MERINO WIND FARM, NORTHERN CAPE PROVINCE

ENVIRONMENTAL MANAGEMENT PROGRAMME

November 2022

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EMPR DETAILS

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DEFINITIONS AND TERMINOLOGY

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 or 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.

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

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 and can include both direct and indirect impacts.

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

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

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

Development area: The development area is that identified area (located within the project site) (~6 463ha in extent) where the Merino Wind Farm is planned to be located.

Development footprint: The development footprint is the defined area (~2 800ha in extent) (located within the development area) where the wind turbines and other associated infrastructure for the Merino Wind Farm is planned to be constructed. This is the actual footprint of the facility, and the area which would be disturbed.

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/occur 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:

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

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

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

Environmental impact assessment: Environmental Impact Assessment, as defined in the NEMA EIA Regulations, is a systematic process of identifying, assessing and reporting environmental impacts associated with an activity.

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: A 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.

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.

Incident: Section 30 of NEMA defines an 'incident' as "an unexpected sudden occurrence, including a major emission, fire or explosion leading to serious danger to the public or potentially serious pollution of or detriment to the environment, whether immediate or delayed."[1]

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

Indirect impacts: Indirect or induced changes that may occur because 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 because 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 public.

Mitigation hierarchy: The mitigation hierarchy is a framework for managing risks and potential impacts related to biodiversity and ecosystem services. The mitigation hierarchy is used when planning and implementing development projects, to provide a logical and effective approach to protecting and conserving biodiversity and maintaining important ecosystem services. It is a tool to aid in the sustainable management of living, natural resources, which provides a mechanism for making explicit decisions that balance conservation needs with development priorities

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

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

[1]http://ipwis.pgwc.gov.za/ipwisdoc/Public/Publications/ChemicalsMgt/A%20Procedure%20for%20Section%2030%20of%20NEMA.pdf

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

Project site: The project site is the area with an extent of 29 909ha, within which the Merino Wind Farm development footprint will be located.

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

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

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

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

Tower: The tower, which supports the nacelle to which the rotor is attached, is constructed from tubular steel or concrete. It is approximately 130m 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. The tower must be strong enough to support the nacelle and blades, and to sustain vibration, wind loading and the overall weather elements for the lifetime of the wind turbine.

Waste: Any substance, material or object, that is unwanted, rejected, abandoned, discarded or disposed of, or that is intended or required to be discarded or disposed of, by the holder of that substance, material or object, whether or not such substance, material or object can be re-used, recycled or recovered and includes all wastes as defined in Schedule 3 to the Waste Amendment Act (as amended on June 2014); or any other substance, material or object that is not included in Schedule 3 that may be defined as a waste by the Minister.

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.

ABBREVIATIONS AND ACRONYMS

DFFE	Department of Forestry, Fisheries and the Environment.
DHSWS	Department of Human Settlements, Water and Sanitation
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme
EPC	Engineering Procurement Contractor
ECO	Environmental Control Officer
EO	Environmental Officer
GG	Government Gazette
GN	Government Notice
Ha	Hectare
I&AP	Interested and Affected Party
km^2	Square kilometres
kV	Kilovolt
m^2	Square meters
m/s	Meters per second
MW	Mega Watt
NEMA	National Environmental Management Act (Act No 107 of 1998)
NHRA	National Heritage Resources Act (Act No 25 of 1999)
NIRP	National Integrated Resource Planning
NWA	National Water Act (Act No 36 of 1998)
PM	Project Manager
SHE	Safety, Health and Environment
SAHRA	South African Heritage Resources Agency
SANRAL	South African National Roads Agency Limited

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CHAPTER 1: INTRODUCTION

This Environmental Management Programme has been compiled for the Merino Wind Farm. The project site is located approximately 35km south-west of Richmond and 80km south-east of Victoria West, within the Ubuntu Local Municipality and the Pixley Ka Seme District Municipality in the Northern Cape Province. The Merino Wind Farm will include up to 35 wind turbines and will have a contracted capacity of up to 140MW. A preferred project site with an extent of ~29 909ha has been identified by Great Karoo Renewable Energy (Pty) Ltd as a technically suitable area for the development of the Merino Wind Farm. A development area of ~6 463ha for the placement of the wind farm infrastructure has been identified within the project site and the much smaller development footprint[2] of ~2 800ha will be placed and sited within the development area.

This EMPr has been developed on the basis of the findings of the Environmental Impact Assessment (EIA) undertaken for the project (Savannah, 2022), and must be implemented to protect sensitive on-site and off-site features through controlling construction, operation and decommissioning activities that could have a detrimental effect on the environment, and through avoiding or minimising potential impacts. This EMPr is applicable to all Great Karoo Renewable Energy (Pty) Ltd employees and contractors working on the pre-construction, construction, and operation and maintenance phases of the Merino Wind Farm. The document must be adhered to and updated as relevant throughout the project life cycle. This document fulfils the requirement of the EIA Regulations, 2014 (as amended) and forms part of the EIA Report of the project.

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, halted or minimised. 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. While no permitting or licensing requirements arise directly by virtue of the Merino Wind Farm, this section will be applicable throughout the life cycle of the project.

2 The development footprint of the Merino Wind Farm will be located within the ~6 463ha development area and will be a much smaller area within which the wind turbines and associated infrastructure will be constructed and operated in. The development footprint has been subject to detailed design by the developer through the consideration of sensitive environmental features identified by independent specialists, which need to be avoided by the wind farm.

CHAPTER 2: PROJECT DETAILS

The Merino Wind Farm is proposed in response to the identified objectives of the national and provincial government and local and district municipalities to develop renewable energy facilities for power generation purposes. It is the developer's intention to bid the Merino Wind Farm under the Department of Mineral Resources and Energy's (DMRE's) Renewable Energy Independent Power Producer Procurement (REIPPP) Programme or a similar programme, with the aim of evacuating the generated power into the national grid. This will aid in the diversification and stabilisation of the country's electricity supply, in line with the objectives of the Integrated Resource Plan (IRP), with the Merino Wind Farm set to inject up to 140MW into the national grid.

A technically feasible project site[3], with an extent of ~29 909ha has been identified by Great Karoo Renewable Energy (Pty) Ltd as a technically suitable area for the development of the Merino Wind Farm. A development area[4] of ~6 463ha has been identified within the project site by the proponent for the development. The development area consists of four (4) affected properties, which include(refer to **Figure 2.1** and **Table 2.1**):

- Portion 1 of Farm Rondavel 85
- Portion 0 of Farm Rondavel 85
- Portion 9 of Farm Bult & Rietfontein 96
- Portion 0 of Farm Vogelstruisfontein 84

During the Scoping Phase, the full extent of the development area was considered by the specialist assessments, with the aim of determining the suitability from an environmental and social perspective and identifying areas that should be avoided in development planning. Based on the specialist assessments undertaken during the Scoping Phase, areas of environmental sensitivity were identified within the development area. In order to avoid these areas of potential sensitivity and to ensure that potential detrimental environmental impacts are minimised as far as possible, the developer identified a suitable development footprint (~2 800ha in extent) within the larger development area where the wind turbines and other associated infrastructure for the Merino Wind Farm is planned to be constructed. Since the development area assessed during the Scoping Phase is larger than the area required for the development footprint, it provides the opportunity for the optimal placement of the infrastructure, ensuring avoidance of major identified environmental sensitivities.

Infrastructure associated with the Merino Wind Farm will include:

- Up to 35 wind turbines with a maximum hub height of up to 170m and tip height of up to 250m.
- Concrete turbine foundations to support the turbine hardstands.
- Inverters and transformers.
- Temporary laydown areas which will accommodate storage and assembly areas.
- Cabling between the turbines, to be laid underground where practical.

[3] The project site is the area with an extent of 29 909ha, within which the Merino Wind Farm development footprint will be located.
4 The development area is that identified area (located within the project site) where the Merino Wind Farm is planned to be located. This area has been selected as a practicable option for the facility, considering technical preference and constraints. The development area is ~6 463ha in extent.

- A temporary concrete batching plant.
- 33/132kV onsite facility substation.
- Underground cabling from the onsite substation to the 132kV collector substation.
- Electrical and auxiliary equipment required at the collector substation that serves the wind energy facility, including switchyard/bay, control building, fences, etc.
- Battery Energy Storage System (BESS).
- Access roads and internal distribution roads.
- Site offices and maintenance buildings, including workshop areas for maintenance and storage.

Table 2.1: Detailed description of the Merino Wind Farm development area

Province	**Northern Cape Province**
District Municipality	Pixley Ka Seme District Municipality
Local Municipality	Ubuntu Local Municipality
Ward Number (s)	Ward 3
Nearest town(s)	Richmond (~35km south-west) and Victoria West (~80km south-east)
Affected Properties: Farm name(s), number(s) and portion numbers	» Portion 1 of Farm Rondavel 85 » Portion 0 of Farm Rondavel 85 » Portion 9 of Farm Bult & Rietfontein 96 » Portion 0 of Farm Vogelstruisfontein 84
SG 21 Digit Code (s)	» Portion 1 of Farm Rondavel 85: C06300000000008500001 » Portion 0 of Farm Rondavel 85: C06300000000008500000 » Portion 9 of Farm Bult & Rietfontein 96: C06300000000009600009 » Portion 0 of Farm Vogelstruisfontein 84: C06300000000008400000
Current zoning	Agriculture
Site Coordinates (centre of development area)	31°29'36.88"S; 23°37'50.76"E
Site Coordinates (corner/bend points of development area)	31°27'26.73"S; 23°37'29.27"E 31°27'19.38"S; 23°38'19.97"E 31°27'43.44"S; 23°38'49.10"E 31°27'40.66"S; 23°39'31.87"E 31°28'8.95"S; 23°40'42.67"E 31°28'42.34"S; 23°41'3.58"E 31°29'5.72"S; 23°40'43.88"E 31°29'45.85"S; 23°40'59.67"E 31°30'2.93"S; 23°39'46.23"E 31°31'40.82"S; 23°40'34.80"E 31°33'8.23"S; 23°39'6.12"E 31°32'38.57"S; 23°38'19.82"E 31°32'45.18"S; 23°38'8.25"E 31°32'31.25"S; 23°37'44.32"E 31°32'8.62"S; 23°37'39.32"E 31°31'5.99"S; 23°36'59.12"E 31°30'47.91"S; 23°36'40.43"E 31°30'48.54"S; 23°36'32.36"E 31°30'52.51"S; 23°36'26.47"E 31°30'49.61"S; 23°36'22.03"E 31°30'54.24"S; 23°34'46.08"E 31°29'49.60"S; 23°34'45.64"E 31°29'12.31"S; 23°34'33.02"E 31°29'0.55"S; 23°34'16.33"E

	31°28'51.83"S; 23°34'20.27"E 31°28'34.40"S; 23°34'54.59"E 31°28'34.46"S; 23°36'15.22"E 31°28'30.43"S; 23°37'3.90"E

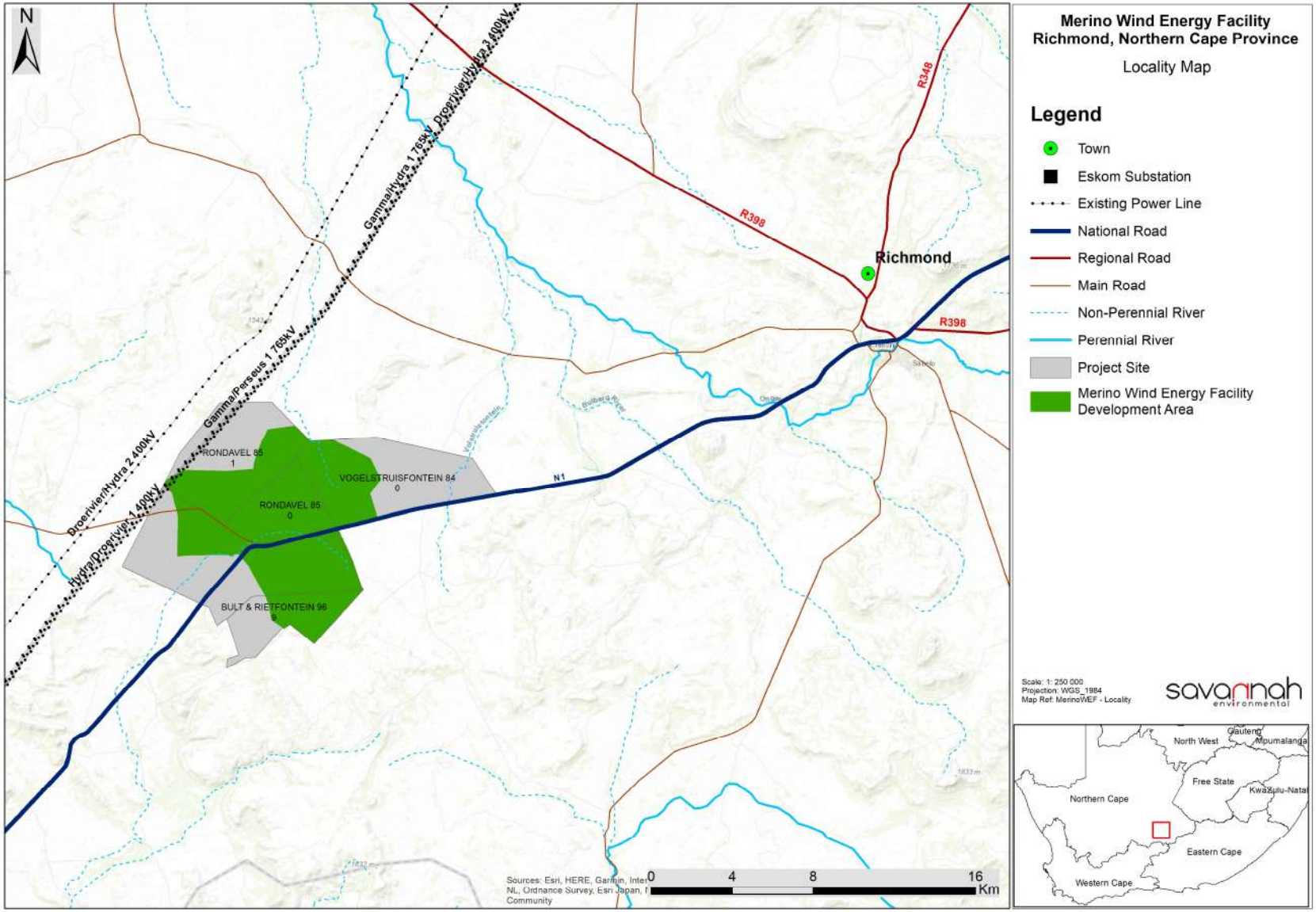


Figure 2.1: Locality map of the project site within which the Merino Wind Farm is proposed to be developed

2.1. Findings of the Environmental Impact Assessment

An Environmental Impact Assessment (EIA) was undertaken for the proposed project in accordance with the requirements of the EIA Regulations, 2014 (as amended). The EIA Report, together with the specialist studies contained within **Appendices D-M** provide a detailed assessment of the potential impacts that may result from the development of the Merino Wind Farm.

No environmental fatal flaws or unacceptable impacts were identified in the detailed specialist studies conducted, provided that the recommended mitigation measures are implemented. These measures include, amongst others, the avoidance of sensitive features within the development area and the removal of the one proposed turbine from the Merino Wind Farm located on the ridgelines, as specified by the specialists.

The potential environmental impacts associated with the Merino Wind Farm assessed through the EIA process include:

- Impacts on terrestrial ecology (flora and fauna).
- Impacts on aquatic ecology.
- Impacts on avifauna.
- Impacts on bats.
- Impacts on land use, soils, and agricultural potential.
- Impacts on heritage resources, including archaeology, palaeontology and the cultural landscape.
- Noise impacts due to the construction and operation of the wind farm.
- Visual impacts on the area imposed by the components of the facility.
- Positive and negative social impacts.

The environmental sensitivities identified by the relevant specialists for the project site are illustrated in **Figure 2.2**. The development footprint, as assessed, has been overlain with the relevant environmental sensitivities.

2.1.1 Impacts on Ecology

The study area consists mostly of natural habitat that is used for commercial animal husbandry. The proposal to build the Merino Wind Farm on site will therefore have significant effects on natural habitat. The existing biodiversity on site is, however, relatively limited in terms of uniqueness or potential presence of species of concern, with the possible presence of one Critically Endangered mammal species.

The vegetation on site is not considered to be part of any threatened ecosystem and has not been assessed as being of high conservation value due to rates of transformation. The regional vegetation types that occur on site, i.e., Eastern Upper Karoo and Upper Karoo Hardeveld, are both widespread and have low rates of transformation across their geographical range.

There are three plant species listed as Rare (*Anisodontea malavastroides, Aloe broomii var. tarkaensis* and *Tridentea virescens*) that could potentially occur on site, but these are all widespread species that are naturally rare where they are found. None have been previously recorded on this site. There are also two plant species protected according to National legislation (*Crinum bulbispermum and Harpagophytum procumbens*) that could potentially occur in the geographical area, but these are also very widespread

species. The loss of some individuals, if they are found to occur on site, would not affect the conservation status of any of the species. It is, however, unlikely that any of them would be affected.

There are a small number of fauna species of conservation concern that were assessed as having a possibility of occurring on site. The Riverine Rabbit has been previously recorded within the broader project site. At a regional level, the Critical Biodiversity Area (CBA) map for Northern Cape indicates one drainage line, along with a buffer on each side, that is designated as being a CBA1 area. The remaining drainage lines of the study area are indicated as being Ecological Support Areas (ESAs).

Sensitivities that occur specifically within the development area for the Merino Wind Farm that may be vulnerable to damage from the proposed project are as follows:

» Dry stream beds, including the associated riparian habitats and adjacent floodplains (High sensitivity)
» CBA1 (high sensitivity)
» Habitat suitable for Riverine Rabbit (very high sensitivity)
» Ridges (medium to high sensitivity)
» Plains vegetation (medium sensitivity)

The impacts on ecology associated with the Merino Wind Farm are of low or medium significance. If appropriate mitigation measures are put in place, all impacts can be reduced to having low significance, except for loss of habitat, which will remain medium significance after mitigation. The specialist concluded that the project can proceed from an ecological perspective.

2.1.2 Impacts on Aquatic Ecology

Based on a combination of desktop and in-field delineation, three (3) forms of watercourses were identified and delineated within the 500m regulated area. These include episodic rivers, drainage lines and dams. No natural wetland systems were identified for the development area. The rivers and drainage lines are both classified as a river HGM type system. The dams are regarded as artificial systems and typically formed / created in the preferential flow paths of the river HGM type. The drainage lines are not characterised by riparian vegetation and grasses, these systems represent bare surfaces with evidence of surface run-off.

The results of the habitat assessment indicate natural (class A) and largely natural (class B) instream and riparian conditions for the catchment respectively. The overall ecological importance and sensitivity for the area was determined to be moderate. The overall ecosystem service benefit for the system is high.

The recommended buffer was calculated to be 15m and 22m for the drainage lines and rivers, respectively, for the construction and operational phases. The buffer zone will not be applicable for proposed infrastructure that traverse the systems, however, for all secondary activities such as laydown yards and storage areas, the buffer zone must be implemented.

The pre-mitigation impact significance for all considered aspects is expected to be medium. The expected post-mitigation impact significance is expected to be low should all mitigation measures and recommendations be implemented. It is the opinion of the specialist that no fatal flaws are presented for the proposed project. The project may be considered favourably by the issuing authority, but all mitigation measures and recommendations must be considered for the authorisation.

Since there are watercourses present within the development area of the Merino Wind Farm as identified in the Aquatic Impact Assessment (**Appendix E** of the EIA Report), a water use authorisation for the project will be required from the DWS for water uses identified in Section 21(c) and 21(i) of the National Water Act (Act 36 of 1998).

2.1.3 Impacts on Avifauna

The South African Bird Atlas Project 2 (SABAP2) data indicates that a total of 165 bird species could potentially occur within the broader area. Of these, 24 species are classified as priority species and 12 of these are South African Red List species. Of the priority species, 17 are likely to occur regularly in the development area, namely, Black Harrier, Black Stork, Blue Crane, Greater Flamingo, Karoo Korhaan, Lanner Falcon, Ludwig's Bustard, Martial Eagle, Secretarybid, Tawny Eagle, Verreaux's Eagle and Cape Vulture.

The following specific environmental sensitivities were identified from an avifaunal perspective:

» **Large dams: 800m turbine No-Go zone**
Surface water in this semi-arid habitat is crucially important for priority avifauna and many non-priority species. It is important to leave open space with no turbines for birds to access and leave the surface water area unhindered. Blue Cranes are also likely to at times roost in the larger dams and could fly in and out of these areas before dawn / after dusk which further necessitates a sufficient buffer around the dams.

» **Boreholes: 200m turbine No-Go zone**
Surface water in this semi-arid habitat is crucially important for priority avifauna and many non-priority species. It is important to leave open space with no turbines for birds to access and leave the surface water area unhindered.

» **Verreaux's Eagle nest: 3.7km all infrastructure No-Go zone and 5.2km medium sensitivity zone**
A 3.7km infrastructure free buffer zone must be implemented around the Verreaux's Eagle (SA status: Vulnerable) nest near the site (at -31.425449° 23.702398°). This is to reduce the collision risk. It is recommended that suitable pro-active mitigation be implemented at all turbines within a 5.2 km radius around the Verreaux's Eagle nest during daylight hours, once the wind farm commences with operations, to reduce the risk of collisions of Verreaux's Eagles with the turbines. Suitable pro-active mitigation measures should be selected prior to commencement of operation, informed by best-available information at the time of implementation.

» **Tawny Eagle nests: 3km all infrastructure No-Go zone**
A 3km infrastructure free buffer zone must be implemented around the Tawny Eagle (SA status: Endangered) nests at (-31.540635°, 23.716886°) and (-31.445988°, 23.583921°). This is to reduce the turbine collision risk.

» **Martial Eagle nests: 5km all infrastructure No-Go zone**
A 5km infrastructure free buffer zone must be implemented around the Martial Eagle (SA status: Endangered) nest (at -31.524550° 23.534279°). This is to reduce the turbine collision risk.

The proposed Merino Wind Farm will have a medium impact on avifauna which, in most instances, could be reduced to a low impact through appropriate mitigation. **The currently proposed 35 turbine lay-out which**

was assessed in the Avifauna Impact Assessment Report avoids all the recommended avifaunal turbine exclusion zones and is therefore deemed acceptable. The development is therefore supported, provided the recommended mitigation measures are strictly applied.

2.1.4 Impacts on Bats

Several site visits were made to the Merino Wind Farm between December 2020 and December 2021. The passive data indicates that the three bat species most likely to be impacted on by the proposed wind farm are *Laephotis* (formerly *Neoromicia*) *capensis, Miniopterus natalensis* and *Tadarida aegyptiaca*. These more abundant species are of a large value to the local ecosystems as they provide a greater contribution to most ecological services than the rarer species, due to their higher numbers.

Due to the extrapolated nature of the national screening tool, further Google Earth satellite imagery and verifications during site visits were used to spatially demarcate areas of the site with high and medium sensitivities relating to bat species ecology and habitat preferences, where high sensitivities and their buffers are no-go zones for turbines and turbine blade overhang. In other words, no turbine blades may intrude into high sensitivity buffers. Medium sensitivities indicate areas of probable increased risk due to seasonal fluctuations in bat activity, but turbines are allowed to be constructed in medium sensitivity areas. Considering the current proposed layout for the Merino Wind Farm, no turbines are intruding onto the high bat sensitivities. The layout respects the bat sensitivity map when applying an 80m blade length.

Based on the bat activity recorded at the Merino Wind Farm, the significance ratings for the majority of the impacts to bats posed by the development are predicted to be medium before mitigation. After mitigation, all impacts are predicted to be low, except for bat mortality due to moving turbines, which is predicted to remain of medium significance after mitigation.

From a bat impact perspective, no reasons have been identified for the Merino Wind Farm development not to proceed to the approval phase. If the proposed Merino Wind Farm is approved, a minimum of 2 years of operational bat mortality monitoring must be conducted from the start of the operation of the facility.

2.1.5 Impacts on Land Use, Soil and Agricultural Potential

Various soil forms were identified throughout the development area, namely the Tubatse, Oakleaf and Bethesda soil forms. These soil forms are characterised by an orthic topsoil on top of a neocutanic horizon. The Tubatse and Bethesda soil forms are characterised by a lithic and hard rock horizon underneath the neocutanic horizons respectively with the Oakleaf being characterised by a deep neocutanic horizon.

Eight potential land capability classes are located within the proposed development area, namely, Land Capability 1 to 5 (Very Low to Low); and Land Capability 6 to 8 (Low/Moderate to Moderate Sensitivity). The soil forms identified within the development area have been determined to be associated with one land capability, namely LCIII, i.e., Low.

The significance ratings for the impacts of the proposed wind farm on land capability are predicted to be low before and after mitigation. Considering the low sensitivities associated with land potential resources and the low significance of the identified impacts, it is the specialist's opinion that the proposed activities will have an acceptable impact on soil resources and that the proposed activities should proceed as have been planned.

2.1.6 Impacts on Heritage Resources (archaeology, palaeontology and cultural landscape)

During the site survey four (4) archaeological and heritage resources were identified within the development area for the Merino Wind Farm. The development area is underlain by sediments of very high palaeontological significance and five (5) palaeontological heritage resources were identified during the survey of the development area. The landscape of the development area has been assessed for cultural significance, and found to have five distinct character areas, namely, historic movement corridors, open plains interrupted by low koppies, elevated areas with steep sided mountain ridges, areas of landscape that have been transformed by significant infrastructural development, and remote landscape with wilderness qualities. Based on character area analysis undertaken as part of the cultural landscape assessment, areas classified as no-go, tread lightly (subject to site specific constraints), and developable areas were identified within the development area.

There are limited impacts anticipated to archaeological and palaeontological heritage from this proposed development and as such, the principle of a renewable energy facility in this location is supported from a heritage perspective provided that the infrastructure is located in areas able to tolerate the impact of the high degree of change from a cultural landscape perspective.
A number of the proposed turbines are located on the ridge-lines which have been identified as no-go for turbine development due to the high negative impact anticipated to the existing Karoo sense of place. In order to mitigate this impact, it is recommended that one proposed turbine (i.e., M30) from the Merino Wind Farm be removed or relocated from the ridgelines.

Based on the outcomes of this report, it is not anticipated that the proposed development of the Merino Wind Farm and its associated infrastructure will negatively impact on significant heritage resources on condition that the recommended mitigation measures are implemented, including the removal or relocation of the turbine referred to previously.

2.1.7 Noise Impacts

Ambient (background) sound levels were measured over a period of three nights from 9 September to 12 September 2021 in accordance with the South African National Standard SANS 10103:2008. The results of the measurements at each location indicate that ambient sound levels in the area are generally low and typical of a rural noise district during low wind conditions.

Considering measurements collected over the past decade at numerous locations during different seasons, ambient sound levels will likely increase as wind speeds increase. Residential areas and potential noise-sensitive developments/receptors/communities (NSRs) were identified using aerial images as well as a physical site visit.

Considering the low significance of the potential noise impacts (with mitigation, inclusive of cumulative impacts) for the proposed Merino Wind Farm and associated infrastructure, it is recommended that the development be authorised. The proposed layout (i.e., turbine placement) is considered to be acceptable from a noise perspective. No further noise studies or additional noise measurements are recommended or required.

2.1.8 Visual Impacts

A visibility analysis was undertaken from each of the wind turbine positions (35 in total) at an offset of 170m (approximate hub-height) above ground level.

From the viewshed analysis, it is evident that the proposed wind farm would have a larger core area of potential visual exposure within a 5km radius of the development site. This is due to the tall wind turbine structures and the predominantly flat topography. However, there are some ridges and hills to the south (Bakenskop ridge), east and west of the proposed wind turbine structures. The shielding effect of these ridges is noticeable on the viewshed analysis map, where the frequency of visual exposure in these areas is reduced. The wind turbine structures, especially the eight turbines located on the Bakenskop ridge, will also be highly exposed to observers travelling along the N1 national road. The Rondawel to Hutchinson secondary road will similarly be exposed to the wind turbines, as it traverses the proposed development site.

Visual exposure will remain high in the medium distance (i.e., between 5 and 10km). The shielding effect of the hills and ridges surrounding the proposed development site does however create a more scattered viewshed pattern. The Hoëkop, Bobbejaankrans and Kamberg hills shield observers to the north-west and north-east of the proposed development site. Observations from the N1 national road and the Hutchinson secondary road is highly likely, especially the eight turbines located on top of the Bakenskop ridge.

In the medium to longer distance (i.e., between 10 and 20km), visual exposure will be somewhat reduced, especially towards the north-west and the south-east. This zone also includes a number of homesteads that may be exposed to the project infrastructure. Visual exposure beyond a 20km radius is significantly reduced, especially in the south-east. The wind turbine structures may however still be visible from a number of homesteads within the study area.

Overall, the significance of the visual impacts associated with the proposed Merino Wind Farm is expected to be high as a result of the undeveloped character of the landscape. The facility would be visible within an area that contains certain sensitive visual receptors who could consider visual exposure to this type of infrastructure to be intrusive. Visual receptors include people travelling along the public roads (e.g., the N1 national road), residents of rural homesteads and tourists passing through or holidaying in the region.

Conventional mitigation (e.g. such as screening of the structures) of the potential visual impacts is highly unlikely to succeed due to the nature of the development and the receiving environment. A number of mitigation measures have been proposed. The proposed mitigation measures will primarily be effective in terms of mitigating lighting and construction phase visual impacts, as well as the mitigation of the visual encroachment of wind turbine structures on the N1 national road and the RPGR. The eight wind turbines perched on top of the Bakenskop ridge is expected to contribute the most to the visual impact of the WEF on observers travelling along the N1 national road, as well as on visitors to the RPGR. It is recommended that the project proponent investigate the viability of relocating these wind turbines in light of the conclusions of the VIA. Failing this the Merino Wind Farm may not offer an ideal operating scenario from a visual impact perspective.

In terms of the proposed wind turbine layout, the project proponent needs to adhere to all relevant National, Provincial and Local Government regulations and ordinances, including all prescribed health and safety guidelines. If these are not adhered to, the layout may be deemed non-compliant, and may need to be revised in order to ensure compliance. The visual specialist is not aware of any non-compliance and the layout is deemed acceptable within this (legal) context.

It is likely that the WEF development will be met with (largely valid) concern and potential opposition from affected landowners and tour operators within the region. The fact that the visual impact is expected to be of high significance is undisputed. However, this report cannot categorically state that any of the above conditions were transgressed, nor can it (with the information available to the VIA practitioner) be empirically determined that the statistical majority of objecting stakeholders were exceeded. If evidence to the contrary surfaces during the progression of the development application, this statement may need to be revised.

2.1.9 Social Impacts

Impacts are expected to occur with the development of the Merino Wind Farm during the construction, operation and decommissioning phases. Both positive and negative impacts are identified and assessed.

Positive impacts during construction includes:
» Creation of employment and business opportunities, and opportunity for skills development and on-site training.

Negative impacts during construction includes:
» Impacts associated with the presence of construction workers on local communities.
» Impacts related to the potential influx of jobseekers.
» Increased risks to livestock and farming infrastructure associated with the construction related activities and presence of construction workers on the site.
» Increased risk of grass fires associated with construction related activities.
» Nuisance impacts, such as noise, dust, and safety, associated with construction related activities and vehicles.
» Impact on productive farmland.

Positive impacts during operation includes:
» The establishment of infrastructure to improve energy security and support renewable sector.
» Creation of employment opportunities.
» Benefits to the affected landowners.
» Benefits associated with the socio-economic contributions to community development.

Negative impacts during operation includes:
» Noise impacts associated with the operation of the plant.
» Visual impacts and associated impacts on sense of place.
» Potential impact on property values.
» Potential impact on tourism.

The findings of the SIA indicate that the proposed Merino Wind Farm will result in several social and socio-economic benefits, including creation of employment and business opportunities during both the construction and operational phases. The project will also contribute to local economic development though socio-economic development (SED) contributions. In addition, the development will improve energy security and reduce the carbon footprint associated with energy generation in South Africa.

Objections to the proposed Merino WEF were raised by the owners of the Ratelfontein Private Game Reserve (RPGR). The objections were linked to the visual impact of the turbines and the potential impact on current tourism related activities and property values. Based on the findings of the VIA (LOGIS, October 2022) the potential visual impacts on the RPGR can be mitigated by relocating 8 turbines located along the Bakenskop ridge. This would create an opportunity to mitigate the visual impact on the RPGR and the associated tourism related activities. The SIA also recommends that the proponents investigate the option of compensating the owners of the RPGR for potential lost revenue linked to the potential visual impact of the proposed Merino WEF on tourism related activities on the property. Based on this, the findings of the SIA indicate that the significance of all the potential negative impacts with mitigation are likely to be Low Negative. The potential negative impacts can therefore be effectively mitigated if the recommended mitigation measures are implemented. The establishment of the proposed Merino WEF is therefore supported by the findings of the SIA.

Recommendations

- The option of removing / relocating the eight (8) wind turbines located on top of the Bakenskop ridge should be investigated.
- The option of compensating the RPGR for potential lost tourism related revenue should also be investigated by the proponent. This will involve determining if visitor numbers and associated revenue decrease following the establishment of the proposed Merino WEF and then compensating the owners of RPGR for the difference.

2.1.10 Impacts on Traffic

It is assumed that if components are imported to South Africa, it will be via the Port of Ngqura, which is located in the Eastern Cape, ~425km from the proposed site. Alternatively, components can be imported via the Port of Saldanha in the Western Cape, which is located ~675km from the proposed site.

The preferred route for abnormal load vehicles will be from the port (i.e., Port of Ngqura), heading north on the R75, passing Wolwefontein and Jansenville, and onto the R63 at Graaff-Reinet. The vehicles will travel on the R63 to the N1, passing Murraysburg, and continue on the N1 to the proposed site.

The proposed access points to the development area are located along the N1, as shown in **Figure 9.19**. Proposed Access Point 1 has a surfaced bellmouth which leads to the existing gravel road to the Hutchinson railway station. Proposed Access Point 2 is an existing gravel farm access road with an unsurfaced bellmouth.

Generally, the road width at the access points needs to be a minimum of 8m and the access roads on site a minimum of 4.5m (preferably 5m). The radius at the access points needs to be large enough to allow for all construction vehicles to turn safely.
Overall, the significance of the impacts on traffic associated with the Merino Wind Farm are predicted to be medium before mitigation, and low following the implementation of mitigation measures. The traffic generated during this the operation phase will be minimal and will have not have any impact on the surrounding road network. From a traffic impact perspective, no reasons have been identified for the Merino Wind Farm development not to proceed to the approval phase.

2.2.11 Assessment of Cumulative Impacts

Cumulative impacts and benefits on various environmental and social receptors will occur to varying degrees with the development of several renewable energy facilities in South Africa. The degree of significance of these cumulative impacts is difficult to predict without detailed studies based on more comprehensive data/information on each of the receptors and the site-specific developments. The alignment of renewable energy developments with South Africa's National Energy Response Plan and the global drive to move away from the use of non-renewable energy resources and to reduce greenhouse gas emissions is undoubtedly positive. The economic benefits of renewable energy developments at a local, regional and national level have the potential to be significant.

The are several authorised renewable energy projects within a 30km radius of the proposed site, namely:

- Brakpoort Solar PV Facility
- Umsinde Emoyeni Wind Energy Facility
- Aurora Solar PV Facility
- Mainstream Renewable Energy Cluster
- Ishwati Emoyeni Wind Energy Facility
- Trouberg Wind Energy Facility
- Modderfontein Wind Energy Facility
- Nobelsfontein Wind Energy Facility
- Bietjiesfontein Solar Energy Facility
- Karoo Renewable Energy Facility

In addition to the renewable energy facilities listed above, four new renewable energy facilities (three solar PV facilities and one wind farm) are proposed by Great Karoo Renewable Energy (Pty) Ltd adjacent to the Merino Wind Farm, namely:

- Kwana Solar PV Facility
- Moriri Solar PV Facility
- Nku Solar PV Facility
- Angora Wind Farm

All cumulative impacts associated with the Merino Wind Farm will be of a medium or low significance, with impacts of a high significance associated with the visual impacts. A summary of the cumulative impacts is included in **Table 2.2** below.

Table 2.2: Summary of the cumulative impact significance for the Merino Wind Farm

Specialist assessment	Overall significance of impact of the proposed project considered in isolation	Cumulative significance of impact of the project and other projects in the area
Ecology	Medium	Medium
Aquatic Ecology	Low	Medium
Avifauna	Low	Medium
Bats	Medium	Medium
Land use, soil and agricultural potential	Low	Low
Heritage (including archaeology, palaeontology and sense of place)	Medium	Medium
Noise	Low	Low

Specialist assessment	Overall significance of impact of the proposed project considered in isolation	Cumulative significance of impact of the project and other projects in the area
Visual	High	High
Socio-Economic	*Positive impacts:* Low *Negative impacts:* Medium or Low (depending on the impact being considered)	*Positive impacts:* Medium *Negative impacts:* High, Medium or Low (depending on the impact being considered)
Traffic	Low	Medium (assuming all projects in the area are constructed at the same time)

Based on the specialist cumulative assessment and findings, the development of the Merino Wind Farm and its contribution to the overall impact of all renewable energy projects to be developed within a 30km radius, it can be concluded that the Merino Wind Farm cumulative impacts will be of a medium to low significance, with impacts of a high significance mainly relating to visual impacts on the landscape. Therefore, the development of the Merino Wind Farm will not result in unacceptable, high cumulative impacts and will not result in a whole-scale change of the environment.

2.2. Facility Layout and Comparative Assessment of the Site Compound Alternatives

The development footprint assessed within this EIA was designed by the project developer in order to respond to and avoid the sensitive environmental and social features located within the development area (**Figure 2.2**). This approach ensured the application of the mitigation hierarchy (i.e., avoid, minimise, mitigate and offset) to the Merino Wind Farm project, which ultimately ensures that the development is appropriate from an environmental perspective and is suitable for development within the development area.

For the majority of specialists, the impacts associated with the Merino Wind Farm facility layout are of low to medium significance post-mitigation and the assessed layout is considered acceptable. Only the heritage specialist identified one turbine (i.e., M30) to be unacceptably placed within the development footprint (**Figure 2.3**)

Three (3) alternative locations for the site compound were assessed in this EIA Report. From the specialist studies undertaken, the following conclusions were made regarding the site compound alternatives:

	Alternative 1	Alternative 2	Alternative 3
Terrestrial Ecology	Least Preferred	Acceptable	Preferred
Avifauna	Acceptable	Acceptable	Acceptable
Heritage	Least Preferred	Acceptable	Acceptable

From the above summary of the specialist findings, it was determined that Alternative 1 is least preferred from an ecological and heritage perspective given its location within CBA1 (very high sensitivity), drainage feature (high sensitivity), karroid plains (medium sensitivity) and within the recommended no-go development areas around sites GK037 and GK038. From an ecological perspective, Alternative 2 is situated within karroid plains, drainage features and mountain slopes (medium-high sensitivity) and Alternative 3 is located within karroid plains and mountain slopes. Both Alternative 2 and 3 are no located within any

recommended no-go development areas from a heritage perspective. All three alternatives are situated in Karoo scrub, which is not particularly sensitive as far is avifauna is concerned.

Considering the above findings, it can be concluded that either Alternative 2 or Alternative 3 are considered preferred. It should however be noted that the final preferred option will be informed by the final technical preference.

