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# PROPOSED TSITSIKAMMA COMMUNITY WIND ENERGY FACILITY, EASTERN CAPE PROVINCE

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## CONSTRUCTION & OPERATION ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPr) FOR THE TSITSIKAMMA COMMUNITY WIND ENERGY FACILITY

### REVISION 3

Revised in terms of the requirements of the Environmental Authorisation

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Prepared for:

**Tsitsikamma Community Wind Energy Facility (RE) (Pty) Ltd** owned by:

Cennergi  
PO Box 11052  
Die Hoewes 1  
0163



Watt Energy  
PO Box 63826  
Greenacres  
6057



Prepared by  
Savannah Environmental (Pty) Ltd  
PO Box 148  
Sunninghill  
2175



## PROJECT DETAILS

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<b>Authors</b>	:	Savannah Environmental (Pty) Ltd Jo-Anne Thomas
<b>Specialists</b>	:	MetroGIS David Hoare Consulting Avisense Consulting Outeniqua Geotechnical Services Eastern Cape Heritage Consultants M2 Environmental Connections Terrasoil Science Tony Barbour Natura Viva Bio3
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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:** The reading on an integrating impulse sound level meter taken at a measuring point in the absence of any alleged disturbing noise at the end of a total period of at least 10 minutes after such meter was put into operation.

**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.

**Commence:** The start of any physical activity, including site preparation and any other activity on site 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.

**Cumulative impacts:** Impacts that result from the incremental impact of the proposed activity on a common resource when added to the impacts of other past, present or reasonably foreseeable future activities (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.

**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.

**'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 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 Programme:** An operational plan that organises and co-ordinates mitigation, rehabilitation and monitoring measures in order to guide the implementation of a proposal and its on-going maintenance after implementation.

**Environmental Assessment Practitioner:** An individual responsible for the planning, management and coordinating of Environmental Management Programme or any other appropriate environmental instruments introduced by legislation.

**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).

**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.

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

**Natural properties of an ecosystem (*sensu* Convention on Wetlands):** Defined in Handbook 1 as the "...physical, biological or chemical components, such as soil, water, plants, animals and nutrients, and the interactions between them". (Ramsar Convention Secretariat. 2004. Ramsar handbooks for the wise use of wetlands. 2nd Edition. Handbook 1. Ramsar Convention Secretariat, Gland, Switzerland.) (see <http://www.ramsar.org/>).

**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).

**Ramsar Convention on Wetlands:** "The Convention on Wetlands (Ramsar, Iran, 1971) is an intergovernmental treaty whose mission is "the conservation and wise use of all wetlands through local, regional and national actions and international cooperation, as a contribution towards achieving sustainable development throughout the world". As of March 2004, 138 nations have joined the Convention as Contracting Parties, and more than 1300 wetlands around the world, covering almost 120 million hectares, have been designated for inclusion in the Ramsar List of Wetlands of International Importance." (Ramsar Convention Secretariat. 2004. Ramsar handbooks for the wise use of wetlands. 2nd Edition. Handbook 1. Ramsar Convention Secretariat, Gland, Switzerland.) (refer <http://www.ramsar.org/>). South Africa is a Contracting Party to the Convention.

**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).

**Regional Methodology:** The Western Cape Department of Environmental Affairs and Development Planning (DEA&DP) have developed a guideline document entitled *Strategic Initiative to Introduce Commercial Land Based Wind Energy Development to the Western Cape - Towards a Regional Methodology for Wind Energy Site Selection* (Western Cape Provincial Government, May 2006). The methodology proposed within this guideline document is intended to be a regional level planning tool to guide planners and decision-makers with regards to appropriate areas for wind energy development (on the basis of planning, environmental, infrastructural and landscape parameters).

**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. It is approximately 80 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 40 to 80 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 speed:** The rate at which air flows past a point above the earth's surface.

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## INTRODUCTION

## CHAPTER 1

---

This Construction and Operational Environmental Management Programme (CEMP and OEMP) has been compiled for the 100MW Tsitsikamma Community Wind Energy Facility, being planned by Tsitsikamma Community Wind Energy Facility (RF) (Pty) Ltd. The project involves the construction and operation of up to 31 wind turbines and associated infrastructure. This project received Environmental Authorisation on 01 March 2012. Following a competitive bidding process under the Independent Power Producer (IPP) Procurement Programme being conducted by the Department of Energy, the Tsitsikamma Community Wind Energy Facility was awarded preferred bidder status in May 2012. Construction is due to commence in late August 2014.

This Environmental Management Programme (EMP) is an update of the draft EMPr submitted with the Environmental Impact Assessment (EIA) for the project (in accordance with the requirement of Conditions 17 and 18 of the Environmental Authorisation), and includes the conditions of the Environmental Authorisation of March 2012.

This EMPr is applicable to all Tsitsikamma Community Wind Energy Facility (RF) (Pty) Ltd employees and contractors working on the pre-construction, construction, and operation and maintenance phases of the Tsitsikamma Community Wind Energy Facility. The document will be adhered to, updated as relevant throughout the project life cycle.

## PROJECT DETAILS

## CHAPTER 2

**Tsitsikamma Community Wind Energy Facility (RF) (Pty) Ltd**, an independent producer of electricity, is proposing to establish a commercial wind energy facility and associated infrastructure on a site located within the Koukamma Local Municipality in the Eastern Cape Province. The proposed wind energy facility will be known as the **Tsitsikamma Community Wind Farm** and is proposed to be constructed on land partly owned by the Tsitsikamma Community Trust. The proposed site is situated approximately 30 km west of Humansdorp, south of the N2 National Road in the Tsitsikamma area. Wind turbines with a capacity of up to **100 MW**, collectively referred to as a **wind energy facility**, are planned to be constructed over an area of approximately 54 km<sup>2</sup> in extent.

**Infrastructure** associated with the facility will include:

- » **Up to 31 Wind Turbines** (with a hub height of up to 100 m and blade length of 54.64m (blade diameter of 112)) with a total generating capacity of ~100 MW
- » **Foundations** (of up to 25 x 25 x 4 m) to support the turbine towers
- » Underground cables between turbines
- » **On-site Substation** (covering an area of up to 115m x 38m) connecting to Eskom Switching station which in turn connects to Eskom's Diep River Substation Extension, as well as admin/control and other building. Approximate co-ordinates of substation: 34°4'23.85"S; 24° 30' 20.94" E.
- » Underground cables between turbines
- » Internal **access roads** (of up to 6m wide) to each wind turbine.
- » Small areas (turn-around points) for trucks and cranes at certain locations alongside the roads.
- » Permanent and temporary hardstand areas adjacent to turbine foundations. The permanent areas will be constructed from gravel in the same manner as the roads. The Temporary areas will be rehabilitated to their original state after construction
- » **Main access road / haul road** to the site
- » Relocation of Workshop / administration building to within or adjacent to the footprint of the on-site substation (up to 100m<sup>2</sup>).

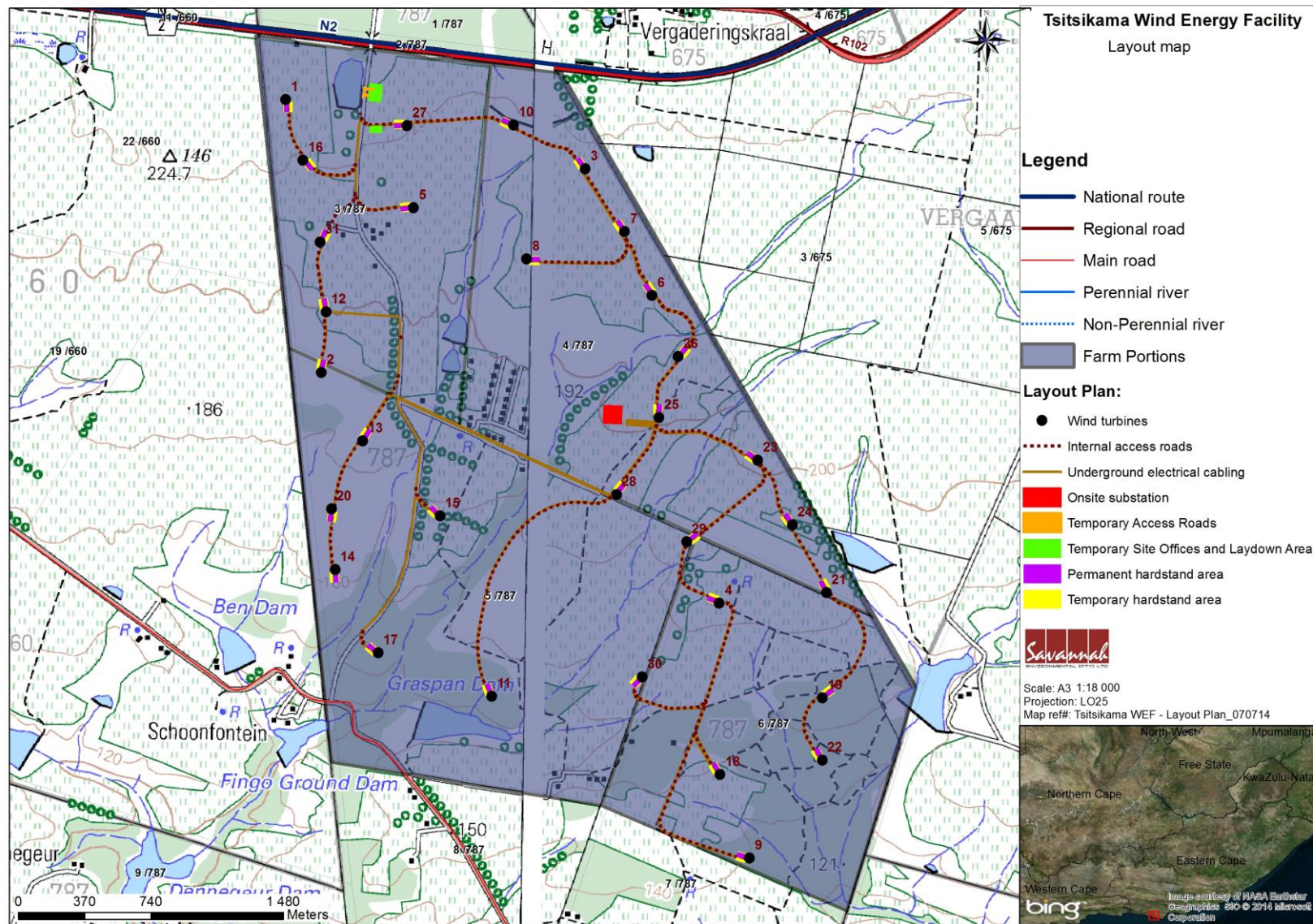
The facility will be fuelled by wind. No other fuels will be used as a generating fuel during the operation phase.

The final layout overlaid on the sensitivity map (Wetlands, drainage lines, rivers, stream and water crossing of roads, no-go areas, and the location of heritage sites), as per Condition 14 of the Environmental Authorisation, is displayed in Figure 2.1. Figure 2.1 includes:

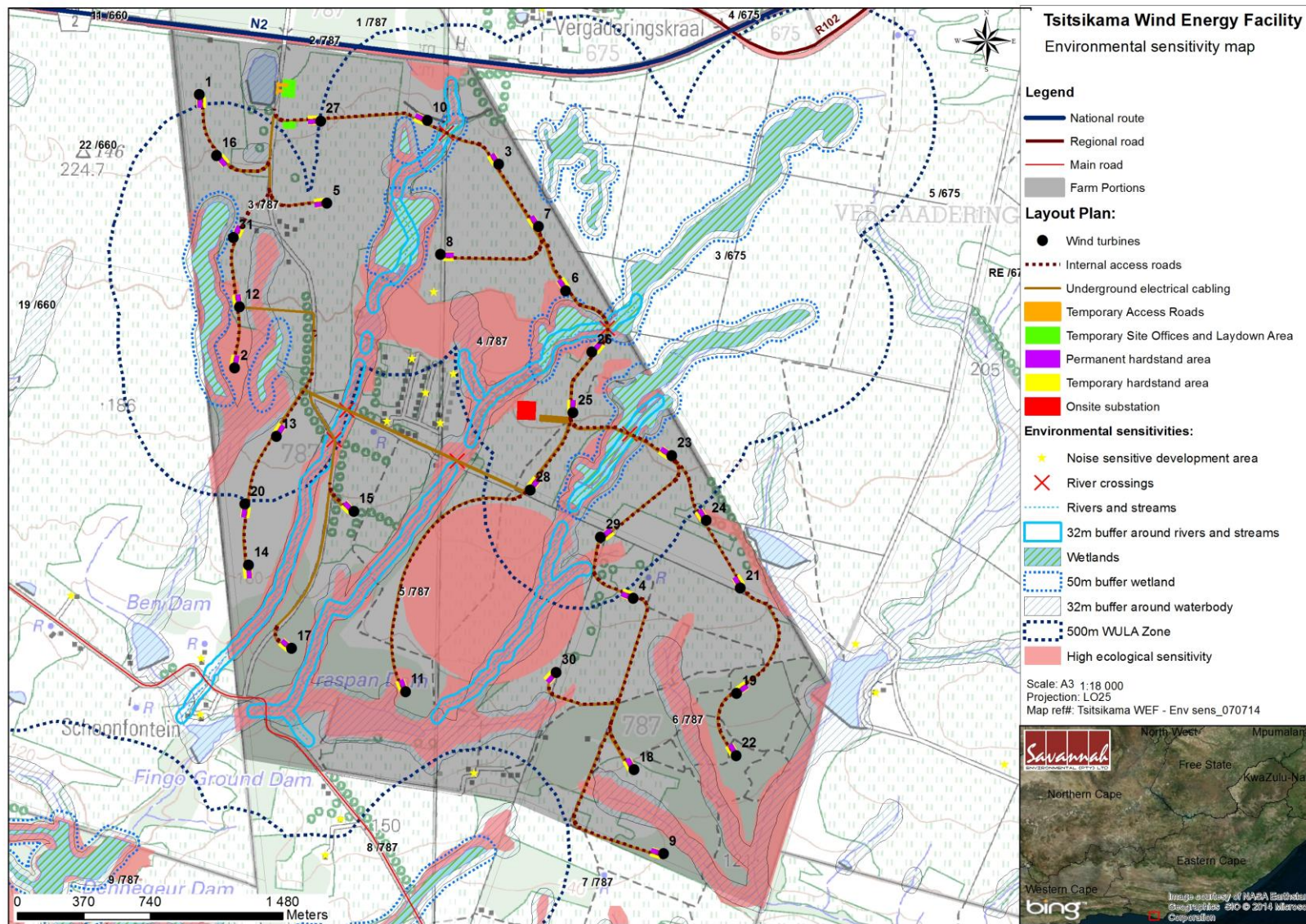
- » Turbine positions and associated infrastructure.
- » Foundation footprint
- » Permanent laydown area footprint
- » Internal roads including their width (construction period width and the operation period width) and with numbered sections between the other site elements which they serve (to make commenting on sections possible).
- » Substations and or transformer sites including their entire footprint
- » Cable routes and trench dimensions (where they are not along international roads)
- » Cut and fill areas at turbine sites along road and at sub-station/transformer sites.
- » All existing infrastructure, especially roads
- » Buildings including accommodation

In terms of the findings of the EIA Report and subsequent specialist surveys and monitoring, various planning, construction and operation-related environmental impacts were identified, including:

- » Disturbance of ecological environment (flora and fauna)
- » Impacts on avifauna (birds) and bats
- » Impacts on soils and agricultural potential
- » Disturbance to sense of place, visual aesthetics
- » Noise pollution
- » Socio-economic impacts
- » Soil erosion and degradation
- » Impacts on heritage and fossil resources
- » Storage and utilisation of hazardous substances on-site
- » Impacts on wetlands and drainage lines



**Figure 2.1:** Locality map displaying the final layout in relation to the site sensitivity as identified through the EIA process



**Figure 2.2:** Zoomed in locality map displaying the final layout in relation to the site sensitivity as identified through the EIA process

