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# HOPEFIELD SMALL WIND FARM NEAR HOPEFIELD, WESTERN CAPE PROVINCE

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## CONSTRUCTION & OPERATION ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPr) - REVISION 1

DEA REFERENCE: 14/12/16/3/3/1/1099

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## PROJECT DETAILS

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## DEFINITIONS AND TERMINOLOGY

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**Alien species:** A species that is not indigenous to the area or out of its natural distribution range.

**Alternatives:** Alternatives are different means of meeting the general purpose and need of a proposed activity. Alternatives may include location or site alternatives, activity alternatives, process or technology alternatives, temporal alternatives or the 'do nothing' alternative.

**Ambient sound level:** means the background noise level already present in the environment (in the absence of noise generated by any other proposed development).

**Archaeological material:** Remains resulting from human activities which are in a state of disuse and are in or on land and which are older than 100 years, including artefacts, human and hominid remains and artificial features and structures.

**Assessment:** The process of collecting, organising, analysing, interpreting and communicating information which is relevant.

**Biological diversity:** The variables among living organisms from all sources including, terrestrial, marine and other aquatic ecosystems and the ecological complexes they belong to.

**Commencement:** The start of any physical activity, including site preparation and any other activity on site resulting in the furtherance of a listed activity or specified activity, but does not include any activity required for the purposes of an investigation or feasibility study as long as such investigation or feasibility study does not constitute a listed activity or specified activity.

**Commercial Operation date:** The date after which all testing and commissioning has been completed and is the initiation date to which the seller can start producing electricity for sale (i.e. when the project has been substantially completed).

**Commissioning:** Commissioning commences once construction is completed. Commissioning covers all activities including testing after all components of the power station are installed.

**Construction:** Construction means the building, erection or establishment of a facility, structure or infrastructure that is necessary for the undertaking of a listed or specified activity. Construction begins with any activity which requires Environmental Authorisation.

**Cumulative impacts:** Impacts that result from the incremental impact of a proposed activity on a common resource when added to the impacts of other past, present or reasonably foreseeable future activities (e.g. discharges of nutrients and heated water to a river that combine to cause algal bloom and subsequent loss of dissolved oxygen that is greater than the additive impacts of each pollutant). Cumulative impacts can occur from the collective impacts of individual minor actions over a period of time and can include both direct and indirect impacts.

**Cut-in speed:** The minimum wind speed at which the wind turbine will generate usable power.

**Cut-out speed:** The wind speed at which shut down occurs.

**Decommissioning:** To take out of active service permanently or dismantle partly or wholly, or closure of a facility to the extent that it cannot be readily re-commissioned. This usually occurs at the end of the life of a facility.

**Department/ the competent authority:** Refers to the Department of Environmental Affairs or any other relevant authority responsible for administering environmental laws.

**Direct impacts:** Impacts that are caused directly by the activity and generally occur at the same time and at the place of the activity (e.g. noise generated by blasting operations on the site of the activity). These impacts are usually associated with the construction, operation or maintenance of an activity and are generally obvious and quantifiable.

**Disturbing noise:** A noise level that exceeds the ambient sound level measured continuously at the same measuring point by 7 dB or more. A disturbing noise would be a noise that increase the rating level with more than 7 dBA. Therefore, for this area the rating level is 35 dBA, and if the operation of the wind energy facility results in a noise level higher than 42 dBA, and that change can be attributed to the wind farm that would be a disturbing noise.

**'Do nothing' alternative:** The 'do nothing' alternative is the option of not undertaking the proposed activity or any of its alternatives. The 'do nothing' alternative also provides the baseline against which the impacts of other alternatives should be compared.

**Ecosystem:** A dynamic system of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit.

**Endangered species:** Taxa in danger of extinction and whose survival is unlikely if the causal factors continue operating. Included here are taxa whose numbers of individuals

have been reduced to a critical level or whose habitats have been so drastically reduced that they are deemed to be in immediate danger of extinction.

**Endemic:** An "endemic" is a species that grows in a particular area (is endemic to that region) and has a restricted distribution. It is only found in a particular place. Whether something is endemic or not depends on the geographical boundaries of the area in question and the area can be defined at different scales.

**Environment:** the surroundings within which humans exist and that are made up of:

- i. the land, water and atmosphere of the earth;
- ii. micro-organisms, plant and animal life;
- iii. any part or combination of (i) and (ii) and the interrelationships among and between them; and
- iv. the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well-being.

**Environmental assessment practitioner:** An individual responsible for the planning, management and coordinating of environmental management plan or any other appropriate environmental instruments introduced by legislation.

**Environmental Impact:** An action or series of actions that have an effect on the environment.

**Environmental impact assessment:** Environmental Impact Assessment (EIA), as defined in the NEMA EIA Regulations and in relation to an application to which scoping must be applied, means the process of collecting, organising, analysing, interpreting and communicating information that is relevant to the consideration of that application.

**Environmental management:** Ensuring that environmental concerns are included in all stages of development, so that development is sustainable and does not exceed the carrying capacity of the environment.

**Environmental management inspector:** A person designated as an environmental management inspector in terms of Section 31B or 31C on the National Environmental Management Act 107 of 1998.

**Environmental Management Programme:** A plan that organises and co-ordinates mitigation, rehabilitation and monitoring measures for all life cycle phase of a project in order to guide the implementation of a proposal and its ongoing maintenance after implementation.

**Generator:** The generator is what converts the turning motion of a wind turbine's blades into electricity.

**Habitat:** The place in which a species or ecological community occurs naturally.

**Hazardous waste:** Any waste that contains organic or inorganic elements or compounds that may, owing to the inherent physical, chemical or toxicological characteristics of that waste, have a detrimental impact on health and the environment (Van der Linde and Feris, 2010; pg 185).

**Heritage:** That which is inherited and forms part of the National Estate (Historical places, objects, fossils as defined by the National Heritage Resources Act of 2000.

**Indigenous:** All biological organisms that occurred naturally within the study area prior to 1800.

**Indirect impacts:** Indirect or induced changes that may occur as a result of the activity (e.g. the reduction of water in a stream that supply water to a reservoir that supply water to the activity). These types of impacts include all the potential impacts that do not manifest immediately when the activity is undertaken or which occur at a different place as a result of the activity.

**Interested and Affected Party:** Individuals or groups concerned with or affected by an activity and its consequences. These include the authorities, local communities, investors, work force, consumers, environmental interest groups and the general public.

**Method statement:** A method statement is a written submission to the ECO and the Proponent's Representative by the Contractor(s) in collaboration with his/her EO.

**Nacelle:** The nacelle contains the generator, control equipment, gearbox and anemometer for monitoring the wind speed and direction.

**Pollution:** A change in the environment caused by substances (radio-active or other waves, noise, odours, dust or heat emitted from any activity, including the storage or treatment or waste or substances.

**Pre-construction:** The period prior to the commencement of construction, which may include activities (e.g. geotechnical surveys) which do not require Environmental Authorisation.

**Rare species:** Taxa with small world populations that are not at present Endangered or Vulnerable, but are at risk as some unexpected threat could easily cause a critical decline. These taxa are usually localised within restricted geographical areas or habitats or are thinly scattered over a more extensive range. This category was termed Critically Rare by Hall and Veldhuis (1985) to distinguish it from the more generally used word "rare".

**Red data species:** Species listed in terms of the International Union for Conservation of Nature and Natural Resources (IUCN) Red List of Threatened Species, and/or in terms of the South African Red Data list. In terms of the South African Red Data list, species are classified as being extinct, endangered, vulnerable, rare, indeterminate, insufficiently known or not threatened (see other definitions within this glossary).

**Rotor:** The portion of the wind turbine that collects energy from the wind is called the rotor. The rotor converts the energy in the wind into rotational energy to turn the generator. The rotor has three blades that rotate at a constant speed of about 15 to 28 revolutions per minute (rpm).

**Significant impact:** An impact that by its magnitude, duration, intensity or probability of occurrence may have a notable effect on one or more aspects of the environment.

**Tower:** The tower, which supports the rotor, is constructed from tubular steel and/or concrete. It is approximately 120 m tall. The nacelle and the rotor are attached to the top of the tower. The tower on which a wind turbine is mounted is not just a support structure. It also raises the wind turbine so that its blades safely clear the ground and so it can reach the stronger winds at higher elevations. Larger wind turbines are usually mounted on towers ranging from 80 to 120 m tall. The tower must be strong enough to support the wind turbine and to sustain vibration, wind loading and the overall weather elements for the lifetime of the wind turbine.

**Waste:** Any substance, whether or not that substance can be reduced re-used, recycled and recovered; that is surplus, unwanted, rejected, discarded, abandoned or disposed of which the generator has no further use for the purposes of production. Any product which must be treated and disposed of, that is identified as waste by the minister of Environmental affairs (by notice in the Gazette) and includes waste generated by the mining, medical or other sectors, but: A by-product is not considered waste, and portion of waste, once re-used, recycled and recovered, ceases to be waste (Van der Linde and Feris, 2010; pg 186).

**Wind power:** A measure of the energy available in the wind.

**Wind rose:** The term given to the diagrammatic representation of joint wind speed and direction distribution at a particular location. The length of time that the wind comes from a particular sector is shown by the length of the spoke, and the speed is shown by the thickness of the spoke.

**Wind speed:** The rate at which air flows past a point above the earth's surface.

## ABBREVIATIONS AND ACRONYMS

<u>DEA</u>	<u>National Department of Environmental Affairs</u>
<u>DWS</u>	<u>Department of Water and Sanitation</u>
<u>ECO</u>	<u>Environmental Control Officer</u>
<u>EIA</u>	<u>Environmental Impact Assessment</u>
<u>EMPr</u>	<u>Environmental Management Programme</u>
<u>EO</u>	<u>Environmental Officer (employed by the Contractor)</u>
<u>GG</u>	<u>Government Gazette</u>
<u>GN</u>	<u>Government Notice</u>
<u>Ha</u>	<u>Hectare</u>
<u>I&amp;AP</u>	<u>Interested and Affected Party</u>
<u>km<sup>2</sup></u>	<u>Square kilometres</u>
<u>kV</u>	<u>Kilovolt</u>
<u>m<sup>2</sup></u>	<u>Square meters</u>
<u>m/s</u>	<u>Meters per second</u>
<u>MW</u>	<u>Mega Watt</u>
<u>NEMA</u>	<u>National Environmental Management Act (Act No 107 of 1998)</u>
<u>NHRA</u>	<u>National Heritage Resources Act (Act No 25 of 1999)</u>
<u>NIRP</u>	<u>National Integrated Resource Planning</u>
<u>NWA</u>	<u>National Water Act (Act No 36 of 1998)</u>
<u>PM</u>	<u>Project Manager</u>
<u>SHE</u>	<u>Safety, Health and Environment</u>
<u>SAHRA</u>	<u>South African Heritage Resources Agency</u>
<u>SANRAL</u>	<u>South African National Roads Agency Limited</u>



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## INTRODUCTION

## CHAPTER 1

This Construction and Operational Environmental Management Plan (CEMP and OEMP) has been compiled for the 5MW Hopefield Small Wind Farm Project to be constructed and operated by Hopefield Small Wind Farm (Pty) Ltd. The project involves the construction and operation of a wind energy facility as well as its associated infrastructure. This project received Environmental Authorisation on 11 June 2014 (refer to **Appendix A**). Following a competitive bidding process under the Department of Energy's (DoE's) Renewable Energy Independent Power Producer Procurement Programme (REIPPP) for small projects, 5MW Hopefield Small Wind Farm was awarded Preferred Bidder status in bid window one (round one for small projects). Construction is due to commence after financial close is achieved, which is targeted to take place in Q4 of 2016.

This Environmental Management Programme (EMPr) is an update of the draft EMPr submitted with the Basic Assessment (BA) for the project and responds to condition 14 (refer to Table 1.1 below) of the Environmental Authorisation of 11 June 2016 (DEA Ref No.:14/12/16/3/3/1/1099) as well as recommendations of the specialist walk-through surveys. Changes made have been underlined for ease of reference.

The EMPr has been developed on the basis of the findings of the BA and subsequent walkthrough assessments conducted of the Optimised Layout as per conditions 35 and 107 of the EA (DEA ref No.: 14/12/16/3/3/1/1099), and must be implemented to protect sensitive on-site and off-site features through controlling construction, operation and decommissioning activities that could have a detrimental effect on the environment, and through avoiding or minimising potential impacts. This EMPr is applicable to all by Hopefield Small Wind Farm (Pty) Ltd employees and contractors (including subcontractors) working on the pre-construction, construction, and operation and maintenance phases, as well as decommissioning (if and when applicable), of the Hopefield Small Wind Farm. The document will be adhered to, updated as relevant throughout the project life cycle as it is seen as a living document that could respond to real-time changes. This document fulfils the requirement of the Department and is an update of the draft EMPr submitted with the BAR.

**Table 1.1: Conditions of the Environmental Authorisation**

<b>EA (DEA Ref No.: 14/12/16/3/3/1/1099) conditions relevant to this EMPr:</b>	<b>Section in EMPr/ comment:</b>
Condition 12 – A copy of the final layout map must be submitted to the Department for written approval prior to commencement of the activity. All available biodiversity information must be used in the finalisation of the layout	Refer to Figure 3.2 and Appendix B. The layout has been included with the EMPr.

map. Existing infrastructure must be used as far as possible e.g. roads. The layout must indicate the following:	
12.1 – Position of wind turbines and associated infrastructure.	Refer to Figure 3.2 and Appendix B.
12.2 – Labelled / numbered turbine positions.	Refer to Figure 3.2 and Appendix B.
12.3 – Foundation footprint.	Refer to Figure 3.2 and Appendix B. The foundation footprint will be approximately 25m in diameter.
12.4 – Internal roads indicating width.	Refer to Figure 3.2 and Appendix B. The width of the roads will be approximately 3-6m.
12.5 – Wetlands, drainage lines, rivers, stream and water crossing of roads and cables.	Refer to Figure 3.3 and Appendix B. Not applicable
12.6 – All sensitive features e.g. heritage sites, wetlands, pans and drainage channels that will be affected by the facility and associated infrastructure.	Refer to Figure 3.3 and Appendix B. Not applicable
12.7 – Substation(s) inverters and/or transformer(s) sites including their entire footprint.	Refer to Figure 3.2 and Appendix B.
12.8 – Connection routes (including pylon positions) to the distribution/transmission network.	Refer to Figure 3.2 and Appendix B.
12.9 – All existing infrastructure on the site, especially roads.	Refer to Figure 3.2 and Appendix B.
12.10 – Buildings, including accommodation.	Refer to Figure 3.2 and Appendix B.
12.11 – All no-go and buffer areas.	Refer to Figure 3.3 and Appendix B.
12.12 – A map combining the final layout plan superimposed (overlain) on the environmental sensitivity map. The map must reflect the proposed location of turbines as stated in the BAR dated February 2014.	Refer to Figure 3.4 and Appendix B.
Condition 14 – The Environmental Management Plan (EMPr) submitted as part of the BAR must be amended to include measures as dictated by the final site lay-out map and micro-siting; and the provisions of the Environmental Authorisation. The EMPr must be submitted to the Department for written approval prior to commencement of the activity. Once approved the EMPr must be implemented and adhered to.	This EMPr document is in response to condition 14. The final layout is included as <b>Appendix B</b> . The EMPr was submitted for comment to all registered I&APs for 30-days from 2 September 2016 until 3 October 2016.
Condition 19 – The EMPr amendment must	

include the following:	
19.1. All recommendations and mitigation measures recorded in the BAR.	All recommendations and mitigation measures recorded in the BAR have been incorporated into this EMPr.
19.2 All mitigation measures in the specialist reports must be included in the EMPr and implemented.  All mitigation measures arising from the compliance with condition 49.	All mitigation measures as listed in the specialist reports have been included in this EMPr and will be implemented.  It is important to note that the final optimised layout took these buffers into account as far as practically possible as is reflected in the final layout and sensitivity map (refer to <b>Appendix B</b> ).
19.3 The requirements and conditions of the EA.	As per this table, all the conditions in the EA relevant to this EMPr has been adhered to and included in the EMPr.
19.4 The final site layout map.	Refer to <b>Appendix B</b> .
19.5. An alien invasive management plan.	Refer to <b>Appendix C</b> .
19.6. A plant rescue and protection plan.	Refer to <b>Appendix D</b> .
19.7. A re-vegetation and habitat rehabilitation plan.	Refer to <b>Appendix E</b> .
19.8. A traffic management plan for the site access roads.	Refer to <b>Appendix F</b> .
19.9. A storm water management plan.	Refer to <b>Appendix G</b> .
19.10. An erosion management plan.	Refer to <b>Appendix H</b> .
19.11. An effective monitoring system to detect any leakage or spillage of all hazardous substances during their transportation, handling, use and storage.	Refer to OBJECTIVE 18 under Chapter 6 and OBJECTIVE 7 under Chapter 8.
19.12. Measures to protect hydrological features.	Refer to <b>Appendix G</b> (Storm Water Management Plan) and OBJECTIVE 11 under Chapter 6.
19.13. An avifauna and bat monitoring report.	Refer to <b>Appendix K</b> and <b>Appendix L</b> .
19.14. An environmental sensitivity map	Refer to Figure 3.3 and <b>Appendix B</b> .
19.15. A map combining the final layout and the	Refer to Figure 3.2, 3.3 and

environmental sensitivity map.

**Appendix B.**

All EA conditions, related to the EMPr, under the section 'specific conditions' have been addressed in the report and are found in their respective sections or in the relevant appendices.



## PURPOSE & OBJECTIVES OF THE EMPR

## CHAPTER 2

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An Environmental Management Programme (EMPr) is defined as “an environmental management tool used to ensure that undue or reasonably avoidable adverse impacts associated with the planning, construction, operation and decommissioning of a project are avoided or mitigated, and that the positive benefits of the projects are enhanced”<sup>1</sup>. The objective of this Environmental Management Programme is to provide consistent information and guidance for implementing the management and monitoring measures established in the permitting process and help achieve environmental policy goals. The purpose of an EMPr is to ensure continuous improvement of environmental performance, reducing negative impacts and enhancing positive effects during the construction and operation of the facility. An effective EMPr is concerned with both the immediate outcome as well as the long-term impacts of the project.

The EMPr provides specific environmental guidance for the construction, operational and decommissioning phases of a project, and is intended to manage and mitigate construction and operational activities so that unnecessary or preventable environmental impacts do not result. These impacts range from those incurred during start up (i.e. site clearing and site establishment) through those incurred during the construction activities themselves (i.e. erosion, noise, dust and visual impacts) to those incurred during site rehabilitation (i.e. soil stabilisation, re-vegetation) during operation and during decommissioning (i.e. similar to construction phase activities). The EMPr also defines monitoring requirements in order to ensure that the specified objectives are met.

This Construction and Operational Environmental Management Programme (CEMPR and OEMPR) has been compiled for the authorised 5MW Hopefield Small Wind Farm. This EMPr is applicable to all employees and contractors (including subcontractors) working on the pre-construction, construction, and operation and maintenance phases of the project and where/if applicable the decommissioning phase. The document will be adhered to and updated as relevant throughout the project life cycle.

This EMPr has been compiled in accordance with Section 33 of the EIA Regulations and will be further developed in terms of specific requirements listed in any authorisations issued for the proposed project. The EMPr has been developed as a set of environmental specifications (i.e. principles of environmental management for the proposed wind energy facility), which are appropriately contextualised to provide clear guidance in terms of the on-site implementation of these specifications (i.e. on-site contextualisation is provided through the inclusion of various monitoring and

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<sup>1</sup> Provincial Government Western Cape, Department of Environmental Affairs and Development Planning: *Guideline for Environmental Management Plans*, 2005.

implementation tools for use of the EMPr by the project implementer as well as compliance monitors).

The EMPr has the following objectives:

- » To outline mitigation measures and environmental specifications which are required to be implemented for the planning, construction, rehabilitation, operation and decommissioning phases of the project in order to manage and minimise the extent of potential environmental impacts, and to manage environmental impacts associated with the facility.
- » Ensure that the construction, operational and decommissioning phases do not result in undue or reasonably avoidable adverse environmental impacts, and ensure that any potential environmental benefits are enhanced.
- » Identify entities who will be responsible for the implementation of the measures and outline functions and responsibilities.
- » Propose mechanisms for monitoring compliance, and preventing long-term or permanent environmental degradation.
- » Facilitate appropriate and proactive responses to unforeseen events or changes in project implementation that was not considered in the BA process.

The management and mitigation measures identified within the Basic Assessment (BA) process as well as from the walk-through surveys are systematically addressed in the EMPr, ensuring the minimisation of adverse environmental impacts to an acceptable level.

Hopefield Small Wind Farm (Pty) Ltd must ensure that the implementation of the project complies with the requirements of any and all environmental authorisations, permits, and obligations emanating from relevant environmental legislation. This obligation is partly met through the development and the implementation of this EMPr through its integration into the contract documentation for activities associated with both construction and operation, and if and when applicable, the decommissioning of the facility (this is however unlikely and would be guided by the legislation and requirements at the time). Since this EMPr is part of the BA process undertaken for the authorised Hopefield Small Wind Farm, it is important that this guideline document be read in conjunction with the Final Basic Assessment Reports (February 2014). This will contextualise the EMPr and enable a thorough understanding of its role and purpose in the integrated environmental management process. Should there be a conflict of interpretation between this EMPr and the environmental authorisation, the stipulations in the environmental authorisation shall prevail over that of the EMPr, unless otherwise agreed by the authorities in writing. Similarly, any provisions in legislation overrule any provisions or interpretations within this EMPr. This EMPr for pre-construction, construction, operational and decommissioning activities has been compiled in accordance with Appendix 4 of the EIA Regulations (2014) and in terms of specific requirements listed in any authorisations issued for the proposed project.

Since this EMPr is part of the BA process undertaken for the authorised Hopefield Small Wind Farm, it is important that this document be read in conjunction with the BA Report as well as the Environmental Authorisation that has been issued (refer to **Appendix A**). This further includes the specialist's walk-through surveys undertaken for the final optimised layout on which this EMPr is based. This will contextualise the EMPr and enable a thorough understanding of its role and purpose in the integrated environmental management process.

The EMPr is a dynamic document, which must be updated when required. It is considered critical that this final EMPr be updated to include site-specific information and specifications as required throughout the life-cycle of the facility. This will ensure that the project activities are planned and implemented taking sensitive environmental features into account.

This EMPr shall be binding on all the parties involved in the construction and operational phases of the project, and shall be enforceable at all levels of contract and operational management within the project. The document must be adhered to, updated as relevant throughout the project life cycle.

## PROJECT DETAILS

## CHAPTER 3

**Hopefield Small Wind Farm (Pty) Ltd** obtained environmental authorisation to establish a 5MW wind farm for the purpose of electricity generation. The proposed facility is to be located on Portion 1 of the Farm Leliefontein 317 and remaining extent of portion 25 of the Farm Koperfontein 346, located in the Saldanha Bay Local Municipality within the West Coast District Municipality near the town of Hopefield, Western Cape Province. The optimised final layout of the wind turbines and associated infrastructure is shown in **Figure 3.2** (refer to **Appendix B**).

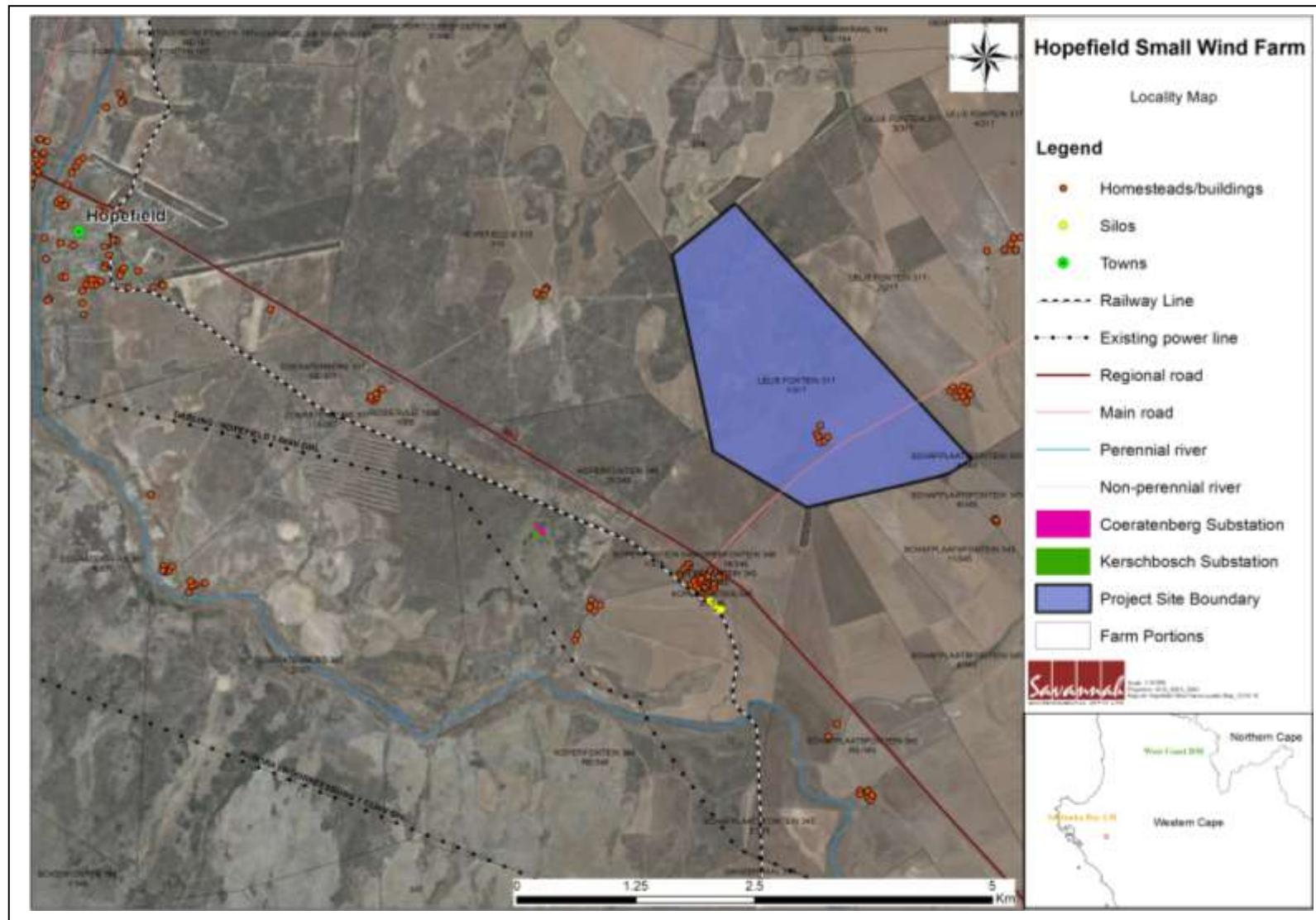
The project is adjacent to the existing 67MW Hopefield Wind Farm, and will be referred to as the **Hopefield Small Wind Farm**.

The Hopefield Small Wind Farm will comprise of the following infrastructure (refer to **Figure 3.2 and Appendix B**):

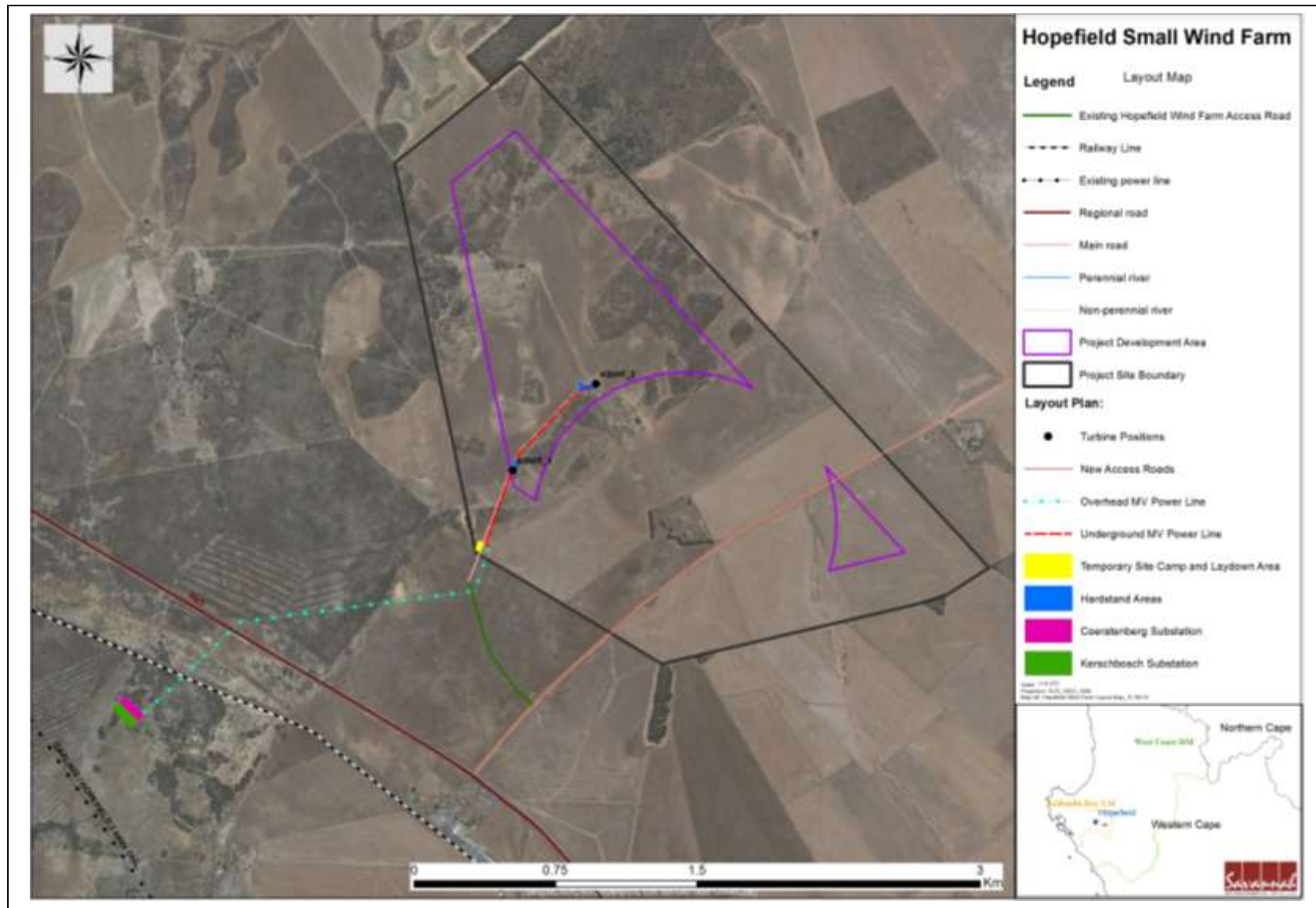
- » Wind turbine units, each with a generating capacity of between to 1.5 – 3 MW, and limited in combination to a maximum output of 5.0MW.
- » Wind turbines with hub height of up to 120m and a rotor diameter of up to 125m.
- » Steel tubular (and/or concrete towers) may be used comprising multiple sections.
- » Concrete foundations to support the turbines.
- » Cabling between the turbines, to be laid underground where practical.
- » An on-site substation with a new circa 10MVA step-up transformer to increase the voltage level from medium voltage (typically equal or less than 33kV) to high voltage (132kV at the Kerschbosch substation).
- » A medium voltage overhead power line to connect the facility to the electricity grid at the Kerschbosch substation, situated within the existing adjacent Hopefield Wind Farm.
- » Internal access roads to each turbine.
- » The development footprint of the facility will be approximately 9ha.

### 3.1 Final Layout

As per condition 12 of the Environmental Authorisation, a final layout has been prepared by Hopefield Small Wind Farm (Pty) Ltd (refer to **Table 1.1, Figure 3.2 and Appendix B**).