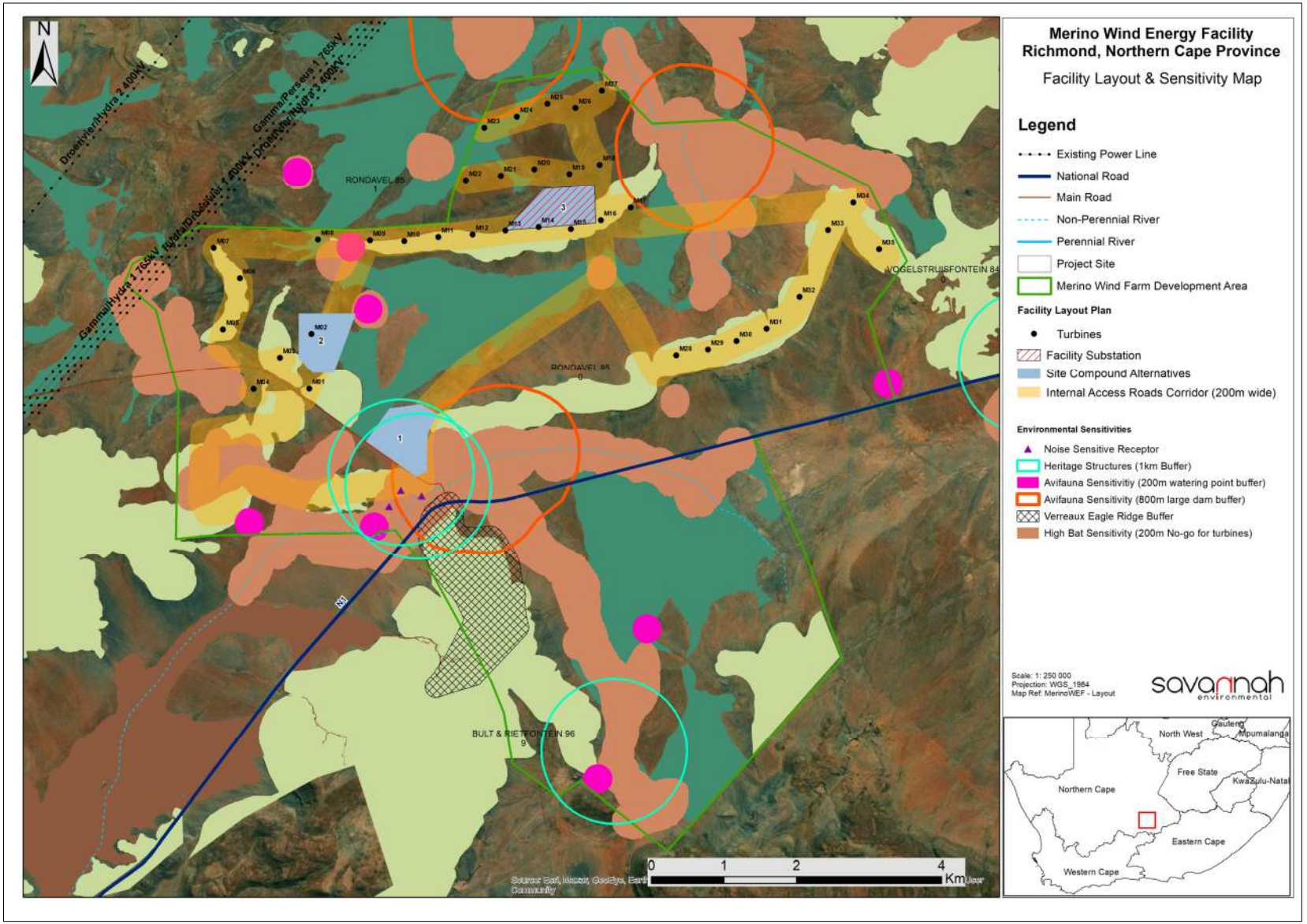


Figure 2.2: The development footprint, as assessed, overlain with the relevant environmental sensitivities

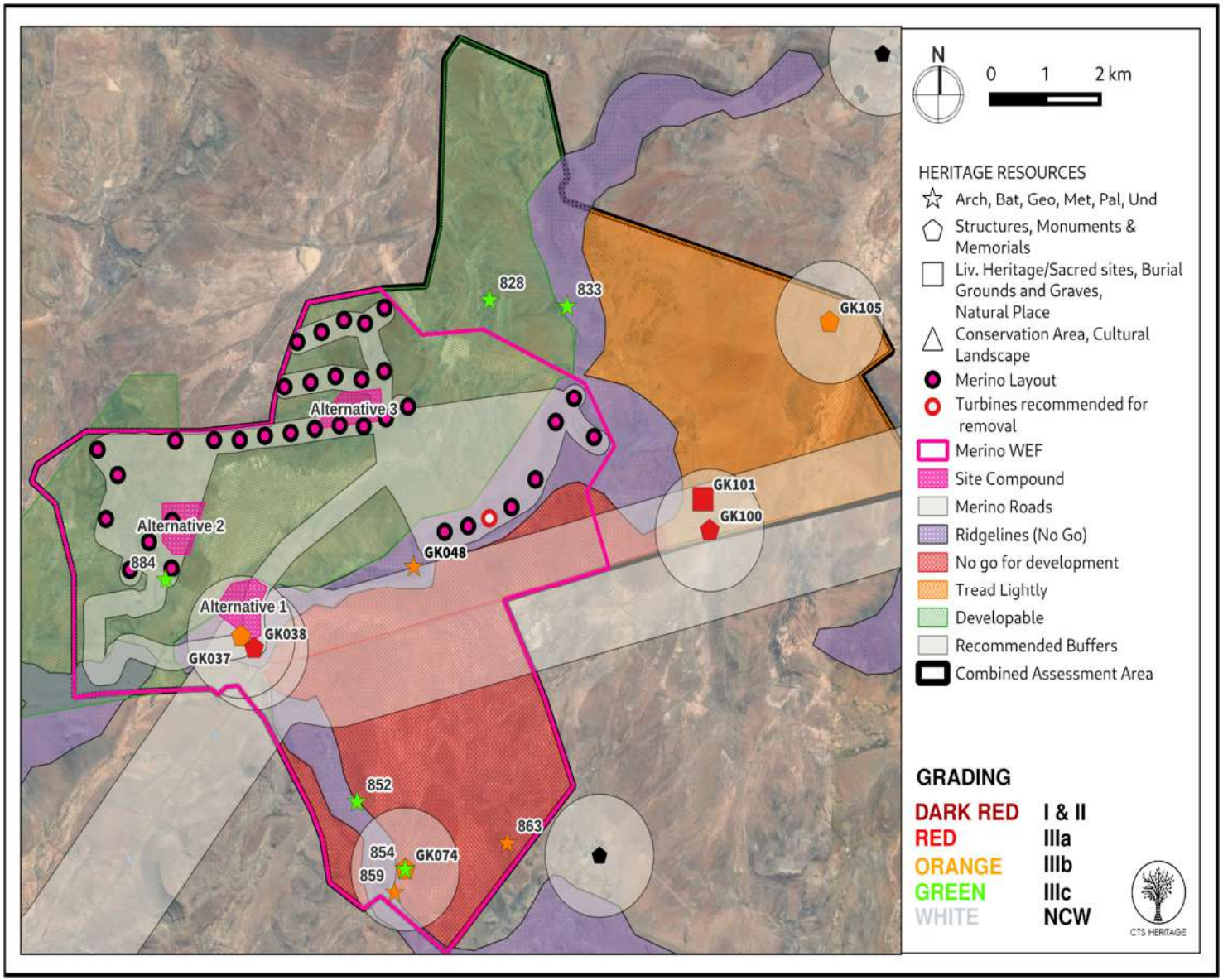


Figure 2.3: Map showing turbine recommended for removal or relocation

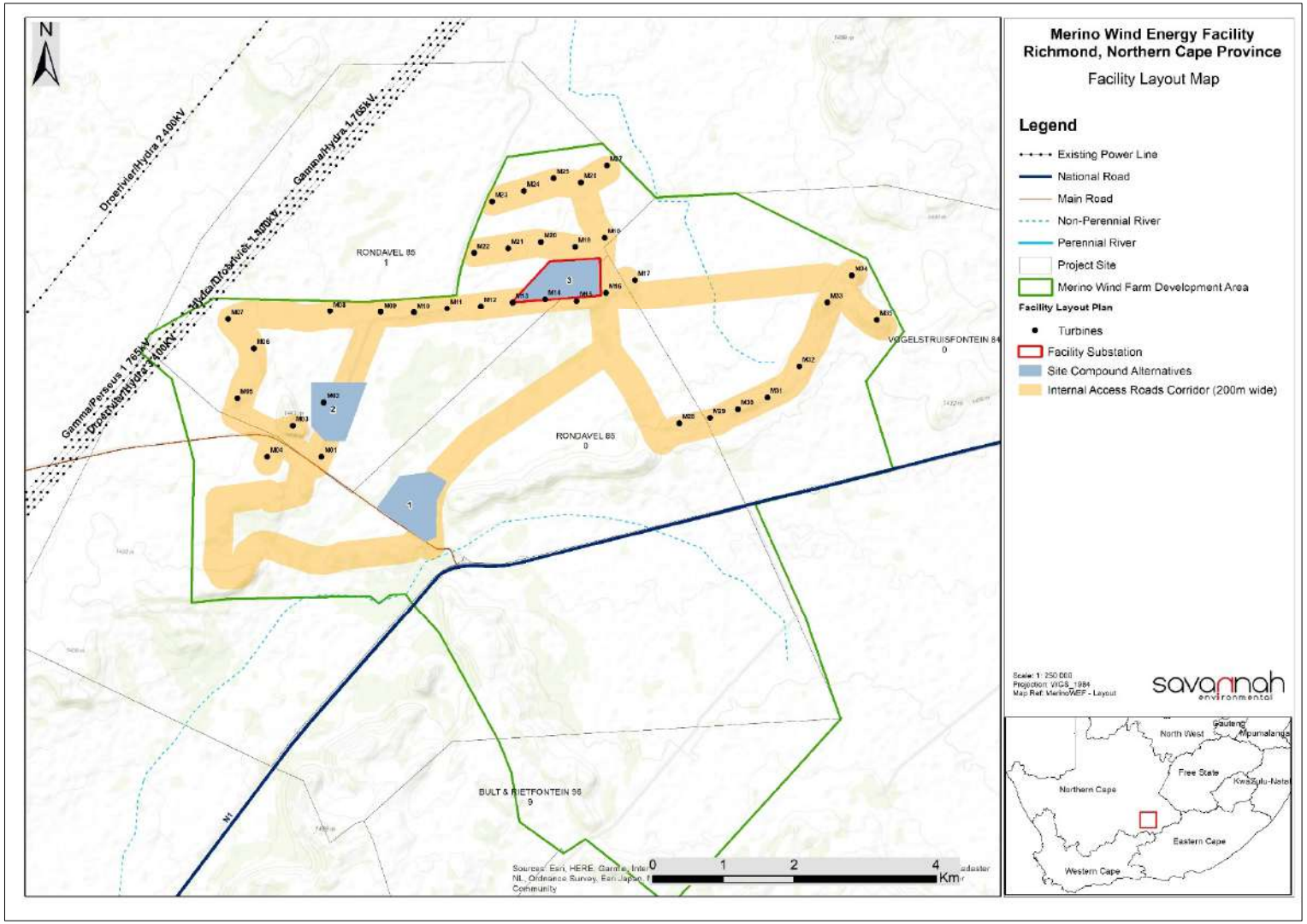


Figure 2.4: Map showing the development area within which the development footprint for the Merino Wind Farm and associated infrastructure has been placed and assessed as part of this EIA process

2.3. Overall Conclusion (Impact Statement)

The preferred activity was determined by the developer to be the development of a renewable energy facility on site using wind as the preferred technology, due to the availability of a suitable wind resource. A technically viable development footprint was proposed by the developer and assessed as part of the EIA process. The assessment of the development footprint within the development area was undertaken by independent specialists and their findings have informed the results of this EIA Report.

From a review of the relevant policy and planning framework, it was concluded that the project is well aligned with the policy framework, and a clear need for the project is seen from a policy perspective at a local, provincial and National level.

The specialist findings from the EIA studies undertaken have indicated that there are no identified fatal flaws associated with the implementation of the development footprint within the development area. The developer has designed a project development footprint in response to the identified sensitive environmental features and areas present within the development area. This approach is in line with the application of the mitigation hierarchy, where all the sensitive areas which could be impacted by the development have been avoided (i.e., tier 1 of the mitigation hierarchy). Feedback from the heritage specialist has indicated that one proposed turbine from the Merino Wind Farm be removed or relocated from the ridgelines (refer to **Figure 2.3**) to ensure a low acceptable impact from a cultural landscape perspective.

The impacts that are expected to remain after the avoidance of the sensitive areas have been reduced through the recommendation of specific mitigation measures by the specialists. The minimisation of the significance of the impacts is in line with tier 2 of the mitigation hierarchy.

Therefore, impacts can be mitigated to acceptable levels or enhanced through the implementation of the recommended mitigation or enhancement measures. This is however not relevant for the visual impact of the wind farm as the turbines will be visible regardless of the mitigation applied, especially to sensitive receptors such as the RPGR. This high significance rating is, however, not considered as a fatal flaw by the specialist.

As detailed in the cost-benefit analysis, the benefits of the Merino Wind Farm are expected to occur at a national, regional and local level. As the costs to the environment at a site-specific level have been largely limited through the appropriate placement of infrastructure on the project site within lower sensitive areas through the avoidance of features and areas considered to be sensitive, the benefits of the project are expected to partially offset the localised environmental costs of the wind farm. From a social perspective, both positive and negative impacts are expected.

Through the assessment of the development footprint within the development area, it can be concluded that the development of the Merino Wind Farm will not result in unacceptable environmental impacts (subject to the implementation of the recommended mitigation measures).

Based on the comparative assessment of the site compound alternatives, it can be concluded that either Alternative 2 or Alternative 3 are considered preferred. It should however be noted that the final preferred option will be informed by the final technical preference.

2.4. Overall Recommendation

Considering the findings of the independent specialist studies, the impacts identified, the development footprint proposed by the developer, the avoidance of the sensitive environmental features within the development area, as well as the potential to further minimise the impacts to acceptable levels through mitigation, it is the reasoned opinion of the EAP that the Merino Wind Farm is acceptable within the landscape and can reasonably be authorised subject to the removal or relocation of the one proposed turbine from the Merino Wind Farm located on the ridgelines (i.e., M30) as recommended by the heritage specialist. Considering the findings of the comparative assessment of the site compound location alternatives, it is the reasoned opinion of the EAP that either Alternative 2 or Alternative 3 is acceptable and can be utilised for the establishment of the site compound.

The Merino Wind Farm with a contracted capacity of up to 140MW, located on the project site consisting of four affected properties (Portion 1 of Farm Rondavel 85, Portion 0 of Farm Rondavel 85, Portion 9 of Farm Bult & Rietfontein 96, and Portion 0 of Farm Vogelstruisfontein 84) includes the following infrastructure (to be included within an authorisation issued for the project):

- Up to 35 wind turbines with a maximum hub height of up to 170m and tip height of up to 250m.
- Concrete turbine foundations to support the turbine hardstands.
- Inverters and transformers.
- Temporary laydown areas which will accommodate storage and assembly areas.
- Cabling between the turbines, to be laid underground where practical.
- A temporary concrete batching plant.
- 33/132kV onsite facility substation.
- Underground cabling from the onsite substation to the 132kV collector substation.
- Electrical and auxiliary equipment required at the collector substation that serves the wind energy facility, including switchyard/bay, control building, fences, etc.
- Battery Energy Storage System (BESS).
- Access roads and internal distribution roads.

The following key conditions would be required to be included within an authorisation issued for the Merino Wind Farm:

- All mitigation measures detailed within this EIA Report, as well as the specialist reports contained within **Appendices D to M** are to be implemented.
- The EMPr as contained within **Appendix N** and **O** of this EIA Report should form part of the contract with the Contractors appointed to construct and maintain the wind farm in order to ensure compliance with environmental specifications and management measures. The implementation of this EMPr for all life cycle phases of the Merino Wind Farm is considered key in achieving the appropriate environmental management standards as detailed for this project.
- <u>The option of removing / relocating the eight (8) wind turbines located on top of the Bakenskop ridge should be investigated.</u>
- <u>The option of compensating the RPGR for potential lost tourism related revenue should also be investigated by the proponent. This will involve determining if visitor numbers and associated revenue</u>

decrease following the establishment of the proposed Merino WEF and then compensating the owners of RPGR for the difference.

- Following the final design of the Merino Wind Farm, a revised layout must be submitted to DFFE for review and approval prior to commencing with construction. No development is permitted within the identified no-go areas as detailed in **Figure 11.1** of the EIA Report.
- Due to the potential for impact to significant rock engravings, an archaeological walkdown of roads and turbine placement is recommended once the layout is finalised.
- One turbine from the proposed Merino WEF layout is removed or moved to a less sensitive area (**Figure 11.3** of the EIA Report).
- Implement a chance finds procedure for the rescuing of any fossils or heritage resources discovered during construction.
- Undertake a detailed walk-through survey of footprint areas that are within habitats where SCC are likely to occur during a favourable season to locate any individuals of protected plants, as well as for any populations of threatened plant species. This survey must cover the footprint of all approved infrastructure, including internal access roads (final infrastructure layout). The best season is early to late Summer, but dependent on recent rainfall and vegetation growth.
- Obtain the necessary permits for specimens or protected plant species that will be lost due to construction of the project.
- As far as possible, locate infrastructure within areas that have been previously disturbed or in areas with lower sensitivity scores.

A validity period of 10 years of the Environmental Authorisation is requested, should the project obtain approval from DFFE.

2.5. Activities and Components associated with the Merino Wind Farm

The main activities/components associated with the Merino Wind Farm are detailed in **Table 2.3**.

Table 2.3: Activities associated with Planning, Construction, Operation and Decommissioning of the Merino Wind Farm

Construction Phase	
Requirements	» Project receives Environmental Authorisation from the DFFE, preferred bidder allocation granted by DMRE, a generating license issued by NERSA, and a Power Purchase Agreement secured with Eskom. In addition to bidding into the REIPPPP, the developer is also considering options such as Private Power Purchase Agreements and Wheeling Agreements with Eskom to deliver the generated power to Private Offtakers. » Duration dependent on number of turbines, expected to be 15-18 months for Merino Wind Farm. » Create direct construction employment opportunities. Approximately 350 employment opportunities will be created. » No on-site labour camps. Employees to be accommodated in the nearby towns such as Richmond and Victoria West and transported to and from site on a daily basis. » Overnight on-site worker presence would be limited to security staff. » Waste removal and sanitation will be undertaken by a sub-contractor, where possible. Waste containers, including containers for hazardous waste, will be located at easily accessible locations /turbine positions on site when construction activities are undertaken. » Electricity required for construction activities will be generated by a generator. Where low voltage connections are possible, these will be considered. » Water required for the construction phase will be supplied by the municipality. In addition, where possible, borehole water will be used. Should water availability at the time of construction be limited, water will be transported to site via water tanks. Water will be used for sanitation and potable water on site as well as construction works.
Activities to be undertaken	
Conduct surveys prior to construction	» Including, but not limited to, a geotechnical survey, site survey and confirmation of the turbine micro-siting footprint, and survey of the on-site collector substation site to determine and confirm the locations of all associated infrastructure.
Establishment of access roads to the Site	» Internal access roads within the site will be established at the commencement of construction. » Existing access roads will be utilised, where possible, to minimise impact. It is unlikely that access roads will need to be upgraded as part of the proposed development. » Access roads to be established between the turbines for construction and/or maintenance activities within the development footprint.

	» Internal service road alignment will be approximately 4.5m wide. To be determined by the final micro-siting or positioning of the wind turbines.
Undertake site preparation	» Including the clearance of vegetation at the footprint of each turbine, establishment of the laydown areas, the establishment of internal access roads and excavations for foundations. » Stripping of topsoil to be stockpiled, backfilled, removed from site and/or spread on site. » To be undertaken in a systematic manner to reduce the risk of exposed ground being subjected erosion. » Include search and rescue of floral species of concern (where required) and the identification and excavation of any sites of cultural/heritage value (where required).
Establishment of laydown areas and batching plant on site	» A laydown area for the storage of wind turbine components, including the cranes required for tower/turbine assembly and civil engineering construction equipment. » The laydown will also accommodate building materials and equipment associated with the construction of buildings. » A crane hardstand at each turbine position where the main lifting crane will be erected and/or disassembled. Each hardstand to be ~80m x 35m in extent. » No borrow pits will be required. Infilling or depositing materials will be sourced from licenced borrow pits within the surrounding areas. » A temporary concrete batching plant of 50m x 50m in extent to facilitate the concrete requirements for turbine foundations.
Construct foundation	» Concrete foundations of a diameter of up to 25m to be constructed at each turbine location. » Excavations to be undertaken mechanically. » Concrete foundation will be constructed to support a mounting ring. » Depending on geological conditions, the use of alternative foundations may be considered (e.g., reinforced piles).
Transport of components and equipment to and within the site	» Turbine units to be transported include the tower segments, hub, nacelle, and three rotor blades. » Components to be transported to the site in sections on flatbed trucks by the turbine supplier. Imported components to be transported from the most feasible port of entry, which is deemed to be the Port of Ngqura in the Eastern Cape Province. Alternatively, components can be imported via the Port of Saldanha in the Western Cape. » Components considered as abnormal loads in terms of Road Traffic Act (Act No 29 of 1989) due to dimensional limitations (abnormal length of the blades) and load limitations (i.e., the nacelle) will require a permit for the transportation of the abnormal loads on public roads. » Specialised construction and lifting equipment to be transported to site to erect the wind turbines. » Civil engineering construction equipment to be brought to the site for the civil works (e.g., excavators, trucks, graders, compaction equipment, cement trucks, site offices etc.). » Components for the establishment of the substation (including transformers) and the associated infrastructures to be transported to site. » Transportation will take place via appropriate National and Provincial roads, and the dedicated access/haul road to the site.

Construction of the turbine	» A lifting crane will be utilised to lift the tower sections, nacelle, and rotor into place. » Approximately 1 week is required to erect a single turbine depending on climatic conditions. » Lifting cranes are required to move between the turbine sites.
Construction of the substation	» One on-site collector substation to be constructed within the development footprint. » Substation will be constructed with a high-voltage (HV) yard footprint of up to 1000m x 700m.
Connection of wind turbines to the substation	» Each wind turbine to be connected to the on-site collector substation via underground electrical cables. » Excavation of trenches is required for the installation of the cables. Trenches will be approximately 1.5m deep. » Underground cables are planned to follow the internal access roads, as far as possible.
Establishment of ancillary infrastructure	» Site offices and maintenance buildings, including workshop areas for maintenance and storage will be required. » Establishment will require the clearing of vegetation, levelling, and the excavation of foundations prior to construction.
Connect substation to the power grid	» A 132/33kV on-site collector substation to be connected to a proposed 132kV central collector substation via a 132kV underground cabling.
Undertake site rehabilitation	» Commence with rehabilitation efforts once construction completed in an area, and all construction equipment is removed. » On commissioning, access points to the site not required during the operation phase will be closed and prepared for rehabilitation.
Operation Phase	
Requirements	» Duration will be 20-25 years. » Requirements for security and maintenance of the project. » Employment opportunities relating mainly to operation activities and maintenance. Approximately 20 full-time employment opportunities will be available during the operation of the wind farm.
Activities to be undertaken	
Operation and Maintenance	» Full time security, maintenance, and control room staff. » All turbines will be operational except under circumstances of mechanical breakdown, inclement weather conditions, or maintenance activities. » Wind turbines to be subject to periodic maintenance and inspection. » Disposal of waste products (e.g., oil) in accordance with relevant waste management legislation. » Areas which were disturbed during the construction phase to be utilised, should a laydown area be required during operation.
Decommissioning Phase	
Requirements	» Decommissioning of the Merino Wind Farm infrastructure at the end of its economic life. » Potential for repowering of the facility, depending on the condition of the facility at the time. » Expected lifespan of approximately 20 - 25 years (with maintenance) before decommissioning is required. » Decommissioning activities to comply with the legislation relevant at the time.

Activities to be undertaken	
Site preparation	» Confirming the integrity of site access to accommodate the required equipment and lifting cranes. » Preparation of the site (e.g., laydown areas and construction platform). » Mobilisation of construction equipment.
Disassemble and remove turbines	» Large crane required for the disassembling of the turbine and tower sections. » Components to 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. » Concrete will be removed to a depth as defined by an agricultural specialist and the area rehabilitated. » Cables will be excavated and removed, as may be required
Components to be disposed of or recycled	» Foundation » Tower » Electrical facilities in tower base » Rotor » Generator » Machine house » Regarding the foundation body and sub-base of the tower, the concrete will undergo crushing and be used as combined base/wearing course » Reinforcing steel will go through cleansing and milling to re-melt the components

It is expected that the areas of the project site affected by the wind farm infrastructure (development footprint) will revert back to their original land-use (i.e. primarily grazing) once the Merino Wind Farm has reached the end of its economic life and all infrastructure has been decommissioned.

CHAPTER 3: PURPOSE AND OBJECTIVES OF THE EMPR

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". The objective of this EMPr 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 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 to 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.

This EMPr is applicable to all employees and contractors working on the pre-construction, construction, and operation and maintenance phases of the Merino Wind Farm. The document must be adhered to and updated as relevant throughout the project life cycle.

This EMPr has been compiled in accordance with Appendix 4 of the EIA Regulations, 2014 (as amended). This is a dynamic document and will be further developed in terms of specific requirements listed in any authorisations issued for the Merino Wind Farm and/or as the project develops. The EMPr has been developed as a set of environmental specifications (i.e. principles of environmental management). The specifications have been developed on the basis of the findings of the Environmental Impact Assessment (EIA), and must be implemented to protect sensitive on-site and off-site features through controlling construction, operation and decommissioning activities that could have a detrimental effect on the environment, and through avoiding or minimising potential impacts.

The EMPr has the following objectives:

- 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 Merino Wind Farm.
- 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.
- Identify entities who will be responsible for the implementation of the measures and outline functions and responsibilities.
- Propose mechanisms and frequency for monitoring compliance, and prevent long-term or permanent environmental degradation.

» Facilitate appropriate and proactive responses to unforeseen events or changes in project implementation that were not considered in the BA process.

The mitigation measures identified within the EIA process are systematically addressed in the EMPr, ensuring the minimisation of adverse environmental impacts to an acceptable level.

Great Karoo Renewable Energy (Pty) Ltd must ensure that the implementation of the project complies with the requirements of all environmental authorisations, permits, and obligations emanating from relevant environmental legislation. This obligation is partly met through the development and the implementation of this EMPr, and through its integration into the relevant contract documentation provided to parties responsible for construction and/or operation activities on the site. The adequacy and efficacy of implementation is to be monitored by an independent Environmental Control Officer (ECO). Since this EMPr is part of the EIA process for the Merino Wind Farm, it is important that this document be read in conjunction with the EIA Report compiled for this project. This will contextualise the EMPr and enable a thorough understanding of its role and purpose in the integrated environmental management process. Should there be a conflict of interpretation between this EMPr and the Environmental Authorisation, the stipulations in the Environmental Authorisation shall prevail over that of the EMPr, unless otherwise agreed by the authorities in writing. Similarly, any provisions in legislation overrule any provisions or interpretations within this EMPr.

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

CHAPTER 4: STRUCTURE OF THIS EMPR

The first three chapters provide background to the EMPr and the Merino Wind Farm, while the chapters which follow consider the following:

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

These chapters set out the procedures necessary for Great Karoo Renewable Energy (Pty) Ltd as the project owner, to minimise environmental impacts and achieve environmental compliance. For each of the phases of implementation, an over-arching environmental **goal** is stated. In order to meet this goal, a number of **objectives** are listed. The EMPr 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 EMPr table has been established for each environmental objective. The information provided within the EMPr table for each objective is illustrated below:

OBJECTIVE: Description of the objective, which is necessary to meet the overall goals; which take into account the findings of the EIA specialist studies

Project component/s	List of project components affecting the objective, i.e.: » Wind turbines; » Access roads; and » Associated infrastructure.
Potential Impact	Brief description of potential environmental impact if objective is not met.
Activity/risk source	Description of activities which could impact on achieving objective.
Mitigation: Target/Objective	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

Performance Indicator	Description of key indicator(s) that track progress/indicate the effectiveness of the management plan.
Monitoring	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 throughout the life of the wind farm whenever changes, such as the following, occur:

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

4.1. Project Team

This EMPr was compiled by:

EMP Compilers	
Mmakoena Mmola	Savannah Environmental
Jo-Anne Thomas	Savannah Environmental
Input from Specialist Consultants	
David Hoare of David Hoare Consulting (Pty) Ltd	**Ecology**
Chris van Rooyen of Chris van Rooyen Consulting	Avifauna
Werner Marais of Animalia	Bats
Ivan Baker of the Biodiversity Company	Freshwater and Soils
Morné de Jager of Enviro-Acoustic Research	Noise
Lourens du Plessis of LoGIS	Visual
Tony Barbour of Tony Barbour Environmental Consulting	Social
Jenna Lavin of CTS Heritage	Heritage (including Archaeology Palaeontology and Cultural Heritage
Iris Wink of JG Afrika	Traffic

The Savannah Environmental team have extensive knowledge and experience in environmental impact assessments and environmental management, having been involved in EIA processes for more than fifteen (16) years. They have managed and drafted Environmental Management Programmes for other power generation projects throughout South Africa, including numerous wind and solar energy facilities.

CHAPTER 5: ROLES AND RESPONSIBILITIES

OBJECTIVE 1: Establish clear reporting, communication, and responsibilities during construction in relation to the overall implementation of the EMPr

Formal responsibilities are necessary to ensure that key procedures are executed. Specific responsibilities of the Technical Director/Manager, Site Manager, Internal Environmental Officer, Safety and Health Representative, Independent Environmental Control Officer (ECO) and Contractor for the construction phase of this project are as detailed below. Formal responsibilities are necessary to ensure that key procedures are executed. **Figure 5.1** provides an organogram indicating the organisational structure for the implementation of the EMPr.

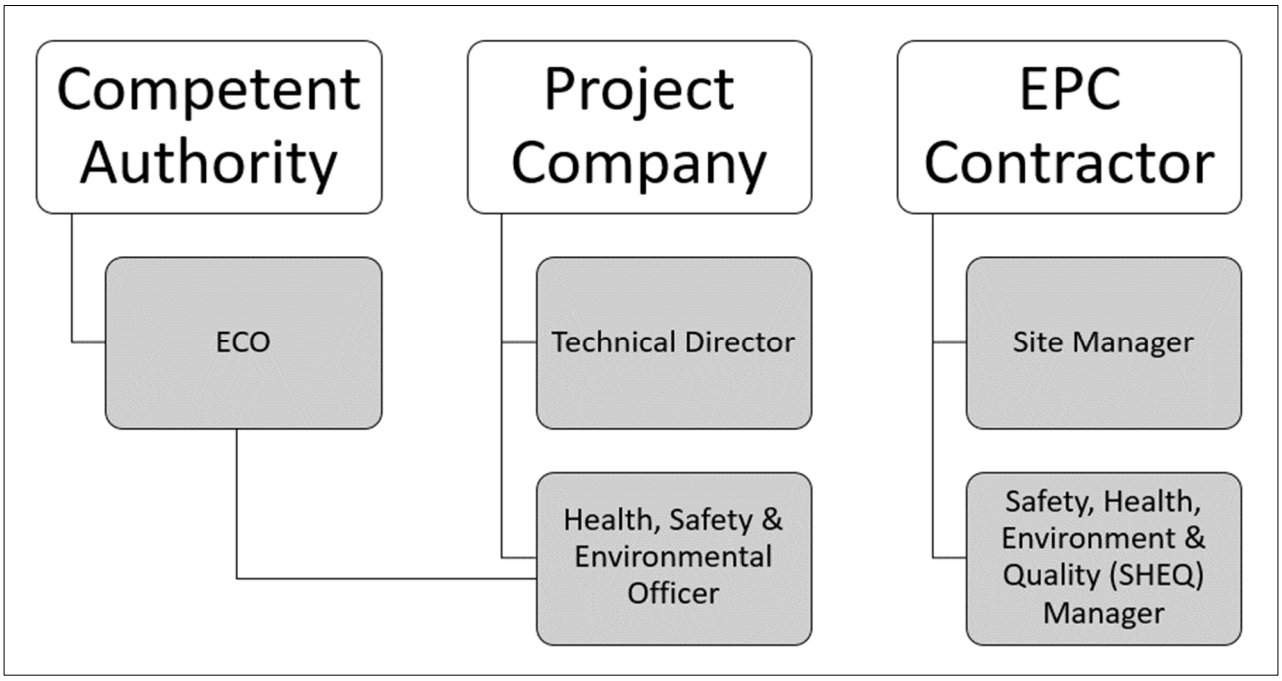


Figure 5.1: Organisational structure for the implementation of the EMPr

i) The Developer

As the Proponent, Great Karoo Renewable Energy (Pty) Ltd, must ensure that the project's implementation complies with the requirements of all EAs and all other permits, and obligations emanating from relevant environmental legislation.

ii) Construction Manager

The Construction Manager will:

» Ensure all specifications and legal constraints, specifically with regards to the environment, are highlighted to the Contractor(s), so that they are aware of these.
» Ensure that Developer and its Contractor(s) are made aware of all stipulations within the EMPr.

- 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 through input from the independent ECO.
- Be fully conversant with the BA for the project, the EMPr, the conditions of the EA (once issued), and all relevant environmental legislation.
- Be fully knowledgeable with the contents of all relevant licences and permits.

iii) Site Manager

The Project Manager/Site Manager is responsible for the overall management of the project and EMPr implementation. The following tasks will fall within his/her responsibilities:

- Be fully conversant with the BA for the project, the EMPr, the EA conditions (once issued), and all relevant environmental legislation.
- Be fully knowledgeable with the contents of all relevant licences and permits.
- Be familiar with this EMPr's recommendations and mitigation measures; and implement these measures.
- Ensure all specifications and legal constraints, specifically with regards to the environment, are highlighted to the Contractor(s) so that they are aware of these.
- Monitor site activities on a daily basis for compliance.
- Ensure that the EMPr is correctly implemented throughout the project through site inspections and meetings. This must be documented as part of the site meeting minutes.
- Conduct internal audits of the construction site against the EMPr.
- Confine the construction site to the demarcated area.
- Rectify transgressions through the implementation of corrective action.

iv) Environmental Control Officer

A suitably qualified Environmental Control Officer (ECO)[5] must be appointed by the project proponent prior to the commencement of any authorised activities and 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. Accordingly, the ECO will:

- Be fully knowledgeable of the contents of the EIA.
- Be fully knowledgeable of the contents of the conditions of the EA (once issued).
- Be fully knowledgeable of the contents of the EMPr.
- Be fully knowledgeable of all the licences and permits issued to the site.
- Be fully knowledgeable of the contents of all relevant environmental legislation.
- Ensure that the contents of the EMPr are communicated to the Contractors site staff and that the Site Manager and Contractors are constantly made aware of the contents through ongoing discussion.
- Ensure that the compliance of the EMPr, EA and the legislation is monitored through regular and comprehensive inspection of the site and surrounding areas.
- Ensure that the Site Manager has input into the review and acceptance of construction methods and method statements or site-specific plans.

[5] The ECO should have a relevant degree or technical diploma in environmental management and at least 2 years of experience in the field.

- Ensure that if the EMPr, EA and/or the legislation conditions, regulations or specifications are not followed then appropriate measures are undertaken to address any non-compliances (for example an ECO may cease construction or an activity to prevent a non-compliance from continuing).
- Ensure that any non-compliance or remedial measures that need to be applied are reported.
- Keep records of all activities on site, problems identified, transgressions noted and a task schedule of tasks undertaken by the ECO.
- Independently report to the FSDESTEA in terms of compliance with the specifications of the EMPr and conditions of the EA (once issued).
- Keep records of all reports submitted to the FSDESTEA.

The ECO must be present full-time on site for the site preparation and initial clearing activities to ensure the correct demarcation of no-go areas, to facilitate environmental induction with construction staff and 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). Thereafter, monthly compliance audits can be undertaken, provided that adequate compliance with the EA, environmental permits and EMPr is achieved. The developer must appoint a designated Environmental Officer (EO) to be present on-site to deal with any environmental issues as they arise. 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.

v) Contractors

The Lead Contractor is responsible for the following:

- Ensure compliance with the EA, environmental permits and the EMPr at all times during construction.
- Have the overall responsibility of the EMPr and its implementation.
- Ensure that all appointed contractors and sub-contractors are aware of the EMPr and their respective responsibilities.
- Provide all necessary supervision during the execution of the project.
- Comply with any special conditions as stipulated by landowners.
- Inform and educate all employees about the environmental risks associated with the various activities to be undertaken, and highlight those activities which must be avoided during the construction process in order to minimise significant impacts to the environment.
- Maintain an environmental register which keeps a record of all incidents which occur on the site during construction. These incidents include:
  - Public involvement / complaints;
  - Health and safety incidents;
  - Hazardous materials stored on site;
  - Non-compliance incidents; and
  - 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.
- Conduct audits to ensure compliance to the EMPr.
- Ensure there is communication with the Project Manager, the ECO, and relevant discipline engineers on matters concerning the environment.
- Should the Contractor require clarity on any aspect of the EMPr, the Contractor must contact the Environmental Consultant/Officer for advice.

Contractors and Service Providers must be 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 contractor's 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.
- A copy of the EMPr must be easily accessible to all on-site staff members.
- Employees must be familiar with the requirements of this EMPr and the environmental specifications as they apply to the construction of the Solar PV Facility.
- Prior to commencing any site works, all employees and sub-contractors must have attended an environmental awareness training course which must provide staff with an appreciation of the project's environmental requirements, and how they are to be implemented.
- Staff will be informed of environmental issues as deemed necessary by the ECO.

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 the above 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.
- 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).

vi) Contractor's Safety, Health and Environment Representative/Environmental Officer

The Contractor's Safety, Health and Environment (SHE) Representative/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 SHE/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 SHE/EO 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.

OBJECTIVE 2: Establish clear reporting, communication, and responsibilities during operation in relation to overall implementation of the EMPr during operation

Formal responsibilities are necessary to ensure that key procedures are executed during operation. Several professionals will form part of the operation team. For the purposes of the EMPr, the generic roles that need to be defined are those of the:

- Operations Manager.
- Environmental Manager.

It is acknowledged that the specific titles for these functions may vary once the project is implemented. The purpose of this section of the EMPr is to give a generic outline of what these roles typically entail. It is expected that this will be further defined during project implementation.

i) Operations Manager

The Plant 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.

ii) Environmental Manager Environmental Manager

The Environmental Manager will:

- Develop and Implement an Environmental Management System (EMS) for the project.
- Manage and report on the Solar PV Energy Facility's environmental performance.
- Maintain a register of all known environmental impacts and manage the monitoring thereof.
- Conduct internal environmental audits and co-ordinate external environmental audits.
- Liaise with statutory bodies (such as FSDESTEA and conservation authorities) on environmental performance and other issues.
- Conduct environmental training and awareness for the employees who operate and maintain the solar facility.
- Compile environmental policies and procedures.
- Liaise with interested and affected parties (I&APs) on environmental issues of common concern.
- Track and control the lodging of any complaints regarding environmental matters.

The Environmental Manager must provide fourteen (14) days written notification to the FSDESTEA that the project's operation phase will commence.

CHAPTER 6: MANAGEMENT PROGRAMME: PLANNING AND DESIGN

Overall Goal: undertake the pre-construction (planning and design) phase in a way that:

- Ensures that the design of the wind farm responds to the identified environmental constraints and opportunities.
- Ensures that pre-construction activities are undertaken in accordance with all relevant legislative requirements.
- Ensures that adequate regard has been taken of identified environmental sensitivities, as well as any landowner and community concerns and that these are appropriately addressed through design and planning (where applicable).
- Enables the construction activities to be undertaken without significant disruption to other land uses and activities in the area.
- Ensures that the best environmental options are selected for the wind farm.

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

6.1. Objectives

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

Subject to final turbine micro-siting and subsequent acceptance from DFFE , the facility layout detailed in **Figure 2.4** must be implemented. Cognisance of sensitive areas defined in **Figure 2.2** and within the EIAR eport should be considered when undertaking the final design of the facility.

Project component/s	» Wind turbines. » Access roads. » Cabling between turbines. » Substations. » BESS. » All other associated infrastructure.
Potential Impact	» Design fails to respond optimally to the identified environmental considerations. » Employment creation for the construction, operation and decommissioning activities. » Design fails to respond optimally to the environmental considerations.
Activities/risk sources	» Positioning of turbines and alignment of access roads and underground cabling. » Positioning of substation. » Positioning of BESS. » Pre-construction activities, e.g. geotechnical investigations.
Mitigation: Target/Objective	» To ensure that the design of the wind farm responds to the identified environmental constraints and opportunities, including the constraints identified through the EIA process. » To ensure that pre-construction activities are undertaken in an environmentally friendly manner by e.g. avoiding identified sensitive areas.

	» Optimal planning of visual infrastructure to minimise visual impact.

Mitigation: Action/control	Responsibility	Timeframe
As far as possible, locate infrastructure within areas that have been previously disturbed or in areas with lower sensitivity scores. Avoid sensitive features and habitats when locating infrastructure.	Developer EPC Contractor	Design phase
Use the shapefiles provided within the EIA process defining the watercourses within the site to signpost the edge of the watercourses closest to site. Place the sign 22m from the edge (this is the buffer zone). Label these areas as environmentally sensitive areas, keep out.	Developer EPC Contractor	Design phase
Maintain adequate buffer zones around hydrological features so that these do not become degraded from runoff and erosion.	Developer EPC Contractor	Design phase
Select a site compound alternative that falls outside of CBA1 areas.	Developer EPC Contractor	Design phase
Locate linear infrastructure outside boundaries of CBA1 areas, except where these are located entirely within existing disturbance and/or transformation.	Developer EPC Contractor	Design phase
A 3.7km turbine exclusion zone should be implemented around the Verreaux's Eagle nests listed below, and the construction of turbines from 3.7km up to 5.2km from the nest should be avoided, if possible: - FPVE2 (-31.543776° 23.597448°) - FPVE4 (-31.540635° 23.716886°) - FPVE5 (-31.560946° 23.612253°)	Developer EPC Contractor	Design phase
A 3km No-Go zone should be implemented around the Tawny Eagle nest (FPTE1) (-31.445988° 23.583921°).	Developer EPC Contractor	Design phase
A 5km No-Go zone should be implemented around the Martial Eagle nest (FPME1) (-31.524550° 23.534279°).	Developer EPC Contractor	Design phase
A 750m turbine exclusion zone must be implemented around the following Jackal Buzzard nests: - JB1 -31.532193° 23.617943° - JB2 -31.453311° 23.679073°	Developer EPC Contractor	Design phase
An 800m turbine exclusion zone should be implemented at the large dams listed below: - -31.505297° 23.624400° - -31.463982° 23.653370° - -31.452242° 23.623465°	Developer EPC Contractor	Design phase
A 500m turbine exclusion zone should be implemented at the medium-sized dam situated at -31.468068° 23.613909°.	Developer EPC Contractor	Design phase
A 200m turbine exclusion zone should be implemented around the following boreholes: - -31.512977° 23.608149° - -31.512790° 23.590034° - -31.524881° 23.648011° - -31.543646° 23.641418° - -31.493728° 23.682023° - -31.492167° 23.622478°	Developer EPC Contractor	Design phase

Mitigation: Action/control	Responsibility	Timeframe
- -31.485982° 23.606518° - -31.478371° 23.603843° - -31.493728° 23.682023°		
No turbines must be constructed on the ridge stretching from -31.512735° 23.617398° to -31.531996° 23.618575°.	Developer EPC Contractor	Design phase
One of the turbines located along the ridgeline must be removed to break up the cluster and to minimise the impact to the sense of place (**Figure 2.3**).	Developer EPC Contractor	Design phase
Adhere to the bat sensitivity map.	Developer EPC Contractor	Design phase
A no-go development buffer of 1km must be implemented around Sites GK037, GK038 and GK074.	Developer EPC Contractor	Design phase
A no-go development buffer of 50m must be implemented around site GK048.	Developer EPC Contractor	Design phase
The option of removing / relocating the eight (8) wind turbines located on top of the Bakenskop ridge should be investigated.	Developer EPC Contractor	Design phase
The option of compensating the RPGR for potential lost tourism related revenue should be investigated by the proponent. This will involve determining if visitor numbers and associated revenue decrease following the establishment of the proposed Merino WEF and then compensating the owners of RPGR for the difference.	Developer EPC Contractor	Design phase
Plan and conduct pre-construction activities in an environmentally responsible manner and in a manner that does not lead to unnecessary impacts and disturbance.	Developer EPC Contractor	Pre-construction
Consider design level mitigation measures recommended by the specialists, especially with respect to flora, fauna, aquatic ecology, avifauna, bats, and heritage sites, as detailed within the EIA report and relevant appendices.	Developer EPC Contractor	Design phase
The hierarchy of sensitivity zones identified should be considered where possible with preferential placement of turbines in areas with no sensitivity score, followed by low sensitivity, medium sensitivity and medium-high sensitivity.	Developer EPC Contractor	Design phase
No turbines should be planned in no-go areas, while associated infrastructure should be avoided where possible in these areas. The turbine blade should not protrude into these areas, and therefore the bases should be constructed with sufficient distance from these areas to prevent this.	Developer EPC Contractor	Design phase
The final pole designs must be signed off by the bird specialist to ensure that a bird-friendly design is used, where relevant.	Developer EPC Contractor	Design phase
Plan lighting as follows: - Implement needs-based night lighting if considered acceptable by the CAA. - Limit aircraft warning lights to the turbines on the perimeter according to CAA requirements, thereby reducing the overall impact. - Shield the sources of light by physical barriers (walls, vegetation, or the structure itself).	Developer EPC Contractor	Design phase

Mitigation: Action/control	Responsibility	Timeframe
- Limit mounting heights of lighting fixtures, or alternatively use foot-lights or bollard level lights. - Make use of minimum lumen or wattage in fixtures. - Make use of down-lighters, or shielded fixtures. - Make use of Low Pressure Sodium lighting or other types of low impact lighting. - Make use of motion detectors on security lighting. This will allow the site to remain in relative darkness, until lighting is required for security or maintenance purposes.		
If possible, do not place outside lights near turbines of adjacent WEF's.	Developer EPC Contractor	Design phase

Performance Indicator	» Design meets the objectives and does not degrade the environment. » Design and layout respond to the mitigation measures and recommendations in the EIA Report.
Monitoring	» Ensure that the design implemented meets the objectives and mitigation measures in the EIA Report through review of the facility design by the Project Manager and ECO prior to the commencement of construction.

OBJECTIVE 2: Ensure that relevant permits and site-specific plans are in place to manage impacts on the environment

Project Component/s	» Wind turbines. » Access roads. » Cabling between turbines. » Substations. » BESS. » All other associated infrastructure.
Potential Impact	» Impact on identified sensitive areas. » Design fails to respond optimally to the environmental considerations.
Activities/Risk Sources	» Positioning of all project components » Pre-construction activities, e.g. geotechnical investigations, site surveys of substation footprint, internal access roads and environmental walk-through surveys. » Positioning of temporary sites.
Mitigation: Target/Objective	» To ensure that the design of the power plant responds to the identified environmental constraints and opportunities. » To ensure that pre-construction activities are undertaken in an environmentally friendly manner. » To ensure that the design of the power plant responds to the identified constraints identified through pre-construction surveys.

Mitigation: Action/Control	Responsibility	Timeframe
Undertake a detailed walk-through survey of footprint areas that are within habitats where SCC are likely to occur during a favourable season to locate any individuals of protected plants, as well as for any populations of threatened plant species. This	Developer Specialist	Pre-construction

Mitigation: Action/Control	Responsibility	Timeframe
survey must cover the footprint of all approved infrastructure, including internal access roads (final infrastructure layout). The best season is early to late Summer, but dependent on recent rainfall and vegetation growth.		
Compile a Plant Rescue Plan to be approved by the appropriate authorities.	Developer Specialist	Pre-construction
Obtain the necessary permits for specimens or protected plant species that will be lost due to construction of the project.	Developer Specialist	Pre-construction
Compile and implement a Rehabilitation Plan.	Developer Specialist	Pre-construction
Compile an Alien Plant Management Plan, including monitoring, to ensure minimal impacts on surrounding areas.	Developer Specialist	Pre-construction
Compile and implement a Stormwater Management Plan, which highlights control priorities and areas and provides a programme for long-term control.	Developer Specialist	Pre-construction
Obtain any additional environmental permits required prior to the commencement of construction.	Developer	Pre-construction
Obtain abnormal load permits for transportation of project components to site (if required).	Contractor(s)	Prior to construction
Develop a detailed method statement for the implementation of the alien invasive management plan and open space management plan for the site (refer to **Appendix C**).	Developer	Pre-construction
Develop a detailed method statement for the implementation of the plant rescue and protection plan for the site (refer to **Appendix E**).	Developer	Pre-construction
Develop a detailed method statement for the implementation of the re-vegetation and habitat rehabilitation plan for the site (refer to **Appendix D**).	Developer	Pre-construction
Develop a detailed method statement for the implementation of the traffic and transportation management plan for the site (refer to **Appendix F**).	Developer	Pre-construction
Prepare a detailed Fire Management Plan.	Developer	Pre-construction

Performance Indicator	» Layout does not destroy/degrade no-go areas. » No disturbance of no-go areas. » Permits are obtained and relevant conditions complied with. » Relevant management plans and Method Statements prepared and implemented.
Monitoring	» Review of the design by the Project Manager and the ECO prior to the commencement of construction. » Monitor ongoing compliance with the EMPr.