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

The main activities/components associated with the Tsitsikamma Community Wind Energy Facility comprise the following:

### 2.1.1 Activities Associated with Planning, Construction, Operation and Decommissioning of the Facility

Main Activity/Project Component	Components of Activity	Details
<b>Construction</b>		
Establishment of access roads to the site	<ul style="list-style-type: none"> <li>» Upgrade access/haul roads to the site</li> <li>» Establish internal access roads: 3-6 m wide permanent roadway within the site between the turbines for use during construction and operation phase.</li> <li>» Temporary track (adjacent to and utilising part of the permanent road) of up to 11m in width for use by the crane during construction phase only.</li> </ul>	<ul style="list-style-type: none"> <li>» Access roads will be constructed in advance of any components being delivered to site, and will remain in place after completion for future access and possibly access for replacement of parts if necessary.</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-siting/positioning of the wind turbines (as well as by surveys undertaken by heritage &amp; paleontological specialist's surveys). To accommodate the large crawler crane required for turbine assembly, a track of approximately 11m in width is required to be established on the site to accommodate the passage of the fully rigged crawler crane.</li> </ul>
Undertake site preparation	<ul style="list-style-type: none"> <li>» Site establishment of offices/workshop with ablutions and stores, contractors yards</li> <li>» Establishment of internal access roads (permanent and temporary roads)</li> <li>» Clearance of vegetation at the footprint of each turbine</li> <li>» Excavations for foundations</li> </ul>	<ul style="list-style-type: none"> <li>» These activities will require the stripping of topsoil, which will need to be stockpiled, backfilled and/or spread on site.</li> </ul>



Main Activity/Project Component	Components of Activity	Details
Establishment of lay down areas on site	<ul style="list-style-type: none"> <li>» Lay down areas (temporary footprint <u>50m</u> x 50m) at each turbine position for the storage of wind turbine components and accommodation of construction and crane lifting equipment.</li> <li>» <u>Two</u> temporary main lay down area at construction site (100m x 100m wide).</li> </ul>	<ul style="list-style-type: none"> <li>» The lay down area will need to accommodate the cranes required in tower/turbine assembly.</li> <li>» Lay down and storage areas will be required to be established for the normal civil engineering construction equipment which will be required on site.</li> <li>» A large lay down area will be required at each position where the main lifting crawler crane may be required to be erected and/or disassembled. This area would be required to be compacted and levelled to accommodate the assembly crane, which would need to access the crawler crane from all sides.</li> <li>» Such areas to make use of already compacted areas as far as possible, such as roadways or other laydown areas.</li> </ul>
Construct wind turbine foundations	<ul style="list-style-type: none"> <li>» Concrete foundations of up to <u>25</u> x <u>25m</u> x <u>4</u> m depth at each turbine location</li> </ul>	<ul style="list-style-type: none"> <li>» Foundation holes will be mechanically excavated.</li> <li>» Shoring and safety barriers will be erected.</li> </ul>
Transport of components and equipment to site	<ul style="list-style-type: none"> <li>» Flatbed trucks will be used to transport all components to site:                             <ul style="list-style-type: none"> <li>* Turbine units consist of a tower comprised of 4 segments, a nacelle, and three rotor blades (each of up to 50 m in length).</li> <li>* Components of various specialised construction, 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>* The normal civil engineering construction equipment for the civil works (e.g. excavators,</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>» Turbine units consist of a tower comprised of 4 segments, a nacelle, and three rotor blades. Components of various specialised construction, lifting equipment and counter weights etc. are required on site (e.g. 200 ton mobile assembly crane and a 750 ton main lift crawler crane) to erect the wind turbines. Other components include components required for the establishment of the substation (including transformers) and those required for the establishment of the power line (including towers and cabling).</li> <li>» The wind turbine, including tower, will be brought to site by the supplier in sections. 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</li> </ul>

Main Activity/Project Component	Components of Activity	Details
	<p>trucks, graders, compaction equipment, cement mixers, etc.).</p> <ul style="list-style-type: none"> <li>* The components required for the establishment of the substation (including transformers)</li> <li>* Components required for the establishment of the power line (including towers and cabling)</li> <li>» Ready-mix cement trucks for turbine, substation and visitors centre foundations</li> </ul>	<p>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) 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. It is estimated that 10 trucks will be used for the transport of each turbine.</p>
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 rotor.</li> </ul>	<ul style="list-style-type: none"> <li>» The large lifting crane will lift the tower sections into place.</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 by the smaller crane. It will then be lifted to the nacelle by the large crane, and bolted in place.</li> <li>» It will take approximately 2 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>
Construct substation and ancillary infrastructure.	<ul style="list-style-type: none"> <li>» Substation components</li> <li>» Security fencing around high-voltage (HV) Yard</li> <li>» Workshop</li> </ul>	<ul style="list-style-type: none"> <li>» Will require the clearing of vegetation and levelling of the development site and the excavation of foundations prior to construction.</li> <li>» A lay down area for building materials and equipment associated with these buildings will also be required.</li> <li>» The substation will be constructed within a high-voltage (HV) yard footprint of up to 50 x 100m.</li> <li>» The substation would be constructed in the following simplified sequence:</li> </ul>

Main Activity/Project Component	Components of Activity	Details
		<ul style="list-style-type: none"> <li>* Step 1: Survey of the site</li> <li>* Step 2: Site clearing and levelling and construction of access road to substation sites</li> <li>* Step 3: Construction of terrace and foundations</li> <li>* Step 4: Assembly, erection and installation of equipment</li> <li>* Step 5: Connection of conductors to equipment</li> <li>* Step 6: Rehabilitation of any disturbed areas and protection of erosion sensitive areas.</li> </ul>
Connection of wind turbines to the on-site substation	<ul style="list-style-type: none"> <li>» Wind turbines</li> <li>» 33 kV underground electrical cabling connecting each turbine to the substation</li> </ul>	<ul style="list-style-type: none"> <li>» The installation of these cables will require the excavation of trenches, approximately 1m in depth within which these cables can then be laid. The underground cables would follow the internal access roads as far as reasonably possible.</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>
Undertake site <u>rehabilitation</u>	<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>» 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.</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 30 skilled staff members, who will be responsible for monitoring and maintenance when required.</li> <li>» No permanent staff will be required on site for any extended period of time.</li> </ul>

Main Activity/Project Component	Components of Activity	Details
		<ul style="list-style-type: none"> <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>		
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 replacement of the turbines with more appropriate technology/infrastructure available at that time.</li> </ul>
Disassemble and remove 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.</li> </ul>

## **LEGISLATIVE REQUIREMENTS**

## **CHAPTER 3**

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Table 3.1 provides an outline of the relevant environmental legislation and permitting requirements associated with the proposed project. This list of legislation is applicable at this time and should be updated on a continuous basis as the environmental legislation within South Africa changes.

**Table 3.1:** Relevant legislative permitting requirements applicable to the Wind Energy Facility Project

Legislation	Applicable Requirements	Relevant Authority	Compliance requirements
<p>National Environmental Management Act (Act No 107 of 1998)</p>	<p>EIA Regulations have been promulgated in terms of Chapter 5. Activities which may not commence without an environmental authorisation are identified within these Regulations.</p> <p>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 of the relevant environmental authorisation.</p> <p>In terms of GNR 387 of 21 April 2006, a scoping and EIA process is required to be undertaken for the proposed project</p>	<p>National Department of Environmental Affairs – lead authority.</p> <p>Provincial Environmental Department - commenting authority.</p>	<p>An <b>Environmental authorisation</b> has been issued for the project.</p>
<p>National Environmental Management Act (Act No 107 of 1998)</p>	<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>	<p>Department of Environmental Affairs (as regulator of NEMA).</p>	<p>While no permitting or licensing requirements arise directly by virtue of the proposed project, this section will find application during the EIA phase and will continue to apply throughout the life cycle of the project.</p>

Legislation	Applicable Requirements	Relevant Authority	Compliance requirements
Environment Conservation Act (Act No 73 of 1989)	National Noise Control Regulations (GN R154 dated 10 January 1992).	National Department of Environmental Affairs Provincial Environmental Department - commenting authority. Local authorities Local Municipality	There is no requirement for a noise permit in terms of the legislation.  There are noise level limits which must be adhered to, as detailed in SANS 10103. It provides the maximum average background ambient sound levels, $L_{Req,d}$ and $L_{Req,n}$ , during the day and night respectively to which different types of developments may be exposed.
National Water Act (Act No 36 of 1998)	Water uses must be licensed unless such water use falls into one of the categories listed in <u>S21</u> of the Act or falls under general authorisation in terms of S39 and GN 1191 of GG 20526 October 1999.	Department of Water Affairs	<u>A water use license has been obtained for the project in terms of S21 of the NWA.</u>
National Water Act (Act No 36 of 1998)	In terms of Section 19, the project proponent must ensure that reasonable measures are taken throughout the life cycle of this project to prevent and remedy the effects of pollution to water resources from occurring, continuing or recurring.	Department of Water Affairs (as regulator of NWA)	While no permitting or licensing requirements arise directly by virtue of the proposed project, this section will find application during the life cycle of the project.
Minerals and Petroleum Resources Development Act (Act No 28 of 2002)	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.  <u>A Section 53 permit may be required from any person who intends to use the surface of any land in any way which may be contrary to any object of this Act or which is likely to impede</u>	Department of Minerals and Energy	As no borrow pits are expected to be required for the construction of the facility, no mining permit or right is required to be obtained.  <u>A Section 53 permit has been obtained for the project in terms of Section 53 of the MPRDA</u>

Legislation	Applicable Requirements	Relevant Authority	Compliance requirements
	<p><u>any such object.</u></p> <p>Requirements for Environmental Management Programmes and Environmental Management Programmes are set out in Section 39 of the Act.</p>		
<p>National Environmental Management: Air Quality Act (Act No 39 of 2004)</p>	<p>Sections 18, 19 and 20 of the Act allow certain areas to be declared and managed as "priority areas".</p> <p>Declaration of controlled emitters (Part 3 of Act) and controlled fuels (Part 4 of Act) with relevant emission standards.</p>	<p>National Department of Environmental Affairs</p>	<p>While no permitting or licensing requirements arise from this legislation, this Act will find application during the operational phase of the project.</p> <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>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</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>A permit may be required should identified cultural/heritage sites on site be required to be disturbed or destroyed as a result of the construction activities.</p>



Legislation	Applicable Requirements	Relevant Authority	Compliance requirements
	<p>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 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>Nature Conservation Ordinance (Act 19 of 1974)</p>	<p>Article 63 prohibits the picking of certain fauna (including cutting, chopping, taking, gathering, uprooting, damaging or destroying). Schedule 3 lists endangered flora and Schedule 4 lists protected flora.</p> <p>Articles 26 to 47 regulates the use of wild animals.</p>	<p>National Department of Environmental Affairs</p>	<p><u>A biodiversity permit has been obtained for the project in terms of Section 62 of the Nature and Environmental Conservation Ordinance.</u></p>
<p>National Environmental Management: Biodiversity Act (Act No 10 of 2004)</p>	<p>In terms of S57, the Minister of Environmental Affairs has published a list of critically endangered, endangered, vulnerable, and protected species in GNR 151 in Government Gazette 29657 of 23 February 2007 and the regulations associated therewith in GNR 152 in GG29657 of 23 February 2007, which came into effect on 1 June 2007.</p>	<p>Department of Environmental Affairs</p>	<p>As the applicant will not carry out any restricted activity, as is defined in S1 of the Act, no permit is required to be obtained in this regard.</p>

Legislation	Applicable Requirements	Relevant Authority	Compliance requirements
	<p>In terms of GNR 152 of 23 February 2007: Regulations relating to listed threatened and protected species, the relevant specialists must be employed during the EIA Phase of the project to incorporate the legal provisions as well as the regulations associated with listed threatened and protected species (GNR 152) into specialist reports in order to identify permitting requirements at an early stage of the EIA Phase.</p> <p>The Act provides for listing threatened or protected ecosystems, in one of four categories: critically endangered (CR), 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, GoN 1002), 9 December 2011).</p> <p><u>Section 97(1) provides for the minister to</u></p>		<p>No threatened plant species are likely to be impacted by the proposed development. However, should any species be impacted, the relevant permit/s should be obtained.</p> <p><u>The developer does not intend carrying out any restricted activities involving Invasive Alien Species on the site. Where necessary the provisions of GNR 598 will be applicable.</u></p>

Legislation	Applicable Requirements	Relevant Authority	Compliance requirements
	<p><u>develop and publish Alien and Invasive Species Regulations. GN R. 598 has been published on 01 August 2014 to provide for the assessment of risks and potential impacts on biodiversity of restricted activities involving specimens of alien species or listed invasive species; and control the eradication of listed invasive species. These regulations repeal The Alien and Invasive Species Regulations 2013, published in Government Notice No R.506, Gazette No. 33683 of 19 July 2013 and come into effect 60 days after publication (i.e. 01 October 2014).</u></p>		
<p>Conservation of Agricultural Resources Act (Act No 43 of 1983)</p>	<p>Regulation 15 of GNR1048 provides for the declaration of weeds and invader plants, and these are set out in Table 3 of GNR1048. Declared Weeds and Invaders in South Africa are categorised according to one of the following categories:</p> <ul style="list-style-type: none"> <li>» Category 1 plants: are prohibited and must be controlled.</li> <li>» Category 2 plants: (commercially used plants) may be grown in demarcated areas providing that there is a permit and that steps are taken to prevent their spread.</li> <li>» Category 3 plants: (ornamentally used plants) may no longer be planted; existing plants may remain, as long as all reasonable steps are taken to prevent the spreading thereof, except within the</li> </ul>	<p>Department of Agriculture</p>	<p>While no permitting or licensing requirements arise from this legislation, this Act will find application during the EIA phase 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>

Legislation	Applicable Requirements	Relevant Authority	Compliance requirements
	<p>floodline of watercourses and wetlands.</p> <p>These regulations provide that Category 1, 2 and 3 plants must not occur on land and that such plants must be controlled by the methods set out in Regulation 15E.</p>		
<p>National Veld and Forest Fire Act (Act 101 of 1998)</p>	<p>In terms of Section <u>12</u> the applicant would be obliged to burn firebreaks to ensure that should a veld fire occur on the property, that it does not spread to adjoining land.</p> <p>In terms of section 12 the applicant must ensure that the firebreak is 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.</p> <p>In terms of section 17, the applicant must have such equipment, protective clothing and trained personnel for extinguishing fires.</p>	<p>Department of Water Affairs</p>	<p>While no permitting or licensing requirements arise from this legislation, this act will find application during the operational phase of the project. Due to the fire prone nature of the area, it must be ensured that the landowner and developer are part of the local Fire Protection Agency.</p>
<p>National Forests Act (Act No 84 of 1998)</p>	<p>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 dispose of any protected tree, except under a licence granted by the Minister'.</p>	<p>Department of Water Affairs</p>	<p>A permit or license is required for the destruction of protected tree species and/or indigenous tree species within a natural forest. As none such species occur on the site, no permits in this regard are required.</p>

Legislation	Applicable Requirements	Relevant Authority	Compliance requirements
	<p>Forests: Prohibits the destruction of indigenous trees in any natural forest without a licence.</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>An obstacle approval <u>has been obtained for the Project in terms of the CARS.</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</p>	<p>Department of Health</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</p>

Legislation	Applicable Requirements	Relevant Authority	Compliance requirements
	<p>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 being in force.</p>		<p>Department of Health.</p>
<p>National Road Traffic Act (Act No 93 of 1996)</p>	<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</p>	<p>Provincial Department of Transport (provincial 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> </ul>