**Figure 3.1:** Locality map showing the broader study site identified for the Hopefield Small Wind Farm.



**Figure 3.2:** Layout for the Hopefield Small Wind Farm. Refer to **Appendix B** for A3 Maps.

### 3.2 Activities and Components associated with the Wind Energy Facility

The main anticipated activities/components associated with the Hopefield Small Wind Farm comprise the following:

**Table 3.1:** Activities anticipated Associated with Planning, Construction, Operation and Decommissioning of the Facility

Main Activity/Project Component	Components of Activity	Details
<b>Planning</b>		
Conduct surveys	<ul style="list-style-type: none"> <li>» Geotechnical survey by geotechnical engineer</li> <li>» Site survey and confirmation of the turbine micro-siting footprints</li> <li>» Survey of substation site</li> <li>» Survey of power line servitude to determine tower locations</li> <li>» <u>Survey of selected MV underground and overhead power line routes between the turbines</u></li> <li>» <u>Survey of internal access routes and watercourse crossings</u></li> <li>» <u>Environmental walk-through surveys</u></li> </ul>	<ul style="list-style-type: none"> <li>» Surveys to be undertaken prior to initiating construction.</li> </ul>
<b>Construction</b>		
Establishment of access roads to and within the site	<ul style="list-style-type: none"> <li>» Upgrade access/haul roads to the site Establish internal access roads: 8 m wide permanent roadway within the site between the turbines for use during construction and operation phase.</li> <li>» <u>Temporary track/ corridor (adjacent to and utilising part of the permanent road) of ~20 to a maximum of 30m</u></li> </ul>	<ul style="list-style-type: none"> <li>» Access roads will be constructed in advance of any large scale components being delivered to site, and will remain in place after completion for future access and possibly access for replacement of parts if necessary, <u>i.e. maintenance activities</u>.</li> <li>» Existing access roads to the site will be utilised, and upgraded where required. Special haul roads may need to be constructed to and within the site to accommodate abnormally loaded vehicle access and circulation.</li> <li>» The internal service road alignment is informed by the final micro-</li> </ul>

Main Activity/Project Component	Components of Activity	Details
	<p><u>(in consultation with the ECO/EO) in width for use by the crawler crane during construction phase only</u></p>	<p>siting/positioning of the wind turbines, as well as final specialist surveys, <u>or where applicable by the ECO/EO. The latter is applicable when the internal access roads alignment needs to deviate from its current routing due to unforeseen topographical issues, e.g. steep inclines.</u></p> <p>» <u>To accommodate the large crawler crane(s) and other abnormal plant/vehicles required for turbine assembly, a temporary track/corridor of approximately 20 to a maximum of 30m (in consultation with the ECO/EO) in width is required to be established on the site to accommodate the passage of the fully rigged crawler crane.</u></p>
<p>Undertake site preparation</p>	<p>» Site establishment of offices/workshop with ablutions and stores, contractors yards</p> <p>» Laydown areas for steel reinforcement cages and formwork</p> <p>» Establishment of internal access roads (permanent and temporary roads)</p> <p>» Clearance of vegetation at the footprint of each turbine</p> <p>» Excavations for foundations</p>	<p>» <u>These activities will require the stripping of topsoil, which will need to be stockpiled, backfilled, where necessary, and/or spread on site and where necessary used latter for rehabilitation.</u></p>
<p>Establishment of lay down areas on site</p>	<p>» Permanent hard standing/lay down areas (footprint 30m x 50m) at each turbine position for the storage and assembly of wind turbine components and accommodation of construction and crane lifting equipment.</p> <p>» <u>Construction site office</u></p> <p>» Temporary laydown areas for equipment storage and crane assembly (maximum 20m x 150 m</p>	<p>» The <u>permanent</u> lay down area will need to accommodate the cranes required in tower/turbine assembly <u>during construction and for maintenance if and when required.</u></p> <p>» <u>Temporary</u> lay down and storage areas will be required to be established for the normal civil engineering construction equipment which will be required on site.</p> <p>» A <u>large permanent</u> lay down area will be required at each position where the main lifting crane may be required to be erected and/or disassembled and where wind turbine components are assembled. Such areas to make use of already compacted areas as far as</p>



Main Activity/Project Component	Components of Activity	Details
	wide).	possible, such as roadways or other lay down areas. <u>This area would be required to be levelled, compacted, with foundations in part, to accommodate the assembly crane and tower segments, which would need to access the main crane from all sides.</u>
Construct wind turbine foundations	<ul style="list-style-type: none"> <li>» <u>Turbine foundations will have a circular base of approximately 25m diameter.</u> Foundation holes will be excavated to a depth of approximately 4m-6m, depending on the underlying <u>geotechnical conditions on site</u></li> <li>» Concrete will be brought to site as ready-mix. Up to 95 concrete trucks will be required per turbine foundation</li> </ul>	<ul style="list-style-type: none"> <li>» Foundation holes will be mechanically excavated and might use <u>explosives where necessary, e.g. where the subsurface conditions don't allow for mechanical excavation (permits would be required for the latter – to be obtained by the Contractor(s)).</u></li> <li>» Shoring and safety barriers will be erected around open excavations where necessary.</li> </ul>
Establishment of onsite batching plants	<ul style="list-style-type: none"> <li>» A batching plant will be required for construction covering approximately 100m x 100m.</li> </ul>	<ul style="list-style-type: none"> <li>» Batching plant equipment will need to be installed.</li> <li>» A small office may be necessary.</li> <li>» A lay down area will need to accommodate aggregate material for batching.</li> </ul>
Transport of components and equipment to site	<ul style="list-style-type: none"> <li>» Trucks will be used to transport all components to site:</li> <li>* Components of various specialised construction equipment, lifting equipment and counter weights etc. are required on site (e.g. mobile assembly crane and main lift crawler crane) to erect the wind turbines.</li> <li>* Components required for the establishment of the substation (including transformers) and those required for the establishment of the power line (including towers and</li> </ul>	<ul style="list-style-type: none"> <li>» Turbine units consist of a tower comprised of a number of segments, a nacelle, rotor and three blades.</li> <li>» The wind turbine, including tower, will be brought to site by the supplier in sections/segments. The individual components are defined as abnormal loads in terms of the Road Traffic Act (Act No 29 of 1989) by virtue of the dimensional limitations (abnormal length of the blades) and load limitations (i.e. the nacelle). The dimensional requirements of the load during the construction phase (length/height) may require alterations to the existing road infrastructure (widening on corners, removal of traffic islands), accommodation of street furniture (electricity, street lighting, traffic signals, telephone lines etc.) and protection of road-related structures (bridges, culverts, portal culverts, retaining walls etc.)</li> </ul>

Main Activity/Project Component	Components of Activity	Details
	<p>cabling).</p> <ul style="list-style-type: none"> <li>* <u>The normal civil engineering construction equipment for the civil works (e.g. excavators, trucks, graders, compaction equipment, cement/concrete mixers, etc.).</u></li> <li>* <u>Components required for the establishment of the MV overhead power line (including towers and cabling).</u></li> <li>* <u>Ready-mix concrete trucks for, <i>inter alia</i>, turbine and building foundations.</u></li> </ul>	<p>as a result of abnormal loading. The equipment will be transported to the site using appropriate National and Provincial routes, and the dedicated access/haul road to the site itself.</p> <ul style="list-style-type: none"> <li>» It is estimated that approximately 12 trucks will be used for the transport of each turbine and tower.</li> </ul>
<u>Construct ancillary infrastructure.</u>	<ul style="list-style-type: none"> <li>» <u>Security fencing around high-voltage (HV) Yard</u></li> <li>» <u>Workshop</u></li> <li>» <u>Temporary site offices</u></li> <li>» <u>Operation and Maintenance building(s)</u></li> </ul>	<ul style="list-style-type: none"> <li>» <u>Will require the clearing of vegetation and levelling of the development site and the excavation of foundations prior to construction.</u></li> <li>» <u>A lay down area for building materials and equipment associated with these buildings will also be required.</u></li> </ul>
Erect turbines	<ul style="list-style-type: none"> <li>» Large lifting crane used for lifting of large, heavy components</li> <li>» A small crane for the assembly of the large crane and wind turbine components (tower, nacelle and rotor).</li> </ul>	<ul style="list-style-type: none"> <li>» The large lifting crane will lift the tower sections into place, assisted by the smaller crane.</li> <li>» The nacelle, which contains the gearbox, generator and yawing mechanism, will then be placed onto the top of the assembled tower.</li> <li>» The rotor (i.e. the blades of the turbine) will then be assembled or partially assembled on the ground <u>by the smaller crane</u>. It will then be lifted to the nacelle <u>by the large crane</u>, and bolted in place. <u>Alternatively the blades may be lifted into position on the nacelle individually by the main crane.</u></li> <li>» It will take approximately 4 days to erect each turbine, although this will depend on the climatic conditions as a relatively wind-free day will be required for the installation of the rotor.</li> </ul>

Main Activity/Project Component	Components of Activity	Details
		<ul style="list-style-type: none"> <li>» Turbines will be sited approximately 600 m apart from each other in order to minimise wake effects and wind turbulence.</li> </ul>
Construct substation	<ul style="list-style-type: none"> <li>» Substation components</li> <li>» Security fencing around high-voltage (HV) yard</li> </ul>	<ul style="list-style-type: none"> <li>» The substation will be constructed with a high-voltage (HV) yard footprint of up to 100 m x 80 m. It will include ancillary infrastructure (including an office, workshop etc.).</li> </ul>
<u>Medium voltage cabling between the turbines to the on-site substation</u>	<ul style="list-style-type: none"> <li>» Wind turbines</li> <li>» <u>Medium Voltage (MV) underground and overhead power lines</u> connecting each turbine to the substation</li> </ul>	<ul style="list-style-type: none"> <li>» The installation of underground cables will require the excavation of trenches, approximately 1m – 2m in depth within which these cables can then be laid.</li> <li>» The underground cables would follow the internal access roads as far as reasonably possible.</li> <li>» <u>The MV overhead power line will be constructed by placing pylons in more disturbed areas and avoiding any sensitive areas identified in the walkthrough surveys.</u></li> <li>» <u>Where underground cabling is not practical or environmentally sensible (e.g. in rocky area where blasting would be required), cabling would be above ground, suspended between ~8-10m high pylons at ~60-90m centres.</u></li> <li>» <u>Where required, a servitude of up to 31 m will be required for the MV power line.</u></li> </ul>
Connect substation to power grid	<ul style="list-style-type: none"> <li>» Connect substation to the existing electricity distribution network/grid via the Kerschbosch Substation</li> </ul>	<ul style="list-style-type: none"> <li>» Power line (up to 132 kV) connecting the substation to the existing electricity distribution network/grid via the Kerschbosch Substation (constructed on the Hopefield Wind Energy Facility site).</li> <li>» A route for the power line will be surveyed and pegged prior to construction.</li> </ul>
Commissioning of the facility	<ul style="list-style-type: none"> <li>» Wind energy facility commissioning</li> </ul>	<ul style="list-style-type: none"> <li>» Prior to the start-up of a wind turbine, a series of checks and tests will be carried out, including both static and dynamic tests to make sure the turbine is working within appropriate limits.</li> <li>» Grid interconnection and unit synchronisation will be undertaken to confirm the turbine and unit performance. Physical adjustments may be needed such as changing the pitch of the blades.</li> </ul>

Main Activity/Project Component	Components of Activity	Details
Undertake site rehabilitation	<ul style="list-style-type: none"> <li>» Remove all construction equipment from the site</li> <li>» Rehabilitation of temporarily disturbed areas where practical and reasonable</li> </ul>	<ul style="list-style-type: none"> <li>» <u>On full commissioning of the facility, any access points, access roads and laydown areas within the site which are not required during the operation phase will be closed and prepared for rehabilitation.</u></li> <li>» On full commissioning of the facility, any access points to the site which are not required during the operation phase will be closed and prepared for rehabilitation. Due to the mobility of the sandy soils, and as rehabilitation and recovery of vegetation on the site will be slow, rehabilitation activities will (as far as possible) be carried out at each turbine location once construction of that particular turbine is completed.</li> </ul>
<b>Operation</b>		
Operation	<ul style="list-style-type: none"> <li>» Operation of turbines within the wind energy facility</li> </ul>	<ul style="list-style-type: none"> <li>» Once operational, the wind energy facility will be monitored remotely. It is estimated that the operational phase of the project will provide employment for approximately 5 skilled staff members, who will be responsible for monitoring and maintenance, when required. <u>It is anticipated that there will be full time security, maintenance and control room staff required on site, although located at the adjacent Hopefield Wind Farm.</u></li> <li>» Each turbine in the facility will be operational, except under circumstances of mechanical breakdown, extreme weather conditions or maintenance activities.</li> </ul>
Maintenance	<ul style="list-style-type: none"> <li>» Oil and grease – turbines</li> <li>» Transformer oil - substation</li> <li>» Waste product disposal</li> </ul>	<ul style="list-style-type: none"> <li>» The wind turbines will be subject to periodic maintenance and inspection. Periodic oil changes will be required and any waste products (e.g. oil) will be disposed of in accordance with relevant waste management legislation.</li> <li>» The turbine infrastructure is expected to have a lifespan of approximately 20 - 30 years, with maintenance.</li> </ul>
<b>Decommissioning</b>		

Main Activity/Project Component	Components of Activity	Details
Site preparation	<ul style="list-style-type: none"> <li>» Confirming the integrity of the access to the site to accommodate required equipment and lifting cranes.</li> <li>» Preparation of the site (e.g. lay down areas, construction platform)</li> <li>» Mobilisation of construction equipment</li> </ul>	<ul style="list-style-type: none"> <li>» Equipment associated with this facility would only be decommissioned once it has reached the end of its economic life. It is most likely that decommissioning activities of the infrastructure of the facility would comprise the disassembly (and possible replacement of the turbines with more appropriate technology/infrastructure available at that time).</li> </ul>
Disassemble and replace existing turbines	<ul style="list-style-type: none"> <li>» A large crane will be used to disassemble the turbine and tower sections.</li> </ul>	<ul style="list-style-type: none"> <li>» Turbine components would be reused, recycled or disposed of in accordance with regulatory requirements.</li> <li>» The hours of operation for noisy construction activities are guided by the Environment Conservation Act (noise control regulations). If the project requires construction work outside of the designated hours, regulatory authorities and affected stakeholders will be consulted and subsequent negotiations will be made to ensure the suitability of the revised activities (if applicable).</li> </ul>

### 3.3 Findings of the Environmental Impact Assessment

In terms of the findings of the BA Report, various potential planning, construction and operation-related potential environmental impacts were identified all within acceptable limits, as having to be managed, including:

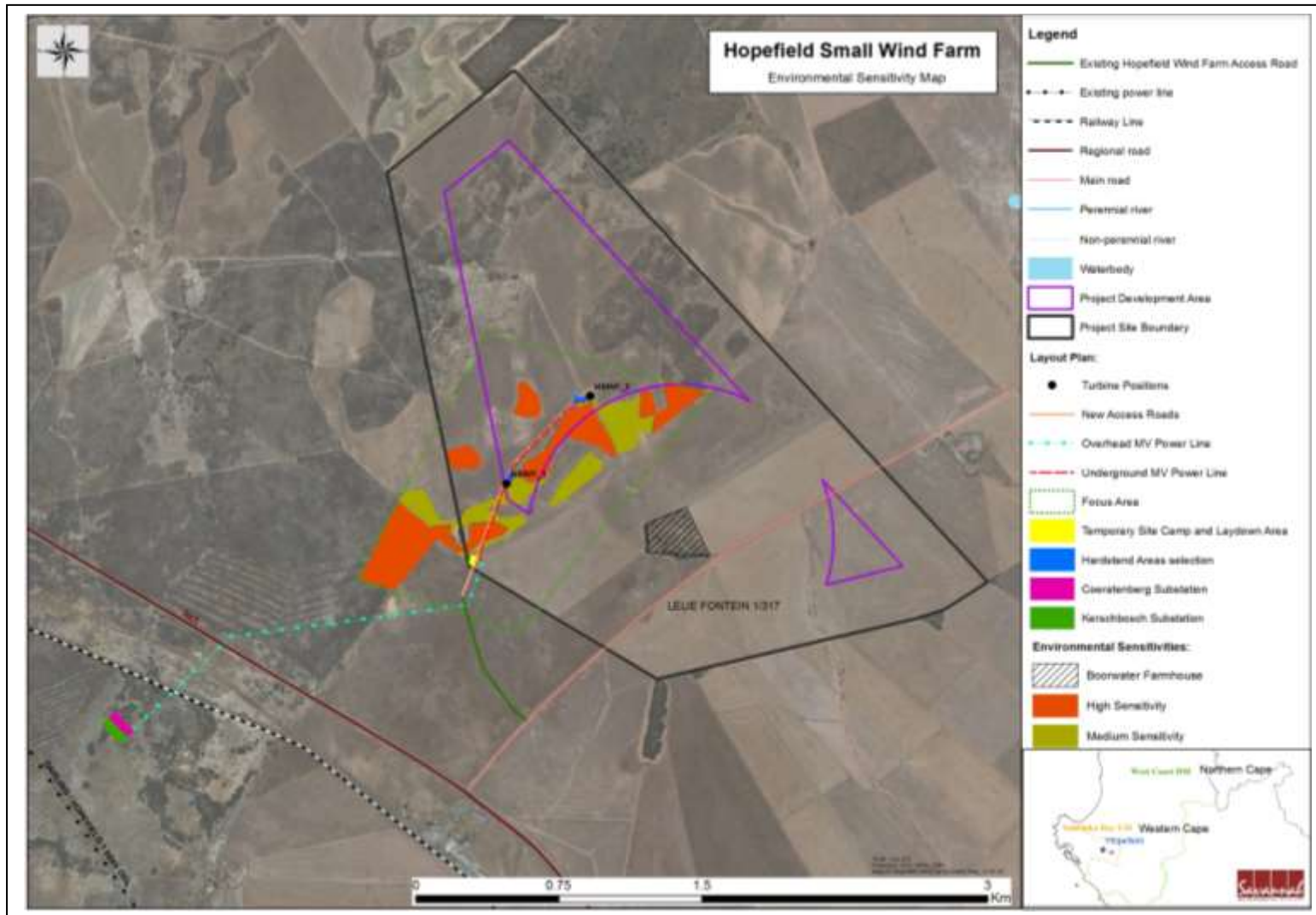
- » Disturbance of the ecological environment (flora and fauna);
- » Potential impacts on avifauna (birds);
- » Potential impacts on bats;
- » Potential visual impacts, including disturbance to sense of place, visual aesthetics;
- » Noise pollution during construction;
- » Socio-economic impacts;
- » Potential soil erosion and windblown dust; and
- » Storage and utilisation of hazardous substances on-site.

From the specialist investigations and walkthroughs undertaken for the authorised wind energy facility development site and the power line corridor, it was concluded that the majority of impacts identified through the BA process (including specialist studies and walkthrough surveys are of **moderate to low significance** with the implementation of appropriate mitigation measures. Limited areas of potential high sensitivity were identified all of which are avoided by the optimised wind farm layout (refer to the sensitivity map - **Figure 3.3 and Appendix B**). The general findings include:

- » All infrastructure is located in areas as assessed in the BAR and to the specialist's satisfaction.
- » Over 85% of the proposed infrastructure (including the two turbines and the overhead line ) is proposed within areas of **Low ecological sensitivity**, in the form of cultivated or fallow lands. The remainder consists of **Medium or High sensitivity** vegetation although considered permissible due to its very limited extent and mitigation measures that will be implemented.
- » A 110m section of the approved road and cables route traverse a High ecological sensitivity zone, and this is the primary reason for the slightly elevated botanical and terrestrial faunal impact. No rerouting of any infrastructure is however required due to the very limited extent and that the land is already within an agricultural area and unconnected to other such areas. All other infrastructure is located within medium or low sensitivity areas (cultivated lands), with the exception of an 800m long stretch of the overhead power line to the existing Kerschbosch substation, which is likely to have a Low negative ecological impact.
- » The underlying vegetation type in the High and Medium sensitivity areas is Hopefield Sand Fynbos, which is an Endangered vegetation type on a national basis, and supports small and regionally insignificant populations of three plant Species of Conservation Concern within the development area. No rare or threatened terrestrial fauna is likely to occur within the development footprint.

- » No Protected plant species occur in the Medium sensitivity area, but the High sensitivity area does support the following Protected plant species: *Echiostachys spicatus*, *Moraea fugax*, *Gladiolus carinatus*, *G. caryophyllaceus*, *Hymenogyne glabra*, *Agathosma capensis*, *Diascia* sp., and *Lachenalia* sp. The requisite permits will be obtained from Cape Nature.
- » The updated bird atlas (2014 - 2016) data from the region indicates that habitat immediately around the 3.3 km line supports up to 122 bird species, with two additional red-listed species (Black Harrier *Circus maurus*, Great White Pelican *Pelecanus onocrotalus*). New data from the avifaunal walkthrough survey indicates that at least 13 collision-prone species from the top 100 species may be susceptible to impact. It should be note that a plantation of mature gums *Eucalyptus* spp, en-route is a source of roosting and nesting raptors. The dams noted by Harebottle (2013) may attract wetland birds and the red-listed Great White Pelican *Pelecanus onocrotalus*, and two other species may be susceptible to power line collision unless mitigation measures are put in place.

The EMPr has been developed and must be implemented to protect sensitive on-site and off-site features through controlling construction and operation activities that could have a detrimental effect on the environment, and avoiding or minimising potential impacts were possible.



**Figure 3.3:** Environmental sensitivity map for the project study area illustrating sensitive areas in relation to the Final Hopefield Small Wind Farm layout refer to **Appendix B** for A3 maps)



### 3.4 Applicable Legislation

The following legislation and guidelines have informed the scope and content of this EMP:

- » National Environmental Management Act (Act No 107 of 1998);
- » EIA Regulations, published under Chapter 5 of the NEMA (GNR 545, GNR 546 (GN 982, GNR 983, GNR 984 and GNR 985 in Government Gazette 38282 of 4 December 2014).
- » Guidelines published in terms of the NEMA EIA Regulations, in particular:
  - Companion to the National Environmental Management Act (NEMA) Environmental Impact Assessment (EIA) Regulations of 2010 (Draft Guideline; DEA, 2010).
  - Public Participation in the BA Process (DEA, 2010).
  - Integrated Environmental Management Information Series (published by DEA).
- » International guidelines – the Equator Principles and the International Finance Corporation and World Bank Environmental, Health, and Safety Guidelines for Wind Energy (2007).

Several other Acts, standards, or guidelines have also informed the project process and the scope of issues addressed and assessed in the BA Report. A review of legislative requirements applicable to the proposed project is provided in **Table 3.2**.

**Table 3.2:** Relevant legislative permitting requirements applicable to the project

Legislation / Policy / Guideline	Applicable Requirements	Relevant Authority	Compliance requirements
<b>National Legislation</b>			
National Environmental Management Act (Act No 107 of 1998)	<ul style="list-style-type: none"> <li>» EMA requires, inter alia, that:                             <ul style="list-style-type: none"> <li>* Development must be socially, environmentally, and economically sustainable.”</li> <li>* Disturbance of ecosystems and loss of biological diversity are avoided, or, where they cannot be altogether avoided, are minimised and remedied.”</li> <li>* A risk-averse and cautious approach is applied, which takes into account the limits of current knowledge about the consequences of decisions and actions.”</li> </ul> </li> <li>» EIA Regulations have been promulgated in terms of Chapter 5. Activities which may not commence without an environmental authorisation are identified within these Regulations.</li> <li>» <u>In terms of Section 24(1) of NEMA, the potential impact on the environment associated with these listed activities must be considered, investigated, assessed and reported on to the competent authority (the decision-maker) charged by NEMA with granting</u></li> </ul>	<ul style="list-style-type: none"> <li>» National Department of Environmental Affairs – lead authority.</li> <li>» Provincial Environmental Department – Commenting authority (<u>Western Cape DEA&amp;DP</u>)</li> </ul>	<p><u>An authorisation was issued for the project by the DEA on 11 June 2014. This Authorisation was issued in terms of the 2010 EIA Regulations.</u></p>

	<p><u>of the relevant environmental authorisation.</u> In terms of GNR 543 of 18 June 2010, a Basic Assessment Process is required to be undertaken for the proposed project.</p>		
National Environmental Management Act (Act No 107 of 1998)	<p>In terms of the Duty of Care provision in S28(1) the project proponent must ensure that reasonable measures are taken throughout the life cycle of this project to ensure that any pollution or degradation of the environment associated with this project is avoided, stopped or minimised.</p> <p>In terms of NEMA, it has become the legal duty of a project proponent to consider a project holistically, and to consider the cumulative effect of a variety of impacts.</p>	Department of Environmental Affairs (as regulator of NEMA).	While no permitting or licensing requirements arise directly by virtue of the proposed project, this section will find application during the BA phase and will continue to apply throughout the life cycle of the project.
National Environmental Management: Waste Act (Act No 59 of 2008)	<p>» The purpose of this Act is to reform the law regulating waste management in order to protect health and the environment by providing for the licensing and control of waste management activities.</p> <p>» The Act provides listed activities requiring a waste license (GN 722, November 2014)</p> <p><u>The Minister may by notice in the Gazette publish a list of waste management activities that have, or are likely to have, a detrimental effect on the environment.</u></p>	<p>Hazardous Waste – National DEA</p> <p><u>General Waste – Western Cape DEA&amp;DP</u></p>	<p>As no waste disposal site is to be associated with the project, no permit is required in this regard.</p> <p>Waste handling, storage and disposal during construction and operation is required to be undertaken in accordance with the requirements of the Act, <u>as detailed in this EMPr (refer to <b>Appendix J</b>) Waste Management Plan).</u></p> <p>The volumes of waste to be generated and stored on the site</p>

	<p><u>The Minister may amend the list by –</u></p> <ul style="list-style-type: none"><li>» <u>Adding other waste management activities to the list.</u></li><li>» <u>Removing waste management activities from the list.</u></li><li>» <u>Making other changes to the particulars on the list.</u></li></ul> <p><u>In terms of the Regulations published in terms of this Act (GN 912 of November 2013), a Basic Assessment or Environmental Impact Assessment is required to be undertaken for identified listed activities.</u></p> <p><u>Any person who stores waste must at least take steps, unless otherwise provided by this Act, to ensure that:</u></p> <ul style="list-style-type: none"><li>» <u>The containers in which any waste is stored, are intact and not corroded or in any other way rendered unfit for the safe storage of waste.</u></li><li>» <u>Adequate measures are taken to prevent accidental spillage or leaking.</u></li><li>» <u>The waste cannot be blown away.</u></li><li>» <u>Nuisances such as odour, visual impacts and breeding of vectors do not arise; and</u></li><li>» <u>Pollution of the environment and harm</u></li></ul>		<p>during construction and operation of the facility will not require a waste license (provided these remain below the prescribed thresholds).</p>
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	<u>to health are prevented.</u>		
Environment Conservation Act (Act No 73 of 1989)	<p>In terms of section 25 of the ECA, the national noise-control regulations (GN R154 in Government Gazette No. 13717 dated 10 January 1992) were promulgated. The NCRs were revised under Government Notice Number R. 55 of 14 January 1994 to make it obligatory for all authorities to apply the regulations.</p> <p>Subsequently, in terms of Schedule 5 of the Constitution of South Africa of 1996, legislative responsibility for administering the noise control regulations was devolved to provincial and local authorities. Provincial Noise Control Regulations exist in the Western Cape Province.</p> <p>Allows the Minister of Environmental Affairs to make regulations regarding noise, among other concerns</p>	<p>National Department of Environmental Affairs</p> <p>Provincial Environmental Department - commenting authority.</p> <p>Local Municipality</p>	<p>There is no requirement for a noise permit in terms of the legislation.</p>
National Water Act (Act No 36 of 1998)	<p>Water uses <u>under S21 of the Act</u> must be licensed unless such water use falls into one of the categories listed in S22 of the Act or falls under general authorisation in terms of S39 and GN 1191 of GG 20526 October 1999.</p> <p>In terms of Section 19, the project proponent must ensure that reasonable measures are taken throughout the life cycle</p>	<p>Department of Water and <u>Sanitation (DWS)</u></p>	<p>A water use permit or license is required to be applied for or obtained, if infrastructure such as access roads or cabling cross watercourses, or for infrastructure within 500m of a wetland or watercourse (Section 21 c and i). <u>This however does not apply to this site/project.</u></p>

	of this project to prevent and remedy the effects of pollution to water resources from occurring, continuing or recurring.		
Minerals and Petroleum Resources Development Act (Act No 28 of 2002)	<p>A mining permit or mining right may be required where a mineral in question is to be mined (e.g. materials from a borrow pit) in accordance with the provisions of the Act.</p> <p>Requirements for Environmental Management Programmes and Environmental Management Plans are set out in S39 of the Act.</p> <p>S53 Department of Mineral Resources: Approval from the Department of Mineral Resources (DMR) may be required to use land surface contrary to the objects of the Act in terms of section 53 of the Mineral and Petroleum Resources Development Act, (Act No 28 of 2002): In terms of the Act approval from the Minister of Mineral Resources is required to ensure that proposed activities do not sterilise a mineral resources that might occur on site.</p>	Department of Mineral Resources (DMR)	<p>If borrow pits are required for the construction of the facility, a mining permit or right is required to be obtained.</p> <p>A Section 53 application has been submitted the Western Cape DMR office.</p> <p><u>This is however not required for this site/project.</u></p>
National Environmental Management: Air Quality Act (Act No 39 of 2004)	<p><u>Measures in respect of dust control (S32) and National Dust Control Regulations of November 2013.</u></p> <p><u>Measures to control noise (S34) - no regulations promulgated yet.</u></p>	DEA – Air quality Local Municipality - Noise	<p>While no permitting or licensing requirements arise from this legislation, this Act will find application during the construction phase of the project.</p> <p><u>The Act provides that an air quality</u></p>

	<ul style="list-style-type: none"> <li>» S18, S19 and S20 of the Act allow certain areas to be declared and managed as "priority areas"</li> <li>» Declaration of controlled emitters (Part 3 of Act) and controlled fuels (Part 4 of Act) with relevant emission standards</li> </ul> <p>The Act provides that an air quality officer may require any person to submit an atmospheric impact report if there is reasonable suspicion that the person has failed to comply with the Act.</p>		<p><u>officer may require any person to submit an atmospheric impact report if there is reasonable suspicion that the person has failed to comply with the Act. The air quality officer may require a dust monitoring programme as per the Regulations for dust control. This EMPr however makes provision for managing and mitigating potential dust impacts.</u></p>
<p>National Heritage Resources Act (Act No 25 of 1999)</p>	<p>Section 38 states that Heritage Impact Assessments (HIAs) are required for certain kinds of development including</p> <ul style="list-style-type: none"> <li>» the construction of a road, power line, pipeline, canal or other similar linear development or barrier exceeding 300 m in length;</li> <li>» any development or other activity which will change the character of a site exceeding 5 000 m<sup>2</sup> in extent.</li> </ul> <p>The relevant Heritage Resources Authority must be notified of developments such as linear developments (such as roads and power lines), bridges exceeding 50 m, or any development or other activity which will change the character of a site exceeding 5 000 m<sup>2</sup>; or the re-zoning of a site exceeding 10 000 m<sup>2</sup> in extent. This</p>	<p>South African Heritage Resources Agency (SAHRA) – National heritage sites (grade 1 sites) as well as all historic graves and human remains.</p> <p>Heritage Western Cape – Issue of permits for removal or destruction of heritage resources in the Western Cape.</p>	<p>A Heritage Impact Assessment (HIA) <u>was undertaken</u> as part of the BA Process to identify heritage sites.</p>

	<p>notification must be provided in the early stages of initiating that development, and details regarding the location, nature and extent of the proposed development must be provided.</p> <p>Standalone HIAs are not required where an EIA is carried out as long as the EIA contains an adequate HIA component that fulfils the provisions of Section 38. In such cases only those components not addressed by the EIA should be covered by the heritage component.</p>		
<p>National Environmental Management: Biodiversity Act (Act No 10 of 2004)</p>	<ul style="list-style-type: none"> <li>» Provides for the MEC/Minister to identify any process or activity in such a listed ecosystem as a threatening process (S53)</li> <li>» A list of threatened &amp; protected species has been published in terms of S 56(1) - Government Gazette 29657.</li> <li>» Three government notices have been published, i.e. GN R 150 (Commencement of Threatened and Protected Species Regulations, 2007), GN R 151 (Lists of critically endangered, vulnerable and protected species) and GN R 152 (Threatened or Protected Species Regulations).</li> <li>» Provides for listing threatened or protected ecosystems, in one of four categories: critically endangered (CR),</li> </ul>	<p>National Department of Environmental Affairs</p>	<p>Specialist flora and fauna studies were undertaken as part of the BA process. <u>A specialist ecological assessment and an ecological walkthrough has been undertaken for the project.</u></p> <p><u>It has been concluded that permits must be obtained from CapeNature for the removal or loss of small site populations of the 8 Protected Species as well as all species noted.</u></p>



endangered (EN), vulnerable (VU) or protected. The first national list of threatened terrestrial ecosystems has been gazetted, together with supporting information on the listing process including the purpose and rationale for listing ecosystems, the criteria used to identify listed ecosystems, the implications of listing ecosystems, and summary statistics and national maps of listed ecosystems (National Environmental Management: Biodiversity Act: National list of ecosystems that are threatened and in need of protection, (G 34809, GN 1002), 9 December 2011).

- » This Act also regulates alien and invader species.
- » Under this Act, a permit would be required for any activity which is of a nature that may negatively impact on the survival of a listed protected species.

The Proponent has a responsibility for:

- » The conservation of endangered ecosystems and restriction of activities according to the categorisation of the area (not just by listed activity as specified in the EIA regulations).

	<ul style="list-style-type: none"> <li>» <u>Promote the application of appropriate environmental management tools in order to ensure integrated environmental management of activities thereby ensuring that all development within the area are in line with ecological sustainable development and protection of biodiversity.</u></li> <li>» <u>Limit further loss of biodiversity and conserve endangered ecosystems.</u></li> </ul>		
<p><u>National Environmental Management: Biodiversity Act 10 of 2004</u></p>	<p><u>GNR 598: The Alien and Invasive Species (AIS) Regulations provides for the declaration of weeds and invader plants.</u></p>	<p><u>Department of Agriculture, Forestry and Fisheries (DAFF)</u></p>	<p><u>This Act will find application throughout the life cycle of the project. In this regard, soil erosion prevention and soil conservation strategies are included in this EMPr. In addition, weed control and management has also been included in this EMPr (refer to <b>Appendix C – Alien invasive Plant Management Plan</b>).</u></p>
<p><u>National Veld and Forest Fire Act (Act 101 of 1998)</u></p>	<ul style="list-style-type: none"> <li>» Provides requirements for veldfire prevention through firebreaks and required measures for fire-fighting. Chapter 4 places a duty on landowners to prepare and maintain firebreaks, and Chapter 5 places a duty on all landowners to acquire equipment and have available personnel to fight fires.</li> <li>» In terms of S21 the applicant would be obliged to burn firebreaks to ensure that</li> </ul>	<p><u>Department of Agriculture, Forestry and Fisheries</u></p>	<p><u>While no permitting or licensing requirements arise from this legislation, this act will find application during the operational phase of the project in terms of fire prevention and management. The <u>relevant management and mitigation measures has been included in this EMPr.</u></u></p>

	<p>should a veldfire occur on the property, that it does not spread to adjoining land.</p> <ul style="list-style-type: none"> <li>» In terms of S12 the firebreak would need to be wide and long enough to have a reasonable chance of preventing the fire from spreading, not causing erosion, and is reasonably free of inflammable material. In terms of S17, the applicant must have such equipment, protective clothing, and trained personnel for extinguishing fires.</li> </ul>		
<p>Conservation of Agricultural Resources Act (Act No 43 of 1983)</p>	<ul style="list-style-type: none"> <li>» Prohibition of the spreading of weeds (S5).</li> <li>» Classification of categories of weeds &amp; invader plants (Regulation 15 of GN R1048) &amp; restrictions in terms of where these species may occur. Requirement &amp; methods to implement control measures for alien and invasive plant species (Regulation 15E of GN R1048).</li> </ul>	<p>Department of Agriculture, <u>Forestry and Fisheries</u></p>	<p>While no permitting or licensing requirements arise from this legislation, this Act will find application during the BA and will continue to apply throughout the life cycle of the project. In this regard, soil erosion prevention and soil conservation strategies must be developed and implemented. In addition, a weed control and management plan must be implemented.</p> <p>The permission of agricultural authorities will be required if the Project requires the draining of vleis, marshes or water sponges on land outside urban areas.</p> <p><u>This Act will find application during</u></p>

			<p><u>the BA and will continue to apply throughout the life cycle of the project. In this regard, soil erosion prevention and soil conservation strategies must be developed and implemented. In addition, weed control and management has also been included in this EMPr (refer to Appendix C – Alien invasive Plant Management Plan).</u></p>
<p>National Forests Act (Act No 84 of 1998)</p>	<p>In terms of S5 (1) no person may cut, disturb, damage or destroy any protected tree or possess, collect, remove, transport, export, purchase, sell donate or in any other manner acquire or dispose of any protected tree or any forest product derived from a protected tree, except under a license granted by the Minister to an (applicant and subject to such period and conditions as may be stipulated".                  GN 1042 provides a list of protected tree species.</p> <p><u>Protected trees: According to this act, the Minister may declare a tree, group of trees, woodland or a species of trees as protected. The prohibitions provide that ` no person may cut, damage, disturb, destroy or remove any protected tree, or collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or</u></p>	<p>Department of Agriculture, Forestry and Fisheries</p>	<p>A permit or license is required for the destruction of protected tree species and/or indigenous tree species within a natural forest.</p> <p><u>Before the clearing of the site, the appropriate permits must be obtained from the Department of Agriculture, Forestry and Fisheries (DAFF) for the removal of plants listed in the National Forest Act and from the relevant provincial department for the destruction of species protected in terms of the specific provincial legislation. Copies of permits must be kept by the ECO.</u></p> <p><u>No Protected tree species or indigenous tree species were identified on site.</u></p>

	<p><u>dispose of any protected tree, except under a licence granted by the Minister’.</u></p> <p><u>Forests: Prohibits the destruction of indigenous trees in any natural forest without a licence.</u></p>		
<p>Aviation Act (Act No 74 of 1962) 13<sup>th</sup> amendment of the Civil Aviation Regulations (CARS) 1997</p>	<p>Any structure exceeding 45m above ground level or structures where the top of the structure exceeds 150m above the mean ground level, the mean ground level considered to be the lowest point in a 3km radius around such structure.</p> <p>Structures lower than 45m, which are considered as a danger to aviation shall be marked as such when specified.</p> <p>Overhead wires, cables etc., crossing a river, valley or major roads shall be marked and in addition their supporting towers marked and lighted if an aeronautical study indicates it could constitute a hazard to aircraft.</p> <p>Section 14 of Obstacle limitations and marking outside aerodrome or heliport – CAR Part 139.01.33 relates specifically to appropriate marking of wind energy facilities.</p>	<p>Civil Aviation Authority (CAA)</p>	<p>This act will find application during the operational phase of the project. Appropriate marking is required to meet the specifications as detailed in the CAR Part 139.01.33. An obstacle approval for the Wind Farm is required to be obtained from the CAA.</p> <p><u>While no permitting or licence requirements arise from the legislation, this act will find application during the operational phase of the project. Appropriate marking is required to meet the specifications as detailed in the CAR Part 139.01.33.</u></p> <p><u>Approval must be obtained from the CAA that the wind facility will not interfere with the performance of aerodrome radio Communication, Navigation and Surveillance (CNS) equipment, especially the radar, prior to commencement of the</u></p>

