rock kraals.
- Photographs must be taken (of the site) before construction commences, as a visual reference.
- Engage with the roads authorities prior to construction to ensure the necessary road upgrades, permits, traffic escorts etc are scheduled.
- Stormwater management principles to be incorporated into the design (refer to Stormwater Management Plan in Appendix M, and Erosion Management Plan in Appendix L).

### Ecology:

- Undertake a walk-through survey within the footprint of the proposed infrastructure prior to construction in order to identify any individual trees/ protected plants that may be affected. (Note: This has been completed (refer to Ecological Walkthrough Report attached in Appendix E1).
- Obtain required permit(s) for the permanent destruction/ removal of any affected listed/ protected trees/ plants. Slight local adjustments to tower positions (of powerlines) should be considered to avoid any affected individuals. (Note: The ecological specialist has been commissioned by the Developer to carry out this permit application process, and permits will be obtained prior to construction commencing).

- Locate roads, cabling and other infrastructure in order to avoid drainage lines, as far as possible; and
- Locate the proposed project in such a way that the development footprint is minimized, as far as possible.
- Rescue any species of value from the footprint of construction (as per the Plant Rescue and Protection Plan (refer to Appendix F)).
- Some road alignment changes (detailed in the “Proposed Layout Changes” section of the Ecological Walkthrough Report – refer to Appendix E1) were proposed by the ecological specialist, and the majority have now been implemented by the Developer, to avoid drainage areas (specifically lowland flats that are seasonally waterlogged), areas of high topographic (habitat) diversity, and steep slopes. (The ecological specialist has confirmed that the proposed Final Layout is acceptable – refer to Appendix E1).

#### Avifauna:

- A 12 month long bird monitoring programme must be implemented prior to the commencement of construction. (Note: This has been completed. Pre-construction monitoring was conducted in 2013-2014 (Van Rooyen et al. 2014), the second year of pre-construction monitoring was completed in July 2022, and the additional analysis of flight data was undertaken to inform a curtailment programme).
- Note: The avifauna recommendations included in the amended EMPr are based on the pre-construction monitoring conducted in 2013-2014 (Van Rooyen et al. 2014), the second year of pre-construction monitoring that was completed in July 2022, and the additional analysis of flight data undertaken to inform a curtailment programme. The recommendations in the Avifauna Walkthrough Report (November 2022) (refer to Appendix E2) replace all recommendations contained in previous avifaunal impact assessment reports and Environmental Management Programmes, which are now outdated).

The following design changes were recommended to the applicant by the avifauna specialist and implemented in the current (final) layout to be included in the amended EMPr:

- Ideally no turbines should be located in the VERA high risk zone. It is noted that the project received environmental authorization before the Verreux’s Eagle guidelines, or the VERA model came in to being. The current turbine layout has been assessed as the most conservative layout possible in terms of avoiding VERA high risk zones and maintaining the viability of the project, in contrast to the previous layout which was authorized prior to the release of the VERA model and Verreux’s Eagle guidelines.
- It is understood that the 26 of the current 28 turbine positions will be utilised. This represents a significant 57.3% reduction, with 35 turbines being removed from the authorized layout of 61.
- It is recommended that a 200m turbine exclusion zone around dams and water troughs as a pre-cautionary measure against SCC and other priority species collisions.
- A 750m turbine exclusion zone around the Jackal Buzzard nests must be implemented.
- A 100m turbine setback from the escarpment edge must be maintained.
- All internal 33kV medium voltage cables are to be buried if technically and practically possible.

- Those sections where the 33kV medium voltage cable cannot be trenched due to technical or environmental reasons, but needs run on overhead poles, the proposed pole designs must be approved by the avifaunal specialist, to ensure that the designs are raptor-friendly.
- Bird flight diverters are to be fitted to all internal 33kV overhead lines according to the applicable Eskom Engineering Instruction.
- All turbines must have one blade painted in signal red according to pattern no.4 depicted in Figure 3. 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 (see Simmons *et al.* 2021 (Appendix 6 of Appendix E2) for an explanation of the science and research behind this mitigation method).

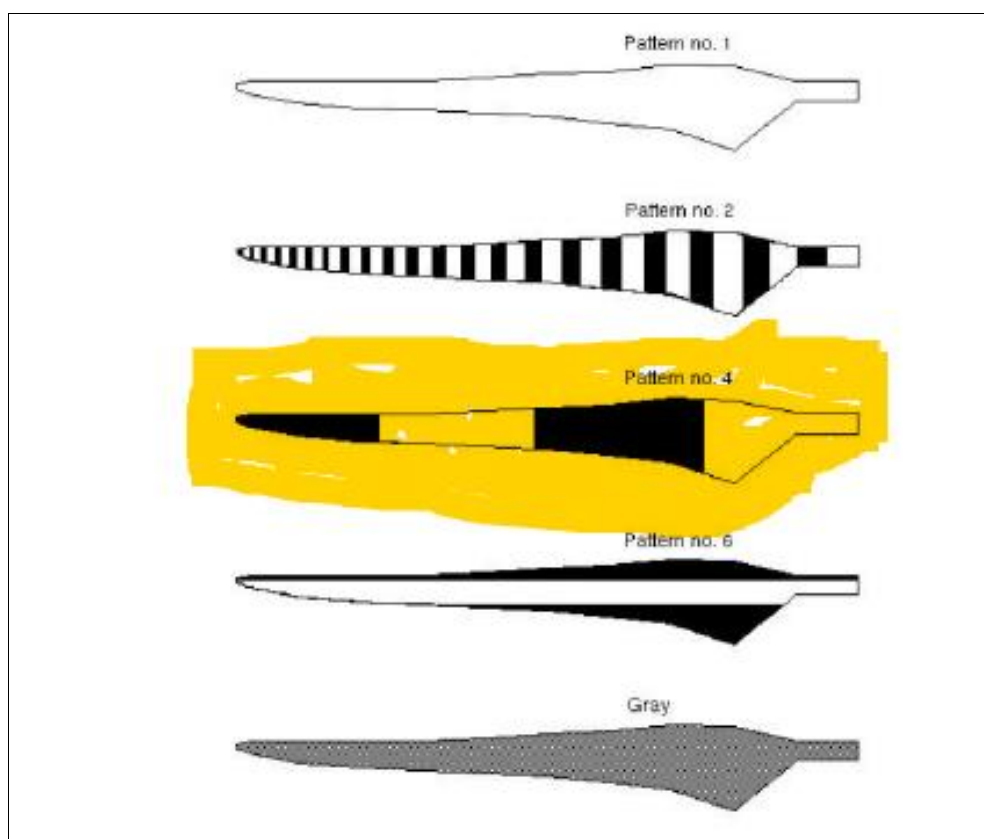


Figure 3: Pattern no.4 is the recommended pattern for blade painting at the WEF

#### Bats:

- Implementation of the Mitigation Action Plan for Bats (refer to Appendix G), including the following:
  - **Minimisation of light pollution and artificial habitat creation:**
    - During the planning phase for the Mulilo De Aar 2 South WEF it must become mandatory to only use lights with low sensitivity motion sensors that switch off automatically when no persons are nearby, to prevent the creation of regular insect gathering pools, where practically possible without compromising security requirements. This applies to the turbine bases (if applicable) and other infrastructure/buildings. Aviation lights should remain as required by aviation regulations. Floodlights should be

- down-hooded and where possible, lights with a colour (lighting temperature) that attract less insects should be used. This mitigation step is a simple and cost-effective strategy to effectively decrease the chances of bat mortality on site.
- The storm water drainage plan must avoid creations of artificial ponds/open water sources or wetlands in turbine zones (less than 282.5m from any turbine base), as these will increase insect activity and therefore bat activity in the area. This can result in turbines that were previously assessed as having a low risk to be financially and biologically costly high-risk turbines.
  - **Curtailment to prevent freewheeling:**
    - 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.
    - Based on high bat activity detected during the 12-month preconstruction study, from 1 September to 31 March every night for the lifetime of the facility, curtailment must be applied to all turbines by ninety-degree feathering of blades below the manufacturer's cut-in speed, so it is exactly parallel to the wind direction and minimises freewheeling blade rotation as much as possible without locking the blades. This can significantly lower probability of bat mortalities. Influence on productivity is minimal since no power is generated below the manufacture's cut-in speed.
  - **Curtailment that increases the cut in speed:**
    - The activity levels of South African bats generally decrease in weather conditions with increased wind speeds. However, in scenarios where above 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 may be curtailed in this manner by means of blade feathering, to render the blades motionless in wind speeds below the mitigation cut-in speed.

#### Heritage:

- Four archaeological sites located in 2022 (refer to Appendix E3) in proximity to access roads to WTGs require either avoidance or mitigation in the form of archaeological sampling. These are:
  - JG104 – 20 m buffer or mitigate;
  - G110 – 60 m buffer or mitigate;

- G113 – 30 m buffer or mitigate; and
- JG134 – (historical ashheap near the Vendussie Kuil farm complex that is crossed by Access Road) - 20 m buffer or mitigate.

If the mitigation of any of these sites is chosen, a permit for the work will need to be obtained from SAHRA by a suitably qualified archaeologist and the work must be carried out prior to construction commencing.

- The 500 m buffers in place around the Kranskop and Vendussie Kuil farm werfs must remain although:
  - The small overlap of the laydown area and access road with the Kranskop buffer is permitted; and
  - The access road within the Vendussie Kuil buffer is permitted, but that instead of constructing a new road within a short distance of the farm complex, the section of the existing farm road within the buffer is upgraded to serve as the access road, thereby limiting the impacts of the WEF on the farm complex. (Note: This recommendation has been addressed in the Final Layout Plan).
- All rock kraals on site must be demarcated and labelled as no go areas. No wind turbine must be erected within rock kraals.

#### Visual:

- Careful siting of substation, siting and cladding of buildings
- Careful alignment of roads for least visibility, revegetating disturbed slopes
- Appropriate location of buildings, return adjacent ground to original state
- Turbine paint treatment: white, matte, no stripes, decals, logos- The colour finish of the turbines: Paint treatment: white, matte, no stripes, decals, logos preferable, **however** painting of one of the blades of each turbine (with red or black), as per avifaunal specialist recommendations, is acceptable.
- Comply with road safety traffic requirements
- Compliance with EMP
- Optional mitigation measures recommended by visual specialist:
  - As the screening of wind turbines is not practical, only avoidance measures are possible. Where possible, the micro-siting of turbines could be considered, as in the case of WTG 19 and 24. The routing of the internal overhead powerline between WTG 21 and 24 should be re-considered, given the visual sensitivity of the steep slopes and small kloof, but is considered acceptable from a visual impact perspective).
- The visual mitigations contained in the original VIA of 2011 are still relevant, and no other additional visual mitigations are proposed. (Note: The proposed painting of one of the blades of each turbine, as recommended by the avifaunal specialist during the current EMPr and layout plan finalisation process, is considered acceptable from a visual impact perspective. Accordingly, amendment of the mitigation measures in the original VIA (2011) that indicated that blades must be white (with no stripes, decals or logos) is considered acceptable, to allow for the proposed blade painting. The update of the visual mitigation measure to allow for the proposed blade painting will be addressed in the update of the EMPr process).
- Consider temporary hard-standings for cranes in place of permanent hard-standings.

- The alignment of access roads should be carefully considered to minimize visible scarring from cut and fill, and gravel should be used as surface material. Roads alignments should lie with the contour as far as possible.
- The new road(s) that will connect the turbines and permit free access for maintenance and inspection vehicles in the site should also be gravel.
- Visibility of buildings and ancillary infrastructure: These should be sited in places where they would be least visible and where topography can offer shielding to potential receptors. Their cladding should be in materials sympathetic to those of surrounding lands.
- The aircraft warning lights required by CAA should be fitted with shields so that they are only visible to aircraft, not to receptors on the ground at lower elevations
- The power lines should be buried on the site, where reasonable and feasible, as they introduce horizontal lines above ground which conflict with the strong vertical element of the turbine structures.

#### Freshwater:

- There must be no construction of access roads through wetlands and pans. (Note: Crossings over water courses (e.g. rivers streams and drainage lines) are permitted).
- No wind turbines, pylons, substations and construction camps must be erected within 32m of wetlands and drainage lines, and within 75m of pans and dams.
- A buffer of at least 32m (from centre of stream for smaller drainage lines and from top of bank for larger tributaries) should be maintained adjacent to the identified freshwater features, as well as from the edge of the pans and wetland areas.
- To reduce the risk of erosion, the locality of the turbines and structures should preferably not be on any steep slopes or within the wide wash areas on the plains (\*this requirement has been checked by the aquatic specialist and the final layout and turbine positions meet this and are acceptable to the aquatic specialist). Run-off over the exposed areas should be mitigated to reduce the rate and volume of run-off and prevent erosion occurring on the site and within the freshwater features and drainage lines.
- Where new roads need to be constructed the existing road infrastructure should be rationalised and any unnecessary roads decommissioned and rehabilitated to reduce the disturbance of the area and within the stream beds.
- For new access roads to the turbines, these should rather be along the ridges of the hills than in the drainage/stream beds. Where access routes need to be constructed through streams/drainage lines, the disturbance of the channel should be limited.
- Wetland and pan areas should be avoided and any road adjacent to a wetland feature should also remain outside of the 32m buffer zone as far as possible. All crossings over drainage channels or stream beds should be such that the flow within the drainage channel is not impeded, and appropriate water use licences and/or general authorisations must be obtained in line with the National Water Act (NWA) Road infrastructure, transmission lines and cable alignments should coincide as much as possible to minimize the impact.
- Avoid watercourses and recommended buffers (i.e. a buffer of at least 32m (from centre of stream for smaller drainage lines and from top of bank for larger tributaries) should be maintained adjacent to the identified freshwater features, as well as from the edge of the pans and wetlands areas), as far as possible;
- Make use of existing disturbed areas where possible;



- Do not stockpile or dump rubble or waste associated with the construction works within the aquatic features or the recommended buffers;
- Water consumption requirements for the site for the construction and operation of the site if not obtained from an authorised water user within the area, must be authorised by the DWS;
- No liquid waste should be discharged into any of the aquatic features within the site without the approval of the DWS.
- Adequate and erosion mitigation measures should be incorporated into design and implemented during construction.

#### Transportation:

- Engage with the roads authorities prior to construction to ensure the necessary road upgrades, permits, traffic escorts etc are scheduled.
- Compliance with the Transport and Traffic Management Plan for the project (refer to Appendix K). The Traffic Management Plan included in Appendix K has been prepared in respect of the planning phase of the proposed facility.
- Update the Traffic Management Plan prior to the commencement of the construction phase and the operational phase, when more detailed information regarding the delivery of components, traffic data and construction activities are available.
- Transport Route: It is assumed that all components will be imported and shipped to either Coega, Richards Bay, Cape Town or Saldanha Bay harbours. Based on the abnormal load requirements, a preliminary route as outlined in Section 8 of the Transport and Traffic Management Plan for the project (refer to Appendix K) is proposed for transporting the large equipment to the site. These routes have all already been cleared for abnormal loads with the implementation of previous wind farms in the area. No additional geometric upgrades are required along the route.
- Permits will need to be obtained from the relevant road authorities for all abnormal loads and the specific route will be specified based on the characteristics of each load type.
- Access is proposed via the existing gravel Kranskop Road off the R389.
- Private roads and local access roads on the WEF site should be upgraded to at least 6 metres wide to accommodate the abnormal load vehicles.
- Transport Management Plan:
  - Abnormal permits are required for vehicles exceeding the permissible maximum dimensions on road freight transport in terms of the Road Traffic Act (Act No. 93 of 1996). The permit will describe load limitations for each load based on the component and the transport route. A permit is required for each Province that the haulage route traverses.
  - The Technical Recommendations for Highways (TRH 11): "Draft Guidelines for Granting of Exemption Permits for the Conveyance of Abnormal Loads and for other Events on Public Roads" outlines the rules and conditions that apply to the transport of abnormal loads and vehicles on public roads.

Agriculture/ Soils:

- Avoid homesteads and interact with land owners with regards to the final turbine positioning. It is also assumed and recommended that a non-developmental buffer will be placed around existing homesteads.