Legislation	Applicable Requirements	Relevant Authority	Compliance requirements
	<p>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>		<ul style="list-style-type: none"> <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>South African National Roads Agency Limited and National Roads Act, 1998 (Act 7 of 1998)</u></p>	<p><u>Any structure on or over, or below the surface of, a national road or land in a building restriction area, erect, construct or lay, or establish any structure or other thing (including anything which is attached to the land on which it stands even though it does not form part of that land).</u></p> <p><u>Any structural alteration or addition to a structure or that other thing situated on or over, or below the surface of, a national road or land in a building restriction area.</u></p>	<p><u>South African National Roads Agency Limited (national roads)</u></p>	<p><u>A SANRAL approval has been obtained from SANRAL in terms of the provisions of Section 48 of the South African National Roads Agency Limited and National Roads Act, 1998 (Act 7 of 1998).</u></p>

Legislation	Applicable Requirements	Relevant Authority	Compliance requirements
	<u>Erecting, constructing, laying or establishing any structure or that other thing on or over, or below the surface of, a national road or land in a building restriction area, or for any structural alteration or addition to any structure or other thing so situated.</u>		
Development Facilitation Act (Act No 67 of 1995)	Provides for the overall framework and administrative structures for planning throughout the Republic.  Sections 2- 4 provide general principles for land development and conflict resolution.	Provincial Environmental Department - commenting authority.  Local Municipality, District Municipality	The applicant <u>has submitted</u> a land development application in the 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.
Details land subdivision requirements and procedures. Applies for subdivision of all agricultural land.	Provincial Environmental Department - commenting authority.  Local Municipality, District Municipality	Rezoning will have to be in place prior to any subdivision approval in terms of Section 24 and 17 of LUPO.	A rezoning application has been <u>obtained from</u> the local Municipality.
National Environmental Management: Waste Act (Act No 59) of 2008	<ul style="list-style-type: none"> <li>» The Minister may by notice in the <i>Gazette</i> publish a list of waste management activities that have, or are likely to have, a detrimental effect on the environment.</li> <li>» The Minister may amend the list by—                             <ul style="list-style-type: none"> <li>(a) adding other waste management activities to the list;</li> <li>(b) removing waste management activities from the list; or</li> <li>(c) making other changes to the particulars on the list.</li> </ul> </li> </ul>	Provincial Department of Environment Affairs (general waste)  National Department of Environmental Affairs (DEA) (hazardous waste)	Waste licence could be required in the event that more than 100m <sup>3</sup> of general waste or more than <u>80m<sup>3</sup></u> of hazardous waste is to be stored on site at any one time. The volumes of waste generated during construction and operation of the facility are not expected to be large enough to require a waste license.  Waste must be stored in terms of National Environmental Management: Waste Act,



Legislation	Applicable Requirements	Relevant Authority	Compliance requirements
			2008 (Act No. 59 of 2008) – National norms and standard for the storage of waste.
Promotion of Access to Information Act (Act No 2 of 2000)	» All requests for access to information held by state or private body are provided for in the Act under S11.	National Department of Environmental Affairs (DEA)	No permitting or licensing requirements. This act may find application during through the project life cycle.
Promotion of Administrative Justice Act (Act No 3 of 2000)	» In terms of Section 3 the government is required to act lawfully and take procedurally fair, reasonable and rational decisions » Interested & affected parties have right to be heard	National Department of Environmental Affairs (DEA)	No permitting or licensing requirements. This act will find application during through the project life cycle.
Provincial Legislation			
Cape Land Use Planning Ordinance (No 15 of 1985)	Details land subdivision and rezoning requirements and procedures	Local authority, i.e. Kouga Local Municipality	Given that the wind energy development is proposed on land that is zoned for agricultural use, a rezoning application in terms of Section 17 of LUPO to an alternative appropriate zone will be required.  Rezoning is required to be undertaken following the issuing of an environmental Authorisation for the proposed project.
Eastern Cape Provincial Growth and Development Programme	Section 5 of the PGDP (2004-2014) identifies six strategic objective areas of the PGDP. Of these the infrastructure programme is of relevance to the study. The report notes that development of infrastructure, especially in the former homelands, is a necessary condition to eradicate poverty.	Eastern Cape Department of Economic Development & Environmental Affairs (DEDEA)	Infrastructure development, in turn, must have strong growth promotion effects on the agriculture, manufacturing and tourism sectors by improving market access and by “crowding in” private investment. Poverty alleviation should also be promoted through labour-intensive and

Legislation	Applicable Requirements	Relevant Authority	Compliance requirements
			community based construction methods.
<b>Local Legislation / Policies / Plans</b>			
Kouga Local Municipality Integrated Development Plan (2007-2012)	The Kouga Local Municipality Integrated Development Plan (IDP) (2007-2012) identifies 5 Key Priority Areas (KPA) in line with the National standards to address the municipality's development objectives: <ul style="list-style-type: none"> <li>» Infrastructure and Basic Services;</li> <li>» Socio-economic Development;</li> <li>» Institutional Transformation;</li> <li>» Good Governance and Public Participation;</li> <li>» Financial viability and Management.</li> </ul>	Kouga Local Municipality	The IDP objectives are relevant Those objectives that are relevant to the proposed project include: <ul style="list-style-type: none"> <li>» Communities of Kouga have access to safe and convenient road networks. The road networks should support tourism, people's access to economic activities, as well as access to education, health and social service;</li> <li>» All formal households have access to reliable and affordable electricity as well as streetlights, which supports safety and access for emergency services in Kouga, by 2012;</li> <li>» Economic growth is stimulated in the Kouga region, and sustainable employment has been facilitated by creating a 5% growth in job creation by 2011;</li> <li>» Kouga Municipality manages the available land in a sustainable manner that makes land available for development initiatives and economic growth that meets legal requirements.</li> </ul>
<b>Standards</b>			
Noise Standards	Four South African Bureau of Standards (SABS) scientific standards are considered relevant to noise from a Wind Energy Facility.	Local Municipality	The recommendations that the standards make are likely to inform decisions by authorities, but non-compliance with the

Legislation	Applicable Requirements	Relevant Authority	Compliance requirements
	<p>They are:</p> <ul style="list-style-type: none"> <li>» SANS 10103:2008. 'The measurement and rating of environmental noise with respect to annoyance and to speech communication'.</li> <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>		<p>standards will not necessarily render an activity unlawful per se.</p>

## PURPOSE & OBJECTIVES OF THE EMPR

## CHAPTER 4

An Environmental Management Programme (EMPr) is defined as “an environmental management tool used to ensure that undue or reasonably avoidable adverse impacts of the construction, operation and decommissioning of a project are prevented 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 help ensure compliance with recommendations and conditions specified through an EIA process, as well as 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 and operation phases of a project, and is intended to manage and mitigate construction and operation activities so that unnecessary or preventable environmental impacts do not result. These impacts range from those incurred during start up (site clearing and site establishment) through those incurred during the construction activities themselves (erosion, noise, dust) to those incurred during site rehabilitation (soil stabilisation, re-vegetation) and operation. The EMPr also defines monitoring requirements in order to ensure that the specified objectives are met.

The EMPr has been developed as a set of environmental specifications (i.e. principles of environmental management for the proposed Tsitsikamma Community 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 implementation tools.

The EMPr has the following objectives:

- » To outline mitigation measures and environmental specifications which are required to be implemented for the planning, construction, rehabilitation and operation phases of the project in order to minimise the extent of environmental impacts, and to manage environmental impacts associated with the wind energy facility.

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

- » To ensure that the construction and operation phases do not result in undue or reasonably avoidable adverse environmental impacts, and ensure that any potential environmental benefits are enhanced.
- » To identify entities who will be responsible for the implementation of the measures and outline functions and responsibilities.
- » To propose mechanisms for monitoring compliance, and preventing long-term or permanent environmental degradation.
- » To facilitate appropriate and proactive responses to unforeseen events or changes in project implementation that were not considered in the EIA process.

The mitigation measures identified within the Environmental Impact Assessment process are systematically addressed in the EMP, ensuring the minimisation of adverse environmental impacts to an acceptable level.

Tsitsikamma Community Wind Energy Facility (RF) (Pty) Ltd must ensure that the implementation of the project complies with the requirements of any and all environmental authorisations and any other permits (once issued), and obligations emanating from other relevant environmental legislation. This obligation is partly met through the development of the EMP, and the implementation of the EMPr through its integration into the contract documentation for activities associated with both construction and operation. Since this EMPr is part of the EIA process undertaken for the proposed Tsitsikamma Community Wind Energy Facility, it is important that this guideline document be read in conjunction with the Final Scoping Report (May 2011) and draft EIA Report (August 2011). This will contextualise the EMPr and enable a thorough understanding of its role and purpose in the integrated environmental process. This EMPr for construction and operation activities has been compiled in accordance with the EIA Regulations of June 2010 and will be further developed in terms of specific requirements listed in any authorisations issued for the proposed project. This EMPr should be considered a dynamic document, requiring regular review and updating as new information becomes available in order for it to remain relevant to the requirements of the site and the environment.

To achieve effective environmental management, it is important that Contractors are aware of their responsibilities in terms of the relevant environmental legislation and the contents of this EMP. 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:

- » Ensuring that employees have a basic understanding of the key environmental features of the construction site and the surrounding environment.
- » 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. Employees must be

familiar with the requirements of the EMPr and the environmental specifications as they apply to the construction of the facility.

- » Ensuring that, prior to commencing any site works, all employees and sub-contractors have attended an appropriate Environmental Awareness Training course. The course must provide the site staff with an appreciation of the project's environmental requirements, the EMPr specifications, and how they are to be implemented.
- » Basic training in the identification of archaeological sites/objects, and protected or Red List 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.

**STRUCTURE OF THIS EMP**

**CHAPTER 5**

The first two chapters provide background to the EMP and the proposed project. The chapters which follow consider the:

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

These chapters set out the procedures necessary for Tsitsikamma Community Wind Energy Facility to achieve environmental compliance. For each of the phases for the wind energy facility 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 EMP 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 environmental impact assessment specialist studies

<b>Project component/s</b>	List of project components affecting the objective, i.e.: <ul style="list-style-type: none"> <li>» wind energy turbines</li> <li>» access roads</li> <li>» substation</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</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, such as 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.
- » 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.

### 5.1. Project Team

This draft EMPr was compiled by:

<b>EMP Compilers</b>	
Jo-Anne Thomas	Savannah Environmental
<b>Specialists</b>	
Ecology: flora, fauna and wetlands	David Hoare of David Hoare Consulting cc
Ecology: Flora, fauna and wetlands walk through survey and Alien Plants management strategy.	Marianne Strohbach (Savannah Environmental (PTY) Ltd)
Avifauna	Andrew Jenkins of Avisense Consulting cc
Geology and erosion potential	Iain Paton of Outeniqua Geotechnical Services cc
Soils and agricultural potential	Johan van der Waals of Terrasoil
Visual	Lourens du Plessis of MetroGIS
Heritage	Johan Binneman of Eastern Cape Heritage Consultants
Palaeontology	John Almond of Natura Viva cc
Noise	Morne de Jager of Menco of M2 Environmental Connections cc
Social Impact	Tony Barbour (Environmental Consultant and Researcher)
Water Use License	Patsy Scherman and Brian Colloty of Scherman Colloty and Associates
Pre-construction bird and bat monitoring	Bio3

The Savannah Environmental team has extensive knowledge and experience in environmental impact assessment and environmental management, having being



involved in EIA processes over the past ten (10) years. They have managed and drafted Environmental Management Programmes for other wind energy facility projects throughout South Africa. In addition, they have been involved in compliance monitoring of major construction projects in South Africa.

## MANAGEMENT PLAN FOR WIND ENERGY FACILITY: PLANNING & DESIGN

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## CHAPTER 6

### 6.1. Planning and Design

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

As a precaution, a preconstruction survey for *Protea coronata* was undertaken at the location of turbines 1, 2 and 3 to determine whether this species occurs within the footprint of these turbines or not, no *Protea coronate* were found. The species is serotinous and regenerates from seed following fire mortality of adult plants. If any individuals occur there, viable seeds should be collected at the appropriate time of the year and sown within suitable nearby habitats. The best approach would probably be to cut off entire flowering branches and place them within suitable habitat.

There are fifteen plant species of conservation concern that could occur in available habitats in the study area but were not present in the walk through survey.

A number of protected tree species have a geographic distribution that includes the study area appear on this list, including the following: *Curtisia dentata*, *Ocotea bullata*, *Pittosporum viridiflorum*, *Podocarpus falcatus*, *Podocarpus latifolius* and *Sideroxylon inerme* subsp. *inerme*. Only *Sideroxylon inerme* subsp. *inerme* was found on site, in the dunes area in the southern part of the site.

Factors that may lead to parts of the study area having high ecological sensitivity are the presence of wetlands within the drainage lines on site, potential presence of erodable substrates, the potential presence of various plant and animal species of conservation concern, and protected trees.

The drainage lines on site drain into two main systems that lead to the sea via the Klipdrif and Tsitsikamma Rivers. The site constitutes part of the catchment for these rivers. The mouths of the rivers have an estuary, which is considered to be very sensitive and is shown as having high conservation value and sensitivity in the ECBCP. The potential impacts of activities on site on these river systems need to be carefully managed. It is especially important that the estuaries are not affected by activities on site, for example, increased water turbidity due to erosion of substrates into upper reaches of watercourses.

<b>Project component/s</b>	Project components affecting the objective: » wind energy turbines » access roads » substation » access roads
<b>Potential Impact</b>	» Design fails to respond optimally to the environmental consideration
<b>Activities/risk sources</b>	» Positioning of turbines and access roads » Positioning of substation » access roads
<b>Mitigation: Target/Objective</b>	» To ensure that the design of the facility responds to the identified environmental constraints and opportunities

<b>Mitigation: Action/control</b>	<b>Responsibility</b>	<b>Timeframe</b>
Consider design level mitigation measures recommended by the specialists, especially with respect to ecology, visual aesthetics, soils, wetlands and avifauna as detailed within the EIA report and relevant appendices.	Engineering Design Consultant / turbine supplier Tsitsikamma Community Wind Energy Facility (RF) (Pty) Ltd	Tender Design & Design Review Stage
Access roads to be carefully planned to minimise the impacted area and prevent unnecessary over compaction of soil. Keep grazing and natural units as intact as possible.	Tsitsikamma Community Wind Energy Facility (RF) (Pty) Ltd	Design phase
In order to prevent damage to wetlands / agriculturally sensitive areas turbines 8, 12, 14, 17, 19, 21, 23, 25, 28 and 29 were relocated.	Tsitsikamma Community Wind Energy Facility (RF) (Pty) Ltd	Design
As a precaution, a preconstruction survey was conducted. No <i>Protea coronata</i> were located at turbines 1, 2 and 3 and at the location of the access roads to turbines 1, 2 and 3. If any individuals are found during construction, viable seeds should be collected at the appropriate time of the year and sown within suitable nearby habitats. The best approach would probably be to cut off entire flowering branches and place them within suitable habitat. If possible, avoid affected populations by shifting power line tower structures slightly.	Tsitsikamma Community Wind Energy Facility (RF) (Pty) Ltd	Pre-construction
Depending on the species potentially affected, other measures appropriate to the ecology of the species may be possible to mitigate impacts, for example collecting seed and sowing it in suitable nearby habitat. A qualified botanist should be consulted in such cases and measures determined in consultation with relevant authorities.	Tsitsikamma Community Wind Energy Facility (RF) (Pty) Ltd	Pre-construction