OBJECTIVE 3: Ensure compliance of required mitigation measures and recommendations by contractors

Project Component/s	» Wind turbines. » Access roads.

	» Cabling between turbines. » Substations. » BESS. » All other associated infrastructure.
Potential Impact	» Impact on identified sensitive areas. » Planning fails to respond optimally to the environmental considerations.
Activities/Risk Sources	» Positioning of all project components » Pre-construction activities. » Positioning of temporary sites. » Employment and procurement procedures.
Mitigation: Target/Objective	» To ensure that appropriate planning is undertaken by the contractor to ensure compliance with the conditions of the EA and EMPr. » To ensure that pre-construction and construction activities are undertaken in an environmentally friendly manner.

Mitigation: Action/Control	**Responsibility**	**Timeframe**
An Environmental Control Officer (ECO) should be appointed to monitor the construction phase.	Developer Contractor	Pre-construction
Personnel must be educated about protection status of species, including distinguishing features, to be able to identify protected species.	Developer Contractor	Pre-construction
Educate staff and relevant contractors on the location and importance of the identified watercourses through toolbox talks and by including them in site inductions and the overall master plan.	Developer Contractor	Pre-construction
All contractors and employees should undergo induction which is to include a component of environmental awareness. The induction is to include aspects such as the need to avoid littering, the reporting and cleaning of spills and leaks and general good "housekeeping".	Developer Contractor	Pre-construction
The terms of this EMPr and the Environmental Authorisation must be included in all tender documentation and Contractors contracts.	Developer Contractor	Pre-construction

Performance Indicator	» Conditions of the EA and EMPr form part of all contracts. » Construction activities are undertaken in a socially and environmentally friendly manner.
Monitoring	» Monitor ongoing compliance with the EMPr and method statements.

OBJECTIVE 4: To ensure effective communication mechanisms

It is important to maintain on-going communication with the public (including affected and surrounding landowners) during the construction and operation phases of the Merino Wind Farm. Any issues and concerns raised should be addressed as far as possible in as short a timeframe as possible.

Project component/s	» Wind turbines. » Access roads.

	» Cabling between turbines. » Substations. » BESS. » All other associated infrastructure.
Potential Impact	» Impacts on affected and surrounding landowners and land uses.
Activity/risk source	» Activities associated with pre-construction phase. » Activities associated with construction of the wind farm. » Activities associated with operation.
Mitigation: Target/Objective	» Effective communication with affected and surrounding landowners. » Addressing any issues and concerns raised as far as possible in as short a timeframe as possible.

Mitigation: Action/control	Responsibility	Timeframe
Compile and implement a grievance mechanism procedure for the public (including the affected and surrounding landowners) (using **Appendix B**) to be implemented during both the construction and operation phases of the wind farm and if applicable during decommissioning. This procedure should include the details of the contact person who will be receiving issues raised by interested and affected parties, and the process that will be followed to address issues. The mechanism must also include procedures to lodge complaints in order for the local community to express any complaints or grievances with the construction process. A Public Complaints register must be maintained by the Contractor to record all complaints and queries relating to the project and the actions taken to resolve the issue. A Project Specific Grievance Mechanism will be developed and implemented prior to construction.	Developer Contractor O&M Operator	Pre-construction (construction procedure) Pre-operation (operation procedure)
Develop and implement a grievance mechanism for the construction, operation and closure phases of the wind farm for all employees, contractors, subcontractors and site personnel. This procedure should be in line with the South African Labour Law.	Developer Contractor O&M Operator	Pre-construction (construction procedure) Pre-operation (operation procedure)
Develop a public relations (PR) campaign prior to commencement of construction to communicate to community members the construction programme, inclusive of regular updates to generate excitement in the community.	Developer	Pre-construction
Meet with the affected owners and discuss their concerns over property and land values, as well as educate and inform them on the potential environmental impacts that could ensue.	Developer	Pre-construction
Create partnerships with local tourism and game farm industry to promote the development of green energy in the community and for these establishments to communicate to their guests the benefits of green energy	Developer	Pre-construction
Develop an incident reporting system to record non-conformances to the EMPr.	Contractor	Pre-construction Duration of construction
Ongoing consultation with stakeholders must be undertaken throughout the construction phase.	Developer	Duration of construction

Mitigation: Action/control	Responsibility	Timeframe
The proponent should enter into an agreement with local farmers in the area whereby damages to farm property etc. during the construction phase will be compensated for. The agreement should be signed before the construction phase commences.	Developer	Pre-construction

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

CHAPTER 7: MANAGEMENT PROGRAMME: CONSTRUCTION

Overall Goal: Undertake the construction phase in a way that:

- Ensures that construction activities are properly managed in respect of environmental aspects and impacts.
- Enables construction activities to be undertaken without significant disruption to other land uses and activities in the area, in particular concerning noise impacts, farming practices, traffic and road use, and effects on local residents.
- Minimises the impact on the indigenous natural vegetation, protected tree species, and habitats of ecological value.
- Minimises impacts on fauna using the site.
- Minimises the impact on heritage sites should they be uncovered.
- Ensures rehabilitation of disturbed areas following the execution of the works, such that residual environmental impacts are remediated or curtailed.

An environmental baseline must be established during the undertaking of construction activities, where possible.

7.1. Objectives

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

OBJECTIVE 1: Securing the site and site establishment

Project component/s	» Wind turbines. » Access roads. » Cabling between turbines. » Substations. » BESS. » All other associated infrastructure.
Potential Impact	» Hazards to landowners and public. » Security of materials. » Substantially increased damage to natural vegetation. » Potential impact on fauna and avifauna habitat.
Activities/risk sources	» Open excavations (foundations and cable trenches). » Movement of construction employees, vehicles and plant equipment in the area and on-site.
Mitigation: Target/Objective	» To secure the site against unauthorised entry. » To protect members of the public/landowners/residents.

Mitigation: Action/control	Responsibility	Timeframe
Implement strict access control for the site.		

Mitigation: Action/control	Responsibility	Timeframe
The construction area should be fenced off before construction commences and no workers should be permitted to leave the fenced off area.	Contractor	During site establishment Maintenance: for duration of Contract
All farm gates must be closed after passing through.	Contractor	Construction
Secure the site, working areas and excavations in an appropriate manner. Adequate protective measures must be implemented to prevent unauthorised access to the working area and the internal access/haul routes.	Contractor EO	During site establishment Maintenance: for duration of Contract
The Contractor must take all reasonable measures to ensure the safety of the public in the surrounding area. Where the public could be exposed to danger by any of the works or site activities, the Contractor must, as appropriate, provide suitable flagmen, barriers and/or warning signs in English 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.	Contractor	During site establishment Maintenance: for duration of Contract

Performance Indicator	» Site is secure and there is no unauthorised entry. » No members of the public/ landowners injured as a result of construction activities. » Fauna and flora is protected as far as practically possible. » Appropriate and adequate waste management and sanitation facilities provided at construction site.
Monitoring	» Regular visual inspection of the fence for signs of deterioration/forced access. » An incident reporting system must be used to record non-conformances to the EMPr. » Public complaints register must be developed and maintained on site. » ECO/ EO to monitor all construction areas on a continuous basis until all construction is completed; immediate reporting back to the site manager. » ECO/ EO to address any infringements with responsible contractors as soon as these are recorded.

OBJECTIVE 2: Appropriate management of the construction site and construction workers

Project Component/s	» Wind turbines. » Access roads. » Cabling between turbines. » Substations. » BESS. » All other associated infrastructure.
Potential Impact	» Damage to indigenous natural vegetation and sensitive areas. » Damage to and/or loss of topsoil (i.e. pollution, compaction etc.). » Impacts on the surrounding environment due to inadequate sanitation and waste removal facilities. » Pollution/contamination of the environment.
Activities/Risk Sources	» Vegetation clearing and levelling of equipment storage area/s. » Access to and from the equipment storage area/s. » Ablution facilities. » Contractors not aware of the requirements of the EMPr, leading to unnecessary impacts on the surrounding environment.

Mitigation: Target/Objective	» Limit equipment storage within demarcated designated areas. » Ensure adequate sanitation facilities and waste management practices. » Ensure appropriate management of actions by on-site personnel in order to minimise impacts to the surrounding environment.

Mitigation: Action/Control	Responsibility	Timeframe
To minimise impacts on the surrounding environment, contractors must be required to adopt a certain Code of Conduct and commit to restricting construction activities to areas within the development footprint. Contractors and their sub-contractors must be familiar with the conditions of the Environmental Authorisation, the BA Report, and this EMPr, as well as the requirements of all relevant environmental legislation.	Contractors	Construction
Contractors must ensure that all workers are informed at the outset of the construction phase of the conditions contained on the Code of Conduct.	Contractor and sub-contractor/s	Pre-construction
Restrict the activities and movement of construction workers and vehicles to the immediate construction site and existing access roads.	Contractor	Construction
All construction vehicles must adhere to clearly defined and demarcated roads. No driving outside of the development boundary must be permitted.	Contractor	Construction
Ensure all construction equipment and vehicles are properly maintained at all times.	Contractor	Construction
Minimise the development footprint within high sensitivity areas	Contractor	Construction
Develop an integrated management plan for the development area, which is beneficial to fauna and flora.	Specialist	Pre-construction
Ensure that construction workers are clearly identifiable. All workers must carry identification cards and wear identifiable clothing.	Contractor	Construction
All personnel should undergo environmental induction with regards to fauna and in particular awareness about not harming or collecting species such as snakes, tortoises and snakes which are often persecuted out of fear or superstition, waste management and the importance of not undertaking activities that could result in pollution of those watercourses.	Contractor	Construction
Regular toolbox talks should be undertaken to ensure appropriate levels of environmental awareness.	Contractor	Construction
Contact details of emergency services must be prominently displayed on site.	Contractor	Construction
Contractor must provide adequate firefighting equipment on site and provide firefighting training to selected construction staff.	Contractor	Construction
Personnel trained in first aid must be on site to deal with smaller incidents that require medical attention.	Contractor	Construction
Road borders must be regularly maintained to ensure that vegetation remains short to serve as an effective firebreak. An emergency fire plan must be developed with emergency procedures in the event of a fire.	Contractor	Duration of construction

Mitigation: Action/Control	Responsibility	Timeframe
Strict control of the behaviour of construction workers must be implemented in terms of works near watercourses.	Contractor	Construction
Ensure waste storage facilities are maintained and emptied on a regular basis.	Contractor	Duration of construction
Ensure that rubble, litter, and disused construction materials are appropriately stored (if not removed daily) and then disposed regularly at licensed waste facilities.	Contractor	Duration of Contract
No liquid waste, including grey water, may be discharged into any water body or drainage line. All sewage disposal to take place at a registered and operational wastewater treatment works. Proof of disposal to be retained as proof of responsible disposal.	Contractor	Duration of construction
All contaminated water must be contained by means of careful run-off management on site.	Contractor	Construction
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.	Contractor	During construction.
Ensure ablution facilities are appropriately maintained. Ablutions must be cleaned regularly and associated waste disposed of at a registered/permitted waste disposal site. Ablutions must be removed from site when construction is completed.	Contractor and sub-contractor/s	Duration of contract
Cooking and eating of meals must take place in a designated area. No fires are allowed on site. 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
Keep a record of all hazardous substances stored on site. Clearly label all the containers storing hazardous waste.	Contractor	Duration of contract
A Method Statement must be compiled for the management of pests and vermin within the site, specifically relating to the canteen area if applicable.	Contractor	Construction
Ensure proper health and safety plans in place during the construction period to ensure safety on and around site during construction, including fencing of the property and site access restriction.	Contractor and sub-contractor/s	Pre-construction
All disturbed areas that are not used such as excess road widths, should be rehabilitated with locally occurring shrubs and grasses after construction to reduce the overall footprint of the development.	Contractor and sub-contractor/s	Construction
On completion of the construction phase, all construction workers must leave the site within one week of their contract ending.	Contractor and sub-contractor/s	Construction

Performance Indicator	» Code of Conduct drafted before commencement of the construction phase. » Appropriate training of all staff is undertaken prior to them commencing work on the construction site.

	» Ablution and waste removal facilities are in a good working order and do not pollute the environment due to mismanagement. » All areas are rehabilitated promptly after construction in an area is complete. » Excess vegetation clearing and levelling is not undertaken. » No complaints regarding contractor behaviour or habits.
Monitoring	» Regular audits of the construction camps and areas of construction on site by the EO. » Proof of disposal of sewage at an appropriate licensed wastewater treatment works. » Proof of disposal of waste at an appropriate licensed waste disposal facility. » An incident reporting system must be used to record non-conformances to the EMPr. » Observation and supervision of Contractor practices throughout the construction phase by the EO. » Complaints will be investigated and, if appropriate, acted upon.

OBJECTIVE 3: Maximise local employment and business opportunities associated with the construction phase

It is acknowledged that skilled personnel are required for the construction of the wind turbines and associated infrastructure. However, where semi-skilled and unskilled labour is required, opportunities for local employment should be maximised as far as possible. Employment of locals and the involvement of local Small, Micro and Medium Enterprises (SMMEs) would enhance the social benefits associated with the wind farm, even if the opportunities are only temporary. The procurement of local goods could furthermore result in positive economic spin-offs.

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

Mitigation: Action/control	Responsibility	Timeframe
Where reasonable and practical, the proponent should appoint local contractors and implement a 'locals first' policy, especially for semi and low-skilled job categories. However, due to the low skills levels in the area, the majority of skilled posts are likely to be filled by people from outside the area.	Contractor	Construction
Where feasible, efforts should be made to employ local contactors that are compliant with Broad Based Black Economic Empowerment (BBBEE) criteria.	Contractor	Construction
Before the construction phase commences the proponent should meet with representatives from the ULM to establish the existence of a skills database for the area. If such as database exists it should be made available to the contractors appointed for the construction phase.	Contractor	Construction
The local authorities, community representatives, and organisations on the interested and affected party database	Contractor	Construction

Mitigation: Action/control	Responsibility	Timeframe
should be informed of the final decision regarding the project and the potential job opportunities for locals and the employment procedures that the proponent intends following for the construction phase of the project.		
Where feasible, training and skills development programmes for locals should be initiated prior to the initiation of the construction phase.	Contractor	Construction
The recruitment selection process should seek to promote gender equality and the employment of women wherever possible.	Contractor	Construction
The proponent should liaise with the ULM with regards the establishment of a database of local companies, specifically BBBEE companies, which qualify as potential service providers (e.g., construction companies, catering companies, waste collection companies, security companies etc.) prior to the commencement of the tender process for construction contractors. These companies should be notified of the tender process and invited to bid for project-related work.	Contractor	Construction
Where possible, the proponent should assist local BBBEE companies to complete and submit the required tender forms and associated information.	Contractor	Construction
The ULM, in conjunction with the local business sector and representatives from the local hospitality industry, should identify strategies aimed at maximising the potential benefits associated with the project.	Contractor	Construction

Performance Indicator	» Maximum amount of semi and unskilled labour locally sourced where possible. » Local suppliers and SMMEs contracted where possible. » Skills transfer facilitated where required. » Apprenticeship programmes established
Monitoring and Reporting	» Contractors and appointed ECO must monitor indicators listed above to ensure that they have been met for the construction phase.

OBJECTIVE 4: Avoid negative social impacts associated with the construction phase

Project component/s	» Construction and establishment activities associated with the establishment of the wind farm, including associated infrastructure. » Construction work force.
Potential Impact	» The presence of construction workers who live outside the area and who are housed in local towns can impact on family structures and social networks. » Presence of construction workers on site may result in loss of livestock due to stock theft and damage to farm infrastructure, such as gates and fences. Poaching of wild animals may also occur. » Impacts on the surrounding environment due to inadequate sanitation and waste removal facilities. » Impact on the safety of farmers and communities (increased crime etc.) by construction workers and also damage to farm infrastructure such as gates and fences.

	» Increase in production and GDP-R.
Activities/risk sources	» The presence of construction workers can impact negatively on family structures and social networks, especially in small, rural communities. » The presence of construction workers on the site can result in stock thefts or illegal hunting/ trapping of fauna and or game and damage to farm infrastructure.
Mitigation: Target/Objective	» Avoid and/or minimise the potential impact of construction workers on the local community and their livelihoods. » To minimise impacts on the social and biophysical environment. » Maximise the economic benefit to the local municipality. » Prohibit theft of stock and valuables on impacted and adjacent farm portions. » Procure goods and services, as far as practically possible, from the local municipality. » Initiate site access control and monitor movement to and from the site.

Mitigation: Action/control	Responsibility	Timeframe
Where possible, the proponent should make it a requirement for contractors to implement a 'locals first' policy for construction jobs, specifically for semi and low-skilled job categories.	Contractor	Construction
The proponent and the contractor should implement an HIV/AIDS awareness programme for all construction workers at the outset of the construction phase.	Contractor	Construction
The construction area should be fenced off before construction commences and no workers should be permitted to leave the fenced off area.	Contractor	Construction
The contractor should provide transport for workers to and from the site on a daily basis. This will enable the contactor to effectively manage and monitor the movement of construction workers on and off the site.	Contractor	Construction
The contractor must ensure that all construction workers from outside the area are transported back to their place of residence within 2 days of their contract coming to an end.	Contractor	Construction
It is recommended that no construction workers, except for security personnel, should be permitted to stay over-night on the site. However, as indicated above, due to the location of the site, on-site accommodation for workers may need to be provided.	Contractor	Construction
The proponent should implement a policy that no employment will be available at the gate.	Contractor	Construction
The proponent should enter into an agreement with local farmers in the area whereby damages to farm property etc. during the construction phase will be compensated for. The agreement should be signed before the construction phase commences.	Contractor	Construction
Contractors appointed by the proponent must ensure that construction workers found guilty of stealing livestock and/or damaging farm infrastructure are dismissed and charged. This should be contained in the Code of Conduct. All dismissals must be in accordance with South African labour legislation.	Contractor	Construction
As per the conditions of the Code of Conduct, in the advent of a fire being caused by construction workers and or construction activities, the appointed contractors must compensate farmers for any damage caused to their farms. The contractor should	Contractor	Construction

Mitigation: Action/control	Responsibility	Timeframe
also compensate the fire-fighting costs borne by farmers and local authorities.		
Dust suppression measures should be implemented, such as wetting on a regular basis and ensuring that vehicles used to transport sand and building materials are fitted with tarpaulins or covers.	Contractor	Construction

Performance Indicator	» No criminal activities attributable to the construction workers are reported. » No complaints received from landowners or the general public.
Monitoring and Reporting	» 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 5: Control of noise pollution stemming from construction activities

Various construction activities would be taking place during the development of the facility and may pose a noise risk to the closest receptors. These activities could include temporary or short-term activities where small equipment is used (such as the digging of trenches to lay underground power lines). The impact of such activities is generally very low. Impacts may however occur where activities are undertaken at night.

Project component/s	» Construction of turbines. » Cabling between turbines. » Substations. » Access roads.
Potential Impact	» Increased noise levels at potentially sensitive receptors.
Activity/risk source	» Any construction activities taking place within 500m from potentially noise sensitive developments (NSD). » Site preparation and earthworks. » Construction-related transport. » Foundations or plant equipment installation. » Building activities.
Mitigation: Target/Objective	» Ensure that maximum noise levels at potentially sensitive receptors are less than 65dBA. » Prevent the generation of disturbing or nuisance noises. » Ensure acceptable noise levels at surrounding stakeholders and potentially sensitive receptors. » Ensure compliance with the National Noise Control Regulations. » Ensure night-time noise levels less than 45dBA.

Mitigation: Action/control	Responsibility	Timeframe
Establish a line of communication and notify all stakeholders and noise sensitive developments of the means of registering any issues, complaints or comments.	Developer	Construction
Night-time construction activities (closer than 800 \m from Noise Sensitive Developments (NSDs)) are not recommended and must be minimised where possible, and only if these activities can be minimised to one location using minimum equipment.	Developer	Construction

Mitigation: Action/control	Responsibility	Timeframe
Roads must not be constructed within 150m from occupied dwellings used for residential purposes (to reduce noise levels below 42dBA if construction traffic may use the road at night).	Developer	Construction
Ensure that all equipment is maintained and fitted with the required noise abatement equipment.	EPC Contractor	Weekly inspection
The construction crew must abide by the local by-laws regarding noise.	EPC Contractor	Construction phase

Performance Indicator	» Construction activities do not change the existing ambient sound levels with more than 7dB. » Ensure that maximum noise levels at potentially sensitive receptors are less than 65dBA. » No noise complaints are registered
Monitoring and Reporting	» Ambient sound measurements are recommended to take place prior to the construction of the wind farm.

OBJECTIVE 6: Management of dust and emissions and damage to roads

During the construction phase, limited gaseous or particulate emissions (and dust) is 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.

Project component/s	» Wind turbines. » Access roads. » Cabling between turbines. » Substations. » BESS. » All other associated infrastructure.
Potential Impact	» Dust impacts can occur from cleared areas and from vehicle movement along gravel roads. » Release of minor amounts of air pollutants (for example NO_2, CO and SO_2) from vehicles and construction equipment.
Activities/risk sources	» The movement of construction vehicles and their activities on the site. » Clearing of vegetation and topsoil. » Excavation, grading and scraping. » Transport of materials, equipment and components. » Re-entrainment of deposited dust by vehicle movements. » Wind erosion from topsoil and spoil stockpiles and unsealed roads and surfaces. » Fuel burning from construction vehicles with combustion engines.
Mitigation: Target/Objective	» To avoid and or minimise the potential dust impacts associated with heavy vehicles, and also minimise damage to roads. » To ensure emissions from all vehicles are minimised, where possible, for the duration of the construction phase. » To minimise nuisance to the community and adjacent landowners from dust emissions and to comply with workplace health and safety requirements for the duration of the construction phase. » To minimise damage to roads.

Mitigation: Action/control	Responsibility	Timeframe
Speed limits should be set for all roads on site, as well as access roads to the site. These limits should not exceed 40 km/h, but may be set lower, depending on local circumstances. Strict enforcement of speed limits should occur – install speed control measures, such as speed humps, if necessary.	Contractor Transportation contractor	Construction phase
Monitor road surfaces for erosion and repair or upgrade, where necessary.	Contractor	Construction phase
Reduce and control construction dust using approved dust suppression techniques as and when required (i.e. whenever dust becomes apparent).	Contractor	Construction phase
All vehicles must be road worthy, and drivers must be qualified and made aware of the potential road safety issues and need for strict speed limits.	Contractor	Construction phase
The movement of construction vehicles on the site should be confined to agreed access road/s.	Contractor	Construction phase
The movement of heavy vehicles associated with the construction phase should be timed to avoid times days of the week, such as weekends, when the volume of traffic travelling along the access roads may be higher.	Contractor	Construction phase
Regular maintenance of gravel roads must be undertaken by the Contractor during the construction phase.	Contractor	Construction phase

Performance Indicator	» Appropriate dust suppression measures implemented on site during the construction phase. » Drivers made aware of the potential safety issues and enforcement of strict speed limits when they are employed or before entering the site. » Road worthy certificates in place for all heavy vehicles at the outset of the construction phase and updated on a monthly basis.
Monitoring and Reporting	» The Developer and appointed EO 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. » 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 7: Conservation of the existing soil resource within the site and in the adjacent areas

The natural soil on the site needs to be preserved as far as possible to minimise impacts on the environment. Soil degradation including erosion (by wind and water) and subsequent deposition elsewhere is of a concern. Uncontrolled run-off relating to construction activities (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 disturbed areas where human impact is likely are the focus of the mitigation measures laid out below.

Project component/s	» Wind turbines. » Access roads. » Cabling between turbines. » Substations. » BESS. » All other associated infrastructure.
Potential Impact	» Erosion and soil loss. » Increased runoff. » Downstream sedimentation.
Activities/risk sources	» Rainfall and wind erosion of disturbed areas. » Excavation, stockpiling and compaction of soil. » Concentrated discharge of water from construction activity. » Stormwater run-off from sealed surfaces. » Mobile construction equipment movement on site. » Roadside drainage ditches. » Project related infrastructure, such as buildings, turbines and fences.
Mitigation: Target/Objective	» To minimise erosion of soil from site during construction. » To minimise damage to vegetation by erosion or deposition. » To retain all topsoil with a stable soil surface

Mitigation: Action/control	**Responsibility**	**Timeframe**
All excess soil (soil that are stripped and stockpiled to make way for foundations) must be stored, to be used for rehabilitation of eroded areas.		
Rip all compacted areas outside of the developed areas that have been compacted. This must be done by means of a commercial ripper that has at least two rows of tines. Ripping must take place between 1 and 3 days after seeding and following a rainfall event (seeding must therefore be carried out directly after a rainfall event).		
Keep gradients of roads adequately low to minimise erosion.		
Align roads to avoid steep slopes and avoid the necessity for significant cuts and fills.		
Install additional flood and/or erosion control measures, where necessary.		
Prevent any spills from occurring. Machines must be parked within hard park areas and must be checked daily for fluid leaks.		
Salvaging topsoil: » Topsoil must always be salvaged and stored separately from subsoil and lower-lying parent rock or other spoil material. » Topsoil stripping removes up to 30 cm or less of the upper soils. » In cultivated areas, depth of topsoil may increase and needs to be confirmed with the land owner. » Prior to salvaging topsoil the depth, quality and characteristics of topsoil should be known for every management area. o This will give an indication of total volumes of topsoil that need to be stored to enable the proper planning and placement of topsoil storage. o Different types of topsoil – rocky soils and sands or loams must be stored separately.	Contractor	Construction

Mitigation: Action/control	Responsibility	Timeframe
» Topsoil should be removed (and stored) under dry conditions to avoid excessive compaction whenever topsoil will have to be stored for longer than one year.		
Storing topsoil: » Viability of stored topsoil depends on moisture, temperature, oxygen, nutrients and time stored. » Rapid decomposition of organic material in warm, moist topsoil rapidly decreases microbial activity necessary for nutrient cycling, and reduces the amount of beneficial micro-organisms in the soil. » Stockpile location should ideally be in a disturbed but weed-free area. » Storage of all topsoil that is disturbed should be of a maximum height of 2m and the maximum length of time before re-use is 18 months. » Topsoil handling should be reduced to stripping, piling (once), and re-application. Between the stockpiling and reapplication, stored topsoil should not undergo any further handling except control of erosion and (alien) invasive vegetation. » Where topsoil can be reapplied within six months to one year after excavation, it will be useful to store the topsoil as close as possible to the area of excavation and re-application, e.g. next to cabling trenches. » Do not mix overburden with topsoil stockpiles, as this will dilute the proportion of fertile soil (with less fertile subsoil or rock material). » Employ wind nets made from Hessian or similarly fibrous and biodegradable material, where required, to stabilise newly placed topsoil stockpiles and to reduce wind erosion. » In cases where topsoil has to be stored longer than 6 months or during the rainy season, soils should be kept as dry as possible and protected from erosion and degradation by: o Preventing ponding on or between heaps of topsoil o Covering topsoil berms o Preventing all forms of contamination or pollution o Preventing any form of compaction o Monitoring the establishment of all invasive vegetation and removing such if it appears o Keeping slopes of topsoil at a maximal 2:1 ratio o Monitoring and mitigating erosion where it appears » Where topsoil needs to be stored in excess of one year, it is recommended to either cover the topsoil or allow an indigenous grass cover to grow on it – if this does not happen spontaneously, seeding should be considered.	Contractor	Construction
Identify and demarcate construction areas for general construction work and restrict construction activity to these areas.	Contractor	Construction
Spillages of cement to be cleaned up immediately and disposed or re-used in the construction process.	Contractor	Construction

Mitigation: Action/control	Responsibility	Timeframe
The contractors used for the construction should have spill kits available onsite prior to construction to ensure that any fuel, oil or hazardous substance spills are cleaned-up and discarded correctly.	Contractor	Construction
All removed soil and material stockpiles must be protected from erosion, stored on flat areas where run-off will be minimised, and be surrounded by bunds.	Contractor	Construction
Cement batching to take place in designated areas only, as approved on site layout (if applicable).	Contractor	Construction
Implement erosion control measures denuded areas as required and monitor erosion and manage all occurrences according to the erosion management plan (refer to **Appendix G**). Erosion control measures should be implemented in areas where slopes have been disturbed.	Contractor	Construction
Control depth of all excavations and stability of cut faces/sidewalls.	Contractor	Construction
Reapplying topsoil: » Spoil materials and subsoil must be back-filled first, then covered with topsoil. » Immediate replacement of topsoil after the undertaking of construction activities within an area. » Generally, topsoil should be re-applied to a depth slightly greater than the topsoil horizon of a pre-selected undisturbed reference site. » The minimum depth of topsoil needed for re-vegetation to be successful is approximately 20 cm. » If the amount of topsoil available is limited, a strategy must be devised to optimise re-vegetation efforts with the topsoil available. » Reapplied topsoil should be landscaped in a way that creates a variable microtopography of small ridges and valleys that run parallel to existing contours of the landscape. The valleys become catch-basins for seeds and act as run-on zones for rainfall, increasing moisture levels where the seeds are likely to be more concentrated. This greatly improves the success rate of re-vegetation efforts. » To stabilise reapplied topsoil and minimise raindrop impact and erosion: o Use organic material from cleared and shredded woody vegetation where possible o Alternatively, suitable geotextiles or organic erosion mats can be used as necessary » Continued monitoring will be necessary to detect any sign of erosion early enough to allow timeous mitigation.	Contractor	Construction
Re-applied topsoil needs to be re-vegetated as soon as possible.	Contractor	Construction
» Implement general erosion control measures/practises: » Runoff control and attenuation can be achieved by using any or a combination of sand bags, logs, silt fences, storm water channels and catch-pits, shade nets, geofabrics, seeding or mulching as needed on and around cleared and disturbed areas.	Contractor	Construction

Mitigation: Action/control	Responsibility	Timeframe
o Ensure that all soil surfaces are protected by vegetation or a covering to avoid the surface being eroded by wind or water. » Ensure that heavy machinery does not compact areas that are not meant to be compacted as this will result in compacted hydrophobic, water repellent soils which increase the erosion potential of the area. » Prevent the concentration or flow of surface water or storm water down cut or fill slopes or along pipeline routes or roads and ensure measures to prevent erosion are in place prior to construction. » Minimise and restrict site clearing to areas required for construction purposes only and restrict disturbance to adjacent undisturbed natural vegetation. » Vegetation clearing should occur in parallel with the construction progress to minimise erosion and/or run-off. Large tracts of bare soil will either cause dust pollution or quickly erode and then result in sedimentation. » When implementing dust control measures, prevent over-wetting, saturation, and run-off that may cause erosion and sedimentation.		
Conservation measures should be applied to ensure that soil does not get unusable or unproductive and to ensue soil stabilisation.	Contractor	Construction

Performance Indicator	» Minimal level of soil erosion around site. » Minimal level of soil degradation. » No activity outside demarcated areas. » Acceptable state of excavations. » No activity in restricted areas. » Acceptable state of excavations, as determined by EO and ECO. » Progressive return of disturbed and rehabilitated areas to the desired end state (refer also to the Plant Rescue and Protection Plan in **Appendix E).** » No indications of visible topsoil loss.
Monitoring and Reporting	» Continual inspections of the site by the EO. » Reporting of ineffective sediment control systems and rectification as soon as possible. » If soil loss is suspected, acceleration of soil conservation and rehabilitation measures must be implemented.

OBJECTIVE 8: Minimise the impacts on and loss of indigenous vegetation and control of alien invasive plants

The Merino Wind Farm site is mapped as falling within the Upper Karoo Hardeveld and Eastern Upper Karoo vegetation types. Both vegetation types are classified as Least Threatened. 0.7% of the Eastern Upper Karoo is formally conserved and 2% of the vegetation has been significantly transformed. 2.9% of the Upper Karoo Hardeveld uis formally considered and less than 1% of the vegetation type has undergone significant transformation.

The development area for the Merino Wind Farm overlaps with a CBA One (CBA 1), Other Natural Areas (ONA) and an Ecological Support Area.

There are three plant species listed as Rare (*Anisodontea malavastroides, Aloe broomii var. tarkaensis* and *Tridentea virescens*) that could potentially occur on site, but these are all widespread species that are naturally rare where they are found. None have been previously recorded on this site. There are also two plant species protected according to National legislation (*Crinum bulbispermum and Harpagophytum procumbens*) that could potentially occur in the geographical area, but these are also very widespread species. The loss of some individuals, if they are found to occur on site, would not affect the conservation status of any of the species. It is, however, unlikely that any of them would be affected.

Project component/s	» Wind turbines. » Access roads. » Cabling between turbines. » Substations. » BESS. » All other associated infrastructure.
Potential Impact	» Loss of plant cover leading to loss of faunal habitat and loss of specimens of protected plants. » Invasion by alien invader plants and declared weeds.
Activity/risk source	» Site preparation and clearing. » Soil disturbance » Introduction of plant propagules with people and vehicles. » Activities outside of designated construction areas. » Driving off designated routes.
Mitigation: Target/Objective	» To limit construction activities to designated areas. » Implement invasive plant clearing prior to construction, but after site demarcation. » To limit the establishment of alien invader plants and declared weeds.

Mitigation: Action/control	Responsibility	Timeframe
Restrict impact to development footprint only and limit disturbance creeping into surrounding areas.	Contractor	Construction
Where possible, access roads should be located along existing farm and district roads.	Contractor	Construction
Access to sensitive areas should be limited during construction.	Contractor	Construction
Footprints of infrastructure, laydown areas, construction sites, roads and substation sites should be clearly demarcated.	Contractor	Construction
No additional clearing of vegetation should take place without a proper assessment of the environmental impacts and authorization from relevant authorities, unless for maintenance purposes, in which case all reasonable steps should be taken to limit damage to natural areas.	Contractor	Construction
No driving of vehicles off-road outside of construction areas should take place.	Contractor	Construction
Limit clearing of natural habitat designated as sensitive, especially rocky outcrops, cliffs and riparian habitats, where possible.	Contractor	Construction
Where significant populations of species of conservation concern are found, shift infrastructure to avoid direct impacts.	Contractor	Construction

Mitigation: Action/control	Responsibility	Timeframe
For any plants that are transplanted, annual monitoring should take place to assess survival. This should be undertaken for a period of three years after translocation and be undertaken by a qualified botanist. The monitoring programme must be designed prior to translocation of plants and should include control sites (areas not disturbed by the project) to evaluate mortality relative to wild populations.	Contractor	Construction
No collecting or poaching of any plant species must be permitted on site. Report any illegal collection to conservation authorities.	Contractor	Construction
Loss of protected species of conservation concern must be report to the conservation authorities.	Contractor	Construction
Undertake regular monitoring to detect alien invasions early so that they can be controlled.	Contractor	Construction
Implement control measures for declared weeds and alien invader plants.	Contractor	Construction
Removal of vegetation must be restricted to a minimum and must be rehabilitated to its former state where possible after construction.	Contractor	Construction
Construction of new roads should only be considered if existing roads cannot be upgraded.	Contractor	Construction
All areas disturbed by construction related activities, such as access roads on the site, construction camps etc., should be rehabilitated at the end of the construction phase.	Contractor	Immediately after construction
Promptly remove / control all alien invader plants that may emerge during construction (i.e. weedy annuals and other alien forbs).	Contractor	Construction
All alien vegetation within the site should be managed in terms of the Regulation GNR.1048 of 25 May 1984 (as amended) issued in terms of the CARA and IAP regulations.	Contractor	Construction
Landscape and re-vegetate all denuded areas as soon as possible.	Contractor	Construction
Adequate sanitary facilities and ablutions on the servitude must be provided for all personnel throughout the project area. Use of these facilities must be enforced (these facilities must be kept clean so that they are a desired alternative to the surrounding vegetation).	Contractor	Construction
Contractor should ensure that open fires on the site for cooking or heating are not allowed except in designated areas.	Contractor	Construction
Smoking on site should be confined to designated areas.	Contractor	Construction
Contractor should ensure that construction related activities that pose a potential fire risk, such as welding, are properly managed and are confined to areas where the risk of fires has been reduced. Measures to reduce the risk of fires include avoiding working in high wind conditions when the risk of fires is greater. In this regard special care should be taken during the high-risk dry, windy winter months.	Contractor	Construction
Contractor should provide adequate fire-fighting equipment on-site, including a fire fighting vehicle. Contractor should provide fire-fighting training to selected construction staff.	Contractor	Construction

Performance Indicator	» No disturbance outside of designated work areas. » Limited alien infestation within project control area. » Construction activities restricted to the development footprint.

Monitoring and Reporting	» Observation of vegetation clearing activities by ,the EO throughout the construction phase. » Monitoring of alien plant establishment within the site on an on-going basis.

OBJECTIVE 9: Protection of terrestrial fauna

The semi-arid area south of Richmond is known for a low diversity of mammals firstly related to the lack of open water and secondly the long history of farming in the region. The impact of the sheep farming is that the migration corridors of larger mammals were restricted and over time, many species have been lost to the area. In recent years with the increase in hunting, some farmers have reintroduced some of the mammals that were previously present in the area. The obvious threat of predators to livestock further contributes to the low diversity of mammals occurring in the area. The smaller cats e.g., *Genetta genetta, Felis nigripes* (Vulnerable) and the less feared small fox, *Otocyon megalotis* were recorded recently in the QDS (FitzPatrick Institute of African Ornithology – Virtual Museum, Mammal Records, 2021 and i-Naturalist, 2021). There was some rodent activity (active burrows and tracks) observed, but the species were not identified during the survey.

According to the records (FitzPatrick Institute of African Ornithology – Virtual Museum, Frog Records, 2021), only two (2) amphibian species were recently collected within the area (QD 3123DA). These are the Common Caco (*Cacosternum boettgeri*) and Tandy's Sand Frog (*Tomopterna tandyi*), both with a listed conservation status of "Least Concern". Due to the recent droughts, the probability of encountering any specimens within the project is low.

One will expect a more extensive list of reptiles for the study, but the combined list for the QDS (FitzPatrick Institute of African Ornithology – Virtual Museum, Mammal Records, 2021 and i-Naturalist, 2021) gives a short list of recently confirmed specimens. This can be a result of the recent extensive drought and modified landscape (grazing and vegetation modification) associated with the agricultural activities. There are no species listed as red data for the area.

A number of scorpions are listed for the larger area around the study site (African Snake Bite Institute, 2021) and a number of active burrows of these animals were noted during the survey.

Project component/s	» Wind turbines. » Access roads. » Cabling between turbines. » Substations. » BESS. » All other associated infrastructure.
Potential Impact	» Vegetation clearance and associated impacts on faunal habitats. » Loss of fauna species. » Disturbance to fauna species.
Activity/risk source	» Site preparation and earthworks. » Foundations or plant equipment installation. » Mobile construction equipment movement on site. » Access road construction activities. » Traffic to and from site.

	» Substation construction facilities.
Mitigation: Target/Objective	» To minimise footprints of habitat destruction. » To minimise disturbance to resident and visitor faunal species. » To minimise loss of fauna species.

Mitigation: Action/control	Responsibility	Timeframe
Pre-construction walk-through, undertaken in the correct season, in front of construction must be undertaken to move any individual animals, such as tortoises, prior to construction.	Contractor	Construction
No dogs or other pets should be allowed on site, except those confined to landowners' dwellings.	Contractor	Construction
Personnel on site should undergo environmental induction training, including the need to abide by speed limits, the increased risk of collisions with wild animals on roads in rural areas.	Contractor	Construction
Proper waste management must be implemented, ensuring no toxic or dangerous substances are accessible to wildlife. This should also apply to stockpiles of new and used materials to ensure that they do not become a hazard.	Contractor	Construction
No collecting, hunting or poaching of any animal species should take place.	Contractor	Construction
Report any mortality of protected species to conservation authorities.	Contractor	Construction
Appropriate lighting should be installed to minimize impacts on nocturnal animals, as per visual specialist assessment.	Contractor	Construction
Construction activities should not be undertaken at night.	Contractor	Construction
Noise and light pollution should be managed according to guidelines from the noise specialist study and visual specialist assessment respectively.	Contractor	Construction
The extent of clearing and disturbance to the vegetation must be kept to a minimum so that impact on fauna and their habitats is restricted.	Contractor	Construction
Personnel on site should undergo environmental induction training, including the need to abide by speed limits, the increased risk of collisions with wild animals on roads in rural areas.		
Speed limits should be set for all roads on site, as well as access roads to the site. These limits should not exceed 40 km/h, but may be set lower, depending on local circumstances. Strict enforcement of speed limits should occur – install speed control measures, such as speed humps, if necessary.	Contractor	Construction

Performance Indicator	» No disturbance outside of designated work areas. » Minimised clearing of existing/natural vegetation and habitats for fauna. » Limited impacts on faunal species (i.e. noted/recorded fatalities), especially those of conservation concern.
Monitoring and Reporting	» Observation of vegetation clearing activities by the EO throughout construction phase. » Supervision of all clearing and earthworks by the EO.

OBJECTIVE 10: Protection of avifauna

The South African Bird Atlas Project 2 (SABAP2) data indicates that a total of 165 bird species could potentially occur within the broader area. Of these, 24 species are classified as priority species and 12 of these are South African Red List species. Of the priority species, 17 are likely to occur regularly in the development area, namely, Black Harrier, Black Stork, Blue Crane, Greater Flamingo, Karoo Korhaan, Lanner Falcon, Ludwig's Bustard, Martial Eagle, Secretarybid, Tawny Eagle, Verreaux's Eagle and Cape Vulture.

Project component/s	» Wind turbines. » Access roads. » Cabling between turbines. » Substations. » BESS. » All other associated infrastructure.
Potential Impact	» Disturbance of birds (e.g. destruction of habitat). » Displacement of birds. » Collision with project components. » Mortality due to electrocution of the electrical infrastructure.
Activity/risk source	» Site preparation and earthworks. » Foundations or plant equipment installation. » Mobile construction equipment movement on site. » Access road construction activities. » Substation construction facilities. » Traffic to and from site.
Mitigation: Target/Objective	» To minimise footprints of habitat destruction. » To minimise disturbance to resident and visitor avifaunal species.

Mitigation: Action/control	Responsibility	Timeframe
Construction activity should be restricted to the immediate footprint of the infrastructure as far as possible, and in particular to the proposed road network. Access to the remainder of the site should be strictly controlled to prevent unnecessary disturbance of priority species.		
Removal of vegetation must be restricted to a minimum and must be rehabilitated to its former state where possible after construction.	Contractor	Construction
Construction of new roads should only be considered if existing roads cannot be upgraded.	Contractor	Construction
Vehicle and pedestrian access to the site should be controlled and restricted as much as possible to prevent unnecessary disturbance of priority species.	Contractor	Construction
Excavated rocks should be removed, or all infilling for road construction should be compacted and all lose rock piles at the base or periphery of such infilling should be covered and packed down to eliminate all potential crevices and shelter for small mammals such as Rock Hyraxes (the primary source of food for the Verreaux's Eagles).	Contractor	Construction

Mitigation: Action/control	Responsibility	Timeframe
The mitigation measures proposed by the vegetation specialist, including rehabilitation, must be strictly implemented.	Contractor	Construction
Overhead lines should be restricted to an absolute minimum and should only be allowed if underground cabling is unfeasible due to technical constraints.	Contractor	Construction
Bird flight diverters should be installed on all 33kV overhead lines on the full span length on the earthwire (according to Eskom guidelines - five metres apart). Light and dark colour devices must be alternated to provide contrast against both dark and light backgrounds respectively. These devices must be installed as soon as the conductors are strung.	Contractor	Construction

Performance Indicator	» No disturbance outside of designated work areas. » Minimised clearing of existing/natural vegetation and habitats for avifauna. » Limited impacts on avifaunal species (i.e. noted/recorded fatalities), especially those of conservation concern.
Monitoring and Reporting	» Observation of vegetation clearing activities by the EO throughout construction phase. » Supervision of all clearing and earthworks by the EO.