Noise:

It is recommended that the project applicant (Developer):

- re-evaluate the noise impact should the layout be revised where:
  - a. any WTG, located within 1,500m from an identified and verified NSR, are moved closer to the NSR;
  - b. any new WTG are introduced within 1,500m from an identified and verified NSR;
  - c. the number of WTG within 2,000m from any identified and verified NSR are increased;
- re-evaluate the noise impact should the applicant make use of a wind turbine with a maximum SPL exceeding 112.6 dBA re 1 pW (including the reported uncertainty);
- The applicant should also develop and implement an environmental noise monitoring plan at NSR02 (if used for residential purposes). Refer to Section 12 of Appendix E6 – for the Environmental Noise Monitoring Plan). Should the structure at NSR02 not be used for residential purposes, measurements at this NSR would not be required.
- For a WTG with a SPL of 112.6 dBA (re 1 pW), ambient sound levels should be measured at NSR02 before the development of the WEF, with the measurements repeated after the first year of operation. Should the structure at NSR02 not be used for residential purposes, measurements at this NSR would not be required.
- To ensure that noise does not become an issue for future residents or land owners, it is recommended that the applicant get written agreement from current land owners that:
  - no new residential dwellings will be developed within areas enveloped by the 42 dBA noise level contour, and
  - structures located within the 45 dBA noise level contour not be used for residential use.

## 4 COMPLIANCE MONITORING, ROLES AND RESPONSIBILITIES

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Prior to the commencement of construction of the project a suitably qualified and experienced Environmental Control Officer (ECO) shall be appointed by the Developer to ensure that the mitigation rehabilitation measures and recommendations referred to in the EA are implemented and to monitor and ensure compliance with the provisions of the EMPr and EA, thereby ensuring that identified environmental considerations are efficiently and adequately taken into account during all stages of development. Once appointed, the name and contact details of the ECO shall be submitted to the Director: Compliance Monitoring of DFFE.

### 4.1 Roles and Responsibilities

#### **The Developer/ Holder of the EA:**

Mulilo De Aar 2 South (Pty) Ltd shall:

- Assume overall responsibility for the administration and implementation of the EMPr and compliance with the EA, through an identified Project Manager or Engineer;
  - Appoint a suitably qualified Project Manager or Engineer; and
  - Appoint a suitably qualified independent ECO to monitor compliance with the EMPr and undertake monthly and close out audits of compliance with the requirements of the EMPr and provide a copy of the audit reports to DFFE and the Department of Agriculture, Environmental Affairs, Rural Development and Land Reform (DAERL) and the Contractor.
  - Fourteen (14) days written notice must be given to the Department that the activity will commence. Commencement for the purposes of this condition of the EA includes site preparation. The notice must include a date on which it is anticipated that the activity will commence. This notification period may coincide with the notice of intent to appeal period.
  - The holder of the authorisation must submit an environmental audit report to the Department within 30 days of completion of the construction phase (i.e. within 30 days of site handover) and within 30 days of completion of rehabilitation activities. The audit report must be submitted prior to commencement of the operation phase of the project. Refer to Conditions 27 – 30 of the EA dated 1 March 2013.
  - Fourteen (14) days written notice must be given to the Department (DFFE) that the activity operational phase will commence.
  - Seven (7) days written notice must be given to DENC that the activity will commence. The notice must include a date on which it is anticipated that the activity will commence.
  - Provide all principal contractors working on the project with a copy of the EMPr as part of the tender contract documentation to all the contractors to cost for its requirements within their construction contracts.
  - The applicable conditions of the EA(s) must form part of all contractor's and sub-contractors conditions of contract. A performance based requirement with regard to environmental impact management must be included in all contracts related to any aspect of the EAs for the project (refer to Appendix C).
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- Ensure that all relevant approvals and permits have been obtained prior to the commencement of construction activities.
- Any complaints regarding the development must be brought to the attention of the DENC within 24 hours after receiving the complaint. A complaints register must be kept up to date for inspection by the Department.

***Project Manager or Engineer:***

The Project Manager or Engineer shall:

- Have overall responsibility for the environment;
- Ensure that the requirements as set out in the EMPr and by the relevant authorities are adhered to and implemented;
- Have the authority to stop works and issue fines, as necessary;
- Receive reports from the ECO and shall report to Mulilo De Aar 2 South (Pty) Ltd; and
- Support the ECO in his/her roles and responsibilities, i.e. assist the ECO in ensuring that the specifications of the EMPr are being adhered to and promptly issuing instructions requested by the ECO to the Contractor. All site instructions pertaining to environmental matters issued by the Engineer are to be copied to the ECO.
- Reviewing and approving construction methods statements with inputs from the ECO
- Ordering the removal of person(s) and/or equipment not complying with the specifications of the EMPr or Conditions of the EA, or issuing a stop works order (as required by the ECO);
- Issuing of penalties for transgressions of the EMPr specifications, if required.

The duties of the Project Manager during the operation phase will include:

- Liaison with Mulilo De Aar 2 South (Pty) Ltd and DFFE;
- Monitoring of the operation of the project for compliance with the various environmental requirements contained in the Framework Operational EMP;
- Ensuring the proactive and effective implementation and management of environmental protection measures; and
- Monitoring of compliance with the EAs related to the operational phase as issued by DFFE and DENC as well as other relevant environmental legislation.

***Environmental Control Officer (ECO):***

The role of the ECO will be to oversee and monitor compliance with and implementation of the construction phase EMP, which includes compliance with the relevant conditions contained in the EA (refer to Appendix C). This includes the following responsibilities:

- i) Liaison with the Mulilo De Aar 2 South (Pty) Ltd, Project Manager or Engineer and DFFE and/ DAEARDLR;
- ii) Monitoring of all of the Contractor's activities for compliance with the various environmental requirements contained in the construction Specification;
- iii) Monitoring of compliance with the EA related to the construction phase as issued by DFFE and DENC as well as other relevant environmental legislation;
- iv) Reviewing of the Contractor's environmental Method Statements;
- v) Ensuring that the requisite remedial action is implemented in the event of non-compliance;

- vi) Ensuring the proactive and effective implementation and management of environmental protection measures;
- vii) Ensuring that a register of public complaints is maintained by the Contractor and that any and all public comments or issues are appropriately reported and addressed;
- viii) Routine recording and reporting of environmental activities on a weekly and monthly basis;
- ix) Maintain a record of all activities on site, problems identified, transgressions noted, and a schedule of tasks undertaken;
- x) Maintain a details incident and complaints register;
- xi) Maintain a daily site diary;
- xii) Maintain copies of all reports submitted to the Department;
- xiii) Maintain a schedule of current site activities including the monitoring of such activities.
- xiv) Recording and reporting of environmental incidents.

The ECO shall remain employed until all rehabilitation measures, as required for implementation due to construction damage, are completed and the site is ready for operation.

Records relating to monitoring and auditing must be kept on site and made available for inspection to any relevant and competent authority in respect of the development.

#### **4.2 Environmental auditing:**

Records relating to monitoring and auditing must be kept on site and made available for inspection to any relevant and competent authority in respect of this development.

As per Conditions 27 – 30 of the Environmental Authorisation dated 1 March 2013 (refer to Appendix C):

- All documentation e.g. audit/ monitoring/ compliance reports and notifications, required to be submitted to the Department in terms of the authorisation, must be submitted to the *Director: Compliance Monitoring* at the Department (DFFE).
- The holder of the authorisation must submit an environmental audit report to the Department (to both DFFE and DENC) **within 30 days of completion of the construction phase** (i.e. within 30 days of site handover) **and within 30 days of completion of rehabilitation activities.**
- The environmental audit report must:
  - Be compiled by an independent environmental auditor;
  - Indicate the date of the audit, the name of the auditor and the outcome of the audit;
  - Evaluate compliance with the requirements of the approved EMPr and this environmental authorisation;
  - Include measures to be implemented to attend to any non-compliances or degradation noted;
  - Include copies of any approvals granted by other authorities relevant to the development for the reporting period; and

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- Highlight any outstanding environmental issues that must be addressed, along with recommendations for ensuring these issues are appropriately addressed.
  - The audit report must be submitted prior to commencement of the operation phase of the project.
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## 5 CONSTRUCTION PHASE EMP

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### 5.1 Scope

The Construction EMP aims to address mitigation measures (impact management actions) pertaining to the construction phase as identified during the course of the EIA. This Specification covers the requirements for controlling the impact on the environment of all construction activities for the Mulilo De Aar 2 South WEF project. All construction and land clearance activities shall observe the requirements of this specification as well as any relevant environmental legislation and in so doing shall be undertaken in such a manner as to minimise impacts on the natural and social environment. Refer to Section 4 for the persons responsible for the implementation of the impact management actions outlined in Section 5.

### 5.2 Application

This Specification contains clauses that are generally applicable to the undertaking of engineering works and renewable energy developments, in areas where it is necessary to impose pro-active controls on the extent to which the construction activities impact on the environment. The roles and responsibilities in terms of the application and implementation of this Specification have been outlined in Section 4 above.

### 5.3 Impact Management Outcomes

The overall goal for the Construction EMP is to ensure that the construction of the proposed project is undertaken in a manner that ensures that activities are properly managed in respect of environmental aspects and impacts.

Compliance with the Construction EMP will ensure that the construction phase of the project avoids impacts on the environment, as far as possible, and where such impacts cannot be avoided, that they are minimised to within acceptable levels. For the construction phase, such potential impacts, as identified through the EIA process for the project, include: ecological (flora and fauna) impacts, impacts on avifauna, and bats; sedimentation and erosion; impacts on heritage resources (archaeology, palaeontology and cultural heritage); visual impacts; impact on local economy (employment) and social conditions; impact on transport; noise impacts; storage of hazardous substances on site; and dust impacts.

The following section provides the Draft Specification Data which, together with the General Specifications, must be included in all contract documentation associated with the WEF and will accordingly be binding on the Contractor.

### 5.4 **Construction EMP General Specifications**

The complete General Specifications have been included in **Appendix B** and include the following sections:

- Scope
  - Normative References
  - Supporting Specifications
  - Definitions
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- Requirements
    - Material
    - Material handling, use and storage
    - Hazardous substances
    - Shutter oil and curing compound
    - Bitumen
    - Plant
    - Ablution facilities
    - Solid waste management
    - Contaminated water
    - Site structures
    - Noise control
    - Lights
    - Fuel (petrol and diesel) and oil
    - Workshop, equipment maintenance and storage
    - Dust
    - Methods and procedures
    - Environmental awareness training
    - Construction personnel information posters
    - Site clearance
    - Site division
    - Site demarcation
    - "No go" areas
    - Protection of natural features
    - Protection of flora and fauna
    - Protection of archaeological and paleontological remains
    - Access routes/ haul roads
    - Cement and concrete batching
    - Earthworks
    - Pumping
    - Bitumen
    - Fire control
    - Emergency procedures
    - Community relations
    - Erosion and sedimentation control
    - Aesthetics
    - Recreation
    - Access to site
    - Crane operations
    - Trenching
    - Demolition
    - Drilling and jack hammering
    - Stockpiling
    - Site closure and rehabilitation
    - Temporary re-vegetation of the areas disturbed by construction
    - Temporary site closure
  - Compliance with requirements and penalties
    - Compliance
    - Penalties
    - Removal from site and suspension of Works
  - Measurement and Payment
    - Basic principles
      - General
  - All requirements of the environmental management specification
  - Work "required by the Specification Data"
  - Billed items
    - Method Statements: Additional work
    - All requirements of the environmental management specification
-



The following section provides the Draft Specification Data which, along with the General Specifications, will be included in all contract documentation associated with the proposed WEF and will accordingly be binding on the Contractor.

## **5.5 Project Specifications**

### **SDEMA ENVIRONMENTAL MANAGEMENT (SPEC EMA)**

**SCOPE:** The general principles contained within this Specification Data: Environmental Management (SDEMA) shall apply to all construction related activities. All construction activities shall observe any relevant environmental legislation and in so doing shall be undertaken in such a manner as to minimise impacts on the natural and social environment.

#### **SDEMA 2 INTERPRETATIONS**

##### **SDEMA 2.1 Application**

This Specification contains clauses specifically applicable and related to the environmental requirements for the Wind Energy Facility situated on the Eastern Plateau (South) near De Aar, Northern Cape, i.e. the De Aar 2 South WEF.

Where any discrepancy or difference occurs between this SDEMA and the Specification: Environmental Management (Comprehensive), the provision of this Specification shall prevail.

##### **Definitions (Subclause 3)**

For the purposes of this Specification the following definitions shall be added:

Working area: The land and any other place on, under, over, in or through which the Works are to be executed or carried out, and any other land or place made available by the Employer in connection with the Works. The Working Area shall include the site office, construction camp, stockpiles, batching areas, the construction area, all access routes and any additional areas to which the Engineer permits access. The construction footprint must be kept to a minimum.

### **SDEMA3 MATERIALS**

#### **SDEM3.1 Materials handling, use and storage (Subclause 2.4.11)**

The Engineer shall be advised of the areas that the Contractor intends to use for the stockpiling of both natural and manufactured materials. No stockpiling shall occur outside of the working area (as designated by the engineer) and without the Engineer's prior approval of the proposed stockpiling areas. Imported material shall be free of litter, contaminants or exotic plant seed. The Contractor shall ensure that material is not stockpiled along the border of any water body (permanent or seasonal).

Location and treatment of material stockpiles shall take consideration of prevailing wind directions and dwellings. Stockpiles shall be stored under cover so as to prevent erosion and

run off during rainy periods. No rubble, earth or other material shall be dumped within the Eskom servitude restriction area.

Topsoil (300 mm) from construction areas where vegetation clearing is required shall be removed and stockpiled for rehabilitation purposes. This shall be spread over the top of the turbine foundation after the turbine has been erected and any other disturbed areas which are to be rehabilitated and seeded with indigenous species. Ground shall be returned as far as possible to original levels/gradients and any excess material shall not be left in piles, but shall be removed off-site.

Dust suppression measures shall be used particularly during dry periods of weather during the summer months. Dust control measures must be implemented during the construction phase and must comply with the dust regulations promulgated under the Air Quality Act, 2004 (Act 39 of 2004).

All materials on the construction sites should be properly stored and contained. Storage of materials and builders' rubble shall be screened from public view.

Cut material shall be used, where possible, in construction or on site (e.g. in grading gravel roads), or removed from site.

### **SDEM3.2 Hazardous substances (Subclause 2.4.9.3)**

Procedures detailed in the Materials Safety Data Sheets (MSDS) shall be followed in the event of an emergency situation.

Potentially hazardous substances shall be stored, handled and disposed of as prescribed by the Engineer.

An effective monitoring system to detect any leakage or spillage of all hazardous substances during their transportation, handling, use and storage must be detailed in a method statement for approval by the ECO and implemented. This shall include precautionary measures to limit the possibility of oil and other toxic liquids from entering the soil or storm water systems.

Measures should include:

- Daily vehicle inspection to detect any leakages and or spillages.
- Weekly visual inspection of plant and standing equipment.
- Weekly visual inspection of fuel tanks.
- A record of these inspections needs to be kept to demonstrate compliance.
- The contractor needs to provide a method statement for "emergency procedures to deal with leakage and spillage of hazardous substances".
- Spill remediation kits shall be kept on site and all staff members shall be informed of where it is located.

A spillage plan must be implemented and strictly enforced. Any spillage of diesel and oil must be reported and cleared up immediately. In the event of oil spillages and contamination of soil

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by hazardous substances that contaminated area must be cleaned up immediately by removing the contaminated soil and disposing it at the designated hazardous skip bin for correct disposal.

### **SDEM3.3 Shutter oil and curing compound (Subclause 2.4.9.1)**

Shutter oil and curing compound shall be stored and dispensed within a bunded area, and not located closer than 32 m from the top of the river banks/water courses/drainage lines.

## **SDEMA4 REQUIREMENTS**

### **SDEMA4.1 Ablution facilities (Subclause 2.4.20)**

A sufficient number of chemical toilets shall be provided by the Contractor in the construction camp area and at appropriate locations approved by the Engineer. Temporary/ portable toilets shall not be located within 100 m from the top of the river banks/water courses/drainage lines. The ratio of ablution facilities for workers should not be less than that required by the Construction Regulations of 2003 of the Occupational Health and Safety Act. All temporary/ portable toilets shall be secured to the ground to prevent them from toppling due to wind or any other cause. Chemical toilets shall be serviced on a regular basis and service slips shall be retained in a site file.

### **SDEMA4.2 Solid Waste Management (Subclause 2.4.9)**

Hazardous wastes (if any) shall only be sent to landfill sites registered for hazardous wastes. Burying or burning of solid waste shall be prohibited on site. A waste management system shall be established to ensure regular waste removal.

The contractor shall be required to prepare a method statement to indicate how and where solid waste will be disposed of based on the following requirements:

- Hazardous waste
  - Hazardous wastes shall only be disposed at landfill sites registered for hazardous waste;
  - Spills or leaks of construction hazardous materials including, but not limited to, concrete curing compounds, asphalt products, paints, petroleum products from equipment operation and maintenance, pesticides and herbicides shall be monitored and remediated immediately if detected.
  - All hazardous waste materials must be carefully stored as advised by the ECO, and then disposed of at a licensed landfill site.
  - No hazardous waste may be buried or burned under any circumstances.
  - A certificate of disposal shall be obtained by the Contractor and kept on file, if relevant.
  - MSDS shall be available for all hazardous substances stored on site.
  - Appropriate hazardous waste spill kits shall be available on site.
  - An approved waste disposal contractor must be employed to remove and recycle waste oil, if practical.
  - Burying or burning of solid waste shall not be allowed.