<b>Mitigation: Action/control</b>	<b>Responsibility</b>	<b>Timeframe</b>
Turbines 5 and 8, 17 and 25 were located very close to the edge of wetlands or watercourses. However, they have been moved to new positions (see locality map in figure 2.1).	Tsitsikamma Community Wind Energy Facility (RF) (Pty) Ltd	Design phase
Some of the turbines were situated on the edge of potential wetland zones and within areas of high and medium soil sensitivity (refer to EIA report, Savannah Environmental, September 2011). However, since all the turbines located on the edge of wetlands zones have been moved, a wetland delineation is no longer needed (refer to locality map in Figure 2.1).	Tsitsikamma Community Wind Energy Facility (RF) (Pty) Ltd	Design phase
The noise emission specifications were considered with regards to wind turbine generators and it was found that low level noise would be present in limited areas as per the noise impact report, Appendix H	Tsitsikamma Community Wind Energy Facility (RF) (Pty) Ltd	Design phase
A setback of <u>500</u> m around all noise sensitive developments is proposed for the Vestas <u>V112</u> <u>3.0MW</u> WTG.	Tsitsikamma Community Wind Energy Facility (RF) (Pty) Ltd	Design phase
Mining permit/license to be obtained for any borrow pits to be established for the project (if applicable)	Tsitsikamma Community Wind Energy Facility (RF) (Pty) Ltd	Design phase
Obtain required abnormal load permits for transportation of project components to site.	<u>Contractor</u>	Design phase
Obtain permits to impact on any plant species of special concern (in terms of the NEM: Biodiversity Act and the Eastern Cape Ordinance).	Tsitsikamma Community Wind Energy Facility (RF) (Pty) Ltd	Design phase

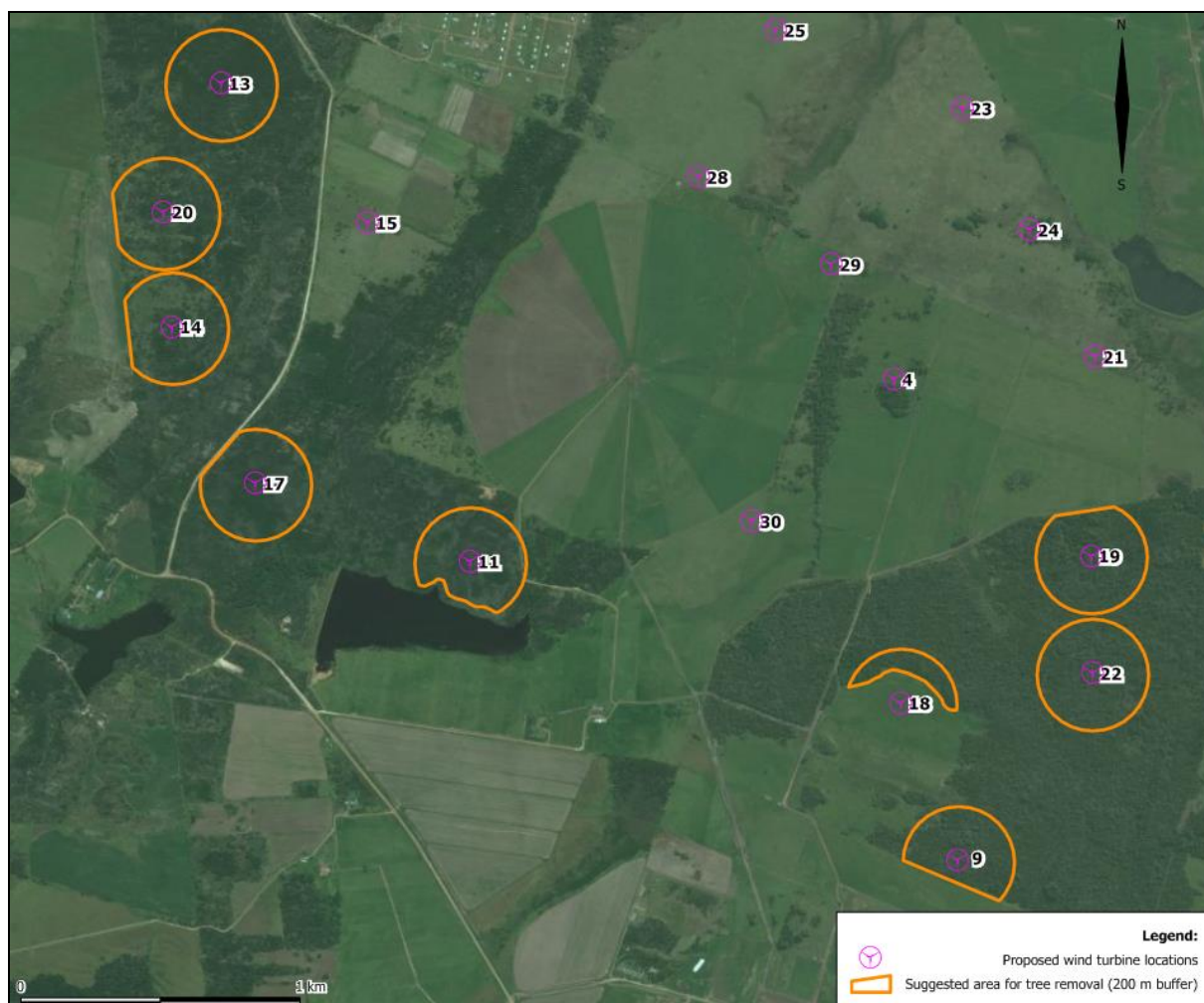
<b>Performance Indicator</b>	<ul style="list-style-type: none"> <li>» Design meets objectives and does not degrade the environment.</li> <li>» Design and layouts etc. respond to the mitigation measures and recommendations in the EIA report.</li> <li>» Low number of species of special concern and individuals of protected tree species lost within project area</li> </ul>
<b>Monitoring</b>	<ul style="list-style-type: none"> <li>» Ensure that the design implemented meets the objectives and mitigation measures in the EIA report through review of the design by the Project Manager and Environmental Control Officer (ECO) prior to the commencement of construction.</li> <li>» On the basis of pre-construction walk-through surveys, determine whether any individuals of affected species will be lost to construction activities.</li> </ul>

**OBJECTIVE: Protection of Bats**

Bird and bat deaths are one of the most controversial biological issues related to wind turbines. The deaths of birds and bats at wind farm sites have raised concerns by conservation agencies internationally. Bats have been found to be particularly vulnerable to being killed by wind turbines. A 12 months pre-construction bat monitoring programme was undertaken for all 4 seasons.

<b>Project component/s</b>	List of project components affecting the objective » access roads » substation » wind turbines
<b>Potential Impact</b>	» Bat mortality and destruction of habitat / roosts
<b>Activity/risk source</b>	» Wind turbine placement
<b>Mitigation: Target/Objective</b>	» Reduce impacts on bat species

<b>Mitigation: Action/control</b>	<b>Responsibility</b>	<b>Timeframe</b>
In order to minimise potential impacts around the turbines within the higher sensitivity areas (i.e. forested areas) it is recommended that an area cleared of trees should be created within a radius of 200m. This is applicable to namely the turbines: 9, 11, 13, 14, 17, 18, 19, 20 and 22 (refer to Figure 6.1). Care should be taken to ensure that the clearing of the forested area does not have any other negative effects (e.g. increased erosion risk, soil stability problems, etc.), and that the area is stabilised through the planting of suitable vegetation within the cleared area	Tsitsikamma Community Wind Energy Facility (RF) (Pty) Ltd Specialist	Planning & design / Pre-Construction



**Figure 6.1:** Proposed additional forest clearing areas (buffer 200m around wind turbines) to implement at the Tsitsikamma wind energy facility

<b>Performance Indicator</b>	» No impacts on bat species of conservation concern.
<b>Monitoring</b>	» None required

**OBJECTIVE: Initiate Bird Monitoring Program**

A 12 months pre-construction bird monitoring programme was undertaken for all 4 seasons by Tsitsikamma Community Wind Energy Facility (RE) (Pty) Ltd (in consultation with an avifauna specialist) to document the effect of the wind energy facility on birds.

<b>Project component/s</b>	List of project components affecting the objective » wind turbines
<b>Potential Impact</b>	» Mortality of birds due to collision with turbines infrastructure.
<b>Activity/risk</b>	» Turbines infrastructure

<b>source</b>	
<b>Mitigation: Target/Objective</b>	» The delivery of an effective impact mitigation scheme for the facility, informed initially by influence of pre-construction monitoring on final construction plans, and refined by post-construction monitoring of actual impacts, and resulting adjustments in management practices and mitigation measures applied.

<b>Mitigation: Action/control</b>	<b>Responsibility</b>	<b>Timeframe</b>
In order to minimise potential impacts around the turbines within the higher sensitivity areas (i.e. forested areas) it is recommended that an area cleared of trees should be created within a radius of 200m. This is applicable to namely the turbines: 9, 11, 13, 14, 17, 18, 19, 20 and 22 (refer to Figure 6.1). Care should be taken to ensure that the clearing of the forested area does not have any other negative effects (e.g. increased erosion risk, soil stability problems, etc.), and that the area is stabilised through the planting of suitable vegetation within the cleared area	Tsitsikamma Community Wind Energy Facility (RF) (Pty) Ltd Specialist	Planning & design / Pre-Construction

<b>Performance Indicator</b>	» 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.
<b>Monitoring</b>	» Monitoring agency will be responsible: <ul style="list-style-type: none"> <li>○ Pre-construction monitoring (one year's data)</li> <li>○ Operational monitoring</li> </ul>

**OBJECTIVE: Commence Phase 1 Palaeontology Pre-construction Field Assessment**

Given the uncertainties concerning the geological mapping of the poorly-exposed, potentially fossiliferous marine rock formations within the study area, as well as their actual palaeontological sensitivity on the ground, a Phase 1 pre-construction field assessment of the broader development area, including the final development footprint was carried out by a professional palaeontologist to identify possible zones or areas of high paleontological sensitivity.

<b>Project component/s</b>	» wind turbines » substation
<b>Potential Impact</b>	» Disturbance, damage, destruction or sealing-in of scientifically valuable fossil material embedded within bedrock or weathered-out at ground surface

<b>Activity/risk source</b>	» Extensive bedrock excavations and surface disturbance (e.g. road construction, excavations for wind turbine foundations, cables etc)
<b>Mitigation: Target/Objective</b>	» Recording, judicious sampling and curation of important fossil heritage within Tsitsikamma development area, both before and during construction, to be achieved before completion of construction phase

<b>Mitigation: Action/control</b>	<b>Responsibility</b>	<b>Timeframe</b>
Undertake a short workshop to train ECOs in recognition, recording and safeguarding of relevant fossil heritage	Tsitsikamma Community Wind Energy Facility (RF) (Pty) Ltd	Following field assessment, before and during construction

<b>Performance Indicator</b>	<ul style="list-style-type: none"> <li>» Training of ECOs</li> <li>» Cumulative acquisition of geographically and stratigraphically well-localised fossil records, samples and relevant geological data from successive subsections of the development area.</li> <li>» Submission of interim and final technical reports to SAHRA <u>or</u> ECPHRA</li> </ul>
<b>Monitoring</b>	<ul style="list-style-type: none"> <li>» Monitoring during construction phase of fresh bedrock exposures within development footprint by ECO and, if necessary, by professional palaeontologist</li> <li>» Realistic frequency, scale and protocol of monitoring to be determined by professional palaeontologist in conjunction with SAHRA and developer</li> <li>» Assessment of interim and final reports by SAHRA <u>or</u> ECPHRA.</li> </ul>



## **MANAGEMENT PLAN FOR WIND ENERGY FACILITY: CONSTRUCTION**

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## **CHAPTER 7**

### **7.1. Overall Goal for Construction**

The construction phase of the wind energy facility 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 energy facility 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, fauna and avifauna on the site as well as on any archaeological and historical value the site may have.

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

As the Proponent, Tsitsikamma Community Wind Energy Facility (RE) (Pty) Ltd must ensure that the implementation of the wind energy facility 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 EMP, and the implementation of the EMP through its integration into the contract documentation. Tsitsikamma Community Wind Energy Facility (RE) (Pty) Ltd will retain various key roles and responsibilities during the construction of the wind energy facility. These are outlined below.

**OBJECTIVE: To establish clear reporting, communication and responsibilities in relation to environmental incident**

Formal responsibilities are necessary to ensure that key procedures are executed. Specific responsibilities of the Project Manager; Site Manager; Environmental Control Officer and Contractor for the construction phase of this project are as detailed below.

The **Project Manager** will:

- » Ensure of 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 Tsitsikamma Community Wind Energy Facility (RE) (Pty) Ltd and its Contractor(s) are made aware of all stipulations within the EMP.

- » Ensure that the EMPr is correctly implemented throughout the project by means of site inspections and meetings. This will be documented as part of the site meeting minutes.
- » Be fully conversant with the Environmental Impact Assessment for the project, the EMP, the conditions of the Environmental Authorisation (once issued), and all relevant environmental legislation.

The **Site Manager** (Tsitsikamma Community Wind Energy Facility (RF) (Pty) Ltd's On-site Representative) will:

- » Be fully knowledgeable with the contents of the Environmental Impact 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 Programme.
- » Be fully knowledgeable with the contents of all relevant environmental legislation, and ensure compliance with these.
- » Be fully knowledgeable with the contents of all relevant licences and permits.
- » Have overall responsibility of the EMPr and its implementation.
- » Conduct audits to ensure compliance to the EMPr.
- » Ensure there is communication with the Project Manager, the Environmental Control Officer and relevant discipline Engineers on matters concerning the environment.
- » 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 in accordance with the IFC standards and Equator Principles.
- » Confine activities to the demarcated construction site.

An independent **Environmental Control Officer (ECO)** must be appointed by the project proponent prior to the commencement of any authorised activities. The ECO will be responsible for monitoring, reviewing and verifying compliance by the Contractor with the environmental specifications of the EMPr and the conditions of the Environmental Authorisation. The ECO will:

- » Be fully knowledgeable with the contents with the Environmental Impact Assessment.
- » Be fully knowledgeable with the contents with the conditions of the Environmental Authorisation (once issued).
- » Be fully knowledgeable with the contents with the Environmental Management Programme.
- » Be fully knowledgeable with the contents with all relevant environmental legislation, and ensure compliance with them.
- » Be fully knowledgeable of all the licences and permits issued to the site.
- » Be fully knowledgeable of the content of the water use licence and the authorisation granted from the department of forestry and fisheries.

- » Ensure that the contents of this document are communicated to the Contractor site staff and that the Site Manager and Contractor are constantly made aware of the contents through discussion.
- » Ensure that the compliance of the EMPr is monitored through regular and comprehensive inspection of the site and surrounding areas.
- » Ensure that if the EMPr conditions or specifications are not followed then appropriate measures are undertaken to address this.
- » 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 a removal is ordered of any person(s) and/or equipment responsible for any contravention of the specifications of the EMPr.
- » Ensure that the compilation of progress reports for submission to the Project Manager, with input from the Site Manager, takes place on a regular basis, including a final post-construction audit.
- » Ensure that there is communication with the Site Manager regarding the monitoring of the site.
- » Ensure that any non-compliance or remedial measures that need to be applied are reported.
- » Keep record of all activities on site, problems identified, transgressions noted and a task schedule of tasks undertaken by the ECO.
- » Independently report to DEA in terms of compliance with the specifications of the EMPr and conditions of the Environmental Authorisation (once issued).

As a general mitigation strategy, the Environmental Control Officer (ECO) should be present full-time on site to:

- » Facilitate environmental induction with construction staff, and the site preparation and initial clearing activities to ensure the correct demarcation of no-go areas,
- » 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).
- » Excavation, levelling and terracing for all infrastructure footprints (as indicated in the layout in Figure 2.1).
- » Monitoring of linear infrastructure construction activities (power line and access road).

Thereafter, monthly or bi-weekly site compliance inspections would probably be sufficient, reducing as construction proceeds, provided compliance is maintained. However, in the absence of the ECO there should be a designated environmental officer present to deal with any environmental issues that may arise such as fuel or oil spills.

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

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

- » 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 EMPr.
- » Ensuring that any instructions issued by the Site Manager on the advice of the ECO are adhered to.
- » 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 and the.
- » 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 EMPr (i.e. ensure their staff are appropriately trained as to the environmental obligations).

**Contractor's Environmental Officer (EO):** The Contractor's Environmental Officer (EO), employed by the Contractor, is responsible for managing the day-to-day on-site implementation of this EMPr, and for the compilation of regular (usually weekly) Monitoring Reports. In addition, the EO must act as 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 and Contractor.

The Contractor's Environmental Officer should:

- » Be well versed in environmental matters.
- » Understand the relevant environmental legislation and processes.
- » 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.