OBJECTIVE 11: Protection of bats

Several site visits were made to the Merino Wind Farm between December 2020 and December 2021. The passive data indicates that the three bat species most likely to be impacted on by the proposed wind farm are *Laephotis* (formerly *Neoromicia*) *capensis, Miniopterus natalensis* and *Tadarida aegyptiaca*. These more abundant species are of a large value to the local ecosystems as they provide a greater contribution to most ecological services than the rarer species, due to their higher numbers.

Project component/s	» Wind turbines. » Access roads. » Cabling between turbines. » Substations. » BESS. » All other associated infrastructure.
Potential Impact	» Foraging bat habitat destruction. » Bat roost disturbance/destruction. » Increased bat mortality due to light pollution and moving turbine blades.
Activity/risk source	» Site preparation and earthworks. » Foundations or plant equipment installation. » Mobile construction equipment movement on site. » Access road construction activities. » Substation construction facilities.
Mitigation: Target/Objective	» To minimise footprints of habitat destruction. » To minimise disturbance to resident and visitor bat species. » To minimise mortality of bat species.

Mitigation: Action/control	Responsibility	Timeframe
Rehabilitate areas disturbed during construction, such as temporary construction camps and laydown yards.	Contractor	Immediately after construction
During construction laydown areas and temporary access roads should be kept to a minimum in order to limit direct vegetation loss and habitat fragmentation. Construction of the infrastructure should, where possible, be situated in areas that are already disturbed.	Contractor	Construction
Impacts on bat habitats must be reduced by limiting the removal of vegetation, particularly large mature trees within 50m of turbine positions.	Contractor	Construction

Performance Indicator	» No disturbance outside of designated work areas. » Minimised clearing of existing/natural vegetation and habitats for bats. » Limited impacts on bat species, especially those of conservation concern.
Monitoring and Reporting	» Observation of vegetation clearing activities by the EO throughout construction phase. » Supervision of all clearing and earthworks by the EO.

OBJECTIVE 12: Minimise impacts on freshwater features

Based on a combination of desktop and in-field delineation, three (3) forms of a watercourses were identified and delineated within the 500m regulated area. These include episodic rivers, drainage lines and dams. No natural wetland systems were identified for the development area. The rivers and drainage lines are both classified as a river HGM type system. The dams are regarded as artificial systems and typically formed / created in the preferential flow paths of the river HGM type. The drainage lines are not characterised by riparian vegetation and grasses, these systems represent bare surfaces with evidence of surface run-off.

The results of the habitat assessment indicate natural (class A) and largely natural (class B) instream and riparian conditions for the catchment respectively. The overall ecological importance and sensitivity for the area was determined to be moderate. The overall ecosystem service benefit for the system is high.

The recommended buffer was calculated to be 15m and 22m for the drainage lines and rivers, respectively, for the construction and operational phases. The buffer zone will not be applicable for proposed infrastructure that traverse the systems, however, for all secondary activities such as laydown yards and storage areas, the buffer zone must be implemented.

Project component/s	» Construction activities. » Storage and handling of dangerous goods.
Potential Impact	» Pollutants such as lime-containing (high pH) construction materials (such as concrete, cement, grouts, etc.) could be harmful to aquatic biota, particularly during low flows when dilution is reduced. » Removal of watercourse habitat. » Compaction of soils within and surrounding the watercourses. » Erosion of soils surrounding watercourses.
Activity/risk source	» Development of the wind farm and associated infrastructure in proximity to watercourses.

	» Increased hardened surfaces.
Mitigation: Target/Objective	» Reduce potential loss of habitat and ecological structure. » No incidents related to spills of chemicals and hazardous materials. » No release of contaminated water into watercourses.

Mitigation: Action/control	Responsibility	Timeframe
Avoid direct impacts to water resources and their associated buffer width (as recommended). This avoidance is not required from watercourse crossings (i.e. roads, pipelines, cables etc), but the number and size of the crossings must be kept to a minimum. Only essential services and equipment are permitted within the crossings and associated buffer during the construction phase.	Contractor	Construction
Prioritise construction of the crossings during the dry season period.	Contractor	Construction
Clearly demarcate the construction footprint and restrict all construction activities to within the proposed infrastructure area.	Contractor	Construction
When clearing vegetation, allow for some vegetation cover as opposed to bare areas.	Contractor	Construction
Minimize the disturbance footprint and unnecessary clearing of vegetation outside of this area.	Contractor	Construction
Educate staff and relevant contractors on the location and importance of the identified watercourses through toolbox talks and by including them in site inductions and the overall master plan.	Contractor	Construction
All activities (including driving) must adhere to the respective buffer areas.	Contractor	Construction
Implement a suitable stormwater management plan for the facility. Priority must be the return of clean water to the resources, avoiding scouring or erosion at any discharge locations.	Contractor	Construction
The contractors used for the construction should have spill kits available onsite prior to construction to ensure that any fuel, oil or hazardous substance spills are cleaned-up and discarded correctly.	Contractor	Construction
All construction activities must be restricted to the development footprint area. This includes laydown and storage areas, ablutions, offices etc.	Contractor	Construction
During construction activities, all rubble generated must be kept in a skip (or similar) and the removed from the site to a licensed facility	Contractor	Construction
All chemicals and toxicants to be used for the construction must be stored in a bunded area.	Contractor	Construction
All machinery and equipment should be inspected regularly for faults and possible leaks, these should be serviced off-site at designed areas.	Contractor	Construction
All contractors and employees should undergo induction which is to include a component of environmental awareness. The induction is to include aspects such as the need to avoid	Contractor	Construction

Mitigation: Action/control	Responsibility	Timeframe
littering, the reporting and cleaning of spills and leaks and general good "housekeeping".		
No dumping of material on site may take place.	Contractor	Construction
No activities are permitted within the watercourses and associated buffer areas unless these are for crossings.	Contractor	Construction

Performance Indicator	» No degradation and erosion of wetlands.
Monitoring	» Monitor management measures in place for protection of freshwater resources.

OBJECTIVE 13: Minimise impacts on heritage sites during the construction of the wind farm

Project component/s	» Excavations of turbine foundations. » Excavations of trenches for the installation of cabling and infrastructure. » Wind turbines and all associated infrastructure.
Potential Impact	» Loss of archaeological artefacts. » Loss of fossil resources. » Impacts on heritage sites.
Activity/risk source	» All bulk earthworks. » Installation of wind turbines.
Mitigation: Target/Objective	» To facilitate the likelihood of noticing heritage resources and ensure appropriate actions in terms of the relevant legislation.

Mitigation: Action/control	Responsibility	Timeframe
Should any significant archaeological resources be uncovered during the course of the construction phase, work must cease in the area of the find and SAHRA must be contacted regarding an appropriate way forward.	Contractor	Construction
The Chance Fossil Finds Procedure must be implemented for the duration of construction activities: » Once alerted to fossil occurrence(s): alert site foreman, stop work in area immediately (N.B. safety first!), safeguard site with security tape / fence / sand bags if necessary. » Record key data while fossil remains are still in situ: o Accurate geographic location – describe and mark on site map / 1: 50 000 map / satellite image / aerial photo. o Context – describe position of fossils within stratigraphy (rock layering), depth below surface. o Photograph fossil(s) in situ with scale, from different angles, including images showing context (e.g. rock layering). » If feasible to leave fossils in situ: o Alert Heritage Resources Agency and project palaeontologist (if any) who will advise on any necessary mitigation.	Contractor	Construction

Mitigation: Action/control	Responsibility	Timeframe
o Ensure fossil site remains safeguarded until clearance is given by the Heritage Resources Agency for work to resume. » If not feasible to leave fossils in situ (emergency procedure only): o Carefully remove fossils, as far as possible still enclosed within the original sedimentary matrix (e.g. entire block of fossiliferous rock). o Photograph fossils against a plain, level background, with scale. o Carefully wrap fossils in several layers of newspaper / tissue paper / plastic bags. o Safeguard fossils together with locality and collection data (including collector and date) in a box in a safe place for examination by a palaeontologist. o Alert Heritage Resources Agency and project palaeontologist (if any) who will advise on any necessary mitigation. » If required by Heritage Resources Agency, ensure that a suitably-qualified specialist palaeontologist is appointed as soon as possible by the developer. » Implement any further mitigation measures proposed by the palaeontologist and Heritage Resources Agency.		

Performance Indicator	» Reporting of and liaison about possible finds of heritage resources. » Heritage resources noticed and rescued. » All heritage items located are dealt with as per the legislative guidelines.
Monitoring and Reporting	» Ensure staff are aware of heritage resources and the procedure to follow when found. » EO to conduct inspections of open excavations.

OBJECTIVE 14: 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.

Project component/s	» Construction site. » Transportation of staff and equipment.
Potential Impact	» Visual impact of general construction activities, and the potential scarring of the landscape due to vegetation clearing and the resulting erosion. » Construction traffic.
Activity/risk source	» The viewing of visual scarring by observers in the vicinity of the wind farm or from the roads in the surrounding area.
Mitigation: Target/Objective	» Minimal disturbance to vegetation cover in close vicinity of the wind farm and its related infrastructure. » Minimised construction traffic, where possible.

	» Minimal visual intrusion by construction activities and intact vegetation cover outside of the immediate construction work areas.

Mitigation: Action/control	Responsibility	Timeframe
Retain and maintain natural vegetation in all areas outside of the development footprint.	Contractor	Construction
Ensure that vegetation is not unnecessarily removed during the construction period.	Contractor	Construction
Restrict the activities and movement of construction workers and vehicles to the immediate construction site and existing access roads.	Contractor	Construction
Restrict construction activities to daylight hours whenever possible in order to reduce lighting impacts.	Contractor	Construction
Ensure that rubble, litter, and disused construction materials are appropriately stored (if not removed daily) and then disposed regularly at licensed waste facilities.	Contractor	Construction
Reduce and control construction dust using approved dust suppression techniques as and when required (i.e. whenever dust becomes apparent).	Contractor	Construction
Rehabilitate all disturbed areas, construction areas, servitudes etc. immediately after the completion of construction works.	Contractor	Construction

Performance Indicator	» Construction site maintained in a neat and tidy condition. » Site appropriately rehabilitated after construction is complete.
Monitoring	» Monitoring of vegetation clearing during construction by EO. » Monitoring of rehabilitated areas quarterly for at least a year following the end of construction (by contractor as part of construction contract).

OBJECTIVE 15: Appropriate handling and management of waste

The construction of the wind farm and associated infrastructure will involve the generation of various wastes. In order to manage the wastes effectively, guidelines for the assessment, classification, and management of wastes, along with industry principles for minimising construction wastes must be implemented. The main wastes expected to be generated by the construction activities include:

» general solid waste
» hazardous waste
» inert waste (rock and soil)
» liquid waste (including grey water and sewage)

Project Component/s	» Wind turbines. » Access roads. » Cabling between turbines. » Substations. » BESS. » All other associated infrastructure.
Potential Impact	» Inefficient use of resources resulting in excessive waste generation.

	» Litter or contamination of the site or water through poor waste management practices.
Activity/Risk Source	» Packaging. » Other construction wastes. » Hydrocarbon use and storage. » Spoil material from excavation, earthworks and site preparation.
Mitigation: Target/Objective	» To comply with waste management legislation. » To minimise production of waste. » To ensure appropriate waste storage and disposal. » To avoid environmental harm from waste disposal.

Mitigation: Action/Control	Responsibility	Timeframe
Implement an integrated waste management approach that is based on waste minimisation and incorporates reduction, recycling, re-use and disposal where appropriate. Where solid waste is disposed of, such disposal shall only occur at an appropriately licensed landfill.	Contractor	Construction
Construction method and materials must be carefully considered in view of waste reduction, re-use, and recycling opportunities.	Contractor	Construction
Construction contractors must provide specific detailed waste management plans to deal with all waste streams.	Contractor	Construction
Ensure that no litter, refuse, wastes, rubbish, rubble, debris and builders wastes generated on the premises is placed, dumped or deposited on adjacent/surrounding properties.	Contractor	Construction
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 as required. 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	Construction
Where practically 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	Construction
Disposal of waste must be in accordance with relevant legislative requirements, including the use of licensed contractors.	Contractor	Construction
Uncontaminated waste must be removed at least weekly for disposal, if feasible; other wastes must be removed for recycling/ disposal at an appropriate frequency.	Contractor	Construction
Hydrocarbon waste must be contained and stored in sealed containers within an appropriately bunded area and clearly labelled. This must be regularly removed and recycled (where possible) or disposed of at an appropriately licensed landfill site.	Contractor	Construction
Waste must be stored in accordance with the relevant legislative requirements.	Contractor	Construction
Waste must be kept to a minimum and must be transported by approved waste transporters to sites designated for their disposal.	Contractor	Construction
No liquid waste, including grey water, may be discharged into any water body or drainage line. All sewage disposal to take place at a registered and operational wastewater treatment works.	Contractor	Construction

Mitigation: Action/Control	Responsibility	Timeframe
All liquid wastes must be contained in appropriately sealed vessels/ponds within the footprint of the development, and be disposed of at a designated waste management facility.	Contractor	Construction
Documentation (waste manifest) must be maintained detailing the quantity, nature, and fate of any regulated waste. Waste disposal records must be available for review at any time.	Contractor	Construction
Regularly serviced chemical toilet facilities and/or septic tank must be used to ensure appropriate control of sewage.	Contractor	Construction
Daily inspection of all chemical toilets and septic tanks must be performed by environmental representatives on site.	Contractor	Construction
In the event where sewage is discharged into the environment, all contaminated vegetation/ rock and soil must be removed immediately and treated as hazardous waste.	Contractor	Construction
Under no circumstances may waste be burnt or buried on site.	Contractor	Construction
Litter generated by the construction crew must be collected in rubbish bins and disposed of weekly, or at an appropriate frequency, at registered waste disposal sites.	Contractor	Construction
Upon the completion of construction, the area must be cleared of potentially polluting materials (including chemical toilets). Spoil stockpiles must also be removed and appropriately disposed of or the materials re-used for an appropriate purpose.	Contractor	Construction

Performance Indicator	» No complaints received regarding waste on site or indiscriminate dumping. » Internal site audits ensuring that waste segregation, recycling and reuse is occurring appropriately. » Provision of all appropriate waste manifests for all waste streams.
Monitoring	» Observation and supervision of waste management practices throughout construction phase. » Waste collection will be monitored on a regular basis. » Waste documentation completed. » Proof of disposal of sewage at an appropriate wastewater treatment works. » A complaints register will be maintained, in which any complaints from the community will be logged. Complaints will be investigated and, if appropriate, acted upon. » An incident reporting system will be used to record non-conformances to the EMPr.

OBJECTIVE 16: Appropriate handling and storage of chemicals, hazardous substances

The construction phase may involve the storage and handling of a variety of chemicals including adhesives, abrasives, oils and lubricants, paints and solvents.

Project Component/s	» Wind turbines. » Access roads. » Cabling between turbines. » Substations. » BESS. » All other associated infrastructure.
Potential Impact	» Release of contaminated water from contact with spilled chemicals.

	» Generation of contaminated wastes from used chemical containers. » Soil pollution.
Activity/Risk Source	» Vehicles associated with site preparation and earthworks. » Construction activities of area and linear infrastructure. » Hydrocarbon spills by vehicles and machinery during levelling, vegetation clearance and transport of workers, materials and equipment and fuel storage tanks. » Accidental spills of hazardous chemicals. » Polluted water from wash bays and workshops. » Pollution from concrete mixing.
Mitigation: Target/Objective	» To ensure that the storage and handling of chemicals and hydrocarbons on-site does not cause pollution to the environment or harm to persons. » To ensure that the storage and maintenance of machinery on-site does not cause pollution of the environment or harm to persons. » Prevent and contain hydrocarbon leaks. » Undertake proper waste management. » Store hazardous chemicals safely in a bunded area.

Mitigation: Action/Control	Responsibility	Timeframe
Implement an emergency preparedness plan during the construction phase.	Contractor	Construction
Any liquids stored on site, including fuels and lubricants, must be stored in accordance with applicable legislation.	Contractor	Construction
Spill kits must be made available on-site for the clean-up of spills and leaks of contaminants. These must be maintained regularly.	Contractor	Construction
Losses of fuel and lubricants from the oil sumps and steering racks of vehicles and equipment must be contained using a drip tray with plastic sheeting filled with absorbent material when not parked on hard standing.	Contractor	Construction
Establish an appropriate Hazardous Stores and fuel storage area which is in accordance with the Hazardous Substance Amendment Act, No. 53 of 1992. This must include but not be limited to: » Designated area; » All applicable safety signage; » Firefighting equipment; » Enclosed by an impermeable bund as per the requirements of the relevant standards and any relevant by-laws; » Protected from the elements, » Lockable; » Ventilated; and » Has adequate capacity to contain 110% of the largest container contents.	Contractor	Construction
The storage of flammable and combustible liquids such as oils must be stored in compliance with Material Safety Data Sheets (MSDS) files.	Contractor	Construction
Corrective action must be undertaken immediately if a complaint is made, or potential/actual leak or spill of polluting substance identified. This includes stopping the contaminant from further escaping, cleaning up the affected environment as much as practically possible and implementing preventive	Contractor	Construction

Mitigation: Action/Control	Responsibility	Timeframe
measures. Where required, a NEMA Section 30 report must be submitted to DFFE within 14 days of the incident.		
In the event of a major spill or leak of contaminants, the relevant administering authority must be immediately notified as per the notification of emergencies/incidents.	Contractor	Construction
Spilled concrete must be cleaned up as soon as possible and disposed of at a suitably licensed waste disposal site.	Contractor	Construction
Accidental spillage of potentially contaminating liquids and solids must be cleaned up immediately in line with procedures by trained staff with the appropriate equipment.	Contractor	Construction
Any contaminated/polluted soil removed from the site must be disposed of at a licensed hazardous waste disposal facility.	Contractor	Construction
All machinery and equipment must be inspected regularly for faults and possible leaks,	Contractor	Construction
Routine servicing and maintenance of vehicles must not to take place on-site (except for emergencies). If repairs of vehicles must take place, an appropriate drip tray must be used to contain any fuel or oils.	Contractor	Construction
Construction machinery must be stored in an appropriately sealed area.	Contractor	Construction
Any storage and disposal permits/approvals which may be required must be obtained, and the conditions attached to such permits and approvals will be compiled with.	Contractor	Construction
Transport of all hazardous substances must be in accordance with the relevant legislation and regulations.	Contractor	Construction
The sediment control and water quality structures used on-site must be monitored and maintained in an operational state at all times.	Contractor	Construction
An effective monitoring system must be put in place to detect any leakage or spillage of all hazardous substances during their transportation, handling, installation and storage.	Contractor	Construction
Precautions must be in place to limit the possibility of oil and other toxic liquids from entering the soil or clean stormwater system.	Contractor	Construction
As much material must be pre-fabricated and then transported to site to avoid the risks of contamination associated with mixing, pouring and the storage of chemicals and compounds on site.	Contractor	Construction
Have appropriate action plans on site, and training for contactors and employees in the event of spills, leaks and other potential impacts to the aquatic systems. All waste generated on-site during construction must be adequately managed.	Contractor	Construction
Minimise fuels and chemicals stored on site.	Contractor	Construction
Implement a contingency plan to handle spills, so that environmental damage is avoided.	Contractor	Construction
Drip trays must be used during all fuel/chemical dispensing and beneath standing machinery/plant.	Contractor	Construction
In the case of petrochemical spillages, the spill must be collected immediately and stored in a designated area until it	Contractor	Construction

Mitigation: Action/Control	Responsibility	Timeframe
can be disposed of in accordance with the Hazardous Chemical Substances Regulations, 1995 (Regulation 15).		

Performance Indicator	» No chemical spills outside of designated storage areas. » No water or soil contamination by spills. » Safe storage of hazardous chemicals. » Proper waste management.
Monitoring	» Observation and supervision of chemical storage and handling practices and vehicle maintenance throughout construction phase. » A complaints register must be maintained, in which any complaints from the community will be logged. » An incident reporting system must be used to record non-conformances to the EMPr. » On-going visual assessment to detect polluted areas and the application of clean-up and preventative procedures. » Monitor hydrocarbon spills from vehicles and machinery during construction continuously and record volume and nature of spill, location and clean-up actions. » Monitor maintenance of drains and intercept drains weekly. » Analyse soil samples for pollution in areas of known spills or where a breach of containment is evident when it occurs. » Records of accidental spills and clean-up procedures and the results thereof must be audited on an annual basis by the ECO. » Records of all incidents that caused chemical pollution must be kept and a summary of the results must be reported to management annually.

OBJECTIVE 17: Effective management of concrete batching plant

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

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

Project component/s	» Concrete batching plant.
Potential Impact	» Dust emissions. » Release of contaminated water. » Generation of contaminated wastes from used chemical containers » Inefficient use of resources resulting in excessive waste generation.
Activity/risk source	» Operation of the batching plant. » Packaging and other construction wastes. » Hydrocarbon use and storage. » Spoil material from excavation, earthworks and site preparation.
Mitigation: Target/Objective	» To ensure that the operation of the batching plant does not cause pollution to the environment or harm to persons.

Mitigation: Action/control	Responsibility	Timeframe
Where possible concrete batching plants should be sited such that impacts on the environment or the amenity of the local community from noise, odour or polluting emissions are minimised.	Contractor	Construction phase
The provision of natural or artificial wind barriers such as trees, fences and landforms may help control the emission of dust from the plant.	Contractor	Construction phase
Where there is a regular movement of vehicles. Access and exit routes for heavy transport vehicles should be planned to minimise noise and dust impacts on the environment.	Contractor	Construction phase
The concrete batching plant site should demonstrate good maintenance practices, including regular sweeping to prevent dust build-up.	Contractor	Construction phase
The prevailing wind direction should be considered to ensure that bunkers and conveyors are sited in a sheltered position to minimise the effects of the wind.	Contractor	Construction phase
Aggregate material should be delivered in a damp condition, and water sprays or a dust suppression agent should be correctly applied to reduce dust emissions and reduce water usage.	Contractor	Construction phase
Conveyors must be designed and constructed to prevent fugitive dust emissions. This may include covering the conveyor with a roof, installing side protection barriers and equipping the conveyor with spill trays, which directs material to a collection point. Belt cleaning devices at the conveyor head may also assist to reduce spillage.	Contractor	Construction phase
The site should be designed and constructed such that clean stormwater, including roof runoff, is diverted away from contaminated areas and directed to the stormwater discharge system.	Contractor	Construction phase
Contaminated stormwater and process wastewater should be captured and recycled where possible. A wastewater collection and recycling system should be designed to collect contaminated water.	Contractor	Construction phase
Areas where spills of oils and chemicals may occur should be equipped with easily accessible spill control kits to assist in prompt and effective spill control.	Contractor	Construction phase
Ensure that all practicable steps are taken to minimise the adverse effect of noise emissions. This responsibility includes not only the noise emitted from the plant and equipment but also associated noise sources, such as radios, loudspeakers and alarms.	Contractor	Construction phase
Where possible, waste concrete should be used for construction purposes at the batching plant or project site.	Contractor	Construction phase

Performance Indicator	» No complaints regarding dust. » No water or soil contamination by chemical spills. » No complaints received regarding waste on site or indiscriminate dumping.

Monitoring and Reporting	» Observation and supervision of chemical storage and handling practices and vehicle maintenance throughout the construction phase. » A complaints register must be maintained, in which any complaints from the community must be logged. Complaints will be investigated and, if appropriate, acted upon. » An incident reporting system must be used to record non-conformances to the EMPr. » The Developer or appointed ECO/EO must monitor indicators listed above to ensure that they have been met for the construction phase.

OBJECTIVE 18: Traffic management and transportation of equipment and materials to site

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

Project component/s	» Wind turbines. » Access roads. » Cabling between turbines. » Substations. » BESS. » All other associated infrastructure.
Potential Impact	» Traffic congestion, particularly on narrow roads or on road passes where overtaking is not permitted. » Risk of accidents. » Deterioration of road pavement conditions (i.e. both surfaced and gravel road) due to abnormal loads.
Activity/risk source	» Construction vehicle movement. » Speeding on local roads. » Degradation of local road conditions. » Site preparation and earthworks. » Foundations or plant equipment installation. » Mobile construction equipment movement on-site. » Substation construction activities.
Mitigation: Target/Objective	» Minimise impact of traffic associated with the construction of the wind farm on the local traffic volume, existing infrastructure, property owners, animals, and road users. » To minimise the potential for negative interaction between pedestrians or sensitive users and traffic associated with the wind farm construction. » To ensure all vehicles are roadworthy and all materials/equipment are transported appropriately and within any imposed permit/licence conditions.

Mitigation: Action/control	Responsibility	Timeframe
Develop and implement a detailed method statement for the implementation of the traffic and transportation management plan (refer to **Appendix F**).	Contractor(s), (Transportation sub-contractor)	Construction

Mitigation: Action/control	Responsibility	Timeframe
Heavy vehicles travelling on secondary roads should adhere to low-speed limits to minimise noise and dust pollution.	Contractor(s), (Transportation sub-contractor)	Construction
If feasible, no construction activities should be carried out during weekends and outside day time working hours	Contractor	Construction
Provide adequate signage along the R335 and R400 to warn motorists of the construction activities taking place on the site. Signage must be maintained on an on-going basis.	Contractor	Construction
Stagger component delivery to the site.	Contractor	Construction
Reduce the construction period.	Contractor	Construction
The use of mobile batching plants and quarries in close proximity to the project site must be investigated.	Contractor	Construction
Staff and general trips should occur outside of peak traffic periods.	Contractor	Construction
Regular maintenance of gravel roads by the contractor during the construction phase.	Contractor	Construction
A designated access (or accesses) to the proposed site must be created to ensure safe entry and exit.	Contractor	Construction
Appropriate road management strategies must be implemented on external and internal roads with all employees and contractors required to abide by standard road and safety procedures.	Contractor(s), (Transportation sub-contractor)	Duration of contract
Construction vehicles carrying material to the site should avoid using roads through densely populated built-up areas.	Contractor(s), (Transportation sub-contractor)	Duration of contract
The movement of all vehicles (barring clearing machinery) within the site must be on designated roadways.	Contractor(s)	Duration of contract
All hazardous substances must be transported in accordance with the relevant legislation and regulations.	Contractor(s)	Duration of contract
Roads must be designed so that changes to surface water runoff are avoided and erosion is not initiated.	Contractor(s)	Duration of contract

Performance Indicator	» No traffic incidents involving project personnel or appointed contractors. » Appropriate signage in place. » No complaints resulting from traffic congestion, delays or driver negligence associated with construction of the wind farm.
Monitoring	» Visual monitoring of traffic control measures to ensure they are effective. » A complaints register will be maintained, in which any complaints from the community will be logged. Complaints will be investigated and, if appropriate, acted upon. » An incident reporting system will be used to record non-conformances to the EMPr.

OBJECTIVE 19: Ensure appropriate rehabilitation of disturbed areas such that residual environmental impacts are remediated or curtailed

Areas requiring rehabilitation will include all areas disturbed during the construction phase and that are not required for regular operation and maintenance operations. Rehabilitation should be undertaken in an area as soon as possible after the completion of construction activities within that area.

Project component/s	» Wind turbines. » Access roads. » Cabling between turbines. » Substations. » BESS. » All other associated infrastructure.
Potential Impact	» Environmental integrity of the site undermined resulting in reduced visual aesthetics, erosion, compromised land capability and the requirement for on-going management intervention.
Activity/risk source	» Site preparation and earthworks. » Excavation of foundations and trenches. » Temporary laydown areas. » Temporary access roads/tracks. » Other disturbed areas/footprints.
Mitigation: Target/Objective	» To ensure and encourage site rehabilitation of disturbed areas. » 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.

Mitigation: Action/control	Responsibility	Timeframe
A site rehabilitation programme should be compiled and implemented (refer to **Appendix D**).	EPC Contractor in consultation with Specialist	Construction
Following construction, rehabilitation of all areas disturbed (e.g. temporary access tracks and laydown areas) must be undertaken.	Contractor	Following execution of the works
All cleared areas must be revegetated with indigenous perennial shrubs and succulents from the local area. These can be cut when dry and placed on the cleared areas if natural recovery is slow.	Contractor	Following execution of the works
Rehabilitation of the working areas must be concurrent with the construction of the project.	Contractor	Construction
All temporary facilities, equipment and waste materials must be removed from site and appropriately disposed of.	Contractor	Following execution of the works
Necessary drainage works and anti-erosion measures must be installed, where required, to minimise loss of topsoil and control erosion.	Contractor	Following execution of the works
Re-vegetated areas may have to be protected from wind erosion and maintained until an acceptable plant cover has been achieved.	Contractor	Following execution of the works
On-going alien plant monitoring and removal should be undertaken on all areas of natural vegetation on an annual basis.	Contractor	Construction

Performance Indicator	» All portions of site, including construction camp and working areas, cleared of equipment and temporary facilities. » Topsoil replaced on all areas and stabilised. » Disturbed areas rehabilitated and acceptable plant cover achieved on rehabilitated sites. » Closed site free of erosion and alien invasive plants.

Monitoring and Reporting	» On-going inspection of rehabilitated areas in order to determine the effectiveness of the rehabilitation measures implemented during the operational lifespan of the wind farm. » On-going alien plant monitoring and removal should be undertaken on an annual basis. » An incident reporting system must be used to record non-conformances to the EMPr.

7.2. Detailing Method Statements

OBJECTIVE 20: 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:

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

Method Statements must be compiled for all activities which affect any aspect of the environment and should be applied consistently to all activities. Specific areas to be addressed in the method statement: pre, during and post construction 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 stormwater management procedures recommended in the stormwater 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 the waste process.
    - Recycle, re-use and removal process and procedure.
- Liquid waste management:
    - 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 existing facilities or sewerage systems where possible. Where no facilities are available, grey water runoff must be controlled to ensure there is no unacceptable seepage occurs.
- Dust and noise pollution:
    - Describe the necessary measures to ensure that noise from construction activities is maintained within lawfully acceptable levels.
    - Procedure to control dust at all times on the site, access roads, borrow pits and spoil sites (dust control shall be sufficient so as not to have significant impacts in terms of the biophysical and social environments). These impacts include visual pollution, decreased safety due to reduced visibility, negative effects on human health and the ecology due to dust particle accumulation.
- Hazardous substance storage (ensure compliance with all national, regional and local legislation with regard to the storage of oils, fuels, lubricants, solvents, wood treatments, bitumen, 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 the storage and handling areas.
    - All storage areas, (i.e. for harmful substances appropriately bunded with a suitable collection point for accidental spills must be implemented and drip trays underneath dispensing mechanisms including leaking engines/machinery).
- Fire prevention and management measures on site.
- Fauna and flora protection process on and off site (i.e. removal to reintroduction or replanting, if necessary):
    - Rehabilitation, re-vegetation process and bush clearing.
- Incident and accident reporting protocol.
- General administration.
- Designate access road and the protocol for when roads are in use.
- Requirements on gate control protocols.

The Contractor may not commence with the activity covered by the Method Statement until it has been reviewed 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.

7.3. Awareness and Competence: Construction Phase of the Merino Wind Farm

OBJECTIVE 21: To ensure all construction personnel have the appropriate level of environmental awareness and competence to ensure continued environmental due diligence and on-going minimisation of environmental harm

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

- All employees must have a basic understanding of the key environmental features of the construction site and the surrounding environment. This includes the discussion/explanation of site environmental matters during toolbox talks.
- The content and requirements of Method Statements are to be clearly explained to all plant operators and general workers. All staff acting in a supervisory capacity is to have copies of the relevant Method Statements and be aware of the content thereof.
- Ensuring that a copy of the EMPr is readily available on-site, and that all senior site staff is aware of the location and have access to the document. Senior site staff will be familiar with the requirements of the EMPr and the environmental specifications as they apply to the construction of the wind farm.
- Ensuring that, prior to commencing any site works, all employees and sub-contractors have attended an Environmental Awareness Training session. The training session must provide the site staff with an appreciation of the project's environmental requirements, and how they are to be implemented.
    - 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 appropriate for the receiving audience.
    - Refresher sessions must be held to ensure the contractor staff are aware of their environmental obligations as practically possible.
- All sub-contractors must have a copy of the EMPr and sign a declaration/ acknowledgement that they are aware and familiar with the contents and requirements of the EMPr and that they will conduct work in such a manner as to ensure compliance with the requirements of the EMPr.
- Contractors and main sub-contractors should have basic training in the identification of archaeological sites/objects, and protected flora and fauna that may be encountered on the site.
- Awareness of any other environmental matters, which are deemed to be necessary by the ECO.
- Ensuring that employee information posters, outlining the environmental "do's" and "don'ts" (as per the environmental awareness training course) are erected at prominent locations throughout the site.

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 on-site, 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:

7.3.1 Environmental Awareness Training

Environmental Awareness Training must be undertaken by the EPC Contractor and must take the form of an on-site talk and demonstration by the EO 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 SHE Officer on site.

7.3.2 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 be undertaken by the Contractor's EO and 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 the 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.

7.3.3 Toolbox Talks

Toolbox talks should be held on a scheduled and regular basis (at least once a week) 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 the reoccurrence thereof. Records of attendance and the awareness talk subject must be kept on file.

7.4. Monitoring Programme: Construction Phase of the Merino Wind Farm

OBJECTIVE 22: To monitor the performance of the control strategies employed against environmental objectives and standards

A monitoring programme must 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. Monitoring during construction must be on-going for the duration of this phase. The Project Manager must ensure that the monitoring is conducted and reported.

The aim of the monitoring and auditing process will be to 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 in communication and feedback to authorities and stakeholders

All documentation e.g. audit/monitoring/compliance reports and notifications, required to be submitted to the DFFE in terms of the Environmental Authorisation, must be submitted to the Director: Compliance Monitoring of the Department.

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

7.4.1. Non-Conformance Reports

All supervisory staff including Foremen, Resident Engineers, and the ECO must be provided with 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.

7.4.2. Incident Reports

According to Section 30 of National Environmental Management Act (NEMA), an "Incident" is defined as an unexpected sudden occurrence, including a major emission, fire or explosion leading to serious danger to the public or potentially serious pollution of or detriment to the environment, whether immediate or delayed.

In terms of the requirements of NEMA, the responsible person must, within 14 days of the incident, report to the Director General, provincial head of department and municipality such information as is available to enable an initial evaluation of the incident, including:

- The nature of the incident.
- The substances involved and an estimation of the quantity released and their possible acute effect on persons and the environment and data needed to assess these effects.
- Initial measures taken to minimise impacts.
- Causes of the incident, whether direct or indirect, including equipment, technology, system, or management failure.
- Measures taken and to be taken to avoid a recurrence of such incident.

7.4.3. Monitoring Reports

A monitoring report will be compiled by the ECO on a monthly basis (or as dictated by the conditions of the EA) and must be submitted to the Director: Compliance Monitoring at DFFE 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, or any other aspect as per the Appendix 7 of the EIA Regulations (2014, as amended 2017). The EPC contractor must ensure that all waste manifests are provided to the ECO on a monthly basis in order to inform and update the DFFE regarding waste related activities.

7.4.4. Audit Report

The Developer must ensure that project compliance with the conditions of the Environmental Authorisation is audited by an independent auditor, and that the audit reports are submitted to the Director: Compliance Monitoring at the DFFE at intervals as dictated by the conditions of the EA. Such audits must be undertaken during both the construction and operation phases of the wind farm. The effectiveness of the mitigation measures and recommendations for amongst others the following: grievance incidents; waste management, alien and open space management, re-vegetation and rehabilitation, plant rescue and protection and traffic and transportation should be audited. The results must form part of the project monitoring and audit reports.

7.4.5. Final Audit Report

A final environmental audit report must be compiled by an independent external auditor and be submitted to DFFE upon completion of the construction and rehabilitation activities (within 30 days of completion of the construction phase. 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.

CHAPTER 8: MANAGEMENT PROGRAMME: OPERATION

Overall Goal: To ensure that the operation of the wind farm 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 Merino Wind Farm in a way that:

- Ensures that operation activities are properly managed in respect of environmental aspects and impacts.
- Enables the wind farm operation activities to be undertaken without significant disruption to other land uses in the area, in particular with regard to farming practices, traffic and road use, and effects on local residents.
- Minimises impacts on fauna using the site.

An environmental manager must be appointed during operation whose duty will be to ensure the implementation of the operational EMPr.

8.1. Objectives

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

OBJECTIVE 1: Securing the site and general maintenance during operation

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

General maintenance at the Merino Wind Farm will be required during the operation of wind farm. The maintenance required may also include the replacement of wind turbines, if required during the operation lifetime of the facility.

Project component/s	» Wind turbines. » Access roads. » Cabling between turbines. » Substations. » BESS. » All other associated infrastructure.
Potential Impact	» Hazards to landowners and public.
Activities/risk sources	» Uncontrolled access to the wind farm and associated infrastructure.
Mitigation: Target/Objective	» To secure the site against unauthorised entry. » To protect members of the public/landowners/residents.

Mitigation: Action/control	Responsibility	Timeframe
General onsite maintenance of the wind turbines during the operation phase must in no way impact or negatively affect the environment, and contractors or other service providers providing onsite maintenance must be made aware of this EMPr and the content thereof.	O&M Operator	Operation phase
All farm gates must be closed after passing through.	O&M Operator	Operation phase
Secure access to the site and entrances.	O&M Operator	Operation phase
Post information boards about public safety hazards and emergency contact information.	O&M Operator	Operation phase
A grievance and consultation plan must be developed and kept on the site at all times during operation of the wind farm. All grievances between landowners and Great Karoo Renewable Energy (Pty) Ltd and between Great Karoo Renewable Energy (Pty) Ltd or any service provider or other entity should be recorded and dealt with in the appropriate grievance channels are outlined in the grievance plan which must be established. Community consultation with surrounding landowners and community members must continue through the life cycle of the project, and must be reported on as such in the grievance and consultation plan. This will allow the receipt of - and facilitate resolution of concerns and grievances about the project's social and environmental issues raised by individuals or groups during the project operational period.	O&M Operator	Operation phase
Should wind turbines be required to be replaced, the following will apply: » Site access must be confirmed for the transportation of the required turbine components and equipment to the site and turbine location of the infrastructure to be replaced. » Materials and turbine structures are to be stored within the previously disturbed construction laydown area. No disturbance of areas outside of these areas should occur. » Full clean-up of all materials must be undertaken after the removal and replacement of the wind turbine and associated infrastructure is complete, and disturbed areas appropriately rehabilitated. » Most of the materials used for wind turbines can be recycled. The majority of the turbine (excluding the blades) can be recovered and re-used or recycled. Recyclable materials must be transported off-site by truck and managed at appropriate facilities in accordance with relevant waste management regulations. No waste materials may be left on-site following the replacement. » Waste material which cannot be recycled shall be disposed of at an appropriately licensed waste disposal site or as required by the relevant legislation.	O&M Operator	Operation phase

Performance Indicator	» Site is secure and there is no unauthorised entry. » No members of the public/ landowners injured. » No complaints from landowners/ public.
Monitoring and Reporting	» Regular visual inspection of fence for signs of deterioration/forced access. » An incident reporting system must be used to record non-conformances to the EMPr. » A public complaints register must be developed and maintained on site. » Landowners should be consulted regularly.

OBJECTIVE 2: 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 the construction, maintenance of the areas rehabilitated post-construction must be undertaken until these areas have successfully re-established.

Project component/s	» Areas requiring regular maintenance. » Route of the security team. » Wind farm including access roads and laydown areas. » Areas disturbed during the construction phase and subsequently rehabilitated at its completion.
Potential Impact	» Disturbance to or loss of vegetation and/or habitat. » Alien plant invasion. » Environmental integrity of site undermined resulting in reduced visual aesthetics, erosion, compromised land capability and the requirement for on-going management intervention.
Activity/Risk Source	» Movement of employee vehicles within and around site.
Mitigation: Target/Objective	» Maintain minimised footprints of disturbance of vegetation/ habitats on-site. » Ensure and encourage plant regrowth in non-operational areas of post-construction rehabilitation.

Mitigation: Action/Control	Responsibility	Timeframe
Restrict activities to infrastructure locations only and limit disturbance creeping into surrounding areas.	O&M Operator	Operation phase
Protect sensitive features and habitats during operational activities. Access to sensitive areas must be enforced.	O&M Operator	Operation phase
Implement Alien Plant Management Plan, including monitoring, to ensure minimal impacts on surrounding areas.	O&M Operator	Operation phase
No additional clearing of vegetation should take place during the operational phase without a proper assessment of the environmental impacts and authorization from relevant authorities, unless for maintenance purposes, in which case all reasonable steps should be taken to limit damage to natural areas.	O&M Operator	Operation phase
Undertake regular monitoring to detect alien invasions early so that they can be controlled	O&M Operator	Operation phase
Speed limits should be set for all roads on site, as well as access roads to the site. These limits should not exceed 40 km/h, but	O&M Operator	Operation phase

Mitigation: Action/Control	Responsibility	Timeframe
may be set lower, depending on local circumstances. Strict enforcement of speed limits should occur – install speed control measures, such as speed humps, if necessary.		
Personnel on site should undergo environmental induction training, including the need to abide by speed limits, the increased risk of collisions with wild animals on roads in rural areas.	O&M Operator	Operation phase
Proper waste management must be implemented, ensuring no toxic or dangerous substances are accessible to wildlife. This should also apply to stockpiles of new and used materials to ensure that they do not become a hazard	O&M Operator	Operation phase
No collecting, hunting or poaching of any animal species should take place.	O&M Operator	Operation phase
Report any mortality of protected species to conservation authorities.	O&M Operator	Operation phase
Noise and light pollution should be managed according to guidelines from the noise specialist study and visual specialist assessment respectively.	O&M Operator	Operation phase
Regular monitoring for erosion after construction to ensure that no erosion problems have developed as result of the disturbance must be undertaken, as per the Erosion Management and Rehabilitation Plans for the project.	O&M Operator	Operation phase
All erosion problems observed must be rectified as soon as possible, using the appropriate erosion control structures and revegetation techniques.	O&M Operator	Operation phase
Vehicle movements must be restricted to designated roadways.	O&M Operator	Operation phase

Performance Indicator	» No further disturbance to vegetation or terrestrial faunal habitats. » No erosion problems resulting from operational activities within the wind farm. » Low abundance of alien plants within affected areas. » Maintenance of a ground cover that resist erosion. » Continued improvement of rehabilitation efforts.
Monitoring	» Observation of vegetation on-site by environmental manager. » Regular inspections to monitor plant regrowth/performance of rehabilitation efforts and weed infestation compared to natural/undisturbed areas. » Annual monitoring with records of alien species presence and clearing actions. » Annual monitoring with records of erosion problems and mitigation actions taken with photographs.

OBJECTIVE 3: Protection of avifauna

Project component/s	» Wind turbines. » Substations. » Other electrical infrastructure.

Potential Impact	» Disturbance to or loss of birds as a result of collision with the turbine blades and project components. » Destruction of habitat. » Displacement of birds. » Collision with project components. » Electrocution on electrical infrastructure.
Activity/risk source	» Spinning turbine blades. » Substation. » Other electrical infrastructure.
Mitigation: Target/Objective	» More accurately determine the impact of the operating wind farm on collision-prone Red Data species. » Minimise impacts associated with the turbines, substation and other electrical infrastructure.