- **General waste**
  - Regular disposal of general waste to registered landfill sites shall be required to prevent nuisance factors such as odours, vermin and flies. No burning of waste shall be allowed.
  - Provide adequate waste bins.
  - Set up system for regular waste removal to an approved landfill facility.
  - Minimise waste by sorting wastes into recyclable and non-recyclable wastes, if practical.
  - No waste may be buried or burned under any circumstances.
  - A housekeeping team should be appointed to regularly monitor for litter and rubble on the construction site.
  - Littering by the employees shall not be allowed under any circumstances.
  - The ECO shall monitor the neatness of the work sites as well as the Contractor campsite.
  - Skip waste containers should be maintained on site. These should be kept covered and arrangements made for them to be collected regularly to prevent vermin and odours.
  - A certificate of disposal shall be obtained by the Contractor and kept on file, if relevant.

#### **SDEMA4.3 Contaminated Water (Subclause 2.4.7)**

The Contractor shall prevent the discharge of any pollutants, such as soaps, detergents, cements, concrete, lime, chemicals, hydrocarbons, glues, solvents, paints and wastewater into the surrounding terrestrial and aquatic environment. A suitable designed wastewater collection system must be provided on site to divert all the wastewater to a single point for management. Should any discharge be necessary it will require the engineer's approval prior to discharging any contaminated water into a lined sump, which will allow sediment particles to settle. Surface contaminants shall be separated by skimming off the surface. Dried particulates collected from the sump and skimmed pollutants such as oils and petrochemicals shall be collected and disposed of at a registered landfill site. The remaining water shall then be drained into an unlined drainage pond where the water can filter into the ground. The pond shall be located in an area approved by the ECO and Engineer. To excavate the pond the top 300 mm of soil shall be removed and stored separately. Once construction is complete the pond shall be backfilled and the top material replaced to cover the area for rehabilitation.

#### **SDEMA4.4 Site Structures (Subclause 2.3)**

No site structures shall be located within 32 m of wetlands and drainage lines, and within 75 m of pans and dams. Construction yards should be restricted in extent as far as possible and should be screened by visually impermeable material. No structures to be occupied or frequented by people shall be built within delineated servitude areas.

Ensure the camp is neat and tidy at all times. Site offices, if required, should be limited to single storey and should be sited carefully using temporary screen fencing to screen from the wider landscape.

Where site offices are required, these shall be limited to single storey and temporary screen fencing used to screen offices from the wider landscape.

#### **SDEMA4.5 Noise control (Subclause 2.4.4)**

The level of noise during the construction phase of the project must be kept as low as possible and must comply with the Noise Control Regulations (GN R 154) as well as the acceptable day rating levels as per the SANSIOI03:2008 guidelines<sup>5</sup>.

Construction traffic shall be routed as far as practically possible from potentially sensitive receptors.

A good working relationship between the developer and all potentially sensitive receptors shall be ensured by establishing communication channels to ensure prior notice to the sensitive receptor if work is to take place close to them. Information that should be provided to the potential sensitive receptor(s) include:

- Proposed working times;
- How long the activity is anticipated to take place;
- What is being done, or why the activity is taking place;
- Contact details of a responsible person where any complaints can be lodged should there be an issue of concern.

Investigate any reasonable and valid noise complaint if registered by a receptor staying within 2,000 m from the location where construction activities are taking place, or where an operational WTG are located. A complaint register, keeping a full record of the complaint, must be kept by the Developer.

When working within 500 m of a potential sensitive receptor, the number of simultaneous activities (e.g. construction of access roads, trenches, etc) shall be limited to the minimum as far as possible. Furthermore, working time shall be co-ordinated with periods when the receptors are not at home, where possible. An example would be to work within the 08:00 to 14:00 time-slot to minimize the significance of the impact because potential receptors are most likely at school or at work, minimizing the probability of an impact happening. Limit the out-of-hours working.

Minimise certain noise-generating activities (or the use of certain equipment) at night, planning the completion of noisiest activities (such a pile driving, rock breaking and excavation) during the daytime period.

Use of the smallest/ quietest equipment for the particular purpose shall be considered.

Ensure that equipment is well-maintained and fitted with the correct and appropriate noise abatement measures. Engine bay covers over heavy equipment could be pre-fitted with sound

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<sup>5</sup> Condition 47 of the EA dated 1 March 2013, and Condition 62 of DENC EA dated February 2018

absorbing material. Heavy equipment that fully encloses the engine bay should be considered, ensuring that the seam gap between the hood and vehicle body is minimised.

Where practicable, mobile equipment should be fitted with broadband (white-noise generators/alarms), rather than tonal reverse alarms.

Include a component covering environmental noise in the Health and Safety Induction to sensitize all employees and contractors about the potential impact from noise, especially those employees and contractors that have to travel past receptors at night, or might be required to do work close (within 2,000m) to NSR at night. This should include issues such as minimising the use of vehicle horns.

#### **SDEMA4.6 Fuel (Petrol and Diesel) and oil (Subclause 2.4.6)**

Fuels in the form of diesel and petrol shall not be stored within 32 m from the top of the river banks/water courses/drainage lines.

All fuel tanks must be stored in a bunded area and constantly monitored for damage and leakage.

#### **SDEMA4.7 Equipment Maintenance and Storage (Subclause 2.4.10)**

Wastewater generated from construction or the washing of vehicles shall not be permitted to enter watercourses, either directly or via a stormwater system.

A designated area with an impermeable surface shall be available for the washing of equipment and vehicles. Wastewater generated from the washing of vehicles and equipment shall drain via an oil and water separator into a bunded area. The oil should be removed as required by a registered service provider to a register facility. The water accumulated in the bunded area can evaporate. If solids are accumulated in the bunded area over time, it should be removed by a registered contractor and disposed at a registered facility.

#### **SDEMA4.8 Stormwater Erosion Control (Subclause 2.4.8)**

The Stormwater Management Plan and Erosion Management Plan for the project must be implemented (refer to Appendix L and Appendix M). Comply with applicable regulations and prevent off-site migration of contaminated storm water or increased soil erosion. Drainage measures shall promote the dissipation of storm water run-off. Establish the stormwater system as a priority, so that all runoff is led to the designated drainage from the site.

The Contractor shall take reasonable measures to control the erosive effects of stormwater runoff. Any runnels or erosion channels developed during the construction period or during the maintenance period shall be backfilled and compacted to limit the impacts of sediment deposition into the surrounding aquatic environment.

Run-off over any exposed areas should be mitigated to reduce the rate and volume of run-off and prevent erosion and bank instability occurring on the site and within the freshwater features

and drainage lines. Contaminated runoff from the construction site(s) must be prevented from entering the rivers/streams.

During the construction phase, in order to prevent soil erosion, the contractor must create a Stormwater Control Method Statement. They must also take the necessary precautions to ensure that the requirements of the complete Stormwater Management Plan are met before, during, and after construction, as well as in accordance with any applicable water use authorization. The person on site who is responsible for ensuring that the necessary stormwater control measures are in place before construction activity begins must be identified in the storm water control method statement. Potential construction phase interventions for the control of storm water (the details of which are to be confirmed in the complete Storm Water Management Plan) are outlined in the Stormwater Management Plan (refer to Appendix M).

Stormwater leaving the premises must not in any way be contaminated by any substance, whether such substance is a solid, liquid, vapour, gas or combination thereof which is produced, used, stored, dumped or spilled on the premises.

#### **SDEMA4.9 Method Statements (Subclause 2.2)**

The following additional method statements shall be provided by the Contractor within 14 days of the receipt of the Letter of Acceptance and prior to the activity covered by the Method Statement being undertaken:

- Logistics for the environmental awareness course for all the Contractors employees.
  - Emergency procedures for fire, accidental leaks and spillages of hazardous materials including:
    - who shall be notified in the event of an emergency, including contact numbers for the relevant local authority,
    - where and how any hazardous spills will be disposed of,
    - the size of spillage which the emergency procedures could contain,
    - location of all emergency equipment and an indication of how regularly the emergency equipment will be checked to ensure that it is working properly.
  - Location and layout of the construction camp in the form of a plan showing offices, stores for fuels, hazardous substances, vehicle parking, access point, equipment cleaning areas and staff toilet placement.
  - Location, layout and preparation of cement/concrete batching facilities including the methods employed for the mixing of concrete and the management of runoff water for such areas. An indication shall be given of how concrete spoil will be minimised and cleared.
  - Method of undertaking earthworks, including spoil management, erosion, dust and noise controls.
  - Method of undertaking blasting.
  - Method to detect leakages.
  - Management measures to be undertaken in instances where traffic flows may be interrupted.
  - Extent of areas to be cleared, the method of clearing and the preparation for this clearing so as to ensure minimisation of exposed areas.
-

- Measures to be put in place during temporary closure periods, e.g. December holidays.
- Measures to be put in place to limit sediment deposition into the surrounding terrestrial and aquatic environment.
- Method statement on integrated waste management shall be compiled by the contractor based on SDEM 4.4.2.
- Stormwater Control Method Statement.

#### **SDEMA4.10 Site Clearance (Subclause 2.7.1)**

The clearing of natural vegetation shall be limited to the authorised footprint of the development and habitat fragmentation must be avoided where possible.

Removal of vegetation (uprooting) must be kept to a minimum. Only those areas where it is imperative to remove vegetation i.e. construction areas, identified storage areas, roads and minor tracks should be cleared. If uprooting is required, the Contractor shall strip the top material and root material of cleared vegetation (top 300 mm layer), for subsequent use during rehabilitation and re-vegetation (see Revegetation and Habitat Rehabilitation Plan in Appendix H). Top material shall be stripped from all areas of the Working Area where topsoil will be impacted by construction activities, including areas for temporary facilities, as directed by the Engineer. All other areas should remain vegetated. If brush-cutting is required as a minimum intervention, this should be applied with discretion; however, it would always be preferred to uprooting.

It is important that any of the cleared areas that are not hardened surfaces are rehabilitated after construction is completed by revegetating the areas disturbed by the construction activities with suitable indigenous plants, as per the Revegetation and Habitat Rehabilitation Plan in Appendix H.

The Contractor shall not make use of herbicides or other chemical methods to clear the proposed site especially near the identified water courses. In order to limit erosion the Contractor shall retain original groundcover, as far as practically possible, adjacent to the aquatic environment and to the trenching line, in accordance with the Revegetation and Rehabilitation Plan in Appendix H and Erosion Management Plan in Appendix L.

Invasive alien plants that currently exist within the immediate area of the construction activities should also be removed and the sites monitored for regrowth on an ongoing basis (Refer to Alien and Invasive Plant Species Management Plan (see Appendix I).

Cleared alien vegetation must not be dumped on adjacent intact vegetation during clearing, and must be undertaken as per the Alien and Invasive Plant Species Management Plan (see Appendix I).

#### **SDEMA4.11 No go areas (Subclause 2.3.3)**

All works to be undertaken shall be within the boundary of the site. A “no go” area shall extend on either side of the working area i.e. all areas outside of the defined working area and designated access roads. The working area shall be demarcated in an appropriate manner



determined by the Engineer. The “no-go” area shall be demarcated by a semi-permanent fence to prevent workers from entering the undisturbed areas.

Based on the ecological importance, all construction activities shall remain outside of all aquatic environments, and a buffer of at least 32m (from centre of stream for smaller drainage lines and from top of bank for larger tributaries) should be maintained adjacent to the identified freshwater features, as well as from the edge of the pans and wetland areas (with the exception of authorised construction activities within 32m of a watercourse, e.g. road crossings) (refer to Environmental Sensitivity Map in Figure 2 and Appendix D). These no go areas shall stay in place until construction of the infrastructure within the buffer area must commence.

No mechanical equipment, including mechanical excavators or high lifting machinery, shall be used in the vicinity of Eskom’s apparatus and/or services, without prior written permission having been granted by Eskom. If such permission is granted the Contractor must give at least seven working days’ notice prior to the commencement of work. This allows time for arrangements to be made for supervision and/or precautionary instructions to be issued by the relevant Eskom Manager. Note: Where and electrical outage is required, at least fourteen work days are required to arrange it.

No equipment associated with earthworks shall be allowed outside of the site and defined access routes, or within “no go” areas, unless expressly permitted by the Engineer.

All identified stone-walled kraals must be avoided during construction (refer to Figure 2 and Appendix E3). The kraal complexes must be demarcated prior to construction and labelled as no go areas during construction.

Contractors and construction workers must be clearly informed of all applicable buffer zones and no-go areas.

#### **SDEMA4.12 Protection of flora and fauna (Subclause 2.4.2)**

No flora shall be removed or damaged, outside of the designated working area, without specialist botanical input. The collection of firewood by construction workers should be prohibited.

No unsupervised open fires are allowed on site. A fire plan must be available on site at all times and employees must be made aware of the plan.

Any snakes found on site shall be removed from site and released into an area away from the site, without harm.

Trapping, poisoning, shooting and/or killing of animals is strictly forbidden, on or surrounding the site. The intentional and accidental killing of fauna must be avoided at all times. No poaching is permitted.

Animals encountered during land clearing, e.g. tortoises, snakes, etc., should not be harmed and should be allowed to passively vacate the area, or should be physically relocated to a nearby safe, natural area.

The contractor shall ensure that the time a trench is left exposed is kept to a minimum, and that open trenches are inspected on a daily basis for animals which may have fallen or become trapped. Any animals found trapped in any trenches shall be freed without harm.

The Revegetation and Habitat Rehabilitation Plan (compiled by the ecological specialist), included in Appendix H, shall be implemented with the aid of a rehabilitation specialist. The specialist is to recommend species to be used in rehabilitation as well as any special measures for rehabilitation and alien vegetation removal. Restoration shall be undertaken as soon as possible after completion of construction activities to reduce the amount of habitat converted at any one time and to speed up the recovery to natural habitats. The Plant Rescue and Protection Plan (compiled by the ecological specialist), included in Appendix F, must be implemented prior to commencement of the construction phase.

Any of the cleared areas onsite that are not hardened surfaces shall be rehabilitated after construction is completed by revegetating the areas disturbed by the construction activities with suitable indigenous plants. Any disturbed areas shall be monitored to ensure that these areas do not become subject to erosion or invasive alien plant growth.

An alien invasive management plan shall be compiled and implemented. The plan shall include mitigation measures to reduce the invasion of alien species and ensure that the continuous monitoring and removal of alien species is undertaken. (Note: The alien invasive management plan for the project has been compiled by the Ecological specialist for the project (refer to Appendix I), and must be implemented).

An open space management plan shall be compiled and implemented. (Note: The Open Space Management Plan has been compiled (refer to Appendix J), and must be implemented to ensure integrated management of the areas containing natural vegetation within the WEF).

Habitat fragmentation must be avoided where possible.

Noise shall be reduced and maintained to a minimum particularly with regards to blasting on the ridge-top associated with excavations for foundations. Blasting should not take place during the breeding seasons of the resident avifaunal community and in particular for priority species and notably the cliff-breeding raptor species. Blasting shall be kept to a minimum and, where possible, synchronized with neighbouring blasts.

In terms of minimising potential avifaunal impacts, construction activities should be restricted to the immediate footprint of the infrastructure, and in particular to the proposed road network. Access to the remainder of the site should be strictly controlled to prevent unnecessary disturbance of Species of Conservation Concern (SCC). Removal of vegetation must be restricted to a minimum. Construction of new roads should only be considered if existing roads cannot be upgraded. Care should be taken not to create habitat for prey species that could draw

priority raptors into the area and expose them to collision risk. Rock piles must be removed or covered and compacted with topsoil to prevent them from becoming habitat for Rock Hyrax (Dassie).

Construction personnel should be educated about the importance of fauna conservation.

Disturbance associated with the operation of the facility shall be minimised, by scheduling maintenance activities to avoid and/or reduce disturbance in sensitive areas at sensitive times – such areas will be identified during the pre-construction and operational monitoring.

An avifauna and bat monitoring programme shall be implemented, by suitably qualified specialists, to document the effect of the construction period on avifauna and bats.

#### **SDEMA4.13 Protection of archaeological and paleontological remains (Subclause 2.4.3)**

Should substantial fossil remains be exposed during construction, these should be safeguarded by the ECO, preferably *in situ*, and the South African Heritage Resources Association (SAHRA) should be notified by the ECO so that appropriate mitigation can be undertaken.

Should any graves or fossil remains be found, all construction activities must be suspended and an archaeologist or palaeontologist must be contacted immediately. The discovered graves must be cordoned off.