<p>Hazardous Substances Act (Act No 15 of 1973)</p>	<p>This Act regulates the control of substances that may cause injury, or ill health, or death by reason of their toxic, corrosive, irritant, strongly sensitising or inflammable nature or the generation of pressure thereby in certain instances and for the control of certain electronic products. To provide for the rating of such substances or products in relation to the degree of danger; to provide for the prohibition and control of the importation, manufacture, sale, use, operation, modification, disposal or dumping of such substances and products.</p> <ul style="list-style-type: none"> <li>» Group I and II: Any substance or mixture of a substance that might by reason of its toxic, corrosive etc., nature or because it generates pressure through decomposition, heat or other means, cause extreme risk of injury etc., can be declared to be Group I or Group II hazardous substance;</li> <li>» Group IV: any electronic product;</li> <li>» Group V: any radioactive material.</li> </ul> <p>The use, conveyance or storage of any hazardous substance (such as distillate fuel) is prohibited without an appropriate license</p>	<p>Department of Health  <u>Saldanha Local Municipality</u></p>	<p><u>activity. A copy of the approval must be kept on site by the ECO.</u></p> <p>It is necessary to identify and list all the Group I, II, III and IV hazardous substances that may be on the site and in what operational context they are used, stored or handled. If applicable, a license is required to be obtained from the Department of Health. <u>It is the Contractor's responsibility to determine if any permits in this regard would be required and if so apply for the relevant permit.</u></p>
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	being in force.		
National Road Traffic Act (Act No 93 of 1996)	<p>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" outline the rules and conditions which apply to the transport of abnormal loads and vehicles on public roads and the detailed procedures to be followed in applying for exemption permits are described and discussed.</p> <p>Legal axle load limits and the restrictions imposed on abnormally heavy loads are discussed in relation to the damaging effect on road pavements, bridges and culverts.</p> <p>The general conditions, limitations and escort requirements for abnormally dimensioned loads and vehicles are also discussed and reference is made to speed restrictions, power/mass ratio, mass distribution and general operating conditions for abnormal loads and vehicles. Provision is also made for the granting of permits for all other exemptions from the requirements of the National Road Traffic Act and the relevant Regulations.</p>	<p>Provincial Department of Transport (provincial roads)</p> <p>South African National Roads Agency Limited (national roads)</p>	<p>An abnormal load/vehicle permit may be required to transport the various components to site for construction. These include:</p> <ul style="list-style-type: none"> <li>» Route clearances and permits will be required for vehicles carrying abnormally heavy or abnormally dimensioned loads.</li> <li>» Transport vehicles exceeding the dimensional limitations (length) of 22m.</li> <li>» Depending on the trailer configuration and height when loaded, some of the power station components may not meet specified dimensional limitations (height and width).</li> </ul> <p><u>The transport Contractor will be responsible for applying for the relevant permits.</u></p>
Development Facilitation Act (Act No 67 of 1995)	Provides for the overall framework and administrative structures for planning	Provincial Department of Environmental Affairs and	The applicant must submit a land development application in the

	<p>throughout the Republic.</p> <p>» Sections 2- 4 provide general principles for land development and conflict resolution.</p>	<p>Development (DEA&amp;DP) - Saldanha Bay Municipality</p> <p>Planning Local</p>	<p>prescribed manner and form as provided for in the Act. A land development applicant who wishes to establish a land development area must comply with procedures set out in the DFA.</p>
<p><b>Provincial Legislation/ Policies / Plans</b></p>			
<p>Western Cape Noise Control Regulations: PN 627 of 1998</p>	<p>The control of noise in the Western Cape Province is legislated in the form of Noise Control Regulations promulgated in terms of section 25 of the Environment Conservation Act No. 73 of 1989.</p>	<p>Western Cape DEA&amp;DP</p>	<p>In terms of Regulation 4 of the Noise Control Regulations: "No person shall make, produce or cause a disturbing noise (greater than 45 dBA), or allow it to be made, produced or caused by any person, animal, machine, device or apparatus or any combination thereof".</p>
<p>Western Cape Land Use Planning Ordinance 15 of 1985</p>	<p>Details land subdivision and rezoning requirements and procedures</p>	<p>Western Cape Department of Environmental Affairs and Development Planning</p> <p>Local authorities, i.e. Saldanha Local Municipality</p>	<p>Given that the wind energy development is proposed on land that is zoned for agricultural use, a consent use application in terms of Section 17 of LUPO to an alternative appropriate zone will be required.</p> <p>Rezoning is required to be undertaken following the issuing of an Environmental Authorisation for the proposed project. <u>This has been approved.</u></p>
<p>Western Cape Nature and Environmental Ordinance</p>	<p>The Nature and Environmental Ordinance 19 of 1974, (as amended by the Western Cape</p>	<p>Cape Nature</p>	<p>Removal or relocation of protected plant or animal species require a</p>



<p>19 of 1974, (as amended by the Western Cape Nature Conservation Laws Amendment Act, Act 2 of 2000</p>	<p>Nature Conservation Laws Amendment Act, Act 2 of 2000) defines the protection status of plants as follows:</p> <ul style="list-style-type: none"> <li>* <b>“endangered flora”</b> means flora of any species which is in danger of extinction and is specified in Schedule 3 or Appendix I of the Convention on International Trade in Endangered Species of Wild Fauna and Flora, Washington, 1973; provided that it shall not include flora of any species specified in such Appendix and Schedule 4; (thus all Schedule 3 species);</li> <li>* <b>“protected flora”</b> means any species of flora specified in Schedule 4 or Appendix II of the Convention on International Trade in Endangered Species of Wild Fauna and Flora, Washington, 1973; provided that it shall not include any species of flora specified in such Appendix and Schedule 3; and</li> <li>* <b>“indigenous unprotected flora”</b> means any species of indigenous flora not specified in Schedule 3 or 4.</li> </ul>		<p>permit to be obtained from the Cape Nature.</p>
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**Standards**

<p>Noise Standards</p>	<p>Four South African Bureau of Standards (SABS) scientific standards are considered relevant to noise from a Wind Energy Facility. They are:</p> <ul style="list-style-type: none"> <li>» SANS 10103:2008. ‘The measurement</li> </ul>	<p>Local Municipality</p>	<p>The recommendations that the standards make are likely to inform decisions by authorities, but non-compliance with the standards will not necessarily render an activity</p>
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	<p>and rating of environmental noise with respect to annoyance and to speech communication’.</p> <ul style="list-style-type: none"><li>» SANS 10210:2004. ‘Calculating and predicting road traffic noise’.</li><li>» SANS 10328:2008. ‘Methods for environmental noise impact assessments’.</li><li>» SANS 10357:2004. ‘The calculation of sound propagation by the Concave method’.</li></ul> <p>The relevant standards use the equivalent continuous rating level as a basis for determining what is acceptable. The levels may take single event noise into account, but single event noise by itself does not determine whether noise levels are acceptable for land use purposes.</p>		unlawful per se.
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Table 3.3: **Standards applicable to the Hopefield Small Wind Farm project**

<b>Theme</b>	<b>Standard</b>	<b>Summary</b>
<u>Air</u>	<u>South African National Standard (SANS) 69</u>	<u>Framework for setting and implementing national ambient air quality standards</u>
	<u>SANS 1929: Ambient Air Quality</u>	<u>Sets limits for common pollutants</u>
<u>Noise</u>	<u>SANS 10328:2003: Methods for Environmental Noise Impact Assessments</u>	<u>General procedure used to determine the noise impact</u>
	<u>SANS 10103:2008: The Measurement and Rating of Environmental Noise with Respect to Land Use, Health, Annoyance and Speech Communication</u>	<u>Provides noise impact criteria</u>
	<u>National Noise Control Regulations</u>	<u>Provides noise impact criteria</u>
	<u>SANS 10210: Calculating and Predicting Road Traffic Noise</u>	<u>Provides guidelines for traffic noise levels</u>
<u>Waste</u>	<u>DWAF (1998) Waste Management Series. Minimum Requirements for the Handling, Classification and Disposal of Hazardous Waste</u>	<u>DWAF Minimum Requirements</u>
	<u>National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) – National norms and standard for the storage of waste.</u>	<ul style="list-style-type: none"> <li>» <u>Provides uniform national approach relating the management of waste facilities</u></li> <li>» <u>Ensure best practice in management of waste storage</u></li> <li>» <u>Provides minimum standards for the design and operation of new and existing waste storage</u></li> </ul>
<u>Water</u>	<u>Best Practise Guideline (G1) Storm Water Management DWA 2006</u>	<u>Provides guidelines to the management of storm water</u>
	<u>South African Water Quality Guidelines</u>	<u>Provides water quality guidelines</u>
<u>Economical, Environmental and Social</u>	<u>Equator Principles 2013</u>	<u>Determines, assesses and manages environmental and social risk in projects</u>

**STRUCTURE OF THIS EMPR**

**CHAPTER 4**

The first three chapters provide background to the EMPr and the proposed project. The chapters which follow consider the:

- » Planning and design activities;
- » Construction activities;
- » Operation activities; and
- » Decommissioning activities.

These chapters set out the procedures necessary for Hopefield Small Wind Farm (Pty) Ltd, as the Proponent to achieve environmental compliance. For each of the phases for the wind farm project, an over-arching environmental **goal** is stated. In order to meet this goal, a number of **objectives** are listed. The management plan has been structured in table format in order to show the links between the goals for each phase and their associated objectives, activities/risk sources, mitigation actions monitoring requirements and performance indicators. A specific Environmental Management Programme table has been established for each environmental objective. The information provided within the EMPr table for each objective is illustrated below:

**OBJECTIVE: Description of the objective, which is necessary in order to meet the overall goals; these take into account the findings of the Basic Assessment specialist studies**

<b>Project component/s</b>	List of project components affecting the objective, e.g.: <ul style="list-style-type: none"> <li>» Wind energy turbines;</li> <li>» access roads;</li> <li>» substation; and</li> <li>» power line.</li> </ul>
<b>Potential Impact</b>	Brief description of potential environmental impact if objective is not met.
<b>Activity/risk source</b>	Description of activities which could impact on achieving objective.
<b>Mitigation: Target/Objective</b>	Description of the target; include quantitative measures and/or dates of completion.

Mitigation: Action/control	Responsibility	Timeframe
List specific action(s) required to meet the mitigation target/objective described above.	Who is responsible for the measures	Time periods for implementation of measures.

<b>Performance Indicator</b>	Description of key indicator(s) that track progress/indicate the effectiveness of the management plan.
<b>Monitoring and Reporting</b>	Mechanisms for monitoring compliance; the key monitoring actions required to check whether the objectives are being achieved, taking into consideration responsibility, frequency, methods and reporting.

The objectives and EMPr tables are required to be reviewed and possibly modified whenever changes, e.g. the following, occur:

- » Planned activities change (i.e. in terms of the components of the facility).
- » Modification to or addition to environmental objectives and targets.
- » Additional or unforeseen environmental impacts are identified and additional measures are required to be included in the EMPr to prevent deterioration or further deterioration of the environment.
- » Relevant legal or other requirements are changed or introduced.
- » Significant progress has been made on achieving an objective or target such that it should be re-examined to determine if it is still relevant, should be modified, etc.

Any amendments to the impact management outcomes or objectives of the EMPr must be approved by the Competent Authority (i.e. DEA) prior to implementation, unless these are required to address an emergency situation in which case the Environmental Control Officer (ECO) in conjunction with the Contractor's Environmental Officer (EO) should be consulted.

Specific plans have been developed for the project in order to address specific issues of potential concern<sup>2</sup>. These are detailed below.

Relevant EMP sections according to EA

<b>Plan / Study</b>	<b>Inclusion in EMP</b>
<u>Environmental Authorisation</u>	<u>Appendix A</u>
<u>Final Facility Layout and Sensitivity Maps</u>	<u>Appendix B</u>
<u>Alien Invasive and Open Space Management Plan</u>	<u>Appendix C</u>
<u>Plant Rescue &amp; Protection Plan</u>	<u>Appendix D</u>
<u>Revegetation and Rehabilitation Management Plan</u>	<u>Appendix E</u>
<u>Traffic Management plan</u>	<u>Appendix F</u>
<u>Stormwater Management Plan</u>	<u>Appendix G</u>
<u>Erosion Management Plan</u>	<u>Appendix H</u>
<u>Grievance Mechanism for public complaints and issues</u>	<u>Appendix I</u>
<u>Waste Management Plan</u>	<u>Appendix J</u>
<u>Bird monitoring programme for the operational</u>	<u>Appendix K</u>

<sup>2</sup> These plans have been developed as specified by the DEA in the acceptance letter of the scoping report as well as the Environmental Authorisation dated 11 June 2014.

<u>phase</u>	
<u>Bat monitoring programme for the operational phase</u>	<u>Appendix L</u>
<u>Environmental Team CV's</u>	<u>Appendix M</u>

#### 4.1 Project Team

This EMPr was compiled by:

<b>EMP Compilers:</b>	<u>Thalita Botha</u>	<u>Savannah Environmental</u>
	<u>Tebogo Mapinga</u>	<u>Savannah Environmental</u>
	Jo-Anne Thomas	Savannah Environmental
<b>Specialists:</b>	Nick Helme – Vegetation and Fauna	Nick Helme Botanical Surveys
	<u>Nick Helme – Ecological Walkthrough</u>	<u>Nick Helme Botanical Surveys</u>
	Johann Lanz – Soil and Agricultural Potential	Johann Lanz Consulting
	Tim Hart - Heritage	Archaeology Contracts Office (ACO)
	Doug Harebottle - Avifauna	Doug Harebottle Consulting
	Joana Marques - Bats	Bio3
	Morne de Jager - Noise	EARES
	Lourens du Plessis - Visual	MetroGIS

The Savannah Environmental team have extensive knowledge and experience in environmental impact assessment and environmental management, having being involved in EIA processes over the past years. They have managed and drafted environmental management plans/programmes for other power generation projects (including renewable energy projects) throughout South Africa. In addition, they have been involved in compliance monitoring of major construction projects in South Africa.

## MANAGEMENT PROGRAMME FOR THE WIND ENERGY FACILITY: PLANNING & DESIGN

## CHAPTER 5

### 5.1 Goal for Pre-Construction

**Overall Goal for Pre-Construction (Planning and Design):** Undertake the pre-construction (planning and design) phase of the wind farm in a way that:

- » Ensures that the design of the facility responds to the identified environmental constraints and opportunities - this was realised through the optimization of the wind farm layout which was designed to avoid, as far as possible, identified sensitive environmental areas. It was further realised through the specialists walkthrough surveys of the final optimised layout which was aimed at ensuring the optimised layout responded to environmental constraints and opportunities.
- » Ensures that pre-construction activities are undertaken in accordance with all relevant legislative requirements and avoids sensitive environmental areas as far as practically possible.
- » Ensures that adequate regard has been taken of any landowner and community concerns and that these are appropriately addressed through design and planning (where appropriate).
- » Ensures that the best environmental options are selected for the linear components, including the access roads and power line alignments.
- » Enables the wind farm construction activities to be undertaken without significant disruption to other land uses in the area.

In order to meet this goal, the following objectives have been identified, together with necessary actions and monitoring requirements.

### 5.2 Planning and Design

**OBJECTIVE 1:** To ensure that the design of the facility responds to the identified environmental constraints and opportunities

Subject to acceptance from DEA, the layout as detailed in **Appendix B** must be implemented.

Project component/s	
	<ul style="list-style-type: none"><li>» wind turbines;</li><li>» Cabling between turbines</li><li>» access roads and crane hard standings;</li><li>» service building(s);</li><li>» substation;</li></ul>

	<ul style="list-style-type: none"> <li>» power line; and</li> <li>» associated infrastructure.</li> </ul>
<b>Potential Impact</b>	<ul style="list-style-type: none"> <li>» Design fails to respond optimally to the environmental considerations.</li> </ul>
<b>Activities/risk sources</b>	<ul style="list-style-type: none"> <li>» Positioning of turbines and alignment of access roads <u>and underground cabling</u></li> <li>» <u>Positioning of substation</u></li> <li>» Alignments of overhead power line, <u>specifically pylon positions</u></li> <li>» <u>Pre-construction activities, e.g. geotechnical investigations</u></li> </ul>
<b>Mitigation: Target/Objective</b>	<ul style="list-style-type: none"> <li>» To ensure that the design of the facility responds to the identified environmental constraints and opportunities.</li> <li>» <u>To ensure that pre-construction activities are undertaken in an environmentally friendly manner by e.g. avoiding identified sensitive areas</u></li> <li>» <u>To ensure the selection of the best environmental option for design of infrastructure.</u></li> <li>» To ensure that the design of the facility responds to the identified constraints identified through pre-construction bird and bat monitoring.</li> </ul>

<b>Mitigation: Action/control</b>	<b>Responsibility</b>	<b>Timeframe</b>
<u>The Proponent to finalise layout of all components, and submit to DEA for approval.</u>	<u>Proponent Contractor(s)</u>	Prior to construction
Consider design level mitigation measures recommended by the specialists, especially with respect to noise, flora and avifauna, as detailed within the BA report and relevant appendices.	Proponent Contractor(s)	Design phase
Disturbance, in the form of permanent and temporary construction, should be concentrated in the Low Sensitivity areas identified. Only limited infrastructural development should occur in the Medium – High Sensitivity areas provided that it does not significantly compromise the ecological connectivity currently on site.	Proponent Contractor(s)	Design phase
<u>No temporary site camps will be allowed outside the footprint of the development area as the establishment of such structure might trigger a listed activity as defined in the Environmental Impact Assessment regulations, 2010.</u>	<u>Contractor(s)</u>	<u>Prior Construction</u>
In order to reduce the noise impact to a negligible magnitude it is recommended that the wind turbines be installed at a distance of at least 300 m within the Wind Farm boundary in the vicinity of sensitive receptors, such as residences.	Proponent	Design phase
<u>Electric fencing should not have any strands within 30cm of the ground, which should be</u>	<u>Proponent</u>	<u>Design phase</u>



Mitigation: Action/control	Responsibility	Timeframe
<u>sufficient to allow smaller mammals, reptiles and leopard tortoises to pass through, but still remain effective as a security barrier.</u>		
Access roads to be carefully planned to minimise the impacted area and prevent unnecessary over compaction of soil.	Proponent	Design phase
<u>Positions of turbines jeopardizing compliance with accepted noise levels should be revised during the micro-sitting of the units in question and predicted noise levels re-modelled by the noise specialist, in order to ensure that the predicted noise levels are less than 45dB(A).</u>	Proponent	Design phase
<u>A comprehensive stormwater management must be compiled and detail how stormwater off hard surfaces will be managed to reduce velocities and volumes of water that could lead to erosion of surfaces (refer to <b>Appendix G</b>).</u>	Contractor(s)	Design phase
<u>The EMPr should form part of the contract with the Contractors appointed to construct and maintain the proposed wind energy facility, and will be used to ensure compliance with environmental specifications and management measures. The implementation of this EMPr for all life cycle phases of the proposed project is considered to be key in achieving the appropriate environmental management standards as detailed for this project.</u>	Proponent Contractor(s)	Tender Design & Design Review Stage
<u>The final location of the wind turbines and associated infrastructure (including access roads) was informed by a survey undertaken by an ecological specialist to identify any of the Red List plant species that have a geographic distribution in the areas, this includes:</u> » <u>Vulnerable species (<i>Romulea eburnea</i>, <i>Lotononis venosa</i> and <i>Geissorhiza karoica</i>);</u> <u>and</u> » <u>Rare species (<i>Cleretum lyratifolium</i> and <i>Strumaria karoica</i>).</u>	Proponent Contractor(s)	Design phase
<u>Mining permit/license to be obtained for any borrow pits to be established for the project (if applicable). Permits must be kept on site by the ECO.</u>	Contractor(s)	Design phase
<u>Approval must be obtained from the South African Weather Services (WeatherSA) that the energy facility will not interfere with the</u>	Proponent Contractor(s)	Design phase

Mitigation: Action/control	Responsibility	Timeframe
<u>performance of their equipment, especially radar, prior to commencement of the activity. A copy of the approval must be kept on site by the ECO.</u>		
<u>Obtain required abnormal load permits for transportation of project components to site.</u>	<u>Contractor(s)/ Transport Contractor</u>	<u>Design phase</u>
<u>Determine an appropriate location for onsite batching outside of identified sensitive areas.</u>	<u>Contractor(s)</u>	<u>Design phase</u>
A detailed geotechnical investigation is required for the design phase.	<u>Proponent Contractor(s)</u>	Design phase
Balance technical and financial considerations against environmental constraints and opportunities in finalising the design of key elements.	<u>Proponent</u>	Design phase
<u>Wind turbines and other infrastructures to be installed should be sited on low and medium sensitivity areas as far as technically viable with high sensitivity areas kept to a minimum. Linear infrastructures should make use of existing roads and accesses whenever technically viable.</u>	<u>Proponent</u>	<u>Design phase</u>
<u>The facility must be designed to discourage the use of infrastructure components as perching or roosting substrates by birds.</u>	<u>Contractor(s)</u>	<u>Design phase</u>
<u>The final development area should be surveyed for species suitable for search and rescue or destruction as applicable or recommended by the botanical.</u>	<u>Proponent Contractor(s)</u>	<u>Pre-construction</u>
<u>Should any water pipeline be crossed or affected during the construction phase, detailed design drawings must be presented to the West Coast District Municipality for approval prior to construction. Should water be required from the West Coast District Municipality during construction, operational and decommissioning phases for the development, application for such water usage shall be lodged in advance.</u>	<u>Contractor</u>	<u>Pre-construction</u>
<u>Develop an alien invasive plant management plan for the site (refer to <b>Appendix C</b>).</u>	<u>Proponent</u>	<u>Pre-construction</u>
<u>Develop a plant rescue and protection plan for the site (refer to <b>Appendix D</b>).</u>	<u>Proponent</u>	<u>Pre-construction</u>
<u>Develop a re-vegetation and habitat rehabilitation plan for the site (refer to</u>	<u>Proponent</u>	<u>Pre-construction</u>

<b>Mitigation: Action/control</b>	<b>Responsibility</b>	<b>Timeframe</b>
<b>Appendix E).</b>		
<u>Develop a traffic management plan for the site (refer to <b>Appendix F</b>).</u>	<u>Proponent</u>	<u>Pre-construction</u>
<u>Develop a storm water management plan for the site (refer to <b>Appendix G</b>).</u>	<u>Proponent</u>	<u>Pre-construction</u>
<u>Develop an erosion management plan for the site (refer to <b>Appendix H</b>).</u>	<u>Proponent</u>	<u>Pre-construction</u>
<u>Develop an effective monitoring system to detect any leakage or spillage of all hazardous substances during their transportation, handling, use and storage. This must include precautionary measures to limit the possibility of oil and other toxic liquids from entering the soil or storm water systems.</u>	<u>Proponent</u>	<u>Pre-construction</u>
<u>The holder of an environmental authorisation has the responsibility to notify the competent authority of any alienation, transfer and, change of ownership rights in the property on which the activity is to take place.</u>	<u>Proponent</u>	<u>On-going</u>
<u>Submit a final development layout map for the entire wind farm for approval to the department, as required by the Environmental Authorisation (refer to Appendix B).</u>	<u>Proponent</u>	<u>Pre-construction</u>
<u>Fourteen (14) days written notice must be given to the Department that the activity (including the operational phase) will commence. The notification must include a date on which the activity will commence as well as the reference number.</u>	<u>Proponent</u>	<u>Pre-construction</u>
<u>ECO to be appointed prior to the commencement of any authorised activities. Once appointed the name and contact details of the ECO must be submitted to the Director: Compliance Monitoring at the DEA.</u>	<u>Proponent</u>	<u>Pre-construction</u>

<b>Performance Indicator</b>	<ul style="list-style-type: none"> <li>» Design meets objectives and does not <u>unnecessarily</u> degrade the environment.</li> <li>» Design and layouts etc. respond to the mitigation measures and recommendations in the BAR and walkthrough reports.</li> </ul>
<b>Monitoring and Reporting</b>	<ul style="list-style-type: none"> <li>» Ensure that the design implemented meets the objectives and mitigation measures in the BA Report through review of the design by the Project Manager, SHE representative, Environmental</li> </ul>

consultant/manager, ECO, Contractor and the Environmental Officer (EO) prior to the commencement of construction.

**OBJECTIVE 2: To ensure selection of best environmental option for alignment/design of the power line and access roads**

An overhead power line is proposed to connect the the wind farm to the electricity grid via the Kerschbosch substation, a distance of approximately 3km.

<b>Project component/s</b>	» Power line » Access roads
<b>Potential Impact</b>	» Route that degrades environment unnecessarily, particularly with respect to visual aesthetics, loss of indigenous flora, erosion, and impacts on local communities/residents
<b>Activities/risk sources</b>	» Alignment of power line within corridor
<b>Mitigation: Target/Objective</b>	» To ensure selection of best environmental option for alignment for the power line

<b>Mitigation: Action/control</b>	<b>Responsibility</b>	<b>Timeframe</b>
Select alignment that curtails environmental impacts and enhances environmental benefits, while being technically feasible and affordable.	Hopefield Small Wind Farm (Pty) Ltd and contractor	Design phase
Consider design level mitigation measures recommended by the specialists, especially with respect to ecology as detailed within the BA report and relevant appendices.	Contractor	Design phase
Bird-friendly power line tower and conductor designs must be used. The tower designs used should be those which are poorly suited to serve as nesting substrates by most bird species and with perching areas situated in areas either off-set or well away from the conductors.	Contractor	Design phase
Use existing roads, minimise length of roads through sensitive areas as far as possible, etc.	Hopefield Small Wind Farm (Pty) Ltd and contractor	Design phase

<b>Performance Indicator</b>	» Power line and access road alignment meets objectives. » Selected alignment minimises any negative environmental impacts and maximises any benefits.
<b>Monitoring</b>	» Ensure that the design implemented meets the objectives and mitigation measures in the BA report through review of the design by the Project Manager, SHE representative and the environmental consultant/manager prior to the commencement of construction.

**OBJECTIVE 2: To ensure effective communication mechanisms**

On-going communication with affected and surrounding landowners is important to maintain during the construction and operational phases of the wind farm. Any issues and concerns raised should be addressed as far as possible in as short a timeframe as possible.

<b><u>Project component/s</u></b>	<ul style="list-style-type: none"> <li>» <u>Wind turbines</u></li> <li>» <u>Cabling between turbines</u></li> <li>» <u>Access roads</u></li> <li>» <u>Buildings</u></li> <li>» <u>Overhead power line(s)</u></li> <li>» <u>All other infrastructure</u></li> </ul>
<b><u>Potential Impact</u></b>	» <u>Impacts on affected and surrounding landowners and land uses</u>
<b><u>Activity/risk source</u></b>	<ul style="list-style-type: none"> <li>» <u>Activities associated with pre-construction activities</u></li> <li>» <u>Activities associated with construction of the wind farm</u></li> <li>» <u>Activities associated with construction of watercourse crossings</u></li> <li>» <u>Activities associated with operation</u></li> </ul>
<b><u>Mitigation: Target/Objective</u></b>	<ul style="list-style-type: none"> <li>» <u>Effective communication with affected and surrounding landowners</u></li> <li>» <u>Addressing of any issues and concerns raised as far as possible in as short a timeframe as possible</u></li> </ul>

<b><u>Mitigation: Action/control</u></b>	<b><u>Responsibility</u></b>	<b><u>Timeframe</u></b>
<p><u>Compile and implement a grievance mechanism procedure for the public (using <b>Appendix I</b>) to be implemented during both the construction and operational phases of the facility and if applicable during decommissioning. This procedure should include details of the contact person who will be receiving issues raised by interested and affected parties, and the process that will be followed to address issues.</u></p> <p><u>A Project Specific Grievance Mechanism will be developed and implemented prior to construction.</u></p>	<p><u>Proponent and/or Contractor(s)</u></p>	<p><u>Pre-construction (construction procedure)</u> <u>Pre-operation (operation procedure)</u></p>
<p><u>Develop and implement a grievance mechanism for the construction, operational and closure phases of the project for all employees, contractors, subcontractors and site personnel. This procedure should be in line with the South African Labour Law.</u></p>	<p><u>Proponent and/or Contractor(s)</u></p>	<p><u>Pre-construction (construction procedure)</u> <u>Pre-operation (operation procedure)</u></p>
<p><u>Liaison with landowners is to be undertaken prior to the commencement of construction in order to agree on landowner-specific</u></p>	<p><u>Proponent and/or Contractor(s)</u></p>	<p><u>Pre-construction</u></p>

<b>Mitigation: Action/control</b>	<b>Responsibility</b>	<b>Timeframe</b>
<u>conditions during construction and maintenance, as well as to provide sufficient time for them to plan agricultural activities.</u>		
<u>An incident reporting system must be developed and used to record non-conformances to the EMPr.</u>	<u>Contractor(s)/ ECO</u>	<u>Pre-construction</u> <u>Duration of</u> <u>construction</u>
<u>Public complaints register must be developed and maintained on site in line with the Grievance mechanism (<b>Appendix I</b>).</u>	<u>Contractor(s)</u>	<u>Pre-construction</u> <u>Duration of</u> <u>construction</u>
<u>Potential interference with public safety communications systems (e.g. radio traffic related to emergency activities) must be avoided.</u>	<u>Contractor(s)</u>	<u>All phases of the</u> <u>project</u>

<b>Performance Indicator</b>	» Effective communication procedures in place for all phases as required.
<b>Monitoring</b>	» <u>An incident reporting system should be used to record non-conformances to the EMPr. Grievance mechanism procedures should be implemented.</u> » <u>Public complaints register must be developed and maintained.</u>

### OBJECTIVE 3: Protection of Heritage and Palaeontological Resources

<b>Project component/s</b>	» Wind turbines » <u>Cabling between turbines</u> » Access roads » <u>Overhead power line – specifically pylons</u> » All other infrastructure
<b>Potential Impact</b>	» Destruction of potential fossil/palaeontological resources
<b>Activity/risk source</b>	» Activities associated with construction of the wind farm » Activities associated with operation
<b>Mitigation: Target/Objective</b>	» <u>Protection of identified heritage sites</u> » <u>Protection of potential heritage artefacts uncovered during construction</u>

<b>Mitigation: Action/control</b>	<b>Responsibility</b>	<b>Timeframe</b>
All palaeontological specialist work should conform to international best practice for palaeontological fieldwork and (e.g. data recording fossil collection and curation) should adhere as far as possible to the minimum standards for Phase 2 palaeontological studies recently	<u>Proponent</u> and Specialist	Pre-Construction

Mitigation: Action/control	Responsibility	Timeframe
developed by SAHRA (2013).		
<u>On-site investigation to identify and cordon off sensitive heritage sites/areas must be undertaken prior to commencement of construction.</u>	Contractor(s) in conjunction with the ECO/EO/ Environmental Representative	Pre-construction
A realistic, collaborative monitoring programme and protocol should be drawn up by the palaeontologist in conjunction with the proponent.	<u>Proponent</u> and Specialist	Pre-construction
<u>If any significant changes, i.e. outside what was considered in the walkthrough, are made to the final layout of the Hopefield Small Wind Farm, an archaeological walk-through survey of the changes must be conducted and further mitigatory recommendations may be made if necessary.</u>	<u>Proponent</u> and Specialist	<u>Design / Pre-Construction</u>
<u>All buffers and no-go areas stipulated in the Heritage Report must be adhered to for both facilities, roads and power lines.</u>	<u>Proponent</u> and Specialist	<u>Pre-Construction</u>

<b>Performance Indicator</b>	» No impacts on valuable fossil heritage. » No impacts on valuable heritage resources.
<b>Monitoring</b>	» <u>Contractor to cordon off sensitive sites</u>



## MANAGEMENT PROGRAMME FOR THE WIND ENERGY FACILITY: CONSTRUCTION

## CHAPTER 6

### 6.1. Overall Goal for Construction

The construction phase of the Hopefield Small Wind Farm should be undertaken in such a way that ensures the construction activities are properly managed in respect of environmental aspects and impacts and enables the Wind Farm construction activities to be undertaken without significant disruption to other land uses in the area, in particular with regard to noise impacts, traffic and road use, and effects on local residents. The construction phase of the facility should also be undertaken in such a way as to minimise the impact on the vegetation on site., fauna and avifauna on the site as well as on any archaeological and historical value the site may have, as determined by the BAR and resultant walkthrough surveys.

### 6.2. Institutional Arrangements: Roles and Responsibilities for the Construction Phase of the Wind Energy Facility

The Proponent, Hopefield Small Wind Farm (Pty) Ltd must ensure that the implementation of the Wind Farm complies with the requirements of any and all environmental authorisations and permits, and obligations emanating from other relevant environmental legislation. This obligation is partly met through the development of the EMPr, and the implementation of the EMPr through its integration into the contract documentation. These are outlined below. Hopefield Small Wind Farm (Pty) Ltd will retain various key and facilitation roles and responsibilities during the construction of the Wind Farm, however, the Contractor(s) will be responsible for implementing the conditions of the EMPr.

#### a) OBJECTIVE 1: To establish clear reporting, communication, and responsibilities in relation to environmental incident overall implementation of the EMPr

Formal responsibilities are necessary to ensure that key procedures are executed. Specific responsibilities of the Project Manager, Site Manager, Safety, Health and Environment Representative, Environmental Officer (EO)/ Environmental Representative, ECO and Contractor for the construction phase of this project are as detailed below. Formal responsibilities are necessary to ensure that key procedures are executed.

The **Owner's Engineer** will:

- » Be fully knowledgeable with the contents of the Basic Assessment.
- » Be fully knowledgeable with the contents and conditions of the Environmental Authorisation (once issued).
- » Be fully knowledgeable with the contents of the Environmental Management Plan.
- » Be fully knowledgeable with the contents of all relevant environmental legislation and ensure compliance with these.
- » Have overall responsibility of the EMP and its implementation.
- » Ensure that Hopefield Small Wind Farm (Pty) Ltd and its Contractor(s) are made aware of all stipulations within the EMP.
- » Ensure that the EMP is correctly implemented throughout the project by means of site inspections and meetings. This will be documented as part of the site meeting minutes.
- » Ensure that no actions are taken which will harm or may indirectly cause harm to the environment, and take steps to prevent pollution on the site.
- » Confine activities to the demarcated construction site.
- » Be fully conversant with the Basic Assessment for the project, the conditions of the Environmental Authorisation (once issued), and all relevant environmental legislation.

Hopefield Small Wind Farm (Pty) Ltd must appoint a suitably qualified independent **Environmental Control Officer** (ECO) for the construction phase of the project. The ECO will be responsible for monitoring, reviewing and verifying compliance by the Contractor with the environmental specification. Accordingly, the ECO will:

- » Be fully knowledgeable with the contents of the Basic Assessment.
- » Be fully knowledgeable with the contents and with the conditions of the Environmental Authorisation including all subsequent amendments.
- » Be fully knowledgeable with the contents of the EMPr.
- » Be fully knowledgeable of all the project licences and permits issued to the site and ensure communication to the relevant personnel on the conditions contained therein.
- » Be fully knowledgeable with the contents of all relevant environmental legislation, and ensure compliance with them.
- » Ensure that the contents of this document are communicated to the Contractor(s) site staff and that the Site Manager and Contractors are constantly made aware of the contents through regular discussion.
- » Ensure that the compliance of the EMPr, EA and legislative is monitored through regular and comprehensive inspection of the site and surrounding areas.
- » Ensure that if the EMPr, EA and/or the legislation conditions, regulations or specifications are not followed then appropriate measures are undertaken to address any non-compliances (for example an ECO may cease an activity to prevent a non-compliance from continuing, if reasonable (i.e. if all other options have been exhausted)).