Mitigation: Action/control	Responsibility	Timeframe
Once operational, vehicle and pedestrian access to the site should be controlled and restricted to prevent unnecessary destruction of vegetation.	O&M Operator	Operation phase
Formal live-bird monitoring should be resumed once the turbines have been constructed, as per the most recent edition of the Best Practice Guidelines (Jenkins et al. 2015). The purpose of this would be to establish if displacement of priority species has occurred and to what extent. The exact time when operational monitoring should commence, will depend on the construction schedule, and should commence when the first turbines start operating. The Best Practice Guidelines require that, as an absolute minimum, operational monitoring should be undertaken for the first two (preferably three) years of operation, and then repeated again in year 5, and again every five years thereafter for the operational lifetime of the facility.	O&M Operator	Operation phase
Carcass searches must commence to establish mortality rates, as per the most recent edition of the Best Practice Guidelines (Jenkins et al. 2015). The exact time when operational monitoring should commence will depend on the construction schedule, and should commence when the first turbines start operating. The Best Practice Guidelines require that, as an absolute minimum, operational monitoring should be undertaken for the first two (preferably three) years of operation, and then repeated again in year 5, and again every five years thereafter for the operational lifetime of the facility.	O&M Operator	Operation phase
If annual estimated collision rates indicate unsustainable mortality levels of priority species, i.e. if natural background mortality together with the estimated mortality caused by turbine collisions exceeds a critical mortality threshold as determined by the avifaunal specialist in consultation with other experts e.g. BLSA, additional measures will have to be implemented which could include shutdown on demand. This must be undertaken in consultation with a qualified avifauna specialist.	Developer Specialist	Operation phase

Mitigation: Action/control	Responsibility	Timeframe
Bi-monthly inspections of the overhead sections of the MV network must be conducted to look for carcasses under the poles, where relevant.	O&M Operator	Operation phase
With regards to the infrastructure within the substation yard, the hardware is too complex to warrant any mitigation for electrocution at this stage. It is rather recommended that if any impacts are recorded once operational, site specific mitigation be applied reactively and in consultation with a qualified avifauna specialist.	Developer Specialist	Operation phase
Bird flight diverters should be installed on all 33kV overhead lines on the full span length on the earthwire (according to Eskom guidelines - five metres apart). Light and dark colour devices must be alternated to provide contrast against both dark and light backgrounds respectively. These devices must be installed as soon as the conductors are strung.	O&M Operator	Operation phase

Performance Indicator	» Minimal additional disturbance to bird populations on the wind farm site. » Continued improvement of bird protection devices, as informed by the operational monitoring. » Regular provision of clearly worded, logical and objective information on the interface between the local avifauna and operating wind farm. » Clear and logical recommendations on why, how and when to institute mitigation measures to reduce avian impacts of the development, from the pre-construction to operation phase.
Monitoring and Reporting	» Observation of avifaunal populations and incidence of injuries/death from collisions from turbine blades. » Monitoring of facility and reporting where fatalities do occur. » Review of bird monitoring report on a full year of post-construction monitoring.

OBJECTIVE 4: Protection of bat species

Based on the bat activity recorded at the Merino Wind Farm, the significance ratings for the majority of the impacts to bats posed by the development are predicted to be medium or high before mitigation. After mitigation, all impacts are predicted to be low. Based on the opportunity for reduction of the impacts through appropriate mitigation measures from a high or medium significance to a low acceptable significance no fatal flaws are expected to occur.

Project component/s	» Wind turbines. » Substations.
Potential Impact	» Disturbance to or loss of bats as a result of collision with turbines and/or barotrauma. » Bat mortality and destruction of habitat / roosts.
Activity/risk source	» Spinning turbine blades.
Mitigation: Target/Objective	» More accurately determine the impact of the operating wind farm on bat species. » Minimise impacts associated with the turbines and substation.

Mitigation: Action/control	Responsibility	Timeframe
Operational acoustic monitoring and carcass searches for bats must be performed, based on best practice, to monitor mortality and bat activity levels. Acoustic monitoring should include monitoring at height (from more than one location i.e. such as on turbines) and at ground level.	Developer Specialist	Operation phase
Apply curtailment during spring, summer and autumn if mortality occurs beyond threshold levels as determined based on applicable guidance (MacEwan et al. 2018). The threshold calculations must be done at a minimum of once a quarter (i.e. not only after the first year of operational monitoring) so that mitigation can be applied as quickly as possible should thresholds be reached.	Developer Specialist	Operation phase

Performance Indicator	» Minimal additional disturbance to bat populations on the wind farm site. » Continued improvement of bat protection devices, as informed by the operational monitoring. » Regular provision of clearly worded, logical and objective information on the interface between the local bats and the proposed/ operating wind farm. » Clear and logical recommendations on why, how and when to institute mitigation measures to reduce bat impacts of the development, from the pre-construction to operation phase.
Monitoring and Reporting	» Monitoring of facility and reporting where fatalities do occur. » Review of bat monitoring report on a full year of post-construction monitoring.

OBJECTIVE 5: Minimisation of 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.

The aircraft warning lights mounted on top of the hub of the wind turbines are prescribed by the Civil Aviation Authority (CAA), and the potential to mitigate their visual impacts is low. The regulations for the CAA's *Marking of Obstacles* should be strictly adhered to, 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.

Project component/s	» Wind farm (including access roads). » Substation. » Ancillary infrastructure.
Potential Impact	» Risk to aircraft in terms of the potential for collision. » Enhanced visual intrusion. » Visual impact of the wind farm degradation (including operational wind turbines) and vegetation rehabilitation failure.
Activity/risk source	» Size/scale of turbines. » Associated lighting. » Other associated infrastructure. » Access roads.

	» Viewing of the degradation and vegetation rehabilitation failure by observers on or near the site.
Mitigation: Target/Objective	» To minimise the potential for visual impact. » To ensure that the wind farm complies with Civil Aviation Authority requirements for turbine visibility to aircraft. » Minimise the contrast with the surrounding environment and visibility of the turbines to humans. » The containment of light emitted from the substation in order to eliminate the risk of additional night-time visual impacts. » Well maintained and neat facility.

Mitigation: Action/control	**Responsibility**	**Timeframe**
Maintain the general appearance of the facility as a whole, including the turbines, servitudes and the ancillary buildings.	O&M Operator	Operation and maintenance
Lighting of the wind farm (for example security lights) should be kept to a minimum. Lights should be directed downwards.	O&M Operator	Operation phase
Aviation warning lights must be mounted on the turbine hub or such measures specified by the Civil Aviation Authority consent.	O&M Operator	Operation and maintenance
Minimise night lighting with motion sensors and make use of an infra-red security system. Maintain lighting focused on the development and angled low.	O&M Operator	Operation phase
If turbines are to be lit at night, lighting should be kept to a minimum and should preferably not be white light. Flashing strobe-like lights should be used where possible.	O&M Operator	Operation phase

Performance Indicator	» Appropriate visibility of infrastructure to aircraft. » Well maintained and neat facility with intact vegetation on and in the vicinity of the wind farm.
Monitoring and Reporting	» Ensure that aviation warning lights or other measures are installed before construction is completed and are fully functional at all times. » Monitoring of the entire site on an ongoing basis by the operator.

OBJECTIVE 6: Minimisation of noise impacts from turbines

With the implementation of the prescribed mitigation measures, noise impacts will be of low significance for daytime and nigh-time construction activities, low significance for operation of the wind turbines at night and low significance during decommissioning of the proposed wind farm. No impacts of a high significance or fatal flaws were identified.

Project component/s	» Wind farm (including access roads).
Potential Impact	» Increased noise levels at potentially sensitive receptors. » Changing ambient sound levels could change the acceptable land use capability. » Disturbing character of noise from the wind turbines..
Activity/risk source	» Simultaneous operation of a number of wind turbines.

Mitigation: Target/Objective	» Define ambient sound levels prior to the development of the wind farm. » Ensure that the change in ambient sound levels as experienced by potentially sensitive receptors is less than 7dBA. » Prevent the generation of nuisance noises. » Ensure acceptable noise levels at surrounding stakeholders and potentially sensitive receptors. » Ensure that noises from wind turbines do not exceed 45dBA at all NSDs.

Mitigation: Action/control	Responsibility	Timeframe
Undertake noise monitoring after the first year of operation of the wind farm. The acoustic consultant must recommend whether future noise monitoring is required.	O&M Operator	Operation phase

Performance Indicator	» Ensure that the change in ambient sound levels as experienced by potentially sensitive receptors is less than 7 dBA
Monitoring and Reporting	» Noise monitoring after the first year of operation and any additional monitoring as recommended by the specialist thereafter

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

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

Project component/s	» Wind turbines. » Substation. » Associated infrastructure.
Potential Impact	» Inefficient use of resources resulting in excessive waste generation. » Litter or contamination of the site or water through poor waste management practices.
Activity/risk source	» Generators and gearbox – turbines. » Transformers and switchgear – substation. » Fuel and oil storage.
Mitigation: Target/Objective	» 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.	O&M Operator	Operation phase
Storage areas for hazardous substances must be conducted within a secured and clearly demarcated area.	O&M Operator	Operation phase
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.	O&M Operator	Operation phase

Mitigation: Action/control	Responsibility	Timeframe
Care must be taken to ensure that spillage of oils and other hazardous substances are limited during maintenance. Handling of these materials should take place within an appropriately sealed and bunded area. Should any accidental spillage take place, it must be cleaned up according to specified standards regarding bioremediation.	O&M Operator	Operation and maintenance
Waste handling, collection and disposal operations must be managed and controlled by a waste management contractor.	O&M Operator / waste management contractor	Operation phase
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.	O&M Operator	Operation phase
General waste must be recycled where possible or disposed of at an appropriately licensed landfill.	O&M Operator	Operation phase
Spill kits must be made available on-site for the clean-up of spills and leaks of contaminants.	O&M Operator	Operation and maintenance
Hazardous waste (including hydrocarbons) and general waste must be stored and disposed of separately.	O&M Operator	Operation phase
Disposal of waste must be in accordance with relevant legislative requirements, including the use of licensed contractors.	O&M Operator/ waste management contractor	Operation phase
No waste may be burned or buried on site.	O&M Operator	Operation phase

Performance Indicator	» No complaints received regarding waste on site or dumping. » Internal site audits identifying that waste segregation, recycling and reuse is occurring appropriately. » Provision of all appropriate waste manifests. » No contamination of soil.
Monitoring and Reporting	» Waste collection must be monitored internally on a regular basis. » Waste documentation must be completed and made available for inspection on request. » 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. » 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 must accompany the monthly reports.

OBJECTIVE 8: Maximise benefits and opportunities for local communities

The operation of the facility will create an estimated 20 full time equivalent (FTE) employment (including foreign FTE positions) positions annually (for 20 years) for the lifetime of the operation of the facility.

Project component/s	» Wind farm. » Day to day operational activities associated with the wind farm including maintenance.
Potential Impact	» The opportunities and benefits associated with the creation of local employment and business should be maximised as far as possible.
Activity/risk source	» The operation phase of the wind farm will create permanent employment opportunities. » The establishment of a wind farm has the potential to create an attraction for visitors to the area. The development also has the potential to promote the benefits of renewable energy projects.
Mitigation: Target/Objective	» Create medium- to long-term full time employment opportunities for locals.

Mitigation: Action/control	Responsibility	Timeframe
Implement a skills development and training programme aimed at maximizing the number of employment opportunities for local community members.	O&M Operator	Operation phase
Maximise opportunities for local content, procurement, and community shareholding.	O&M Operator	Operation phase
Where reasonable and practical, the proponent should appoint local contractors and implement a 'locals first' policy, especially for semi and low-skilled job categories. However, due to the low skills levels in the area, the majority of skilled posts are likely to be filled by people from outside the area.	O&M Operator	Operation phase
Where feasible, efforts should be made to employ local contactors that are compliant with Broad Based Black Economic Empowerment (BBBEE) criteria.	O&M Operator	Operation phase
The recruitment selection process should seek to promote gender equality and the employment of women wherever possible.	O&M Operator	Operation phase
Where possible, the proponent should assist local BBBEE companies to complete and submit the required tender forms and associated information.	O&M Operator	Operation phase
The ULM, in conjunction with the local business sector and representatives from the local hospitality industry, should identify strategies aimed at maximising the potential benefits associated with the project.	O&M Operator	Operation phase
The proponents should liaise with the ULM to identify projects that can be supported by SED contributions. Strict financial management controls, including annual audits, should be instituted to manage the SED contributions.	O&M Operator	Operation phase
Clear criteria for identifying and funding community projects and initiatives in the area should be identified. The criteria should be aimed at maximising the benefits for the community as a whole and not individuals within the community.	O&M Operator	Operation phase

Performance Indicator	» Maximum amount of semi and unskilled labour locally sourced where possible. » Local suppliers and SMMEs contracted where possible. » Skills transfer facilitated where required. » A social development and economic development programme developed and implemented.

Monitoring and Reporting	» Indicators listed above must be met for the operation phase.

OBJECTIVE 9: Implement an appropriate fire management plan during the operation phase

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

Project Component/s	» Operation and maintenance of the wind farm and associated infrastructure.
Potential Impact	» 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 farm infrastructure.
Activities/Risk Sources	» The presence of operation and maintenance personnel and their activities on the site can increase the risk of veld fires.
Mitigation: Target/Objective	» To avoid and or minimise the potential risk of veld fires on local communities and their livelihoods.

Mitigation: Action/Control	Responsibility	Timeframe
Smoking on site should be confined to designated areas.	O&M Operator	Operation phase
Contractor should provide adequate fire-fighting equipment on-site, including a fire fighting vehicle. Contractor should provide fire-fighting training to selected staff.	O&M Operator	Operation phase
Contractor should ensure that open fires on the site for cooking or heating are not allowed except in designated areas	O&M Operator	Operation phase
Ensure that appropriate communication channels are established to be implemented in the event of a fire.	O&M Operator	Operation phase
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.). Access roads may also act as fire breaks.	O&M Operator	Operation phase
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.	O&M Operator	Operation phase
Contact details of emergency services should be prominently displayed on site.	O&M Operator	Operation phase

Performance Indicator	» Firefighting equipment and training provided before the construction phase commences. » Appropriate fire breaks in place.
Monitoring and Reporting	» The Developer must monitor indicators listed above to ensure that they have been met.

8.2. Monitoring Programme: Operation Phase of the Merino Wind Farm

OBJECTIVE 10: To monitor the performance of the control strategies employed against environmental objectives and standards

A monitoring programme must 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. An internal environmental audit must be conducted every 6 months and an external audit must be conducted once a year in order to confirm compliance with the requirements of all environmental permits (including the Environmental Authorisation, once issued) for the project, this EMPr, and all relevant legislation. The results of the audit reports must be made available to the DFFE and the relevant authorities on request, and must be part of monitoring and audit reports. An annual audit report must be compiled and submitted to DFFE. The aim of the 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 in the communication and feedback to authorities and stakeholders.

CHAPTER 9: MANAGEMENT PROGRAMME: DECOMMISSIONING

The turbine infrastructure which will be utilised for the Merino Wind Farm is expected to have a lifespan of 20 to 25 years (with maintenance). Equipment associated with this wind farm 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 wind farm would comprise the dismantling and replacement of the turbines with more appropriate technology/infrastructure available at that time. It must be noted that decommissioning activities will need to be undertaken in accordance with the legislation applicable at that time, which may require this section of the EMPr to be revisited and amended.

The relevant mitigation measures contained under the construction section should be applied during decommissioning and therefore are not repeated in this section.

» ***Site Preparation***
» Site preparation activities will include confirming the integrity of the access to the site to accommodate the required equipment, preparation of the site (e.g. laydown areas, construction platform) and the mobilisation of construction equipment.

» ***Dismantle and Remove Infrastructure***
» The wind infrastructure (turbine and tower sections) of the wind farm will be dismantled once it reaches the end of its economic lifespan. A large crane would be required for dismantling the turbine and tower sections. Once dismantled, the components will be reused, recycled, or disposed of in accordance with regulatory requirements (NEMA / NEM:WA). All parts of the turbine would be considered reusable or recyclable except for the blades.

9.1. Objectives

In decommissioning the Merino Wind Farm, Great Karoo Renewable Energy (Pty) Ltd must ensure that:

» All structures not required for the post-decommissioning use of the site (may include the turbines, substation, ancillary buildings, monitoring masts) are dismantled and/or demolished, removed and waste material disposed of at an appropriately licensed waste disposal site or as required by the relevant legislation.
» Rehabilitate access/service roads and servitudes not required for the post-decommissioning use of the site. If necessary, an ecologist should be consulted to give input into rehabilitation specifications.
» All disturbed areas are compacted, sloped and contoured to ensure drainage and runoff and to minimise the risk of erosion.
» Monitor rehabilitated areas quarterly for at least a year following decommissioning, and implement remedial action as and when required.
» Any fauna encountered during decommissioning activities should be removed to safety by a suitably qualified person.
» All vehicles to adhere to low speed limits (i.e. 30km/h max) on the site, to reduce risk of faunal collisions as well as reduce dust.
» Retrenchments should comply with South African Labour legislation of the day.

The general specifications of Construction and Rehabilitation are also relevant to the decommissioning of the Merino Wind Farm and must be adhered to.

APPENDIX A:
FACILITY LAYOUT AND SENSITIVITY MAPS

Merino Wind Energy Facility
Richmond, Northern Cape Province

Locality Map

N

Gamma/Hydra 1 765kV
Droerivier/Hydra 3 400kV
Gamma/Perseus 1 765kV
Droerivier/Hydra 2 400kV
Hydra/Droerivier 1 400kV

R398
R348
N1

Richmond

RONDAVEL 85
1

VOGELSTRUISFONTEIN 84
0

RONDAVEL 85
0

BULT & RIETFONTEIN 96
9

Bulberg River

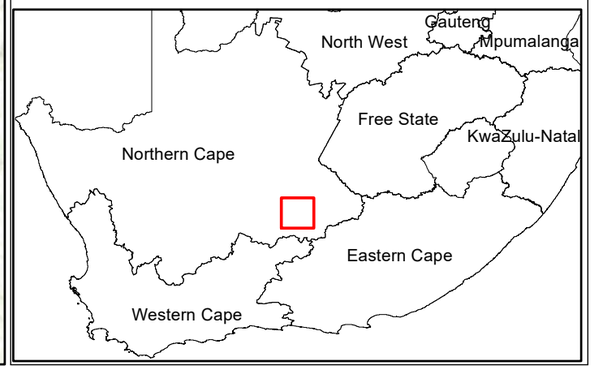
1543 m
1736 m
1833 m
1632 m

Legend

- Town
- Eskom Substation
- Existing Power Line
- National Road
- Regional Road
- Main Road
- Non-Perennial River
- Perennial River
- Project Site
- Merino Wind Energy Facility Development Area

Scale: 1: 250 000
Projection: WGS_1984
Map Ref: MerinoWEF - Locality

savannah environmental

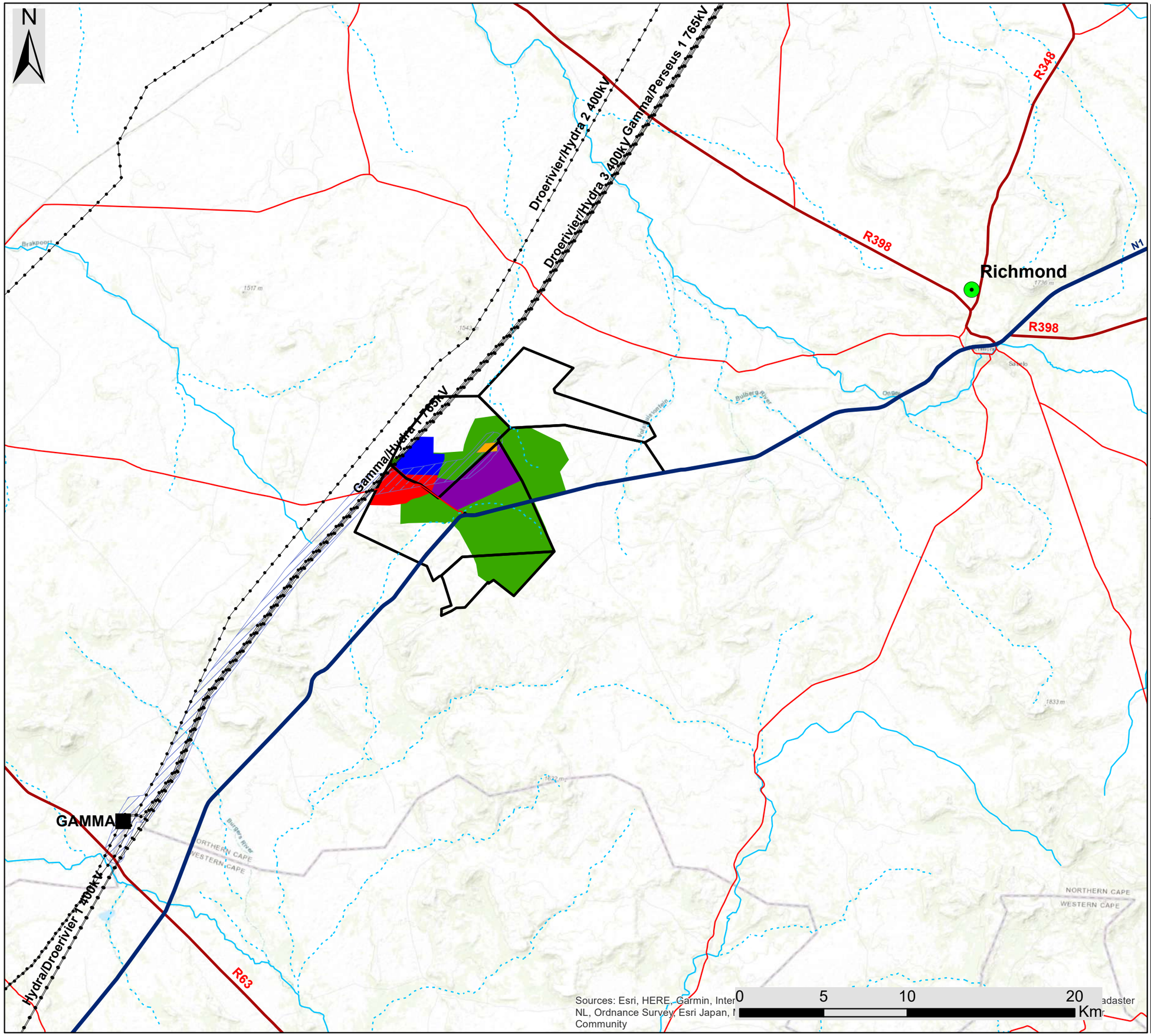


Sources: Esri, HERE, Garmin, Inter
NL, Ordnance Survey, Esri Japan, I
Community

0 4 8 16 Km

Proposed Greater Karoo Renewable Energy Cluster, Richmond, Northern Cape Province

Locality Map

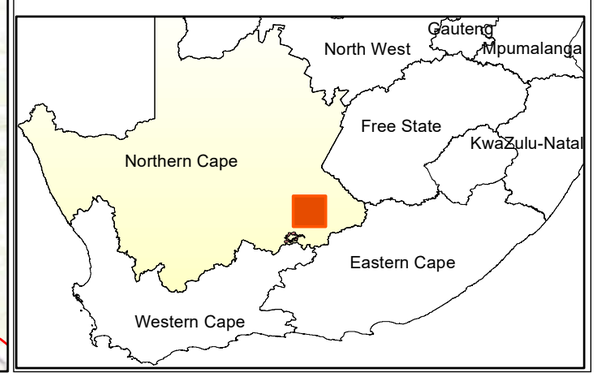


Legend

- Town
- Eskom Substation
- Existing Power Line
- National Road
- Regional Road
- Main Road
- Non-Perennial River
- Perennial River
- Nku Solar PV
- Moriri Solar PV
- Kwana Solar PV
- Merino Wind Farm
- Collector Substation
- Grid Connection Corridor (1km wide)
- Project Sites

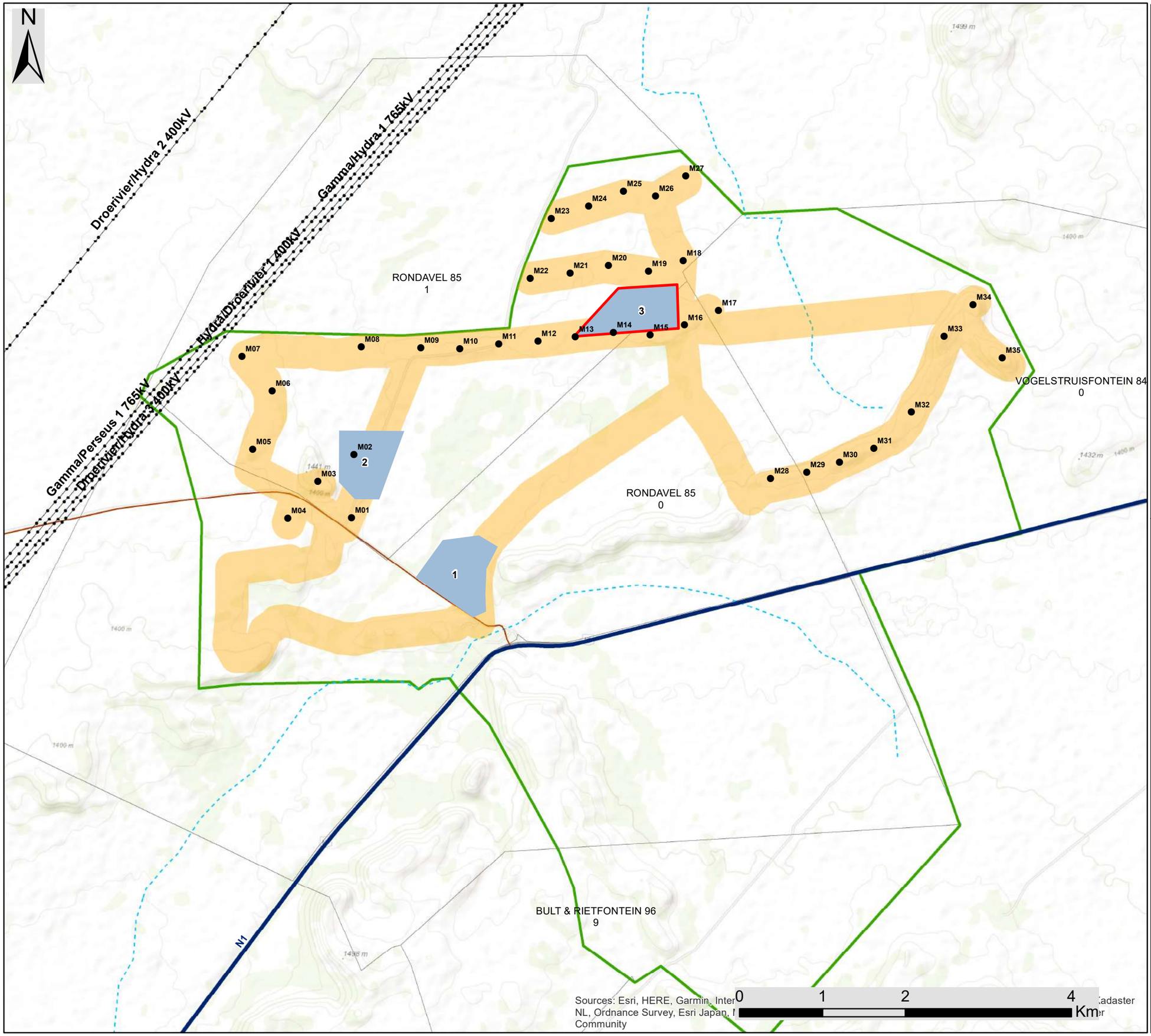
Scale: 1: 250 000
Projection: WGS_1984
Map Ref: Great Karoo BID - Locality

savannah environmental



Merino Wind Energy Facility
Richmond, Northern Cape Province

Facility Layout Map



Legend

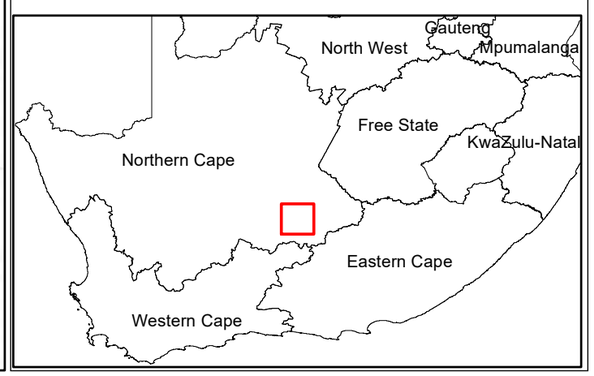
- Existing Power Line
- National Road
- Main Road
- Non-Perennial River
- Perennial River
- Project Site
- Merino Wind Farm Development Area

Facility Layout Plan

- Turbines
- Facility Substation
- Site Compound Alternatives
- Internal Access Roads Corridor (200m wide)

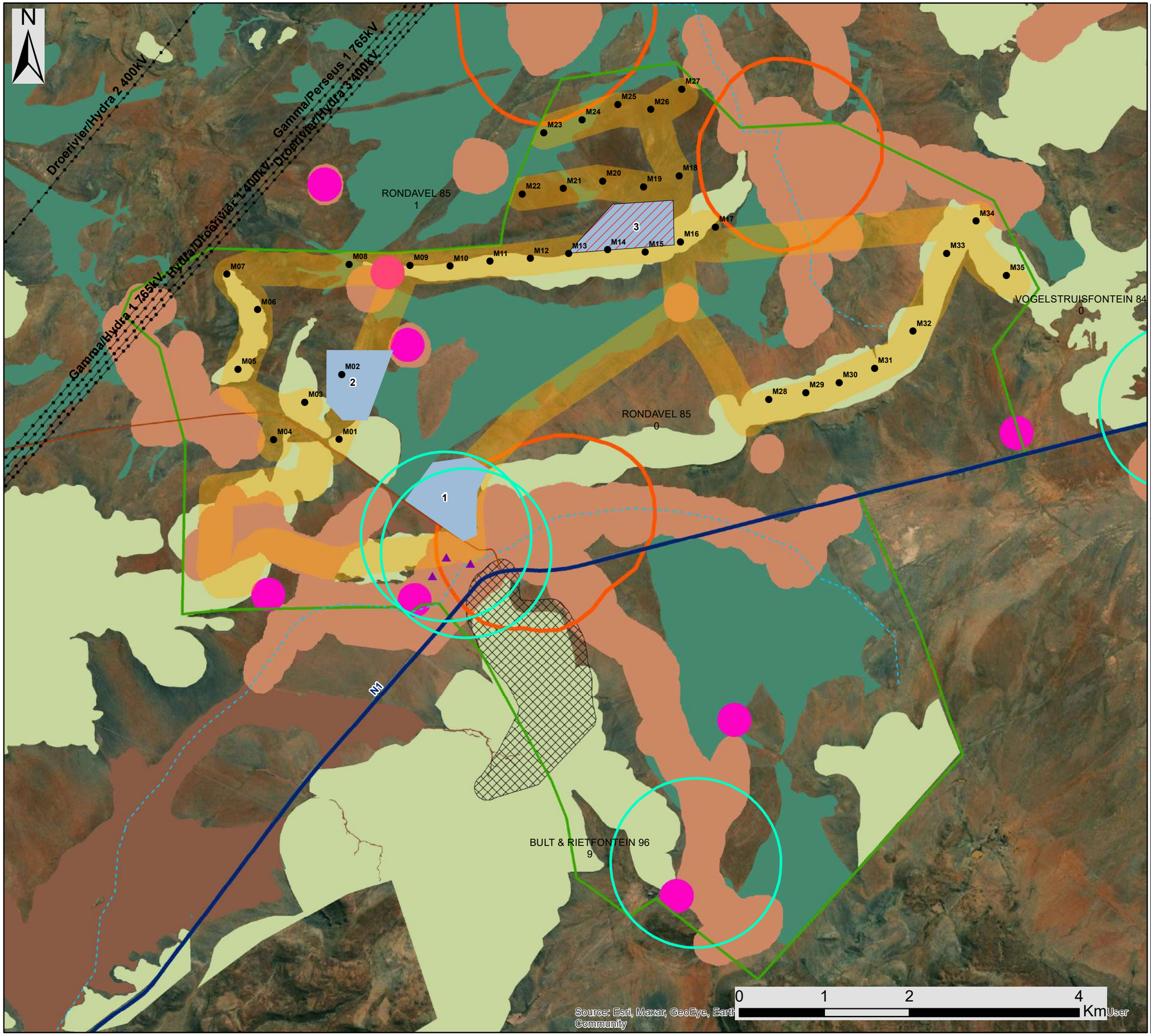
Scale: 1: 250 000
Projection: WGS_1984
Map Ref: MerinoWEF - Layout

savannah environmental



Merino Wind Energy Facility
Richmond, Northern Cape Province

Facility Layout & Sensitivity Map



Legend

- Existing Power Line
- National Road
- Main Road
- Non-Perennial River
- Perennial River
- Project Site
- Merino Wind Farm Development Area

Facility Layout Plan

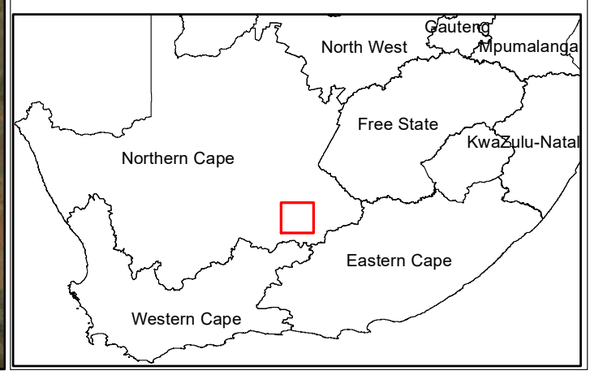
- Turbines
- Facility Substation
- Site Compound Alternatives
- Internal Access Roads Corridor (200m wide)

Environmental Sensitivities

- Noise Sensitive Receptor
- Heritage Structures (1km Buffer)
- Avifauna Sensitivitiy (200m watering point buffer)
- Avifauna Sensitivity (800m large dam buffer)
- Verreaux Eagle Ridge Buffer
- High Bat Sensitivity (200m No-go for turbines)

Scale: 1: 250 000
Projection: WGS_1984
Map Ref: MerinoWEF - Layout

savannah environmental



Proposed Greater Karoo Renewable Energy Cluster, Richmond, Northern Cape Province

Cumulative Map

Legend

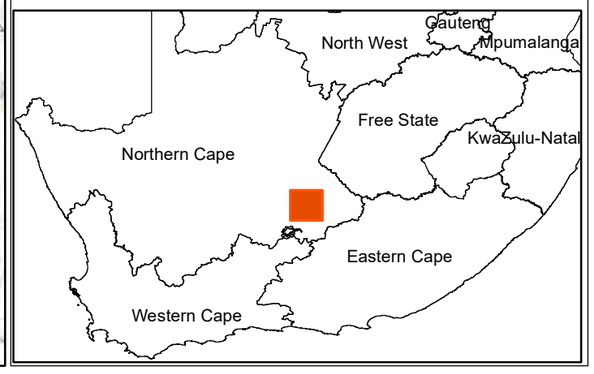
- Town
- Eskom Substation
- Existing Power Line
- National Road
- Regional Road
- Main Road
- Great Karoo Renewable Energy Cluster

Known Authorised Renewable Energy Facilities (based on affected property)

- Nobelsfield Wind Energy Facility
- Bietjiesfontein Solar Energy Facility
- Karoo Renewable Energy Facility
- Brakpoort Solar PV Facility
- Umsinde Emoyeni Wind Energy Facility
- Aurora Solar PV Facility
- Mainstream Renewable Energy Cluster
- Ishwati Emoyeni Wind Energy Facility
- Trouberg Wind Energy Facility
- Modderfontein Wind Energy Facility

Scale: 1: 250 000
Projection: WGS_1984
Map Ref: Great Karoo Cumulative

savannah environmental



Victoria West
Victoria West
Richmond
GAMMAB
Murraysburg
R398
R348
N1
R63
1517 m
1833 m
Ongers
Brakpoort/Hutchinson 1 132kV
Droerivier/Hydra 2 400kV
Droerivier/Hydra 3 400kV
Gamma/Hydra 1 765kV
Gamma/Perseus 1 765kV
Hutchinson/Bieslespoort 1 132kV
Hydra/Droerivier 1 400kV
Gamma/Zeapa 1 765kV
NORTHERN CAPE
WESTERN CAPE
EASTERN

0 5 10 20 Km

Sources: Esri, HERE, Garmin, Inter AN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, M itors, and the GIS User Community

APPENDIX B:
GRIEVANCE MECHANISM FOR COMPLAINTS AND ISSUES

GRIEVANCE MECHANISM / PROCESS

PURPOSE

This Grievance Mechanism has been developed to receive and facilitate the resolution of concerns and grievances regarding the project's environmental and social performance. The aim of the grievance mechanism is to ensure that grievances or concerns are raised by stakeholders and to ensure such grievances are addressed in a manner that:

- Provides a predictable, accessible, transparent, and credible process to all parties, resulting in outcomes that are fair and equitable, accountable and efficient.
- Promotes trust as an integral component of broader community relations activities.
- Enables more systematic identification of emerging issues and trends, facilitating corrective action and pre-emptive engagement.

The aim of this Grievance Mechanism is to address grievances in a manner that does not require a potentially costly and time-consuming legal process.

PROCEDURE FOR RECEIVING AND RESOLVING GRIEVANCES

The following proposed grievance procedures are to be complied with throughout the construction, operation and decommissioning phases of the project:

- Local landowners, communities and authorities must be informed in writing by the Developer of the grievance mechanism and the process by which grievances can be brought to the attention of the Developer through its designated representative. This must be undertaken with the commencement of the construction phase.
- A company representative must be appointed as the contact person in order for grievances to be addressed. The name and contact details of the contact person must be provided to local landowners, communities and authorities when requested.
- Project related grievances relating to the construction, operation and or decommissioning phases must be addressed in writing to the contact person. The contact person should assist local landowners and or communities who may lack resources to submit/prepare written grievances, by recording grievances and completing written grievance notices where applicable, translating requests or concerns or by facilitating contact with the nominated contact person. The following information should be obtained, as far as possible, regarding each written grievance, which may act as both acknowledgement of receipt as well as record of grievance received:
    a. The name and contact details of the complainant;
    b. The nature of the grievance;
    c. Date raised, received, and for which the meeting was arranged;
    d. Persons elected to attend the meeting (which will depend on the grievance); and
    e. A clear statement that the grievance procedure is, in itself, not a legal process. Should such avenues be desired, they must be conducted in a separate process and do not form part of this grievance mechanism.
- The grievance must be registered with the contact person who, within 2 working days of receipt of the grievance, must contact the Complainant to discuss the grievance and, if required, agree on suitable

date and venue for a meeting in order to discuss the grievances raised. Unless otherwise agreed, the meeting should be held within 2 weeks of receipt of the grievance.

- The contact person must draft a letter to be sent to the Complainant acknowledging receipt of the grievance, the name and contact details of Complainant, the nature of the grievance, the date that the grievance was raised, and the date and venue for the meeting (once agreed and only if required).
- A grievance register must be kept on site (in electronic format, so as to facilitate editing and updating), and shall be made available to all parties wishing to gain access thereto.
- Prior to the meeting being held the contact person must contact the Complainant to discuss and agree on the parties who should attend the meeting, as well as a suitable venue. The people who will be required to attend the meeting will depend on the nature of the grievance. While the Complainant and or Developer are entitled to invite their legal representatives to attend the meeting/s, it should be made clear to all the parties involved in the process that the grievance mechanism process is not a legal process, and that if the Complainant invites legal representatives, the cost will be their responsibility. It is therefore recommended that the involvement of legal representatives be limited as far as possible, as a matter of last resort, and that this process be primarily aimed at stakeholder relationship management as opposed to an arbitration or litigation mechanism
- The meeting should be chaired by the Developer's representative appointed to address grievances. The Developer must supply and nominate a representative to capture minutes and record the meeting/s.
- Draft copies of the minutes must be made available to the Complainant and the Developer within 5 working days of the meeting being held. Unless otherwise agreed, comments on the Draft Minutes must be forwarded to the company representative appointed to manage the grievance mechanism within 5 working days of receipt of the draft minutes.
- The meeting agenda must be primarily the discussion of the grievance, avoidance and mitigation measures available and proposed by all parties, as well as a clear indication of the future actions and responsibilities, in order to put into effect the proposed measures and interventions to successfully resolve the grievance.
- In the event of the grievance being resolved to the satisfaction of all the parties concerned, the outcome must be recorded and signed off by the relevant parties. The record should provide details of the date of the meeting/s, the names of the people that attended the meeting/s, the outcome of the meeting/s, and where relevant, the measures identified to address the grievance, the party responsible for implementing the required measures, and the agreed upon timeframes for the measures to be implemented.
- In the event of a dispute between the Complainant and the Developer regarding the grievance, the option of appointing an independent mediator to assist with resolving the issue should be discussed. The record of the meeting/s must note that a dispute has arisen and that the grievance has not been resolved to the satisfaction of all the parties concerned.
- In the event that the parties agree to appoint a mediator, the Developer will be required to identify three (3) mediators and forward the names and CVs to the Complainant within 2 weeks of the dispute being declared. The Complainant, in consultation with the Developer, must identify the preferred mediator and agree on a date for the next meeting. The cost of the mediator must be borne by the Developer. The Developer must supply and nominate a representative to capture minutes and record the meeting/s.
- In the event of the grievance, with the assistance of the mediator, being resolved to the satisfaction of all the parties concerned, the outcome must be recorded and signed off by the relevant parties, including the mediator. The record should provide details on the date of the meeting/s, the names of

the people that attended the meeting/s, the outcome of the meeting/s, and where relevant, the measures identified to address the grievance, the party responsible for implementing the required measures, and the agreed upon timeframes for the measures to be implemented.

- In the event of the dispute not being resolved, the mediator must prepare a draft report that summaries the nature of the grievance and the dispute. The report should include a recommendation by the mediator on the proposed way forward with regard to the addressing the grievance.
- The draft report must be made available to the Complainant and the Developer for comment before being finalised and signed by all parties, which signature may not be unreasonably withheld by either party. Unless otherwise agreed, comments on the draft report must be forwarded to the company representative appointed to manage the grievance mechanism within 5 working days. The way forward will be informed by the recommendations of the mediator and the nature of the grievance.

A Complaint is closed out when no further action is required, or indeed possible. Closure status must be classified and captured following mediation or successful resolution in the Complaints Register as follows:

- Resolved. Complaints where a resolution has been agreed and implemented and the Complainant has signed the Confirmation Form.
- Unresolved. Complaints where it has not been possible to reach an agreed resolution despite mediation.
- Abandoned. Complaints where the Complainant is not contactable after one month following receipt of a Complaint and efforts to trace his or her whereabouts have been unsuccessful.

The grievance mechanism does not replace the right of an individual, community, group or organization to take legal action should they so wish. In the event of the grievance not being resolved to the satisfaction of Complainant and or the Developer, either party may be entitled to legal action if an appropriate option, however, this grievance mechanisms aims to avoid such interactions by addressing the grievances within a short timeframe, and to mutual satisfaction, where possible.

APPENDIX C:
OPEN SPACE MANAGEMENT PLAN

ALIEN PLANT AND OPEN SPACE MANAGEMENT PLAN

1. PURPOSE

Invasive alien plant species pose the second largest threat to biodiversity after direct habitat destruction. The purpose of this Alien Plant and Open Space Management Plan is to provide a framework for the management of alien and invasive plant species during the construction and operation of the Merino Wind Farm and the associated infrastructure. The broad objectives of the plan include the following:

- Ensure alien plants do not become dominant in parts of the site, or the whole site, through the control and management of alien and invasive species presence, dispersal, and encroachment.
- Develop and implement a monitoring and eradication programme for alien and invasive plant species.
- Promote the natural re-establishment and planting of indigenous species in order to retard erosion and alien plant invasion.

This plan should be updated throughout the life cycle of the wind farm, as required in order to ensure that appropriate measures are in place to manage and control the establishment of alien and invasive plant species and to ensure compliance with relevant legislation.

2. LEGISLATIVE CONTEXT

Conservation of Agricultural Resources Act (Act No. 43 of 1983)

In terms of the amendments to the regulations under the Conservation of Agricultural Resources Act (Act No. 43 of 1983), all declared alien plant species must be effectively controlled. Landowners are legally responsible for the control of invasive alien plants on their properties. In terms of this Act, alien invasive plant species are ascribed to one of the following categories:

- Category 1: Prohibited and must be controlled.
- Category 2 (commercially used plants): May be grown in demarcated areas provided that there is a permit and that steps are taken to prevent their spread.
- Category 3 (ornamentally used plants): May no longer be planted. Existing plants may be retained as long as all reasonable steps are taken to prevent the spreading thereof, except within the flood line of watercourses and wetlands.

National Environmental Management: Biodiversity Act, 2004 (Act No.10 of 2004)

The National Environmental Management: Biodiversity Act (NEM:BA) regulates all invasive organisms in South Africa, including a wide range of fauna and flora. Regulations have been published in Government Notices R.506, R.507, R.508 and R.509 of 2013 under NEM:BA. According to this Act and the regulations, any species designated under Section 70 cannot be propagated, grown, bought or sold without a permit. Below is an explanation of the three categories:

- **Category 1a:** Invasive species requiring compulsory control. Any specimens of Category 1a listed species need, by law, to be eradicated from the environment. No permits will be issued.