Areas known to have sensitive archaeological sites shall be avoided.

Four archaeological sites located in 2022 in proximity to access roads to WTGs require either avoidance or mitigation in the form of archaeological sampling. These are:

- JG104 – 20 m buffer or mitigate;
- G110 – 60 m buffer or mitigate;
- G113 – 30 m buffer or mitigate; and
- JG134 – (historical ashheap near the Vendussie Kuil farm complex that is crossed by Access Road) - 20 m buffer or mitigate.

If the mitigation of any of these sites is chosen, a permit for the work will need to be obtained from SAHRA by a suitably qualified archaeologist and the work must be carried out prior to construction commencing.

Any new finds of significant archaeological material must be reported immediately to the project archaeologist and SAHRA so that mitigatory action can be determined and be implemented, if necessary. Mitigation is at the cost of the developer, while time delays and diversion of machinery/plant may be necessary until mitigation in the form of conservation or archaeological sampling is completed.

If any new evidence of archaeological sites or artefacts, paleontological fossils, graves or other heritage resources is found during development or construction, SAHRA and an archaeologist and/or palaeontologist, depending on the nature of the resources found, must be alerted immediately, i.e. if any evidence of archaeological sites or remains (e.g. remnants of stone-

made structures, indigenous ceramics, bones, stone artefacts, ostrich eggshell fragments, charcoal and ash concentrations), fossils or other categories of heritage resources are found during the proposed development, SAHRA APM Unit (Natasha Higgitt/Phillip Hine 021 462 5402) must be alerted as per section 35(3) of the NHRA. Non-compliance with section of the NHRA is an offense in terms of section 51(1)e of the NHRA and item 5 of the Schedule.

A 500m buffer must be implemented around farmsteads, particularly if farm buildings are older than 60 years. According to the heritage specialist, this buffer can be reduced if the building contains no elements of heritage significance.

The 500 m buffers in place around the Kranskop and Vendussie Kuil farm werfs will remain, although:

- The small overlap of the laydown area and access road with the Kranskop buffer is permitted; and,
- The access road within the Vendussie Kuil buffer is permitted, but that instead of constructing a new road within a short distance of the farm complex, the section of the existing farm road within the buffer is upgraded to serve as the access road, thereby limiting the impacts of the WEF on the farm complex. (Note: The Final Layout was amended accordingly to address this recommendation).

All identified stone-walled kraals must be avoided during construction. ACO Associates (the Heritage specialist) has provided the locations of these kraals for inclusion in the Environmental Sensitivity Map for the final layout plan and the kraal complexes must be demarcated prior to construction and labelled as no go areas during construction. Refer to Appendix D and E3.

All rock kraals on site must be demarcated and labelled as no go areas. No wind turbine must be erected within rock kraals.

Should any human remains be disturbed or uncovered during excavations and earthworks for the WEF, work in the vicinity must cease, the remains made secure, preferably in situ and the project archaeologist and SAHRA notified immediately. Buried remains should not be removed until inspected by an archaeologist. If unmarked human burials are uncovered, the SAHRA Burial Grounds and Graves (BGG) Unit (Thingahangwi Tshivhase/Mimi Seetelo 012 320 8490), must be alerted immediately as per section 36(6) of the NHRA. Non-compliance with section of the NHRA is an offense in terms of section 51(1)e of the NHRA and item 5 of the Schedule.

Old buildings which have historical significance must be fenced off during construction phase to avoid vandalism<sup>6</sup>.

The Environmental Control Officer (ECO) responsible for these developments should be alerted to the possibility of fossil remains being found on the surface or exposed by fresh excavations during construction. Should substantial fossil remains be discovered during construction, these should be safeguarded (preferably in situ) and the ECO should alert the South African Heritage Resources Association (SAHRA) so that appropriate mitigation (e.g. recording, sampling or collection) can be undertaken by a professional palaeontologist. The specialist involved would

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<sup>6</sup> Condition 58 of DENC EA dated 31 July 2013

require a collection permit from SAHRA. Fossil material must be curated in an approved repository (e.g. museum or university collection) and all fieldwork and reports should meet the minimum standards for palaeontological impact studies developed by SAHRA.

Monitoring of all substantial bedrock excavations for fossil remains by ECO, with reporting of substantial new palaeontological finds (notably fossil vertebrate bones & teeth) to SAHRA for possible specialist mitigation.

The South African Heritage Resources Agency (SAHRA) stipulated (correspondence dated 9 April 2020, Case ID 8634) that the following conditions apply with regards to the appointment of specialists: i) If heritage resources are uncovered during the course of the development, a professional archaeologist or palaeontologist, depending on the nature of the finds, must be contracted as soon as possible to inspect the heritage resource. If the newly discovered heritage resources prove to be of archaeological or palaeontological significance, a Phase 2 rescue operation may be required subject to permits issued by SAHRA.

#### **SDEMA4.14 Access routes/ haul roads (Subclause 2.4.18)**

Access roads shall be kept tidy. Existing and dedicated access roads must be used. Access is proposed via the existing gravel Kranskop Road off the R389.

Eskom's rights and services shall be acknowledged and respected at all times. Unobstructed access shall be granted to Eskom to access their servitudes.

The contractor shall ensure that all regulations relating to traffic management are observed and local traffic officials are informed of the proposed construction activities. As far as possible, attempts shall be made to ensure that high construction related road usage coincides with low traffic flow periods. If the roads through De Aar or Phillipstown are used as the access road, make use of this road only between 08h00 to 17h00 Monday to Friday for construction traffic.

Turbine components shall be transported overnight as far as possible.

Signage and safety measures during the construction of the access roads shall comply with the guidelines as set out in the latest issue of the SADC Road Traffic Signs Manual. Standard "construction ahead" warning signs should be placed on all relevant roads in the area. Ensure access roads are kept clean and storage of materials is screened.

The Transport and Traffic Management Plan, compiled by ITS, must be implemented for the transport of turbine components, main assembly cranes and other large pieces of equipment including (Note: Refer to Appendix K for the complete plan):

- The Contractor should designate a person as the custodian of the plan and the custodian will ensure that all personnel and subcontractors are trained to ensure compliance. The requirements of the Traffic Management Plan shall apply to all personnel and subcontractors appointed to provide vehicles and machinery or drivers. The Plan needs to be reviewed after an incident and corrective measures should then be incorporated into the Plan.

- A copy of the Traffic Management Plan should be kept on site and the Plan must be available to all personnel.
- The Traffic Management Plan will be reviewed annually or after an incident, when corrective measures will be incorporated into the Plan.
- The Traffic Management Plan should be updated once construction is completed to include the operational traffic requirements.
- All construction vehicles shall have the necessary licences, a valid roadworthy certificate and shall comply with the relevant traffic and transport licencing requirements.
- All drivers of vehicles shall have the required licences to operate the vehicle (or machinery) on site or on any public roads. A professional driving permit (PDP) is required if any of the following vehicles are operated:
  - Goods vehicles, (more than 3 500 kg).
  - Breakdown vehicles.
  - Buses (any bus).
  - Minibus taxis (more than 3 500 kg), transporting 12 or more people, including the driver.
  - Goods vehicle carrying dangerous goods (more than 3 500 kg).
  - Road tank vehicles for petroleum-based flammable liquids.
  - Motor vehicles transporting 12 or more people, including the driver
- All staff shall be transported in appropriate vehicles and staff shall not be allowed to be transported on the back of open trucks. Passenger vehicles shall not exceed the carrying capacity of the vehicle.
- Collections/Drop-off points for staff shall be located at a safe distance from construction activities. Designated pedestrian pathways shall be demarcated where appropriate. All staff shall receive the appropriate site safety induction training. Staff training shall include appropriate precautionary measures required to be undertaken to facilitate safe and efficient traffic management.
- During construction it is expected that road surfaces will require maintenance at regular intervals to prevent damage to the road structure. Once construction is completed the National and Provincial roads (in close proximity to the project) should be inspected and repaired where necessary.
- All vehicles and equipment shall be regularly maintained, repaired when necessary and inspected on a regular basis to ensure that the vehicles are in good working order. All freight and passenger vehicles shall be monitored to ensure that vehicles are not overloaded.
- Signage, in accordance with the South African Road Traffic Signs Manual, will be required at appropriate locations along all access roads, the internal roads to the site and public roads used by construction vehicles (in consultation with the relevant traffic authorities) to indicate the following:
  - all road and pedestrian hazards
  - site access
  - site offices
  - wayfinding signs on internal roads e.g. parking, toilets, emergency assembly point
  - crossing points
  - speed limits
  - turning traffic, heavy vehicles

- dedicated routes for construction vehicles and staff
- no-go areas
- any traffic control information relevant to the construction activity at the time
- It is recommended that flagmen be implemented when high volumes of construction traffic are expected to help direct traffic to ensure safe movement of the vehicles and reducing the potential conflicts.
- All drivers operating vehicles shall comply with the posted speed limits (or the maximum allowable speed as per the permit for abnormal load vehicles) on public roads as well as a proposed 30km/h speed limit within the construction site and access roads.
- Interested and affected parties should be informed of all transport activities taking place that may affect them or require approval e.g. local community, the local authorities, law enforcement and affected landowners.
- Stakeholder engagement should address and provide information to stakeholders regarding general construction activities, construction vehicles routes, projected timelines, procedures for complaints and emergency procedures.
- It is recommended that construction and abnormal load traffic should be limited to outside the typical traffic peaks in build-up areas and through towns. Provincial and Local traffic officials should assist abnormal load vehicles through the towns.
- All deliveries with abnormal loads will operate under an approved transportation plan with the necessary traffic routes and traffic accommodation plans in place.
- General Construction Traffic:
  - The delivery of components and construction materials to the site can be staggered and trips can be scheduled to occur outside of peak traffic periods.
  - Using a mobile batch plant as well as temporary construction material stockpile yards near the proposed site.
  - Transporting site personnel to and from the site by means of busses or minibus taxis. This will reduce the number of trips bound for the site
- The delivery of components and construction materials to the site can be staggered and trips can be scheduled to occur outside of peak traffic periods.
- Using a mobile batch plant as well as temporary construction material stockpile yards near the proposed site.
- Transporting site personnel to and from the site by means of busses or minibus taxis. This will reduce the number of trips bound for the site.

There must be no construction of access roads through wetlands and pans.

#### **SDEMA4.15 Cement and concrete batching (Subclause 2.7.3)**

No cement and / or concrete batching shall occur within the “no-go” areas or within 32 m from the top of river banks/water courses/drainage lines. Reasonable measures shall be implemented to limit contaminated surface run-off into the surrounding vegetation.

#### **SDEMA4.16 Earthworks (Subclause 2.7.4)**

Any blasting is to be executed by a suitably qualified person.

Controlled blasting techniques shall be employed to minimise dust and fly rock during blasting. Dust control measures must be implemented during the construction phase and must comply with the dust regulations promulgated under the Air Quality Act, 2004 (Act 39 of 2004).

The use of explosives of any type within 500 m of Eskom's services shall only occur with Eskom's previous written permission. If such permission is granted the Contractor must give at least fourteen working days prior notice of the commencement of blasting. This allows time for arrangements to be made for supervision and/or precautionary instructions to be issued in terms of the blasting process. It is advisable to make application separately in this regard.

Prior to blasting the Contractor shall notify the relevant occupants/ owners of surrounding land and address any concerns. Buildings within the potential damaging zone of the blast shall be surveyed preferably with the owner present, and any cracks or latent defects pointed out and recorded either using photographs or video. All Local Authority regulations are to be adhered to and all service infrastructures are to be located prior to commencement of blasting activities.

Blasting or drilling shall take place during normal working hours. The Contractor shall notify emergency services, in writing, a minimum of 24 hours prior to any blasting activities commencing on site. Adequate warning must be issued to all personnel on site prior to blasting activities taking place. All legally required signals are to be clearly indicated. The Engineer shall be issued daily updates of the days intended blasting activities.

The Contractor shall prevent damage to special features and the general environment, which includes the removal of flyrock. Damage caused by blasting / drilling shall be repaired to the satisfaction of the Engineer.

Minimise areas disturbed at any one time and protect exposed soil against wind erosion, e.g. by dampening with water or covering with hessian.

Changes in ground level may not infringe statutory ground to conductor clearances or statutory visibility clearances with respect to existing powerlines onsite. Clearances between Eskom's live electrical equipment and the proposed construction work shall be observed as stipulated in terms of Regulation 15 of the Electrical Machinery Regulations of the Occupational Health and Safety Act, 1993 (Act 85 of 1993) at all times.

#### **SDEMA4.17 Community relations (Subclause 2.6)**

Maintain a register that shall contain details of the measures taken to resolve complaints and the details of the communication of these measures to the person who raised the complaint.

#### **SDEM4.18 Erosion and sedimentation control (Subclause 2.7.7)**

Erosion control measures, as included in the Erosion Management Plan (Appendix L), must be implemented to minimise erosion at excavation / clearing sites or aggregate storage sites.

Where necessary, sedimentation barriers must be laid between the Work Area and the "no-go" areas to limit sediment deposition. The sedimentation barrier must consist of a geotextile fabric



stretched across and attached to supporting posts and stabilised with sandbags. The barrier must be inspected daily and any damage must be repaired immediately. Sediment deposits must be removed once they reach half the height of the barrier.

An Erosion Management Plan (refer to Appendix L) for monitoring and rehabilitating erosion events associated with the facility has been compiled and must be implemented as construction commences. Appropriate erosion mitigation forms part of this Plan to prevent and reduce the risk of any potential erosion.

Clearing activities should be kept to a minimum (turbine and road footprint).

In the unlikely event that heavy rains are expected activities should be put on hold to reduce the risk of erosion.

If additional earthworks are required, any steep or large embankments that are expected to be exposed during the 'rainy' months should either be armoured with fascine like structures.

If earth works are required, then stormwater control and wind screening should be undertaken to prevent soil loss from the site.

Minimise duration and extent of construction activities in the river. Construction shall also preferably take place in the low flow season. Where access routes need to be constructed through ephemeral streams, disturbance of the channel should be limited.

Clearing of debris, sediment and hard rubble associated with the construction activities should be undertaken post construction to ensure that flow within the drainage channels are not impeded or diverted. Rehabilitate disturbed stream bed and banks and revegetation with suitable indigenous vegetation.

#### **SDEMA4.19 Site closure and rehabilitation (Subclause 2.7.12)**

All construction debris found within the disturbed areas shall be removed and disposed of at a registered landfill site.

The Revegetation and Habitat Rehabilitation Plan compiled by the ecological specialist (Appendix H) must be implemented. The Plan recommends species to be used in rehabilitation as well as any special measures for rehabilitation such as terracing and use of mulch. The construction footprint associated with the activity shall be re-vegetated with indigenous vegetation, as directed by the Revegetation and Habitat Rehabilitation Plan. Disturbed areas shall be rehabilitated as soon as possible after construction.

Only indigenous plants of the area must be utilised for rehabilitation purposes.

Vegetated areas should preferably be watered if planted in the dry season to aid in establishment of plants; alternately rehabilitation should take place in the wet season; or as agreed with the rehabilitation specialist in the Revegetation and Habitat Rehabilitation Plan.

**SDEMA4.20 Labour requirements**

Equipment shall be regarded electrically live and therefore dangerous at all times. Safety and best practice standards with regards to all safety hazards related to electrical plant shall be employed for the development.

Recruitment shall be based on sound labour practices and with gender equality in mind. Obtain a list of locally available labour and skills. Preference shall be given to local communities.

Appropriate training shall be provided to enable individuals to apply their skills to other construction and development projects in the region once the construction phase is completed.

**SDEMA5 COMPLIANCE WITH REQUIREMENTS AND PENALTIES****SDEMA5.1 Penalties (Subclause 3.2)**

Stop order works will be issued for the transgressions listed below. Stop order works may be issued per incident at the discretion of the Engineer.

- a) Any employees, vehicles, plant, or thing related to the Contractor's operations operating within the designated boundaries of a "no-go" area.
- b) Any vehicle driving in excess of designated speed limits.
- c) Persistent and unrepaired oil leaks from machinery.
- d) Persistent failure to monitor and empty drip trays timeously.
- e) The use of inappropriate methods for refuelling.
- f) Litter on site associated with construction activities.
- g) Deliberate lighting of illegal fires on site.
- h) Employees not making use of the site ablution facilities.
- i) Failure to implement specified noise controls
- j) Failure to empty waste bins on a regular basis.
- k) Inadequate dust control.
- l) A spillage, pollution, fire or any damage to any watercourse/ wetland resulting from negligence on the part of the Contractor.
- m) Any act, that in the reasonable opinion of the Engineer, constitutes a deliberate contravention of the requirements of these Specifications

The Engineer will determine what constitutes a transgression in terms of this clause, subject to the provisions of Clause 57(1) of the General Conditions of Contract. In the event that transgressions continue the Contractor's attention is drawn to the provisions of Sub-clause 55(1) of the General Conditions of Contract 2004 under which the Engineer may cancel the Contract.