- » Monitoring and verification must be implemented to ensure that environmental impacts are kept to a minimum, as far as possible.
- » Ensure that the Site Manager has input into the review and acceptance of construction methods and method statements.
- » Ensure that activities on site comply with all relevant environmental legislation.
- » Ensure that appropriate measures are undertaken to address any non-compliances recorded. The Method Statements must include the timelines to close out the identified non-conformances.
- » Ensure that a removal is ordered of any person(s) and/or equipment responsible for any contravention of the specifications of the EMPr and/or project permits.
- » Keep record of all environmental activities on site, problems identified, transgressions noted and a task schedule of tasks undertaken by the ECO<sub>2</sub>
- » Ensure that the compilation of progress reports for submission to the Owner's Engineer Proponent, with input from the Site Manager, takes place on a regular basis, weekly, Monthly Reports including Final Post-Construction Audit Reports.
- » Ensure that there is regular communication with the Contractor and/or Site Manager regarding the monitoring of the site.
- » Ensure that any non-compliance or remedial measures that need to be applied are reported and recorded.
- » Independently report to the Department of Environment (National & Provincial) in terms of compliance with the specifications of the EMPr and conditions of the EA if and when requested.
- » Submit independent reports to the DEA and other regulating authorities regarding compliance with the requirements of the EMPr, EA and other environmental permits.

**Project Manager/ Coordinator will:**

- » Ensure all specifications and legal constraints specifically with regards to the environment are highlighted to the Contractor(s) so that they are aware of these.
- » Ensure that the project Contractor(s) are made aware of all stipulations within the EMPr.
- » Coordinate the correct implementation of the EMPr throughout the project by means of site inspections and meetings. This will be documented as part of the site meeting minutes.
- » Be fully knowledgeable with the BA Report for the project, the EMPr, the conditions of the Environmental Authorisation, and all relevant licences and permits.
- » Be fully knowledgeable with the contents of all relevant licences and permits.

**Site Manager** (Contractor(s)'s on-site Representative) will:

- » Be fully knowledgeable with the contents of the BA Report and risk management.
- » Be fully knowledgeable with the contents and conditions of the Environmental Authorisation and related amendments.

- » Be fully knowledgeable with the contents of the EMPr.
- » Be fully knowledgeable with the contents of all relevant environmental legislation and ensure compliance with these.
- » Have overall responsibility of the EMPr and its implementation.
- » Ensure that Hopefield Small Wind Farm (Pty) Ltd and its Contractor(s) are made aware of all stipulations within the EMP.
- » Ensure that the EMP is correctly implemented throughout the project by means of site inspections and meetings. This will be documented as part of the site meeting minutes.
- » Ensure that audits are conducted to ensure compliance to the EMPr.
- » Ensure there is communication with the Project Manager, the ECO, the EO/ Environmental Representative, and relevant discipline engineers on matters concerning the environmental compliance.
- » Be fully knowledgeable with the contents of all project licences and permits.
- » Ensure that no actions are taken which will harm or may indirectly cause harm to the environment, and take steps to prevent pollution on the site.
- » Confine activities to the demarcated construction site.
- » Be fully conversant with the Basic Assessment for the project, the conditions of the Environmental Authorisation, and all relevant environmental legislation.

As a general mitigation strategy, the ECO must be present at the site on a regular basis unless the ECO determines from his/her on-site experience that this is not required (apart from the normal auditing requirements – discussed below). The ECO must support and adequately monitor construction activities on site. The ECO shall remain engaged until all rehabilitation measures, as required for implementation due to construction damage, are completed and the site handed over for operation. As an option, the ECO should inform initial site clearing activities and initial foundation excavations and thereafter they can determine due to the nature of the site and the compliance of the contractor(s), if they can reduce the time on site as long as there is an EO on site regularly overseeing all the environmental requirements. The minimum part time option would be monthly site compliance inspections, provided that compliance with the requirements of the EA, EMPr and environmental legislation is maintained.

**Contractor(s) and Service Providers/ Sub-Contractors:** All contractors (including sub-contractors and staff) and service providers are ultimately responsible for:

The Contractor(s) is responsible for the overall execution of the activities envisioned in the construction phase including the implementation and compliance with recommendations and conditions of the EMPr. It is important that the Contractor(s) is fully aware of the responsibilities in terms of the relevant environmental legislation and the contents of this EMPr. The Contractor(s) is responsible for informing employees and sub-contractors of their environmental obligations in terms of the environmental specifications, and for ensuring that employees are adequately experienced and properly

trained in order to execute the works in a manner that will minimise environmental impacts. The Contractor(s)'s obligations in this regard include the following:

- » Ensuring adherence to the environmental management specifications.
- » Ensuring that Method Statements are submitted to the Site Manager (and ECO) for approval before any work is undertaken. Any lack of adherence to this will be considered as non-compliance to the specifications of the EMP.
- » Ensuring that any instructions issued by the Site Manager on the advice of the ECO are adhered to.
- » Ensure implementation and compliance with the EMPr at all times during construction activities.
- » Responsible for the implementation of corrective actions enforced by the ECO/ EO/ Environmental Representative for non-conformances recorded within a reasonable period of time. The Method Statement must indicate the turn-around time for closing out the non-conformances.
- » Ensuring that a report is tabled at each site meeting, which will document all incidents that have occurred during the period before the site meeting.
- » Ensuring that a register is kept in the site office, which lists all transgressions issued by the ECO.
- » Ensuring that a register of all public complaints is maintained.
- » Ensuring that all employees, including those of sub-contractors receive training before the commencement of construction in order that they can constructively contribute towards the successful implementation of the EMP (i.e. ensure their staff are appropriately trained as to the environmental obligations).
- » Employees must be provided with a basic understanding of the key environmental features of the construction site and the surrounding environment by the Contractor Environmental Representative/Officer.
- » A copy of the EMPr must be easily accessible to all on-site staff members.
- » Employees must be familiar with the requirements of this EMPr and the environmental specifications as they apply to the construction of the proposed facility.
- » Prior to commencing any site works, all employees and sub-contractors must have attended an environmental awareness training course which must provide staff with an appreciation of the project's environmental requirements, and how they are to be implemented. The training is to be conducted by the Environmental Representative/Officer.
- » Staff will be informed of environmental issues as deemed necessary by the ECO/ EO/ Environmental Representative.

**Contractor's EO and Environment Representative<sup>3</sup>:** The EO will be responsible for implementation of this EMPr and should be appointed prior to any commencement of the activities.

The Contractor's EO/ Environmental Representative should:

- » Be well versed with all the project documentation and general environmental matters.
- » Understand the relevant environmental legislation and processes and the implementation thereof.
- » Understand the hierarchy of Environmental Compliance Reporting, and the implications of Non-Compliance.
- » Know the background of the project and understand the implementation programme.
- » Be able to resolve conflicts and make recommendations on site in terms of the requirements of this Specification.  
Keep accurate and detailed records of all EMPr-related activities on site. The EO shall keep a regular diary for monitoring the site specific activities as per project schedule.
- » As a general mitigation strategy, the EO should supervise any flora relocation and faunal rescue activities that may need to take place during the site clearing (i.e. during site establishment, and excavation of foundations) and therefore needs the relevant training/ experience. The EO will have overall responsibility for environmental management and implementation of mitigations in absence of the ECO.
- » The EO is responsible for managing the on-site implementation of this EMPr and other Project Permits/Authorisations.
- » Ensure or otherwise train and induct all contractor's employees prior to commencement of any works;
- » Compilation of regular Monitoring Reports to be submitted to the ECO and Site Manager.
- » In addition, the EO/ Environmental Representative must act as project liaison and advisor on all environmental and related issues and ensure that any complaints received from the public are duly recorded and forwarded to the Site Manager, ECO and Contractor(s).

### 6.3. Objectives for the Construction EMPr

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<sup>3</sup> This refers to the Contractor's designated environmental site representative. The person might have a different title, e.g. Safety, Health and Environmental officer, but their core mandate will be as is described in this EMPr.

In order to meet the goal for construction, the following objectives have been identified, together with necessary actions and monitoring requirements.

**OBJECTIVE 2 : Securing the site and site establishment**

The Contractor(s) must take all reasonable measures to ensure the safety of the public in the surrounding area. Where the public could be exposed to danger by any of the works or site activities, the Contractor(s) must, as appropriate, provide suitable flagmen, barriers and/or warning signs in English and any other relevant indigenous languages, all to the approval of the Site Manager. All unattended open excavations shall be adequately demarcated and/or fenced (fencing shall consist of a minimum of three strands of wire wrapped with danger tape). Adequate protective measures must be implemented to prevent unauthorised access to the working area and the internal access/haul routes.

<b>Project component/s</b>	Project components affecting the objective: <ul style="list-style-type: none"> <li>» Wind energy turbines</li> <li>» Cabling between turbines</li> <li>» Access roads</li> <li>» Substation</li> <li>» <u>power line</u></li> <li>» Operation and maintenance buildings</li> <li>» <u>Laydown areas and hardstands</u></li> </ul>
<b>Potential Impact</b>	<ul style="list-style-type: none"> <li>» Hazards to landowners and public</li> <li>» Security of materials</li> <li>» Substantially increased damage to natural vegetation and adjacent sensitive vegetation, due largely to ignorance/unawareness of where such areas are located.</li> <li>» <u>Potential impact on fauna and avifauna</u></li> </ul>
<b>Activities/risk sources</b>	<ul style="list-style-type: none"> <li>» Open excavations (foundations and cable trenches)</li> <li>» Movement of construction employees, vehicles and plant in the area and on-site</li> </ul>
<b>Mitigation: Target/Objective</b>	<ul style="list-style-type: none"> <li>» To secure the site against unauthorised entry</li> <li>» To protect members of the public/landowners/residents</li> </ul>

<b>Mitigation: Action/control</b>	<b>Responsibility</b>	<b>Timeframe</b>
Secure site, working areas and excavations in an appropriate manner, <u>as agreed with the Site Manager, ECO/ EO. Environmental Representative</u>	Contractor/ <u>ECO/ EO/ Environmental Representative</u>	Construction, During site establishment Maintenance: for duration of

Mitigation: Action/control	Responsibility	Timeframe
		Contract.
Where necessary to control access, fence and secure area <u>using appropriate means</u> , and implement access control procedures – <u>fencing should take cognisance of farming activities, e.g. not limiting game and/or sheep and other animals from accessing water/ food (fencing should be discussed and planned in conjunction with the landowners prior to construction).</u>	Contractor	Construction, During site establishment Maintenance: for duration of Contract.
Fence and secure Contractor's equipment camp.	Contractor	Construction, Erection: during site establishment Maintenance: for duration of Contract.
The Contractor must take all reasonable measures to ensure the safety of the public in the surrounding area. Where the public could be exposed to danger by any of the works or site activities, the Contractor must, as appropriate, provide suitable flagmen, barriers and/or warning signs in English, Afrikaans, Xhosa and any other relevant indigenous languages, all to the approval of the Site Manager.	Contractor	Construction
All development footprints for roads, buildings, underground cables, laydown areas and turbine footings should be fenced off and clearly indicated with flags and/or danger tape strips. There is to be no disturbance outside these demarcated areas, at least not without the permission of the ECO.	Contractor	Construction
Fenced off development areas should be bushcut using appropriate methods, following a Search and Rescue of the area. The substantial cut plant material must then be gathered up and stored for later use as mulch on the areas in need of rehabilitation. The material (which will contain large amounts of seed) should be stored in a shaded and dry area, with at least some airflow (a shade cloth wall with a proper waterproof roof is ideal), and should be stored for as short a period as possible before use.	Contractor	Construction
All cable trenches, etc. through sensitive areas should be excavated carefully in order to minimise damage to surrounding areas. All stockpiled sand should be replaced within one week of trench opening.	Contractor	Prior to Construction
<u>Develop and implement an efficient access control system which allows for the identification of all people</u>	<u>Contractor(s)</u>	<u>During site establishment</u>



<b>Mitigation: Action/control</b>	<b>Responsibility</b>	<b>Timeframe</b>
<u>on site.</u>		<u>Implement for duration of contract</u>
Concrete batching plant/s to be located in areas of low sensitivity within the approved development area or an area approved by the ECO.	<u>Contractor(s)</u>	During site establishment
<u>All unattended open excavations must be adequately demarcated and/or fenced (fencing shall consist of a minimum of three strands of wire wrapped with danger tape).</u>	<u>Contractor(s)</u>	<u>During site establishment</u>
Establish appropriately bunded areas for storage of hazardous materials (i.e. fuel to be required during construction). Bunds must be constructed in order to accommodate 110% of the volume of the substance stored.	<u>Contractor(s)</u>	<u>During site establishment and during construction</u>
Areas around fuel tanks must be bunded or contained in an appropriate manner as per the requirements of SABS 089:1999 Part 1.	<u>Contractor(s)</u>	<u>During site establishment and during construction</u>
<u>Establish the necessary ablution facilities with chemical toilets and provide adequate sanitation facilities and ablutions for construction workers (at least one sanitary facility for each sex and for every 30 workers as per the 2014 Construction Regulations; Section 30(1) (b) at appropriate locations on site).</u>	<u>Contractor(s)</u>	<u>During site establishment and during construction</u>
<u>Ablution or sanitation facilities should not be located within 100 m from a 1:100 year flood line or within 32m of a watercourse if the 1:100 year flood line is unknown/uncertain.</u>	<u>Contractor(s)</u>	<u>Site establishment, and duration of construction</u>

<b>Performance Indicator</b>	<ul style="list-style-type: none"> <li>» Site is secure and there is no unauthorised entry.</li> <li>» No members of the public/ landowners injured as a result of construction activities.</li> <li>» <u>Fauna and flora is protected as far as practically possible</u></li> <li>» <u>Appropriate and adequate waste management and sanitation facilities provided at construction site.</u></li> </ul>
<b>Monitoring and Reporting</b>	<ul style="list-style-type: none"> <li>» Regular visual inspection of fence for signs of deterioration/forced access.</li> <li>» An incident reporting system used to record non-conformances to the EMPr.</li> <li>» Public complaints register used to record complaints received.</li> <li>» <u>ECO/ EO/ Environmental Representative</u> to monitor all construction areas on a continuous weekly and monthly basis until all construction is completed; immediate report backs to site manager.</li> <li>» <u>ECO/ EO/ Environmental Representative</u> to address any infringements with responsible contractors as soon as these are recorded.</li> </ul>

	» ECO to monitor harvesting; horticulturist to liaise with botanist; botanist to review rehabilitation success after an adequate period postsowing in rehabilitation areas (if necessary), and to recommend additional measures if rehabilitation deemed insufficient.
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### **OBJECTIVE 3 : Appropriate sourcing of labour**

<b>Project component/s</b>	» wind turbines » power lines » substation » access roads
<b>Potential Impact</b>	» Job opportunities for unskilled labourers from the local communities
<b>Activities/risk sources</b>	» Unskilled job opportunities (excavation activities, erection of fences, eradication of weed species by hand, etc.)
<b>Mitigation: Target/Objective</b>	» To ensure that local labour is utilised as far as possible.

<b>Mitigation: Action/control</b>	<b>Responsibility</b>	<b>Timeframe</b>
Before the construction phase commences Hopefield Small Wind Farm (Pty) Ltd should meet with representatives from the Saldanha Bay Municipality to establish the existence of a skills database for the area. If such a database exists, it should be made available to the contractors appointed for the construction phase.	Contractor(s)	Tender Design and Review stage
The recruitment selection process should seek to promote gender equality and the employment of women wherever possible.	Contractor(s)	Duration of Contract
Training of labour should be undertaken to benefit individuals beyond completion of the project	Contractor(s)	Duration of Contract
Construction workers should be recruited from the local area in and around the towns of Hopefield, Saldanha, Vredenburg and Malmesbury, etc., as far as possible.	Contractor(s)	Duration of Contract
Where required, implement appropriate training and skills development programmes prior to the initiation of the construction phase to ensure that Contractor economic development commitments % targets are met. Skills audit to be undertaken to determine training and skills development requirements.	Contractor(s)	Pre-construction
Local suppliers should be used where possible	Contractor(s)	Duration of

Mitigation: Action/control	Responsibility	Timeframe
		Contract

**OBJECTIVE 4 : Maximise local employment and business opportunities associated with the construction phase**

It is acknowledged that skilled personnel are required for the construction of the wind turbines and associated infrastructure. However, where semi-skilled and unskilled labour is required, opportunities for local employment should be maximised as far as possible. Employment of locals and the involvement of local Small, Micro and Medium Enterprises (SMMEs) would enhance the social benefits associated with the project, even if the opportunities are only temporary. The procurement of local goods could furthermore result in positive economic spin-offs. It is acknowledged that socio-economic development forms a major part of the REIPPPP and the Project therefore has various targets to meet but this must also be achieved where the appropriate skills, training and experience exist.

<b>Project component/s</b>	» <u>Construction activities associated with the establishment of the wind farm, including associated infrastructure.</u>
<b>Potential Impact</b>	» The opportunities and benefits associated with the creation of local employment and business should be maximised. However, due to the relatively small size and complexity of the facility the number of employment and business opportunities for locals will be limited.
<b>Activities/risk sources</b>	» The employment of outside contractors to undertake the work and who make use of their own labour will reduce the employment and business opportunities for locals. Employment of local labour will maximise local employment opportunities.
<b>Mitigation: Target/Objective</b>	» The Contractor, in discussions with the local municipality, should aim to employ as many workers (skilled, semi-skilled / low-skilled) from the local areas/ towns, as possible. » The Contractor should also develop a database of local BBBEE service providers

Mitigation: Action/control	Responsibility	Timeframe
Employ as many workers (skilled, semi-skilled / low-skilled) from the local area/ nearby towns <u>as feasible</u> .	Contractor(s)	Project duration
Where required, implement appropriate training and skills development programmes prior to the initiation of the construction phase to ensure that local employment target is met.	Contractor(s)	Project duration

Mitigation: Action/control	Responsibility	Timeframe
Develop a database of local Broad Based Black Economic Empowerment (BBBEE) service providers and ensure that they are informed of relevant tenders and job opportunities.	Contractor(s)	Project duration
Identify potential opportunities for local businesses.	Proponent/ Contractor(s)	Project duration

<b>Performance Indicator</b>	<ul style="list-style-type: none"> <li>» Source as many local labourers as possible.</li> <li>» Database of potential local BBBEEE services providers in place before construction phase commences.</li> </ul>
<b>Monitoring and Reporting</b>	<ul style="list-style-type: none"> <li>» <u>The proponent's Community Liaison Officer (CLO) and or appointed ECO must monitor various indicators to encourage they are met as far as feasible.</u></li> <li>» An incident reporting system must be used to record non-conformances to the EMPr.</li> <li>» <u>Public complaints register used to record complaints received.</u></li> <li>» <u>A Site Specific Grievance Mechanism must be communicated and implemented prior to construction.</u></li> </ul>

**OBJECTIVE 5: Avoid the negative social impacts on family structures and social networks due to the presence of construction workers from outside the area, including potential loss of livestock, game, other fauna and damage to farm infrastructure**

While the presence of construction workers does not in itself constitute a social impact, the manner in which construction workers conduct themselves can impact on the local community. In this regard the most significant negative impact is associated with the disruption of existing family structures and social networks. This risk is linked to the potential behaviour of male construction workers, including an increase in alcohol and drug use, an increase in crime levels (including stock theft), the loss of girlfriends and or wives to construction workers, an increase in teenage and unwanted pregnancies, an increase in prostitution and an increase in sexually transmitted diseases.

The potential risk to local family structures and social networks is, however, likely to be low. The low and semi-skilled workers are likely to be local residents and will therefore form part of the local family and social network.

<b>Project component/s</b>	<ul style="list-style-type: none"> <li>» Construction and establishment activities associated with the establishment of the wind farm, including associated infrastructure.</li> <li>» Construction work force.</li> </ul>
<b>Potential Impact</b>	<ul style="list-style-type: none"> <li>» The presence of construction workers who live outside the area and</li> </ul>

	<p>who are housed in local towns can impact on family structures and social networks.</p> <ul style="list-style-type: none"> <li>» <u>Impacts on the surrounding environment due to inadequate sanitation and waste removal facilities.</u></li> <li>» <u>Impact on safety of farmers and communities (increased crime etc.) by construction workers and also damage to farm infrastructure such as gates and fences.</u></li> </ul>
<b>Activities/risk sources</b>	<ul style="list-style-type: none"> <li>» The presence of construction workers can impact negatively on family structures and social networks, especially in small, rural communities.</li> <li>» The presence of construction workers on the site can result in stock thefts <u>or illegal hunting/ trapping of fauna and or game</u> and damage to farm infrastructure.</li> </ul>
<b>Mitigation: Target/Objective</b>	<ul style="list-style-type: none"> <li>» Avoid and or minimise the potential impact of construction workers on the local community and livelihoods.</li> <li>» <u>To minimise impacts on the social and biophysical environment.</u></li> </ul>

<b>Mitigation: Action/control</b>	<b>Responsibility</b>	<b>Timeframe</b>
<p>Establish contact with the adjacent farmers and develop a Code of Conduct for construction workers.</p> <p>Ensure that construction workers attend a brief session before they commence activities. The aim of the briefing session is to inform them of the rules and regulations governing activities on the site as set out in the Code of Conduct.</p> <p>Ensure that all workers are informed at the outset of the construction phase of the conditions contained on the Code of Conduct.</p>	<u>Contractor(s)</u>	Pre-construction/ construction
<u>Ensure that construction workers who are found guilty of breaching the Code of Conduct are disciplined accordingly. All disciplinary hearings and/or dismissals must be in accordance with South African labour legislation.</u>	<u>Contractor(s)</u>	<u>Pre-construction/ construction</u>
<u>The housing of construction workers on the site should be limited to security personnel, if required.</u>	<u>Contractor(s)</u>	<u>Pre-construction/ construction</u>
Compensate farmers / community members for any proven cost for any losses, such as livestock, damage to infrastructure etc.	<u>Contractor(s)</u>	<u>Construction</u>
<u>Ensure that all farm gates are locked (when not in use) and secure (when in use) at all times, Gate Management to be discussed with the landowners prior to construction activities. The Landowner Condition including gate management must be documented in the Access and/or Gate Management Method Statements.</u>	<u>Contractor(s)</u>	<u>Construction</u>
<u>Inform the landowner of activity on their land as per</u>	<u>Contractor(s)</u>	<u>Duration _____ of</u>

<b>Mitigation: Action/control</b>	<b>Responsibility</b>	<b>Timeframe</b>
<u>agreed landowner construction requirements or at least two (2) days in advance of planned activities</u>		<u>contract</u>
<u>Procedures and measures to prevent, and in worst cases, attend to fires should be developed in consultation with the surrounding property owners.</u>	<u>Contractor(s)</u>	<u>Pre- construction and when required</u>
<u>Contact details of emergency and police services should be prominently displayed on site.</u>	<u>Contractor(s)</u>	<u>Construction</u>
<u>Appropriate fire-fighting equipment must be present on site and members of the workforce should be appropriately trained in using this equipment in the fighting of veld fires.</u>	<u>Contractor(s)</u>	<u>Construction</u>
<u>Employees, visitors and/or subcontractors should be made well aware of the consequences of any damage to private property and/or loss of livestock, game and/or other fauna.</u>	<u>Proponent/ Contractor(s)</u>	<u>Duration of contract</u>
<u>Should there be any damage to private property and/or loss of livestock, game and/or other fauna that can be linked to the Contractor, or any subcontractor, the landowner shall be compensated accordingly upon sufficient proof thereof.</u>	<u>Proponent/ Contractor(s)</u>	<u>Duration of contract</u>
<u>Reasonable site access control should be implemented.</u>	<u>Contractor(s)</u>	<u>Duration of contract</u>

<b>Performance Indicator</b>	<ul style="list-style-type: none"> <li>» Employment policy and tender documents that set out requirement for local employment and targets completed before construction phase commences.</li> <li>» Code of Conduct developed and approved prior to commencement of construction phase.</li> <li>» Labour locally sourced, where possible.</li> <li>» Tender documents for contractors include recommendations for construction camp.</li> <li>» All construction workers made aware of Code of Conduct within first week of being employed.</li> <li>» Briefing session with construction workers held at outset of construction phase.</li> <li>» <u>Documentation of Landowner Requirements to be agreed with the contractor prior to commencement of construction.</u></li> <li>» <u>Appropriate waste and wastewater management.</u></li> <li>» <u>Community Monitoring Forum in place before construction phase commences.</u></li> <li>» <u>No criminal activities and theft of livestock, illegal hunting or trapping of game and/or other fauna attributable to the construction workers are reported.</u></li> <li>» <u>No complaints received from landowners or the general public.</u></li> <li>» <u>No fires or on-site accidents occur.</u></li> </ul>
<b>Monitoring and</b>	<ul style="list-style-type: none"> <li>» The Proponent, Contractor(s) and/or the appointed ECO must monitor</li> </ul>

<b>Reporting</b>	<p>indicators listed above to ensure that they have been met for the construction phase.</p> <ul style="list-style-type: none"> <li>» An incident reporting system must be used to record non-conformances to the EMPr.</li> <li>» <u>Public complaints register used to record complaints received.</u></li> </ul>
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### **OBJECTIVE 6 : Noise control**

Construction noise as well as traffic movement to and from the Wind Farm site, particularly of heavy-duty vehicles during construction, could potentially result in a noise impact on the residents adjacent to the R45 near the proposed facility.

<b>Project component/s</b>	<ul style="list-style-type: none"> <li>» Wind Energy turbines</li> <li>» <u>Cabling between turbines</u></li> <li>» Access roads</li> <li>» <u>Overhead Power line(s)</u></li> <li>» Construction of infrastructure</li> </ul>
<b>Potential Impact</b>	<ul style="list-style-type: none"> <li>» Increased noise levels at potentially sensitive receptors.</li> <li>» Potentially changing the acceptable land use capability.</li> <li>» Nuisance noise from construction activities affecting the surrounding community.</li> </ul>
<b>Activity/risk source</b>	<ul style="list-style-type: none"> <li>» Any construction activities taking place within 500 m from any potentially noise-sensitive developments (NSDs).</li> <li>» <u>Site preparation and earthworks</u></li> <li>» <u>Construction-related transport</u></li> <li>» <u>Foundations or plant equipment installation</u></li> <li>» <u>Building activities</u></li> <li>» <u>Power line construction activities</u></li> </ul>
<b>Mitigation: Target/Objective</b>	<ul style="list-style-type: none"> <li>» Ensure equivalent A-weighted daytime noise levels below 45 dBA at potentially sensitive receptors.</li> <li>» Ensure as far as possible that maximum noise levels at potentially sensitive receptors be less than 65 dBA.</li> <li>» Prevent the generation of a disturbing or nuisance noises.</li> <li>» Ensure acceptable noise levels at surrounding stakeholders and potentially sensitive receptors.</li> <li>» Ensuring compliance with the Noise Control Regulations.</li> </ul>

<b>Mitigation: Action/control</b>	<b>Responsibility</b>	<b>Timeframe</b>
<u>On-site construction activities should be limited to daylight hours as far as possible. No construction activities after 13:00 on Saturdays, Sundays and public holidays. Should construction activities need to be undertaken outside of these times, landowners need to be consulted. Where work takes place outside of normal</u>	<u>Contractor(s)</u>	Construction

Mitigation: Action/control	Responsibility	Timeframe
<u>working hours, the relevant legislation should be adhered to.</u>		
<u>Construction staff working in areas where the 8-hour ambient noise levels exceed 75dBA must wear ear protection equipment.</u>	Contractor(s)	Construction
<u>Construction noise must be managed according to the Noise Control Regulations and SANS 10103.</u>	Contractor(s)	Construction
The construction crew must abide by the <u>national standards and local by-laws, if any</u> , regarding noise.	Contractor	Construction
All construction equipment, including vehicles, must be properly and appropriately maintained in order to minimise noise generation.	Contractor(s)	Construction
Establish a line of communication and notify all stakeholders and NSDs of the means of registering any issues, complaints or comments.	Contractor	Duration of construction phase  <u>All phases of project.</u>
Notify potentially <u>noise</u> sensitive receptors about work to take place at least 2 days before the activity in the vicinity (within 500 m) of the NSD is to start. The following information to be presented in writing: » Description of activity to take place; » Estimated duration of activity; » Working hours; and » Contact details of responsible party.	Contractor	Duration of construction phase  <u>At least 2 days, but not more than 5 days before activity is to commence.</u>
<u>All wind turbines should be located at a setback distance of 500m from any homestead and day/night noise criteria level at the nearest residents of 45dB(A) should be used to locate the turbines.</u>	Contractor	<u>Duration of construction phase</u>
Ensure that all equipment is maintained and fitted with the required noise abatement equipment.	Contractor	Duration of construction phase
When any noise complaints are received, noise monitoring should be conducted at the complainant, followed by feedback regarding noise levels measured.	Contractor	Duration of construction phase ( <u>within 7 days after complaint was registered</u> )
Where possible construction work should be undertaken during normal working hours (06H00 – 22H00), from Monday to Saturday. If agreements can be reached (in writing) with potentially sensitive receptors (within a 1,000 distance), these working hours can be extended.	Contractor	Duration of construction phase



Mitigation: Action/control	Responsibility	Timeframe
<u>Reducing and maintaining noise disturbance to a minimum particularly with regards to blasting 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. Blasting should be kept to a minimum and, where possible, synchronized with neighbouring blasts.</u>	Contractor	Duration of construction phase

<b>Performance Indicator</b>	<ul style="list-style-type: none"> <li>» No complaints received concerning noise.</li> <li>» Equivalent A-weighted noise levels below 45 dBA at potentially sensitive receptors (8 hours).</li> <li>» Ensure that maximum noise levels at potentially sensitive receptors are less than 65 dBA as far as possible.</li> </ul>
<b>Monitoring and Reporting</b>	<ul style="list-style-type: none"> <li>» Ambient sound measurements are recommended to take place on a regular basis.</li> <li>» <u>Should a complaint about noise be reported, the Proponent and/or Contractor(s) is to look into the matter and determine steps to deal with the complaint</u> An incident reporting system must be used to record non-conformances to the EMPr.</li> <li>» <u>Public complaints register used to record complaints received.</u></li> </ul>

### **OBJECTIVE 7 : Management of dust and emissions to air and damage to roads**

During the construction phase, limited gaseous or particulate emissions (and dust) are anticipated from exhaust emissions from construction vehicles and equipment on-site, as well as vehicle entrained dust from the movement of vehicles on the internal access roads.

<b>Project component/s</b>	<ul style="list-style-type: none"> <li>» Wind Energy turbines</li> <li>» <u>Cabling between turbines</u></li> <li>» Access roads</li> <li>» Substation</li> <li>» Power line</li> <li>» <u>Watercourse crossing, i.e. access roads and culverts</u></li> <li>» <u>Batching Plant</u></li> <li>» <u>Camp site</u></li> </ul>
<b>Potential Impact</b>	<ul style="list-style-type: none"> <li>» Heavy vehicles can generate noise and dust impacts. Movement of heavy vehicles can also damage roads.</li> <li>» Dust and particulates from vehicle movement to and on-site, foundation excavation, road construction activities, road maintenance activities, temporary stockpiles, and vegetation clearing affecting the surrounding residents (dust nuisance) and visibility.</li> </ul>

	<ul style="list-style-type: none"> <li>» Release of minor amounts of air pollutants (for example NO<sub>2</sub>, CO and SO<sub>2</sub>) from vehicles and construction equipment</li> </ul>
<b>Activities/risk sources</b>	<ul style="list-style-type: none"> <li>» The movement of heavy vehicles and their activities on the site can result in noise and dust impacts and damage roads.</li> <li>» Clearing of vegetation and topsoil.</li> <li>» Excavation, grading and scraping.</li> <li>» Transport of materials, equipment and components on internal access roads.</li> <li>» Re-entrainment of deposited dust by vehicle movements.</li> <li>» Wind erosion from topsoil and spoil stockpiles and unsealed roads and surfaces.</li> <li>» Fuel burning from construction vehicles with combustion engines.</li> </ul>
<b>Mitigation: Target/Objective</b>	<ul style="list-style-type: none"> <li>» To avoid and or minimise the potential noise and dust impacts associated with heavy vehicles, and also minimise damage to roads.</li> <li>» To ensure emissions from all vehicles are minimised, where possible, for the duration of the construction phase.</li> <li>» To minimise nuisance to the community and adjacent landowners from dust emissions and to comply with workplace health and safety requirements for the duration of the construction phase.</li> </ul>

<b>Mitigation: Action/control</b>	<b>Responsibility</b>	<b>Timeframe</b>
Roads must be maintained to a manner that will ensure that dust from road or vehicle sources is not visibly excessive.	Contractor	Erection: during site establishment Maintenance: for duration of contract
Appropriate dust suppressant must be applied on all exposed areas and stockpiles <u>during periods of high wind as required to minimise/control airborne dust. Such suppression techniques may include wet suppression, chemical stabilisation, the use of a wind fence, covering surfaces with straw chippings and re-vegetation of open areas.</u>	Contractor	Duration of contract
Implement appropriate dust suppression measures on site such as wetting roads on a regular basis <u>including during site clearing and periods of high winds (by using non-potable water as far as practically possible).</u>	<u>Contractor(s)</u>	Construction
Haul vehicles moving outside the construction site carrying material that can be wind-blown must be covered with tarpaulins <u>if determined necessary by the ECO.</u>	Contractor	Duration of contract
Speed of construction vehicles must be restricted as determined by the ECO.	Contractor	Duration of contract
<u>Ensure vehicles adhere to speed limits on public roads and speed limits set within the site by the Site Manager/ ECO/ EO/ Environmental Representative.</u>	<u>Contractor(s)</u> / transportation contractor	Duration of contract

Mitigation: Action/control	Responsibility	Timeframe
Specific fire safety precautions must be implemented during welding activities associated with the substation and power line construction.	Contractor	Duration of contract
Dust-generating activities or earthworks may need to be rescheduled or the frequency of application of dust control/suppressant increased during periods of high winds if visible dust is blowing toward nearby residences.	Contractor	Duration of contract
Disturbed areas must be re-vegetated as soon as practicable after construction is complete in an area.	Contractor	At completion of the construction phase.
Vehicles and equipment must be maintained in a road-worthy condition at all times.	Contractor	Prior to construction phase.
Regular dust control of materials (sand, soil, concrete) must be used at concrete batching plants on site.	<u>Contractor(s)</u>	Construction
<u>Strictly control vibration pollution from compaction plant or excavation plant as far as practically possible</u>	<u>Contractor(s)</u>	<u>Construction</u>
If monitoring results or complaints indicate inadequate performance against the criteria indicated, then the source of the problem will be identified, and existing procedures or equipment modified to ensure the problem is rectified.	Contractor	Duration of contract

<b>Performance Indicator</b>	<ul style="list-style-type: none"> <li>» No complaints from affected residents or community regarding dust or vehicle emissions</li> <li>» Dust suppression measures implemented for all heavy vehicles that require such measures during the construction phase commences.</li> <li>» All heavy vehicles equipped with speed monitors before they are used in the construction phase.</li> <li>» Drivers made aware of the potential safety issues and enforcement of strict speed limits when they are employed <u>or before entering the site</u>.</li> <li>» Road worthy certificates in place for all heavy vehicles at outset of construction phase and up-dated on a monthly basis.</li> </ul>
<b>Monitoring and Reporting</b>	<p>Monitoring must be undertaken to ensure emissions are not exceeding the prescribed levels via the following methods:</p> <ul style="list-style-type: none"> <li>» Visual daily inspections of dust generation by construction activities throughout the construction phase.</li> <li>» Immediate reporting by personnel of any potential or actual issues with nuisance dust or emissions to the Site Manager or ECO.</li> <li>» A complaints register must be maintained, in which any complaints from residents/the community must be logged. Complaints must be investigated and, where appropriate, acted upon.</li> <li>» An incident reporting system must be used to record non-conformances to the EMP.</li> <li>» The Proponent and appointed ECO must monitor indicators listed</li> </ul>

	above to ensure that they have been met for the construction phase. » Public complaints register used to record complaints received.
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### **OBJECTIVE 8 : Erosion and sediment control**

<b>Project component/s</b>	» wind turbines » access roads » substation » power line.
<b>Potential Impact</b>	» Erosion will cause loss and degradation of soil resources.
<b>Activities/risk sources</b>	» All activities on site can alter surface run-off characteristics.
<b>Mitigation: Target/Objective</b>	» To have no erosion on and downstream of the site as a result of run-off from the site.