- **Category 1b:** Invasive species requiring compulsory control as part of an invasive species control programme. Remove and destroy. These plants are deemed to have such a high invasive potential that infestations can qualify to be placed under a government sponsored invasive species management programme. No permits will be issued.
- **Category 2:** Invasive species regulated by area. A demarcation permit is required to import, possess, grow, breed, move, sell, buy or accept as a gift any plants listed as Category 2 plants. No permits will be issued for Category 2 plants to exist in riparian zones.
- **Category 3:** Invasive species regulated by activity. An individual plant permit is required to undertake any of the following restricted activities (import, possess, grow, breed, move, sell, buy or accept as a gift) involving a Category 3 species. No permits will be issued for Category 3 plants to exist in riparian zones.

The following guide is a useful starting point for the identification of alien plant species: Bromilow, C. 2010. Problem Plants and Alien Weeds of South Africa. Briza, Pretoria.

It is important to note that alien plant species that are regulated in terms of the Conservation of Agricultural Resources Act (Act 43 of 1983) (CARA) as weeds and invader plants are exempted from NEM:BA. This implies that the provisions of the CARA in respect of listed weed and invader plants supersede those of NEM: BA.

3. ALIEN PLANT MANAGEMENT PRINCIPLES

3.1. Prevention and early eradication

A prevention strategy should be considered and established, including regular surveys and monitoring for invasive alien plants, effective rehabilitation of disturbed areas and prevention of unnecessary disturbance of natural areas.

Monitoring plans should be developed which are designed to identify Invasive Alien Plant Species already on site, as well as those that are introduced to the site by the construction activities. Keeping up to date on which weeds are an immediate threat to the site is important, but efforts should be planned to update this information on a regular basis. When additional Invasive Alien Plant Species are recorded on site, an immediate response of locating the site for future monitoring and either hand-pulling the weeds or an application of a suitable herbicide (where permissible only) should be planned. It is, however, better to monitor regularly and act swiftly than to allow invasive alien plants to become established on site.

3.2. Containment and control

If any alien invasive plants are found to become established on site, action plans for their control should be developed, depending on the size of the infestations, budgets, manpower considerations and time. Separate plans of control actions should be developed for each location and/or each species. Appropriate registered chemicals and other possible control agents should be considered in the action plans for each site/species. The use of chemicals are not recommended for any wetland areas. Herbicides should be applied directly to the plant and not to the soil. The key is to ensure that no invasions get out of control. Effective containment and control will ensure that the least energy and resources are required to maintain this status over the long-term. This will also be an indicator that natural systems are impacted to the smallest degree possible.

3.3. General Clearing and Guiding Principles

Alien species control programmes are long-term management projects and should consist of a clearing plan which includes follow up actions for rehabilitation of the cleared area. The lighter infested areas should be cleared first to prevent the build-up of seed banks. Pre-existing dense mature stands ideally should be left for last, as they probably won't increase in density or pose a greater threat than they are currently. Collective management and planning with neighbours may be required in the case of large woody invaders as seeds of alien species are easily dispersed across boundaries by wind or watercourses. All clearing actions should be monitored and documented to keep records of which areas are due for follow-up clearing.

i. Clearing Methods

Different species require different clearing methods such as manual, chemical or biological methods or a combination of both. Care should however be taken so that the clearing methods used do not encourage further invasion and that they are appropriate to the specific species of concern. As such, regardless of the methods used, disturbance to the soil should be kept to a minimum.

Fire should not be used for alien species control or vegetation management at the site. The best-practice clearing method for each species identified should be used.

» **Mechanical control**
This entails damaging or removing the plant by physical action. Different techniques could be used, e.g. uprooting, felling, slashing, mowing, ringbarking or bark stripping. This control option is only really feasible in sparse infestations or on a small scale, and for controlling species that do not coppice after cutting. Species that tend to coppice, need to have the cut stumps or coppice growth treated with herbicides following the mechanical treatment. Mechanical control is labour intensive and therefore expensive and could cause severe soil disturbance and erosion.

» **Chemical Control**
Although it is usually preferable to use manual clearing methods where possible, such methods may create additional disturbance which stimulates alien plant invasion and may also be ineffective for many woody species which re-sprout. Where herbicides are to be used, the impact of the operation on the natural environment should be minimised by observing the following:

- Area contamination must be minimised by careful, accurate application with a minimum amount of herbicide to achieve good control.
- All care must be taken to prevent contamination of any water bodies. This includes due care in storage, application, cleaning equipment and disposal of containers, product and spray mixtures.
- Equipment should be washed where there is no danger of contaminating water sources and washings carefully disposed of at a suitable site.
- To avoid damage to indigenous or other desirable vegetation, products should be selected that will have the least effect on non-target vegetation.
- Coarse droplet nozzles should be fitted to avoid drift onto neighbouring vegetation.
- The appropriate health and safety procedures should also be followed regarding the storage, handling and disposal of herbicides.
- The use of chemicals is not recommended for wetland areas.

For all herbicide applications, the following Regulations and guidelines should be followed:

- Working for Water: Policy on the Use of Herbicides for the Control of Alien Vegetation.
- Pesticide Management Policy for South Africa published in terms of the Fertilizers, Farm Feeds, Agricultural Remedies and Stock Remedies Act, 1947 (Act No. 36 of 1947) – GNR 1120 of 2010.
- South African Bureau of Standards, Standard SANS 10206 (2010).

According to Government Notice No. 13424 dated 26 July 1992, it is an offence to "*acquire, dispose, sell or use an agricultural or stock remedy for a purpose or in a manner other than that specified on the label on a container thereof or on such a container*".

Contractors using herbicides need to have a valid Pest Control Operators License (limited weeds controller) according to the Fertilizer, Farm Feeds, Agricultural Remedies and Stock Remedies Act (Act No. 36 of 1947). This is regulated by the Department of Environment, Forestry and Fisheries.

» **Biological control**

Biological weed control consists of the use of natural enemies to reduce the vigour or reproductive potential of an invasive alien plant. Biological control agents include insects, mites, and micro-organisms such as fungi or bacteria. They usually attack specific parts of the plant, either the reproductive organs directly (flower buds, flowers or fruit) or the seeds after they have dropped. The stress caused by the biological control agent may kill a plant outright or it might impact on the plant's reproductive capacity. In certain instances, the reproductive capacity is reduced to zero and the population is effectively sterilised. All of these outcomes will help to reduce the spread of the species.

To obtain biocontrol agents, provincial representatives of the Working for Water Programme or the Directorate: Land Use and Soil Management (LUSM), Department of Environment, Forestry and Fisheries (DEFF) can be contacted.

3.4. General management practices

The following general management practices should be encouraged or strived for:

- Establish an on-going monitoring programme for the construction phase to detect and quantify any alien species that may become established.
- Alien vegetation regrowth on areas disturbed by construction must be immediately controlled.
- Care must be taken to avoid the introduction of alien invasive plant species to the site. Particular attention must be paid to imported material such as building sand or dirty earth-moving equipment.
- Stockpiles should be checked regularly and any weeds emerging from material stockpiles should be removed.
- Cleared areas that have become invaded by alien species can be sprayed with appropriate herbicides provided that these herbicides break down on contact with the soil. Residual herbicides should not be used.
- The effectiveness of vegetation control varies seasonally, and this is also likely to impact alien species. Control early in the wet season will allow species to regrow, and follow-up control is likely to be required. It is tempting to leave control until late in the wet season to avoid follow-up control. However, this may allow alien species to set seed before control, and hence will not contribute towards reducing alien species abundance. Therefore, vegetation control should be aimed at the

middle of the wet season, with a follow-up event towards the end of the wet season. There are no exact dates that can be specified here as each season is unique and management must therefore respond according to the state and progression of the vegetation.

- » Alien plant management is an iterative process, and it may require repeated control efforts to significantly reduce the abundance of a species. This is often due to the presence of large and persistent seed banks. However, repeated control usually results in rapid decline once seed banks become depleted.
- » Some alien species are best individually pulled by hand. Regular vegetation control to reduce plant biomass within the site should be conducted. This should be timed so as to coincide with the critical growth phases of the most important alien species on site. This will significantly reduce the cost of alien plant management as this should contribute towards the control of the dominant alien species and additional targeted control will be required only for a limited number of species.
- » No alien species should be cultivated on-site. If vegetation is required for aesthetic purposes, then non-invasive, water-wise locally occurring species should be used.
- » During operation, surveys for alien species should be conducted regularly. It is recommended that this be undertaken every 6 months for the first two years after construction and annually thereafter. All alien plants identified should be cleared using appropriate means.

3.5. Monitoring

In order to assess the impact of clearing activities, follow-ups and rehabilitation efforts, monitoring must be undertaken. This section provides a description of a possible monitoring programme that will provide an assessment of the magnitude of alien plant invasion on site, as well as an assessment of the efficacy of the management programme.

In general, the following principles apply for monitoring:

- » Photographic records must be kept of areas to be cleared prior to work starting and at regular intervals during initial clearing activities. Similarly, photographic records should be kept of the area from immediately before and after follow-up clearing activities. Rehabilitation processes must also be recorded.
- » Simple records must be kept of daily operations, e.g., area/location cleared, labour units and, if ever used, the amount of herbicide used.
- » It is important that, if monitoring results in detection of invasive alien plants, that this leads to immediate action.

The following monitoring should be implemented to ensure management of alien invasive plant species.

Construction Phase

Monitoring Action	Indicator	Timeframe
Document alien species present at the site	List of alien plant species	Preconstruction Monthly during Summer and Autumn 3 Monthly during Winter and Spring
Document alien plant distribution	Alien plant distribution map within priority areas	3 Monthly
Document and record alien plant control measures implemented	Record of clearing activities	3 Monthly

Operation Phase

Monitoring Action	Indicator	Timeframe
Document alien plant species distribution and abundance over time at the site	Alien plant distribution map	Biannually
Document alien plant control measures implemented, and success rate achieved	Records of control measures and their success rate A decline in alien distribution and cover over time at the site	Biannually
Document rehabilitation measures implemented, and success achieved in problem areas	Decline in vulnerable bare areas over time	Biannually

APPENDIX D:
RE-VEGETATION AND HABITAT REHABILITATION PLAN

REVEGETATION AND REHABILITATION PLAN

1. PURPOSE

The purpose of the Revegetation and Rehabilitation Plan is to ensure that areas cleared or impacted during construction activities within the development footprint for the Merino Wind Farm, and that are not required for operation, are rehabilitated to their original state before the operation phase commences, and that the risk of erosion from these areas is reduced. The purpose of the Rehabilitation Plan for the site can be summarised as follows:

- Achieve long-term stabilisation of all disturbed areas.
- Re-vegetate all disturbed areas with suitable local plant species.
- Minimise visual impact of disturbed areas.
- Ensure that disturbed areas are rehabilitated to a condition similar to that found prior to disturbance.

This Revegetation and Rehabilitation Plan must be read in conjunction with other relevant site-specific plans. Prior to the commencement of construction, a detailed Revegetation and Rehabilitation Plan and Method Statement for the site must be compiled with the aid of a suitably qualified and professionally registered specialist (with a botanical or equivalent qualification).

2. RELEVANT ASPECTS OF THE SITE

The vegetation on site is not considered to be part of any threatened ecosystem and has not been assessed as being of high conservation value due to rates of transformation. The regional vegetation types that occur on site, i.e., Eastern Upper Karoo and Upper Karoo Hardeveld, are both widespread and have low rates of transformation across their geographical range.

There are three plant species listed as Rare (*Anisodontea malavastroides, Aloe broomii var. tarkaensis* and *Tridentea virescens*) that could potentially occur on site, but these are all widespread species that are naturally rare where they are found. None have been previously recorded on this site. There are also two plant species protected according to National legislation (*Crinum bulbispermum and Harpagophytum procumbens*) that could potentially occur in the geographical area, but these are also very widespread species. The loss of some individuals, if they are found to occur on site, would not affect the conservation status of any of the species. It is, however, unlikely that any of them would be affected.

3. REHABILITATION METHODS AND PRACTISES

The following general management practices should be encouraged or strived for:

- Clearing of invaded areas must be conducted as per the Alien Management Plan, included in the EMPr.
- No harvesting of vegetation may be undertaken outside the area to be disturbed by construction activities.
- Indigenous plant material must be kept separate from alien material.
- Indigenous seeds may be harvested for purposes of revegetation in areas that are free of alien invasive vegetation, either at the site prior to clearance or from suitable neighbouring sites.
- Topsoil must be reserved wherever possible on site, to be utilised during rehabilitation.

- Sods used for revegetation must be obtained directly from the site, but not from the sensitive areas. Sods must contain at least a 50mm topsoil layer and be minimally disturbed, in particular to existing root systems. Sods must ideally be obtained from areas as close as possible to the region that is to be rehabilitated.
- Water used for the irrigation of re-vegetated areas must be free of chlorine and other pollutants that might have a detrimental effect on the plants.
- All seeded, planted or sodded grass areas and all shrubs or trees planted are to be irrigated at regular intervals.
- On steep slopes and areas where seed and organic matter retention is low, it is recommended that soil savers are used to stabilise the soil surface. Soil savers are man-made materials, usually constructed of organic material such as hemp or jute and are usually applied in areas where traditional rehabilitation techniques are not likely to succeed.
- In areas where soil saver is used, it must be pegged down to ensure that it captures soil and organic matter flowing over the surface.
- The final rehabilitated area must resemble the current composition and structure of the soil as far as practicably possible.
- Progressive rehabilitation is an important element of the rehabilitation strategy and must be implemented where feasible.
- No construction equipment, vehicles or unauthorised personnel must be allowed onto areas that have been rehabilitated.
- Where rehabilitation sites are located within actively grazed areas, they must be fenced off, this must be undertaken in consultation with the landowner.
- Any runnels, erosion channels or wash-aways developing after revegetation must be backfilled and consolidated and the areas restored to a proper stable condition.
- Re-vegetated areas must be monitored frequently and prepared and revegetation from scratch should inadequate signs of surface coverage or grown be evident after two growth seasons. Adequate recovery must be assessed by a qualified botanist or rehabilitation specialist.
- The stockpiled vegetation from the clearing operations must be reduced to mulch where possible and retained along with topsoil to encourage seedbank regrowth and soil fertility.
- Mulches must be collected in such a manner as to restrict the loss of seed.
- Mulch must be stored for as short a period as possible.
- Mulch is to be harvested from areas that are to be denuded of vegetation during construction activities, provided that they are free of seed-bearing alien invasive plants.
- Where herbicides are used to clear vegetation, species-specific chemicals must be applied to individual plants only. General spraying must be strictly prohibited, and only the correct herbicide type must be applied.
- Once rehabilitated, areas must be protected to prevent trampling and erosion.
- Fencing must be removed once a sound vegetative cover has been achieved.

4. MONITORING AND FOLLOW-UP ACTION

Throughout the lifecycle of the development, regular monitoring and adaptive management must be in place to detect any new degradation of rehabilitated areas. During the construction phase, the Environmental Officer (EO) and EPC Contractor will be responsible for initiating and maintaining a suitable monitoring system. Once the development is operational, the Developer will need to identify a suitable entity that will be able to take over and maintain the monitoring cycle and initiate adaptive management as soon as it is required. Monitoring personnel must be adequately trained.

The following are the minimum criteria that must be monitored:

» Associated nature and stability of surface soils.
» Re-emergence of alien and invasive plant species. If noted, remedial action must be taken immediately, as per the alien management plan and mitigation measures contained within the EMPr.

Rehabilitation success, monitoring and follow-up actions are important to achieve the desired cover and soil protection. The following monitoring protocol is recommended:

» Rehabilitation areas must be monitored every 4 months for the first 12 months following construction, or as per the recommendations of specialist.
» Ensure that steep slopes are not de-vegetated unnecessarily and subsequently become hydrophobic (i.e. have increased runoff and a decreased infiltration rate) increasing the erosion potential.
» Soil loss is related to the length of time that soils are exposed prior to rehabilitation or stabilisation. Therefore, the timeframe between construction activities and rehabilitation must be minimised. Phased construction and progressive rehabilitation, where practically possible, are therefore important elements of the erosion control and rehabilitation strategy.
» Any areas showing erosion, must be adaptively managed with particular erosion control measures, depending on the situation.

If the current state of the environment prior to construction (which will be disturbed during the construction phase) is not achieved post impact, within the specified rehabilitation period, maintenance of these areas must continue until an acceptable state is achieved (excluding alien plant species or weeds). Additional rehabilitation methods may be necessary to achieve the current state before construction commences.

Monitoring of the rehabilitation success, as well as follow-up adaptive management, combined with the clearing of emerging alien plant species must all continue for as long as is considered necessary, depending on regrowth rates.

APPENDIX E:
PLANT RESCUE AND PROTECTION PLAN

PLANT RESCUE AND PROTECTION PLAN

1. PURPOSE

The purpose of the Plant Rescue and Protection Plan is to implement avoidance and mitigation measures, in addition to the mitigations included in the Environmental Management Programme (EMPr) to reduce the impact of the development of the wind farm and associated infrastructure on listed and protected plant species and their habitats during construction and operation. This subplan is required in order to ensure compliance with national and provincial legislation for vegetation clearing and any required destruction or translocation of provincially and nationally protected species within the footprint of the development.

The Plan first provides some legislative background on the regulations relevant to listed and protected species, under the Nature and Environmental Conservation Ordinance (Act 19 of 1974) and trees protected under the National List of Protected Tree Species. This is followed by an identification of protected species present within the development footprint and actions that should be implemented to minimise impact on these species and comply with legislative requirements.

2. IDENTIFICATION OF SPECIES OF CONSERVATION CONCERN

Plant species are protected at the national level as well as the provincial level and different permits may be required for different species depending on their protection level. At the national level, protected trees are listed by DEFF under the National List of Protected Trees, which is updated on a regular basis. Any clearing of nationally protected trees requires a permit from DAFF. At the provincial level, all species red-listed under the Red List of South African plants (http://redlist.sanbi.org/) as well as species listed under the Nature and Environmental Conservation Ordinance (Act 19 of 1974) are protected and require provincial permits. The Nature and Environmental Conservation Ordinance (Act 19 of 1974) lists a variety of species as protected.

3. IDENTIFICATION OF LISTED SPECIES

In this section, the listed species observed to occur within the broader area are identified and listed.

There are three species listed as Rare that are considered to occur within the geographical area under consideration and could potentially occur on site, namely, *Anisodontea malavastroides, Aloe broomii* var. *tarkaensis* and *Tridentea virescens* (refer to **Table 1**). These are all species with wide geographical distributions, but which are rarely encountered. None of these species are considered to be threatened and none were observed on site.

Table 1: Plant species of conservation importance (Threatened, Near Threatened and Declining) that have historically been recorded in the study area

Family	Taxon	Status	Habitat	Likelihood of occurrence on site
Apocynaceae	*Tridentea virescens*	RARE	Warmbad in southern Namibia to Kakamas and Prieska in the Nortern Cape stretching east to Prince Albert and Aberdeen. Stony ground, or hard loam in floodplains.	**MEDIUM**

Malvaceae	*Anisodontea malavastroides*	RARE	This species is endemic to the mountains of the Great Karoo, where it occurs in the Nuweveld and Sneeuberg mountains between Beaufort West and Middelburg. It occurs in arid grassland on summit plateaus and escarpments.	**MEDIUM**
Asphodelaceae	*Aloe broomii* var. *tarkaensis*	LC	Tarkastad, Middelburg and Graaff-Reinet districts, possibly also in the Victoria West district. Low, stony ridges.	**MEDIUM**

No plant species protected under the National Environmental Management: Biodiversity Act (No. 10 of 2004) were identified on site. However, several have a geographical distribution that includes the project site. Numerous plant species protected under the Northern Cape Nature Conservation Act (No. 9 of 2009) were identified on site. Despite not being threatened, any impacts on these species will require a permit from the relevant authority. There is a possibility that there may be additional protected plant species present on site that were not detected during the field survey. A comprehensive walk-through survey of the final footprint is required to compile a complete list of these protected species.

According to the National Web-Based Environmental screening tool, 2 plant species have been flagged as of concern for the area the current project is in, these are listed below. A description of each species is provided.

Hereroa concava (Aizoaceae)

Vulnerable B1ab(iii)

Due to taxonomic uncertainty, this species' distribution range is not well known. It appears to be endemic to a small area in the Great Karoo between Beaufort West, Richmond and De Aar. It is known to occur in Eastern Upper Karoo and Upper Karoo Hardeveld vegetation types. Plants occur sheltered among shrubs on flats and plateaus with shale outcrops. There are very few records of this species, and these known records are scattered over a wide area. Herbarium collections, where the identity is confirmed, indicate that it is common in the Karoo National Park. Its abundance elsewhere is not well known. Known records from iNaturalist include the plains above the mountains north of Beaufort West, and a hilltop north of Hanover. The study site is almost exactly half way between these two locations and habitat on site fits the description of locations where this species has been previously recorded. There are two records of *Hereroa* species on site that have only been identified to genus level. Based on the distribution of known taxa, it is highly likely that they are *Hereroa concava*. It is therefore assumed that it probably occurs on site, and that rocky hills are the most likely habitat on site.

Sensitive species 945

A Near Threatened geophyte known from the summits of rocky dolerite ridges in the Nama Karoo. It is endemic to the karoo, occurring in the Sneeuberg, Agter-Sneeuberg and Nuweveld Mountains, extending inland to the area between Hanover and Beaufort West, broadly following the N1 road. There is a known photographic observation within the broad renewable energy cluster assessed for this overall project, which is near to the current Merino Wind Farm project. It is likely, based on the habitat requirements and distribution, that the species occurs on site, and that rocky hills are the most likely habitat on site.

Additional listed plant species for the study area

A database search identifies a number of additional listed plant species that could possibly occur on site that are not flagged in the Screening Tool output. This includes the following:

- Tridentia virescens (Apocynaceae) (Rare): Warmbad in southern Namibia to Kakamas and Prieska in the Nortern Cape stretching east to Prince Albert and Aberdeen. Stony ground, or hard loam in floodplains. It has a very wide geographical distribution but is rarely found. A relatively recent (2017) observation was made in the Doornkloof Nature Reserve north of Colesberg (www.ispotnature.org) and it was documented in 1957 from near Murraysburg in habitat similar to that found on site. There is therefore at least a moderate probability that it occurs on site.
- Anisodontea malvastroides (Rare): This species is endemic to the mountains of the Great Karoo, where it occurs in the Nuweveld and Sneeuberg mountains between Beaufort West and Middelburg in arid grassland on summit plateaus and escarpments. It has also been recorded on an inselberg-like outcrop north of Richmond. It could possibly occur on site, in which case it is likely to be found on the summit of prominent hills.
- Aloe broomii var tarkaensis (Rare) is found from Tarkastad and Middelburg to Graaff-Reinet in low stony ridges associated with the escarpment. The distribution of var. tarkaensis is to the south-east of the current site. Two observations of Aloe broomii were made on site, but both are from var. broomii and not var. tarkaensis. Aloe broomii var tarkaensis is therefore unlikely to occur on site.

A total of seventy-two (72) plant species were recorded during the field surveys (Appendix 2 of the Terrestrial Plant Species Compliance Statement) If other observation data is taken into account from other ad hoc surveys in the area, then there are close to 200 plant species that are known to occur in the direct study area and nearly 470 that are known from the general area that includes the site. This is relatively diverse for an arid environment.

4. MITIGATION & AVOIDANCE OPTIONS

The primary mitigation and avoidance measure that must be implemented at the pre-construction phase is the Pre-construction Walk-Through of the development footprint. This defines which and how many individuals of listed and protected species are found within the development footprint. This information is required for the DFFE and Provincial Eastern Cape Department of Economic Development, Environmental Affairs and Tourism (DEDEAT) permits which must be obtained before construction can commence.

Where listed plant species fall within the development footprint and avoidance is not possible, then it may be possible to translocate the affected individuals outside of the development footprint. However, not all species are suitable for translocation. Recommendations in this regard would be made following the walk-through of the facility development footprint before construction, where all listed and protected species within the development footprint will be identified and located.

5. RESCUE AND PROTECTION PLAN

5.1. Pre-construction

- Identification of all listed species which may occur within the site, based on the SANBI POSA database as well as the specialist BA studies for the site and any other relevant literature.
- Before construction commences at the site, the following actions should be taken:
  - A walk-through of the final development footprint by a suitably qualified botanist/ecologist to locate and identify all listed and protected species which fall within the development footprint. This should happen during the flowering season at the site.

- A walk-through report following the walk-through which identifies areas where minor deviations to roads and other infrastructure can be made to avoid sensitive areas and important populations of listed species. The report should also contain a full list of localities where listed species occur within the development footprint and the number of affected individuals in each instance, so that this information can be used to comply with the permit conditions required by the relevant legislation. Those species suitable for search as rescue should be identified in the walk-through report.
- A permit to clear the site and relocate species of concern is required from Provincial Eastern Cape Department of Economic Development, Environmental Affairs and Tourism (DEDEAT) before construction commences. A tree clearing permit is also required from DEFF to clear protected trees from the site.
- Once the permits have been issued, there should be a search and rescue operation of all listed species that cannot be avoided, which have been identified in the walk-through report as being suitable for search and rescue within the development footprint. Affected individuals should be translocated to a similar habitat outside of the development footprint and marked for monitoring purposes.

5.2. Construction

» Vegetation clearing should take place in a phased manner, so that large cleared areas are not left standing with no activity for long periods of time and pose a wind and water erosion risk. This will require coordination between the contractor and EO, to ensure that the EO is able to monitor activities appropriately.
» All cleared material must be handled according to the Revegetation and Rehabilitation Plan and used to encourage the recovery of disturbed areas.
» EO to monitor vegetation clearing at the site. Any deviations from the plans that may be required should first be checked for listed species by the EO and any listed species present which are able to survive translocation should be translocated to a safe site.
» All areas to be cleared should be demarcated with construction tape, survey markers or similar. All construction vehicles should work only within the designated area.
» Plants suitable for translocation or for use in rehabilitation of already cleared areas should be identified and relocated before general clearing takes place.
» Any listed species observed within the development footprint that were missed during the pre-construction plant sweeps must be translocated to a safe site before clearing commences.
» Many listed species are also sought after for traditional medicine or by collectors and so the EO and ECO must ensure that all staff attend environmental induction training in which the legal and conservation aspects of harvesting plants from the wild are discussed.
» The EO must monitor construction activities in sensitive habitats such as in dune areas carefully to ensure that impacts to these areas are minimised.

5.3. Operation

» Access to the site should be strictly controlled and all personnel entering or leaving the site must be required to sign in and out with the security officers.
» The collecting of plants of their parts must be strictly forbidden and signs stating so must be placed at the entrance gates to the site.

6. MONITORING AND REPORTING REQUIREMENTS

The following reporting and monitoring requirements are recommended as part of the plant rescue and protection plan:

- Pre-construction walk-through report detailing the location and distribution of all listed and protected species. This must include a walk-through of all infrastructure including all new access roads, cables, buildings and the substation. The report must include recommendations of route adjustments where necessary, as well as provide a full account of how many individuals of each listed species will be impacted by the development. Details of plants suitable for search and rescue must also be included.
- Permit applications to DEDEAT and DEFF. This requires the walk-through report as well as the identification and quantification of all listed and protected species within the development footprint. The permit is required before any search and rescue or vegetation clearance can take place. Where large numbers of listed species are affected, a site inspection and additional requirements may be imposed by Provincial Eastern Cape Department of Economic Development, Environmental Affairs and Tourism (DEDEAT) and/or DEFF as part of the permit conditions. All documentation associated with this process needs to be retained and the final clearing permit must be kept at the site.
- Active daily monitoring of clearing during construction by the EO to ensure that listed species and sensitive habitats are avoided. All incidents must be recorded along with the remedial measures implemented.
- Post-construction monitoring of plants translocated during search and rescue to evaluate the success of the intervention. Monitoring for a year post-transplant should be sufficient to gauge success.

APPENDIX F:
TRAFFIC AND TRANSPORTATION MANAGEMENT PLAN

PRINCIPLES FOR TRAFFIC MANAGEMENT

1. PURPOSE

The purpose of this Traffic Management Plan (TMP) is to address regulatory compliance, traffic management practices, and protection measures to help reduce impacts related to transportation and the construction of temporary and long-term access within the vicinity of the Wind Farm Wind Farm project site. The objectives of this plan include the following:

- To ensure compliance with all legislation regulating traffic and transportation within South Africa (National, Provincial, Local & associated guidelines).
- To avoid incidents and accidents while vehicles are being driven and while transporting personnel, materials, and equipment to and from the project site.
- To raise greater safety awareness in each driver and to ensure the compliance of all safe driving provisions for all the vehicles.
- To raise awareness to ensure drivers respect and follow traffic regulations.
- To avoid the deterioration of access roads and the pollution that can be created due to noise and emissions produced by equipment, machinery, and vehicles.

2. RELEVANT ASPECTS OF THE PROJECT

The Merino Wind Farm is located approximately 35km south-west of Richmond and 80km south-east of Victoria West, within the Ubuntu Local Municipality and the Pixley Ka Seme District Municipality in the Northern Cape Province and it is bisected by the N1, which will be the main route to the site.

It is assumed that if components are imported to South Africa, it will be via the Port of Ngqura, which is located in the Eastern Cape, ~425km from the proposed site. Alternatively, components can be imported via the Port of Saldanha in the Western Cape, which is located ~675km from the proposed site.

The preferred route for abnormal load vehicles will be from the port (i.e., Port of Ngqura), heading north on the R75, passing Wolwefontein and Jansenville, and onto the R63 at Graaff-Reinet. The vehicles will travel on the R63 to the N1, passing Murraysburg, and continue on the N1 to the proposed site.

3. TRAFFIC AND TRANSPORTATION MANAGEMENT PRINCIPLES

- Prior to the commencement of construction, the contractor must develop their own detailed Transport Management Plan (TMP) based on traffic volumes and road carry capacity outlines.
- The transport contractor must ensure that all required permits for the transportation of abnormal loads are in place prior to the transportation of equipment and project components to the project site. Specific abnormal load routes must be developed with environmental factors taken into consideration.
- Before construction commences, authorised access routes must be clearly marked in the field with signs or flagging.
    - Traffic signs used must conform to the National Road Traffic Act and South African National Standards.
    - Appropriate signs must be installed at locations as deemed necessary.

- Signage must be placed at intersections, speed limit alterations, severe changes in road grading, where road hazards are located and where usual traffic flow changes abruptly.
- All traffic signs must be obeyed by all staff and visitors on site, without exception.

» The EPC Contractor must review the location of the designated access and will be responsible for ensuring construction travel is limited to designated routes. The entrance of the main access road must not be constructed before a blind rise or on a bend of the public road.
» All employees must attend an environmental training program (e.g., toolbox talks) by the Environmental Officer (EO). Through this program, employees will be instructed to use only approved access roads, drive within the delineated road limits, and obey jurisdictional and posted speed limits to minimise potential impacts to the environment and other road users.
» The contractor will be responsible for making sure that their suppliers, vendors, and subcontractors strictly comply with the principles of this TMP and the contractor's TMP.
» Adjacent landowners must be notified of the construction schedule.
» Access roads and entrances to the site should be carefully planned to limit any intrusion on the neighbouring property owners and road users.
» Signs must be posted in the project area to notify landowners and others of the construction activity.
» Flagging must be provided at access points to the project site and must be maintained until construction is completed on the site.
» Speed limits must be established prior to commencement of construction and enforced for all construction traffic. The following limits are suggested for internal roads:
- 60 km/hour where sign posted.
- 40 km/hour where sign posted.
- 20km/hour around workshop areas, in all car parks and yards.
- A warning system, penalties or fines must be put in place where speed limits are not adhered to.

» Speed controls and implementation of appropriate dust suppression measures must be enforced to minimise dust pollution.
» Throughout construction the contractor will be responsible for monitoring the condition of roads used by project traffic and for ensuring that roads are maintained in a condition that is comparable to the condition they were in before the construction began.
» Inspect traffic/road signs regularly for cleanliness, condition and appropriateness. Take immediate action to rectify any problems with signage.
» Drivers must have an appropriate valid driver's license and other operation licences required by applicable legislation.
» All vehicles must be maintained in good mechanical, electrical, and electronic condition, including but not limited to the brake systems, steering, tires, windshield wipers, side mirrors and rear view mirror, safety belts, signal indicators, and lenses.
» Any traffic delays attributable to construction traffic must be co-ordinated with the appropriate authorities.
» No deviation from approved transportation routes must be allowed, unless roads are closed for reasons outside the control of the contractor.
» Impacts on local communities must be minimised. Consideration should be given to limiting construction vehicles travelling on public roadways during the morning and late afternoon commute time.
» A driver must not use the vehicle's horn except on the grounds of safety.
» Drivers of vehicles must always keep to the left and must be observant of other road users.
» Drivers must follow communication procedures and shall where applicable be trained in the correct use of two-way radios.

- Ensure all staff are trained upon entering the site regarding the meaning and correct response to each traffic sign utilised on site.
- All light vehicles must be fitted with a flashing amber strobe or revolving light.
- Persons authorized to operate on site must have a legal valid appropriate code provincial driver's license and competency certificate where applicable.
- No passengers allowed in any construction vehicles. If an assistant is required, they must obtain permission
- Vehicles must be maintained at approved intervals and must be inspected daily before use to ensure safe operation.
- All vehicles must only be used within the design specifications and limits set by the manufacturer.
- All construction vehicles will be used according to the Health & Safety Plan and related Method Statements and/or Risk Assessments.
- Weather and road conditions must be sufficient to allow safe operation to proceed. Head lights must be turned on at all times.
- No vehicle will be driven with any defect that may impact on the safe operation of that vehicle.
- Two-way radios shall only be used for official/work related matters.
- The use of mobile phones while driving a vehicle is prohibited.
- All vehicles shall carry a fire extinguisher (Dry Powder); 2.5kg for light vehicles, 4.5kg for haul trucks and 9kg for machinery.

4. MONITORING

- The principal contractor must ensure that all vehicles adhere to the speed limits.
- A speeding register must be kept with details of the offending driver.
- Repeat offenders must be penalised.

APPENDIX G:
STORMWATER AND EROSION MANAGEMENT PLAN

STORMWATER MANAGEMENT PLAN

1. PURPOSE

By taking greater cognisance of natural hydrological patterns and processes it is possible to develop storm water management systems in a manner that reduces these potentially negative impacts and mimic nature. The main risks associated with inappropriate storm water management are increased erosion risk and risks associated with flooding. Therefore, this Storm water Management Plan and the Erosion Management Plan are closely linked to one another and should be managed together.

This Storm water Management Plan addresses the management of storm water runoff from the development site and significant impacts relating to resultant impacts such as soil erosion and downstream sedimentation. The main factors influencing the planning of storm water management measures and infrastructure are:

» Topography and slope gradients;
» Placing of infrastructure and infrastructure design;
» Annual average rainfall; and
» Rainfall intensities.

The objective of the plan is therefore to provide measures to address runoff from disturbed portions of the site, such that they:

» Do not result in concentrated flows into natural watercourses i.e. provision should be made for temporary or permanent measures that allow for attenuation, control of velocities and capturing of sediment upstream of natural watercourses.
» Do not result in any necessity for concrete or other lining of natural watercourses to protect them from concentrated flows off the development if not necessary.
» Do not divert flows out of their natural flow pathways, thus depriving downstream watercourses of water.

This Storm water Management Plan must be updated and refined once the construction/ civil engineering plans have been finalised following detailed design.

2. RELEVANT ASPECTS OF THE SITE

The region within which the project site is located is relatively dry. Rainfall occurs mainly in Summer and Autumn, peaking in March, with a Mean Annual Precipitation (MAP) ranging from 180 to 430mm (from west to east respectively). The area is characterised by a high frost occurrence rate ranging from just below 30 to 80 days per year. The mean minimum and maximum temperatures in the area are -7.2℃ and 36.1℃ for July and January, respectively.

The project site occurs on land that ranges in elevation from approximately 1 170m (in the south-western corner of the study area) to 1 830m (at the top of the mountains to the east). The terrain surrounding the site is predominantly flat to the north and south, with a ridge traversing the centre pf the site from the east to the west. The proposed development area itself is located at an average elevation of 1 389m above sea level. The overall terrain morphological description of the project site is described as *undulating plains* (lowlands),

with *ridges*, *hills* and *mountains*. These hills and mountains are often referred to as *inselbergs* (island mountains) due to their isolated nature, or *mesas* (table mountains) due to their flat-topped summits.

The scope percentage of the development area has been calculated and most of the development area is characterised by a slope percentage between 0 and 20%, with some smaller patches within the development area characterised by a slope percentage in excess of 82%.

Strategic Water Source Areas (SWSAs)

Strategic Water Source Areas (SWSAs) are defined as areas of land that:

- Supply a disproportionate (i.e., relatively large) quantity of mean annual surface water runoff in relation to their size and so are considered nationally important.
- Have high groundwater recharge and where the groundwater forms a nationally important resource.
- That meet both criteria mentioned above.

They include transboundary Water Source Areas that extend into Lesotho and Swaziland. The project site is located outside of any SWSA for surface water and groundwater.

Freshwater Features:

Based on a combination of desktop and in-field delineation, three (3) forms of watercourses were identified and delineated within the 500m regulated area. These include episodic rivers, drainage lines and dams. No natural wetland systems were identified for the development area. The rivers and drainage lines are both classified as a river HGM type system. The dams are regarded as artificial systems and typically formed / created in the preferential flow paths of the river HGM type. The drainage lines are not characterised by riparian vegetation and grasses, these systems represent bare surfaces with evidence of surface run-off.

The results of the habitat assessment indicate natural (class A) and largely natural (class B) instream and riparian conditions for the catchment respectively. The overall ecological importance and sensitivity for the area was determined to be moderate. The overall ecosystem service benefit for the system is high.

3. STORMWATER MANAGEMENT PRINCIPLES

In the design phase, various storm water management principles should be considered including:

- Prevent concentration of storm water flow at any point where the ground is susceptible to erosion.
- Reduce storm water flows as far as possible by the effective use of attenuating devices (such as swales, berms, and silt fences). As construction progresses, the storm water control measures are to be monitored and adjusted to ensure complete erosion and pollution control at all times.
- Silt traps must be used where there is a danger of topsoil or material stockpiles eroding and entering streams and other sensitive areas.
- Construction of gabions and other stabilisation features on steep slopes may be undertaken to prevent erosion, if deemed necessary.
- Minimise the area of exposure of bare soils to minimise the erosive forces of wind, water and all forms of traffic.
- Ensure that development does not increase the rate of storm water flow above that which the natural ground can safely accommodate at any point in the sub-catchments.

- Ensure that all storm water control works are constructed in a safe and aesthetic manner in keeping with the overall development.
- Plan and construct storm water management systems to remove contaminants before they pollute surface waters or groundwater resources.
- Contain soil erosion, whether induced by wind or water forces, by constructing protective works to trap sediment at appropriate locations. This applies particularly during construction.
- Avoid situations where natural or artificial slopes may become saturated and unstable, both during and after the construction process.
- Design and construct roads to avoid concentration of flow along and off the road. Where flow concentration is unavoidable, measures to incorporate the road into the pre-development storm water flow should not exceed the capacity of the culvert. To assist with the storm water run-off, gravel roads should typically be graded and shaped with a 2-3% cross fall back into the slope, allowing storm water to be channelled in a controlled manner towards the, natural drainage lines and to assist with any sheet flow on the site.
- Design culvert inlet structures to ensure that the capacity of the culvert does not exceed the pre-development storm water flow at that point. Provide detention storage on the road and/or upstream of the storm water culvert.
- Design outlet culvert structures to dissipate flow energy. Any unlined downstream channel must be adequately protected against soil erosion.
- Where the construction of a building causes a change in the vegetative cover of the site that might result in soil erosion, the risk of soil erosion by storm water must be minimised by the provision of appropriate artificial soil stabilisation mechanisms or re-vegetation of the area. Any inlet to a piped system should be fitted with a screen or grating to prevent debris and refuse from entering the storm water system.
- Preferably all drainage channels on site and contained within the larger area of the property (i.e. including buffer zone) should remain in the natural state so that the existing hydrology is not disturbed.

3.1. Engineering Specifications

Detailed engineering specifications for a Storm water Management Plan describing and illustrating the proposed storm water control measures must be prepared by the Civil Engineers during the detailed design phase and should be based on the underlying principles of this Storm water Management Plan. This should include erosion control measures. Requirements for project design include:

- Erosion control measures to be implemented before and during the construction period, including the final storm water control measures (post construction) must be indicated within the Final/Updated Storm water Management Plan.
- All temporary and permanent water management structures or stabilisation methods must be indicated within the Final/Updated Storm water Management Plan.
- The drainage system for the site should be designed to specifications that can adequately deal with a 1:50 year intensity rainfall event or more to ensure sufficient capacity for carrying storm water around and away from infrastructure.
- Procedures for storm water flow through a project site need to take into consideration both normal operating practice and special circumstances. Special circumstances in this case typically include severe rainfall events.
- An on-site Engineer or Environmental Officer is to be responsible for ensuring implementation of the erosion control measures on site during the construction period.

» The EPC Contractor holds ultimate responsibility for remedial action in the event that the approved storm water plan is not correctly or appropriately implemented and damage to the environment is caused.

During the construction phase, the contractor must prepare a Storm water Control Method Statement to ensure that all construction methods adopted on site do not cause, or precipitate soil erosion and shall take adequate steps to ensure that the requirements of the Storm water Management Plan are met before, during and after construction. The designated responsible person on site, must be indicated in the Storm water Control Method Statement and shall ensure that no construction work takes place before the relevant storm water control measures are in place.

An operation phase Storm water Management Plan should be designed and implemented if not already addressed by the mitigations implemented as part of construction, with a view to preventing the passage of concentrated flows off hardened surfaces and onto natural areas.

PRINCIPLES FOR EROSION MANAGEMENT

1. PURPOSE

Exposed and unprotected soils are the main cause of erosion in most situations. Therefore, this Erosion Management Plan, the Storm water Management Plan and the Revegetation and Rehabilitation Plan are closely linked to one another and should not operate independently, but should rather be seen as complementary activities within the broader environmental management of the site and should therefore be managed together.

This Erosion Management Plan addresses the management and mitigation of potential impacts relating to soil erosion. The objective of the plan is to provide:

» A general framework for soil erosion and sediment control, which enables the contractor to identify areas where erosion can occur and is likely to be accelerated by construction related activities.
» An outline of general methods to monitor, manage and rehabilitate erosion prone areas, ensuring that all erosion resulting from all phases of the development is addressed.

This plan must be updated and refined once the construction/ civil engineering plans have been finalised following detailed design.

2. RELEVANT ASPECTS OF THE SITE

The project site occurs on land that ranges in elevation from approximately 1 170m (in the south-western corner of the study area) to 1 830m (at the top of the mountains to the east). The terrain surrounding the site is predominantly flat to the north and south, with a ridge traversing the centre pf the site from the east to the west. The proposed development area itself is located at an average elevation of 1 389m above sea level. The overall terrain morphological description of the project site is described as *undulating plains* (lowlands), with *ridges*, *hills* and *mountains*. These hills and mountains are often referred to as *inselbergs* (island mountains) due to their isolated nature, or *mesas* (table mountains) due to their flat-topped summits.

The scope percentage of the development area has been calculated and most of the development area is characterised by a slope percentage between 0 and 20%, with some smaller patches within the development area characterised by a slope percentage in excess of 82%.

Soil erosion is a frequent risk associated with solar facilities on account of the vegetation clearing and disturbance associated with the construction phase of the development and may continue occurring throughout the operation phase. Service roads and installed infrastructure will generate increased direct runoff during intense rainfall events and may exacerbate the loss of topsoil and the effects of erosion. These eroded materials may enter the nearby watercourses and may potentially impact these systems through siltation and change in chemistry and turbidity of the water.

During construction, there will be a lot of disturbed and loose soil at the site which will render the area vulnerable to erosion. During the operation phase the impacts related to loss of land use and land capability will remain the same. Areas under permanent buildings, substations, transformers and other covered surfaces are no longer susceptible to erosion, but hard surfaces will increase run-off during rain storms onto bare soil surfaces.

3. EROSION AND SEDIMENT CONTROL PRINCIPLES

The goals of erosion control during and after construction at the site should be to:

» Protect the land surface from erosion;
» Intercept and safely direct run-off water from undisturbed upslope areas through the site without allowing it to cause erosion within the site or become contaminated with sediment; and
» Progressively revegetate or stabilise disturbed areas.