## **Specific Mitigation Measures applicable to the construction phase recommended by the specialists:**

### **Agriculture/ Soils:**

- Due to the overarching site characteristics and the nature of the proposed development viable mitigation measures are limited and will most likely revolve around erosion control:
  - Clearing activities should be kept to a minimum (turbine and road footprint).
  - In the unlikely event that heavy rains are expected activities should be put on hold to reduce the risk of erosion.
  - If additional earthworks are required, any steep or large embankments that are expected to be exposed during the 'rainy' months should either be armoured with fascine like structures.
- If earth works are required then storm water control and wind screening should be undertaken to prevent soil loss from the site.

### **Avifauna:**

- Construction activity should be restricted to the immediate footprint of the infrastructure, and in particular to the proposed road network. Access to the remainder of the site should be strictly controlled to prevent unnecessary disturbance of SCC.
- Removal of vegetation must be restricted to a minimum.
- Construction of new roads should only be considered if existing roads cannot be upgraded.
- Care should be taken not to create habitat for prey species that could draw priority raptors into the area and expose them to collision risk. Rock piles must be removed or covered and compacted with topsoil to prevent them from becoming habitat for Rock Hyrax (Dassie).

### **Ecology:**

#### WTGs

1. Unnecessary impacts on surrounding natural vegetation must be avoided. The construction impacts must be contained to the footprint of the turbines and laydown area.
2. Disturbed areas must be rehabilitated as soon as possible after construction, using site-appropriate indigenous species. (Refer to Revegetation and Habitat Rehabilitation Management Plan in Appendix H).
3. Existing access roads must be used, where possible.

#### Internal Access Roads

4. Unnecessary impacts on surrounding natural vegetation must be avoided. The construction impacts must be contained to the footprint/servitude of the internal access roads.
5. Existing access roads must be used, where possible, as the location for new roads. Disturbances will then be placed where there is an existing, albeit small, disturbance.
6. Steep slopes must be avoided, if possible.
7. Rehabilitate disturbed areas adjacent to construction as quickly as possible. (Refer to Revegetation and Habitat Rehabilitation Management Plan in Appendix H).

8. Rescue any species of value from the footprint of construction. (Refer to Plant Rescue and Protection Plan in Appendix F).
9. Control alien plants adjacent to infrastructure (refer to Alien Invasive Management Plan in Appendix I).

### **Freshwater:**

- Construction activities should as far as possible be limited to the identified sites for the proposed wind energy facilities and the structures.
- A buffer of at least 32m (from centre of stream for smaller drainage lines and from top of bank for larger tributaries) should be maintained adjacent to the identified freshwater features, as well as from the edge of the pans and wetland areas.
- It is important that any of the cleared areas that are not hardened surfaces are rehabilitated after construction is completed by revegetating the areas disturbed by the construction activities with suitable indigenous plants.
- Invasive alien plants that currently exist within the immediate area of the construction activities should also be removed and the sites monitored for regrowth on an ongoing basis.
- To reduce the risk of erosion, the locality of the turbines and structures should preferably not be on any steep slopes or within the wide wash areas on the plains (\*this requirement has been checked and the final layout and turbine positions meet this and are acceptable). Run-off over the exposed areas should be mitigated to reduce the rate and volume of run-off and prevent erosion occurring on the site and within the freshwater features and drainage lines.
- Contaminated runoff from the construction site(s) should be prevented from entering the rivers/streams. All materials on the construction sites should be properly stored and contained.
- Disposal of waste from the sites should also be properly managed. Construction workers should be given ablution facilities at the construction sites that are located at least 100m away from the river system and regularly serviced. These measures should be addressed, implemented and monitored in terms of the EMP for the construction phase.
- Where new roads need to be constructed the existing road infrastructure should be rationalised and any unnecessary roads decommissioned and rehabilitated to reduce the disturbance of the area and within the stream beds.
- For new access roads to the turbines, these should rather be along the ridges of the hills than in the drainage/stream beds. Where access routes need to be constructed through streams/drainage lines, the disturbance of the channel should be limited.
- Wetland and pan areas should be avoided and any road adjacent to a wetland feature should also remain outside of the 32m buffer zone as far as possible. All crossings over drainage channels or stream beds should be such that the flow within the drainage channel is not impeded, and appropriate water use licences and/or general authorisations must be obtained in line with the National Water Act (NWA) Road infrastructure, transmission lines and cable alignments should coincide as much as possible to minimize the impact.
- Avoid watercourses and recommended buffers (i.e. a buffer of at least 32m (from centre of stream for smaller drainage lines and from top of bank for larger tributaries) should be maintained adjacent to the identified freshwater features, as well as from the edge of the pans and wetlands areas), as far as possible.
- Make use of existing disturbed areas where possible.

- Do not stockpile or dump rubble or waste associated with the construction works within the aquatic features or the recommended buffers.
- Water consumption requirements for the site for the construction and operation of the site if not obtained from an authorised water user within the area, must be authorised by the DWS;
- No liquid waste should be discharged into any of the aquatic features within the site without the approval of the DWS.
- Wastewater should be properly contained on-site and removed to a licensed wastewater treatment facility that is able to treat the wastewater;
- A stormwater management plan should be compiled for the compacted surfaces within the site. Where necessary measures to dissipate flow intensity or protect erosion should be included in the plan. The plan should also mitigate any contaminated runoff from the construction and operation activities from being discharged into any of the aquatic features;
- Adequate erosion mitigation measures should be incorporated into design and implemented during construction.

### **Heritage:**

- Four archaeological sites located in 2022 (refer to Heritage Walkthrough Report for the final layout attached in Appendix E3) in proximity to access roads to WTGs require either avoidance or mitigation in the form of archaeological sampling. These are:
  - JG104 – 20 m buffer or mitigate;
  - G110 – 60 m buffer or mitigate;
  - G113 – 30 m buffer or mitigate; and
  - JG134 – (historical ashheap near the Vendussie Kuil farm complex that is crossed by Access Road) - 20 m buffer or mitigate.

If the mitigation of any of these sites is chosen, a permit for the work will need to be obtained from SAHRA by a suitably qualified archaeologist and the work must be carried out prior to construction commencing.
- Any new finds of significant archaeological material must be reported immediately to the project archaeologist and SAHRA so that mitigatory action can be determined and be implemented, if necessary. Mitigation is at the cost of the developer, while time delays and diversion of machinery/plant may be necessary until mitigation in the form of conservation or archaeological sampling is completed.
- All identified stone-walled kraals must avoided during construction. ACO has provided the locations of these kraals for inclusion in the Environmental Sensitivity Map for the final layout plan and the kraal complexes must be demarcated prior to construction and labelled as no go areas during construction.
- The 500 m buffers in place around the Kranskop and Vendussie Kuil farm werfs will remain although:
  - The small overlap of the laydown area and access road with the Kranskop buffer is permitted; and
  - The access road within the Vendussie Kuil buffer is permitted, but that instead of constructing a new road within a short distance of the farm complex, the section of the existing farm road within the buffer is upgraded to serve as the access road, thereby limiting the impacts of the WEF on the farm complex. (Note: This recommendation has been addressed in the Final Layout Plan).

- Should any human remains be disturbed or uncovered during excavations and earthworks for the WEF, work in the vicinity must cease, the remains made secure, preferably in situ and the project archaeologist and SAHRA notified immediately. Buried remains should not be removed until inspected by an archaeologist.

### **Palaeontology:**

- The Environmental Control Officer (ECO) responsible for these developments should be alerted to the possibility of fossil remains being found on the surface or exposed by fresh excavations during construction. Should substantial fossil remains be discovered during construction, these should be safeguarded (preferably in situ) and the ECO should alert the South African Heritage Resources Association (SAHRA) so that appropriate mitigation (e.g. recording, sampling or collection) can be undertaken by a professional palaeontologist. The specialist involved would require a collection permit from SAHRA. Fossil material must be curated in an approved repository (e.g. museum or university collection) and all fieldwork and reports should meet the minimum standards for palaeontological impact studies developed by SAHRA.
- Monitoring of all substantial bedrock excavations for fossil remains by ECO, with reporting of substantial new palaeontological finds (notably fossil vertebrate bones & teeth) to SAHRA for possible specialist mitigation.

### **Noise:**

It is recommended that the project applicant (Developer):

- ensure that equipment is well maintained and fitted with the correct and appropriate noise abatement measures. Engine bay covers over heavy equipment could be pre-fitted with sound absorbing material. Heavy equipment that fully encloses the engine bay should be considered, ensuring that the seam gap between the hood and vehicle body is minimised;
- include a component covering environmental noise in the Health and Safety Induction to sensitize all employees and contractors about the potential impact from noise, especially those employees and contractors that have to travel past receptors at night, or might be required to do work close (within 2,000m) to NSR at night. This should include issues such as minimising the use of vehicle horns;
- where practicable, mobile equipment should be fitted with broadband (white-noise generators/alarms), rather than tonal reverse alarms.
- The developer must implement a line of communication (i.e. a help line where complaints could be lodged). All potential sensitive receptors should be made aware of these contact numbers. The proposed WEF should maintain a commitment to the local community (people staying within 2,000 m from construction or operational activities) and respond to noise concerns in an expedient fashion.
- investigate any reasonable and valid noise complaint if registered by a receptor staying within 2,000 m from the location where construction activities are taking place, or where an operational WTG are located. A complaint register, keeping a full record of the complaint, must be kept by the applicant; and

- minimise certain noise-generating activities (or the use of certain equipment) at night, planning the completion of noisiest activities (such a pile driving, rock breaking and excavation) during the daytime period.

### **Visual:**

- Access roads to be kept clean and storage of materials to be screened from public view. Storage of builders' rubble to be controlled.
- Limited out-of-hours working
- Site offices should be limited to single storey and they should be sited carefully using temporary screen fencing to screen from the wider landscape.
- Appropriate location of buildings, return adjacent ground to original state
- Aesthetic treatment of turbines, local consultations
- Cover and re-vegetate over turbine foundations; return adjacent ground to original state; remove surplus spoil off site
- Disturbed areas to be re-vegetated
- Ensure prompt revegetation of disturbed areas.
- Compliance with EMP
- Aesthetic treatment of turbines, local consultations
- The colour finish of turbines: Paint treatment: white, matt, no stripes, decals, logos – **however**, painting of one of the blades of each turbine (with red or black), as per avifaunal specialist recommendations, is acceptable.
- Comply with road traffic safety requirements
- Carefully alignment of roads for least visibility, revegetating disturbed slopes
- The new road(s) that will connect the turbines and permit free access for maintenance and inspection vehicles in the site should also be gravel.
- The alignment of access roads should be carefully considered to minimize visible scarring from cut and fill, and gravel should be used as surface material. Roads alignments should lie with the contour as far as possible;
- As much as possible, place any new structures where they are least visible to the greatest number of people;
- Minimise the construction period, where possible (i.e. keep construction period as short as possible);
- Retain 100-150 mm of topsoil, where there is sufficiently deep topsoil, from any disturbed areas to rehabilitate disturbed areas after construction;
- The developer would be required to ensure that all excess material is not left around in piles, and the ground is returned as far as possible to original levels/gradients.
- Use cut material where possible in construction or on site (e.g. in grading gravel roads) or remove cut material from site;
- The use of contaminants, such as diesel, curing compounds, shutter oil and cement, should be controlled on site, litter should be regarded a serious offence and no fires should be allowed on site. All site employees should receive training in awareness of these issues;
- Establish screening structures to shield construction works from sensitive receptors.

## 5.6 **Environmental auditing:**

Records relating to monitoring and auditing must be kept on site and made available for inspection to any relevant and competent authority in respect of this development.

As per Conditions 27 – 30 of the Environmental Authorisation dated 1 March 2013 (refer to Appendix C):

- All documentation e.g. audit/ monitoring/ compliance reports and notifications, required to be submitted to the Department in terms of the authorisation, must be submitted to the *Director: Compliance Monitoring* at the Department (DFFE).
- The holder of the authorisation must submit an environmental audit report to the Department (to both DFFE and DENC) **within 30 days of completion of the construction phase** (i.e. within 30 days of site handover) **and within 30 days of completion of rehabilitation activities.**
- The environmental audit report must:
  - Be compiled by an independent environmental auditor;
  - Indicate the date of the audit, the name of the auditor and the outcome of the audit;
  - Evaluate compliance with the requirements of the approved EMP and this environmental authorisation;
  - Include measures to be implemented to attend to any non-compliances or degradation noted;
  - Include copies of any approvals granted by other authorities relevant to the development for the reporting period; and
  - Highlight any outstanding environmental issues that must be addressed, along with recommendations for ensuring these issues are appropriately addressed.
- The audit report must be submitted prior to commencement of the operation phase of the project.



## 6 OPERATIONAL FRAMEWORK EMP

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This section contains the Operational Framework EMP. The impact management outcomes of the operational phase EMP are to provide the holder of the EA with the necessary tools to ensure that the potential impacts on the environment during the operational phase of the project, as identified through the EIA process for the project and finalisation of the Layout Plan process, are avoided and/or minimized wherever possible, including: impacts on ecology; birds; bats; climate change; noise; agricultural resources; visual aesthetics and freshwater resources. The OEMP aims to ensure that the development is maintained and operated in an environmentally sensitive and sustainable manner, that the operation of the development does not result in reasonably avoidable environmental impacts; and that positive impacts of the activities are enhanced.

The information, including impact management actions and outcomes, is summarised in tabular format illustrating the activity, aspect, impact, mitigation measure, performance indicators, resources, schedule and verification. These criteria are listed and explained below:

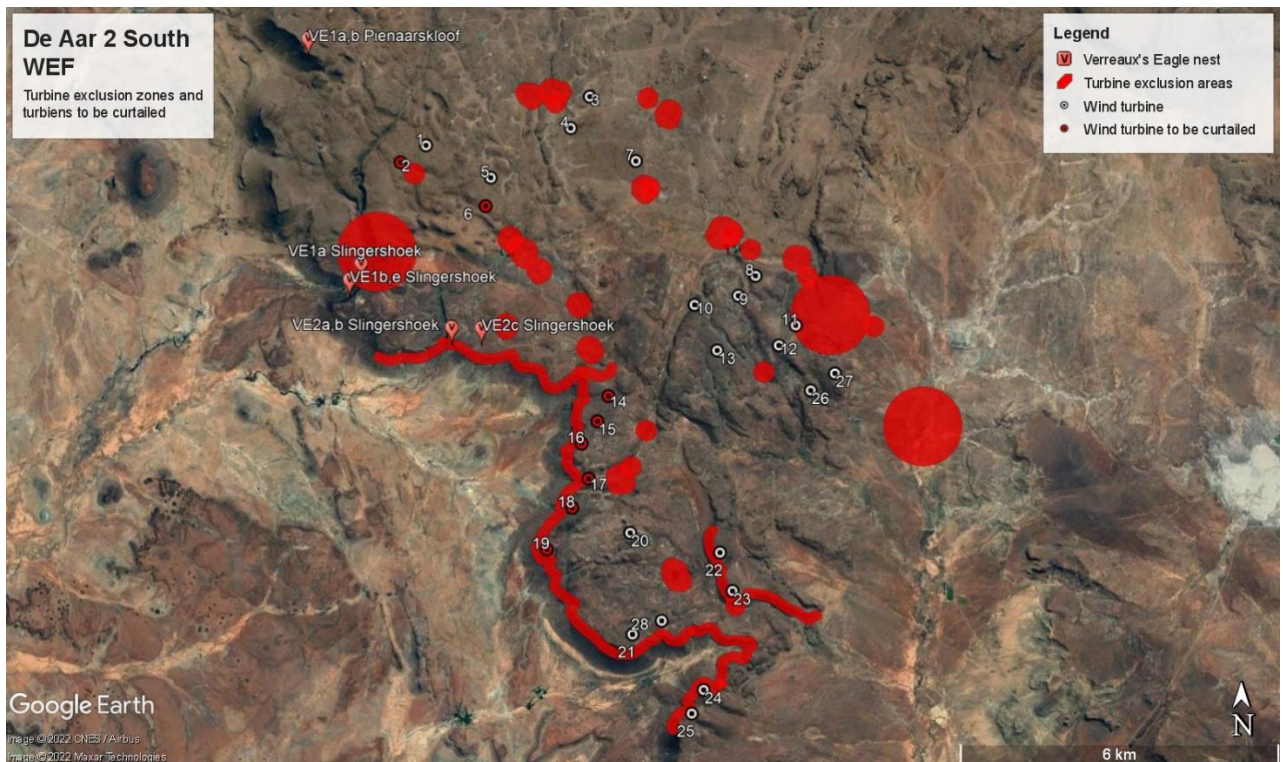
The following components are identified/ described:

- **Activity:** component/ activity of the project for which the impact has been identified;
  - **Aspect:** the aspect of the above activity which will be impacted;
  - **Impact:** the environmental impact identified and to be mitigated;
  - **Mitigation measure (impact management action):** measures identified for implementation in terms of environmental management to reduce, rectify or contain the identified environmental impact – mitigation is divided into the following:
    - **Objective:** desired outcome of mitigation measure,
    - **Mechanism:** method of achieving the objective;
  - **Performance indicators:** outcomes that will indicate achievement of objective/s;
  - **Responsibility:** party or parties identified for implementation of mitigation measure/s;
  - **Resources:** available resources to aid implementation of mitigation;
  - **Schedule:** timeframe in which identified impact and mitigation measure is anticipated to occur; frequency of monitoring required; and/or time periods within which the impact management actions must be implemented; and
  - **Verification:** party or parties identified as responsible for review and assessment of final outcome.
-

**Specific Mitigation Measures (applicable to the operational phase) recommended by the project specialists are outlined below:**

**Avifauna:**

- A programme of observer-based Shutdown on Demand (SdoD) to reduce potential SCC turbine collisions must be implemented for the whole wind farm. Trigger species are the following: Verreaux's Eagle, Martial Eagle, Black Stork, Lanner Falcon, Tawny Eagle, Cape Vulture and White-backed Vulture. The details of the SdoD (number of observation points, training of observers and scheduled shifts) must be determined in consultation with the avifaunal specialist. The SdoD must be in place to commence on the first day of commercial operation.
- In addition to the SdoD, a system of automated curtailment of the highest risk turbines must be implemented for those times of day and varied seasonally when flight activity is most likely to happen. Based on the analysis of flight data as explained in Section 7 of the Avifauna Walk Through Report (Appendix E2), the following are recommended:
  - Turbines 2, 6, 14, 15, 16, 17, 18, 19 must be curtailed (see Figure 9 in Appendix E2) for the location of the turbines). Turbines were identified based on proximity to Verreaux's Eagle nests, and observed flight activity.
  - Curtailment threshold for summer and autumn (1 November to 31 May): 80% or higher probability of flying.
  - Curtailment threshold for winter and spring (1 June to 31 October): 60% or higher probability of flying. The lower threshold is to reduce the likelihood of impact on dependent chicks/fledglings.
- Vehicle and pedestrian access to the site should be controlled and restricted to access roads to prevent unnecessary disturbance of SCC.
- Formal operational monitoring should be resumed once the turbines have been constructed, as per the most recent edition (2015) of the best practice guidelines (Jenkins *et al.* 2011). The exact time when post-construction monitoring should commence, will depend on the construction schedule, and will be agreed upon with the site operator once these timelines and a commercial operational date have been finalised.
- As a minimum, operational monitoring should be undertaken for the first five years of operation, and then repeated again every five years thereafter for the operational lifetime of the facility. The exact scope and nature of the post-construction monitoring will be determined on an ongoing basis by the results of the monitoring through a process of adaptive management.
- Depending on the results of the monitoring, a range of mitigation measures will have to be considered if the impact on mortality turns out to be significant, including expanding curtailment to additional problem turbines during high-risk periods.



**Figure 4: The proposed turbine exclusion zones Jackal Buzzard nests, boreholes, dams and escarpment edge, and turbines (white points) including those turbines to be curtailed (red points).**

### **Bats:**

- Implementation of the Mitigation Action Plan for Bats (refer to Appendix G), including the following:
  - Step 1: Minimisation of light pollution and ratification habitat creation:
    - Bi-annual visits to the facility at night must be conducted for the operational lifetime of the facility by operational staff of the facility, to assess the lighting setup and whether the passive motion sensors are functioning correctly. The bat specialist conducting the operational bat mortality monitoring must conduct at least one visit to site during nighttime to assess the placement and setup of outside lights on the facility. When lights are replaced and maintenance on lights is conducted, the Mitigation Action Plan must be consulted (refer to Appendix G).
  - Step 2: Appointment of bat specialist to conduct operational bat mortality monitoring.
    - As soon as the De Aar 2 South WEF facility becomes operational, a bat specialist must be appointed to conduct a minimum of 2 years of operational bat mortality monitoring. The methodology of this monitoring must comply with the *South African Good Practice Guidelines for Operational Monitoring for Bats at Wind Energy Facilities - 2<sup>nd</sup> Edition June 2020* (Aronson et al. 2020), or any newer version of the applicable guidelines that may be in force at the start of operation of the facility.
    - The results of the bat mortality study may be used to develop mitigation measures focused on specific problematic turbines. The results of the

operational monitoring must be made available, on request, to other bat specialists conducting operational and preconstruction monitoring on WEF's in South Africa.

- Step 3: Curtailment to prevent freewheeling
  - Based on high bat activity detected during the 12-month preconstruction study, from 1 September to 31 March every night for the lifetime of the facility, curtailment must be applied to all turbines by ninety-degree feathering of blades below the manufacturer's cut-in speed, so it is exactly parallel to the wind direction and minimises freewheeling blade rotation as much as possible without locking the blades. This can significantly lower probability of bat mortalities. Influence on productivity is minimal since no power is generated below the manufacture's cut-in speed.
- Step 4: Additional mitigation by curtailment or acoustic deterrents
  - If mitigation steps 1 – 3 of the Mitigation Action Plan for bats (Appendix G) are followed, and the bat mortality monitoring study detects bat mortalities that are above the sustainable threshold for the Mulilo De Aar 2 South WEF, then additional mitigation will need to be implemented to bring bat mortalities to or below the sustainable threshold. According to the *South African Bat Fatality Threshold Guidelines* (MacEwan, et al., Edition 2, October 2018), this threshold is calculated by considering the hectare size of the WEF area of turbine influence and the value of 2% of bats/10ha/year for the ecoregions that the WEF is located in, to give an annual number of sustainable bat mortalities that is acceptable for the WEF. The area of turbine influence of a wind farm is dictated by the turbine layout and is a tight fitting polygon around the turbine layout (refer to Figure 6.1 in Appendix E8). In this version of the guidelines the acceptable sustainable threshold is calculated as 0.2 bats/10ha/annum for the Nama Karoo ecoregion which occupies the turbine area of influence. The calculated annual acceptable sustainable threshold of bat mortalities for the total De Aar 2 South WEF is indicated in Table 4 below. The threshold is based on values adjusted for biases such as searcher efficiency and carcass persistence. Note that a newer version of the Threshold Guidelines or another similar applicable document may be adopted during the operation of the WEF.

**Table 4:** The sustainable acceptable mortality thresholds of the authorised De Aar 2 South WEF.

	<u>Area of influence of wind turbines (hectares)</u>	<u>Acceptable annual mortality of bats</u>
<u>De Aar 2 South WEF (Nama Karoo)</u>	<u>3097</u>	<u>0.2 x (3097/10)</u> <u>= 0.2 x 309.7</u> <u>= <b>62 bats</b></u>

- Such additional mitigation measures may be to curtail problematic turbines according to the mitigation cut-in speed (refer to Section 5.3 in Appendix E8), and/or to utilise acoustic deterrents on problematic

- turbines (refer to Section 6.4 in Appendix E8). If the turbine layout is amended, the calculation in Table 4 needs to be revised.
- Preliminarily, it is advised that any additional mitigation measures that may be required be applied during the months of September to March, and must be applied to any turbines or group of turbines identified as causing the wind farm's mortalities to be above the sustainable threshold levels. This time period is based on high bat activity months as detected during the 12-month preconstruction study.
  - The bat specialist conducting the operational bat monitoring may recommend other time periods for additional mitigation, based on robust mortality data. If required, the bat specialist may make use of climatic data to allow for an active and adaptable mitigation schedule.
  - Step 5: Auditing of bat mortalities for the lifetime of the WEF
    - During the implementation of mitigation Steps 1 – 4, it is crucial for the facility to determine and monitor bat mortalities in order to implement, maintain and adapt mitigations as efficiently as possible. For the duration of the lifetime of the facility, the impacts on bats must be audited/monitored by reliable methods of carcass searching and/or electronic devices capable of automatically counting bat mortalities. Such auditing should occur every 5 years (after the end of the initial 2-year operational study) for all turbines on site, and continuously for turbines where mitigations discussed in Step 4 (Sections 5.3 and 5.4 in Appendix E8) are implemented.
  - Acoustic bat deterrents
    - 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.
    - 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.

## **Ecology:**

### WTG, OHPL & Internal Access Roads

- Disturbance of indigenous vegetation outside of the footprint of construction must be kept to a minimum.
  - Where disturbance is unavoidable, disturbed areas should be rehabilitated as quickly as possible. Refer to Revegetation and Habitat Rehabilitation Management Plan in Appendix H.
-

- Any alien plants within the control zone of the Developer must be immediately controlled to avoid establishment of a soil seed bank. Control measures must follow established norms and legal limitations in terms of the method to be used and the chemical substances used. Refer to Alien Invasive Management Plan for the project included in Appendix I.
- An on-going monitoring programme should be implemented to detect and quantify any alien plants that may become established and provide information for the management of aliens. Refer to Alien Invasive Management Plan for the project included in Appendix I.

### **Freshwater:**

- Operational activities should as far as possible be limited to the delineated site for the proposed development and the identified infrastructure routes.
- Invasive alien plant growth should be monitored on an ongoing basis to ensure that these disturbed areas do not become infested with invasive alien plants.
- Storm water run-off infrastructure must be maintained to mitigate both the flow and water quality impacts of any storm water leaving the WEFs site. Should any erosion features develop, they should be stabilised as soon as possible.
- Water supply, sanitation services as well as solid waste management should preferably be provided by an off-site service provider.
- Any disturbed areas should be rehabilitated and monitored to ensure that these areas do not become subject to erosion or invasive alien plant growth.

### **Noise:**

It is recommended that the Developer:

- Ensure that equipment is well maintained and fitted with the correct and appropriate noise abatement measures. Engine bay covers over heavy equipment could be pre-fitted with sound absorbing material. Heavy equipment that fully encloses the engine bay should be considered, ensuring that the seam gap between the hood and vehicle body is minimised;
- Investigate any reasonable and valid noise complaint if registered by a receptor staying within 2,000 m from the location where construction activities are taking place, or where an operational WTG are located. A complaint register, keeping a full record of the complaint, must be kept by the applicant; and
- Develop and conduct environmental noise monitoring at selected NSR living within the 40 dBA noise contour for the first year of operation (NSR 02). (The Developer should develop and implement an environmental noise monitoring plan at NSR02 (if used for residential purposes). Refer to Section 12 of Appendix E6 –for the Environmental Noise Monitoring Plan. Should the structure at NSR02 not be used for residential purposes, measurements at this NSR would not be required.
- The developer must implement a line of communication (i.e. a help line where complaints could be lodged). All potential sensitive receptors should be made aware of these contact numbers. The proposed WEF should maintain a commitment to the local community (people staying within 2,000 m from construction or operational activities) and respond to noise concerns in an expedient fashion.

- To ensure that noise does not become an issue for future residents or land owners, it is recommended that the applicant get written agreement from current land owners that no new residential dwellings will be developed within areas enveloped by the 42 dBA noise level contour. Structures located within the 45 dBA noise contour should not be used for residential purposes.

### **Visual:**

- Access roads to be kept clean and storage of materials to be screened from public view. Storage of builders' rubble to be controlled.
- Aesthetic treatment of turbines, local consultations
- Compliance with EMP.
- Disturbed areas to be revegetated
- Reduce visual clutter, where possible
- Establish buildings in locations not visible to majority of receptors
- Consider probability of habituation to the visual impact from sensitive receptors
- The colour finish of the turbines: Paint treatment: white, matte, no stripes, decals, logos preferable, **however** painting of one of the blades of each turbine (with red or black), as per avifaunal specialist recommendations, is acceptable.

### **Transport:**

- The Traffic Management Plan (refer to Appendix K) should be updated once construction is completed to include the operational traffic requirements.
- The Traffic Management Plan needs to be reviewed annually or after an incident and corrective measures should then be incorporated into the Plan.
- The maintenance or replacement of wind turbine components would require a crane and abnormal vehicles. Although abnormal load vehicles would be required, the maintenance or replacement of components can be staggered, and the transportation of the components would therefore take place over a short period of time, presumably delivered in one day. Furthermore, traffic disruptions can be minimised by transporting the components during off-peak hours. This phase is therefore expected to generate minimal traffic.
- The delivery of components and construction materials to the site should be staggered and trips should be scheduled to occur outside of peak traffic periods.
- Transporting site personnel to and from the site by means of busses or minibus taxis. This will reduce the number of trips bound for the site.

This section contains the Operational Framework EMP table (Table 5) which constitutes the Operational Framework EMP.

Operational Framework Environmental Management Programme Table									
NO.	ACTIVITY	ASPECT	IMPACT	MITIGATION MEASURE: (objective and mechanism ( <u>impact management actions</u> ))	PERFORMANCE INDICATOR	RESPONSIBILITY	RESOURCES	SCHEDULE	VERIFICATION
1.	All Activities (wind energy facility)	Environmental management documentation and procedures	No framework within which to locate the management of the operational phase.  No procedures against which to assess environmental performance during the operational phase and thus no measure of compliance.	<p><b>Objective:</b> To ensure that the operation of the wind energy facility does not result in avoidable impacts on the environment, and that any impacts that do occur are anticipated and managed.</p> <p><b>Mechanism:</b></p> <ol style="list-style-type: none"> <li>1) Appoint a suitably qualified <u>Environmental Manager (EM)</u> to monitor compliance (either independent or in-house).</li> <li>2) Audit the compliance with the requirements of the environmental specification contained within the OEMP.</li> <li>3) <u>3) Appoint an independent Environmental Professional to undertake bi-annual audits for the first three years of operation and once every five years thereafter. Each audit is to be based on site visits by the auditor as well as a review of any</u></li> </ol>	Environmental impacts effectively monitored and managed during the operational phase.  Comprehensive record of compliance and remedial actions available <u>on site.</u>	<u>Holder of EA/ Developer</u>  O&M (Operation and Maintenance Contractor	OEMP	<u>Independent audits to be undertaken bi-annually for the first three years of operation and once every five years thereafter.</u>	<u>EM</u>  <u>DFFE</u>  <u>DAEARDLR</u>



**Operational Framework Environmental Management Programme Table**

NO.	ACTIVITY	ASPECT	IMPACT	MITIGATION MEASURE: (objective and mechanism <u>(impact management actions)</u> )	PERFORMANCE INDICATOR	RESPONSIBILITY	RESOURCES	SCHEDULE	VERIFICATION
				<p><u>records of environmental management to be kept by the EM. The audit must also determine whether the OEMP is adequately dealing with the range of environmental impacts on the site, i.e. whether the plan is still appropriate, or whether it needs to be extended. The Audit Report produced shall comply with the requirements of Regulation 34 of GN R982, as amended, and shall meet the content requirements laid out in Appendix 7 of GN R982, as amended. The audit report is to include recommendations of changes required to the OEMP document and/or any Appendices to the EMPr that have relevance to the Operational Phase, management practices</u></p>					

## Operational Framework Environmental Management Programme Table

NO.	ACTIVITY	ASPECT	IMPACT	MITIGATION MEASURE: (objective and mechanism ( <u>impact management actions</u> ))	PERFORMANCE INDICATOR	RESPONSIBILITY	RESOURCES	SCHEDULE	VERIFICATION
				<p><u>etc to improve environmental management of the site. The results of this audit must be submitted to DFFE and DAERL.</u></p> <p>4) <u>Records relating to monitoring and auditing must be kept on site and made available for inspection to any relevant and competent authority in respect of this development.</u></p> <p>5) <u>Auditing to comply with requirements of the EA.</u></p>					
2.	All Activities (wind energy facility)	Protection of the surrounding environment (aquatic and terrestrial)	<u>Impact of the operation and maintenance of the WEF on the surrounding environment (Ecological impacts, including potential impacts on watercourses)</u>	<p><b>Objective:</b> To ensure that impacts on the surrounding biophysical environment are minimised during the operational phase.</p> <p><b>Mechanism:</b></p> <p>1) During maintenance activities limit movement in disturbed areas.</p> <p>2) <u>Vehicle movements to be restricted to designated roadways.</u></p> <p>3) <u>Any areas disturbed</u></p>	<p><u>Impacts on the surrounding environment including aquatic and terrestrial ecology, are avoided and/or minimised wherever possible.</u></p> <p><u>No further disturbance to vegetation.</u></p>	O&M Contractor  EM	<p><u>EMPr</u></p> <p><u>Revegetation and Habitat Rehabilitation Plan</u></p> <p><u>Stormwater Management Plan and Erosion Management Plan</u></p> <p><u>Open Space Management Plan</u></p>	<u>Ongoing, as required (operational phase)</u>	<p><u>EM/ Holder of EA</u></p> <p><u>DFFE</u></p> <p><u>DAEARDLR</u></p> <p><u>DWS</u></p>