### 7.3. Objectives

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

#### OBJECTIVE: Securing the site and site establishment

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 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>» access roads</li> <li>» substation</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 adjacent sensitive vegetation</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 vehicles 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	Contractor	Erection: during site establishment Maintenance: for duration of Contract
Where necessary to control access, fence and secure area.	Contractor	Erection: during site establishment Maintenance: for duration of Contract

<b>Mitigation: Action/control</b>	<b>Responsibility</b>	<b>Timeframe</b>
Secure site, working areas and excavations in an appropriate manner, as agreed with the ECO.	Contractor	Erection: during site establishment Maintenance: for duration of Contract
All development footprints for roads, buildings, underground cables, laydown areas and turbine footings should be appropriately 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	Erection: during site establishment Maintenance: for duration of Contract
Minimise vegetation clearance or removal associated with site establishment activities. Trim trees under supervision, where possible. Compile a method statement referring to vegetation management.	Contractor	Erection: during Site establishment
Road borders must be regularly maintained to ensure that vegetation remains short to serve as an effective firebreak.	Contractor	Erection: during site establishment  Maintenance: duration of contract
Provide adequate sanitary facilities and ablutions for construction workers (1 toilet per every 15 workers) at appropriate locations on site.	Contractor	Erection: during site establishment  Maintenance: duration of contract
Ablution or sanitary facilities should not be located within 100 m from a 1:100 year flood line including water courses, wetlands or within a horizontal distance of less than 100 m, whichever is applicable	Contractor	During site establishment, construction, maintenance
Supply adequate, contained and accessible waste collection bins and skips at site where construction is being undertaken. 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. Remove stored domestic waste to the nearest registered solid waste disposal facility.	Contractor	Erection: during site establishment  Maintenance: duration of contract within a particular area

Mitigation: Action/control	Responsibility	Timeframe
Liquid waste: No liquid, including grey water, may be discharged into any water body or drainage line without purification with accordance to the Department of Water Affairs' (DWA) specifications and guidelines.	Contractor	Maintenance: duration of contract within a particular area
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.	Contractor	During and post construction.
Keep a record of all hazardous substances stored on site for submission to the ECO and follow the hazardous substance monitoring program. Clearly label all the containers storing hazardous waste.	Contractor	
An open space management method statement to be implemented during the construction of the facility.	Contractor	Pre-Construction

<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</li> </ul>
<b>Monitoring</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 will be used to record non-conformances to the EMP.</li> <li>» Public complaints register must be developed and maintained on site.</li> <li>» ECO to monitor all construction areas on a continuous basis until all construction is completed; immediate report backs to site manager.</li> <li>» ECO to address any infringements with responsible contractors as soon as these are recorded.</li> </ul>

### OBJECTIVE: Noise control

Construction noise as well as traffic movement to and from the wind energy facility site (particularly the use of heavy-duty vehicles) could potentially result in a noise impact on the residents near the proposed facility during construction. The significance of noise during the construction phase is considered to be low, yet mitigation measures are included in this report to allow the developer to further reduce the noise levels. Mitigation options included both management measures as well as technical changes.

<b>Project component/s</b>	List of project components affecting the objective: <ul style="list-style-type: none"> <li>» wind energy turbines</li> <li>» access roads</li> </ul>
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	» substation
<b>Potential Impact</b>	» Nuisance noise from construction activities affecting the surrounding community.
<b>Activity/risk source</b>	» Any construction activities taking place within 500 m from potentially sensitive receptors (PSR).
<b>Mitigation: Target/Objective</b>	» Ensure equivalent A-weighted noise levels below 45 dBA at potentially sensitive receptors. » Ensure that maximum noise levels at potentially sensitive receptors be less than 65 dBA. » Prevent the generation of a disturbing or nuisance noises. » Ensure acceptable noise levels at surrounding stakeholders and potentially sensitive receptors. » Ensuring compliance with the Noise Control Regulations.

<b>Mitigation: Action/control</b>	<b>Responsibility</b>	<b>Timeframe</b>
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 the all the surrounding (within a 1,000 distance) potentially sensitive receptors, these working hours can be extended.	Contractor	Construction
The construction crew must abide by the national standards and local by-laws regarding noise.	Contractor	Construction
All construction equipment, including vehicles, will be properly and appropriately maintained in order to minimise noise generation.	Contractor	Construction
Establish a line of communication and notify all stakeholders and sensitive receptors of the means of registering any issues, complaints or comments.	Environmental Control Officer	All phases of project
Notify potentially sensitive receptors about work to take place at least 2 days before the activity in the vicinity (within 500 m) of the PSR is to start. The following information to be presented in writing: » Description of Activity to take place » Estimated duration of activity » Working hours » Contact details of responsible party	Contractor, Environmental Control Officer	At least 2 days, but not more than 5 days before activity is to commence
Measure the peak noise levels of equipment used when operational and keep database of noise levels.	Acoustical Consultant / Approved Noise Inspection Authority	Start of project Quarterly during construction phase
If any noise complaints are received, noise monitoring should be conducted at the complainant, followed by feedback regarding noise levels measured	Acoustical Consultant / Approved Noise Inspection	Within 7 days after complaint was registered



Mitigation: Action/control	Responsibility	Timeframe
	Authority	

<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.</li> <li>» Ensure that maximum noise levels at potentially sensitive receptors are less than 65 dBA.</li> </ul>
<b>Monitoring</b>	<ul style="list-style-type: none"> <li>» Noise monitoring to be conducted downwind from all noisy activities or at sensitive receptors when work is taking place within 1,000 meters from a potentially sensitive receptor. Monitoring to take place every time that a noise complaint is registered.</li> <li>» An incident reporting system must be used to record non-conformances to the EMPr.</li> <li>» Public complaints register must be developed and maintained on site.</li> </ul>

### OBJECTIVE: Management of dust and emissions and damage to roads

During the construction phase, limited gaseous or particulate emissions 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>	Project components affecting the objective: <ul style="list-style-type: none"> <li>» wind energy turbines</li> <li>» access roads</li> <li>» substation</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> </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> </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> </ul>

Mitigation: Action/control	Responsibility	Timeframe
Implement appropriate dust suppression measures on site such as wetting roads on a regular basis.	Contractor	Construction
Haul vehicles moving outside the construction site carrying material that can be wind-blown should be covered with tarpaulins.	Contractor	Duration of contract
<u>Speed of construction vehicles must be restricted to low speeds on public and farm roads.</u>	Contractor/ transportation 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

Mitigation: Action/control	Responsibility	Timeframe
		phase
Vehicles and equipment must be maintained in a road-worthy condition at all times.	Contractor	Prior to construction phase
Ensure that damage to internal roads attributable to construction vehicles is repaired before completion of construction phase.	Contractor	Before completion of construction phase

<b>Performance Indicator</b>	<ul style="list-style-type: none"> <li>» Appropriate dust suppression measures implemented for all heavy vehicles that require such measures during the construction phase.</li> <li>» Drivers made aware of the potential safety issues and enforcement of strict speed limits when they are employed.</li> <li>» All heavy vehicles equipped with speed monitors before they are used in the construction phase.</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</b>	<ul style="list-style-type: none"> <li>» Tsitsikamma Community Wind Energy Facility (RE) (Pty) Ltd and appointed ECO must monitor indicators listed above to ensure that they have been met for the construction phase. Immediate reporting by personnel of any potential or actual issues with nuisance dust or emissions to the Site Manager.</li> <li>» An incident reporting system must be used to record non-conformances to the EMPr.</li> <li>» Public complaints register must be developed and maintained on site.</li> </ul>

### OBJECTIVE: Soil and rock degradation and erosion control, water quality management

The natural soil on the site needs to be preserved as far as possible in order 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.) will 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.

A set of strictly adhered to mitigation measures are required to be implemented in order to effectively limit the impact on the environment. The disturbance areas where human impact is likely are the focus of the mitigation measures laid out below.

<b>Project component/s</b>	<ul style="list-style-type: none"> <li>» wind energy turbines</li> <li>» access roads</li> <li>» substation</li> <li>» Sealed surfaces (e.g. roofs, concrete surfaces, compacted road surfaces, paved roads / areas)</li> <li>» All other infrastructure</li> </ul>
<b>Potential Impact</b>	<ul style="list-style-type: none"> <li>» Erosion and soil loss</li> <li>» Soil and rock removal</li> <li>» Soil mixing, wetting, stockpiling, compaction</li> <li>» Soil pollution</li> <li>» Accelerated soil erosion</li> <li>» Increased deposition of soil into drainage systems</li> <li>» Increased run-off over the site</li> <li>» Dust pollution</li> <li>» Negative impacts on wetlands</li> <li>» Disturbance to or loss of wetland/pan habitat</li> <li>» Sedimentation of watercourses/wetland areas</li> <li>» A loss of indigenous vegetation cover (Cape floristic kingdom)</li> <li>» Disturbance of fauna species (Yellow bellied house snake and the Fynbos Golden Mole)</li> <li>» Destruction of domestic animals.</li> <li>» Increased runoff into drainage lines can potentially be associated with accelerated erosion</li> </ul>
<b>Activities/risk sources</b>	<ul style="list-style-type: none"> <li>» Rainfall and wind erosion of disturbed areas</li> <li>» Excavation, stockpiling and compaction of soil</li> <li>» Concentrated discharge of water from construction activity</li> <li>» Stormwater run-off from sealed surfaces</li> <li>» Mobile construction equipment movement on site</li> <li>» River/stream/drainage line road crossings</li> <li>» Roadside drainage ditches</li> <li>» Project related infrastructure, such as buildings, turbines and fences</li> </ul>
<b>Mitigation: Target/Objective</b>	<ul style="list-style-type: none"> <li>» To minimise erosion of soil from site during construction</li> <li>» To minimise deposition of soil into drainage lines</li> <li>» To minimise damage to vegetation by erosion or deposition</li> <li>» To minimise damage to rock, soil, <u>animals</u> and vegetation by construction activity</li> <li>» No accelerated overland flow related surface erosion as a result of a loss of vegetation cover</li> <li>» No reduction in the surface area of wetlands (drainage lines and other wetland areas) as a result of the establishment of infrastructure</li> <li>» Minimal loss of vegetation cover due to construction related activities</li> <li>» No or insignificant loss of wetland area in the specialist study area</li> <li>» No increase in runoff into drainage lines as a result of construction of project related infrastructure</li> <li>» No increase in runoff into drainage lines as a result of road construction</li> </ul>

<b>Mitigation: Action/control</b>	<b>Responsibility</b>	<b>Timeframe</b>
Identify and demarcate construction areas for general construction work and restrict construction activity to these areas. Prevent unnecessary destructive activity within construction areas (prevent over-excavations and double handling)	ECO/Contractor	Before and during construction
Stockpile topsoil for re-use in rehabilitation phase. Maintain stockpile shape and protect from erosion as per the erosion management plan. All stockpiles must be positioned at least 50 m away from drainage lines and wetlands. Limit the height of stockpiles as far as possible in order to reduce compaction.	Contractor	During site establishment and any activity related to earthworks as well as the duration of construction
Stockpile of topsoil for re-use in rehabilitation phase should be managed. The stock pile must be protected in a manner to prevent erosion. Stockpiles of topsoil must to be landscaped to ensure that no topsoil is stored higher than 40-50 cm, then levelled to prevent damage by erosion whilst encouraging regrowth of indigenous vegetation. Such regrowth will not only stabilise the topsoil, but also prevent further degradation and limit the loss of soil seed banks. The stock pile must be checked regularly to ensure that no alien vegetation establishes on the pile.	Contractor and ECO	Before and during construction
All cable trenches, etc., through sensitive areas should be excavated carefully in order to minimise damage to surrounding areas. The trenches must be checked on a daily basis for the presence of trapped animals. Any animals found must be removed in a safe manner, unharmed and placed in an area where the animal will be comfortable. If the ECO is unable to assist in the movement of the endangered species ensure a member of nature conservation assists with the translocation.	Contractor / ECO	Duration of construction
Disturbance of vegetation and topsoil must be kept to a practical minimum.	Contractor	Duration of contract
No unauthorised off road driving will be allowed, to prevent sensitive vegetation being destroyed, unless authorised by the ECO.	Contractor	Duration of contract
New access roads to be carefully planned and constructed to minimise the impacted area and prevent unnecessary excavation, placement and compaction of soil. Special attention to be given to roads that cross drainage lines.	Engineer / ECO / Contractor	Before and during construction
Rehabilitate disturbance areas as soon as construction in an area is completed as per the rehabilitation plan.	Contractor	During and after construction
As far as possible, access to the wind energy facility construction site should be restricted to a single access	Contractor	Duration of contract

<b>Mitigation: Action/control</b>	<b>Responsibility</b>	<b>Timeframe</b>
point.		
Internal access roads should be kept to a minimum.	Contractor / ECO	During site establishment
Erosion control measures: Run-off control and attenuation on slopes (sand bags, logs), silt fences, stormwater channels and catch-pits, shade nets, soil binding, geofabrics, hydroseeding or mulching over cleared areas, in accordance with the erosion management plan (refer to Appendix G).	Engineer / ECO / Contractor	Before construction and
Control depth of excavations and stability of cut faces/sidewalls.	Engineer / ECO / Contractor	maintenance over duration of contract
Compile a comprehensive stormwater management plan (refer to Appendix F) as part of the final design of the project and implement during construction and operation.	Construction team, management, environmental control officer	Construction & operation
Where access roads cross natural drainage lines or wetlands, culverts (or other appropriate measures) must be designed to allow free flow. Regular maintenance must be carried out.	Construction team, management, environmental control officer	Construction & operation
All vehicles on site must be appropriate to access the site. No off road driving is permitted unless authorised by the ECO.	Construction team, management, environmental control officer	Pre-construction, Construction & operation
4x4s or diff lock vehicles must be used in wet or steep conditions to reduce the erosion on the roads and the surrounding area.	Construction team, management, environmental control officer	Pre-construction

<b>Performance Indicator</b>	<ul style="list-style-type: none"> <li>» No activity in identified no-go areas</li> <li>» Acceptable level of activity within disturbance areas, as determined by ECO</li> <li>» Acceptable level of soil erosion around site, as determined by ECO</li> <li>» Acceptable level of increased siltation in drainage lines, as determined by ECO</li> <li>» Acceptable level of soil degradation, as determined by ECO</li> <li>» Acceptable state of excavations, as determined by EO &amp; ECO</li> </ul>
<b>Monitoring</b>	<ul style="list-style-type: none"> <li>» Fortnightly inspections of the site by ECO</li> <li>» Fortnightly inspections of sediment control devices by ECO</li> <li>» Fortnightly inspections of surroundings, including drainage lines by ECO</li> </ul>

	<ul style="list-style-type: none"> <li>» Immediate reporting of ineffective sediment control systems</li> <li>» An incident reporting system must record non-conformances to the EMPr.</li> <li>» Public complaints register must be developed and maintained on site.</li> </ul>
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**OBJECTIVE: Minimisation of development footprint**

In order to minimise impacts on flora, fauna and ecological processes, the development footprint should be limited.