These goals can be achieved by applying the management practices outlined in the following sections.

3.1. On-Site Erosion Management

Soil erosion is a frequent risk associated with solar facilities on account of the vegetation clearing and disturbance associated with the construction phase of the development and may continue occurring throughout the operation phase. Service roads and installed infrastructure will generate increased direct runoff during intense rainfall events and may exacerbate the loss of topsoil and the effects of erosion. These eroded materials may enter the nearby watercourses and may potentially impact these systems through siltation and change in chemistry and turbidity of the water. General factors to consider regarding erosion risk at the site includes the following:

» Due to the sandy nature of soils in the study area, soil loss will be greater during dry periods as it is more prone to wind erosion. Therefore, precautions to prevent erosion should be present throughout the year.
» Reduction of a stable vegetation cover and associated below-ground biomass that currently increases soil surface porosity, water infiltration rates and thus improves the soil moisture availability. Without the vegetation, the soil will be prone to extensive surface capping, leading to accelerated erosion and further loss of organic material and soil seed reserves from the local environment.
» Soil loss is related to the length of time that soils are exposed prior to rehabilitation or stabilisation. Therefore, the gap between construction activities and rehabilitation should be minimised. Phased construction and progressive rehabilitation, where practically possible, are therefore important elements of the erosion control strategy.
» The extent of disturbance will influence the risk and consequences of erosion. Therefore, site clearing should be restricted to areas required for construction purposes only. As far as possible, large areas should not be cleared all at once, especially in areas where the risk of erosion is higher.
» Roads should be planned and constructed in a manner which minimises their erosion potential. Roads should therefore follow the natural contour as far as possible. Roads parallel to the slope direction should be avoided as far as possible.
» Where necessary, new roads constructed should include water diversion structures with energy dissipation features present to slow and disperse the water into the receiving area.
» Roads used for project-related activities and other disturbed areas should be regularly monitored for erosion. Any erosion problems recorded should be rectified as soon as possible and monitored thereafter to ensure that they do not re-occur.
» Runoff may have to be specifically channelled or storm water adequately controlled to prevent localised rill and gully erosion.
» Compacted areas should have adequate drainage systems to avoid pooling and surface flow. Heavy machinery should not compact those areas which are not intended to be compacted as this will result in compacted hydrophobic, water repellent soils which increase the erosion potential of the area. Where compaction does occur, the areas should be ripped.

- All bare areas should be revegetated with appropriate locally occurring species, to bind the soil and limit erosion potential.
- Silt fences should be used where there is a danger of topsoil or material stockpiles eroding and entering streams and other sensitive areas.
- Gabions and other stabilisation features must be used on steep slopes and other areas vulnerable to erosion to minimise erosion risk as far as possible.
- Activity at the site after large rainfall events when the soils are wet and erosion risk is increased should be reduced. No driving off of hardened roads should occur at any time, and particularly immediately following large rainfall events.
- Topsoil should be removed and stored in a designated area separately from subsoil and away from construction activities (as per the recommendations in the EMPr). Topsoil should be reapplied where appropriate as soon as possible in order to encourage and facilitate rapid regeneration of the natural vegetation in cleared areas.
- Regular monitoring of the site for erosion problems during construction (on-going) and operation (at least twice annually) is recommended, particularly after large summer thunderstorms have been experienced. The ECO will determine the frequency of monitoring based on the severity of the impacts in the erosion prone areas.

3.1.1 Erosion control mechanisms

The contractor may use the following mechanisms (whichever proves more appropriate/ effective) to combat erosion when necessary:

- Reno mattresses;
- Slope attenuation;
- Hessian material;
- Shade catch nets;
- Gabion baskets;
- Silt fences;
- Storm water channels and catch pits;
- Soil bindings;
- Geofabrics;
- Hydro-seeding and/or re-vegetating;
- Mulching over cleared areas;
- Boulders and size varied rocks; and
- Tilling.

3.2 Engineering Specifications

A detailed engineering specifications Storm water Management Plan describing and illustrating the proposed stormwater control measures must be prepared by the Civil Engineers during the detailed design phase and should be based on the underlying principles of the Storm water Management Plan and this should include erosion control measures. Requirements for project design include:

- Erosion control measures to be implemented before and during the construction period, including the final storm water control measures (post construction).
- All temporary and permanent water management structures or stabilisation methods must be indicated within the Storm water Management Plan.

» An on-site Engineer or Environmental Officer (EO)/ SHE Representative to be responsible for ensuring implementation of the erosion control measures on site during the construction period. The ECO should monitor the effectiveness of these measures on the interval agreed upon with the Site Manager and EO.
» The EPC Contractor holds ultimate responsibility for remedial action in the event that the approved Storm water Management Plan is not correctly or appropriately implemented and damage to the environment is caused.

3.3 Monitoring

The site must be monitored continuously during construction and operation in order to determine any indications of erosion. If any erosion features are recorded as a result of the activities on-site the Environmental Officer (EO)/ SHE Representative (during construction) or Environmental Manager (during operation) must:

» Assess the significance of the situation.
» Take photographs of the soil degradation.
» Determine the cause of the soil erosion.
» Inform the contractor/operator that rehabilitation must take place and that the contractor/operator is to implement a rehabilitation method statement and management plan to be approved by the Site/Environmental Manager in conjunction with the ECO.
» Monitor that the contractor/operator is taking action to stop the erosion and assist them where needed.
» Report and monitor the progress of rehabilitation weekly and record all the findings in a site register (during construction).
» All actions with regards to the incidents must be reported on a monthly compliance report which should be kept on file for if/when the Competent Authority requests to see it (during construction) and kept on file for consideration during the annual audits (during construction and operation).

The Contractor (in consultation with an appropriate specialist, e.g. an engineer) must:

» Select a system/mechanism to treat the erosion.
» Design and implement the appropriate system/mechanism.
» Monitor the area to ensure that the system functions like it should. If the system fails, the method must be adapted or adjusted to ensure the accelerated erosion is controlled.
» Continue monitoring until the area has been stabilised.

3 CONCLUSION

The Erosion Management Plan is a document to assist the Proponent/ EPC Contractor with guidelines on how to manage erosion during all phases of the project. The implementation of management measures is not only good practice to ensure minimisation of degradation, but also necessary to ensure compliance with legislative requirements. This document forms part of the EMPr, and is required to be considered and adhered to during the design, construction, operation and decommissioning phases of the project (if and where applicable). During the construction phase, the contractor must prepare an Erosion Control Method Statement to ensure that all construction methods adopted on site do not cause, or precipitate soil erosion and shall take adequate steps to ensure that the requirements of this plan are met before, during and after

construction. The designated responsible person on site, must be indicated in the Method Statement and shall ensure that relevant erosion control measures are in place throughout the construction phase.

An operation phase Erosion Management Plan should be designed and implemented if not already addressed by the mitigations implemented as part of construction, with a view to preventing the passage of concentrated flows off hardened surfaces and onto natural areas.

APPENDIX H:
WASTE MANAGEMENT PLAN

WASTE MANAGEMENT PLAN

1. PURPOSE

A Waste Management Plan (WMP) plays a key role in achieving sustainable waste management throughout all phases of the project. The plan prescribes measures for the collection, temporary storage and safe disposal of the various waste streams associated with the project and includes provisions for the recovery, re-use and recycling of waste. The purpose of this plan is therefore to ensure that effective procedures are implemented for the handling, storage, transportation, and disposal of waste generated from the project activities on site.

This WMP has been compiled as part of the project EMPr and is based on waste stream information available at the time of compilation. Construction and operation activities must be assessed on an ongoing basis in order to determine the efficacy of the plan and whether further revision of the plan is required. This plan should be updated should further detail regarding waste quantities and categorisation become available, during the construction and/or operation stages.

2. RELEVANT ASPECTS OF THE SITE

It is expected that the development of the Merino Wind Farm will generate construction solid waste, general waste and hazardous waste during the lifetime of the wind farm.

Waste generated on site, originates from various sources, including but not limited to:

- Concrete waste generated from spoil and excess concrete.
- Contaminated water, soil, rocks, and vegetation due to hydrocarbon spills.
- Hazardous waste from vehicle, equipment and machinery parts and servicing, fluorescent tubes, used hydrocarbon containers, and waste ink cartridges.
- Recyclable waste in the form of paper, glass, steel, aluminium, wood/ wood pallets, plastic (PET bottles, PVC, LDPE) and cardboard.
- Organic waste from food waste as well as alien and endemic vegetation removal.
- Sewage from portable toilets and septic tanks.
- Inert waste from spoil material from site clearance and trenching works.

3. LEGISLATIVE REQUIREMENTS

Waste in South Africa is currently governed by several regulations, including:

- National Environmental Management: Waste Act (NEM:WA), 2008 (Act 59 of 2008);
- National Environmental Management: Waste Amendment Act, 2014 (Act 26 of 2014);
- The South African Constitution (Act 108 of 1996);
- Hazardous Substances Act (Act 5 of 1973);
- Health Act (Act 63 of 1977);
- Environment Conservation Act (Act 73 of 1989);
- Occupational Health and Safety Act (Act 85 of 1993);
- National Water Act (Act 36 of 1998);
- The National Environmental Management Act (Act 107 of 1998) (as amended);

- Municipal Structures Act (Act 117 of 1998);
- Municipal Systems Act (Act 32 of 2000);
- Mineral and Petroleum Resources Development Act (Act 28 of 2002); and
- Air Quality Act (Act 39 of 2004).

Storage of waste must be conducted in accordance with the National Norms and Standards for the Storage of Waste, published in GNR 926.

4. WASTE MANAGEMENT PRINCIPLES

An integrated approach to waste management is needed on site. Such an approach is illustrated in **Figure 1**.

It is important to ensure that waste is managed with the following objectives in mind during all phases of the project:

- Reducing volumes of waste is the greatest priority;
- If reduction is not feasible, the maximum amount of waste is to be recycled; and
- Waste that cannot be recycled is to be disposed of in the most environmentally responsible manner.

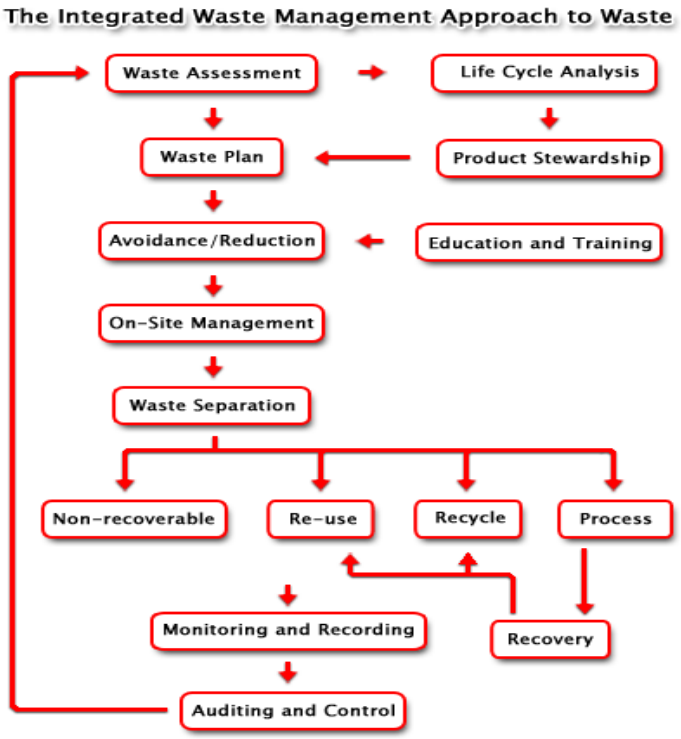


Figure 1: Integrated Waste Management Flow Diagram
(Source: http://www.enviroserv.co.za/pages/content.asp?SectionId=496)

4.1. Construction phase

A plan for the management of waste during the construction phase is detailed below. A Method Statement detailing specific waste management practices during construction should be prepared by the Contractor prior to the commencement of construction, for approval by the Resident Engineer and/or ECO.

4.1.1. Waste Assessment / Inventory

- The Environmental Officer (EO), or designated staff member, must develop, implement, and maintain a waste inventory reflecting all waste generated during construction for both general and hazardous waste streams.
- Construction methods and materials should be carefully considered in view of waste reduction, re-use, and recycling opportunities, to be pro-actively implemented.
- Once a waste inventory has been established, targets for the recovery of waste (minimisation, re-use, recycling) should be set.
- The EO must conduct waste classification and rating in terms of SANS 10288 and Government Notice 634 published under the NEM: WA.

4.1.2. Waste collection, handling, and storage

- It is the responsibility of the EO to ensure that each subcontractor implements their own waste recycling system, i.e., separate bins for food waste, plastics, paper, wood, glass cardboard, metals, etc. Such practises must be made contractually binding upon appointment of the subcontractors.
- Waste manifests and waste acceptance approvals (i.e., receipts) from designated waste facilities must be kept on file at the site office, in order to record and prove continual compliance for future auditing.
- Septic tanks and portable toilets must be monitored by the EO or responsible subcontractor and maintained regularly. Below ground storage of septic tanks must withstand the external forces of the surrounding environment. The area above the tank must be demarcated to prevent any vehicles or heavy machinery from moving around in the surrounding area.
- Waste collection bins and hazardous waste containers must be provided by the principal contractor and subcontractors and placed at strategic locations around the site for the storage of organic, recyclable and hazardous waste.
- A dedicated waste area must be established on site for the storage of all waste streams before removal from site. The storage period must not trigger listed waste activities as per the NEMWA, GN 921 of November 2013.
- Signage/ colour coding must be used to differentiate disposal areas for the various waste streams (i.e. paper, cardboard, metals, food waste, glass etc.).
- Hazardous waste must be stored within a bunded area constructed according to SABS requirements and must ensure complete containment of the spilled material in the event of a breach. As such, appropriate bunding material, design, capacity and type must be utilised to ensure that no contamination of the surrounding environment will occur despite a containment breach. The net capacity of a bunded compound in a storage facility should be at least 120% of the net capacity of the largest tank.
- Take into consideration the capacity displaced by other tanks within the same bunded area and any foundations.

- Treat interconnected tanks as a single tank of equivalent total volume for the purposes of the bund design criteria
- The location of all temporary waste storage areas must aim to minimise the potential for impact on the surrounding environment, including prevention of contaminated runoff, seepage, and vermin control, while being reasonably placed in terms of centrality and accessibility on site. Where required, an additional temporary waste storage area may be designated, provided identical controls are exercised for these locations.
- Waste storage shall be in accordance with all Regulations and best-practice guidelines and under no circumstances may waste be burnt on site.
- A dedicated waste management team must be appointed by the principal contractors' SHE Officer, who will be responsible for ensuring the continuous sorting of waste and maintenance of the area. The waste management team must be trained in all areas of waste management and monitored by the SHE Officer.
- All waste removed from site must be done by a registered/ licensed subcontractor, who must supply information regarding how waste recycling/ disposal will be achieved. The registered subcontractor must provide waste manifests for all removals at least once a month or for every disposal made, records of which must be kept on file at the site camp for the duration of the construction period.

4.1.3. Management of waste storage areas

- The position of all waste storage areas must be located so as to ensure minimal degradation to the environment. The main waste storage area must have a suitable stormwater system separating clean and contaminated stormwater.
- Collection bins placed around the site and at subcontractors' camps (if at a different location than the main site camp) must be maintained and emptied on a regular basis by the principal contractor to avoid overflowing receptacles.
- Inspections and maintenance of the main waste storage area must be undertaken daily. Skips and storage containers must be clearly marked, or colour coded and well-maintained. Monitor for rodents and take corrective action if they become a problem.
- Waste must be stored in designated containers and not on the ground.
- Inspections and maintenance of bunds must be undertaken regularly. Bunds must be inspected for leaks or cracks in the foundation and walls.
- It is assumed that any rainwater collected inside the bund is contaminated and must be treated by oil/water separation (or similar method) prior to dewatering, or removed and stored as hazardous waste, and not released into the environment.
- If any leaks occur in the bund, these must be removed immediately.
- Bund systems must be designed to avoid dewatering of contaminated water, but to rather separate oil and hydrocarbons from water prior to dewatering.
- Following rainfall event bunds must always be dewatered in order to maintain a sufficient storage capacity in the event of a breach.
- No mixing of hazardous and general waste is allowed.

4.1.4. Disposal

- Waste generated on site must be removed on a regular basis. This frequency may change during construction depending on waste volumes generated at different stages of the construction process,

however removal must occur prior to the storage capacity being reached to avoid overflow of containers and poor waste storage.
» Waste must be removed by a suitably qualified contractor and disposed of at an appropriately licensed landfill site. Proof of appropriate disposal must be provided by the contractor to the EO and ECO.

4.1.5. Record keeping

The success of the Waste Management Plan is determined by measuring criteria such as waste volumes, cost recovery from recycling and cost of disposal. Recorded data can indicate the effect of training and education, or the need for education. It will provide trends and benchmarks for setting goals and standards. It will provide clear evidence of the success or otherwise of the plan.

» Documentation (waste manifest, certificate of issue or safe disposal) must be kept detailing the quantity, nature, and fate of any regulated waste for audit purposes.
» Waste management must form part of the monthly reporting requirements in terms of volumes generated, types, storage and final disposal.

4.1.6. Training

Training and awareness regarding waste management shall be provided to all employees and contractors as part of the toolbox talks or on-site awareness sessions with the EO and at the frequency as set out by the ECO.

4.2. Operation phase

It is expected that the operation phase will result in the production of limited amounts of general waste consisting mostly of cardboard, paper, plastic, tins, metals, and a variety of synthetic compounds. Hazardous wastes (including grease, oils) will also be generated. All waste generated will be required to be temporarily stored at the facility in appropriate sealed containers prior to disposal at a permitted landfill site or other facilities.

The following waste management principles apply during the operation phase:

» The SHE Manager must develop, implement, and maintain a waste inventory reflecting all waste generated during operation for both general and hazardous waste streams.
» Adequate waste collection bins at site must be supplied. Separate bins should be provided for general and hazardous waste.
» Recyclable waste must be removed from the waste stream and stored separately.
» All waste must be stored in appropriate temporary storage containers (separated between different operation wastes, and contaminated or wet waste).
» Waste storage shall be in accordance with all best-practice guidelines and under no circumstances may waste be burnt on site.
» Waste generated on site must be removed on a regular basis throughout the operation phase.
» Waste must be removed by a suitably qualified contractor and disposed at an appropriately licensed landfill site. Proof of appropriate disposal must be provided by the contractor and kept on site.

5. Monitoring of Waste Management Activities

Records must be kept of the volumes/ mass of the different waste streams that are collected from the site throughout the life of the project. The appointed waste contractor is to provide monthly reports to the operator containing the following information:

- Monthly volumes/ mass of the different waste streams collected;
- Monthly volumes/ mass of the waste that is disposed of at a landfill site;
- Monthly volumes/ mass of the waste that is recycled; and
- Data illustrating progress compared to previous months.

This report will aid in monitoring the progress and relevance of the waste management procedures that are in place. If it is found that the implemented procedures are not as effective as required, this WMP is to be reviewed and amended accordingly. This report must from part of the EO's reports to the ECO on a monthly basis.

APPENDIX I:
EMERGENCY PREPARDENESS, RESPONSE AND FIRE MANAGEMENT PLAN

EMERGENCY PREPAREDNESS, RESPONSE AND FIRE MANAGEMENT PLAN

1. PURPOSE

The purpose of the Emergency Preparedness and Response Plan is:

- To assist contractor personnel to prepare for and respond quickly and safely to emergency incidents, and to establish a state of readiness which will enable prompt and effective responses to possible events.
- To control or limit any effect that an emergency or potential emergency may have on site or on neighbouring areas.
- To facilitate emergency responses and to provide such assistance on the site as is appropriate to the occasion.
- To ensure communication of all vital information as soon as possible.
- To facilitate the reorganisation and reconstruction activities so that normal operations can be resumed.
- To provide for training so that a high level of preparedness can be continually maintained.

This plan outlines response actions for potential incidents of any size. It details response procedures that will minimise potential health and safety hazards, environmental damage, and clean-up efforts. The plan has been prepared to ensure quick access to all the information required in responding to an emergency event. The plan will enable an effective, comprehensive response to prevent injury or damage to the construction personnel, public, and environment during the project. Contractors are expected to comply with all procedures described in this document. A Method Statement should be prepared at the commencement of construction detailing how this plan is to be implemented as well as details of relevant responsible parties for the implementation. The method statement must also reflect conditions of the IFC Performance Standard 1 and include the following:

- Identification of areas where accidents and emergency situations may occur;
- Communities and individuals that may be impacted;
- Response procedure;
- Provisions of equipment and resources;
- Designation of responsibilities;
- Communication; and
- Periodic training to ensure effective response to potentially affected communities.

2. PROJECT-SPECIFIC DETAILS

The Merino Wind Farm is located approximately 35km south-west of Richmond and 80km south-east of Victoria West within the Ubuntu Local Municipality and the Pixley Ka Seme District Municipality in the Northern Cape Province. The Merino Wind Farm will include up to 35 wind turbines with a contracted capacity of up to 140MW and associated infrastructure to be constructed over an area of approximately 2 800ha in extent, known as the development footprint, contained with a development area of approximately 6 463ha in extent, which is contained within a project site of approximately 29 909ha in extent.

Due to the scale and nature of this development, it is anticipated that the following risks could potentially arises during the construction and operation phases:

» Fires;
» Leakage of hazardous substances;
» Storage of flammable materials and substances;
» Flood events;
» Accidents; and
» Natural disasters.

3. EMERGENCY RESPONSE PLAN

There are three levels of emergency as follows:

» Local Emergency: An alert confined to a specific locality.
» Site Emergency: An alert that cannot be localised and which presents danger to other areas within the site boundary or outside the site boundary.
» Evacuation: An alert when all personnel are required to leave the affected area and assemble in a safe location.

If there is any doubt as to whether any hazardous situation constitutes an emergency, then it must be treated as an Evacuation.

Every effort must be made to control, reduce or stop the cause of any emergency provided it is safe to do so. For example, in the event of a fire, isolate the fuel supply and limit the propagation of the fire by cooling the adjacent areas. Then confine and extinguish the fire (where appropriate) making sure that re-ignition cannot occur.

3.1. Emergency Scenario Contingency Planning

3.1.1. Scenario: Spill which would result in the contamination of land, surface or groundwater

i. Spill Prevention Measures

Preventing spills must be the top priority at all operations which have the potential of endangering the environment. The responsibility to effectively prevent and mitigate any scenario lies with the Contractor and the ECO. In order to reduce the risk of spills and associated contamination, the following principles should be considered during construction and operation activities:

» All equipment refuelling, servicing and maintenance activities should only be undertaken within appropriately sealed/contained or bunded designated areas.
» All maintenance materials, oils, grease, lubricants, etc. should be stored in a designated area in an appropriate storage container.
» No refuelling, storage, servicing, or maintenance of equipment should take place within sensitive environmental resources in order to reduce the risk of contamination by spills.
» No refuelling or servicing should be undertaken without absorbent material or drip pans properly placed to contain spilled fuel.

- Any fluids drained from the machinery during servicing should be collected in leak-proof containers and taken to an appropriate disposal or recycling facility.
- If these activities result in damage or accumulation of product on the soil, the contaminated soil must be disposed of as hazardous waste. Under no circumstances shall contaminated soil be added to a spoils pile and transported to a regular disposal site.
- Chemical toilets used during construction must be regularly cleaned. Chemicals used in toilets are also hazardous to the environment and must be controlled. Portable chemical toilets could overflow if not pumped regularly or they could spill if dropped or overturned during moving. Care and due diligence should be taken at all times.
- Contact details of emergency services and HazMat Response Contractors are to be clearly displayed on the site. All staff are to be made aware of these details and must be familiar with the procedures for notification in the event of an emergency.

ii. Procedures

The following action plan is proposed in the event of a spill:

1. Spill or release identified.
2. Assess person safety, safety of others and environment.
3. Stop the spill if safely possible.
4. Contain the spill to limit entering surrounding areas.
5. Identify the substance spilled.
6. Quantify the spill (under or over guideline/threshold levels).
7. Notify the Site Manager and emergency response crew and authorities (in the event of major spill).
8. Inform users (and downstream users) of the potential risk.
9. Clean up of the spill using spill kit or by HazMat team.
10. Record of the spill incident on company database.

a) Procedures for containing and controlling the spill (i.e., on land or in water)

Measures can be taken to prepare for quick and effective containment of any potential spills. Each contractor must keep sufficient supplies of spill containment equipment at the construction sites, at all times during and after the construction phase. These should include specialised spill kits or spill containment equipment. Other spill containment measures include using drip pans underneath vehicles and equipment every time refuelling, servicing, or maintenance activities are undertaken.

Specific spill containment methods for land and water contamination are outlined below.

Containment of Spills on Land

Spills on land include spills on rock, gravel, soil and/or vegetation. It is important to note that soil is a natural sorbent, and therefore spills on soil are generally less serious than spills on water as contaminated soil can be more easily recovered. It is important that all measures be undertaken to avoid spills reaching open water bodies. The following methods could be used:

- *Dykes* - Dykes can be created using soil surrounding a spill on land. These dykes are constructed around the perimeter or down slope of the spilled substance. A dyke needs to be built up to a size that

will ensure containment of the maximum quantity of contaminant that may reach it. A plastic tarp can be placed on and at the base of the dyke such that the contaminant can pool up and subsequently be removed with sorbent materials or by pump into barrels or bags. If the spill is migrating very slowly, a dyke may not be necessary, and sorbents can be used to soak up contaminants before they migrate away from the source of the spill.

» *Trenches* - Trenches can be dug out to contain spills. Spades, pick axes or a front-end loader can be used depending on the size of the trench required. Spilled substances can then be recovered using a pump or sorbent materials.

b) Procedures for transferring, storing, and managing spill related wastes

Used sorbent materials are to be placed in plastic bags for future disposal. All materials mentioned in this section are to be available in the spill kits. Following clean up, any tools or equipment used must be properly washed and decontaminated or replaced if this is not possible.

Spilled substances and materials used for containment must be placed into empty waste oil containers and sealed for proper disposal at an approved disposal facility.

c) Procedures for restoring affected areas

Criteria that may be considered include natural biodegradation of oil, replacement of soil and revegetation. Once a spill of reportable size has been contained, the ECO and the relevant Authority must be consulted to confirm that the appropriate clean up levels are met.

3.1.2. Scenario: Fire (and fire water handling)

i. Action Plan

The following action plan is proposed in the event of a fire:

1. Quantify risk.
2. Assess person safety, safety of others and environment.
3. If safe – attempt to extinguish the fire using appropriate equipment.
4. If not safe to extinguish, contain fire.
5. Notify Site Manager and emergency response crew and authorities.
6. Inform users of the potential risk of fire.
7. Record the incident on the company database or filing register.

ii. Procedures

Because large scale fires may spread very fast in the environment it is most advisable that the employee/contractor not put his/her life in danger in the case of an uncontrolled fire.

Portable firefighting equipment must be provided at strategic locations throughout the site, in line with the Building Code of South Africa and the relevant provincial building code. All emergency equipment including

portable fire extinguisher, hose reels and hydrants must be maintained and inspected by a qualified contractor in accordance with the relevant legislation and national standards.

Current evacuation signs and diagrams for the building or site that are compliant to relevant state legislation must be provided in a conspicuous position, on each evacuation route. Contact details for the relevant emergency services should be clearly displayed on site and all employees should be aware of procedures to follow in the case of an emergency.

a) Procedures for initial actions

Persons should not fight the fire if any of the following conditions exist:

» They have not been trained or instructed in the use of a fire extinguisher.
» They do not know what is burning.
» The fire is spreading rapidly.
» They do not have the proper equipment.
» They cannot do so without a means of escape.
» They may inhale toxic smoke.

b) Reporting procedures

In terms of the requirements of NEMA, the responsible person must, within 14 days of the incident, report to the Director General, provincial head of department and municipality.

» Report fire immediately to the site manager, who will determine if it is to be reported to the relevant emergency services and authorities.
» The site manager must have copies of the Report form to be completed.

SUMMARY: RESPONSE PROCEDURE

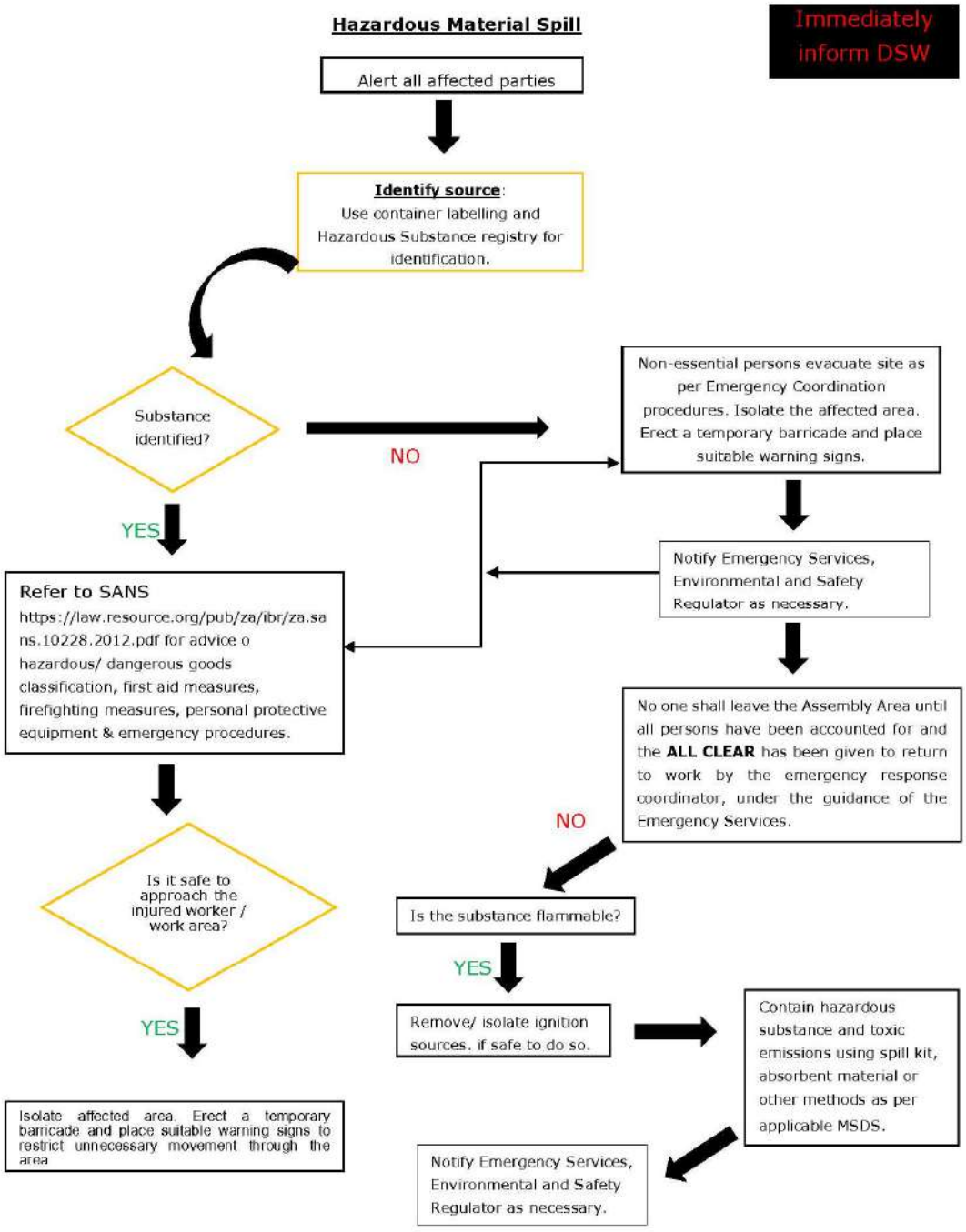


Figure 1: Hazardous Material Spill

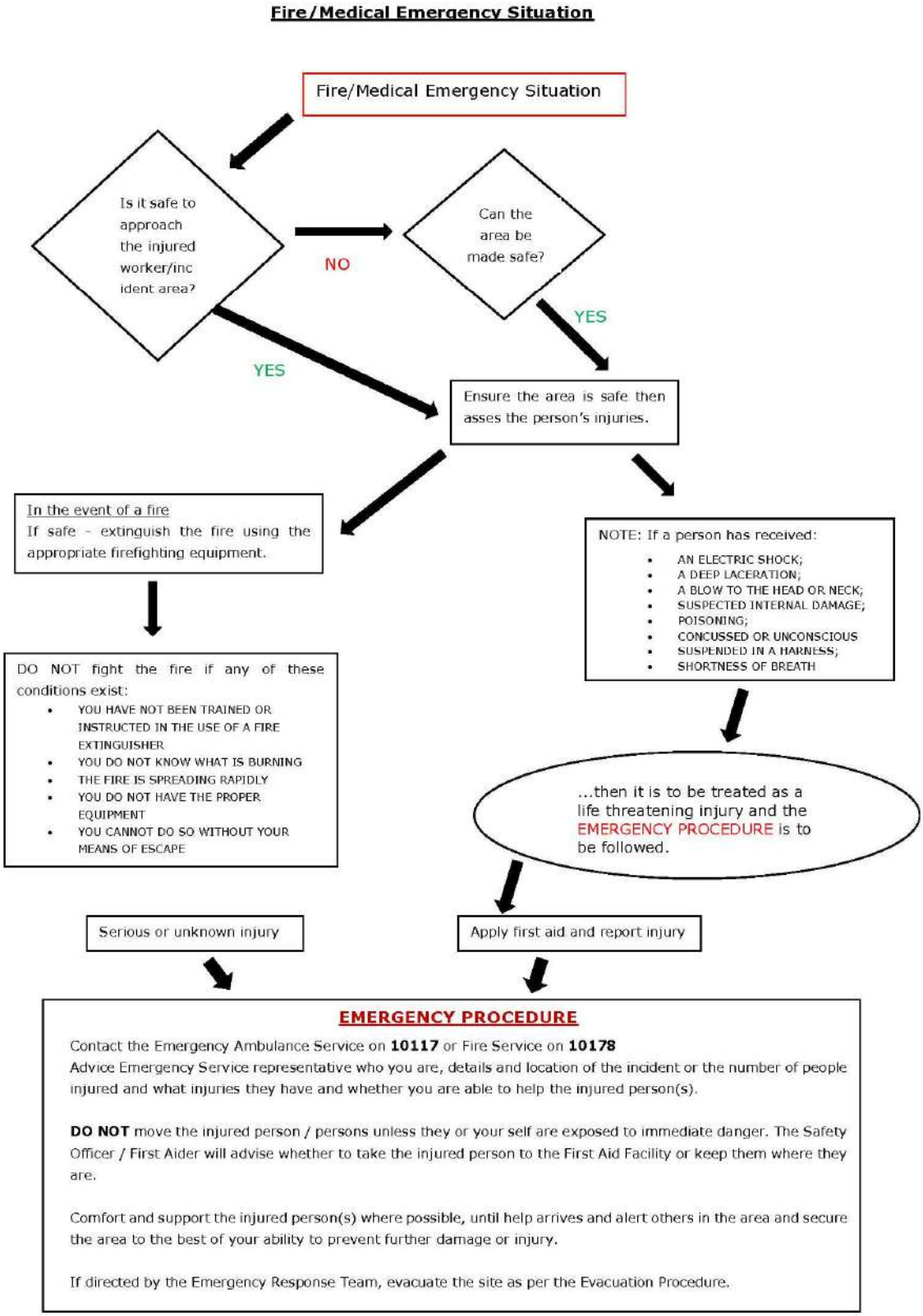


Figure 2: Emergency Fire/Medical

4. PROCEDURE RESPONSIBILITY

The Contractor's Safety, Health and Environment (SHE) Representative, 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 SHE must act as liaison and advisor on all environmental and related issues.

The local authorities will provide their assistance when deemed necessary, or when it has been requested and/or indicated in Section 30 (8) of NEMA. The provincial authority will provide assistance and guidance where required and conduct awareness programmes.

APPENDIX J:
CURRICULCUM VITAE OF THE PROJECT TEAM

savannah environmental

1st Floor, Block 2, 5 Woodlands Drive Office Park
Woodlands Drive, Woodmead
Johannesburg, South Africa

Email: joanne@savannahsa.com
Tel: +27 (11) 656 3237

CURRICULUM VITAE OF JO-ANNE THOMAS

Profession:	Environmental Management and Compliance Consultant; Environmental Assessment Practitioner
Specialisation:	Environmental Management; Strategic environmental advice; Environmental compliance advice & monitoring; Environmental Impact Assessments; Policy, strategy & guideline formulation; Project Management; General Ecology
Work experience:	Twenty four (24) years in the environmental field

VOCATIONAL EXPERIENCE

Provide technical input for projects in the environmental management field, specialising in Strategic Environmental Advice, Environmental Impact Assessment studies, environmental auditing and monitoring, environmental permitting, public participation, Environmental Management Plans and Programmes, environmental policy, strategy and guideline formulation, and integrated environmental management. Key focus on integration of the specialist environmental studies and findings into larger engineering-based projects, strategic assessment, and providing practical and achievable environmental management solutions and mitigation measures. Responsibilities for environmental studies include project management (including client and authority liaison and management of specialist teams); review and manipulation of data; identification and assessment of potential negative environmental impacts and benefits; review of specialist studies; and the identification of mitigation measures. Compilation of the reports for environmental studies is in accordance with all relevant environmental legislation.

Undertaking of numerous environmental management studies has resulted in a good working knowledge of environmental legislation and policy requirements. Recent projects have been undertaken for both the public- and private-sector, including compliance advice and monitoring, electricity generation and transmission projects, various types of linear developments (such as National Road, local roads and power lines), waste management projects (landfills), mining rights and permits, policy, strategy and guideline development, as well as general environmental planning, development and management.

SKILLS BASE AND CORE COMPETENCIES

- Project management for a range of projects
- Identification and assessment of potential negative environmental impacts and benefits through the review and manipulation of data and specialist studies
- Identification of practical and achievable mitigation and management measures and the development of appropriate management plans
- Compilation of environmental reports in accordance with relevant environmental legislative requirements
- External and peer review of environmental reports & compliance advice and monitoring
- Formulation of environmental policies, strategies and guidelines
- Strategic and regional assessments; pre-feasibility & site selection
- Public participation processes for a variety of projects
- Strategic environmental advice to a wide variety of clients both in the public and private sectors
- Working knowledge of environmental planning processes, policies, regulatory frameworks and legislation

EDUCATION AND PROFESSIONAL STATUS

Degrees:

- B.Sc Earth Sciences, University of the Witwatersrand, Johannesburg (1993)
- B.Sc Honours in Botany, University of the Witwatersrand, Johannesburg (1994)
- M.Sc in Botany, University of the Witwatersrand, Johannesburg (1996)

Short Courses:

- Environmental Impact Assessment, Potchefstroom University (1998)
- Environmental Law, Morgan University (2001)
- Environmental Legislation, IMBEWU (2017)
- Mining Legislation, Cameron Cross & Associates (2013)
- Environmental and Social Risk Management (ESRM), International Finance Corporation (2018)

Professional Society Affiliations:

- Registered EAP with the Environmental Assessment Practitioners Association of South Africa (EAPASA) (2019/726)
- Registered with the South African Council for Natural Scientific Professions as a Professional Natural Scientist: Environmental Scientist (400024/00)
- Registered with the International Associated for Impact Assessment South Africa (IAIAsa): 5601
- Member of the South African Wind Energy Association (SAWEA)

EMPLOYMENT

Date	Company	Roles and Responsibilities
January 2006 - Current:	Savannah Environmental (Pty) Ltd	Director Project manager Independent specialist environmental consultant, Environmental Assessment Practitioner (EAP) and advisor.
1997 – 2005:	Bohlweki Environmental (Pty) Ltd	Senior Environmental Scientist at. Environmental Management and Project Management
January – July 1997:	Sutherland High School, Pretoria	Junior Science Teacher

PROJECT EXPERIENCE

Project experience includes large infrastructure projects, including electricity generation and transmission, wastewater treatment facilities, mining and prospecting activities, property development, and national roads, as well as strategy and guidelines development.