**Operational Framework Environmental Management Programme Table**

NO.	ACTIVITY	ASPECT	IMPACT	MITIGATION MEASURE: (objective and mechanism <u>(impact management actions)</u> )	PERFORMANCE INDICATOR	RESPONSIBILITY	RESOURCES	SCHEDULE	VERIFICATION
				<p>during maintenance should be rehabilitated, as per requirements of the Revegetation and Habitat Rehabilitation Plan (Appendix H).</p> <p>4) Ongoing implementation of the Stormwater Management Plan and Erosion Management Plan (Appendix L and M) to ensure compliance with applicable regulations and prevent off-site migration of contaminated storm water or increased soil erosion.</p> <p>5) Ensure ongoing implementation of the Open Space Management Plan (Appendix J).</p> <p>6) Continuous monitoring and removal of alien and invasive plant species within the wind energy facility, and ensure ongoing implementation of the Alien and Invasive</p>	<p><u>Continued improvement in rehabilitation efforts.</u></p> <p><u>No erosion or diversion of flow in watercourses.</u></p> <p><u>Adherence to recommended aquatic buffers.</u></p>		Alien Invasive Management Plan		

**Operational Framework Environmental Management Programme Table**

NO.	ACTIVITY	ASPECT	IMPACT	MITIGATION MEASURE: (objective and mechanism <u>(impact management actions)</u> )	PERFORMANCE INDICATOR	RESPONSIBILITY	RESOURCES	SCHEDULE	VERIFICATION
				<p><u>Plant Specialist Management Plan and the Revegetation and Habitat Rehabilitation Plan.</u></p> <p>7) <u>A fire plan must be available on site at all times and employees must be made aware of the plan.</u></p> <p><u>Specific Freshwater mitigation measures:</u></p> <ul style="list-style-type: none"> <li>• <u>Operational activities should as far as possible be limited to the delineated site for the proposed development and the identified infrastructure routes. Invasive alien plant growth should be monitored on an ongoing basis to ensure that these disturbed areas do not become infested with invasive alien plants.</u></li> <li>• <u>Storm water run-off infrastructure must be maintained to mitigate both the flow and water quality impacts of any storm water leaving the wind energy facilities site.</u></li> </ul>					

## Operational Framework Environmental Management Programme Table

NO.	ACTIVITY	ASPECT	IMPACT	MITIGATION MEASURE: (objective and mechanism ( <u>impact management actions</u> ))	PERFORMANCE INDICATOR	RESPONSIBILITY	RESOURCES	SCHEDULE	VERIFICATION
				<p><u>Should any erosion features develop, they should be stabilised as soon as possible.</u></p> <ul style="list-style-type: none"> <li><u>Water supply, sanitation services as well as solid waste management should preferably be provided by an off-site service provider.</u></li> <li><u>Any disturbed areas should be rehabilitated and monitored to ensure that these areas do not become subject to erosion or invasive alien plant growth.</u></li> </ul>					
3.	<u>All Activities (wind energy facility)</u>	<u>Protection of fauna (Note: avifauna and bats are outlined separately below)</u>	<u>Disturbance to or loss of fauna and/or habitat.</u>  <u>Direct mortalities.</u>	<p><b>Objective:</b> To minimise impacts on fauna.</p> <p><b>Mechanisms:</b></p> <ol style="list-style-type: none"> <li><u>Vehicle movements to be restricted to designated roadways.</u></li> <li><u>Adherence to reduced vehicle speeds by all vehicles moving on site.</u></li> <li><u>The EM, in addition to selected permanent staff, to attend snake handling training. Once the training is completed, the EM</u></li> </ol>	<p><u>No additional disturbance to fauna populations on the WEF site.</u></p> <p><u>Continued improvement of fauna protection efforts.</u></p>	<p><u>EM</u></p> <p><u>O&amp;M Contractor</u></p>	<u>EMP</u>	<u>Ongoing</u>	<p><u>EM</u></p> <p><u>O&amp;M Contractor</u></p>

**Operational Framework Environmental Management Programme Table**

NO.	ACTIVITY	ASPECT	IMPACT	MITIGATION MEASURE: (objective and mechanism <u>(impact management actions)</u> )	PERFORMANCE INDICATOR	RESPONSIBILITY	RESOURCES	SCHEDULE	VERIFICATION
				<p><u>must apply for a fauna relocation permit from DENC, if required.</u></p> <p>4) <u>The EM shall ensure that no hunting, trapping, shooting, poisoning or otherwise disturbance of any fauna takes place.</u></p> <p>5) <u>The feeding of wild animals is prohibited.</u></p> <p>6) <u>The use of pesticides is prohibited unless approved by the EM and O&amp;M Contractor.</u></p> <p>7) <u>No domestic pets of O&amp;M staff are permitted on site.</u></p>					
4.	Operational Activities (wind energy facility)	Protection of bats	Disturbance to or loss of bats, and/or habitat	<p><b>Objective:</b> To minimise impacts on bats.</p> <p><b>Mechanism:</b></p> <p>1) <u>Implementation of the Mitigation Action Plan for Bats (refer to Appendix G).</u></p> <p>2) <u>Bi-annual visits to the facility at night must be conducted for the operational lifetime of the facility by operational staff of the facility, to assess the lighting setup and whether the passive motion sensors are</u></p>	<p><u>No additional disturbance to bat populations on the WEF site.</u></p> <p><u>No bat mortalities resulting from the WEF.</u></p>	<p><u>Bat Specialist</u></p> <p><u>EM</u></p> <p><u>O&amp;M staff</u></p> <p><u>Holder of EA</u></p>	<p><u>Environmental Management Procedures in OEMP</u></p> <p><u>Bat Mitigation Action Plan (Refer to Appendix G)</u></p>	<p><u>Ongoing, as per the schedule in Bat Mitigation Action Plan (refer to Appendix G)</u></p> <p><u>Bi-annual</u></p>	<p><u>Mulilo</u></p> <p><u>EM</u></p> <p><u>O&amp;M Contactor</u></p> <p><u>DFFE</u></p> <p><u>DAEARDLR</u></p>

**Operational Framework Environmental Management Programme Table**

NO.	ACTIVITY	ASPECT	IMPACT	MITIGATION MEASURE: (objective and mechanism <u>(impact management actions)</u> )	PERFORMANCE INDICATOR	RESPONSIBILITY	RESOURCES	SCHEDULE	VERIFICATION
				<p><u>functioning correctly. The bat specialist conducting the operational bat mortality monitoring must conduct at least one visit to site during nighttime to assess the placement and setup of outside lights on the facility. When lights are replaced and maintenance on lights is conducted, the Mitigation Action Plan must be consulted (refer to Appendix G). Appointment of bat specialist to conduct operational bat mortality monitoring (please refer to the bat Mitigation Action Plan in Appendix G).</u></p> <p>3) <u>Curtailed to prevent freewheeling (refer to the bat Mitigation Action Plan in Appendix G).</u></p> <p>4. <u>Additional mitigation by curtailment or acoustic deterrents (please refer to the bat Mitigation</u></p>					

**Operational Framework Environmental Management Programme Table**

NO.	ACTIVITY	ASPECT	IMPACT	MITIGATION MEASURE: (objective and mechanism ( <u>impact management actions</u> ))	PERFORMANCE INDICATOR	RESPONSIBILITY	RESOURCES	SCHEDULE	VERIFICATION
				<p><u>Action Plan in Appendix G, and described above.</u></p> <p>5. Auditing of bat mortalities: During _____ the implementation of the above _____ mitigation measures, it is crucial for the facility to determine and monitor bat mortalities in order to implement, maintain and adapt mitigations as efficiently as possible (please refer to the bat Mitigation Action Plan in Appendix G and bat specialist _____ specific operational mitigation measures described in detail above).</p> <p>6. Implementation of acoustic bat deterrents, if required, as per recommendations of bat specialist.</p>				<p><u>Every 5 years (after the end of the initial 2 year operational study) for all turbines, and continuously for turbines where mitigations in Step 4 of the Mitigation Action Plan are implemented.</u></p>	
5.	Operational Activities (wind energy facility)	<u>Protection of avifauna</u>	<p>Disturbance to or loss of birds as a result of collision with the turbine blades.</p> <p>Disturbance to or loss of birds as a result of collision</p>	<p><b>Objective:</b> To reduce the impact of the operating WEF on priority bird species.</p> <p><b>Mechanisms:</b></p> <ul style="list-style-type: none"> <li>• <u>A programme of observer-based Shutdown on Demand to reduce potential SCC</u></li> </ul>	<p>No additional disturbance to avifauna populations on the WEF site.</p> <p>No additional disturbance to avifauna</p>	<p>Bird specialist</p> <p>O&amp;M Contractor</p> <p>PM</p>	<p>EMP</p> <p>Avifaunal Walk-Through Report (see <u>Appendix E2</u>)</p>	<p>In accordance with the <u>Avifaunal Walk-Through Report (Appendix E2). (Formal operational monitoring should be</u></p>	<p>EM</p> <p>O&amp;M Contractor</p> <p>DFFE</p>



## Operational Framework Environmental Management Programme Table

NO.	ACTIVITY	ASPECT	IMPACT	MITIGATION MEASURE: (objective and mechanism ( <u>impact management actions</u> ))	PERFORMANCE INDICATOR	RESPONSIBILITY	RESOURCES	SCHEDULE	VERIFICATION
			with the overhead power lines.  Electrocution as a result of the power lines.	<p><u>turbine collisions must be implemented for the whole wind farm. Trigger species are the following: Verreaux's Eagle, Martial Eagle, Black Stork, Lanner Falcon, Tawny Eagle, Cape Vulture and White-backed Vulture. The details of the SdoD (number of observation points, training of observers and scheduled shifts) must be determined in consultation with the avifaunal specialist. The SdoD must be in place to commence on the first day of commercial operation.</u></p> <ul style="list-style-type: none"> <li><u>In addition to the SdoD, a system of automated curtailment of the highest risk turbines must be implemented for those times of day and varied seasonally when flight activity is most likely to happen.</u> <u>Based on the analysis of flight data as explained in Section 7 in the Avifauna Walk-Through Report (Appendix E2), the following are recommended:</u> <ul style="list-style-type: none"> <li><u>Turbines 2, 6, 14, 15,</u></li> </ul> </li> </ul>	<p>populations along the length of the power line routes.</p> <p>Continued improvement of avifauna protection efforts.</p> <p><u>Monitoring reports submitted to relevant provincial environment, Birdlife South Africa, the Endangered Wildlife Trust (EWT), and DFFE on a quarterly basis.</u></p>			<p><u>resumed once the turbines have been constructed, as per the most recent edition (2015) of the best practice guidelines (Jenkins et al. 2011). The exact time when post-construction monitoring should commence, will depend on the construction schedule, and will be agreed upon with the site operator once these timelines and a commercial operational date have been finalised.</u></p> <ul style="list-style-type: none"> <li><u>As a minimum, operational monitoring should be undertaken for the first five years of operation, and then repeated</u></li> </ul>	

**Operational Framework Environmental Management Programme Table**

NO.	ACTIVITY	ASPECT	IMPACT	MITIGATION MEASURE: (objective and mechanism <u>(impact management actions)</u> )	PERFORMANCE INDICATOR	RESPONSIBILITY	RESOURCES	SCHEDULE	VERIFICATION
				<p><u>16, 17, 18, 19 must be curtailed (see Figure 9 in Appendix E2) for the location of the turbines). Turbines were identified based on proximity to Verreaux's Eagle nests, and observed flight activity.</u></p> <ul style="list-style-type: none"> <li>○ <u>Curtailed threshold for summer and autumn (1 November to 31 May): 80% or higher probability of flying.</u></li> <li>○ <u>Curtailed threshold for winter and spring (1 June to 31 October): 60% or higher probability of flying. The lower threshold is to reduce the likelihood of impact on dependent chicks/fledglings.</u></li> <li>• <u>Vehicle and pedestrian access to the site should be controlled and restricted to access roads to prevent unnecessary disturbance of SCC.</u></li> <li>• <u>Formal operational monitoring should be resumed once the turbines have been constructed, as per the most recent edition</u></li> </ul>				<p><u>again every five years thereafter for the operational lifetime of the facility. The exact scope and nature of the post-construction monitoring will be determined on an ongoing basis by the results of the monitoring through a process of adaptive management.</u></p>	

**Operational Framework Environmental Management Programme Table**

NO.	ACTIVITY	ASPECT	IMPACT	MITIGATION MEASURE: (objective and mechanism <u>(impact management actions)</u> )	PERFORMANCE INDICATOR	RESPONSIBILITY	RESOURCES	SCHEDULE	VERIFICATION
				<p><u>(2015) of the best practice guidelines (Jenkins <i>et al.</i> 2011). The exact time when post-construction monitoring should commence, will depend on the construction schedule, and will be agreed upon with the site operator once these timelines and a commercial operational date have been finalised.</u></p> <ul style="list-style-type: none"> <li>• <u>As a minimum, operational monitoring should be undertaken for the first five years of operation, and then repeated again every five years thereafter for the operational lifetime of the facility. The exact scope and nature of the post-construction monitoring will be determined on an ongoing basis by the results of the monitoring through a process of adaptive management.</u></li> <li>• <u>Depending on the results of the monitoring, a range of mitigation measures will have to be considered if the impact on mortality turns out to be significant, including expanding curtailment to</u></li> </ul>					

Operational Framework Environmental Management Programme Table

NO.	ACTIVITY	ASPECT	IMPACT	MITIGATION MEASURE: (objective and mechanism ( <u>impact management actions</u> ))	PERFORMANCE INDICATOR	RESPONSIBILITY	RESOURCES	SCHEDULE	VERIFICATION
				<p><u>additional problem turbines during high-risk periods.</u></p> <ul style="list-style-type: none"> <li>• <u>Reports regarding bird monitoring must be submitted to the relevant provincial environment, Birdlife South Africa, the Endangered Wildlife Trust (EWT), and the Department (DFFE) on a quarterly basis.</u></li> <li>• <u>Bird flappers and/or diverters must be installed at all points where powerlines cross avifaunal corridors, wetlands, drainage line and pans.</u></li> </ul>					
6.	Construction Activities (wind energy facility)	Appropriate handling and management of hazardous substances and waste	Litter or contamination of the site or water through poor waste management practices.	<p><b>Objective:</b> To minimise the production of waste. To ensure appropriate waste disposal. To avoid environmental harm from waste disposal.</p> <p><b>Mechanisms:</b></p> <ol style="list-style-type: none"> <li>1) Hazardous substances must be stored in sealed containers within a clearly demarcated area.</li> <li>2) All structures and/or components replaced during maintenance activities must be appropriately disposed of at an appropriately</li> </ol>	<p>No complaints received regarding waste on site or indiscriminate dumping.</p> <p>Internal site audits identifying that waste segregation, recycling and re-use is taking place.</p> <p>No contamination of soil or water.</p>	O&M Contractor	EMP	Waste collection must be monitored on a regular basis.	EM O&M Contractor

**Operational Framework Environmental Management Programme Table**

NO.	ACTIVITY	ASPECT	IMPACT	MITIGATION MEASURE: (objective and mechanism <u>(impact management actions)</u> )	PERFORMANCE INDICATOR	RESPONSIBILITY	RESOURCES	SCHEDULE	VERIFICATION
				<p>licenced waste disposal site or sold to a recycling merchant for recycling.</p> <p>3) Care must be taken to ensure that spillage of oils and other hazardous substances are limited during maintenance. Handling of these materials should take place within an appropriately sealed and bunded area. Should any accidental spillage take place, it will be cleared up according to specified standards for bioremediation. <u>A spillage plan must be implemented and strictly enforced.</u></p> <p>4) Used oils and chemicals will be appropriately disposed at a licensed facility.</p> <p>5) General waste will be recycled where possible or disposed of at an appropriately licensed landfill.</p> <p>6) Hazardous waste (including hydrocarbons) and general waste will be stored and disposed of separately.</p> <p>7) Disposal of waste will</p>					