<b>Project component/s</b>	List of project components affecting the objective: <ul style="list-style-type: none"> <li>» wind energy turbines</li> <li>» access roads</li> <li>» substation</li> </ul>
<b>Potential Impact</b>	<ul style="list-style-type: none"> <li>» Impacts on natural vegetation and habitats</li> <li>» Impacts on soil</li> <li>» Loss of topsoil</li> </ul>
<b>Activity/risk source</b>	<ul style="list-style-type: none"> <li>» Site preparation and earthworks</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 and site office/visitors centre (e.g. compaction)</li> <li>» Foundations or plant equipment installation</li> <li>» Track for crane movement on-site</li> <li>» Substation construction activities</li> <li>» Stockpiling of topsoil, subsoil and spoil material</li> </ul>
<b>Mitigation: Target/Objective</b>	<ul style="list-style-type: none"> <li>» To minimise footprints of disturbance of vegetation/habitats on-site</li> <li>» Remove and store all topsoil on areas that are to be excavated; and use this topsoil in subsequent rehabilitation of disturbed areas.</li> <li>» Fill material is to be sourced from tower base excavations; spoil material to be minimised.</li> </ul>

Mitigation: Action/control	Responsibility	Timeframe
Construction activities must be restricted to demarcated areas so that impact on flora and fauna is restricted.	Contractor	Site establishment & duration of contract
No activity is permitted in identified no go areas (refer to Figure 2.1).	Contractor	Site establishment & duration of contract
Rehabilitate any disturbed areas immediately after construction in that area is complete in order to	Construction team, management,	Construction & operation

Mitigation: Action/control	Responsibility	Timeframe
stabilise landscapes.	environmental control officer	

<b>Performance Indicator</b>	<ul style="list-style-type: none"> <li>» Zero disturbance outside of designated work areas</li> <li>» Minimise loss of topsoil</li> <li>» Minimise clearing of existing natural vegetation</li> </ul>
<b>Monitoring</b>	<ul style="list-style-type: none"> <li>» Observation of vegetation clearing and soil management activities by ECO throughout construction phase.</li> <li>» Supervision of all clearing and earthworks.</li> <li>» An incident reporting system must be used to record non-conformances to the EMPr.</li> <li>» Public complaints register must be developed and maintained on site.</li> </ul>

### OBJECTIVE: Limit Damage to wetland areas and drainage lines

Construction within wetlands and drainage lines must be minimised as far as possible. Where impacts are unavoidable, mitigation measures are required to minimise impacts on these systems.

<b>Project component/s</b>	<ul style="list-style-type: none"> <li>» wind energy turbines</li> <li>» access roads and cabling</li> <li>» associated access road</li> </ul>
<b>Potential Impact</b>	» Damage to wetland areas by any means that will result in hydrological changes (includes erosion, siltation, dust, direct removal of soil of vegetation, dumping of material within wetlands). The focus should be on the functioning of the wetland as a natural system.
<b>Activity/risk source</b>	<ul style="list-style-type: none"> <li>» Construction and operation of facility</li> <li>» Construction of access roads</li> </ul>
<b>Mitigation: Target/Objective</b>	» No damage to drainage lines or wetlands within project area

Mitigation: Action/control	Responsibility	Timeframe
Align underground cables and internal access roads as far as possible along existing infrastructure & disturbances.	Tsitsikamma Community Wind Energy Facility (RF) (Pty) Ltd, Construction team, ECO	Construction & Operation
Rehabilitate any disturbed areas as soon as possible once construction is completed in an area.	Tsitsikamma Community Wind Energy Facility (RF) (Pty) Ltd,	Construction & Operation

Mitigation: Action/control	Responsibility	Timeframe
	Construction team, ECO	
For any new construction where direct impacts on wetlands are unavoidable, cross watercourses perpendicularly to minimise disturbance footprints.	Tsitsikamma Community Wind Energy Facility (RF) (Pty) Ltd, Construction team, ECO	
Construction must not cause the width of the watercourse to be narrowed.	Tsitsikamma Community Wind Energy Facility (RF) (Pty) Ltd, Construction team, ECO	Construction & Operation
Control stormwater and runoff water through the implementation of a stormwater management plan (refer to Appendix F) for the site.	Tsitsikamma Community Wind Energy Facility (RF) (Pty) Ltd, Construction team, ECO	Construction & Operation

<b>Performance Indicator</b>	» No impacts on water quality, water quantity, wetland vegetation, natural status of wetland
<b>Monitoring</b>	<ul style="list-style-type: none"> <li>» Habitat loss in watercourses should be monitored before and after construction.</li> <li>» The presence and development of erosion features downstream of any construction through wetlands must be monitored.</li> <li>» The ECO should be responsible for driving this process.</li> <li>» An incident reporting system must be used to record non-conformances to the EMPr.</li> <li>» Public complaints register must be developed and maintained on site.</li> </ul>

### OBJECTIVE: Protection of indigenous vegetation and control of alien invasive plants

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. There are a number of different alien plant species that could become established on site. A checklist of species previously recorded in the grid in which the site is located indicates that the following species are likely to invade the site, given the right conditions: *Acacia cyclops*, *Acacia saligna*, *Acacia mearnsii*, *Datura stramonium*, *Hakea sericea* and *Pinus pinaster*. The black wattle (*Acacia mearnsii*) is currently the most problematic invader on site, but *Pinus pinaster* also occurs in significant numbers. The potential therefore exists for



extensive and diverse invasion of the site. The habitats most likely to be affected are watercourses, strandveld and fynbos.

<b>Project component/s</b>	List of project components affecting the objective: » wind energy turbines and associated laydown area » access roads and cabling » temporary laydown areas » substation
<b>Potential Impact</b>	» Loss of vegetation of conservation concern » Spread of alien species
<b>Activity/risk source</b>	» Site preparation and earthworks » Construction-related traffic » Foundations » Mobile construction equipment » Dumping or damage by construction equipment outside of demarcated construction areas
<b>Mitigation: Target/Objective</b>	» To retain natural vegetation in the highly sensitive areas of the site » To minimise footprints of disturbance of vegetation/habitats on-site » No alien plants within project control area » No loss of species of conservation concern

<b>Mitigation: Action/control</b>	<b>Responsibility</b>	<b>Timeframe</b>
Unnecessary impacts on surrounding natural vegetation must be avoided, e.g. driving around in the veld. The construction impacts must be contained to the footprint of the infrastructure.	Construction team, management (ECO)	Construction
Avoid creating conditions in which alien plants may become established: » Keep disturbance of indigenous vegetation to a minimum » Rehabilitate disturbed areas as quickly as possible once construction is complete in an area » Do not import soil from areas with alien plants	Construction team, management (environmental officer)	Construction & Operation
Establish an ongoing monitoring programme to detect and quantify any alien species that may become established and identify the problem species (as per Conservation of Agricultural Resources Act, Act 43 of 1983) and the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004).	Construction team, management (environmental officer)	Construction & Operation
Immediately control any alien plants that become established using registered control methods.	Construction team, management (environmental officer)	Construction & Operation
Internal access roads and underground cables should be aligned as far as possible along existing linear disturbances, e.g. roads on site and away from steep	Construction team, management (ECO)	Construction / design

Mitigation: Action/control	Responsibility	Timeframe
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.		
Unnecessary impacts on surrounding natural vegetation must be avoided.	Construction team, management (ECO)	Construction
A site rehabilitation programme should be compiled and implemented.	Contractor in consultation with Specialist	Duration of contract

<b>Performance Indicator</b>	<ul style="list-style-type: none"> <li>» Zero disturbance outside of designated work areas.</li> <li>» Minimised clearing of existing/natural vegetation.</li> <li>» No loss of natural vegetation within "no-go" areas. Loss of other natural vegetation only within designated footprint of infrastructure.</li> <li>» No significant fragmentation of untransformed areas of natural vegetation.</li> <li>» No alien infestation within project control area.</li> </ul>
<b>Monitoring</b>	<ul style="list-style-type: none"> <li>» Observation of vegetation clearing activities by ECO throughout construction phase.</li> <li>» Supervision of all clearing and earthworks.</li> <li>» Monitoring of alien plant establishment within the project control area on an on-going basis.</li> <li>» Annual audit of project area and immediate surroundings by qualified botanist. If no species are detected, then this can be stated. If any alien invasive species are detected then the distribution of these should be mapped (GPS co-ordinates of plants or concentrations of plants), number of individuals (whole site or per unit area), age and/or size classes of plants and aerial cover of plants. The results should be interpreted in terms of the risk posed to sensitive habitats within and surrounding the project area. The environmental manager should be responsible for driving this process. Reporting frequency depends on legal compliance framework.</li> <li>» An incident reporting system must be used to record non-conformances to the EMP.</li> <li>» Public complaints register must be developed and maintained on site.</li> </ul>

## OBJECTIVE: Protection of fauna & avifauna

Infrastructure associated with the facility often impacts on birds and animals. Furthermore, the construction and maintenance of the power line linking the facility to the electricity grid will result in some disturbance and habitat destruction. New roads constructed will also have a disturbance and habitat destruction impact.

<b>Project component/s</b>	List of project components affecting the objective: » wind energy turbines and associated laydown areas » access roads and cabling » temporary laydown areas » substation
<b>Potential Impact</b>	» Vegetation clearance and associated impacts on faunal habitats » Disturbance of birds
<b>Activity/risk source</b>	» Site preparation and earthworks » Construction-related traffic » Foundations or plant equipment installation » Mobile construction equipment
<b>Mitigation: Target/Objective</b>	» To minimise footprints of habitat destruction » To minimise disturbance to resident and visitor faunal and avifaunal species

<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 or disturbance.	Contractor in consultation with Specialist	Pre-construction
Ensure principals and mitigations measures contained within the construction EMPr are applied	Relevant Environmental Control Officer	During 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
A site rehabilitation programme should be compiled and implemented.	Contractor in consultation with Specialist	Duration of contract

<b>Performance Indicator</b>	» Zero disturbance outside of designated work areas » Minimised clearing of existing/natural vegetation and habitats for fauna and avifauna » Limited impacts on faunal species (i.e. noted/recorded fatalities), especially those of conservation concern.
<b>Monitoring</b>	» Observation of vegetation clearing activities by ECO throughout construction phase » Supervision of all clearing and earthworks by ECO » An incident reporting system must be used to record non-conformances to the EMPr. » Public complaints register must be developed and maintained on site.

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

The main cause of impacts to archaeological sites is physical disturbance of the material itself and its context. The heritage and scientific potential of an archaeological site is highly dependent on its geological and spatial context. This means that even though, for example a deep excavation may expose archaeological artefacts, the artefacts are relatively meaningless once removed from the area in which they were found. Large-scale excavations for foundations will damage archaeological sites, as will road construction activities.

Providing that the recommended mitigation measures with regard to fossils are carried through, it is likely that the potentially negative impacts of the proposed development on local fossil resources will be substantially reduced and, furthermore, they will partially offset by the positive impact represented by increased understanding of the paleontological heritage of the Humansdorp region.

<b>Project component/s</b>	List of project components affecting the objective: » wind energy turbines » access roads and cabling » substation
<b>Potential Impact</b>	» Heritage objects or artefacts found on site are inappropriately managed or destroyed » Loss of fossil resources
<b>Activity/risk source</b>	» Site preparation and earthworks » Foundations or plant equipment installation » Mobile construction equipment movement on site » Substation construction facilities
<b>Mitigation: Target/Objective</b>	» To ensure that any heritage objects found on site are treated appropriately and in accordance with the relevant legislation

<b>Mitigation: Action/control</b>	<b>Responsibility</b>	<b>Timeframe</b>
Construction managers/foremen should be informed before construction starts on the possible types of heritage sites and cultural material they may encounter and the procedures to follow when they find sites.	Tsitsikamma Community Wind Energy Facility (RF) (Pty) Ltd	Pre-construction
<u>If any concentrations of archaeological material are uncovered during development, work within the affected area must immediately cease and be reported to the nearest archaeologist, the Eastern Cape Provincial Heritage Resources Agency and/or the South African Heritage Resources Agency.</u>	Tsitsikamma Community Wind Energy Facility (RF) (Pty) Ltd /Contractor in consultation with Specialist	Duration of contract
If at any stage during the construction phase any	Tsitsikamma	Duration of

Mitigation: Action/control	Responsibility	Timeframe
semblance of a fossil were to be observed, it would be vital to recover the fossil and report the occurrence to the geological staff at either the Albany Museum or Rhodes University in Grahamstown.	Community Wind Energy Facility (RF) (Pty) Ltd	contract

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

#### OBJECTIVE: Minimisation of visual impacts associated with construction

During construction 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>	List of project components affecting the objective: <ul style="list-style-type: none"> <li>» Construction site</li> <li>» access roads</li> </ul>
<b>Potential Impact</b>	<ul style="list-style-type: none"> <li>» The potential scarring of the landscape due to the creation of new access roads/tracks or the unnecessary removal of vegetation.</li> <li>» Construction traffic.</li> </ul>
<b>Activity/risk source</b>	<ul style="list-style-type: none"> <li>» The viewing of visual scarring by observers in the vicinity of the facility or from the roads traversing the site.</li> </ul>
<b>Mitigation: Target/Objective</b>	<ul style="list-style-type: none"> <li>» Minimal disturbance to vegetation cover in close vicinity to the proposed facility and its related infrastructure.</li> <li>» Minimised construction traffic, where possible.</li> </ul>

Mitigation: Action/control	Responsibility	Timeframe
Implement an environmentally responsive planning approach to roads and infrastructure to limit cut and fill requirements. Plan with due cognisance of the topography.	Tsitsikamma Community Wind Energy Facility (RF) (Pty) Ltd / design consultant	Planning & Construction
The activities and movement of construction workers and construction site vehicles must be restricted to the immediate construction site.	Contractor	Construction

Mitigation: Action/control	Responsibility	Timeframe
The general appearance of construction activities, construction equipment camps and lay-down areas must be maintained by means of the timely removal of rubble and disused construction materials.	Contractor	Construction
Adopt responsible construction practices aimed at containing the construction activities to specifically demarcated areas thereby limiting the removal of natural vegetation to the minimum.	Contractor	Construction
Use of proper topsoil removal and storage techniques when installing infrastructure. Implementation of controlled trenching procedures and insertion of correct erosion control measures.	Contractor/ Tsitsikamma Community Wind Energy Facility (RF) (Pty) Ltd	Construction
The turbines must be painted a pale, matt, non-reflective colour (i.e. off white, as specified by the CAA requirements) before erection of the turbines.	Contractor	Erection of turbines
Limit access to the construction sites (during both construction and operational phases) along existing access roads.	Contractor	Duration of contract
Where disturbance is unavoidable, disturbed areas should be rehabilitated as soon as possible after construction is completed in an area. Prior to construction, the footprint of each turbine must be searched for populations of potentially affected plant species of concern.	Contractor/ Tsitsikamma Community Wind Energy Facility (RF) (Pty) Ltd	Construction

<b>Performance Indicator</b>	» Site appropriately rehabilitated after construction is complete.
<b>Monitoring</b>	<ul style="list-style-type: none"> <li>» Monitoring of vegetation clearing during the construction phase.</li> <li>» Monitoring of rehabilitation activities to ensure appropriate rehabilitation of the site.</li> <li>» An incident reporting system must be used to record non-conformances to the EMPr.</li> <li>» Public complaints register must be developed and maintained on site.</li> </ul>

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

The construction phase of the wind energy facility 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 facility will include general solid waste, hazardous waste and liquid waste. A guideline for integrated management of construction waste is included as Appendix B of this EMPr.