<b>Mitigation: Action/control</b>	<b>Responsibility</b>	<b>Timeframe</b>
Construct an effective run-off control system to collect and safely disseminate water where necessary from surfaces during all phases of the project, without causing downstream erosion. The system will need to adapt to changing conditions through the construction phase into the operational phase.	Contractor	Project life time
Implement appropriate erosion control measures in areas disturbed as a result of construction activities.	Contractor	Duration of construction

<b>Performance Indicator</b>	» No erosion on or downstream of the site as a result of run-off from the site.
<b>Monitoring</b>	» Include periodical site inspection in environmental performance reporting that inspects the effectiveness of the run-off control system and specifically records occurrence or not of any erosion on site or downstream.

### **OBJECTIVE 9 : Management of soil resources**

In order to minimise impacts on flora, fauna and ecological processes, the development footprint should be restricted to demarcated construction areas.

<b>Project component/s</b>	» All constructional activities that disturb the soil below surface, such as levelling, excavations etc.
<b>Potential Impact</b>	» Lack of topsoil, resulting in significant decrease in soil fertility.
<b>Activity/risk source</b>	» All constructional activities that disturb the soil below surface, such as levelling, excavations etc.
<b>Mitigation: Target/Objective</b>	» Ensure effective topsoil covering on all disturbed areas.

<b>Mitigation: Action/control</b>	<b>Responsibility</b>	<b>Timeframe</b>
The upper 30 cm of topsoil should first be stripped from the entire disturbed surface and stockpiled for re-spreading during rehabilitation.	Contractor	Duration of the construction phase
Topsoil should be stored separately from any other materials (such as subsoil)	Contractor	Duration of the construction phase
Topsoil stockpiles must be conserved against losses through erosion by establishing vegetation cover on them.	Contractor	Duration of the construction phase
Dispose of all subsurface spoils from excavations where they will not impact on agricultural land (for example on road surfaces) or where they can be effectively covered with topsoil.	Contractor	Duration of the construction phase
The stockpiled topsoil must be evenly spread over the entire disturbed surface during rehabilitation.	Contractor	During rehabilitation after construction is completed in an area
<u>Foundations and trenches must be backfilled with originally excavated materials as much possible. Excess excavation materials must be disposed of only in approved areas or, if suitable, stockpiled for use in reclamation activities.</u>	<u>Contractor</u>	<u>During rehabilitation after construction is completed in an area</u>

<b>Performance Indicator</b>	No disturbed areas are left without an effective covering of topsoil, and potential for re-vegetation after rehabilitation.
<b>Monitoring</b>	<p>Establish an effective record keeping system for each area where soil is disturbed for constructional purposes. These records should be included in environmental performance reports, and should include all the records below.</p> <ul style="list-style-type: none"> <li>» Record the GPS coordinates of each area.</li> <li>» Record the date of topsoil stripping.</li> <li>» Record the GPS coordinates of where the topsoil is stockpiled.</li> <li>» Record the date of cessation of constructional (or operational) activities at the particular site.</li> <li>» Photograph the area on cessation of constructional activities.</li> <li>» Record date and depth of re-spreading of topsoil.</li> <li>» Photograph the area on completion of rehabilitation and on an annual</li> </ul>

basis thereafter to show vegetation establishment and evaluate progress of restoration over time.

**OBJECTIVE 10 : Soil degradation and erosion control**

The natural soil on the site needs to be preserved as far as possible to minimise impacts on the environment. Soil degradation including erosion (by wind and water) and subsequent deposition elsewhere is of a concern in areas underlain by fine grained soil which can be mobilised when disturbed, even on relatively low slope gradients (accelerated erosion). Uncontrolled run-off relating to construction activity (excessive wetting, etc.) could also lead to accelerated erosion. Degradation of the natural soil profile due to excavation, stockpiling, compaction, pollution and other construction activities will affect soil forming processes and associated ecosystems. Steep slopes are prone to soil erosion and good soil management must be undertaken during construction on these slopes.

A set of strictly adhered to mitigation measures are required to be implemented in order to effectively limit/ manage the potential impact on the environment. The disturbance areas where human impact is likely are the focus of the mitigation measures laid out below. Management of erosion will be required during the construction phase of the facility. The section below provides a guideline for the management of erosion on site and will need to be supplemented with the principles for erosion management contained in the Erosion Management Plan included in **Appendix H**.

<b>Project component/s</b>	<ul style="list-style-type: none"> <li>» <u>Wind turbines;</u></li> <li>» <u>Access roads;</u></li> <li>» <u>Sealed surfaces (e.g. roofs, concrete surfaces, compacted road surfaces, paved roads / areas);</u></li> <li>» <u>All other infrastructure (site camp, batching plant etc.).</u></li> </ul>
<b>Potential Impact</b>	<ul style="list-style-type: none"> <li>» <u>Erosion and soil loss;</u></li> <li>» <u>Sedimentation of watercourses;</u></li> <li>» <u>A loss of indigenous vegetation cover; and</u></li> <li>» <u>Increased runoff into drainage lines can potentially be associated with accelerated erosion.</u></li> </ul>
<b>Activities/risk sources</b>	<ul style="list-style-type: none"> <li>» <u>Rainfall and wind erosion of disturbed areas;</u></li> <li>» <u>Excavation, stockpiling and compaction of soil;</u></li> </ul>

	<ul style="list-style-type: none"> <li>» <u>Concentrated discharge of water from construction activity;</u></li> <li>» <u>Stormwater run-off from sealed surfaces;</u></li> <li>» <u>Mobile construction equipment movement on site;</u></li> <li>» <u>River/stream/drainage line road crossings ;</u></li> <li>» <u>Roadside drainage ditches; and</u></li> <li>» <u>Project related infrastructure, such as buildings, turbines and fences.</u></li> </ul>
<b>Mitigation: Target/Objective</b>	<ul style="list-style-type: none"> <li>» <u>To minimise erosion of soil from site during construction;</u></li> <li>» <u>To minimise damage to vegetation by erosion or deposition;</u></li> <li>» <u>To minimise damage to soil and vegetation by construction activity;</u></li> <li>» <u>No accelerated overland flow related surface erosion as a result of a loss of vegetation cover; and</u></li> <li>» <u>Minimal loss of vegetation cover due to construction related activities.</u></li> </ul>

<b>Mitigation: Action/control</b>	<b>Responsibility</b>	<b>Timeframe</b>
<u>Stockpile topsoil separately from subsoil for re-use in rehabilitation phase. Maintain stockpile shape and protect from erosion. All stockpiles must be positioned at least 50 m away from drainage lines if practically possible. Limit the height of stockpiles to 2m as far as possible to reduce compaction.</u>	<u>Contractor(s)</u>	<u>During site establishment and any activity related to earthworks as well as the duration of construction.</u>
<u>New access roads to be carefully planned and constructed to minimise the impacted area and prevent unnecessary excavation, placement and compaction of soil. (Allowance has been made for micro-siting of internal access roads)</u>	<u>Contractor(s)</u>	<u>Before and during construction</u>
<u>Identify and demarcate construction areas for general construction work and restrict construction activity to these areas.</u>	<u>Contractor(s)</u>	<u>Construction</u>
<u>Rehabilitate disturbance areas as soon as construction in an area is completed, if practically and logistically possible.</u>	<u>Contractor(s)</u>	<u>During and after construction</u>
<u>Stockpiles not used in three (3) months after stripping must be seeded or appropriately covered to prevent dust and erosion - only if natural seeding does not occur.</u>	<u>Contractor(s)</u>	<u>During and after construction</u>
<u>Erosion control measures: Implement run-off attenuation on slopes (sand bags, logs), silt fences, stormwater catch-pits, shade nets or temporary mulching over denuded areas.</u>	<u>Contractor(s)</u>	<u>Erection: Before construction Maintenance: Duration of contract.</u>
<u>Particular care should be taken in the design of road drainage line crossings in order to ensure there is no step in the channel bed, substrate continuity is maintained and no undue constriction of flow takes place.</u>	<u>Contractor(s)</u>	<u>Erection: during site establishment Maintenance: for duration of</u>

<b>Mitigation: Action/control</b>	<b>Responsibility</b>	<b>Timeframe</b>
		<u>contract.</u>
<u>Where access roads cross natural drainage lines, culverts (or other appropriate measures) must be designed to allow free flow. Regular maintenance of the culverts must be carried out.</u>	<u>Engineer / Contractor(s)</u>	<u>Before and during construction</u>
<u>Control depth of all excavations and stability of cut faces/sidewalls – this will also be covered by health and safety requirements.</u>	<u>Engineer / Contractor(s)</u>	<u>Maintenance over duration of contract</u>
<u>Compile a comprehensive stormwater management plan as part of the final design of the project and implement during construction and operation (refer to <b>Appendix G</b>).</u>	<u>Contractor(s)</u>	<u>Compile during design; implement during construction &amp; operation</u>
<u>Cement/Concrete batching to take place in designated areas only, as detailed on the approved facility layout map (if applicable).</u>	<u>Contractor(s)</u>	<u>Construction.</u>
<u>Spillages of cement/concrete to be cleaned up immediately and disposed of.</u>	<u>Contractor(s)</u>	<u>Construction</u>
<u>Spill kits to be kept on active parts of the construction site &amp; at site offices.</u>	<u>Contractor(s)</u>	<u>Construction</u>
<u>Soil erosion control measures (such as hessian mats and gabions) be used for in erosion prone areas such as steep slopes.</u>	<u>Contractor(s)</u>	<u>Construction</u>
<u>Storm water Management Plan to be updated and implemented as soon as the designs have been finalised.</u>	<u>Contractor(s)</u>	<u>Construction</u>

<b>Performance Indicator</b>	<ul style="list-style-type: none"> <li>» <u>Acceptable level of activity within disturbance areas;</u></li> <li>» <u>No activity outside of designated areas;</u></li> <li>» <u>Minimal level of soil erosion around site as a result of construction activities;</u></li> <li>» <u>Minimal level of soil degradation as a result of construction activities;</u></li> <li>» <u>Limited soil erosion around site as a result of construction activities;</u> <u>and</u></li> <li>» <u>Acceptable state of excavations, as determined by ECO.</u></li> </ul>
<b>Monitoring and Reporting</b>	<ul style="list-style-type: none"> <li>» <u>Regular inspections of the site by ECO/ EO/ Environmental Representative;</u></li> <li>» <u>Fortnightly inspections of sediment control devices by ECO/ EO/ Environmental Representative;</u></li> <li>» <u>Reporting of ineffective sediment control systems and rectification as soon as possible;</u></li> <li>» <u>An incident reporting system must record non-conformances to the EMPr; and</u></li> <li>» <u>Public complaints register used to record complaints received.</u></li> </ul>



**OBJECTIVE 11 : Limit disturbance and avoid damage to drainage lines/ watercourses**

The layout for the wind energy facility avoids the placement of turbines and access roads within wetland areas. However, there are still some instances where roads and cables may cross watercourse areas. Mitigation measures are required to minimise impacts on those systems affected in this regard.

<b>Project component/s</b>	<ul style="list-style-type: none"> <li>» <u>Access roads</u></li> <li>» <u>Cabling</u></li> <li>» <u>Watercourse crossing, i.e. access roads and culverts</u></li> <li>» <u>Wind turbines</u></li> <li>» <u>Workshop area/ laydown areas</u></li> </ul>
<b>Potential Impact</b>	<ul style="list-style-type: none"> <li>» <u>Damage to drainage line areas by any means that will result in hydrological changes (includes erosion, siltation, dust, and direct removal of soil or vegetation, contamination, dumping of material). The focus should be on the functioning of the drainage line as a natural system.</u></li> <li>» <u>Increased runoff into drainage lines can potentially be associated with accelerated erosion.</u></li> </ul>
<b>Activity/risk source</b>	<ul style="list-style-type: none"> <li>» <u>Construction of access roads and cabling.</u></li> </ul>
<b>Mitigation: Target/Objective</b>	<ul style="list-style-type: none"> <li>» <u>Minimise damage to watercourse areas where crossing will be built.</u></li> <li>» <u>No increase in runoff into drainage lines as a result of construction of project related infrastructure.</u></li> <li>» <u>No increase in runoff into drainage lines as a result of road construction</u></li> <li>»</li> </ul>

<b>Mitigation: Action/control</b>	<b>Responsibility</b>	<b>Timeframe</b>
<u>Align underground cables and internal access roads as far as possible along existing infrastructure and disturbances, e.g. within the internal access road construction corridor.</u>	<u>Proponent, Contractor(s)</u>	<u>Construction</u>
<u>For any new construction where direct impacts on drainage lines are unavoidable cross watercourses perpendicularly as far as practically possible to minimise disturbance footprints.</u>	<u>Contractor(s)</u>	<u>Construction</u>
<u>Wetlands, rivers and river riparian areas must be treated as "no-go" areas and appropriately demarcated as such. No vehicles, machinery, personnel,</u>	<u>Contractor and ECO</u>	<u>Construction</u>

<b>Mitigation: Action/control</b>	<b>Responsibility</b>	<b>Timeframe</b>
<u>construction material, fuel, oil, bitumen or waste must be allowed into these areas without the express permission of and supervision of the ECO, except for rehabilitation work in these areas.</u>		
<u>Any development within 1:100 year flood line or within the riparian habitat constitutes a Water Use License from the Department of Water Affairs (DWA) prior to the commencement of the project should the holder impact on any wetland or water resource. A copy must be kept by the ECO if applicable/required.</u>	<u>Contractor and ECO</u>	<u>Pre-construction</u>
<u>Rehabilitate any disturbed areas as soon as possible once construction is completed in an area.</u>	<u>Contractor(s)</u>	<u>Construction</u>
<u>Bridge design must be such that it minimises impact to riparian areas with minimal alterations to water flow and must allow the movement of fauna and flora.</u>	<u>Contractor(s)</u>	<u>Construction</u>
<u>Obtain required water use license/ GA for impacting on drainage lines (if applicable).</u>	<u>Proponent</u>	<u>Pre-construction</u>
<u>Construction must not result in the width of the watercourse being narrowed.</u>	<u>Contractor(s)</u>	<u>Construction</u>
<u>Control storm water and runoff water through the implementation of a storm water management plan for the site (<b>refer to Appendix G</b>).</u>	<u>Contractor(s), ECO/ EO /Environmental Representative</u>	<u>Construction</u>
<u>Contaminated runoff from the construction site(s) should be prevented from entering the rivers/streams.</u>	<u>Contractor(s)</u>	<u>Construction</u>
<u>Ablution facilities at the construction sites, i.e. outside the construction camp must be located at least 100m away from drainage lines and must be regularly serviced.</u>	<u>Contractor(s)</u>	<u>Construction</u>
<u>Concrete batching plants and stockpiles to be located more than 50m away from drainage lines wherever practically possible. If not possible, the ECO/ EO/ Environmental Representative must be consulted to ensure the relevant mitigation measures are implemented.</u>	<u>Contractor(s)/ ECO/ ESO/ Environmental Representative</u>	<u>Construction</u>
<u>Utilise erosion control measures on access roads, wetland areas and drainage lines.</u>	<u>Contractor(s)</u>	<u>Construction</u>
<u>Capture runoff from roofs in rainwater tanks or disperse runoff from impervious surfaces onto adjacent areas.</u>	<u>Contractor(s)</u>	<u>Construction</u>
<u>Freshwater ecosystems located in close proximity to the construction areas must be inspected on a regular basis by the ECO for signs of disturbance from construction activities and for signs of sedimentation and pollution (especially after rainfall). If signs of disturbance are not immediate action must be taken to remedy the</u>	<u>Contractor(s), ECO</u>	<u>Construction</u>

Mitigation: Action/control	Responsibility	Timeframe
<u>situation and, if necessary, a freshwater ecologist must be consulted for advice on the most suitable remediation measures.</u>		
<u>No discharge of effluent or polluted water must be allowed into any rivers or wetland areas.</u>	Contractor(s)	Construction
<u>If construction areas are to be pumped of water (e.g. after rains), this water must be pumped into an appropriate settlement area, and not allowed to flow into any rivers or wetland areas.</u>	Contractor(s)x	Construction

<b>Performance Indicator</b>	<ul style="list-style-type: none"> <li>» Limited impacts on water quality, water quantity, riparian or wetland vegetation, natural status of riparian or wetland areas.</li> <li>» <u>No increase in runoff into drainage lines as a result of construction of project related infrastructure.</u></li> </ul>
<b>Monitoring and Reporting</b>	<ul style="list-style-type: none"> <li>» Habitat loss in watercourses should be monitored before and after construction <u>by the ECO/ EO/ Environmental Representative.</u></li> <li>» <u>The ECO in conjunction with the EO/ Environmental Representative, should be responsible for monitoring and reporting.</u></li> <li>» An incident reporting system must be used to record non-conformances to the EMPr.</li> <li>» Weekly monitoring by the ECO/ EO/ Environmental Representative during the construction phase to ensure mitre drains or similar runoff management structures are properly constructed.</li> <li>» <u>Public complaints register must be used to record complaints received.</u></li> </ul>

**OBJECTIVE 12 : Protection of indigenous vegetation, control of alien invasive plants and management of topsoil**

The proposed development area does not fall within any identified Critical Biodiversity area. The majority of the infrastructure is planned outside of identified sensitive areas. Only short sections of the access road and power line cross these sensitive areas.

Impacts on vegetation at the construction stage are expected to be mainly as a result of direct permanent loss of vegetation in development footprint areas. Due to disturbance of vegetation, there is a higher risk of alien species dominating disturbed areas. Therefore, control of alien invasive plants is required. An Alien Invasive Plant Management Plan is attached to **Appendix C**. Method for Plant Rescue and Habitat Rehabilitation (a Plant Rescue and Protection Plan and Re-Vegetation Management Plan and Rehabilitation Plan) is attached to **Appendix D** and **E**.

Within the footprint area for the development, a number of protected species were recorded. These species found are protected by the provincial legislation (Western Cape Nature Conservation Laws Amendment Act of 2000). All protected plants that occur on access routes and turbine sites will be affected by the development and permits from the relevant authority (Western Cape of Environmental Affairs and Development Planning) should be obtained for these species prior to any form of disturbance.

<b>Project component/s</b>	<ul style="list-style-type: none"> <li>» wind turbines and associated laydown areas;</li> <li>» access roads and cabling;</li> <li>» substation</li> <li>» power line</li> <li>» workshop area;</li> <li>» site camp</li> <li>» batching plants; and</li> <li>» temporary laydown areas;</li> </ul>
<b>Potential Impact</b>	<ul style="list-style-type: none"> <li>» Clearing of natural vegetation</li> <li>» Construction activities</li> <li>» Traffic to and from site</li> <li>» Loss of species of conservation concern</li> <li>» Proliferation of alien plants</li> </ul>
<b>Activity/risk source</b>	<ul style="list-style-type: none"> <li>» Site preparation and earthworks</li> <li>» Construction-related traffic</li> <li>» Trenching activities for cable laying</li> <li>» Excavation for tower base foundations</li> <li>» Construction of site access road</li> <li>» Site preparation for lay-down area(s) and site office/visitor's centre (e.g. compaction)</li> <li>» Foundations or plant equipment installation</li> <li>» Mobile construction equipment</li> <li>» Power line construction activities</li> <li>» Dumping or damage by construction equipment outside of demarcated construction areas.</li> <li>» Track for crawler crane movement on-site</li> <li>» Stockpiling of topsoil, subsoil and spoil material</li> </ul>
<b>Mitigation: Target/Objective</b>	<ul style="list-style-type: none"> <li>» To retain natural vegetation in the highly and moderate sensitive areas on the site;</li> <li>» To minimise footprints of disturbance of vegetation/habitats on-site;</li> <li>» No alien plants within project control area;</li> <li>» Remove and store all topsoil on areas that are to be excavated wherever practically possible; and use this topsoil in subsequent rehabilitation of disturbed areas; and</li> <li>» Limited loss of species of conservation concern.</li> </ul>

<b>Mitigation: Action/control</b>	<b>Responsibility</b>	<b>Timeframe</b>
Areas to be cleared must be clearly marked in the field to eliminate unnecessary clearing. <u>Vegetation clearing</u>	Contractor in consultation with	Pre-construction

<u>must be limited to the authorised footprint.</u>	Specialist	
<u>Identify and demarcate areas within which activities are to be undertaken. Ensure that activities are restricted to these areas to ensure unnecessary impacts on surrounding natural vegetation are avoided. Prohibit any vehicular passage off designated roads.</u>	Contractor(s)	<u>Construction</u>
The appointed horticulturist must collect a locally indigenous seed mix from the natural vegetation on site and must store this for use in areas in need of rehabilitation, such as the laydown areas, crane tracks, and cable routings. Only suitable locally indigenous Hopefield Sand Fynbos species, as listed in the botanical report (Helme 2008, 2009), should be used for rehabilitation or planting anywhere on site.	Specialist <u>and</u> <u>contractor</u>	Pre-construction
The extent of clearing and disturbance to the indigenous vegetation must be kept to a minimum so that the impact on flora and fauna is restricted. <u>Rehabilitate disturbed areas as quickly as possible.</u>	Contractor	Site establishment & duration of contract
<u>Avoiding construction in areas of natural vegetation particularly where remnant patches are present and that may be classified as sensitive vegetation types.</u>	Contractor	Duration of contract
A site rehabilitation programme must be compiled and implemented.	Contractor in consultation with Specialist	Duration of contract
Compile and implement an alien plant control programme. The alien clearing program should be coordinated by a full time environmental manager, with inputs from a qualified botanist familiar with the site. All alien plant control must be undertaken by well trained and properly equipped personnel.	Hopefield Small Wind Farm (Pty) Ltd in consultation with an expert environmental manager and specialist	Full life cycle of facility
<u>No importing of soil from areas with alien plants.</u>	Contractor(s)	<u>Construction</u>
<u>All areas of disturbed soil must be reclaimed using only indigenous grass and shrubs. Reclamation activities shall be undertaken according to the rehabilitation plan.</u>	Contractor <u>in</u> <u>consultation with</u> <u>Specialist</u>	<u>Duration of</u> <u>contract</u>
<u>Control any alien plants that become established using registered control methods.</u>	Contractor(s)	<u>Construction &amp;</u> <u>Operation</u>
<u>Cleared alien vegetation must not be dumped on adjacent intact vegetation during clearing but must be temporarily stored in a demarcated area.</u>	Contractor(s)	<u>During</u> <u>construction</u>
In areas where herbicides are required to be used for alien plant species control, spraying should only be undertaken in summer (November – February), and an approved broadleaf (dicotyledon) herbicide must be used, rather than a broad spectrum herbicide	Hopefield Small Wind Farm (Pty) Ltd in consultation with an expert environmental manager	Full life cycle of facility

<p><u>Unnecessary impacts on surrounding natural vegetation must be avoided, e.g. driving around in the veld where there are no existing roads or where there aren't new roads planned. The construction impacts must be contained to the footprint of the infrastructure.</u></p>	<p><u>Contractor(s)</u></p>	<p><u>Construction</u></p>
<p><u>Internal access roads and cables should be aligned as far as possible along existing linear disturbances, e.g. access road corridors on site and away from steep slopes and drainage lines as much as possible. Where new roads are to be constructed, these should follow existing tracks or disturbed areas or the edges of disturbed areas as far as possible.</u></p>	<p><u>Contractor(s)</u></p>	<p><u>Construction / design</u></p>
<p><u>Establish an on-going monitoring programme to detect, quantify and remove any alien species that may become established and identify the problem species (as per Conservation of Agricultural Resources Act, Act 43 of 1983 and NEM: Biodiversity Act).</u></p>	<p><u>Contractor(s)</u></p>	<p><u>Construction &amp; Operation</u></p>
<p><u>Salvaging topsoil:</u></p> <ul style="list-style-type: none"> <li>» <u>Topsoil must always be salvaged and stored separately from subsoil and lower-lying parent rock or other spoil material.</u> <ul style="list-style-type: none"> <li>○ <u>Topsoil stripping removes up to 30 cm or less of the upper soils.</u></li> <li>○ <u>In cultivated areas, depth of topsoil may increase and needs to be confirmed with the land owner</u></li> </ul> </li> <li>» <u>Prior to salvaging topsoil the depth, quality and characteristics of topsoil should be known for every management area.</u> <ul style="list-style-type: none"> <li>* <u>This will give an indication of total volumes of topsoil that need to be stored to enable the proper planning and placement of topsoil storage.</u></li> <li>* <u>Different types of topsoil – rocky soils and sands or loams must be stored separately</u></li> </ul> </li> </ul> <p><u>Topsoil should be removed (and stored) under dry conditions to avoid excessive compaction whenever topsoil will have to be stored for longer than one year.</u></p>	<p><u>Contractor(s)</u></p>	<p><u>Before and during construction</u></p>
<p><u>Storing topsoil:</u></p> <ul style="list-style-type: none"> <li>» <u>Viability of stored topsoil depends on moisture, temperature, oxygen, nutrients and time stored.</u></li> <li>» <u>Rapid decomposition of organic material in warm, moist topsoil rapidly decreases microbial activity necessary for nutrient cycling, and reduces the amount of beneficial micro-organisms in the soil.</u></li> <li>» <u>Stockpile location, if not adjacent to a linear development:</u> <ul style="list-style-type: none"> <li>* <u>At least 50 m from any watering point</u></li> </ul> </li> </ul>	<p><u>Contractor(s)</u></p>	<p><u>Before and during construction</u></p>

<ul style="list-style-type: none"> <li>* <u>Ideally a disturbed but weed-free area</u></li> <li>» <u>Topsoil is typically stored in berms with a width of 150 – 200 cm, and a maximum height of 2m:</u> <ul style="list-style-type: none"> <li>* <u>Place berms along contours or perpendicular to the prevailing wind direction</u></li> <li>* <u>Adhere to the following general rule: the larger the pile of topsoil storage needs to be, the shorter should be the time it is stored</u></li> </ul> </li> <li>» <u>Topsoil handling should be reduced to stripping, piling (once), and re-application. Between the stockpiling and reapplication, stored topsoil should not undergo any further handling except control of erosion and (alien) invasive vegetation</u></li> <li>» <u>Where topsoil can be reapplied within six months to one year after excavation, it will be useful to store the topsoil as close as possible to the area of excavation and re-application, e.g. next to cabling trenches</u> <ul style="list-style-type: none"> <li>* <u>In such case, use one side of the linear development for machinery and access only</u></li> <li>* <u>Place topsoil on the other/far side of this development, followed by the subsoil (e.g. on geotextile)</u></li> </ul> </li> <li>» <u>In cases where topsoil has to be stored longer than 6 months or during the rainy season, soils should be kept as dry as possible and protected from erosion and degradation by:</u> <ul style="list-style-type: none"> <li>* <u>Preventing puddling on or between heaps of topsoil</u></li> <li>* <u>Or covering topsoil berms</u></li> <li>* <u>Preventing all forms of contamination or pollution</u></li> <li>* <u>Preventing any form of compaction</u></li> <li>* <u>Monitoring establishment of all invasive vegetation and removing such if it appears</u></li> <li>* <u>Keeping slopes of topsoil at a maximal 2:1 ratio</u></li> <li>* <u>Monitoring and mitigating erosion where it appears</u></li> <li>* <u>Where topsoil needs to be stored in excess of more than 6 months, it is recommended to either cover the topsoil or allow an indigenous grass cover to grow on it – if this does not happen spontaneously, seeding should be considered. This must be implemented only after consultation with the ECO.</u></li> </ul> </li> </ul>		
<p><u>Reapplying topsoil:</u></p> <ul style="list-style-type: none"> <li>» <u>Spoil materials and subsoil must be back-filled first,</u></li> </ul>	<p><u>Contractor(s)</u></p>	<p><u>Before and during</u></p>

<p><u>then covered with topsoil</u></p> <ul style="list-style-type: none"> <li>» <u>Generally, topsoil should be re-applied to a depth equal to slightly greater than the topsoil horizon of a pre-selected undisturbed reference site</u></li> <li>» <u>The minimum depth of topsoil needed for revegetation to be successful is approximately 20 cm</u></li> <li>» <u>If the amount of topsoil available is limited, a strategy must be worked to out to optimise revegetation efforts with the topsoil available</u></li> <li>» <u>Reapplied topsoil should be landscaped in a way that creates a variable microtopography of small ridges and valleys that run parallel to existing contours of the landscape. The valleys become catch-basins for seeds and act as run-on zones for rainfall, increasing moisture levels where the seeds are likely to be more concentrated. This greatly improves the success rate of revegetation efforts.</u></li> <li>» <u>To stabilise reapplied topsoils and minimise raindrop impact and erosion:</u> <ul style="list-style-type: none"> <li>○ <u>Use organic material from cleared and shredded woody vegetation where possible</u></li> <li>○ <u>Alternatively, suitable geotextiles or organic erosion mats can be used as necessary</u></li> </ul> </li> </ul> <p><u>Continued monitoring will be necessary to detect any sign of erosion early enough to allow timeous mitigation</u></p>		<p><u>construction</u></p>
<p><u>Re-applied topsoil needs to be re-vegetated as soon as possible, following the specifications of the revegetation and rehabilitation plan (<b>refer to Appendix E</b>).</u></p>	<p><u>Contractor(s)</u></p>	<p><u>Before _____ and during construction, monitored during operational phase</u></p>

<p><b>Performance Indicator</b></p>	<ul style="list-style-type: none"> <li>» No disturbance outside of designated work areas</li> <li>» Minimised clearing of existing/natural vegetation.</li> <li>» Limited impacts on areas of identified and demarcated sensitive habitats/vegetation</li> <li>» <u>Limited fragmentation of untransformed areas of natural vegetation.</u></li> <li>» <u>Limited alien infestation within project control area.</u></li> </ul>
<p><b>Monitoring and Reporting</b></p>	<ul style="list-style-type: none"> <li>» Observation of vegetation clearing activities by <u>ECO/EO/ Environmental Representative</u> throughout construction phase.</li> <li>» ECO to monitor Search and Rescue; horticulturist to liaise with botanist.</li> <li>» Botanist to review rehabilitation success after 3 months of replanting of rehabilitation areas.</li> <li>» Supervision of all clearing and earthworks.</li> </ul>



	<ul style="list-style-type: none"> <li>» Monitoring of alien plant establishment within the project control area on an on-going basis.</li> <li>» An incident reporting system must be used to record non-conformances to the EMPr.</li> <li>» <u>Public complaints register must be used to record complaints received.</u></li> </ul>
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**OBJECTIVE 13 : Protection of fauna, bats & avifauna**

Numerous reptile and mammal species potentially occur in the Hopefield study area, but only a few are of conservation concern. The establishment of a Wind Farm at the Hopefield site could affect fauna, in general, in various ways. However, these impacts are of a low significance due to the small size of the affected area and the absence of species of conservation concern.

Bats are habitual animals and often some species visit the site after development. New developments, such as the Hopefield Small Wind Farm, might even attract more bats due to the possibility of night lights which tend to attract more insects. Some of the bat species that occur on the proposed site are known to roost in culverts, aardvark burrows, rock crevices, buildings and under the bark of trees. The removal of natural vegetation during the construction phase of development might alter the foraging and roosting habitat of some species.

At least 209 bird species are considered likely to occur with some regularity within the anticipated impact zone of the wind farm. Construction will create disturbance to birds in the proposed site and surrounding area. Several species may be affected by some degree of habitat loss associated with the construction of project infrastructure. New roads constructed will also have a disturbance and habitat destruction impact. This section should also be read in conjunction with the Avifauna and Bat Monitoring Programme (attached as **Appendix K** and **Appendix L**).

<b>Project component/s</b>	<ul style="list-style-type: none"> <li>» wind turbines and associated laydown areas;</li> <li>» access roads and cabling;</li> <li>» substation;</li> <li>» power lines;</li> <li>» batching plants; and</li> <li>» temporary laydown areas.</li> </ul>
<b>Potential Impact</b>	<ul style="list-style-type: none"> <li>» Vegetation clearance and associated impacts on faunal habitats</li> <li>» Traffic to and from site</li> <li>» Barrier effect of internal access road and fencing</li> <li>» Disturbance of birds (<u>e.g. destruction of habitat, collisions, electrocution</u>)</li> </ul>

<b>Activity/risk source</b>	<ul style="list-style-type: none"> <li>» Site preparation and earthworks;</li> <li>» Construction-related traffic;</li> <li>» Foundations or plant equipment installation;</li> <li>» Mobile construction equipment; and</li> <li>» Power line construction activities</li> </ul>
<b>Mitigation: Target/Objective</b>	<ul style="list-style-type: none"> <li>» To minimise footprints of habitat destruction; and</li> <li>» To minimise disturbance to (and death of) resident and visitor faunal and avifaunal species.</li> </ul>

<b>Mitigation: Action/control</b>	<b>Responsibility</b>	<b>Timeframe</b>
Areas to be cleared must be clearly marked in the field to eliminate unnecessary clearing/disturbance.	Contractor in consultation with Specialist	Pre-construction
The extent of clearing and disturbance to the native vegetation must be kept to a minimum so that impact on fauna and their habitats is restricted.	Contractor	Site establishment & duration of contract.
Moles and golden moles are easily recognisable by their thick fur, rudimentary eyes and short legs and they can be removed using any bucket of appropriate size.	Contractor	Construction
<u>Where roads pass right next to major water bodies, provision shall be made for fauna such as toads to pass under the roads by using culverts or similar structures.</u>	<u>Contractor</u>	<u>Construction</u>
<u>The ECO/ EO/ Environmental Representative must have the required Competency Certificates, received from the attendance of a Reptile Husbandry and Handling Course as there may be many poisonous snakes to be moved. Alternatively, if any poisonous animals are encountered on site, they should either be allowed sufficient space and time to relocate, or a relevantly qualified person must be contacted to remove/relocate the animal.</u>	<u>Contractor(s)/ ECO/ EO/ Environmental Representative</u>	<u>Duration of contract</u>
<u>Should any animals be found these should be relocated prior to construction, the ECO/ EO/ Environmental Representative should first be consulted to ensure that no permits are required for relocation. If permits are required these must first be obtained.</u>	<u>Contractor(s)</u>	<u>Site establishment &amp; duration of contract.</u>
<u>Construction phase bird monitoring must be considered as is contained in the Bird Monitoring Programme (refer to <b>Appendix K</b>).</u>	<u>Contractor(s)</u>	<u>Site establishment &amp; duration of contract.</u>
<u>Limiting construction to between February and July to minimize impacts on avifaunal breeding productivity if at all possible.</u>	<u>Contractor(s)</u>	<u>Duration of contract</u>
<u>No poaching or illegal hunting of wildlife on site during construction</u>	<u>Contractor(s)</u>	<u>Site establishment &amp;</u>

Mitigation: Action/control	Responsibility	Timeframe
		<u>duration of contract.</u>
<u>Structures with potential to provide bat roosting should be inspected prior to any activity that may cause negative impacts on the bat species (e.g. conversions or demolition of buildings, removal of large trees).</u>	Contractor(s)	<u>Duration of contract</u>
<u>All dead tree stumps, clumps of trees and holes in the ground, at the proposed basis of the power line poles, should be investigated by the ECO for potential bat roosts as soon as construction information is available. If the ECO does not know what to look for, he should contact a bat specialist. If bat rests are found, the object, such as a dead tree, or clump of trees, should be handled with care, so as to not injure bats that might be roosting within.</u>	ECO	<u>Construction</u>
<u>If bat rests are found at the entrance of derelict Aardvark holes or other holes in the ground, this should be marked by the ECO who should be present during the construction activities at those sites.</u>	ECO	<u>Construction</u>
The site Rehabilitation Programme should be implemented ( <u>refer to Appendix E</u> ).	Contractor(s) in consultation with Specialist	Duration of contract
<u>No animals are to be harmed or killed by the Proponent or Contractor(s). Employees should be trained (e.g. during toolbox talks) that poisonous animals should not be killed and if encountered the ECO/ EO/ Environmental Representative should be informed.</u>	Contractor(s)/ ECO/ EO/ Environmental Representative	<u>Duration of contract</u>
<u>Employees must be prohibited from harvesting wild plants for any purpose.</u>	Contractor(s)	<u>Duration of contract</u>
<u>Active breeding in the immediate surroundings must be monitored during construction by the ECO/EO/ Environmental Representative. Should any bird nests be found that are likely to be disturbed by construction activities, these will not be relocated without first consulting an avifaunal specialist. If nests cannot be relocated, other mitigation measures will be investigated.</u>	Contractor(s)/ ECO/ EO/ Environmental Representative	<u>Site establishment &amp; duration on contract</u>
<u>The applicant must restrict the construction activities to the footprint area. No access to the remainder of the property is allowed.</u>	Contractor(s)	<u>During construction</u>

**Performance Indicator**

- » No disturbance outside of designated work areas.
- » Minimised clearing of existing/natural vegetation and habitats for

	<p>fauna <u>and avifauna.</u></p> <p>» Limited impacts on faunal species (<u>including avifauna</u>) (i.e. noted/recorded fatalities), <u>especially those of conservation concern.</u></p>
<b>Monitoring and Reporting</b>	<p>» Observation of vegetation clearing activities by <u>ECO/EO/ Environmental Representative</u> throughout construction phase.</p> <p>» Standard reporting form to be completed for every new site clearing action. Information required would include: date, size of affected area, number of people used in search, duration of search, number of tortoises found, number of animals rescued during site clearing.</p> <p>» Supervision of all clearing and earthworks by <u>ECO/ EO/ Environmental Representative.</u></p> <p>» An incident reporting system must be used to record non-conformances to the EMPr.</p> <p>» <u>Public complaints register must be used to record complaints received.</u></p>

**OBJECTIVE 14 : Protection of fossils and sites of heritage and archaeological value**

Indications are that in terms of palaeontological and archaeological heritage the proposed activity is acceptable; impacts will be limited and controllable. The landscape affected by the proposal is transformed by agriculture and the adjacent Hopefield Wind Farm.