## Operational Framework Environmental Management Programme Table

NO.	ACTIVITY	ASPECT	IMPACT	MITIGATION MEASURE: (objective and mechanism ( <u>impact management actions</u> ))	PERFORMANCE INDICATOR	RESPONSIBILITY	RESOURCES	SCHEDULE	VERIFICATION
				<p>be in accordance with relevant legislative requirements, including the use of licensed contractors.</p> <p>8) <u>Any waste generated during the operational phase must be disposed of at a waste disposal site licensed for such waste.</u></p> <p>9) <u>No on-site burning of waste is permitted.</u></p>					
<u>7.</u>	Operational Activities (wind energy facility)	Environmental management of the operational phase	Positive impacts on socio-economic environment during operation	<p><b>Objective:</b> To ensure that the operation of the wind energy facility maximises positive impacts on the socio-economic environment.</p> <p><b>Mechanism:</b></p> <p>1) Train local people for operation and maintenance of facility.</p> <p>2) Employ local labour for the operational phase, where possible, and particularly for day to day operations and maintenance.</p>	Consult annual skills and training records, employment records and proof of staff residency in the area prior to employment	<u>O&amp;M Contractor</u>	<u>EMPr</u>	During Operational Phase (full lifetime) when the need arises to employ people.	<u>PM</u> <u>O&amp;M Contractor</u>
<u>8.</u>	All Activities (wind energy facility)	Visual aesthetics	Impact of the proposed development on the surrounding visual aesthetics of	<p><b>Objective:</b> To ensure that impacts on the visual aesthetics are minimised during the operational phase.</p>	Condition of the project infrastructure and roads.	<u>O&amp;M Contractor</u>	<u>EMPr</u> <u>Visual Specialist Statement on</u>	As required based on annual inspections of the project	<u>PM</u> <u>DFFE</u> <u>DAEARDLR</u>

## Operational Framework Environmental Management Programme Table

NO.	ACTIVITY	ASPECT	IMPACT	MITIGATION MEASURE: (objective and mechanism ( <u>impact management actions</u> ))	PERFORMANCE INDICATOR	RESPONSIBILITY	RESOURCES	SCHEDULE	VERIFICATION
			the area	<p><b>Mechanism:</b></p> <p>1) During operation, the maintenance of the turbines, the internal roads, the power line servitude and other ancillary structures and infrastructure will ensure that the facility does not degrade, thus aggravating visual impact.</p> <p>2) <u>Access roads to be kept clean and storage of materials to be screened from public view. Storage of builders rubble to be controlled.</u></p> <p>3) <u>The colour finish of the turbines: Paint treatment: white, matte, no stripes, decals, logos preferable, <b>however painting of one of the blades of each turbine (with red or black), as per avifaunal specialist recommendations, is acceptable.</b></u></p> <p>4) Turbines should be</p>			the EMPr update and Layout Finalisation (Appendix E7)		

## Operational Framework Environmental Management Programme Table

NO.	ACTIVITY	ASPECT	IMPACT	MITIGATION MEASURE: (objective and mechanism ( <u>impact management actions</u> ))	PERFORMANCE INDICATOR	RESPONSIBILITY	RESOURCES	SCHEDULE	VERIFICATION
				<p>maintained in operational condition.</p> <p>5) <u>Disturbed areas to be revegetated.</u></p> <p>6) <u>Reduce visual clutter where possible.</u></p> <p>7) <u>Consider probability of habituation to the visual impact from sensitive receptors.</u></p>					
9.	<u>Activities within the buffer zones of the Eskom powerlines</u>	<u>Protection of Eskom infrastructure</u>	<u>Impact of the proposed development on the Eskom powerlines</u>	<p><b>Objective:</b> <u>To ensure that the operation of the wind energy facility does not result in avoidable impacts on the Eskom powerlines.</u></p> <p><b>Mechanism:</b></p> <p>1) <u>Liaise with Eskom to come to an agreement regarding suitable risk mitigation measures to be put into place for operational management.</u></p> <p>2) <u>No mechanical equipment, including mechanical excavators or high lifting machinery, shall be used in the vicinity of Eskom's apparatus and/or services, without prior written permission having been granted by Eskom. If such</u></p>	Compliance with Eskom's guidelines	O&M Contractor	EMP	During Operational Phase (full lifetime)	<u>PM/ Engineer</u> <u>O&amp;M Contractor</u> <u>Eskom</u>



## Operational Framework Environmental Management Programme Table

NO.	ACTIVITY	ASPECT	IMPACT	MITIGATION MEASURE: (objective and mechanism ( <u>impact management actions</u> ))	PERFORMANCE INDICATOR	RESPONSIBILITY	RESOURCES	SCHEDULE	VERIFICATION
				<p><u>permission is granted the Contractor must give at least seven working days' notice prior to the commencement of work. This allows time for arrangements to be made for supervision and/or precautionary instructions to be issued by the relevant Eskom Manager Note: Where and electrical outage is required, at least fourteen work days are required to arrange it.</u></p> <p>3) <u>Unobstructed access shall be granted to Eskom to access their servitudes.</u></p> <p>4) <u>Equipment shall be regarded electrically live and therefore dangerous at all times. Safety and best practice standards with regards to all safety hazards related to electrical plant shall be employed for the projects.</u></p>					
10	<u>Operational activities (Wind Energy Facility)</u>	Environmental management of the operational phase	<u>Noise impact on the surrounding environment</u>	<b>Objective:</b> <u>To ensure that the operation of the wind energy facility does not result in avoidable and/or unacceptable noise impacts</u>	<u>Compliance with noise specifications in EMPr.</u>	<u>Developer</u> <u>PM/ Engineer</u> <u>O&amp;M Contractor</u>	<u>EMPr,</u> <u>Appendix E6 of EMPr</u>	<u>Ongoing</u> <u>In accordance with Noise Environmental</u>	<u>PM/ Engineer</u> <u>O&amp;M Contractor</u>

**Operational Framework Environmental Management Programme Table**

NO.	ACTIVITY	ASPECT	IMPACT	MITIGATION MEASURE: (objective and mechanism ( <u>impact management actions</u> ))	PERFORMANCE INDICATOR	RESPONSIBILITY	RESOURCES	SCHEDULE	VERIFICATION
				<p>on the surrounding environment.</p> <p><b>Mechanism:</b></p> <ul style="list-style-type: none"> <li>Ensure that equipment is well maintained and fitted with the correct and appropriate noise abatement measures. Engine bay covers over heavy equipment could be pre-fitted with sound absorbing material. Heavy equipment that fully encloses the engine bay should be considered, ensuring that the seam gap between the hood and vehicle body is minimised.</li> <li>investigate any reasonable and valid noise complaint if registered by a receptor staying within 2,000 m from the location where construction activities are taking place, or where an operational WTG are located. A complaint register, keeping a full record of the complaint, must be kept by the applicant; and</li> <li>Develop and conduct</li> </ul>	No noise complaints lodged.			Monitoring Plan (see Section 12 of the Appendix E6), if monitoring required at NSD2.	

**Operational Framework Environmental Management Programme Table**

NO.	ACTIVITY	ASPECT	IMPACT	MITIGATION MEASURE: (objective and mechanism <u>(impact management actions)</u> )	PERFORMANCE INDICATOR	RESPONSIBILITY	RESOURCES	SCHEDULE	VERIFICATION
				<p><u>environmental noise monitoring at selected NSR living within the 40 dBA noise contour for the first year of operation (NSR 02). (i.e. develop and implement an environmental noise monitoring plan at NSR02 (if used for residential purposes). Refer to Section 12 of Appendix E6 –for the Environmental Noise Monitoring Plan. Should the structure at NSR02 not be used for residential purposes, measurements at this NSR would not be required.</u></p> <ul style="list-style-type: none"> <li><u>To ensure that noise does not become an issue for future residents or landowners, it is recommended that the applicant get written agreement from current land owners that no new residential dwellings will be developed within areas enveloped by the 42 dBA noise level contour. Structures located within the 45 dBA noise contour should not be used for residential purposes.</u></li> </ul>					

## Operational Framework Environmental Management Programme Table

NO.	ACTIVITY	ASPECT	IMPACT	MITIGATION MEASURE: (objective and mechanism ( <u>impact management actions</u> ))	PERFORMANCE INDICATOR	RESPONSIBILITY	RESOURCES	SCHEDULE	VERIFICATION
				<ul style="list-style-type: none"> <li>It is recommended that the applicant define the status and use of the structures at NSR02. If these structures are used for residential purposes, the residents should be informed of the projected noise levels at this NSR.</li> </ul>					
11.	All Activities (wind energy facility)	Traffic and transport	Potential traffic impacts resulting from maintenance and operational activities	<p><b>Objective:</b> To minimise potential traffic and transportation impacts; and to enable the identification and implementation of all legal and best practice requirements in respect of the management of traffic associated with the operation of the facility.</p> <p><b>Mechanisms:</b></p> <ul style="list-style-type: none"> <li>The Traffic Management Plan (refer to Appendix K) should be updated once construction is completed to include the operational traffic requirements.</li> <li>Implementation of the Transport and Traffic Management Plan (Appendix K).</li> <li>The Traffic Management Plan needs to be reviewed annually or</li> </ul>	<p>Updated Traffic Management Plan</p> <p>No traffic or transportation incidents</p>	<p>Developer</p> <p>PM/ Engineer</p> <p>O&amp;M Contractor</p>	<p>EMPr,</p> <p>Transportation and Traffic Management Plan (Appendix K of EMPr)</p>	<p>Ongoing</p> <p>Update Traffic Management Plan once construction is complete, before commencement of operational phase</p> <p>Annual review of Traffic Management Plan, or after incident</p> <p>In accordance with Transportation and Traffic Management Plan - refer to Appendix K.</p>	<p>PM/ Engineer</p> <p>O&amp;M Contractor</p>

**Operational Framework Environmental Management Programme Table**

NO.	ACTIVITY	ASPECT	IMPACT	MITIGATION MEASURE: (objective and mechanism <u>(impact management actions)</u> )	PERFORMANCE INDICATOR	RESPONSIBILITY	RESOURCES	SCHEDULE	VERIFICATION
				<p><u>after an incident and corrective measures should then be incorporated into the Plan.</u></p> <ul style="list-style-type: none"> <li>• <u>The delivery of components and construction materials (for maintenance activities) to the site should be staggered and trips should be scheduled to occur outside of peak traffic periods.</u></li> <li>• <u>Transporting site personnel to and from the site by means of busses or minibus taxis. This will reduce the number of trips bound for the site.</u></li> </ul>					

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## 7 DECOMMISSIONING

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The proposed project has a project lifespan of 20-30 years, based on the mechanical characteristics of the turbines. However, as all the infrastructure, such as roads, transmission, substations and foundations would already be established, and the energy source (wind) is a renewable one, the proposed projects would most likely continue to be operated after 20-30 years. Turbines would be upgraded to make use of the latest technology available. All redundant equipment that was replaced would be removed from site and would be sold off.

The following activities would form part of any decommissioning:

1. Site preparation activities would include confirming the integrity of the access to the site to accommodate the required equipment and lifting cranes, preparation of the site (e.g. lay down areas, construction platform) and the mobilisation of construction equipment.
2. A large crane would be brought on site to disassemble the turbine and tower sections. These components would be reused, recycled and disposed of in accordance with regulatory requirements. All parts of the turbines would be considered reusable or recyclable, except for the blades.

If the facility is decommissioned then the site would be fully rehabilitated in accordance with requirements in terms of relevant legislation such as the National Environmental Management Act. The concrete bases of the turbines, transformers and transmission lines could be removed, but would most likely be left under the ground, to avoid disturbing rehabilitated areas once more. The turbines would be removed as described above. All roads would be left on site, as it would assist the farmer in accessing his land.

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## 8 CONCLUSION

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In conclusion it should be noted that the EMP<sub>r</sub> should be regarded as a living document and changes should be made to the EMP<sub>r</sub> as required by project evolution, while retaining the underlying principles and objectives on which the document is based. Any proposed amendments to the approved EMP<sub>r</sub> shall take account of the requirements of EA, NEMA EIA Regulations (2014), as amended, or applicable EIA Regulations at the time, which may require an approval process from the competent authority, prior to the implementation of any EMP<sub>r</sub> amendments.

The compilation of the amended EMP<sub>r</sub> has been informed by specialist inputs for the EMP<sub>r</sub> and Layout Plan finalisation process (refer to Appendix E), as well as incorporating principles of best practice in terms of environmental management. By identifying the potential impacts, mitigation measures, performance indicators, responsibilities, available resources, potential schedule and verification responsibility, the EMP<sub>r</sub> has provided a platform on which both the construction phase and the operational phase EMP<sub>r</sub>s can be founded. The EMP<sub>r</sub> has ensured that the individual EMP<sub>s</sub> will be able to incorporate mitigation measures based on the project in its entirety as opposed to phase-specific measures.

Records relating to monitoring and auditing must be kept on site and made available for inspection to any relevant and competent authority in respect of this development.

The holder of the authorisation must submit an environmental audit report to the Department (DFFE) within 30 days of completion of the construction phase (i.e. within 30 days of site handover) and within 30 days of completion of rehabilitation activities. The audit report must be compiled by an independent environmental auditor, in compliance with Conditions 27 – 30 of the EA dated 1 March 2013.

All Conditions of Authorisation must be complied with by the holder of the EA (refer to Appendix C), as well as the specifications of the EMP<sub>r</sub>.

A copy of the approved EMP<sub>r</sub> (including the EA and amendments to the EA) must be kept at the property where the development will be undertaken.

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**APPENDIX A1**  
**CURRICULUM VITAE OF**  
**PERSONS RESPONSIBLE FOR**  
**COMPILING THE ORIGINAL EMPr**  
**(April 2012) (Revision 0)**

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**APPENDIX A2**  
**CURRICULUM VITAE OF**  
**ENVIRONMENTAL ASSESSMENT**  
**PRACTITIONER RESPONSIBLE**  
**FOR COMPILING THE UPDATE OF**  
**THE EMP<sub>r</sub> (Revision 1)**

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**APPENDIX B**  
**CONSTRUCTION EMP GENERAL**  
**SPECIFICATIONS**  
**(COMPREHENSIVE) (AURECON,**  
**2012)**

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**APPENDIX C  
ENVIRONMENTAL  
AUTHORISATIONS (AND  
AMENDMENTS TO THE EA'S)**

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**APPENDIX D**  
**FINAL LAYOUT PLAN &**  
**ENVIRONMENTAL SENSITIVITY**  
**MAP**

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**APPENDIX E**

**SPECIALIST INPUTS FOR THE**

**UPDATE OF THE EMP<sub>r</sub> AND**

**FINALISATION OF THE LAYOUT**

**PLAN**

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**APPENDIX E1**  
**ECOLOGICAL WALKTHROUGH**  
**REPORT**

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**APPENDIX E2**  
**AVIFAUNAL WALKTHROUGH**  
**REPORT**

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**APPENDIX E3**  
**HERITAGE WALKTHROUGH**  
**REPORT**

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**APPENDIX E4**  
**PALAEONTOLOGY STATEMENT**

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**APPENDIX E5**  
**AQUATIC STATEMENT**

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# **APPENDIX E6**

# **NOISE ASSESSMENT**

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# **APPENDIX E7**

# **VISUAL ASSESSMENT**

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# **APPENDIX E8**

# **BAT ASSESSMENT**

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**APPENDIX E9**  
**AGRICULTURAL/SOILS**  
**STATEMENT**

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**APPENDIX F**  
**PLANT RESCUE & PROTECTION**  
**PLAN**

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# **APPENDIX G**

# **BAT MITIGATION ACTION PLAN**

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**APPENDIX H**  
**REVEGETATION & HABITAT**  
**REHABILITATION PLAN**

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**APPENDIX I**  
**ALIEN AND INVASIVE PLANT**  
**SPECIES MANAGEMENT PLAN**

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**APPENDIX J**  
**OPEN SPACE MANAGEMENT**  
**PLAN**

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# **APPENDIX K TRANSPORTATION PLAN**

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# **APPENDIX L**

# **EROSION MANAGEMENT PLAN**

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**APPENDIX M**  
**STORMWATER MANAGEMENT**  
**PLAN**

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**APPENDIX N**  
**TRAINING MATERIALS FOR**  
**ENVIRONMENTAL AWARENESS**  
**COURSE**

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**APPENDIX O**

**GENERIC ENVIRONMENTAL  
MANAGEMENT PROGRAMME  
(EMPr) FOR THE DEVELOPMENT  
AND EXPANSION OF  
SUBSTATION INFRASTRUCTURE  
FOR THE TRANSMISSION AND  
DISTRIBUTION OF ELECTRICITY**

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# **APPENDIX P**

# **LOCALITY PLAN**

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**APPENDIX Q**  
**INDICATIVE STORMWATER**  
**MANAGEMENT DRAWINGS,**  
**INCLUDING INDICATIVE**  
**BRIDGING STRUCTURES FOR**  
**WATERCOURSE CROSSINGS**

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