<b>Project component/s</b>	<ul style="list-style-type: none"> <li>» wind energy turbines</li> <li>» substation</li> </ul>
<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</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>» Substation construction activities</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>	<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 legislation</li> <li>» To minimise production of waste</li> <li>» To ensure appropriate waste storage and disposal</li> <li>» To avoid environmental harm from waste disposal</li> </ul>

<b>Mitigation: Action/control</b>	<b>Responsibility</b>	<b>Timeframe</b>
The storage of flammable and combustible liquids such as oils must be in designated areas which are appropriately bunded, and stored in compliance with MSDS files, as defined by the SHE Representative / ECO.	Contractor	Duration of contract
Any spills must receive the necessary clean-up action. Bioremediation kits are to 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).	Contractor	Duration of contract
Any storage and disposal permits/approvals which may be required will be obtained, and the conditions attached to such permits and approvals must be complied with.	Contractor	Duration of contract
Routine servicing and maintenance of vehicles is not to take place on-site (except for emergency situations or large cranes which cannot be moved off-site). If repairs of vehicles must take place on site, an appropriate drip tray must be used to contain any fuel or oils.	Contractor	Duration of contract
Transport of all hazardous substances must be in accordance with the relevant legislation and	Contractor	Duration of contract

<b>Mitigation: Action/control</b>	<b>Responsibility</b>	<b>Timeframe</b>
regulations.		
Waste disposal records must be available for review at any time.	Contractor	Duration of contract
Construction contractors must provide specific detailed waste management plans to deal with all waste streams.	Contractor	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	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.).	Contractor	Duration of contract
Disposal of waste must be in accordance with relevant legislative requirements, including the use of licensed contractors.	Contractor	Duration of contract
Hydrocarbon waste must be contained and stored in sealed containers within an appropriately bunded area.	Contractor	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	Duration of contract
Documentation (waste manifest) must be maintained detailing the quantity, nature and fate of any hazardous waste.	Contractor	Duration of contract
An incident/complaints register must be established and maintained on-site.	Contractor	Duration of contract
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.	Contractors	Erection: during site establishment Maintenance: 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.	Contractors	Erection: during site establishment Maintenance: for duration of Contract within



Mitigation: Action/control	Responsibility	Timeframe
		a particular area
Supply waste collection bins at construction equipment and construction crew camps.	Contractors	Erection: during site establishment Maintenance: for duration of Contract within a particular area
Construction equipment must be refuelled within designated refuelling locations, or where remote refuelling is required, appropriate drip trays must be utilised.	Contractor	Duration of contract
All stored fuels to be maintained within a bund and on a sealed surface.	Contractor	Duration of contract
Fuel storage areas must be inspected regularly to ensure bund stability, integrity and function.	Contractor	Duration of contract
Construction machinery must be stored in an appropriately sealed area.	Contractor	Duration of contract
Oily water from bunds at the substation must be removed from site by licensed contractors.	Contractor	Duration of contract
Spilled cement or concrete must be cleaned up as soon as possible and disposed of at a suitably licensed waste disposal site.	Contractor	Duration of contract
Corrective action must be undertaken immediately if a complaint is received, 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.	Contractor	Duration of contract
<u>In the event of a major spill or leak of contaminants, the area must be demarcated/ and isolated and the relevant administering authority must be immediately notified as per the notification of emergencies/ incidents.</u>	Contractor	Duration of contract
Any contaminated/polluted soil removed from the site must be disposed of at a licensed hazardous waste disposal facility.	Contractor	Duration of contract
Upon the completion of construction, the area will be cleared of potentially polluting materials.	Contractor	Completion of construction

**Performance Indicator**

- » No chemical spills outside of designated storage areas
- » No water or soil contamination by chemical spills
- » No complaints received regarding waste on site or indiscriminate

	<p>dumping</p> <ul style="list-style-type: none"> <li>» Internal site audits ensuring that waste segregation, recycling and reuse is occurring appropriately</li> <li>» Provision of all appropriate waste manifests for all waste streams</li> <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> </ul>
<b>Monitoring</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 will 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>» An incident reporting system must be used to record non-conformances to the EMPr.</li> <li>» Tsitsikamma Community Wind Energy Facility (RF) (Pty) Ltd or appointed ECO must monitor indicators listed above to ensure that they have been met for the construction phase.</li> <li>» Public complaints register must be developed and maintained on site.</li> </ul>

**OBJECTIVE: Avoidance of veld fires**

<b>Mitigation: Action/control</b>	<b>Responsibility</b>	<b>Timeframe</b>
Ensure that <u>smoking and</u> open fires on the site for cooking or heating are not allowed except in designated areas.	Contractor / ECO	Construction phase  Ensure that designated areas for fires are identified on site at the outset of the construction phase.
Provide adequate fire fighting equipment onsite.	<u>Contractor</u>	Ensure that fire fighting equipment is provided before the construction

Mitigation: Action/control	Responsibility	Timeframe
		phase commences.
Provide fire-fighting training to selected construction staff.	<u>Contractor</u>	Ensure that fire fighting training is provided before the construction phase commences.

**OBJECTIVE: 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 (once issued), the EIA Report and this EMPr, as well as the requirements of all relevant environmental legislation.

<b>Project component/s</b>	» Wind energy facility and associated infrastructure
<b>Potential Impact</b>	» Pollution/contamination of the environment » Disturbance to the environment and surrounding communities
<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
This EMPr and the Environmental Authorisation must be included in all tender documentation and Contractors contracts.	Tsitsikamma Community Wind Energy Facility (RF) (Pty) Ltd	Tender process
An ECO must be permanently on site throughout the road construction, cable laying, and turbine foundation excavation periods, and at other times should visit the site at least once a week.	Tsitsikamma Community Wind Energy Facility (RF) (Pty) Ltd	Duration of construction
Contractors must use chemical toilets/ablution facilities situated at designated areas of the site (1 toilet per 15 people); no abluting must be permitted outside the designated area. These facilities must be regularly serviced by appropriate contractors. The	Contractor (and sub-contractor/s)	Duration of contract

Mitigation: Action/control	Responsibility	Timeframe
removal of the sewage from the toilets must be conducted in a way to avoid any spills from occurring and the sewage must be transported to a registered facility. These facilities must not be located within 100m from any river, wetland or drainage line		
Cooking 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
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, will disturb flora or fauna outside of the demarcated construction area/s.	Contractor (and sub-contractor/s)	Duration of contract

<b>Performance Indicator</b>	<ul style="list-style-type: none"> <li>» Compliance with specified conditions of Environmental Authorisation, EIA report and EMPr.</li> <li>» No complaints regarding contractor behaviour or habits</li> <li>» Code of Conduct drafted before commencement of construction phase &amp; briefing session with construction workers held at outset of construction phase</li> </ul>
<b>Monitoring</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.</li> <li>» An incident reporting system must be used to record non-conformances to the EMPr.</li> </ul>

#### 7.4. Detailing Method Statements

**OBJECTIVE: Ensure all construction activities are undertaken with the appropriate level of environmental awareness to minimise environmental risk**

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, and how specifications within this EMPr will be met. That is, the Contractor will be required to describe how specified requirements will be achieved through the submission of written Method Statements to the Site Manager 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 Site Manager, setting out the plant, materials, labour and method the Contractor proposes using to conduct an activity, in such detail that the Site Manager 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:

- » 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.

Specific areas to be addressed in the method statement: pre, during and post construction include:

- » Site establishment (which explains all activities from induction training to offloading, construction sequence for site establishment and the different amenities and 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.
- » 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.
- » 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 wetlands or natural watercourses.
- » Dust and noise pollution
  - \* Describe necessary measures to ensure that noise from construction activities is maintained within lawfully acceptable levels (construction activities generating output levels of 85 dB(A) near human settlement, are to be confined to working hours (08h00 - 17h00) Mondays to Fridays).
  - \* 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, cement, 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, (ie: 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 (ie 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 approved by the Site Manager, except in the case of emergency activities and then only with the consent of the Site Manager. Approval 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 approved. The ECO should monitor the construction activities to ensure that these are undertaken in accordance with the approved Method Statement.

## 7.5. Awareness and Competence: Construction Phase of the Wind Energy Facility

**OBJECTIVE: 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:

- » Employees must have a basic understanding of the key environmental features of the construction site and the surrounding environment.
- » 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.
- » Employees 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 course.
- » The course should be sufficient to provide the site staff with an appreciation of the project's environmental requirements, and how they are to be implemented.
- » 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.

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. This training and awareness will be achieved in the following ways:

#### **7.5.1 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.

#### **7.5.2 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 site.

This induction training should include discussing the developer'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 repercussions of not complying with these. 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 SHE Officer on site.

#### **7.5.3 Toolbox Talks**

Toolbox talks should be held on a scheduled and regular basis (at least twice a month) 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.



## 7.6. Monitoring Programme: Construction Phase of the Wind Energy Facility

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

A monitoring programme should be in place not only to ensure conformance with the EMPr, but also to monitor any environmental issues and impacts which have not been accounted for in the EMPr that are, or could result in significant environmental impacts for which corrective action is required. The period and frequency of monitoring will most likely be stipulated by the Environmental Authorisation. Where this is not clearly dictated, Tsitsikamma Community Wind Energy Facility (RF) (Pty) Ltd will determine and stipulate the period and frequency of monitoring required in consultation with relevant stakeholders and authorities. The Project 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
- » Aid communication and feedback to authorities and stakeholders.

The independent Environmental Control Officer (ECO) will ensure compliance with the environmental authorisation (EA), EMPr, relevant permits and licences and the environmental legislation during construction, and will conduct monitoring activities on a regular basis. An independent ECO must be appointed, and must 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.

### 7.6.1. Non-Conformance Reports

All supervisory staff including Foremen, Resident Engineers, and the ECO 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.

### ***7.6.2. Monitoring Reports***

A monitoring report will be compiled by the ECO on a monthly basis and must be submitted to DEA for their records. 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.

### ***7.6.3. Final Audit Report***

A final environmental audit report must be compiled by an independent auditor and be submitted to DEA upon completion of the construction and rehabilitation activities (within 30 days of completion of the construction phase (i.e. within 30 days of site handover) and within 30 days of completion of rehabilitation activities). This report must indicate the date of the audit, the name of the auditor and the outcome of the audit in terms of compliance with the environmental authorisation conditions and the requirements of the EMPr. Further details of the audit report are contained in Condition 29 – 30.9 of the Environmental Authorisation (March 2012).

**MANAGEMENT PLAN FOR WIND ENERGY FACILITY:  
 REHABILITATION OF DISTURBED AREAS**

**CHAPTER 8**

**8.1. 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

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

**OBJECTIVE: To ensure rehabilitation of disturbed areas**

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>	List of project components affecting the objective: <ul style="list-style-type: none"> <li>» wind energy facility (including temporary access roads and laydown areas)</li> <li>» substation</li> <li>» temporary laydown areas</li> </ul>
<b>Potential Impact</b>	» Environmental integrity of site undermined resulting in reduced visual aesthetics, erosion, compromised land capability and the requirement for on-going management intervention
<b>Activity/risk source</b>	<ul style="list-style-type: none"> <li>» Temporary laydown areas</li> <li>» Temporary access roads/tracks</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</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>

<b>Mitigation: Action/control</b>	<b>Responsibility</b>	<b>Timeframe</b>
All temporary facilities, equipment and waste materials must be removed from site and appropriately disposed of.	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

Mitigation: Action/control	Responsibility	Timeframe
		activities in an area
Necessary drainage works and anti-erosion measures must be installed, where required, to minimise loss of topsoil and control erosion (see erosion management plan, appendix G).	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 per the re-vegetation and rehabilitation management plan, appendix E.</u>	Contractor in consultation with rehabilitation specialist	Following completion of construction activities in an area
Re-vegetated areas may have to be protected from wind erosion and maintained until an acceptable plant cover has been achieved.	<u>Contractor</u> in consultation with rehabilitation specialist	Post-rehabilitation
<u>On-going alien plant monitoring and removal within the disturbed project footprint (where the initial clearing for construction took place) must be undertaken on all areas of natural vegetation on an annual basis.</u>	Contractor in consultation with rehabilitation specialist	Post-rehabilitation

Performance Indicator	<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 plant cover achieved on rehabilitated sites</li> <li>» Closed site free of erosion and alien invasive plants</li> </ul>
Monitoring	<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>» An incident reporting system must be used to record non-conformances to the EMPr.</li> </ul>

## MANAGEMENT PLAN FOR WIND ENERGY FACILITY: OPERATION

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## CHAPTER 9

An environmental manager should be appointed during operation whose duty it will be to minimise impacts on surrounding sensitive habitats, including wetlands. In addition, it is important to monitor the incidence of bird and bat collisions with the wind turbines. Should any significant impacts of the facility on priority bird populations be detected by the monitoring programme, mitigation could be required to be investigated for those selected problem turbines.

### 9.1. Overall Goal for Operation

**Overall Goal for Operation:** To ensure that the operation of the wind energy facility does not have unforeseen impacts on the environment and to ensure that all 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 energy facility 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.

### 9.2. Objectives

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

**OBJECTIVE: To establish clear reporting, communication and responsibilities in relation to environmental incident**

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

The **Power Station Manager** will:

- » 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** will:

- » 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 in accordance with the Equator Principles.
- » Maintain a register of all known environmental impacts and manage the monitoring thereof.
- » Conduct internal environmental audits and co-ordinate external environmental audits.
- » 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.
- » Liaise with interested and affected parties on environmental issues of common concern.
- » Track and control the lodging of any complaints regarding environmental matters.

**OBJECTIVE: Securing the site**

Safety issues may arise with public access to wind turbines (e.g. unauthorised climbing of the turbine) or to the wind farm substation. 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 turbines</li> <li>» access roads</li> <li>» substation</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</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.	Tsitsikamma Community Wind Energy Facility (RF) (Pty) Ltd	Operation

Mitigation: Action/control	Responsibility	Timeframe
Post information boards about public safety hazards and emergency contact information	Tsitsikamma Community Wind Energy Facility (RF) (Pty) Ltd	Operation

<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</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 must be used to record non-conformances to the EMPr.</li> <li>» Public complaints register must be developed and maintained on site.</li> </ul>

**OBJECTIVE: Protection of indigenous natural vegetation, fauna and maintenance of rehabilitation**

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>» Areas requiring regular maintenance.</li> <li>» Route of the security team.</li> <li>» Areas disturbed during the construction phase and subsequently rehabilitated at its completion</li> </ul>
<b>Potential Impact</b>	<ul style="list-style-type: none"> <li>» Disturbance to or loss of vegetation and/or habitat.</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> </ul>
<b>Mitigation: Target/Objective</b>	<ul style="list-style-type: none"> <li>» Maintain minimised footprints of disturbance of vegetation/habitats on-site.</li> <li>» Ensure and encourage plant regrowth in non-operational areas of post-construction rehabilitation.</li> </ul>

Mitigation: Action/Control	Responsibility	Timeframe
Vehicle movements must be restricted to designated roadways.	Tsitsikamma Community Wind Energy Facility (RF)	Operation

Mitigation: Action/Control	Responsibility	Timeframe
	(Pty) Ltd	
Existing roads must be maintained to ensure limited erosion and impact on areas adjacent to roadways.	Tsitsikamma Community Energy Facility (Pty) Ltd Wind Facility (RF)	Operation
An on-going alien plant monitoring and eradication programme must be implemented, where necessary.	Tsitsikamma Community Energy Facility (Pty) Ltd Wind Facility (RF)	Operation
A botanist familiar with the vegetation of the area should monitor the rehabilitation success and alien plant removal on an annual basis.	Tsitsikamma Community Energy Facility (Pty) Ltd /Specialist Wind Facility (RF)	Annual monitoring until successful re-establishment of vegetation in an area

<b>Performance Indicator</b>	<ul style="list-style-type: none"> <li>» No further disturbance to vegetation or terrestrial faunal habitats.</li> <li>» Continued improvement of rehabilitation efforts.</li> </ul>
<b>Monitoring</b>	<ul style="list-style-type: none"> <li>» Observation of vegetation on-site by environmental manager.</li> <li>» Regular inspections to monitor plant regrowth/performance of rehabilitation efforts and weed infestation compared to natural/undisturbed areas.</li> </ul>

**OBJECTIVE: Protection of birds and bats and determination of the impact of the operating facility on priority bat and bird species**

During operation of the facility, the threat of collision of avifauna with the turbine blades is the most concerning issue. However, the real extent of this threat is not currently well understood within the South African context due to the limited numbers of turbines in South Africa with which bird and bat interactions have been monitored. 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 often also impacts on birds. A monitoring programme should be implemented to document the effect on birds (Appendix L). This may also need to be implemented for bats if the pre-construction monitoring identified the need (Appendix K).