<b>Project component/s</b>	<p>» Wind turbines;</p> <p>» Concrete foundations to support the turbines</p> <p>» Cabling between the turbines, to be laid underground where practical</p> <p>» An on-site substation to facilitate the connection between the wind energy facility and the electricity grid.</p> <p>» An overhead power line to connect the facility to the electricity grid</p> <p>» Internal access roads to each turbine</p> <p>» Workshop area/office for maintenance</p>
<b>Potential Impact</b>	<p>» Physical destruction of both palaeontological and human made heritage <u>objects or artefacts</u>, intentional/unintentional neglect of historic buildings; and</p> <p>» Loss of fossil resources.</p>
<b>Activity/risk source</b>	<p>» Construction of roads, turbines bases, transmission lines and substation;</p> <p>» Neglect or illegal alteration of heritage structures;</p> <p>» Site preparation and earthworks;</p> <p>» Foundations or plant equipment installation; and</p> <p>» Mobile construction equipment movement on site;</p>
<b>Mitigation: Target/Objective</b>	<p>» <u>To ensure that any heritage objects found on site are treated appropriately and in accordance with the relevant legislation.</u></p>

Mitigation: Action/control	Responsibility	Timeframe
<u>The ECO/ EO/ Environmental Representative for the project should be well versed before construction starts on the possible types of heritage sites/materials they may encounter and the procedures to follow when they find sites. They should be trained by the Heritage Specialist to identify, follow the relevant procedure and report to the site manager if sites are found.</u>	Contractor(s) and ECO/ EO/ Environmental Representative	Pre-construction
<u>If a heritage object is found, work in that area (the immediate area affecting the find) must be stopped immediately, and appropriate specialists brought in to assess the site, notify the administering authority of the item/site, and undertake due/required processes. The South African Heritage Resources Agency (SAHRA) must be informed.</u>	Proponent / Contractor(s) in consultation with Specialist	Duration of contract
<u>If concentrations of archaeological materials are exposed during construction then all work must stop for an archaeologist to investigate.</u>	Contractor(s)	Construction
<u>If any human remains (or any other concentrations of archaeological heritage material) are exposed during construction, all work in the immediate area affecting the find, must cease and it must be reported immediately to the nearest museum/archaeologist or to the South African Heritage Resources Agency, so that a systematic and professional investigation can be undertaken. Sufficient time should be allowed to investigate and to remove/collect such material.</u>	Contractor(s)	Construction
<u>The ECO/ EO /Environmental Representative for the project should be alerted to the potential for, and scientific significance of, new fossil finds during the construction phase of the development. They should familiarise themselves with the sort of fossils concerned through museum displays and accessible, well-illustrated literature.</u>	Contractor(s) and ECO/ EO/ Environmental Representative	Pre-construction/ Construction

<b>Performance Indicator</b>	<ul style="list-style-type: none"> <li>» <u>Minimum disturbance outside of designated work areas.</u></li> <li>» <u>All heritage items located are dealt with as per the legislative guidelines.</u></li> </ul>
<b>Monitoring and Reporting</b>	<ul style="list-style-type: none"> <li>» <u>Observation of excavation activities by ECO/ EO/ Environmental Representative throughout construction phase.</u></li> <li>» <u>Supervision of all clearing and earthworks.</u></li> <li>» <u>An incident reporting system must be used to record non-conformances to the EMP.</u></li> <li>» <u>Public complaints register must be used to record complaints received.</u></li> </ul>

**OBJECTIVE 15 : Minimisation of visual impacts associated with construction**

The construction phase of a Wind Farm and all associated infrastructure is approximated at roughly 6-12 months, with various peaks. This is dependent on a number of external factors that may not always be controlled. During this time heavy vehicles, components, cranes, equipment and construction crews will frequent the area and may cause, at the very least, a visual nuisance to landowners and residents in the area as well as road users.

<b>Project component/s</b>	<ul style="list-style-type: none"> <li>» <u>Construction site</u></li> <li>» <u>Transportation of staff and equipment</u></li> <li>» Wind turbines</li> <li>» Substation</li> <li>» Power line</li> <li>» Access roads</li> </ul>
<b>Potential Impact</b>	<ul style="list-style-type: none"> <li>» Temporary visual intrusion</li> <li>» <u>The potential scarring of the landscape due to the creation of new access roads/tracks or the unnecessary removal of vegetation; and</u></li> <li>» <u>Construction traffic.</u></li> </ul>
<b>Activity/risk source</b>	<ul style="list-style-type: none"> <li>» <u>The viewing of visual scarring by observers in the vicinity of the facility or from the roads traversing the site;</u></li> <li>» Transportation of Wind Farm, substation and power line components to the site; and</li> <li>» Construction activities on-site and along power line corridor</li> </ul>
<b>Mitigation: Target/Objective</b>	<ul style="list-style-type: none"> <li>» Minimise contrast with surrounding environment and visibility of the construction activities to people in the area;</li> <li>» To ensure that the facility complies with Civil Aviation Authority requirements for turbine and power line visibility to aircraft;</li> <li>» <u>Minimal disturbance to vegetation cover in close vicinity to the proposed facility and its related infrastructure; and</u></li> <li>» <u>Minimised construction traffic, where possible.</u></li> </ul>

<b>Mitigation: Action/control</b>	<b>Responsibility</b>	<b>Timeframe</b>
The activities and movement of construction workers and construction site vehicles must be restricted to the immediate construction site.	Contractor	Duration of contract
The general appearance of construction activities, construction equipment camps and lay-down areas must be maintained <u>and kept neat and tidy</u> by means of the timely removal of rubble and disused construction materials.	Contractor	Construction

<b>Mitigation: Action/control</b>	<b>Responsibility</b>	<b>Timeframe</b>
Construction activities must be restricted to daylight hours (as far as possible) in order to negate or reduce the visual impacts associated with lighting. In the event that night-time construction activities are required to be undertaken, lighting must be placed in such a manner as to limit impacts on the surrounding areas.	Contractor	Duration of contract
<u>Reduce visual disturbances by minimising areas of surface disturbance, controlling erosion, using dust suppression techniques and restoring exposed soil as close as possible to their original contour and vegetation</u>	Contractor	Construction
<u>Limit access to the construction sites (during both construction and operational phases) along existing access roads as far as possible.</u>	Contractor	Duration of contract
Aviation warning lights must be mounted on turbine housing or such measures required by the Civil Aviation Authority.	Contractor	Erection of turbines
Clearance of vegetation within the development footprint must be minimised in order to minimise long-term visual disturbance, and rehabilitation efforts undertaken.	Contractor	Duration of contract
<u>Vehicle movements on local roads must be limited to standard construction operating hours wherever possible to limit noise impacts and dust nuisance.</u>	Contractor	Duration of contract
<u>Times for arrival and departure of heavy vehicles must be co-ordinated as far as possible in order to minimise congestion.</u>	Contractor	Duration of contract
<u>The movement of all vehicles within the site must be on designated roadways.</u>	Contractor	Duration of contract
<u>Signage must be established at appropriate points warning of turning traffic and the construction site (all signage to be in accordance with prescribed standards and must be managed on an ongoing basis).</u>	Contractor	Duration of contract
<u>All vehicles travelling on public roads must adhere to the specified speed limits and all drivers must be in possession of an appropriate valid driver's license.</u>	Contractor	Duration of contract
<u>Ensure all disturbed areas are appropriately rehabilitated once construction in an area is complete.</u>	Contractor	Duration of construction
<u>Signage on or near turbines must be avoided unless they serve to inform the public of the wind turbines and their function.</u>	Contractor	Duration of construction
<u>Commercial messages and graffiti must be avoided.</u>	Contractor	Duration of construction and

Mitigation: Action/control	Responsibility	Timeframe
		<u>operation</u>
<b>Performance Indicator</b>	<ul style="list-style-type: none"> <li>» No complaints regarding visual intrusion associated with construction activities;</li> <li>» <u>Construction site maintained in a neat and tidy condition;</u></li> <li>» <u>Vegetation cover that remains intact with no erosion scarring in close proximity of the facility; and</u></li> <li>» <u>Site appropriately rehabilitated after construction is complete.</u></li> </ul>	
<b>Monitoring</b>	<ul style="list-style-type: none"> <li>» Ensure that mitigation measures are implemented during construction to minimise visual impacts on surrounding communities;</li> <li>» <u>Ensure that aviation warning lights or other measures are installed before construction is completed according to CAA requirements.</u></li> <li>» <u>Ensure that aviation warning lights or other measures are functional at all times.</u></li> <li>» <u>Monitoring of rehabilitation activities to ensure appropriate rehabilitation of the site.</u></li> <li>» An incident reporting system will be used to record non-conformances to the EMPr.</li> <li>» <u>Public complaints register must be used to record complaints received.</u></li> </ul>	

**OBJECTIVE 16** : To avoid and or minimise the potential risk of increased veld fires during the construction phase.

The increased presence of people on the site could increase the risk of veld fires, particularly in the dry season.

<b>Project component/s</b>	<ul style="list-style-type: none"> <li>» wind turbines</li> <li>» construction camp</li> </ul>
<b>Potential Impact</b>	» Fires can pose a personal safety risk to local farmers and communities, and their homes, crops, livestock and farm infrastructure, such as gates and fences.
<b>Activity/risk source</b>	» Contractors are not aware of the requirements of the EMPr, leading to unnecessary impacts on the surrounding environment.
<b>Mitigation: Target/Objective</b>	» To ensure appropriate management of actions by on-site personnel in order to minimise impacts to the surrounding environment.

Mitigation: Action/control	Responsibility	Timeframe
<u>No unsupervised open fires for cooking or heating must be allowed on site.</u>	<u>Contractor(s)</u>	Construction
Provide adequate fire-fighting equipment on-site.	<u>Contractor(s)</u>	Construction
Provide fire-fighting training to selected construction	Contractor(s)	Construction



Mitigation: Action/control	Responsibility	Timeframe
staff.		
Compensate farmers / community members at full market related replacement cost for any losses due to the wind energy facility project, such as livestock, damage to infrastructure etc. <u>as a result of fires that can be directly attributed to construction activities.</u>	<u>Contractor(s)</u>	Construction

<b>Performance Indicator</b>	<ul style="list-style-type: none"> <li>» Designated areas for fires identified on site at the outset of the construction phase.</li> <li>» Fire-fighting equipment and training provided before the construction phase commences.</li> <li>» Compensation claims settled after claim verified by independent party.</li> </ul>
<b>Monitoring</b>	<ul style="list-style-type: none"> <li>» A complaints register must be maintained, in which any complaints from the community are to be logged. Complaints must be investigated and, if appropriate, acted upon.</li> <li>» An incident reporting system must be used to record non-conformances to the EMPr.</li> </ul>

**OBJECTIVE 17 : Traffic management and transportation of equipment and materials to site (Traffic Management Plan)**

The construction phase of the project will be the most significant in terms of generating traffic impacts; resulting from the transport of equipment (including turbine components) and materials and construction crews to the site and the return of the vehicles after delivery of materials. Potential impacts associated with transportation and access relate mostly to works within the site boundary (i.e. the Wind Farm and ancillary infrastructure) and external works outside the site boundary. This section should be read in conjunction with the Traffic and Transportation Plan attached as **Appendix F**.

<b>Project component/s</b>	<ul style="list-style-type: none"> <li>» Wind Turbines;</li> <li>» Access Roads;</li> <li>» Substation;</li> <li>» Power line; and</li> <li>» <u>Construction vehicles</u></li> </ul>
<b>Potential Impact</b>	<ul style="list-style-type: none"> <li>» Traffic congestion, particularly on narrow roads or on road passes where overtaking is not permitted;</li> <li>» Risk of accidents; and</li> <li>» Deterioration of road pavement conditions (i.e. both surfaced and gravel road) due to abnormal loads.</li> </ul>
<b>Activity/risk source</b>	<ul style="list-style-type: none"> <li>» Traffic congestion increase ;</li> <li>» Increased traffic movement (especially heavy/abnormal load</li> </ul>

	<p>vehicles) on R45;</p> <ul style="list-style-type: none"> <li>» Site preparation and earthworks;</li> <li>» Foundations or plant equipment installation;</li> <li>» Transportation of ready-mix cement from off-site batching plant to the site;</li> <li>» Mobile construction equipment movement on-site;</li> <li>» Power line construction activities; and</li> </ul>
<b>Mitigation: Target/Objective</b>	<ul style="list-style-type: none"> <li>» To minimise impact of traffic associated with the construction of the Wind Farm on local traffic;</li> <li>» To minimise potential for negative interaction between pedestrians or sensitive users and traffic associated with the facility construction; and</li> <li>» To ensure all vehicles are roadworthy and all materials/equipment are carried appropriately and within any imposed permit/licence conditions.</li> </ul>

<b>Mitigation: Action/control</b>	<b>Responsibility</b>	<b>Timeframe</b>
<u>Develop and implement a traffic management plan (Refer to <b>Appendix F</b>).</u>	<u>Contractor, (Transportation sub-contractor)</u>	<u>Duration of contract</u>
<u>Existing road infrastructure must be used as far as possible for providing access to the proposed turbine positions. Where no road infrastructure exists, new roads should be placed within existing disturbed areas or environmental conditions must be taken into account to ensure the minimum amount of damage is caused to natural habitats.</u>	<u>Contractor, (Transportation sub-contractor)</u>	<u>Duration of contract</u>
<u>Internal roads must be located to minimize stream crossings. All structures crossing streams must be located and constructed so that they do not decrease channel stability or increase water velocity.</u>	<u>Contractor(s), (Transportation sub-contractor)</u>	<u>Duration of contract</u>
All relevant permits for abnormal loads must be applied for from the relevant authority.	Contractor (or appointed Transportation contractor)	<u>Pre-construction and duration of contract</u>
No deviation from approved transportation routes must be allowed, unless roads are closed for whatever reason outside the control of the contractor.	Contractor	Duration of contract
A designated access (or accesses) to the proposed site must be created to ensure safe entry and exit.	Contractor	<u>Duration of contract</u>
Appropriate road management strategies must be Implemented on external and internal roads with all employees and contractors required to abide by standard road and safety procedures.	Contractor (or appointed Transportation contractor)	<u>Pre-construction and duration of contract</u>
Appropriate dust suppression techniques must be	Contractor	Duration of

used to minimise dust emissions on unsurfaced roads.		contract	
Vehicle movements on local roads must be limited to standard construction operating hours wherever possible to limit noise impacts and dust nuisance.	Contractor	Duration of contract	of contract
Any traffic delays because of construction traffic must be co-ordinated with the appropriate authorities.	Contractor	Duration of contract	of contract
Times for arrival and departure of heavy vehicles must be co-ordinated to minimise congestion on the R45 road.	Contractor	Duration of contract	of contract
A designated access to the proposed site must be created to ensure safe entry and exit.	Contractor	Pre-construction	
Signage must be established at appropriate points warning of turning traffic and the construction site (all signage to be in accordance with prescribed standards). <u>Signage must be maintained on an on-going basis. Signs must be placed along construction roads to identify speed limits, travel restrictions, and other standard traffic control information.</u>	Contractor	Duration of contract	of contract
Appropriate maintenance of all vehicles must be ensured.	Contractor	Duration of contract	of contract
All vehicles travelling on public roads must adhere to the specified speed limits and all drivers must be in possession of an appropriate valid driver's license.	Contractor	Duration of contract	of contract
<u>All construction vehicles should adhere to a low speed limit to avoid collisions with susceptible species such as snakes and tortoises.</u>	<u>Contractor</u>	<u>Duration of contract</u>	<u>of contract</u>
<u>Construction vehicles carrying material to the site should avoid using roads through densely populated built-up areas.</u>	<u>Contractor, (Transportation sub-contractor)</u>	<u>Duration of contract</u>	<u>of contract</u>
The movement of all vehicles within the site must be on designated roadways.	Contractor	Duration of contract	of contract
The movement of vehicle traffic associated with the construction phase must not impact on access to the Koperfontein silos for local farmers, specifically during the harvest months of October and November.	Contractor	Duration of contract	of contract
Ensure that access to grain silos in Koperfontein during the months of October and November is not hindered by the movement of construction vehicles.	Contractor	Duration of contract	of contract
All hazardous substances must be transported in accordance with the relevant legislation and regulations.	Contractor	Duration of contract	of contract
Use gravel rather than asphalt for service road surfaces. Keep hard surfaces as narrow as possible.	Contractor	Duration of contract	of contract

<u>Road borders should be regularly maintained to ensure that vegetation remains short and that they therefore serve as an effective firebreak (where required).</u>	<u>Contractor in consultation with the ECO</u>	<u>Duration of contract</u>
<u>Roads must be designed so that changes to surface water runoff are avoided and erosion is not initiated.</u>	<u>Contractor</u>	<u>Duration of contract</u>

<b>Performance Indicator</b>	<ul style="list-style-type: none"> <li>» No traffic incidents involving Project personnel or appointed contractors;</li> <li>» <u>Appropriate signage in place;</u></li> <li>» No complaints resulting from traffic congestion, delays or driver negligence associated with construction of the Wind Farm; and</li> <li>» Drivers made aware of the potential safety issues and enforcement of strict speed limits when they are employed.</li> <li>» Contractor and drivers aware of the times of the year when wheat is harvested and grain silos need to be accessed (October and November).</li> </ul>
<b>Monitoring</b>	<ul style="list-style-type: none"> <li>» Visual monitoring of dust produced by traffic movement;</li> <li>» Visual monitoring of traffic control measures to ensure they are effective;</li> <li>» A complaints register will be maintained, in which any complaints from the community will be logged. Complaints will be investigated and, if appropriate, acted upon; and</li> <li>» An incident reporting system will be used to record non-conformances to the EMPr.</li> </ul>

**OBJECTIVE 18 : Appropriate handling and storage of chemicals, hazardous substances and waste**

The construction phase of the Wind Farm will involve the storage and handling of a variety of chemicals including adhesives, abrasives, oils and lubricants, paints and solvents. The main wastes expected to be generated by the construction of the Wind Farm will include general solid waste, hazardous waste (which will be very limited) and liquid waste. This section should be read in conjunction with the Waste Management Plan (attached as **Appendix J**).

<b>Project component/s</b>	<ul style="list-style-type: none"> <li>» Wind turbines;</li> <li>» Access roads;</li> <li>» Substation;</li> <li>» Power line;</li> <li>» <u>Concrete batching plant; and</u></li> </ul>
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	» <u>Construction camp/ laydown areas</u>
<b>Potential Impact</b>	<ul style="list-style-type: none"> <li>» Release of contaminated water from contact with spilled chemicals;</li> <li>» Generation of contaminated wastes from used chemical containers;</li> <li>» Inefficient use of resources resulting in excessive waste generation; and</li> <li>» Litter or contamination of the site or water through poor waste management practices.</li> </ul>
<b>Activity/risk source</b>	<ul style="list-style-type: none"> <li>» Vehicles associated with site preparation and earthworks;</li> <li>» Power line construction activities;</li> <li>» Substation construction activities;</li> <li>» Packaging and other construction wastes;</li> <li>» Hydrocarbon use and storage ; and</li> <li>» Spoil material from excavation, earthworks and site preparation.</li> </ul>
<b>Mitigation: Target/Objective</b>	<ul style="list-style-type: none"> <li>» To ensure that the storage and handling of chemicals and hydrocarbons on-site does not cause pollution to the environment or harm to persons;</li> <li>» To ensure that the storage and maintenance of machinery on-site does not cause pollution of the environment or harm to persons;</li> <li>» To comply with waste management guidelines <u>and legislation</u>;</li> <li>» To minimise production of waste;</li> <li>» To ensure appropriate waste storage and disposal; and</li> <li>» To avoid environmental harm from waste disposal.</li> </ul>

<b>Mitigation: Action/control</b>	<b>Responsibility</b>	<b>Timeframe</b>
<u>An effective monitoring system must be implemented during the construction phase to detect any leakage or spillage of hazardous substances during their transportation, handling, use and storage.</u>	<u>Contractor(s)</u>	Duration of contract
The storage of flammable and combustible liquids such as oils must be in designated areas which are appropriately bunded, and stored in compliance with Material Safety Data Sheets (MSDS) files, as defined by the SHE Representative.	<u>Contractor(s)</u>	Duration of contract
Any spills must receive the necessary clean-up action. Bioremediation kits must be kept on-site and used to remediate any spills that may occur. Appropriate arrangements to be made for appropriate collection and disposal of all cleaning materials, absorbents and contaminated soils (in accordance with a waste management plan <u>(refer to Appendix J)</u> ).	<u>Contractor(s)</u>	Duration of contract
<u>Hazardous substances must not be stored where there could be accidental leakage into surface or subterranean water.</u>	<u>Contractor(s)</u>	<u>Duration of contract</u>
Hazardous waste handling and spill response training must be included for staff and contractors as part of site induction.	<u>Contractor(s)</u>	Duration of contract

<b>Mitigation: Action/control</b>	<b>Responsibility</b>	<b>Timeframe</b>
Any storage and disposal permits/approvals which may be required must be obtained, and the conditions attached to such permits and approvals will be complied with.	Contractor(s)	Duration of contract
Routine servicing and maintenance of vehicles must take place in designated areas within the approved development footprint. If repairs of vehicles must take place <u>on site, e.g. during emergencies, an appropriate drip tray must be used to contain any fuel or oils.</u>	Contractor(s)	Duration of contract
Transport of all hazardous substances must be in accordance with the relevant legislation and regulations.	Contractor(s)	Duration of contract
MSDS records to be kept current for chemicals in use.	Contractor(s)	Duration of contract
Waste disposal records must be available for <u>ECO</u> review at all times.	Contractor(s)	Duration of contract
Construction contractors must provide specific detailed waste management plans/ <u>method statements (in accordance with the Waste Management Plan – Attached as <b>Appendix J</b>)</u> to deal with all waste streams.	Contractor(s)	Duration of contract
Specific areas must be designated on-site for the temporary management of various waste streams, i.e. general refuse, construction waste (wood and metal scrap) and contaminated waste. Location of such areas must seek to minimise the potential for impact on the surrounding environment, including prevention of contaminated runoff, seepage and vermin control.	Contractor(s)	Duration of contract
Where possible, construction and general wastes on-site must be reused or recycled. Bins and skips must be available on-site for collection, separation and storage of waste streams (such as wood, metals, general refuse etc.) and must be appropriately labelled.	Contractor(s)	Duration of contract
Uncontaminated waste must be removed at least weekly for disposal; other wastes must be removed for recycling/ disposal at an appropriate frequency.	Contractor(s)	Duration of contract
Disposal of waste must be in accordance with relevant legislative requirements, including the use of licensed contractors <u>and licensed waste disposal sites.</u>	Contractor(s)	Duration of contract
Hydrocarbon waste must be contained and stored in sealed containers within an appropriately bunded area.	Contractor(s)	Duration of contract
Waste and surplus dangerous goods must be kept to a minimum and must be transported by approved waste transporters to sites designated for their disposal.	Contractor(s)	Duration of contract
Documentation (waste manifest) must be maintained	Contractor(s)	Duration of

<b>Mitigation: Action/control</b>	<b>Responsibility</b>	<b>Timeframe</b>
detailing the quantity, nature and fate of any hazardous waste.		contract
Regularly serviced chemical toilets facilities must be used to ensure appropriate control of sewage.	Contractor(s)	Duration of contract
An incident/complaints register must be established and maintained on-site.	Contractor(s)	Duration of contract
Provide adequate fire-fighting equipment onsite.	Contractor(s)	Duration of contract
Provide fire-fighting training to selected construction staff.	Contractor(s)	Duration of construction
Hazardous and non-hazardous waste must be separated at source. Separate waste collection bins must be provided for this purpose. These bins must be clearly marked and appropriately covered.	Contractor(s)	<u>Erection:</u> during site establishment <u>Maintenance:</u> for duration of Contract within a particular area.
All solid waste collected must be disposed of at a registered waste disposal site. A certificate of disposal must be obtained and kept on file. The disposal of waste must be in accordance with all relevant legislation. Under no circumstances may solid waste be burnt or buried on site.	Contractor(s)	<u>Erection:</u> during site establishment <u>Maintenance:</u> for duration of Contract within a particular area.
Supply waste collection bins at construction equipment and construction crew camps.	Contractor(s)	<u>Erection:</u> during site establishment <u>Maintenance:</u> for duration of Contract within a particular area.
Where a registered waste site is not available close to the construction site, a method statement shall be provided with regard to waste management.	Contractor(s)	Site establishment
<u>No dumping or temporary storage of any materials may take place outside designated and demarcated laydown area, and these must all be located within areas of low environmental sensitivity.</u>	Contractor(s)	<u>Duration of contract</u>
<u>Construction equipment must be refuelled within designated refuelling locations, or where remote refuelling is required, appropriate drip trays must be utilised.</u>	Contractor(s)	<u>Duration of contract</u>

<b>Mitigation: Action/control</b>	<b>Responsibility</b>	<b>Timeframe</b>
<u>All stored fuels to be maintained within a bund and on a sealed surface.</u>	Contractor(s)	<u>Duration of contract</u>
<u>Fuel storage areas must be inspected regularly to ensure bund stability, integrity and function.</u>	Contractor(s)	<u>Duration of contract</u>
<u>Leakage of fuel must be avoided at all times and if spillage occurs, it must be remediated immediately.</u>	Contractor(s)	<u>Duration of contract</u>
<u>Construction machinery must be stored in an appropriately sealed area.</u>	Contractor(s)	<u>Duration of contract</u>
<u>Spilled cement/concrete must be cleaned up as soon as possible and disposed of at a suitably licensed waste disposal site.</u>	Contractor(s)	<u>Duration of contract</u>
<u>Hazardous waste such as bitumen, oils, oily rags, paint tins etc. must be disposed of at approved waste landfill site licenced to accept such waste.</u>	Contractor(s)	<u>Duration of contract</u>
<u>Corrective action must be undertaken immediately if a complaint is made, or potential/actual leak or spill of polluting substance identified. This includes stopping the contaminant from further escaping, cleaning up the affected environment as much as practically possible and implementing preventive measures.</u>	Contractor(s)	<u>Duration of contract</u>
<u>In the event of a major spill or leak of contaminants, the relevant administering authority must be immediately notified as per the notification of emergencies/incidents. Spill kits to be kept on-site.</u>	Contractor(s)	<u>Duration of contract</u>
<u>Any contaminated/polluted soil removed from the site must be disposed of at a licensed hazardous waste disposal facility.</u>	Contractor(s)	<u>Duration of contract</u>
<u>Upon the completion of construction, the area will be cleared of potentially polluting materials.</u>	Contractor(s)	<u>Completion of construction</u>
<u>Supply adequate weather and vermin proof waste collection bins and skips (covered at minimum with secured netting or shade cloth) at site where construction is being undertaken. Separate labelled bins should be provided for general and hazardous waste. As far as possible, provision should be made for separation of waste for recycling.</u>	Contractor(s)	<u>Site establishment, and duration of construction</u>
<u>All work sites must be kept free of waste. No solid waste may be burned or buried on site or disposed of by any other method on site or within quarries or borrows pits. Solid waste (general waste) to be disposed of at the nearest municipal landfill site. Slips of disposal to be retained as proof of responsible disposal</u>	Contractor(s)	<u>Site establishment, and duration of construction</u>
<u>Liquid waste: No liquid waste, including grey water, may be</u>	Contractor(s) O&M Contractor	<u>During and post</u>



Mitigation: Action/control	Responsibility	Timeframe
<p><u>discharged into any water body or drainage line. All sewage disposal to take place at a registered and operational wastewater treatment works. Slips of disposal to be retained as proof of responsible disposal</u></p> <p><u>Hazardous substances and hazardous waste: Ensure compliance with all national, regional and local legislation with regard to the storage, handling and disposal of hydrocarbons, chemicals, solvents and any other harmful and hazardous substances and materials. The onus is on the Contractor to identify and interpret the applicable legislation. Hazardous waste to be disposed of at a registered h:H or H:H landfill site. Depending on the classification of the waste, a registered service provider with the necessary permits is to collect, transport and dispose of hazardous waste. Proof of appropriate disposal to be provided to the ECO.</u></p>		<p><u>construction.</u></p>
<p><u>Keep a record of all hazardous substances stored on site for submission to the ECO. Clearly label all the containers storing hazardous waste.</u></p>	<p><u>Contractor(s)</u></p>	<p><u>Pre-Construction</u></p>
<p><u>An effective monitoring system must be put in place to detect any leakage or spillage of all hazardous substances during their transportation, handling, installation and storage.</u></p>	<p><u>Contractor(s)</u></p>	<p><u>Duration of contract</u></p>
<p><u>Precautions must be in place to limit the possibility of oil and other toxic liquids from entering the soil or clean stormwater system.</u></p>	<p><u>Contractor(s)</u></p>	<p><u>Duration of contract</u></p>
<p><u>Implement an integrated waste management approach that is based on waste minimisation and incorporates reduction, recycling, re-use and disposal where appropriate. Where solid waste is disposed of, such disposal shall only occur at a landfill licensed in terms of section 20(b) of the National Environmental Management Waste Act, 2008 (Act 59 of 2008).</u></p>	<p><u>Contractor(s)</u></p>	<p><u>Duration of contract</u></p>
<p><u>Upon the completion of construction, the area must be cleared of potentially polluting materials. Spoil stockpiles must also be removed and appropriately disposed of or the material re-used for an appropriate purpose.</u></p>	<p><u>Contractor(s)</u></p>	<p><u>Completion of construction</u></p>

**Performance Indicator**

- » No avoidable chemical spills outside of designated storage areas;
- » No water or soil contamination by chemical spills;
- » No complaints received regarding waste on site or indiscriminate dumping;
- » Internal site audits ensuring that waste segregation, recycling and reuse is occurring appropriately; and

	<ul style="list-style-type: none"> <li>» Provision of all appropriate waste manifests for all waste streams.</li> <li>» <u>Spills are sufficiently cleaned and dealt with.</u></li> </ul>
<b>Monitoring and Reporting</b>	<ul style="list-style-type: none"> <li>» Observation and supervision of chemical storage and handling practices and vehicle maintenance throughout construction phase.</li> <li>» A complaints register must be maintained, in which any complaints from the community must be logged. Complaints must be investigated and, if appropriate, acted upon.</li> <li>» Observation and supervision of waste management practices throughout construction phase.</li> <li>» Waste collection to be monitored on a regular basis.</li> <li>» Waste documentation completed.</li> <li>» A complaints register must be maintained, in which any complaints from the community must be logged. Complaints must be investigated and, if appropriate, acted upon.</li> <li>» An incident reporting system must be used to record non-conformances to the EMPr.</li> <li>» <u>Proponent and appointed ECO must monitor indicators listed above to ensure that they have been met for the construction phase.</u></li> </ul>

**OBJECTIVE 19 : Ensure disciplined conduct of on-site contractors and workers**

In order to minimise impacts on the surrounding environment, Contractors must be required to adopt a certain Code of Conduct and commit to restricting construction activities to areas within the development footprint. Contractors and their sub-contractors must be familiar with the conditions of the Environmental Authorisation, the BA Report and this EMP, as well as the requirements of all relevant environmental legislation.

<b>Project component/s</b>	<ul style="list-style-type: none"> <li>» Construction of Wind Farm, access roads, substation and power line; and</li> <li>» Conduct of construction employees</li> </ul>
<b>Potential Impact</b>	<ul style="list-style-type: none"> <li>» Pollution/contamination of the environment; and</li> <li>» Disturbance to the environment <u>and surrounding communities.</u></li> </ul>
<b>Activity/risk source</b>	<ul style="list-style-type: none"> <li>» Contractors are not aware of the requirements of the EMPr, leading to unnecessary impacts on the surrounding environment.</li> </ul>
<b>Mitigation: Target/Objective</b>	<ul style="list-style-type: none"> <li>» To ensure appropriate management of actions by on-site personnel in order to minimise impacts to the surrounding environment.</li> </ul>

Mitigation: Action/control	Responsibility	Timeframe
The terms of this EMPr and the Environmental Authorisation must be included in all tender documentation and Contractors contracts.	Hopefield Small Wind Farm (Pty) Ltd	Tender process
An ECO must regularly visit the site throughout the road construction, cable laying, and turbine foundation excavation periods.	Hopefield Small Wind Farm (Pty) Ltd	Duration of construction
Contractors must use chemical toilets/ablution facilities situated at designated areas of the site; no abluting may be permitted outside the designated area. These facilities must be regularly serviced by appropriate contractors. <u>Ablution facilities must not be placed within 50m from any river or drainage line.</u>	Contractor (and sub-contractor/s)	Duration of contract
Cooking/meals must take place in a designated area; no firewood or kindling may be gathered from the site or surrounds.	Contractor (and sub-contractor/s)	Duration of contract
Ensure that construction related activities that pose a potential fire risk, such as welding, are properly managed and are confined to areas where the risk of fires has been reduced.	Contractor (and sub-contractor/s)	Duration of contract
All litter must be deposited in a clearly marked, closed, animal-proof disposal bin in the construction area; particular attention needs to be paid to food waste.	Contractor (and sub-contractor/s)	Duration of contract
No one other than the ECO or personnel authorised by the ECO, may disturb flora or fauna outside of the demarcated construction area/s.	Contractor (and sub-contractor/s)	Duration of contract
Animals disturbed during construction activities should not be harmed but should be allowed to move off to an undisturbed area of the site.	Contractor (and sub-contractor/s)	Duration of contract
Hopefield Small Wind Farm (Pty) Ltd should hold their contractors liable for compensating farmers and communities in full for any stock losses and/or damage to farm infrastructure that can be linked to construction workers. This should be contained in the Code of Conduct <u>or similar</u> to be signed between Hopefield Small Wind Farm (Pty) Ltd, the contractors and neighbouring landowners. The agreement should also cover loses and costs associated with fires caused by construction workers or construction related activities	Contractor (and sub-contractor/s)	Duration of contract
Contractors appointed by Hopefield Small Wind Farm (Pty) Ltd must ensure that all workers are informed at the outset of the construction phase of the conditions contained on the Code of Conduct, specifically consequences of stock theft and trespassing on adjacent farms.	Contractor (and sub-contractor/s)	Duration of contract

<b>Mitigation: Action/control</b>	<b>Responsibility</b>	<b>Timeframe</b>
Contractors appointed by Hopefield Small Wind Farm (Pty) Ltd must ensure that construction workers who are found guilty of stealing livestock and/or damaging farm infrastructure are dismissed and charged. This should be contained in the Code of Conduct. All dismissals must be in accordance with South African labour legislation.	Contractor (and sub-contractor/s)	Duration of contract
<u>Contractors and construction workers must be clearly informed of no-go areas</u>	<u>the Proponent</u>	<u>Duration of contract</u>
<u>No one must disturb flora or fauna outside of the demarcated construction area/s.</u>	<u>Contractor (and sub-contractor/s)</u>	<u>Duration of contract</u>
<u>Workers must be made aware of the importance of not destroying or damaging the vegetation along rivers and in wetland areas and this awareness must be promoted throughout the construction phase.</u>	<u>Contractor (and sub-contractor/s)</u>	<u>Duration of construction</u>
<u>Workers must be made aware of the importance of not polluting rivers or wetlands and of not undertaking activities that could result in such pollution, and this awareness must be promoted throughout the construction phase.</u>	<u>Contractor (and sub-contractor/s)</u>	<u>Duration of construction</u>
<u>Construction staff must be trained in actions to minimise noise impacts.</u>	<u>Contractor (and sub-contractor/s)</u>	<u>Duration of construction</u>

<b>Performance Indicator</b>	<ul style="list-style-type: none"> <li>» Compliance with specified conditions of Environmental Authorisation, BA Report and EMPr;</li> <li>» No complaints regarding contractor behaviour or habits;</li> <li>» Fire-fighting equipment and training provided before the construction phase commences; and</li> <li>» <u>Code of Conduct drafted before commencement of construction phase and briefing session with construction workers held at outset of construction phase.</u></li> </ul>
<b>Monitoring and Reporting</b>	<ul style="list-style-type: none"> <li>» Observation and supervision of Contractor practices throughout construction phase.</li> <li>» A complaints register must be maintained, in which any complaints from the community are to be logged. Complaints must be investigated and, if appropriate, acted upon <u>as soon as possible.</u></li> <li>» An incident reporting system must be used to record non-conformances to the EMPr.</li> </ul>

## **OBJECTIVE 20 : Effective management of concrete batching plants**

Concrete is required during the construction of a wind energy facility. In this regard there could be a need to establish a batching plant within the site. Batching plants are facilities/installations that combine various ingredients to form concrete. Some of these inputs include sand, water, aggregate (rocks, gravel, etc.), fly ash, potash, and cement.

Turbid and highly alkaline wastewater, dust emissions and noise are the key potential impacts associated with concrete batching plants. Concrete batching plants, cement, sand and aggregates can produce dust. Potential pollutants in batching plant wastewater and stormwater include cement, sand, aggregates, chemical additive mixtures, fuels and lubricants.

<b>Project component/s</b>	» Concrete batching plant/s
<b>Potential Impact</b>	<ul style="list-style-type: none"> <li>» Dust emissions</li> <li>» Release of contaminated water</li> <li>» Generation of contaminated wastes from used chemical containers</li> <li>» Inefficient use of resources resulting in excessive waste generation</li> </ul>
<b>Activity/risk source</b>	<ul style="list-style-type: none"> <li>» Operation of the batching plant</li> <li>» Packaging and other construction wastes</li> <li>» Hydrocarbon use and storage</li> <li>» Spoil material from excavation, earthworks and site preparation</li> </ul>
<b>Mitigation: Target/Objective</b>	» To ensure that the operation of the batching plant does not cause pollution to the environment or harm to persons

<b>Mitigation: Action/control</b>	<b>Responsibility</b>	<b>Timeframe</b>
Where possible concrete batching plants should be sited such that impacts on the environment or the amenity of the local community from noise, odour or polluting emissions are minimised	<u>Contractor(s)</u>	Construction phase
The provision of natural or artificial wind barriers such as trees, fences and landforms may help control the emission of dust from the plant.	<u>Contractor(s)</u>	Construction phase
Where there is a regular movement of vehicles. Access and exit routes for heavy transport vehicles should be planned to minimise noise and dust impacts on the environment	<u>Contractor(s)</u>	Construction phase
The concrete batching plant site should demonstrate good maintenance practices, including regular sweeping to prevent dust build-up	<u>Contractor(s)</u>	Construction phase
The prevailing wind direction should be considered to ensure that bunkers and conveyors are sited in a sheltered position to minimise the effects of the wind.	<u>Contractor(s)</u>	Construction phase

<b>Mitigation: Action/control</b>	<b>Responsibility</b>	<b>Timeframe</b>
Aggregate material should be delivered in a damp condition, and water sprays or a dust suppression agent should be correctly applied to reduce dust emissions and reduce water usage	<u>Contractor(s)</u>	Construction phase
Conveyors must be designed and constructed to prevent fugitive dust emissions. This may include covering the conveyor with a roof, installing side protection barriers and equipping the conveyor with spill trays, which direct material to a collection point. Belt cleaning devices at the conveyor head may also assist to reduce spillage.	<u>Contractor(s)</u>	Construction phase
The site should be designed and constructed such that clean stormwater, including roof runoff, is diverted away from contaminated areas and directed to the stormwater discharge system.	<u>Contractor(s)</u>	Construction phase
Any liquids stored on site, including admixtures, fuels and lubricants, should be stored in accordance with applicable legislation	<u>Contractor(s)</u>	Construction phase
Contaminated stormwater and process wastewater should be captured and recycled where possible. A wastewater collection and recycling system should be designed to collect contaminated water.	<u>Contractor(s)</u>	Construction phase
Process wastewater and contaminated stormwater collected from the entire site should be diverted to a settling pond, or series of ponds, such that the water can be reused in the concrete batching process. The settling pond or series of ponds should be lined with an impervious liner capable of containing all contaminants found within the water they are designed to collect	<u>Contractor(s)</u>	Construction phase
Areas where spills of oils and chemicals may occur should be equipped with easily accessible spill control kits to assist in prompt and effective spill control	<u>Contractor(s)</u>	Construction phase
Ensure that all practicable steps are taken to minimise the adverse effect of noise emissions. This responsibility includes not only the noise emitted from the plant and equipment but also associated noise sources, such as radios, loudspeakers and alarms	<u>Contractor(s)</u>	Construction phase
Where possible, waste concrete should be used for construction purposes at the batching plant or project site.	<u>Contractor(s)</u>	Construction phase
The batching plant should be monitored by the	<u>ECO/EO/Environmental</u>	Construction

Mitigation: Action/control	Responsibility	Timeframe
ECO/EO/Environmental Representative to ensure that the plant is operating according to its environmental objectives and within legislative requirements.	Representative	phase

Performance Indicator	<ul style="list-style-type: none"> <li>» No complaints regarding dust</li> <li>» No water or soil contamination by chemical spills</li> <li>» No complaints received regarding waste on site or indiscriminate dumping</li> </ul>
Monitoring	<ul style="list-style-type: none"> <li>» Observation and supervision of chemical storage and handling practices and vehicle maintenance throughout construction phase</li> <li>» A complaints register must be maintained, in which any complaints from the community must be logged. Complaints will be investigated and, if appropriate, acted upon</li> <li>» An incident reporting system must be used to record non-conformances to the EMP</li> <li>» Proponent or appointed ECO/EO/Environmental Representative must monitor indicators listed above to ensure that they have been met for the construction phase</li> </ul>

#### 6.4. Detailing Method Statements

**OBJECTIVE 21 : Ensure all construction activities/practices/procedures are undertaken with the appropriate level of environmental awareness to minimise environmental risk, in line with the specifications of the EMP.**

The environmental specifications are required to be underpinned by a series of Method Statements, within which the Contractors and Service Providers are required to outline how any identified environmental risks will practically be mitigated and managed for the duration of the contract, or for the time period in which that risk will exist. That is, the Contractor will be required to describe how specified requirements will be achieved through the submission of written Method Statements to the Owner’s Engineer (and ECO).

A Method Statement is defined as “a written submission by the Contractor in response to the environmental specification or a request by the Owner’s Engineer, Site Manager and ECO or alike, setting out the plant, materials, labour and method the Contractor proposes using to conduct an activity, in such detail that the Owner’s Engineer, Site Manager and ECO is able to assess whether the Contractor's proposal is in accordance with the Specifications and/or will produce results in accordance with the Specifications”. The Method Statement must cover applicable details with regard to:

- » Details of the responsible person/s;
- » Construction procedures;
- » Materials and equipment to be used;
- » Getting the equipment to and from site;
- » How the equipment/material will be moved while on-site;
- » How and where material will be stored;
- » The containment (or action to be taken if containment is not possible) of leaks or spills of any liquid or material that may occur;
- » Timing and location of activities;
- » Compliance/non-compliance with the Specifications; and
- » Any other information deemed necessary by the Site Manager and/or ECO.

Method Statements must be compiled for all activities which affect any material or significant aspect of the environment and should be applied consistently to all activities. Specific areas to be addressed in the method statement: pre, during and post construction includes, *inter alia*:

- » Site establishment (which explains all activities from induction training to offloading, construction sequence for site establishment and the different amenities to be established etc. Including a site camp plan indicating all of these).
- » Preparation of the site (i.e. clearing vegetation, compacting soils and removing existing infrastructure and waste).
- » Soil management/stockpiling and erosion control.
- » Excavations and backfilling procedure.
- » Batching procedures
- » Stipulate norms and standards for water supply and usage (i.e.: comply strictly to licence and legislation requirements and restrictions)
- » Stipulate the storm water management procedures recommended in the storm water management method statement (in accordance with the Storm Water Management Plan – Attached as **Appendix G**).
- » Ablution facilities (placement, maintenance, management and servicing)
- » Solid Waste Management:
  - \* Description of the waste storage facilities (on site and accumulative).
  - \* Placement of waste stored (on site and accumulative).
  - \* Management and collection of waste process.
  - \* Recycle, re-use and removal process and procedure.
- » Liquid waste management:
  - \* The design, establish, maintain and operate suitable pollution control facilities necessary to prevent discharge of water containing polluting matter or visible suspended materials into rivers, streams or existing drainage systems.
  - \* Should grey water (i.e. water from basins, showers, baths, kitchen sinks etc.) need to be disposed of, link into an existing facilities where possible. Where no facilities are available, grey water runoff must be controlled to ensure there is no seepage into natural watercourses.



- » Dust and noise pollution
  - \* Describe necessary measures to ensure that noise from construction activities is maintained within lawfully acceptable levels.
  - \* Procedure to control dust at all times on the site, access roads, borrow pits and spoil sites (dust control shall be sufficient so as not to have significant impacts in terms of the biophysical and social environments). These impacts include visual pollution, decreased safety due to reduced visibility, negative effects on human health and the ecology due to dust particle accumulation.
- » Hazardous substance storage (Ensure compliance with all national, regional and local legislation with regard to the storage of oils, fuels, lubricants, solvents, wood treatments, bitumen, concrete, pesticides and any other harmful and hazardous substances and materials. South African National Standards apply).
  - \* Lists of all potentially hazardous substances to be used.
  - \* Appropriate handling, storage and disposal procedures.
  - \* Prevention protocol of accidental contamination of soil at storage and handling areas.
  - \* All storage areas, (i.e.: for harmful substances appropriately bunded with a suitable collection point for accidental spills must be implemented and drip trays underneath dispensing mechanisms including leaking engines/machinery).
- » Fire prevention and management measures on site.
- » Fauna and flora protection process on and off site (i.e. removal to reintroduction or replanting, if necessary).
  - \* Rehabilitation and re-vegetation process.
- » Incident and accident reporting protocol.
- » General administration
- » Designate access road and the protocol on while roads are in use.
- » Requirements on gate control protocols.

The Contractor may not commence the activity covered by the Method Statement until it has been provided to, reviewed and accepted by the Site Manager/Project Manager and/or ECO, except in the case of emergency activities and then only with the consent of the Site Manager. Review and accepted (or approval where required) of the Method Statement will not absolve the Contractor from their obligations or responsibilities in terms of their contract. Failure to submit a method statement may result in suspension of the activity concerned until such time as a method statement has been submitted and accepted/approved.

The ECO and the EO/ Environmental Representative must monitor the construction activities to ensure that these are undertaken in accordance with the approved Method Statement(s).

## **6.5 Awareness and Competence: Construction Phase of the Wind Energy Facility**

**OBJECTIVE 22 : To ensure all construction personnel have the appropriate level of environmental awareness and competence to ensure continued environmental due diligence and on-going minimisation of environmental harm**

To achieve effective environmental management, it is important that Contractors are aware of the responsibilities in terms of the relevant environmental legislation and the contents of this EMPr. The Contractor is responsible for informing employees and sub-contractors of their environmental obligations in terms of the environmental specifications, and for ensuring that employees are adequately experienced and properly trained in order to execute the works in a manner that will minimise environmental impacts. The Contractors obligations in this regard include the following:

- » All employees must have a basic understanding of the key environmental features of the construction site and the surrounding environment. This includes the discussion/explanation of site environmental matters during regular toolbox talks.
- » The content and requirements of Method Statements are to be clearly explained to all plant operators and general workers. All staff acting in a supervisory capacity is to have copies of the relevant Method Statements and be aware of the content thereof.
- » Ensuring that a copy of the EMPr is readily available on-site, and that all site staff are aware of the location and have access to the document.
- » Senior site staff will be familiar with the requirements of the EMPr and the environmental specifications as they apply to the construction of the facility.
- » Employees must undergo training for the operation and maintenance activities associated with a wind energy facility and have a basic knowledge of the potential environmental impacts that could occur and how they can be minimised and mitigated.
- » Ensuring that, prior to commencing any site works, all employees and sub-contractors have attended an Environmental Awareness Training talks which can be done by the contractors environmental representative or the ECO.
- » The talks should be sufficient to provide the site staff with an appreciation of the project's environmental requirements, and how they are to be implemented.
- » Basic training in the identification of archaeological sites/objects, and protected flora and fauna that may be encountered on the site.
- » Awareness of any other environmental matters, which are deemed to be necessary by the ECO.
- » Ensuring that employee information posters, outlining the environmental "do's" and "don'ts" (as per the environmental awareness training course) are erected at prominent locations throughout the site.
- » Ensure that construction workers have received basic training in environmental management, including the storage and handling of hazardous substances,

- minimisation of disturbance to sensitive areas, management of waste, and prevention of water pollution.
- » Records must be kept of those that have completed the relevant training.
  - » Training should be done either in a written or verbal format but must be in an appropriate format for the receiving audience.
  - » Refresher sessions must be held to ensure the contractor staff are aware of their environmental obligations as practically possible.
  - » All sub-contractors must have a copy of the EMPr and sign a declaration/acknowledgement that they are aware and familiar with the contents and requirements of the EMPr and that they will conduct work in such a manner as to ensure compliance with the requirements of the EMPr. All subcontractors performing the works should appoint a qualified Environmental Officer for the implementation of this EMPr and other project permits and authorisations.
  - » Contractors and main sub-contractors should have a basic training in the identification of archaeological sites/objects, and protected flora and fauna that may be encountered on the site.

Therefore, prior to the commencement of construction activities on site and before any person commences with work on site thereafter, adequate environmental awareness and responsibility are to be appropriately presented to all staff present onsite, clearly describing their obligations towards environmental controls and methodologies in terms of this EMPr.

#### **6.5.4 Environmental Awareness Training**

Environmental Awareness Training must take the form of an on-site talk and demonstration by the ECO before the commencement of site establishment and construction on site. The education/awareness programme should be aimed at all levels of management and construction workers within the contractor team. A record of attendance of this training must be maintained by the ECO on site.

#### **6.5.2 Induction Training**

Environmental induction training must be presented to all persons who are to work on the site – be it for short or long durations; Contractor’s or Engineer’s staff; administrative or site staff; sub-contractors or visitors to the site.

This induction training should include discussing the Proponent’s environmental policy and values, the function of the EMPr and Contract Specifications and the importance and reasons for compliance to these. The induction training must highlight overall do’s and don’ts on site and clarify the contractual and legal repercussions of non-compliance (penalty fees will be outlined in the service level agreement between the proponent and the contractor). The non-conformance reporting system must be explained during the induction as well. Opportunity for questions and clarifications must form part of this

training. A record of attendance of this training must be maintained by the EO/ Environmental Representative on site.

### **6.5.3 Toolbox Talks**

Toolbox talks should be held on a scheduled and regular basis (at least twice a month/ if necessary) where foremen, environmental and safety representatives of different components of the Works and sub-consultants hold talks relating to environmental practices and safety awareness on site. These talks should also include discussions on possible common incidents occurring on site and the prevention of reoccurrence thereof. Records of attendance and the awareness talk subject must be kept on file.

## **6.6. Monitoring Schedule: Construction Phase of the Wind Farm**

**OBJECTIVE 23 : To monitor the performance of the control strategies employed against environmental objectives and standards**

An environmental monitoring schedule must be in place not only to ensure conformance with the EMP, but also to monitor any environmental issues and impacts which have not been accounted for in the EMP that are, or could result in significant environmental impacts for which corrective action is required. The independent ECO will be responsible for monitoring (on a monthly basis) for the most part on a monthly basis although will include others on a needs basis (also refer to section 6.6.1 below). The Site Manager and Proponent's Environmental Manager will ensure that the monitoring is conducted and reported.

The aim of the monitoring and auditing process would be to routinely monitor the implementation of the specified environmental specifications, in order to:

- » Monitor and audit compliance with the prescriptive and procedural terms of the environmental specifications;
- » Ensure adequate and appropriate interventions to address non-compliance;
- » Ensure adequate and appropriate interventions to address environmental degradation;
- » Provide a mechanism for the lodging and resolution of public complaints;
- » Ensure appropriate and adequate record keeping related to environmental compliance;
- » Determine the effectiveness of the environmental specifications and recommend the requisite changes and updates based on audit outcomes, in order to enhance the efficacy of environmental management on site; and
- » Aid communication and feedback to authorities and stakeholders.

The EO for the Contractor/s performing different aspects of activities on site must be appointed prior to site mobilisation and will be responsible for the day to day

implementation of the EMPr and other project permits and authorisations. The EO will be responsible for weekly and monthly reporting to the ECO and Site Manager.

The ECO will ensure compliance with the EMPr during construction, and will conduct monitoring activities on a regular basis. An independent ECO must be appointed, and have the appropriate experience and qualifications to undertake the necessary tasks. The ECO will report any non-compliance or where corrective action is necessary to the Site Manager, DEA and/or any other monitoring body stipulated by the regulating authorities.

#### **6.6.1 Non-Conformance Reports**

All supervisory staff including Foremen, Resident Engineers, and the ECO/ EO/ Environmental Representative must be provided the means to be able to submit non-conformance reports to the Site Manager. Non-conformance reports will describe, in detail, the cause, nature and effects of any environmental non-conformance by the Contractor. Records of penalties imposed may be required by the relevant authority within 48 (forty eight) hours.

The non-conformance report will be updated on completion of the corrective measures indicated on the finding sheet. The report must indicate that the remediation measures have been implemented timeously and that the non-conformance can be closed-out to the satisfaction of the Site Manager and ECO.

#### **6.6.2 Monitoring Reports**

A monitoring report will be compiled by the ECO on a monthly basis and must be submitted to DEA for their records (Director: Compliance Monitoring). This report should include details of the activities undertaken in the reporting period, any non-conformances or incidents recorded, corrective action required, and details of those non-conformances or incidents which have been closed out. The EO will be responsible for the weekly and monthly reports which will be submitted internally which will aid the ECO in compiling the monitoring report. The monitoring report must be submitted to the DEA on the first week of the following month.

#### **6.6.3 Audit Reports**

The Proponent must ensure that project compliance with the conditions of the Environmental Authorisation is audited, and that the audit reports re submitted to the Director: Compliance Monitoring at the DEA.

#### **6.6.4 Final Audit Report**

A final external audit should be conducted following the completion of rehabilitation after construction is completed. The audit report must be submitted to the DEA within 30 days of completion of the audit (i.e. within 30 days of site handover) and within 30 days of completion of rehabilitation activities.

The final 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 the EA;
- » 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;
- » Highlight any outstanding environmental issues that must be addressed. Along with recommendations for ensuring these issues are appropriately addressed;
- » Include a copy of the EA and the approved EMPr;
- » Include all documentation such as waste disposal certificates, hazardous waste landfill site licenses etc. pertaining to the EA; and
- » Include evidence of adherence to the conditions of this authorisation and the EMPr where relevant such as training records and attendance registers.

**MANAGEMENT PROGRAMME FOR THE WIND ENERGY FACILITY  
 REHABILITATION OF DISTURBED AREAS**

**CHAPTER 7**

**7.1. Overall Goal for the Rehabilitation of Disturbed Areas**

**Overall Goal for the Rehabilitation of Disturbed Areas:** Undertake the rehabilitation measures in a way that:

- » Ensures rehabilitation of disturbed areas following the execution of the works, such that residual environmental impacts are remediated or curtailed (Refer to **Appendix E: Revegetation and Rehabilitation Plan**).

In order to meet this goal, the following objective, actions and monitoring requirements are relevant:

**OBJECTIVE 1 : To ensure rehabilitation of disturbed areas *following the execution of the works, such that residual environmental impacts are remediated or curtailed***

Areas requiring rehabilitation will include all areas disturbed during the construction phase and that are not required for regular maintenance operations.

<b>Project component/s</b>	<ul style="list-style-type: none"> <li>» Wind farm (including temporary access roads and laydown areas);</li> <li>» power line servitude and service road for power line servitude; and</li> <li>» <u>Temporary laydown areas</u>.</li> </ul>
<b>Potential Impact</b>	<ul style="list-style-type: none"> <li>» Environmental integrity of site undermined resulting in reduced visual aesthetics, erosion, compromised land capability and the requirement for on-going management intervention.</li> </ul>
<b>Activity/risk source</b>	<ul style="list-style-type: none"> <li>» <u>Site preparation and earthworks</u>;</li> <li>» <u>Excavation of foundations and trenches</u>;</li> <li>» Temporary laydown areas;</li> <li>» Temporary access roads/tracks; and</li> <li>» Other disturbed areas/footprints</li> </ul>
<b>Mitigation: Target/Objective</b>	<ul style="list-style-type: none"> <li>» To ensure and encourage site rehabilitation of disturbed areas; and</li> <li>» To ensure that the site is appropriately rehabilitated following the execution of the works, such that residual environmental impacts (including erosion) are remediated or curtailed.</li> </ul>

Mitigation: Action/control	Responsibility	Timeframe
The site rehabilitation programme must be implemented (refer to <b>Appendix E</b> ).	Contractor and ECO/ EO/ Environmental Representative in consultation with	Duration of contract

Mitigation: Action/control	Responsibility	Timeframe
	<u>Specialist</u>	
All temporary facilities, equipment and waste materials must be removed from site <u>and appropriately disposed of.</u>	Contractor	Following execution of the works.
All temporary fencing and danger tape should be removed once the construction phase has been completed.	Contractor	Following completion of construction activities in an area
Compacted areas that are no longer needed post-construction (e.g. laydown areas, and the crane tracks) must be ripped and scarified (at the discretion of the horticultural / rehabilitation contractor).	Contractor in consultation with rehabilitation specialist if necessary.	Following completion of construction activities in an area
Necessary drainage works and anti-erosion measures must be installed, where required, to minimise loss of topsoil and control erosion ( <u>e.g. silt fences</u> ).	Contractor	Following completion of construction activities in an area.
Stockpiled topsoil must be replaced in disturbed areas where rehabilitation is to be undertaken as a layer of at least 10 cm in thickness.	Contractor in consultation with rehabilitation specialist if necessary.	Following completion of construction activities in an area
If excess sand is still available it should be dumped in a single designated area that is not within a sensitive area.	Contractor	Following completion of construction activities in an area
Disturbed areas must be rehabilitated/re-vegetated with appropriate natural vegetation and/or local seed mix. Re-use native/indigenous plant species removed from disturbance areas in the rehabilitation phase <u>as far as practically possible.</u>	Contractor in consultation with rehabilitation specialist and the landowners if necessary..	Following completion of construction activities in an area.
<u>No exotic plants may be used for rehabilitation purposes. Only indigenous plants of the area may be utilised.</u>	<u>Contractor(s)</u>	<u>Construction/operation</u>
<u>Newly rehabilitated areas must be adequately demarcated and access restricted (specifically vehicular access) until vegetation is established. Appropriate signage must be established and maintained to ensure personnel are aware of these areas.</u>	<u>Contractor(s)</u>	<u>Construction/operation</u>
Re-vegetated areas may have to be protected from wind erosion and maintained until an acceptable	<u>Contractor</u> in consultation with	Post-rehabilitation



Mitigation: Action/control	Responsibility	Timeframe
plant cover has been achieved. Dark green or black shade (least visually obtrusive) netting may have to be erected as wind screens, at the discretion of the ECO. The screens should be at least 1.5m tall, and oriented 90° to the prevailing winds.	rehabilitation specialist if necessary.	
On-going alien plant monitoring ( <u>as per the Alien Invasive Management Plan- refer to <b>Appendix C</b></u> ) and removal should be undertaken on all areas of natural vegetation on an annual basis. The applicant should attempt to clear at least 10% of the area of alien vegetation every year. (Refer to Guideline for Rehabilitation: <b>Appendix E</b> ).	<u>Contractor</u> in consultation with rehabilitation specialist if necessary.	Post-rehabilitation
<u>All disturbed soil areas (including road and hard stand verges) should be compacted sufficiently to avoid increased burrowing of rodents (which in turn could attract raptors and result in turbine collisions). Disturbed areas should effectively rehabilitated with indigenous grass species as soon as possible.</u>	<u>Contractor(s)</u> in consultation with the <u>ECO/ EO/ Environmental Representative</u>	<u>Following completion of construction activities in an area.</u>

<b>Performance Indicator</b>	<ul style="list-style-type: none"> <li>» All portions of site, including construction camp and working areas, cleared of equipment and temporary facilities;</li> <li>» Topsoil replaced on all areas and stabilised;</li> <li>» Disturbed areas rehabilitated and acceptable at least 50% plant cover achieved on rehabilitated sites; and</li> <li>» Closed site free of erosion and alien invasive plants.</li> </ul>
<b>Monitoring and Reporting</b>	<ul style="list-style-type: none"> <li>» On-going inspection of rehabilitated areas in order to determine effectiveness of rehabilitation measures implemented.</li> <li>» On-going alien plant monitoring and removal should be undertaken on an annual basis.</li> <li>» <u>An incident reporting system must be used to record non-conformances to the EMPr.</u></li> </ul>

## MANAGEMENT PROGRAMME FOR THE WIND ENERGY FACILITY: OPERATION

## CHAPTER 8

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### 8.1. Overall Goal for Operation

**Overall Goal for Operation:** To ensure that the operation of the Wind Farm does not have unforeseen impacts on the environment and to ensure that all potential impacts are monitored and the necessary corrective action taken in all cases. In order to address this goal, it is necessary to operate the wind energy facility in a way that ensures that operation activities are properly managed in respect of environmental aspects and impacts and enables the Wind Farm operation activities to be undertaken without significant disruption to other land uses in the area, in particular with regard to noise impacts, farming practices, traffic and road use, and effects on local residents as well as minimising impacts on birds and other fauna using the site.

### 8.2. Roles and Responsibilities

Formal responsibilities are necessary to ensure that key procedures are executed. Specific responsibilities of wind energy facility's Operations Manager, and Environmental Manager for the operation phase of this project are detailed below.

The **O&M Operator** must:

- » Ensure that adequate resources (human, financial, technology) are made available and appropriately managed for the successful implementation of the operational EMPr.
- » Conduct annual basis reviews of the EMPr to evaluate its effectiveness.
- » Take appropriate action as a result of findings and recommendations in management reviews and audits.
- » Provide forums to communicate matters regarding environmental management.

The **Environmental Manager** or similar in job spec designation must:

- » Develop and Implement an Environmental Management System (EMS) for the wind energy facility and associated infrastructure.
- » Manage and report on the facility's environmental performance.
- » Maintain a register of all known environmental impacts and manage the monitoring thereof.
- » Conduct internal environmental audits and co-ordinate external environmental audits if and when required.
- » Liaise with statutory bodies such as the National and Provincial Department of Environmental Affairs (DEA) on environmental performance and other issues.

- » Conduct environmental training and awareness for the employees who operate and maintain the wind energy facility.
- » Compile environmental policies and procedures where required.
- » Liaise with interested and affected parties on environmental issues of common concern.
- » Track and control the lodging of any complaints regarding environmental matters.

### 8.3. Objectives

In order to meet this goal, the following objectives have been identified, together with necessary actions and monitoring requirements.

#### OBJECTIVE 1 : Securing the site

Safety issues may arise with public access to wind turbines (e.g. unauthorised entry to the site). Prevention and control measures to manage public access are therefore important.

<b>Project component/s</b>	<ul style="list-style-type: none"> <li>» wind energy facility development footprint;</li> <li>» Access roads; and</li> <li>» Operations and service building.</li> </ul>
<b>Potential Impact</b>	» Hazards to landowners and public
<b>Activities/risk sources</b>	» Uncontrolled access to the wind energy facility and associated infrastructure.
<b>Mitigation: Target/Objective</b>	<ul style="list-style-type: none"> <li>» To secure the site against unauthorised entry; and</li> <li>» To protect members of the public/landowners/residents.</li> </ul>

<b>Mitigation: Action/control</b>	<b>Responsibility</b>	<b>Timeframe</b>
Where necessary to control access, fence and secure access to the site and entrances to the site.	<u>Proponent</u> O&M Operator	Operation
Post information boards about public safety hazards and emergency contact information.	<u>Proponent</u> O&M Operator	Operation
<u>The holder of the authorisation must ensure that the operation of the wind facility shall comply with the relevant communication regulations or guidelines relating to electromagnetic interference, e.g. microwave, radion and television transmissions.</u>	<u>Proponent</u>	<u>Operation</u>

<b>Performance Indicator</b>	<ul style="list-style-type: none"> <li>» Site is secure and there is no unauthorised entry;</li> <li>» No members of the public/ landowners injured; and</li> <li>» No complaints from landowners/ public.</li> </ul>
<b>Monitoring and Reporting</b>	» Regular visual inspection of fence for signs of deterioration/forced access

- » An incident reporting system must be used to record non-conformances to the EMPr.
- » Public complaints register must be developed and maintained on site.
- » Landowners should be consulted regularly.

## OBJECTIVE 2 : Protection of vegetation, fauna and maintenance of rehabilitated areas

Indirect impacts on vegetation and terrestrial fauna during operation could result from maintenance activities and the movement of people and vehicles on site. In order to ensure the long-term environmental integrity of the site following construction, maintenance of the areas rehabilitated post-construction must be undertaken until these areas have successfully re-established.

<b>Project component/s</b>	<ul style="list-style-type: none"> <li>» Wind Farm (including access roads and laydown areas)</li> <li>» substation and access to substation</li> <li>» power line and service road for power line servitude</li> <li>» <u>Areas requiring regular maintenance</u></li> <li>» <u>Route of the security team (if required)</u></li> <li>» <u>Wind Energy Facility including access roads and laydown areas</u></li> <li>» <u>Areas disturbed during the construction phase and subsequently rehabilitated at its completion</u></li> </ul>
<b>Potential Impact</b>	<ul style="list-style-type: none"> <li>» Disturbance to or loss of vegetation and/or habitat;</li> <li>» <u>Alien plant invasion;</u></li> <li>» Environmental integrity of site undermined resulting in reduced visual aesthetics, erosion, compromised land capability and the requirement for on-going management intervention.</li> </ul>
<b>Activity/Risk Source</b>	<ul style="list-style-type: none"> <li>» Movement of employee vehicles within and around site.</li> <li>» Laydown areas</li> <li>» Access roads</li> <li>» Other disturbed areas</li> </ul>
<b>Mitigation: Target/Objective</b>	<ul style="list-style-type: none"> <li>» To retain natural vegetation in the western corner of the site, where possible;</li> <li>» To maintain minimised footprints of disturbance of vegetation/habitats on-site;</li> <li>» To ensure and encourage plant regrowth in <u>non-operational</u> areas of post-construction rehabilitation; and</li> <li>» Maintain minimised footprints of disturbance of vegetation/habitats on-site.</li> </ul>

<b>Mitigation: Action/Control</b>	<b>Responsibility</b>	<b>Timeframe</b>
Vehicle movements must be restricted to designated roadways <u>as far as practically possible.</u>	Hopefield Small Wind Farm (Pty) Ltd and <u>O&amp;M Operator</u>	Operation

Existing roads must be maintained to ensure limited erosion and impact on areas adjacent to roadways.	O&M Operator	Operation
An on-going weed eradication programme should be implemented, where necessary.	O&M Operator	Operation
<u>An on-going alien plant monitoring and eradication programme must be implemented, where necessary.</u>	Proponent	Operation
A botanist familiar with the vegetation of the area should monitor the rehabilitation success <u>and alien plant removal</u> on an annual basis in August or September, and make recommendations on how to improve any problem areas.	Hopefield Small Wind Farm (Pty) Ltd /O&M Operator /Specialist	Annual monitoring until successful re-establishment of vegetation in an area
<u>Removal of alien invasive species or other vegetation and follow-up procedures must be in accordance with the Conservation of Agricultural Resources Act, 1983 (Act 43 of 1983).</u>	Hopefield Small Wind Farm (Pty) Ltd /O&M Operator /Specialist	Annual monitoring until successful re-establishment of vegetation in an area
<u>If possible, fire breaks should be established, where appropriate and as discussed with the landowners. Access roads could also act as fire breaks.</u>	Hopefield Small Wind Farm (Pty) Ltd, O&M Operator / Specialist	Duration of contract
If agreeable and necessary, bushcutting of firebreaks should be undertaken only once every second year, and should ideally be undertaken using hand held cutters. Firebreaks should be between 8 and 15m wide.	Operator	Duration of contract
<u>Vegetation control within the facility should be by manual clearing and herbicides should not be used except to control alien plants in the prescribed manner if necessary.</u>	Hopefield Small Wind Farm (Pty) Ltd, O&M Operator / Specialist	Operation
<u>An environmental manager or similar role in job spec designation should be appointed during operation whose duty it will be to minimise impacts on surrounding sensitive habitats</u>	Contractor/Hopefield Small Wind Farm (Pty) Ltd and O&M Operator	Operation

<b>Performance Indicator</b>	<ul style="list-style-type: none"> <li>» No further disturbance to vegetation <u>or terrestrial faunal habitats.</u></li> <li>» Continued improvement of rehabilitation efforts.</li> <li>» Successful rehabilitation of disturbed areas.</li> </ul>
<b>Monitoring</b>	<ul style="list-style-type: none"> <li>» Observation of vegetation on-site by Site Manager.</li> <li>» Regular inspections to monitor plant regrowth/performance of rehabilitation efforts and weed infestation compared to natural/undisturbed areas.</li> <li>» Monitoring of the rehabilitation success on an annual basis in August or September.</li> </ul>

	<ul style="list-style-type: none"> <li>» On-going alien plant monitoring and removal should be undertaken on an annual basis.</li> <li>» <u>Annual monitoring with records of erosion problems and mitigation actions taken with photographs.</u></li> <li>» <u>If necessary, an on-going alien plant monitoring and removal should be undertaken on an annual basis or as deemed necessary by the Proponent Environmental Manager. This must be determined especially for the first 5 years of the operational phase where re-infestation is the highest, or until deemed unnecessary by a suitably qualified botanist/Proponent Environmental Management.</u></li> </ul>
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### OBJECTIVE 3 : Protection of avifauna and priority bird species

During operation of the facility, the threat of collision of avifauna with the turbine blades is of concern. The threat of collision of birds and bats with the turbine blades and overhead power lines is considered to be of moderate to low significance for this facility. Lighting of turbines and other infrastructure has the potential to attract birds, thereby increasing the risk of collisions with turbines. Infrastructure associated with the facility may also impact on birds. Overhead power lines also pose a collision and possibly an electrocution threat to certain bird species.