<b>Project component/s</b>	List of project components affecting the objective: <ul style="list-style-type: none"> <li>» wind energy facility (turbines)</li> <li>» substation</li> </ul>
<b>Potential Impact</b>	<ul style="list-style-type: none"> <li>» Disturbance to or loss of birds and bats as a result of collision with the turbine blades</li> </ul>



	<ul style="list-style-type: none"> <li>» Disturbance to or loss of birds and bats as a result of collision with turbines</li> <li>» Electrocutation and collision with the power line</li> </ul>
<b>Activity/risk source</b>	<ul style="list-style-type: none"> <li>» Spinning turbine blades</li> <li>» Substation</li> </ul>
<b>Mitigation: Target/Objective</b>	<ul style="list-style-type: none"> <li>» More accurately determine the impact of the operating wind energy facility on priority bird species</li> <li>» Minimise impacts associated with the power line and substation</li> </ul>

<b>Mitigation: Action/control</b>	<b>Responsibility</b>	<b>Timeframe</b>
If the preconstruction survey finds that the presence of bats or roosting habitats of concern occur, then the monitoring programme should be continued <u>during operation</u> to document the effect of wind turbines on bat species of concern.	Tsitsikamma Community Wind Energy Facility (RF) (Pty) Ltd Specialist	Planning & design / Pre-Construction
<u>Appoint a suitably qualified specialist to prepare a bird monitoring programme and to undertake bird monitoring during the operational phase.</u>	<u>Tsitsikamma Community Wind Energy Facility (RF) (Pty) Ltd / environmental manager</u>	<u>Operation</u>
A site monitoring programme must be implemented for surveying bird movements in relation to the wind energy facility and fully documenting all collision / electrocution casualties.	Tsitsikamma Community Wind Energy Facility (RF) (Pty) Ltd / environmental manager	Operation
Start post-construction avifaunal monitoring as soon as possible.	Monitoring agency	6 months after construction is completed
One year's post-construction monitoring of bird fatalities during the operational phase is recommended for at least one turbine at the proposed wind energy facility on this site.	Tsitsikamma Community Wind Energy Facility (RF) (Pty) Ltd	Operation
<u>Removal of all dead livestock as soon as possible from the site and keeping detailed information on fatalities</u>	<u>Tsitsikamma Community Wind Energy Facility (RF) (Pty) Ltd</u>	<u>Operation</u>
Periodically collate and analyse post-construction monitoring data.	Advising scientist	Every 3 months of monitoring
Review report on the full year of post-construction monitoring, and integrate findings into operational EMP and broader mitigation scheme.	Advising scientist, monitoring agency in negotiation with	1 year post-construction

Mitigation: Action/control	Responsibility	Timeframe
	Tsitsikamma Community Wind Energy Facility (RF) (Pty) Ltd	
If the turbines are found to have a significant negative impact on bats then further measures will need to be implemented to control the impact, for example, halting operation during low wind conditions.	Tsitsikamma Community Wind Energy Facility (RF) (Pty) Ltd	Pre- Construction

<b>Performance Indicator</b>	<ul style="list-style-type: none"> <li>» No additional disturbance to avifaunal populations on the wind energy facility site</li> <li>» Continued improvement of avifaunal protection efforts</li> <li>» Regular provision of clearly worded, logical and objective information on the interface between the local avifauna and the proposed/operating wind energy facility</li> <li>» 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</li> </ul>
<b>Monitoring</b>	<ul style="list-style-type: none"> <li>» Observation of avifaunal populations and incidence of injuries/death from collisions from turbine blades</li> <li>» Environmental manager to monitor turbine field for fatalities.</li> <li>» Review of report on the full year of post-construction monitoring</li> </ul>

## OBJECTIVE: Minimisation of visual impacts

The primary visual impact, namely the appearance and dimensions of the wind energy facility (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.

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 Civil Aviation Authority (CAA) prescribes these warning lights and the potential to mitigate their visual impacts is low. Indications are that the facility may

not be required to fit a light to each turbine, but rather place synchronous flashing lights on the turbines representing the outer perimeter of the facility. In this manner less warning lights can be utilised to delineate the facility as one large obstruction, thereby lessening the potential visual impact. The regulations for the CAA's *Marking of Obstacles* should be strictly adhered too, as the failure of complying with these guidelines may result in the developer being required to fit additional light fixtures at closer intervals thereby aggravating the visual impact.

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 energy facility (including access roads)</li> <li>» Substation</li> </ul>
<b>Potential Impact</b>	<ul style="list-style-type: none"> <li>» Risk to aircraft in terms of the potential for collision</li> <li>» Enhanced visual intrusion</li> </ul>
<b>Activity/risk source</b>	<ul style="list-style-type: none"> <li>» Substation and associated lighting</li> <li>» Wind turbines and other infrastructure</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</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>
Aviation warning lights must be mounted on turbine hub or such measures required by the Civil Aviation Authority. Indications are that the facility may not be required to fit a light to each turbine, but rather place synchronous flashing lights on the turbines representing the outer perimeter of the facility.	Tsitsikamma Community Wind Energy Facility (RF) (Pty) Ltd	Duration of contract
Maintain the general appearance of the facility in an aesthetically pleasing way.	Tsitsikamma Community Wind Energy Facility (RF) (Pty) Ltd	Operation and maintenance
Ensure that proper planning is undertaken regarding the placement of lighting structures for the substation and that light fixtures only illuminate areas inside the substation sites.	Tsitsikamma Community Wind Energy Facility (RF) (Pty) Ltd	Operation and maintenance
Undertake regular maintenance of light fixtures.	Tsitsikamma Community Wind Energy Facility (RF) (Pty) Ltd	Operation and maintenance

<b>Performance 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 sites.</li> </ul>
<b>Monitoring</b>	<ul style="list-style-type: none"> <li>» Ensure that aviation warning lights or other measures are installed before construction is completed and are fully functional at all times.</li> <li>» The monitoring of the condition and functioning of the light fixtures during the operational phase of the project.</li> </ul>

**OBJECTIVE: Minimisation of noise impacts**

Projected noise levels during operation of the Wind Energy Facility were modelled using the methodology as proposed by SANS 10357:2004 and ISO 9613-2.

The resulting future noise projections indicated that the operation of the facility would not comply with the Noise Control Regulations (GN R154) and the SANS 10103:2008 proposed guidelines during periods when the wind speeds are less than 6 m/s and the wind blows in an easterly direction. While the projected significance of noise impacts is low for most Noise Sensitive developments (NSDs), the significance of a noise impact could be medium for the NSD17 and NSD22.

Mitigation measures are, however, proposed to ensure that the potential noise impacts and risks be optimally minimised. The following measures are recommended to define the performance of the developer in mitigating the projected impacts and reducing the significance of the noise impact.

<b>Project component/s</b>	» Wind energy facility
<b>Potential Impact</b>	» Increased noise levels at potentially sensitive receptors
<b>Activity/risk source</b>	» Wind turbines and other infrastructure
<b>Mitigation: Target/Objective</b>	<ul style="list-style-type: none"> <li>» Prevent the generation of a nuisance noises</li> <li>» Ensure acceptable noise levels at surrounding stakeholders and potentially sensitive receptors.</li> <li>» Ensure that the change in ambient sound levels as experienced by Potentially Sensitive Receptors is less than 5 dBA.</li> </ul>

<b>Mitigation: Action/control</b>	<b>Responsibility</b>	<b>Timeframe</b>
Defining the ambient sound levels in 10 minute bins over a period of 14 days before the operational phase starts inside and outside of the dwellings of at NSD14/NSD15 and one in the vicinity of NSD05-08. 10 minute sampling bins should be co-ordinated with 10 m wind speed.	Acoustical Consultant / Approved Noise Inspection Authority	Before operational phase commences

Mitigation: Action/control	Responsibility	Timeframe
Design and implement a noise monitoring programme	Acoustical Consultant / Approved Noise Inspection Authority	Before operational phase commences
Add additional noise monitoring points at any complainants that registered a noise complaint relating to the operation of the facility.	Acoustical Consultant / Approved Noise Inspection Authority	With quarterly monitoring

<b>Performance Indicator</b>	» Ensure that the change in ambient sound levels as experienced by Potentially Sensitive Receptors is less than 7 dBA
<b>Monitoring</b>	» Quarterly noise monitoring by an Acoustic Consultant or Approved Noise Inspection Authority for the first year of operation as well as when noise complaints are registered. Monitoring should take place over a 24 hour period in 10 minute bins, with the results co-ordinated with the 10 m wind speed. Noise monitoring programme to be developed and implemented at the start of operation.

**OBJECTIVE: Appropriate handling and management of hazardous substances and waste**

The operation of the wind energy facility will involve the generation of limited waste products. The main wastes expected to be generated by the operation activities includes general solid waste and hazardous waste.

<b>Project component/s</b>	» wind energy turbines » substation
<b>Potential Impact</b>	» Inefficient use of resources resulting in excessive waste generation » 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 » Fuel and oil storage
<b>Mitigation: Target/Objective</b>	» To comply with waste management legislation » To minimise production of waste » To ensure appropriate waste disposal » To avoid environmental harm from waste disposal

Mitigation: Action/control	Responsibility	Timeframe
Hazardous substances must be stored in sealed containers within a clearly demarcated designated area.	Tsitsikamma Community Wind	Operation

Mitigation: Action/control	Responsibility	Timeframe
	Energy Facility (RF) (Pty) Ltd	
Storage areas for hazardous substances must be appropriately sealed and banded.	Tsitsikamma Community Wind Energy Facility (RF) (Pty) Ltd	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.	Tsitsikamma Community Wind Energy Facility (RF) (Pty) Ltd	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 area. Should any accidental spillage take place, it must be cleaned up according to specified standards regarding bioremediation and taken to a registered hazardous waste facility.	Tsitsikamma Community Wind Energy Facility (RF) (Pty) Ltd	Operation and maintenance
Waste handling, collection and disposal operations must be managed and controlled by a waste management contractor.	Tsitsikamma Community Wind Energy Facility (RF) (Pty) Ltd / waste management contractor	Operation
Used oils and chemicals: » Where these cannot be recycled, appropriate disposal must be arranged with a licensed facility in consultation with the administering authority. » Waste must be stored and handled according to the relevant legislation and regulations.	Tsitsikamma Community Wind Energy Facility (RF) (Pty) Ltd	Operation
General waste must be recycled where possible or disposed of at an appropriately licensed landfill.	Tsitsikamma Community Wind Energy Facility (RF) (Pty) Ltd	Operation
Hazardous waste (including hydrocarbons) and general waste must be stored and disposed of separately.	Tsitsikamma Community Wind Energy Facility (RF) (Pty) Ltd	Operation
A drip tray must be placed under the pipes pouring concrete at all times to prevent spills from occurring on site.	Tsitsikamma Community Wind Energy Facility (RF) (Pty) Ltd / Contractor	Duration of contract
Mixing concrete and grout on site must be done on a metal tray to ensure no soil is polluted.	Tsitsikamma Community Wind	Duration of contract

Mitigation: Action/control	Responsibility	Timeframe
	Energy Facility (RF) (Pty) Ltd / Contractor	
When cleaning concrete machinery the waste water and material must be contained and disposed at an appropriate registered waste facility.	Tsitsikamma Community Wind Energy Facility (RF) (Pty) Ltd/ Contractor	Duration of contract

<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</li> <li>» No untreated contamination of soil or water</li> </ul>
<b>Monitoring</b>	<ul style="list-style-type: none"> <li>» Waste collection must be monitored on a regular basis.</li> <li>» Waste documentation must be completed and available for inspection on request</li> <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</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 Environmental Manager. All appropriate waste disposal certificates accompany the monthly reports.</li> </ul>

**OBJECTIVE: 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 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.	Tsitsikamma Community Wind Energy Facility (RF) (Pty) Ltd	Operation
Provide fire-fighting training to selected operation and maintenance staff.	Tsitsikamma Community Wind Energy Facility (RF) (Pty) Ltd	
Ensure that appropriate communication channels are established to be implemented in the event of a fire.	Tsitsikamma Community Wind Energy Facility (RF) (Pty) Ltd	Operation
Fire breaks should be established where and when required. Cognisance must be taken of the relevant legislation when planning and burning firebreaks (in terms of timing, etc.).	Tsitsikamma Community Wind Energy Facility (RF) (Pty) Ltd	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.	Tsitsikamma Community Wind Energy Facility (RF) (Pty) Ltd	Operation
Contact details of emergency services should be prominently displayed on site.	Tsitsikamma Community Wind Energy Facility (RF) (Pty) Ltd	Operation

<b>Performance Indicator</b>	<ul style="list-style-type: none"> <li>» Fire fighting equipment and training provided before the construction phase commences.</li> <li>» Appropriate fire breaks in place.</li> </ul>
<b>Monitoring and Reporting</b>	<ul style="list-style-type: none"> <li>» Tsitsikamma Community Wind Energy Facility (RF) (Pty) Ltd must monitor indicators listed above to ensure that they have been met.</li> </ul>

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

Once operational, the 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.

Once construction is completed, 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.</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.</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.</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.</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 and accommodation facility to avoid any environmental pollution focusing on water, waste and sanitation infrastructure and services.	Tsitsikamma Community Wind Energy Facility (RF) (Pty) Ltd	Operation
Vehicle movement to and from the site should be minimised as far as possible.	Tsitsikamma Community Wind Energy Facility (RF) (Pty) Ltd	Operation
Local roads should be maintained to keep the road surface up to a reasonable standard.	Tsitsikamma Community Wind Energy Facility (RF) (Pty) Ltd	Operation
Limit the development of new access roads on site.	Tsitsikamma Community Wind Energy Facility (RF) (Pty) Ltd	Operation
Limit any movement and driving on agricultural or cultivated land to avoid disturbance/destruction	Tsitsikamma Community Wind Energy Facility (RF) (Pty) Ltd	Pre-construction/ construction and Operation
Ensure on-going communication with the landowners of the site in order to ensure minimal impact on farming activities	Tsitsikamma Community Wind Energy Facility (RF) (Pty) Ltd	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.</li> <li>» Continuation of farming activities on site.</li> </ul>
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**Monitoring and reporting**

- » Tsitsikamma Community Wind Energy Facility (RF) (Pty) Ltd should be able to demonstrate that facility is well managed without environmental pollution and that the above requirements have been met.

**MANAGEMENT PLAN FOR WIND ENERGY FACILITY:  
 DECOMMISSIONING**

**CHAPTER 10**

The turbine infrastructure which will be utilised for the proposed wind energy facility is expected to have a lifespan of 20 to 30 years (with maintenance). Equipment associated with this facility would only be decommissioned once it has reached the end of its economic life. The decommissioning activities would need to comply with the legislation relevant at the time.

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.

**10.1. 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.

**10.2 Disassemble Existing Turbines**

A large crane will be brought on site. It will be used to disassemble the turbine and tower sections. These components will be reused, recycled or disposed of in accordance with regulatory requirements. All parts of the turbine would be considered reusable or recyclable except for the blades.

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

<b>Project component/s</b>	» Decommissioning phase of the wind energy facility and associated infrastructure.
<b>Potential Impact</b>	» 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 (10) is small. » Decommissioning is also similar to the construction phase in that it will also create temporary employment opportunities.
<b>Activity/risk source</b>	» Decommissioning of the wind energy facility.
<b>Mitigation:</b>	» To avoid and or minimise the potential social and environmental

<b>Target/Objective</b>	impacts associated with decommissioning phase of the wind energy facility.
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<b>Mitigation: Action/control</b>	<b>Responsibility</b>	<b>Timeframe</b>
Mitigation measures as detailed in the construction phase EMPr regarding impacts on flora, fauna, habitats and wetlands would be applicable to this phase.	Tsitsikamma Community Wind Energy Facility (RF) (Pty) Ltd	At decommissioning.
Rehabilitation to be undertaken in terms of specifications outlined in the Rehabilitation <u>section of this EMPr</u> (Chapter 8) as well as in terms of any specific requirements applicable at the time.	Tsitsikamma Community Wind Energy Facility (RF) (Pty) Ltd	At decommissioning.

<b>Performance Indicator</b>	Compliance with South African legislation at the relevant time.
<b>Monitoring</b>	An ECO will need to supervise decommissioning activities

## **FINALISATION OF THE ENVIRONMENTAL MANAGEMENT PROGRAMME**

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## **CHAPTER 11**

The EMPr is a dynamic document, which must be updated when required. It is considered critical that this draft EMPr 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 taking sensitive environmental features into account.