Bird monitoring must be undertaken during the operation of the facility. A proposed bird monitoring programme for the operational phase is attached to **Appendix K**.

<b>Project component/s</b>	<ul style="list-style-type: none"> <li>» Wind Farm (turbines); and</li> <li>» Power lines</li> </ul>
<b>Potential Impact</b>	<ul style="list-style-type: none"> <li>» Disturbance to or loss of birds as a result of collision with the turbine blades;</li> <li>» Disturbance to or loss of birds as a result of collision with the overhead power line; and</li> <li>» Electrocution and collision with the power lines.</li> </ul>
<b>Activity/risk source</b>	<ul style="list-style-type: none"> <li>» Spinning turbine blades;</li> <li>» <u>Unmarked overhead</u> power lines;</li> </ul>
<b>Mitigation: Target/Objective</b>	<ul style="list-style-type: none"> <li>» More accurately determine the impact of the operating Wind Farm on priority bird species; and</li> <li>» <u>Minimise impacts associated with the turbines, power lines</u></li> </ul>

Mitigation: Action/control	Responsibility	Timeframe
Bird-flappers must be fitted to aerial power line cabling, where required, by a suitably qualified ornithologist.	Contractor	Operation/ maintenance
Some mitigation options that can be employed if	Hopefield Small Wind	Operation

Mitigation: Action/control	Responsibility	Timeframe
monitoring reveals significant numbers of collisions. Mitigation measures should be considered in detail at that time, if needs be.	Farm (Pty) Ltd, <u>O&amp;M Operator /Suitably qualified specialist</u>	
A site monitoring programme must be implemented during operation for surveying bird movements in relation to the Wind Farm and fully documenting all collision casualties	Hopefield Small Wind Farm (Pty) Ltd	Operation
<u>A systematic bird monitoring programme should be implemented at this facility once operational, as per the current best practice guidelines (Appendix K of this EMPr) and EA.</u>	<u>Hopefield Small Wind Farm (Pty) Ltd, O&amp;M Operator in consultation with Specialist</u>	<u>Construction &amp; operation</u>
An ornithologist must be designated to provide input on monitoring and potential mitigation of bird collisions with the turbine blades if necessary. In the event of any bird collisions, they must be recorded and reported to a designated ornithologist.	Hopefield Small Wind Farm (Pty) Ltd	Operation
<u>Review post-construction bird monitoring report on the full year of operational bird monitoring, and integrate findings into operational EMPr and broader mitigation scheme if and where considered necessary.</u>	<u>Advising scientist/biologist/ monitoring agency/avifauna specialist</u>	<u>1 year post-construction</u>
<u>Minimizing the disturbance associated with the operation of the facility, by scheduling maintenance activities to avoid and/or reduce disturbance in sensitive areas at sensitive times (e.g. breeding season). Further minimising of disturbance through scheduling maintenance in conjunction with the Hopefield WEF so that the minimum amount of time is spent travelling through both WEFs.</u>	<u>O&amp;M Operator</u>	<u>Operation</u>
<u>Reports regarding bird monitoring must be submitted to the relevant provincial environmental department, BirdLife South Africa, the Endangered Wildlife Trust (EWT) and DEA on a quarterly basis.</u>	<u>Advising scientist/biologist/ monitoring agency/avifauna specialist</u>	<u>Operation</u>

**Performance Indicator**

- » No additional disturbance to avifaunal populations on the Wind Farm site.
- » No additional disturbance to avifaunal populations along the length of the power line route.
- » Continued improvement of avifaunal protection efforts, if any.
- » Regular provision of clearly worded, logical and objective information on the interface between the local avifauna and the proposed/

	<p><u>operating Wind Farm.</u></p> <p>» <u>Clear and logical recommendations on why, how and when to institute mitigation measures to reduce avian impacts of the development, from pre-construction to operational phase, if required.</u></p>
<b>Monitoring and Reporting</b>	<p>» Observation of avifaunal populations and incidence of injuries/death from collisions from turbine blades or power line.</p> <p>» Regular inspections to monitor casualties from collisions - delegate a suitable on-site monitor to assess avian mortality associated with the facility and power line.</p> <p>» Record all bird casualties that occur on-site as a result of turbine collisions, with accurate information on where, when and how collisions take place, and report all recorded incidents to the designated ornithologist.</p> <p>» <u>Environmental manager to monitor turbine field for fatalities.</u></p> <p>» <u>Review of bird monitoring report on the full year of post-construction monitoring.</u></p> <p>» <u>Condition 29 and 30 of the EA.</u></p>

#### OBJECTIVE 4 : Protection of terrestrial fauna and bats

Indirect impacts on terrestrial fauna during operation could include disturbance and further habitat destruction as a result of maintenance activities and the movement of people and vehicles on site, and direct fatalities from vehicle movements on-site.

Bat mortality at wind energy facilities has been reported world-wide. Bats occurring in the area may potentially suffer mortality from the rotor blades of the turbines when these animals forage at night. Excessive lighting at the facility may attract flying insects and therefore also bats, which may lead to increased mortality from collision with turbine blades. Pre-construction bat monitoring has been completed for all 4 seasons for the project development site. A proposed bat monitoring programme for the operational phase is attached to **Appendix L**.

<b>Project component/s</b>	<p>» Wind Farm (including access roads);</p> <p>» substation and access to substation; and</p> <p>» power line and service road for power line servitude</p>
<b>Potential Impact</b>	<p>» Disturbance to or loss of fauna and/or habitat</p> <p>» Direct mortalities</p>
<b>Activity/risk source</b>	<p>» Movement of vehicles within and around site</p> <p>» Lighting attracting insects and bats</p> <p>» <u>Wind turbine placement</u></p>
<b>Mitigation: Target/Objective</b>	<p>» To keep number of vehicle movements to a minimum;</p> <p>» To maintain minimised footprints of disturbance of vegetation/habitats on-site;</p>



- » To minimise impacts on bats species; and
- » To ensure and encourage site rehabilitation.

Mitigation: Action/control	Responsibility	Timeframe
Vehicle movements restricted to designated roadways.	Operator	Operation
Adherence to reduced vehicle speeds (as prescribed by the ECO) by any vehicles moving on the site to reduce potential for direct mortalities.	Operator	Operation
Excessive lighting at the facility should be avoided.	Operator	Operation and maintenance
<ul style="list-style-type: none"> <li>» Ensure the implementation of a post-construction monitoring (operation phase) bat monitoring programme to survey bat communities within the Wind Energy Facility and determine the impacts resulting from the installed infrastructure. This plan should have a minimum duration of at least two years – to be revised according to the results of the monitoring programme – and should be initiated when the WEF becomes operation;</li> <li>» The results of the operational phase monitoring programme must be taken into account for the implementation of further mitigation measures, if necessary;</li> <li>» If high collision risk areas are identified during the operational phase, or high collision bat fatalities are recorded, this should be evaluated by the bat specialists as soon as possible. Subsequent mitigation measures, adjusted to the risk situation identified, should be proposed and implemented;</li> <li>» If turbines are to be lit at night, lighting should be kept to a minimum<sup>4</sup> but compliant with applicable laws and permits, including the requirements of the South African Civil Aviation Authority;</li> <li>» Lighting of the WEF (for example security lights) should be kept to a minimum and directed downwards, but compliant with legislation.</li> </ul>	Hopefield Small Wind Farm (Pty) Ltd / specialist	Operation and maintenance
<u>A post-construction bat monitoring by an independent monitor should take place for at least two years after operation has commenced (refer to</u>	<u>Hopefield Small Wind Farm (Pty) Ltd</u>	<u>Operational Phase</u>

<sup>4</sup> Provided this complies with all the legal requirements (e.g. Civil Aviation Authority regulations).

Mitigation: Action/control	Responsibility	Timeframe
<b>Appendix L).</b>		
<u>Implement any feasible mitigation measures for bats based on the operational phase bat monitoring if required. Further mitigation options that may be utilized include curtailment, blade feathering, blade lock, acoustic deterrents or light lures.</u>	<u>Hopefield Small Wind Farm (Pty) Ltd, O&amp;M Operator and specialist</u>	<u>Operational Phase</u>

<b>Performance Indicator</b>	<ul style="list-style-type: none"> <li>» No <u>additional</u> disturbance to faunal populations on the site;</li> <li>» Continued improvement of faunal protection efforts <u>and protection devices, if any.</u></li> <li>» <u>Regular provision of clearly worded, logical and objective information on the interface between the bat populations and the proposed/operating Wind Farm.</u></li> <li>» <u>Clear and logical recommendations on why, how and when to institute mitigation measures to reduce bat impacts of the development, from pre-construction to operational phase.</u></li> </ul>
<b>Monitoring and Reporting</b>	<ul style="list-style-type: none"> <li>» <u>Environmental manager to monitor turbine field for fatalities.</u></li> </ul>

## OBJECTIVE 5 : Minimisation of visual impact - lighting

The most significant impact associated with the proposed Wind Farm and associated infrastructure is the visual impact on the natural viewshed of this region imposed by the components of the facility. The primary visual impact, namely the appearance and dimensions of the Wind Farm (mainly the wind turbines) is not possible to mitigate to any significant extent within this landscape. The functional design of the structures and the dimensions of the facility cannot be changed in order to reduce visual impacts. Alternative colour schemes (i.e. painting the turbines sky-blue, grey or darker shades of white) are not permissible as the CAA's Marking of Obstacles expressly states, "Wind turbines shall be painted bright white to provide the maximum daytime conspicuousness". Failure to adhere to the prescribed colour specifications will result in the fitting of supplementary daytime lighting to the wind turbines, once again aggravating the visual impact. The potential for mitigation is therefore low or non-existent. The visual exposure of the two proposed turbines will however be entirely contained within the viewshed of the existing Hopefield Wind Energy Facility, which will largely mitigate this impact.

Another source of glare light, albeit not as intense as flood lighting, is the aircraft warning lights mounted on top of the hub of the wind turbines. These lights are less aggravating due to the toned-down red colour, but have the potential to be visible from a great distance.

The mitigation of secondary visual impacts, such as security and functional lighting, construction activities, etc. may be possible and should be implemented and maintained on an on-going basis.

<b>Project component/s</b>	<ul style="list-style-type: none"> <li>» Wind Farm (including access roads)</li> <li>» substation</li> <li>» power line and service road for power line servitude</li> </ul>
<b>Potential Impact</b>	<ul style="list-style-type: none"> <li>» Risk to aircraft in terms of the potential for collision; and</li> <li>» Enhanced visual intrusion.</li> </ul>
<b>Activity/risk source</b>	<ul style="list-style-type: none"> <li>» Size/scale of turbines</li> <li>» Substation and associated lighting</li> <li>» Access roads</li> <li>» Power line</li> <li>» Other associated infrastructure (e.g. visitors centre)</li> </ul>
<b>Mitigation: Target/Objective</b>	<ul style="list-style-type: none"> <li>» To minimise potential for visual impact;</li> <li>» To ensure that the facility complies with Civil Aviation Authority requirements for turbine visibility to aircraft;</li> <li>» Minimise contrast with surrounding environment and visibility of the turbines to humans; and</li> <li>» The containment of light emitted from the substation in order to eliminate the risk of additional night-time visual impacts.</li> </ul>

<b>Mitigation: Action/control</b>	<b>Responsibility</b>	<b>Timeframe</b>
If necessary, a lighting engineer should be consulted to assist in the planning and placement of light fixtures in order to reduce visual impacts associated with glare and light trespass.	Hopefield Small Wind Farm (Pty) Ltd	Operation and maintenance
<u>Aviation warning lights must be mounted on turbine hub or such measures specified by the Civil Aviation Authority consent.</u>	Hopefield Small Wind Farm (Pty) Ltd and O&M Operator	<u>Operation and maintenance</u>
Ensure that appropriate planning is undertaken regarding the placement of lighting structures for the substation and that light fixtures only illuminate areas inside the substation site. Undertake regular maintenance of light fixtures.	Hopefield Small Wind Farm (Pty) Ltd and O&M Operator	<u>Design, operation and maintenance</u>
Maintain the general appearance of the facility in an aesthetically pleasing way.	Hopefield Small Wind Farm (Pty) Ltd and O&M Operator	Operation and maintenance
<u>Turbines must be positioned in such a way that shadow flicker does not affect any farm buildings.</u>	Hopefield Small Wind Farm (Pty) Ltd	<u>Operation</u>

<b>Performance</b>	» Minimised visual intrusion on surrounding areas.
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<b>Indicator</b>	<ul style="list-style-type: none"> <li>» Appropriate visibility of infrastructure to aircraft.</li> <li>» The effective containment of the light to the substation site.</li> </ul>
<b>Monitoring and Reporting</b>	<ul style="list-style-type: none"> <li>» <u>Ensure that aviation warning lights or other measures are installed before construction is completed and are fully functional at all times.</u></li> <li>» The monitoring of the condition and functioning of the light fixtures during the operational phase of the project.</li> </ul>

## OBJECTIVE 6 : Minimisation of noise impacts from turbines

From the results of the BA studies undertaken, noise impacts associated with the wind energy facility are expected to be of low significance. However, mitigation measures are proposed in order to further reduce any potential for noise impact. The rating level in the area for the wind energy facility is likely to be 35 dBA at night. That would also be the "lower limit". Due to the limited noise receptors in and around the site (as identified in the noise impact assessment report), noise from the turbine is unlikely to negatively affect any residents in the broader study area.

<b>Project component/s</b>	<ul style="list-style-type: none"> <li>» <u>Wind Farm (including access roads)</u></li> <li>» <u>substation</u></li> <li>» <u>power line and service road for power line servitude</u></li> </ul>
<b>Potential Impact</b>	<ul style="list-style-type: none"> <li>» <u>Increased noise levels at potentially sensitive receptors;</u></li> <li>» <u>Changing ambient sound levels could change the acceptable land use capability; and</u></li> <li>» <u>Disturbing character of sound.</u></li> </ul>
<b>Activity/risk source</b>	<ul style="list-style-type: none"> <li>» <u>Operation of wind turbines</u></li> </ul>
<b>Mitigation: Target/Objective</b>	<ul style="list-style-type: none"> <li>» <u>Ensure that the change in ambient sound levels as experienced by Potentially Sensitive Receptors is less than 7 dBA;</u></li> <li>» <u>Prevent the generation of disturbing noise from the wind turbines; and</u></li> <li>» <u>Ensure acceptable noise levels at surrounding stakeholders and potentially sensitive receptors</u></li> </ul>

<b>Mitigation: Action/control</b>	<b>Responsibility</b>	<b>Timeframe</b>
<u>If required, additional noise monitoring points at a complainant that registered a valid and reasonable noise complaint relating to the operation of the facility</u>	<u>Proponent/ O&amp;M Operator / Acoustical Consultant / Approved Noise Inspection Authority</u>	<u>Operation</u>

<b>Performance Indicator</b>	» <u>Ensure that the change in ambient sound levels as experienced by Potentially Sensitive Receptors is less than 5 dBA.</u>
<b>Monitoring and Reporting</b>	» <u>A complaints register must be maintained, in which any complaints from the community are to be logged. Complaints must be investigated and, if appropriate, acted upon.</u>

## OBJECTIVE 7 : Appropriate handling and management of hazardous substances and waste

The operation of the Wind Farm will involve the generation of limited waste products. The main wastes expected to be generated by the operation activities includes general solid waste, hazardous waste and liquid waste.

<b>Project component/s</b>	» Wind turbines; and » Substation
<b>Potential Impact</b>	» Inefficient use of resources resulting in excessive waste generation; and » Litter or contamination of the site or water through poor waste management practices.
<b>Activity/risk source</b>	» Generators and gearbox – turbines; » Transformers and switchgear – substation; » Water storage tank; and » Fuel and oil storage.
<b>Mitigation: Target/Objective</b>	» To comply with waste management guidelines; » To minimise production of waste; » To ensure appropriate waste disposal; and » To avoid environmental harm from waste disposal.

<b>Mitigation: Action/control</b>	<b>Responsibility</b>	<b>Timeframe</b>
Hazardous substances must be stored in sealed containers within a clearly demarcated designated area.	Operator	Operation
Storage areas for hazardous substances must be appropriately sealed and banded.	Operator	Operation
All structures and/or components replaced during maintenance activities must be appropriately disposed of at an appropriately licensed waste disposal site or sold to a recycling merchant for recycling.	Operator	Operation
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 banded	Operator	Operation and maintenance

Mitigation: Action/control	Responsibility	Timeframe
area. Should any accidental spillage take place, it must be cleaned up according to specified standards regarding bioremediation.		
Waste handling, collection and disposal operations must be managed and controlled by a waste management contractor.	O&M Operator / waste management contractor	Operation
Used oils and chemicals: » <u>Where these cannot be recycled</u> , appropriate disposal must be arranged with a licensed facility in consultation with the administering authority <u>or a licensed contractor should be appointed to collect and dispose of used oil.</u> » Waste must be stored and handled according to the relevant legislation and regulations.	Operator / waste management contractor	Operation
General waste must be recycled where possible or disposed of at an appropriately licensed landfill.	Operator / waste management contractor	Operation
Hazardous waste (including hydrocarbons) and general waste must be stored and disposed of separately.	Operator / waste management contractor	Operation
Disposal of waste must be in accordance with relevant legislative requirements, including the use of licensed contractors.	<u>O&amp;M Operator/ waste management contractor</u>	Operation
Regularly serviced chemical toilets and ablution facilities must be used on-site.	Operator / waste management contractor	Operation
<u>No waste may be burned or buried on site.</u>	<u>Proponent</u> <u>O&amp;M Operator</u>	<u>Operation</u>
<u>Hazardous and flammable substances must be stored and used in compliance to the applicable regulations and safety instructions. No chemicals must be stored nor may any vehicle maintenance occur within 350m of the temporal zone of wetlands, a drainage line with or without an extensive floodplain or hillside wetlands.</u>	<u>Proponent</u> <u>O&amp;M Operator</u>	<u>Operation</u>

<b>Performance Indicator</b>	<ul style="list-style-type: none"> <li>» No complaints received regarding waste on site or indiscriminate dumping;</li> <li>» Internal site audits identifying that waste segregation, recycling and reuse is occurring appropriately;</li> <li>» Provision of all appropriate waste manifests; and</li> <li>» No contamination of soil or water.</li> </ul>
<b>Monitoring and Reporting</b>	<ul style="list-style-type: none"> <li>» Waste collection must be monitored internally on a regular basis.</li> <li>» Waste documentation must be completed and available for inspection</li> </ul>

	<p>on request;</p> <ul style="list-style-type: none"> <li>» An incidents/complaints register must be maintained, in which any complaints from the community must be logged. Complaints must be investigated and, if appropriate, acted upon; and</li> <li>» Regular reports on exact quantities of all waste streams exiting the site must be compiled by the waste management contractor and monitored by the SHE Representative <u>environmental manager</u>. All appropriate waste disposal certificates must accompany the monthly reports.</li> </ul>
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**OBJECTIVE 8 : Maximise local employment and business opportunities during operation**

A limited number of permanent employment opportunities will be created during the operational phase of the project. The operational phase is expected to last for 20 - 25 years.

<b>Project component/s</b>	<ul style="list-style-type: none"> <li>» Wind energy facility; and</li> <li>» Day to day operational activities associated with the wind energy facility including maintenance etc.</li> </ul>
<b>Potential Impact</b>	<ul style="list-style-type: none"> <li>» The opportunities and benefits associated with the creation of local employment and business should be maximised as far as possible.</li> </ul>
<b>Activity/risk source</b>	<ul style="list-style-type: none"> <li>» The operational phase of the wind energy facility will create permanent employment opportunities.</li> <li>» The establishment of a wind energy facility has the potential to create and attraction for visitors to the area. The development also has the potential to promote the benefits of renewable energy projects.</li> </ul>
<b>Mitigation: Target/Objective</b>	<ul style="list-style-type: none"> <li>» Create medium- to long-term full time employment for locals.</li> </ul>

Mitigation: Action/control	Responsibility	Timeframe
Identify local members of the community who are suitably qualified or who have the potential to be employed full time.	<u>Proponent</u> O&M Operator	Identify members during construction
Develop a training and skills transfer programme for the operational phase for local personnel.	<u>Proponent</u> O&M Operator	Operations

<b>Performance Indicator</b>	<ul style="list-style-type: none"> <li>» Public exposure to the project.</li> <li>» Meeting with Local Municipality; and</li> <li>» <u>Training and skills development programme developed and designed before construction phase completed.</u></li> </ul>
<b>Monitoring and Reporting</b>	<ul style="list-style-type: none"> <li>» Indicators listed above must be met for the operational phase.</li> </ul>

**OBJECTIVE 9 : Ensure the implementation of an appropriate fire management plan during the operation phase**

The vegetation in the study area may be at risk of fire. The increased presence of people on the site could increase the risk of veld fires, particularly in the dry season.

<b>Project Component/s</b>	» Operation and maintenance of the wind energy facility and associated infrastructure.
<b>Potential Impact</b>	» Veld fires can pose a personal safety risk to local farmers and communities, and their homes, crops, livestock and farm infrastructure, such as gates and fences. In addition, fire can pose a very minor risk to the wind energy facility infrastructure.
<b>Activities/Risk Sources</b>	» The presence of operation and maintenance personnel and their activities on the site can increase the risk of veld fires.
<b>Mitigation: Target/Objective</b>	» To avoid and or minimise the potential risk of veld fires on local communities and their livelihoods.

<b>Mitigation: Action/Control</b>	<b>Responsibility</b>	<b>Timeframe</b>
Provide adequate fire-fighting equipment on site.	<u>O&amp;M Operator</u>	Operation
<u>Join local Fire Protection Association, should there be one in existence.</u>	Proponent/ <u>O&amp;M Operator</u>	<u>Operation</u>
Provide fire-fighting training to selected operation and maintenance staff.	<u>O&amp;M Operator</u>	Operation
Ensure that appropriate communication channels are established to be implemented in the event of a fire.	Proponent/ <u>O&amp;M Operator</u>	Operation
Fire breaks should be established where and when required <u>in consultation with the landowners.</u> Cognisance must be taken of the relevant legislation when planning and burning firebreaks (in terms of timing, etc.). Access roads may also act as fire breaks.	Proponent/ <u>O&amp;M Operator</u>	Operation
Upon completion of the construction phase, an emergency evacuation plan must be drawn up to ensure the safety of the staff and surrounding land users in the case of an emergency.	Proponent/ <u>O&amp;M Operator</u>	Operation
Contact details of emergency services should be prominently displayed on site.	Proponent/ <u>O&amp;M Operator</u>	Operation

<b>Performance Indicator</b>	» Fire-fighting equipment and training provided before the construction phase commences. » Appropriate fire breaks in place.
<b>Monitoring and Reporting</b>	» Proponent must monitor indicators listed above to ensure that they have been met.



**OBJECTIVE 10 : Minimise the potential negative impact on farming activities and on the surrounding landowners**

Once operational, the negative impact on the daily living and movement patterns of neighbouring residents is expected to be minimal and intermittent (i.e. the increase in traffic to and from site, possible dust creation of vehicle movement on gravel roads on site and possible increase in criminal activities). The number of workers on site on a daily basis is anticipated to have minimal negative social impacts in this regard.

Some positive impacts will be experienced with farmers gaining more access to land through the high quality site roads. Farmers involved with the project will also receive income which can be invested into farming activities. Once construction is completed, negative impacts on farming activities on the site must be limited as far as possible.

<b>Project Component/s</b>	<ul style="list-style-type: none"> <li>» Possible negative impacts of activities undertaken on site on the activities of surrounding property owners; and</li> <li>» Impact on farming activities on site.</li> </ul>
<b>Potential Impact</b>	<ul style="list-style-type: none"> <li>» Limited intrusion impact on surrounding land owners; and</li> <li>» Interference with farming activities on site.</li> </ul>
<b>Activities/Risk Sources</b>	<ul style="list-style-type: none"> <li>» Increase in traffic to and from site could affect daily living and movement patterns of surrounding residents, and</li> <li>» Operational activities on site could interfere with farming activities of landowner.</li> </ul>
<b>Mitigation: Target/Objective</b>	<ul style="list-style-type: none"> <li>» Effective management of the facility;</li> <li>» Mitigation of intrusion impacts on property owners; and</li> <li>» Mitigation of impact on farming activities.</li> </ul>

<b>Mitigation: Action/Control</b>	<b>Responsibility</b>	<b>Timeframe</b>
Effective management of the facility to avoid any environmental pollution focusing on water, waste and sanitation infrastructure and services.	<u>Proponent/ O&amp;M Operator</u>	Operation
Vehicle movement to and from the site should be minimised as far as possible.	<u>Proponent/ O&amp;M Operator</u>	Operation
Local roads should be maintained to keep the road surface up to a reasonable standard.	<u>O&amp;M Operator</u>	Operation
Limit the development of new access roads on site.	<u>O&amp;M Operator</u>	Operation
Ensure on-going communication with the landowners of the site in order to ensure minimal impact on farming activities.	<u>Proponent/ O&amp;M Operator</u>	Operation

<b>Performance Indicator</b>	<ul style="list-style-type: none"> <li>» No environmental pollution occurs (i.e. waste, water and sanitation);</li> <li>» No intrusion on private properties and on the activities undertaken on the surrounding properties; and</li> <li>» Continuation of farming activities on site.</li> </ul>
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<b>Monitoring and reporting</b>	» Proponent should be able to demonstrate that facility is well managed without environmental pollution and that the above requirements have been met.
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## **MANAGEMENT PLAN FOR THE WIND FARM: DECOMMISSIONING**

## **CHAPTER 9**

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The turbine infrastructures which will be utilised for the authorised Wind Farm is expected to have a lifespan of 20 - 30 years (with maintenance). Equipment associated with this facility would only be decommissioned once it has reached the end of its economic life. It is most likely that decommissioning activities of the infrastructure of the facility would comprise the disassembly and replacement of the turbines with more appropriate technology/infrastructure available at that time. The relevant mitigation measures contained under the construction section should be applied during decommissioning and therefore is not repeated in this section. It must be noted that decommissioning activities will need to be undertaken in accordance with the relevant legislation applicable at that time, which may require this section of the EMPr to be revisited and amended.

Should the activity ever cease or become redundant, the applicant shall undertake the required actions as prescribed by legislation at the time and comply with all relevant legal requirements administered by any relevant and competent authority at that time.

### **9.1. Site Preparation**

Site preparation activities will include confirming the integrity of the access to the site to accommodate required abnormal load equipment and lifting cranes, preparation of the site (e.g. lay down areas, construction platform) and the mobilisation of construction equipment.

### **9.2 Disassemble Turbines**

The wind (turbine and tower sections) of the proposed facility will be disassembled once it reaches the end of its economic lifespan. A large crane would be required for disassembling the turbine and tower sections. Once disassembled, the components will be reused, recycled, or disposed of in accordance with regulatory requirements (NEMA / NEM:WA). All parts of the turbine would be considered reusable or recyclable except for the blades.

### **9.2 Rehabilitation of the Site**

In order to minimise the extent of rehabilitation activities required during the decommissioning phase, Hopefield Small Wind Farm (Pty) Ltd must ensure that constant effort is applied to rehabilitation activities throughout the construction, operation and maintenance phases of the project.

In decommissioning of the facility Proponent must ensure that:

- » All sites not already vegetated are vegetated as soon as possible after operation ceases with species appropriate to the area.
- » Any fauna encountered during decommission should be removed to safety by a suitably qualified person.
- » All structures, foundations and sealed areas are demolished, removed and waste material disposed of at an appropriately licensed waste disposal site.
- » All access/service roads not required to be retained by landowners are closed and fully rehabilitated.
- » All vehicles to adhere to low speed limits (40km/h max) on the site, to reduce risk of faunal collisions as well as reduce dust.
- » All disturbed areas are compacted, sloped and contoured to ensure drainage and runoff and to minimise the risk of erosion.
- » All rehabilitated areas are monitored for erosion.
- » Components of the facility are removed from the site and disposed of appropriately.
- » Retrenchments should comply with South African Labour legislation of the day.

The section on Rehabilitation (Chapter 7) is also relevant to the decommissioning of sections of the Project and must be adhered to.

**OBJECTIVE 1 : To avoid and or minimise the potential environmental and social impacts associated with the decommissioning phase**

<b>Project component/s</b>	<ul style="list-style-type: none"> <li>» <u>wind turbines; and</u></li> <li>» <u>associated infrastructure.</u></li> </ul>
<b>Potential Impact</b>	<ul style="list-style-type: none"> <li>» Decommissioning will result in job losses, which in turn can result in a number of social impacts, such as reduced quality of life, stress, depression etc. However, the number of people affected (circa 5) is relatively small. Decommissioning is also similar to the construction phase in that it will also create temporary employment opportunities.</li> <li>» <u>Impacts on flora, fauna, soils etc.</u></li> </ul>
<b>Activity/risk source</b>	<ul style="list-style-type: none"> <li>» Decommissioning of the Wind Farm.</li> </ul>
<b>Mitigation: Target/Objective</b>	<ul style="list-style-type: none"> <li>» To avoid and or minimise the potential social impacts associated with decommissioning phase of the Wind Farm.</li> </ul>

<b>Mitigation: Action/control</b>	<b>Responsibility</b>	<b>Timeframe</b>
Retrenchments should comply with South African	Hopefield Small	<u>Decommissioning</u>

<b>Mitigation: Action/control</b>	<b>Responsibility</b>	<b>Timeframe</b>
Labour legislation of the day.	Wind Farm (Pty) Ltd and O&M Operator	
<u>Hopefield Small Wind Farm (Pty) Ltd must ensure that all relevant regulations, national and local legislation are adhered to and that the relevant authorities are informed and involved in the process as much as possible.</u>	<u>Hopefield Small Wind Farm (Pty) Ltd</u>	<u>Decommissioning</u>
<u>Rehabilitation should start immediately after decommissioning is completed.</u>	<u>O&amp;M Operator</u>	<u>Decommissioning</u>
<u>Re-vegetation specifications to be developed.</u>	<u>O&amp;M Operator</u>	<u>Decommissioning</u>
<u>All excavations must be rehabilitated with soil and topsoil, which should not contain invasive plant species (in compliance with the CARA, as amended), to the satisfaction of the ECO.</u>	<u>O&amp;M Operator</u>	<u>Decommissioning</u>
<u>All building materials must be removed from the site. All compacted surfaces must be ripped and re-vegetated as per the re-vegetation specifications.</u>	<u>O&amp;M Operator</u>	<u>Decommissioning</u>
<u>The most suitable seed mix for disturbed areas to be used in rehabilitation would include indigenous species.</u>	<u>O&amp;M Operator</u>	<u>Decommissioning</u>
<u>Rehabilitation to be conducted in a progressive manner (i.e. once decommissioning in an area has been completed the area will be rehabilitated). The rehabilitation of the area with indigenous vegetation must coincide with the rainfall events and all alien invasive vegetation shall be removed.</u>	<u>O&amp;M Operator</u>	<u>Decommissioning</u>
<u>Rehabilitation measures for the site are to include the following:</u> » <u>Re-contouring</u> <u>Subsoil stockpiles should be used to re-contour construction affected areas. The Contractor shall restore the profile, soil condition and landform to as close as possible state to the pre-construction state.</u> » <u>Scarification and ripping</u> <u>All areas where rehabilitation interventions are required shall be cross-ripped before topsoil placement. Topsoil and fertile soil shall be uniformly scarified to allow for vegetation growth</u> » <u>Fertilising</u> <u>The Contractor shall be required to perform soil analysis tests on the top 75mm of prepared surface prior to re-vegetation/seeding to determine the required fertiliser levels for permanent cover.</u> » <u>Seed acquisition</u> <u>The Contractor shall purchase seed from a South</u>	<u>Hopefield Small Wind Farm (Pty) Ltd and O&amp;M Operator</u>	<u>Decommissioning</u>

Mitigation: Action/control	Responsibility	Timeframe
<u>African National Seed Organisation (SANSOR) accredited dealer. Seed used for rehabilitation shall not be older than one season. Purchased seed must be of the correct species and of known origin, dried and packed, conforming to all legal requirements for seed. Proof of compliance must be provided to Proponent prior decommissioning of works.</u>		
<u>The Contractor shall schedule works for placing of topsoil once all infrastructure has been successfully decommissioned. Seeding can then take place after the first rains of the season and should be concluded by one month before the end of the growing season.</u>	<u>O&amp;M Operator</u>	<u>Decommissioning</u>
<u>The seed mix for use in rehabilitation must be an approved mix of indigenous grass species common to the area.</u>	<u>O&amp;M Operator</u>	<u>Decommissioning</u>
<u>The Contractor shall maintain rehabilitated areas free of weeds and invader plants until the end of the Defects Notification Period applicable to rehabilitation. Control of weeds and invader plants must be done in accordance with the specifications stipulated in the CARA.</u>	<u>O&amp;M Operator</u>	<u>Decommissioning</u>
<u>The Contractor shall be responsible for the prevention of erosion in areas impacted upon by their activities. All erosion repairs must be implemented at the first signs thereof and no erosion shall be allowed to develop on a large scale.</u>	<u>O&amp;M Operator</u>	<u>Decommissioning</u>
<u>All recyclable rubble and solid waste (e.g. scrap metal, cables, bottles, cans, and plastic residues) shall be collected and disposed of through a registered recycling company. Waste manifests will be kept by the Contractor and shown to the ECO on request. All non-recyclable rubble and solid waste shall be collected and disposed of at an approved waste disposal site. Waste manifests will be shown to the ECO on request.</u>	<u>O&amp;M Operator</u>	<u>Decommissioning</u>

<b>Performance Indicator</b>	» South African Labour legislation at the relevant time; and » <u>Successful re-vegetation and rehabilitation of the site</u>
<b>Monitoring</b>	» Hopefield Small Wind Farm (Pty) Ltd and Department of Labour and Rehabilitation Close-Out Report.

## **FINALISATION OF THE EMP**

## **CHAPTER 10**

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The EMP is a dynamic document, which must be updated to include any additional specifications as and when required. It is considered critical that this EMP be updated to include site-specific information and specifications following the final walk-through survey by specialists of the power line, and development site. This will ensure that the construction and operation activities are planned and implemented considering sensitive environmental features.