RENEWABLE POWER GENERATION PROJECTS: PHOTOVOLTAIC SOLAR ENERGY FACILITIES

Environmental Impact Assessments and Environmental Management Programmes

Project Name & Location	Client Name	Role
Christiana PV 2 SEF, North West	Solar Reserve South Africa	Project Manager & EAP
De Aar PV facility, Northern Cape	iNca Energy	Project Manager & EAP
Everest SEF near Hennenman, Free State	FRV Energy South Africa	Project Manager & EAP
Graafwater PV SEF, Western Cape	iNca Energy	Project Manager & EAP
Grootkop SEF near Allanridge, Free State	FRV Energy South Africa	Project Manager & EAP
Hertzogville PV 2 SEF with 2 phases, Free State	SunCorp / Solar Reserve	Project Manager & EAP

Project Name & Location	Client Name	Role
Karoshoek CPV facility on site 2 as part of the larger Karoshoek Solar Valley Development East of Upington, Northern Cape	FG Emvelo	Project Manager & EAP
Kgabalatsane SEF North-East for Brits, North West	Built Environment African Energy Services	Project Manager & EAP
Kleinbegin PV SEF West of Groblershoop, Northern Cape	MedEnergy Global	Project Manager & EAP
Lethabo Power Station PV Installation, Free State	Eskom Holdings SoC Limited	Project Manager & EAP
Majuba Power Station PV Installation, Mpumalanga	Eskom Holdings SoC Limited	Project Manager & EAP
Merapi PV SEF Phase 1 – 4 South-East of Excelsior, Free State	SolaireDirect Southern Africa	Project Manager & EAP
Sannaspos Solar Park, Free State	SolaireDirect Southern Africa	Project Manager & EAP
Ofir-Zx PV Plant near Keimoes, Northern Cape	S28 Degrees Energy	Project Manager & EAP
Oryx SEF near Virginia, Free State	FRV Energy South Africa	Project Manager & EAP
Project Blue SEF North of Kleinsee, Northern Cape	WWK Development	Project Manager & EAP
S-Kol PV Plant near Keimoes, Northern Cape	S28 Degrees Energy	Project Manager & EAP
Sonnenberg PV Plant near Keimoes, Northern Cape	S28 Degrees Energy	Project Manager & EAP
Tutuka Power Station PV Installation, Mpumalanga	Eskom Transmission	Project Manager & EAP
Two PV sites within the Northern Cape	MedEnergy Global	Project Manager & EAP
Two PV sites within the Western & Northern Cape	iNca Energy	Project Manager & EAP
Upington PV SEF, Northern Cape	MedEnergy Global	Project Manager & EAP
Vredendal PV facility, Western Cape	iNca Energy	Project Manager & EAP
Waterberg PV plant, Limpopo	Thupela Energy	Project Manager & EAP
Watershed Phase I & II SEF near Litchtenburg, North West	FRV Energy South Africa	Project Manager & EAP
Alldays PV & CPV SEF Phase 1, Limpopo	BioTherm Energy	Project Manager & EAP
Hyperion PV Solar Development 1, 2, 3, 4, 5 & 6, Northern Cape	Building Energy	Project Manager & EAP
Vrede & Rondavel PV, Free State	Mainstream Renewable Energy Developments	Project Manager & EAP

Basic Assessments

Project Name & Location	Client Name	Role
Aberdeen PV SEF, Eastern Cape	BioTherm Energy	Project Manager & EAP
Christiana PV 1 SEF on Hartebeestpan Farm, North-West	Solar Reserve South Africa	Project Manager & EAP
Heuningspruit PV1 & PV 2 facilities near Koppies, Free State	Sun Mechanics	Project Manager & EAP
Kakamas PV Facility, Northern Cape	iNca Energy	Project Manager & EAP
Kakamas II PV Facility, Northern Cape	iNca Energy	Project Manager & EAP
Machadodorp 1 PV SEF, Mpumalanga	Solar To Benefit Africa	Project Manager & EAP
PV site within the Northern Cape	iNca Energy	Project Manager & EAP
PV sites within 4 ACSA airports within South Africa, National	Airports Company South Africa (ACSA)	Project Manager & EAP
RustMo1 PV Plant near Buffelspoort, North West	Momentous Energy	Project Manager & EAP
RustMo2 PV Plant near Buffelspoort, North West	Momentous Energy	Project Manager & EAP
RustMo3 PV Plant near Buffelspoort, North West	Momentous Energy	Project Manager & EAP
RustMo4 PV Plant near Buffelspoort, North West	Momentous Energy	Project Manager & EAP

Project Name & Location	Client Name	Role
Sannaspos PV SEF Phase 2 near Bloemfontein, Free State	SolaireDirect Southern Africa	Project Manager & EAP
Solar Park Expansion within the Rooiwal Power Station, Gauteng	AFRKO Energy	Project Manager & EAP
Steynsrus SEF, Free State	SunCorp	Project Manager & EAP
Sirius Solar PV Project Three and Sirius Solar PV Project Four (BA in terms of REDZ regulations), Northern Cape	SOLA Future Energy	Project Manager & EAP
Northam PV, Limpopo Province	Northam Platinum	Project Manager & EAP
Kolkies PV Suite (x 6 projects) and Sadawa PV Suite (x 4 projects), Western Cape	Mainstream Renewable Energy Developments	Project Manager & EAP

Screening Studies

Project Name & Location	Client Name	Role
Allemans Fontein SEF near Noupoort, Northern Cape	Fusion Energy	Project Manager & EAP
Amandel SEF near Thabazimbi, Limpopo	iNca Energy	Project Manager & EAP
Arola/Doornplaat SEF near Ventersdorp, North West	FRV & iNca Energy	Project Manager & EAP
Bloemfontein Airport PV Installation, Free State	The Power Company	Project Manager & EAP
Brakspruit SEF near Klerksorp, North West	FRV & iNca Energy	Project Manager & EAP
Carolus Poort SEF near Noupoort, Northern Cape	Fusion Energy	Project Manager & EAP
Damfontein SEF near Noupoort, Northern Cape	Fusion Energy	Project Manager & EAP
Everest SEF near Welkom, Free State	FRV & iNca Energy	Project Manager & EAP
Gillmer SEF near Noupoort, Northern Cape	Fusion Energy	Project Manager & EAP
Grootkop SEF near Allansridge, Free State	FRV & iNca Energy	Project Manager & EAP
Heuningspruit PV1 & PV 2 near Koppies, Free State	Cronimat	Project Manager & EAP
Kimberley Airport PV Installation, Northern Cape	The Power Company	Project Manager & EAP
Kolonnade Mall Rooftop PV Installation in Tshwane, Gauteng	Momentous Energy	Project Manager & EAP
Loskop SEF near Groblersdal, Limpopo	S&P Power Unit	Project Manager & EAP
Marble SEF near Marble Hall, Limpopo	S&P Power Unit	Project Manager & EAP
Morgenson PV1 SEF South-West of Windsorton, Northern Cape	Solar Reserve South Africa	Project Manager & EAP
OR Tambo Airport PV Installation, Gauteng	The Power Company	Project Manager & EAP
Oryx SEF near Virginia, Free State	FRV & iNca Energy	Project Manager & EAP
Rhino SEF near Vaalwater, Limpopo	S&P Power Unit	Project Manager & EAP
Rustmo2 PV Plant near Buffelspoort, North West	Momentous Energy	Project Manager & EAP
Spitskop SEF near Northam, Limpopo	FRV & iNca Energy	Project Manager & EAP
Steynsrus PV, Free State	Suncorp	Project Manager & EAP
Tabor SEF near Polokwane, Limpopo	FRV & iNca Energy	Project Manager & EAP
UpingtonAirport PV Installation, Northern Cape	The Power Company	Project Manager & EAP
Valeria SEF near Hartebeestpoort Dam, North West	Solar to Benefit Africa	Project Manager & EAP
Watershed SEF near Lichtenburg, North West	FRV & iNca Energy	Project Manager & EAP
Witkop SEF near Polokwane, Limpopo	FRV & iNca Energy	Project Manager & EAP
Woodmead Retail Park Rooftop PV Installation, Gauteng	Momentous Energy	Project Manager & EAP

Environmental Compliance, Auditing and ECO

Project Name & Location	Client Name	Role
ECO and bi-monthly auditing for the construction of the Adams Solar PV Project Two South of Hotazel,	Enel Green Power	Project Manager

Project Name & Location	Client Name	Role
Northern Cape		
ECO for the construction of the Kathu PV Facility, Northern Cape	REISA	Project Manager
ECO and bi-monthly auditing for the construction of the Pulida PV Facility, Free State	Enel Green Power	Project Manager
ECO for the construction of the RustMo1 SEF, North West	Momentous Energy	Project Manager
ECO for the construction of the Sishen SEF, Northern Cape	Windfall 59 Properties	Project Manager
ECO for the construction of the Upington Airport PV Facility, Northern Cape	Sublanary Trading	Project Manager
Quarterly compliance monitoring of compliance with all environmental licenses for the operation activities at the Kathu PV facility, Northern Cape	REISA	Project Manager
ECO for the construction of the Konkoonsies II PV SEF and associated infrastructure, Northern Cape	BioTherm Energy	Project Manager
ECO for the construction of the Aggeneys PV SEF and associated infrastructure, Northern Cape	BioTherm Energy	Project Manager

Compliance Advice and ESAP Reporting

Project Name & Location	Client Name	Role
Aggeneys Solar Farm, Northern Cape	BioTherm Energy	Environmental Advisor
Airies II PV Facility SW of Kenhardt, Northern Cape	BioTherm Energy	Environmental Advisor
Kalahari SEF Phase II in Kathu, Northern Cape	Engie	Environmental Advisor
Kathu PV Facility, Northern Cape	Building Energy	Environmental Advisor
Kenhardt PV Facility, Northern Cape	BioTherm Energy	Environmental Advisor
Kleinbegin PV SEF West of Groblershoop, Northern Cape	MedEnergy	Environmental Advisor
Konkoonises II SEF near Pofadder, Northern Cape	BioTherm Energy	Environmental Advisor
Konkoonsies Solar Farm, Northern Cape	BioTherm Energy	Environmental Advisor
Lephalale SEF, Limpopo	Exxaro	Environmental Advisor
Pixley ka Seme PV Park, South-East of De Aar, Northern Cape	African Clean Energy Developments (ACED)	Environmental Advisor
RustMo1 PV Plant near Buffelspoort, North West	Momentous Energy	Environmental Advisor
Scuitdrift 1 SEF & Scuitdrift 2 SEF, Limpopo	Building Energy	Environmental Advisor
Sirius PV Plants, Northern Cape	Aurora Power Solutions	Environmental Advisor
Upington Airport PV Power Project, Northern Cape	Sublunary Trading	Environmental Advisor
Upington SEF, Northern Cape	Abengoa Solar	Environmental Advisor
Ofir-ZX PV SEF near Keimoes, Northern Cape	Networx S28 Energy	Environmental Advisor
Environmental Permitting for the Steynsrus PV1 & PV2 SEF's, Northern Cape	Cronimet Power Solutions	Environmental Advisor
Environmental Permitting for the Heuningspruit PV SEF, Northern Cape	Cronimet Power Solutions	Environmental Advisor

Due Diligence Reporting

Project Name & Location	Client Name	Role
5 PV SEF projects in Lephalale, Limpopo	iNca Energy	Environmental Advisor
Prieska PV Plant, Northern Cape	SunEdison Energy India	Environmental Advisor
Sirius Phase One PV Facility near Upington, Northern Cape	Aurora Power Solutions	Environmental Advisor

Environmental Permitting, S53, Water Use Licence (WUL), Waste Management Licence (WML) & Other Applications

Project Name & Location	Client Name	Role
Biodiversity Permit & WULA for the Aggeneys SEF near Aggeneys, Northern Cape	BioTherm Energy	Project Manager & EAP
Biodiversity Permit for the Konkoonises II SEF near Pofadder, Northern Cape	BioTherm Energy	Project Manager & EAP
Biodiversity Permitting for the Lephalale SEF, Limpopo	Exxaro Resources	Project Manager & EAP
Environmental Permitting for the Kleinbegin PV SEF West of Groblershoop, Northern Cape	MedEnergy	Project Manager & EAP
Environmental Permitting for the Upington SEF, Northern Cape	Abengoa Solar	Project Manager & EAP
Environmental Permitting for the Kathu PV Facility, Northern Cape	Building Energy	Project Manager & EAP
Environmental Permitting for the Konkoonsies Solar Farm, Northern Cape	BioTherm Energy	Project Manager & EAP
Environmental Permitting for the Lephalale SEF, Limpopo	Exxaro Resources	Project Manager & EAP
Environmental Permitting for the Scuitdrift 1 SEF & Scuitdrift 2 SEF, Limpopo	Building Energy	Project Manager & EAP
Environmental Permitting for the Sirius PV Plant, Northern Cape	Aurora Power Solutions	Project Manager & EAP
Environmental Permitting for the Steynsrus PV1 & PV2 SEF's, Northern Cape	Cronimet Power Solutions	Project Manager & EAP
Environmental Permitting for the Heuningspruit PV SEF, Northern Cape	Cronimet Power Solutions	Project Manager & EAP
Permits for the Kleinbegin and UAP PV Plants, Northern Cape	MedEnergy Global	Project Manager & EAP
S53 Application for Arriesfontein Solar Park Phase 1 – 3 near Danielskuil, Northern Cape	Solar Reserve / SunCorp	Project Manager & EAP
S53 Application for Hertzogville PV1 & PV 2 SEFs, Free State	Solar Reserve / SunCorp	Project Manager & EAP
S53 Application for the Bloemfontein Airport PV Facility, Free State	Sublunary Trading	Project Manager & EAP
S53 Application for the Kimberley Airport PV Facility, Northern Cape	Sublunary Trading	Project Manager & EAP
S53 Application for the Project Blue SEF, Northern Cape	WWK Developments	Project Manager & EAP
S53 Application for the Upington Airport PV Facility, Free State	Sublunary Trading	Project Manager & EAP
WULA for the Kalahari SEF Phase II in Kathu, Northern Cape	Engie	Project Manager & EAP

RENEWABLE POWER GENERATION PROJECTS: CONCENTRATED SOLAR FACILITIES (CSP)

Environmental Impact Assessments and Environmental Management Programmes

Project Name & Location	Client Name	Role
Ilanga CSP 2, 3, 4, 5, 7 & 9 Facilities near Upington, Northern Cape	Emvelo Holdings	Project Manager & EAP
Ilanga CSP near Upington, Northern Cape	Ilangethu Energy	Project Manager & EAP

Project Name & Location	Client Name	Role
Ilanga Tower 1 Facility near Upington, Northern Cape	Emvelo Holdings	Project Manager & EAP
Karoshoek CPVPD 1-4 facilities on site 2 as part of the larger Karoshoek Solar Valley Development East of Upington, Northern Cape	FG Emvelo	Project Manager & EAP
Karoshoek CSP facilities on sites 1.4; 4 & 5 as part of the larger Karoshoek Solar Valley Development East of Upington, Northern Cape	FG Emvelo	Project Manager & EAP
Karoshoek Linear Fresnel 1 Facility on site 1.1 as part of the larger Karoshoek Solar Valley Development East of Upington, Northern Cape	FG Emvelo	Project Manager & EAP

Environmental Compliance, Auditing and ECO

Project Name & Location	Client Name	Role
ECO for the construction of the !Khi CSP Facility, Northern Cape	Abengoa Solar	Project Manager
ECO for the construction of the Ilanga CSP 1 Facility near Upington, Northern Cape	Karoshoek Solar One	Project Manager
ECO for the construction of the folar Park, Northern Cape	Kathu Solar	Project Manager
ECO for the construction of the KaXu! CSP Facility, Northern Cape	Abengoa Solar	Project Manager
Internal audit of compliance with the conditions of the IWUL issued to the Karoshoek Solar One CSP Facility, Northern Cape	Karoshoek Solar One	Project Manager

Screening Studies

Project Name & Location	Client Name	Role
Upington CSP (Tower) Plant near Kanoneiland, Northern Cape	iNca Energy and FRV	Project Manager & EAP

Compliance Advice and ESAP reporting

Project Name & Location	Client Name	Role
Ilanga CSP Facility near Upington, Northern Cape	Ilangethu Energy	Environmental Advisor
Ilangalethu CSP 2, Northern Cape	FG Emvelo	Environmental Advisor
Kathu CSP Facility, Northern Cape	GDF Suez	Environmental Advisor
Lephalale SEF, Limpopo	Cennergi	Environmental Advisor
Solis I CSP Facility, Northern Cape	Brightsource	Environmental Advisor

Environmental Permitting, S53, Water Use Licence (WUL), Waste Management Licence (WML) & Other Applications

Project Name & Location	Client Name	Role
Environmental Permitting for the Ilanga CSP Facility near Upington, Northern Cape	Ilangethu Energy	Project Manager & EAP
Environmental Permitting for the Kathu CSP, Northern Cape	GDF Suez	Project Manager & EAP
WULA for the Solis I CSP Facility, Northern Cape	Brightsource	Project Manager & EAP

RENEWABLE POWER GENERATION PROJECTS: WIND ENERGY FACILITIES

Environmental Impact Assessments and Environmental Management Programmes

Project Name & Location	Client Name	Role
Sere WEF, Western Cape	Eskom Holdings SoC Limited	EAP
Aberdeen WEF, Eastern Cape	Eskom Holdings SoC Limited	Project Manager & EAP
Amakhala Emoyeni WEF, Eastern Cape	Windlab Developments	Project Manager & EAP
EXXARO West Coast WEF, Western Cape	EXXARO Resources	Project Manager & EAP
Goereesoe Wind Farm near Swellendam, Western Cape	iNca Energy	Project Manager & EAP
Hartneest WEF, Western Cape	Juwi Renewable Energies	Project Manager & EAP
Hopefield WEF, Western Cape	Umoya Energy	EAP
Kleinsee WEF, Northern Cape	Eskom Holdings SoC Limited	Project Manager & EAP
Klipheuwel/Dassiesfontein WEF within the Overberg area, Western Cape	BioTherm Energy	Project Manager & EAP
Moorreesburg WEF, Western Cape	iNca Energy	Project Manager & EAP
Oyster Bay WEF, Eastern Cape	Renewable Energy Resources Southern Africa	Project Manager & EAP
Project Blue WEF, Northern Cape	Windy World	Project Manager & EAP
Rheboksfontein WEF, Western Cape	Moyeng Energy	Project Manager & EAP
Spitskop East WEF near Riebeeck East, Eastern Cape	Renewable Energy Resources Southern Africa	Project Manager & EAP
Suurplaat WEF, Western Cape	Moyeng Energy	Project Manager & EAP
Swellendam WEF, Western Cape	IE Swellendam	Project Manager & EAP
Tsitsikamma WEF, Eastern Cape	Exxarro	Project Manager & EAP
West Coast One WEF, Western Cape	Moyeng Energy	Project Manager & EAP

Basic Assessments

Project Name & Location	Client Name	Role
Amakhala Emoyeni Wind Monitoring Masts, Eastern Cape	Windlab Developments	Project Manager & EAP
Beaufort West Wind Monitoring Masts, Western Cape	Umoya Energy	Project Manager & EAP
Hopefield Community Wind Farm near Hopefield, Western Cape	Umoya Energy	Project Manager & EAP
Koekenaap Wind Monitoring Masts, Western Cape	EXXARO Resources	Project Manager & EAP
Koingnaas WEF, Northern Cape	Just Palm Tree Power	Project Manager & EAP
Laingsburg Area Wind Monitoring Masts, Western Cape	Umoya Energy	Project Manager & EAP
Overberg Area Wind Monitoring Masts, Western Cape	BioTherm Energy	Project Manager & EAP
Oyster Bay Wind Monitoring Masts, Eastern Cape	Renewable Energy Systems Southern Africa (RES)	Project Manager & EAP
Wind Garden & Fronteer WEFs, Eastern Cape	Wind Relc	Project Manager & EAP

Screening Studies

Project Name & Location	Client Name	Role
Albertinia WEF, Western Cape	BioTherm Energy	Project Manager & EAP
Koingnaas WEF, Northern Cape	Just Pal Tree Power	Project Manager & EAP
Napier Region WEF Developments, Western Cape	BioTherm Energy	Project Manager & EAP
Tsitsikamma WEF, Eastern Cape	Exxarro Resources	Project Manager & EAP

Project Name & Location	Client Name	Role
Various WEFs within an identified area in the Overberg area, Western Cape	BioTherm Energy	Project Manager & EAP
Various WEFs within an identified area on the West Coast, Western Cape	Investec Bank Limited	Project Manager & EAP
Various WEFs within an identified area on the West Coast, Western Cape	Eskom Holdings Limited	Project Manager & EAP
Various WEFs within the Western Cape	Western Cape Department of Environmental Affairs and Development Planning	Project Manager & EAP
Velddrift WEF, Western Cape	VentuSA Energy	Project Manager & EAP
Wind 1000 Project	Thabo Consulting on behalf of Eskom Holdings	Project Manager & EAP
Wittekleibosch, Snylip & Doriskraal WEFs, Eastern Cape	Exxarro Resources	Project Manager & EAP

Environmental Compliance, Auditing and ECO

Project Name & Location	Client Name	Role
ECO for the construction of the West Coast One WEF, Western Cape	Aurora Wind Power	Project Manager
ECO for the construction of the Gouda WEF, Western Cape	Blue Falcon	Project Manager
EO for the Dassiesklip Wind Energy Facility, Western Cape	Group 5	Project Manager
Quarterly compliance monitoring of compliance with all environmental licenses for the operation activities at the Gouda Wind Energy facility near Gouda, Western Cape	Blue Falcon	Project Manager
Annual auditing of compliance with all environmental licenses for the operation activities at the West Coast One Wind Energy facility near Vredenburg, Western Cape	Aurora Wind Power	Project Manager
External environmental and social audit for the Amakhala Wind Farm, Eastern Cape	Cennergi	Project Manager
External environmental and social audit for the Tsitsikamma Wind Farm, Eastern Cape	Cennergi	Project Manager
ECO for the construction of the Excelsior Wind Farm and associated infrastructure, Northern Cape	BioTherm Energy	Project Manager
External compliance audit of the Dassiesklip Wind Energy Facility, Western Cape	BioTherm Energy	Project Manager

Compliance Advice

Project Name & Location	Client Name	Role
Amakhala Phase 1 WEF, Eastern Cape	Cennergi	Environmental Advisor
Dassiesfontein WEF within the Overberg area, Western Cape	BioTherm Energy	Environmental Advisor
Excelsior Wind Farm, Western Cape	BioTherm Energy	Environmental Advisor
Great Karoo Wind Farm, Northern Cape	African Clean Energy Developments (ACED)	Environmental Advisor
Hopefield Community WEF, Western Cape	African Clean Energy Developments (ACED)	Environmental Advisor

Rheboksfontein WEF, Western Cape	Moyeng Energy	Environmental Advisor
Tiqua WEF, Western Cape	Cennergi	Environmental Advisor
Tsitsikamma WEF, Eastern Cape	Cennergi	Environmental Advisor
West Coast One WEF, Western Cape	Moyeng Energy	Environmental Advisor

Due Diligence Reporting

Project Name & Location	Client Name	Role
Witteberg WEF, Western Cape	EDPR Renewables	Environmental Advisor
IPD Vredenburg WEF within the Saldanha Bay area, Western Cape	IL&FS Energy Development Company	Environmental Advisor

Environmental Permitting, S53, Water Use Licence (WUL), Waste Management Licence (WML) & Other Applications

Project Name & Location	Client Name	Role
Biodiversity Permitting for the Power Line between the Tsitikamma Community WEF & the Diep River Substation, Eastern Cape	Cennergi	Project Manager & EAP
Biodiversity Permitting for the West Coast One WEF, Western Cape	Aurora Wind Power	Project Manager & EAP
Environmental Permitting for the Excelsior WEF, Western Cape	BioTherm Energy	Project Manager & EAP
Plant Permits & WULA for the Tsitsikamma Community WEF, Eastern Cape	Cennergi	Project Manager & EAP
S24G and WULA for the Rectification for the commencement of unlawful activities on Ruimsig AH in Honeydew, Gauteng	Hossam Soror	Project Manager & EAP
S24G Application for the Rheboksfontein WEF, Western Cape	Ormonde - Theo Basson	Project Manager & EAP
S53 Application & WULA for Suurplaat and Gemini WEFs, Northern Cape	Engie	Project Manager & EAP
S53 Application for the Hopefield Community Wind Farm near Hopefield, Western Cape	Umoya Energy	Project Manager & EAP
S53 Application for the Project Blue WEF, Northern Cape	WWK Developments	Project Manager & EAP
S53 for the Oyster Bay WEF, Eastern Cape	RES	Project Manager & EAP
WULA for the Great Karoo Wind Farm, Northern Cape	African Clean Energy Developments (ACED)	Project Manager & EAP

CONVENTIONAL POWER GENERATION PROJECTS (COAL)

Environmental Impact Assessments and Environmental Management Programmes

Project Name & Location	Client Name	Role
Mutsho Power Station near Makhado, Limpopo	Mutsho Consortium	Project Manager & EAP
Coal-fired Power Station near Ogies, Mpumalanga	Ruukki SA	Project Manager & EAP
Thabametsi IPP Coal-fired Power Station, near Lephalale, Limpopo	Axia	Project Manager & EAP
Transalloys Coal-fired Power Station, Mpumalanga	Transalloys	Project Manager & EAP
Tshivasho IPP Coal-fired Power Station (with WML), near Lephalale, Limpopo	Cennergi	Project Manager & EAP
Umbani Coal-fired Power Station, near Kriel, Mpumalanga	ISS Global Mining	Project Manager & EAP

Project Name & Location	Client Name	Role
Waterberg IPP Coal-Fired Power Station near Lephalale, Limpopo	Exxaro Resources	Project Manager & EAP

Basic Assessments

Project Name & Location	Client Name	Role
Coal Stockyard on Medupi Ash Dump Site, Limpopo	Eskom Holdings	Project Manager & EAP
Biomass Co-Firing Demonstration Facility at Arnot Power Station East of Middleburg, Mpumlanaga	Eskom Holdings	Project Manager & EAP

Screening Studies

Project Name & Location	Client Name	Role
Baseload Power Station near Lephalale, Limpopo	Cennergi	Project Manager & EAP
Coal-Fired Power Plant near Delmas, Mpumalanga	Exxaro Resources	Project Manager & EAP
Makhado Power Station, Limpopo	Mutsho Consortium, Limpopo	Project Manager & EAP

Environmental Compliance, Auditing and ECO

Project Name & Location	Client Name	Role
ECO for the Camden Power Station, Mpumalanga	Eskom Holdings	Project Manager

Compliance Advice

Project Name & Location	Client Name	Role
Thabametsi IPP Coal-fired Power Station, near Lephalale, Limpopo	Axia	Environmental Advisor

Environmental Permitting, S53, Water Use Licence (WUL), Waste Management Licence (WML) & Other Applications

Project Name & Location	Client Name	Role
Permit application for the Thabametsi Bulk Water Pipeline, near Lephalale, Limpopo	Axia	Project Manager & EAP
S53 & WULA for the Waterberg IPP Coal-Fired Power Station near Lephalale, Limpopo	Exxaro Resources	Project Manager & EAP
S53 Application for the Tshivasho Coal-fired Power Station near Lephalale, Limpopo	Cennergi	Project Manager & EAP

CONVENTIONAL POWER GENERATION PROJECTS (GAS)

Environmental Impact Assessments and Environmental Management Programmes

Project Name & Location	Client Name	Role
Ankerlig OCGT to CCGT Conversion project &400 kV transmission power line between Ankerlig and the Omega Substation, Western Cape	Eskom Holdings SoC Limited	Project Manager & EAP
Gourikwa OCGT to CCGT Conversion project & 400kV transmission power line between Gourikwa & Proteus Substation, Western Cape	Eskom Holdings SoC Limited	Project Manager & EAP
Richards Bay Gas to Power Combined Cycle Power Station, KwaZulu-Natal	Eskom Holdings SoC Limited	Project Manager & EAP
Richards Bay Gas to Power Plant, KwaZulu-Natal	Richards Bay Gas Power 2	Project Manager & EAP
Decommissioning & Recommissioning of 3 Gas Turbine Units at Acacia Power Station & 1 Gas Turbine Unit at Port Rex Power Station to the existing	Eskom Holdings	Project Manager & EAP

Project Name & Location	Client Name	Role
Ankerlig Power Station in Atlantis Industria, Western Cape		
320MW gas-to-power station in Richards Bay, KwaZulu-Natal	Phinda Power Projects	Project Manager & EAP

Screening Studies

Project Name & Location	Client Name	Role
Fatal Flaw Analysis for 3 area identified for the establishment of a 500MW CCGT Power Station	Globeleq Advisors Limited	Project Manager & EAP
Richards Bay Gas to Power Combined Cycle Power Station, KwaZulu-Natal	Eskom Holdings SoC Limited	Project Manager & EAP

GRID INFRASTRUCTURE PROJECTS

Environmental Impact Assessments and Environmental Management Programmes

Project Name & Location	Client Name	Role
Aggeneis-Oranjemond Transmission Line & Substation Upgrade, Northern Cape	Eskom Transmission	Project Manager & EAP
Ankerlig-Omega Transmission Power Lines, Western Cape	Eskom Transmission	Project Manager & EAP
Karoshoek Grid Integration project as part of the Karoshoek Solar Valley Development East of Upington, Northern Cape	FG Emvelo	Project Manager & EAP
Koeberg-Omega Transmission Power Lines,, Western Cape	Eskom Transmission	Project Manager & EAP
Koeberg-Stikland Transmission Power Lines, Western Cape	Eskom Transmission	Project Manager & EAP
Kyalami Strengthening Project, Gauteng	Eskom Transmission	Project Manager & EAP
Mokopane Integration Project, Limpopo	Eskom Transmission	Project Manager & EAP
Saldanha Bay Strengthening Project, Western Cape	Eskom Transmission	Project Manager & EAP
Steelpoort Integration Project, Limpopo	Eskom Transmission	Project Manager & EAP
Transmission Lines from the Koeberg-2 Nuclear Power Station site, Western Cape	Eskom Transmission	Project Manager & EAP
Tshwane Strengthening Project, Phase 1, Gauteng	Eskom Transmission	Project Manager & EAP
Main Transmission Substation (MTS) associated with the Choje Wind Farm cluster, Eastern Cape	Wind Relic	Project Manager & EAP

Basic Assessments

Project Name & Location	Client Name	Role
Dassenberg-Koeberg Power Line Deviation from the Koeberg to the Ankerlig Power Station, Western Cape	Eskom Holdings	Project Manager & EAP
Golden Valley II WEF Power Line & Substation near Cookhouse, Eastern Cape	BioTherm Energy	Project Manager & EAP
Golden Valley WEF Power Line near Cookhouse, Eastern Cape	BioTherm Energy	Project Manager & EAP
Karoshoek Grid Integration project as part of the Karoshoek Solar Valley Development East of Upington, Northern Cape	FG Emvelo	Project Manager & EAP

Project Name & Location	Client Name	Role
Konkoonsies II PV SEF Power Line to the Paulputs Substation near Pofadder, Northern Cape	BioTherm Energy	Project Manager & EAP
Perdekraal West WEF Powerline to the Eskom Kappa Substation, Westnern Cape	BioTherm Energy	Project Manager & EAP
Rheboksfontein WEF Powerline to the Aurora Substation, Western Cape	Moyeng Energy	Project Manager & EAP
Soetwater Switching Station near Sutherland, Northern Cape	African Clean Energy Developments (ACED)	Project Manager & EAP
Solis Power I Power Line & Switchyard Station near Upington, Northern Cape	Brightsource	Project Manager & EAP
Stormwater Canal System for the Ilanga CSP near Upington, Northern Cape	Karoshoek Solar One	Project Manager & EAP
Tsitsikamma Community WEF Powerline to the Diep River Substation, Eastern Cape	Eskom Holdings	Project Manager & EAP
Two 132kV Chickadee Lines to the new Zonnebloem Switching Station, Mpumalanga	Eskom Holdings	Project Manager & EAP
Electrical Grid Infrastructure for the Kolkies and Sadawa PV clusters, Western Cape	Mainstream Renewable Energy Developments	Project Manager & EAP
Sadawa Collector substation, Western Cape	Mainstream Renewable Energy Developments	Project Manager & EAP
Electrical Grid Infrastructure for the Vrede and Rondavel PV facilities, Free State	Mainstream Renewable Energy Developments	Project Manager & EAP

Environmental Compliance, Auditing and ECO

Project Name & Location	Client Name	Role
ECO for the construction of the Ferrum-Mookodi Transmission Line, Northern Cape and North West	Trans-Africa Projects on behalf of Eskom	Project Manager
EO for the construction of the Gamma-Kappa Section A Transmission Line, Western Cape	Trans-Africa Projects on behalf of Eskom	Project Manager
EO for the construction of the Gamma-Kappa Section B Transmission Line, Western Cape	Trans-Africa Projects on behalf of Eskom	Project Manager
EO for the construction of the Hydra IPP Integration project, Northern Cape	Trans-Africa Projects on behalf of Eskom	Project Manager
EO for the construction of the Kappa-Sterrekus Section C Transmission Line, Western Cape	Trans-Africa Projects on behalf of Eskom	Project Manager
EO for the construction of the Namaqualand Strengthening project in Port Nolloth, Western Cape	Trans-Africa Projects on behalf of Eskom	Project Manager
ECO for the construction of the Neptune Substation Soil Erosion Mitigation Project, Eastern Cape	Eskom	Project Manager
ECO for the construction of the Ilanga-Gordonia 132kV power line, Northern Cape	Karoshoek Solar One	Project Manager

Environmental Permitting, S53, Water Use Licence (WUL), Waste Management Licence (WML) & Other Applications

Project Name & Location	Client Name	Role
Environmental Permitting and WULA for the Rockdale B Substation & Loop in Power Lines,	Eskom Holdings	Project Manager & EAP
Environmental Permitting and WULA for the Steelpoort Integration project, Limpopo	Eskom Holdings	Project Manager & EAP
Environmental Permitting for Solis CSP near Upington, Northern Cape	Brightsource	Project Manager & EAP

MINING SECTOR PROJECTS

Environmental Impact Assessments and Environmental Management Programmes

Project Name & Location	Client Name	Role
Elitheni Coal Mine near Indwe, Eastern Cape	Elitheni Coal	Project Manager & EAP
Groot Letaba River Development Project Borrow Pits	liso	Project Manager & EAP
Grootegeluk Coal Mine for coal transportation infrastructure between the mine and Medupi Power Station (EMPr amendment) , Limpopo	Eskom Holdings	Project Manager & EAP
Waterberg Coal Mine (EMPr amendment), Limpopo	Seskoko Resources	Project Manager & EAP
Aluminium Plant WML & AEL, Gauteng	GfE-MIR Alloys & Minerals	Project Manager & EAP

Basic Assessments

Project Name & Location	Client Name	Role
Rare Earth Separation Plant in Vredendal, Western Cape	Rareco	Project Manager & EAP
Decommissioning and Demolition of Kilns 5 & 6 at the Slurry Plant, Kwa-Zulu Natal	PPC	Project Manager & EAP

Environmental Compliance, Auditing and ECO

Project Name & Location	Client Name	Role
ECO for the construction of the Duhva Mine Water Recovery Project, Mpumalanga	Eskom Holdings SoC Limited	Project Manager
External compliance audit of Palesa Coal Mine's Integrated Water Use License (IWUL), near KwaMhlanga, Mpumalanga	HCI Coal	Project Manager
External compliance audit of Palesa Coal Mine's Waste Management License (WML) and EMP, near KwaMhlanga, Mpumalanga	HCI Coal	Project Manager
External compliance audit of Mbali Coal Mine's Integrated Water Use License (IWUL), near Ogies, Mpumalanga	HCI Coal	Project Manager
Independent External Compliance Audit of Water Use License (WUL) for the Tronox Namakwa Sands (TNS) Mining Operations (Brand se Baai), Western Cape	Tronox Namakwa Sands	Project Manager
Independent External Compliance Audit of Water Use License (WUL) for the Tronox Namakwa Sands (TNS) Mineral Separation Plant (MSP), Western Cape	Tronox Namakwa Sands	Project Manager
Independent External Compliance Audit of Water Use License (WUL) for the Tronox Namakwa Sands (TNS) Smelter Operations (Saldanha), Western Cape	Tronox Namakwa Sands	Project Manager
Compliance Auditing of the Waste Management Licence for the PetroSA Landfill Site at the GTL Refinery, Western Cape	PetroSA	Project Manager

Environmental Permitting, S53, Water Use Licence (WUL), Waste Management Licence (WML) & Other Applications

Project Name & Location	Client Name	Role
Waste Licence Application for the Rare Earth Separation Plant in Vredendal, Western Cape	Rareco	Project Manager & EAP

WULA for the Expansion of the Landfill site at Exxaro's Namakwa Sands Mineral Separation Plant, Western Cape	Exxaro Resources	Project Manager & EAP
S24G & WML for an Aluminium Plant, Gauteng	GfE-MIR Alloys & Minerals	Project Manager & EAP

INFRASTRUCTURE DEVELOPMENT PROJECTS (BRIDGES, PIPELINES, ROADS, WATER RESOURCES, STORAGE, ETC)

Environmental Impact Assessments and Environmental Management Programmes

Project Name & Location	Client Name	Role
Bridge across the Ngotwane River, on the border of South Africa and Botswana	Eskom Holdings	Project Manager & EAP
Chemical Storage Tanks, Metallurgical Plant Upgrade & Backfill Plant upgrade at South Deep Gold Mine, near Westornaria, Gauteng	Goldfields	Project Manager & EAP
Expansion of the existing Welgedacht Water Care Works, Gauteng	ERWAT	Project Manager & EAP
Golden Valley WEF Access Road near Cookhouse, Eastern Cape	BioTherm Energy	Project Manager & EAP
Great Fish River Wind Farm Access Roads and Watercourse Crossings near Cookhouse, Eastern Cape	African Clean Energy Developments (ACED)	Project Manager & EAP
Ilanga CSP Facility Watercourse Crossings near Upington, Northern Cape	Karoshoek Solar one	Project Manager & EAP
Modification of the existing Hartebeestfontein Water Care Works, Gautng	ERWAT	Project Manager & EAP
N10 Road Realignment for the Ilanga CSP Facility, East of Upington, Northern Cape	SANRAL	Project Manager & EAP
Nxuba (Bedford) Wind Farm Watercourse Crossings near Cookhouse, Eastern Cape	African Clean Energy Developments (ACED)	Project Manager & EAP
Pollution Control Dams at the Medupi Power Station Ash Dump & Coal Stockyard, Limpopo	Eskom	Project Manager & EAP
Qoboshane borrow pits (EMPr only), Eastern Cape	Emalahleni Local Municipality	Project Manager & EAP
Tsitsikamma Community WEF Watercourse Crossings, Eastern Cape	Cennergi	Project Manager & EAP
Clayville Central Steam Plant, Gauteng	Bellmall Energy	Project Manager & EAP
Msenge Emoyeni Wind Farm Watercourse Crossings and Roads, Eastern Cape	Windlab	Project Manager & EAP

Basic Assessments

Project Name & Location	Client Name	Role
Harmony Gold WWTW at Doornkop Mine, Gauteng	Harmony Doornkop Plant	Project Manager & EAP
Ofir-ZX Watercourse Crossing for the Solar PV Facility, near Keimoes, Northern Cape	Networx S28 Energy	Project Manager & EAP
Qoboshane bridge & access roads, Eastern Cape	Emalahleni Local Municipality	Project Manager & EAP
Relocation of the Assay Laboratory near Carletonville, Gauteng	Sibanye Gold	Project Manager & EAP
Richards Bay Harbour Staging Area, KwaZulu-Natal	Eskom Holdings	Project Manager & EAP
S-Kol Watercourse Crossing for the Solar PV Facility, East of Keimoes, Northern Cape	Networx S28 Energy	Project Manager & EAP
Sonnenberg Watercourse Crossing for the Solar PV Facility, West Keimoes, Northern Cape	Networx S28 Energy	Project Manager & EAP

Project Name & Location	Client Name	Role
Kruisvallei Hydroelectric Power Generation Scheme, Free State	Building Energy	Project Manager & EAP
Masetjaba Water Reservoir, Pump Station and Bulk Supply Pipeline near Nigel, Gauteng	Naidu Consulting Engineers	Project Manager & EAP
Access Road for the Dwarsug Wind Farm, Northern Cape Province	South Africa Mainsteam Renewable Power	Project Manager & EAP

Screening Studies

Project Name & Location	Client Name	Role
Roodepoort Open Space Optimisation Programme (OSOP) Precinct, Gauteng	TIMAC Engineering Projects	Project Manager & EAP
Vegetable Oil Plant and Associated Pipeline, Kwa-Zulu Natal	Wilmar Oils and Fats Africa	Project Manager & EAP

Environmental Compliance, Auditing and ECO

Project Name & Location	Client Name	Role
ECO and bi-monthly auditing for the construction of the Olifants River Water Resources Development Project (ORWRDP) Phase 2A: De Hoop Dam, R555 realignment and housing infrastructure	Department of Water and Sanitation	Project Manager Auditor
ECO for the Rehabilitation of the Blaaupan & Storm Water Channel, Gauteng	Airports Company of South Africa (ACSA)	Project Manager
Due Diligence reporting for the Better Fuel Pyrolysis Facility, Gauteng	Better Fuels	Project Manager
ECO for the Construction of the Water Pipeline from Kendal Power Station to Kendal Pump Station, Mpumalanga	Transnet	Project Manager
ECO for the Replacement of Low-Level Bridge, Demolition and Removal of Artificial Pong, and Reinforcement the Banks of the Crocodile River at the Construction at Walter Sisulu National Botanical Gardens, Gauteng Province	South African National Biodiversity Institute (SANBI)	Project Manager
External Compliance Audit of the Air Emission Licence (AEL) for a depot in Bloemfontein, Free State Province and in Tzaneen, Mpumalanga Province	PetroSA	Project Manager

Environmental Permitting, S53, Water Use Licence (WUL), Waste Management Licence (WML) & Other Applications

Project Name & Location	Client Name	Role
WULA for the Izubulo Private Nature Reserve, Limpopo	Kjell Bismeyer, Jann Bader, Laurence Saad	Project Manager & EAP
WULA for the Masodini Private Game Lode, Limpopo	Masodini Private Game Lodge	Environmental Advisor
WULA for the Ezulwini Private Nature Reserve, Limpopo	Ezulwini Investments	Project Manager & EAP
WULA for the Masodini Private Game Lode, Limpopo	Masodini Private Game Lodge	Project Manager & EAP
WULA for the N10 Realignment at the Ilanga SEF, Northern Cape	Karoshoek Solar One	Project Manager & EAP
WULA for the Kruisvallei Hydroelectric Power Generation Scheme, Free State	Building Energy	Project Manager & EAP

Project Name & Location	Client Name	Role
S24G and WULA for the Ilegal construction of structures within a watercourse on EFF 24 Ruimsig Agricultural Holdings, Gauteng	Sorror Language Services	Project Manager & EAP

HOUSING AND URBAN PROJECTS

Basic Assessments

Project Name & Location	Client Name	Role
Postmasburg Housing Development, Northern Cape	Transnet	Project Manager & EAP

Compliance Advice and reporting

Project Name & Location	Client Name	Role
Kampi ya Thude at the Olifants West Game Reserve, Limpopo	Nick Elliot	Environmental Advisor
External Compliance Audit of WUL for the Johannesburg Country Club, Gauteng	Johannesburg Country Club	Project Manager

Environmental Compliance, Auditing and ECO

Project Name & Location	Client Name	Role
Due Diligence Audit for the Due Diligence Audit Report, Gauteng	Delta BEC (on behalf of Johannesburg Development Agency (JDA))	Project Manager

ENVIRONMENTAL MANAGEMENT TOOLS

Project Name & Location	Client Name	Role
Development of the 3rd Edition Environmental Implementation Plan (EIP)	Gauteng Department of Agriculture and Rural Development (GDARD)	Project Manager & EAP
Development of Provincial Guidelines on 4x4 routes, Western Cape	Western Cape Department of Environmental Affairs and Development Planning	EAP
Compilation of Construction and Operation EMP for the Braamhoek Transmission Integration Project, Kwazulu-Natal	Eskom Holdings	Project Manager & EAP
Compilation of EMP for the Wholesale Trade of Petroleum Products, Gauteng	Munaca Technologies	Project Manager & EAP
Operational Environmental Management Programme (OEMP) for Medupi Power Station, Limpopo	Eskom Holdings	Project Manager & EAP
Operational Environmental Management Programme (OEMP) for the Dube TradePort Site Wide Precinct	Dube TradePort Corporation	Project Manager & EAP
Operational Environmental Management Programme (OEMP) for the Kusile Power Station, Mpumalanga	Eskom Holdings	Project Manager & EAP
Review of Basic Assessment Process for the Wittekleibosch Wind Monitoring Mast, Eastern Cape	Exxaro Resources	Project Manager & EAP
Revision of the EMPr for the Sirius Solar PV	Aurora Power Solutions	Project Manager & EAP

Project Name & Location	Client Name	Role
State of the Environment (SoE) for Emalahleni Local Municipality, Mpumalanga	Simo Consulting on behalf of Emalahleni Local Municipality	Project Manager & EAP
Aspects and Impacts Register for Salberg Concrete Products operations	Salberg Concrete Products	EAP
First State of Waste Report for South Africa	Golder on behalf of the Department of Environmental Affairs	Project Manager & EAP
Responsibilities Matrix and Gap Analysis for the Kruisvallei Hydroelectric Power Generation Scheme, Free State Province	Building Energy	Project Manager
Responsibilities Matrix and Gap Analysis for the Roggeveld Wind Farm, Northern & Western Cape Provinces	Building Energy	Project Manager

PROJECTS OUTSIDE OF SOUTH AFRICA

Project Name & Location	Client Name	Role
Advisory Services for the Zizabona Transmission Project, Zambia, Zimbabwe, Botswana & Namibia	PHD Capital	Advisor
EIA for the Semonkong WEF, Lesotho	MOSCET	Project Manager & EAP
EMP for the Kuvaninga Energia Gas Fired Power Project, Mozambique	ADC (Pty) Ltd	Project Manager & EAP
Environmental Screening Report for the SEF near Thabana Morena, Lesotho	Building Energy	EAP
EPBs for the Kawambwa, Mansa, Mwense and Nchelenge SEFs in Luapula Province, Zambia	Building Energy	Project Manager & EAP
ESG Due Diligence for the Hilton Garden Inn Development in Windhoek, Namibia	Vatange Capital	Project Manager
Mandahill Mall Rooftop PV SEF EPB, Lusaka, Zambia	Building Energy	Project Manager & EAP
Monthly ECO for the PV Power Plant for the Mocuba Power Station	Scatec	Project Manager

APPENDIX K:
APPLICABLE LEGISLATION

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
National Legislation			
Constitution of the Republic of South Africa (No. 108 of 1996)	In terms of Section 24, the State has an obligation to give effect to the environmental right. The environmental right states that: "*Everyone has the right –* » *To an environment that is not harmful to their health or well-being, and* » *To have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that:* ∗ *Prevent pollution and ecological degradation,* ∗ *Promote conservation, and* ∗ *Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development*."	Applicable to all authorities	There are no permitting requirements associated with this Act. The application of the Environmental Right however implies that environmental impacts associated with proposed development are considered separately and cumulatively. It is also important to note that the "right to an environment clause" includes the notion that justifiable economic and social development should be promoted, through the use of natural resources and ecologically sustainable development.
National Environmental Management Act (No. 107 of 1998) (NEMA)	The 2014 EIA Regulations have been promulgated in terms of Chapter 5 of NEMA. Listed activities which may not commence without EA are identified within the Listing Notices (GNR 327, GNR 325 and GNR 324) which form part of these Regulations (GNR 326). In terms of Section 24(1) of NEMA, the potential impact on the environment associated with these listed activities must be assessed and reported on to the competent authority charged by NEMA with granting of the relevant environmental authorisation. Considering the capacity of the proposed Merino Wind Farm (i.e., contracted capacity of 140MW) and the triggering of Activity 1 of Listing Notice 2 (GNR 325), a full Scoping and EIA process is required in support of the Application for EA.	DFFE – Competent Authority Northern Cape DAEARD&LR – Commenting Authority	The listed activities triggered by the proposed project have been identified and are being assessed as part of the EIA process currently underway for the project. The EIA process will culminate in the submission of a Final EIA Report to the DFFE for decision-making.

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
National Environmental Management Act (No 107 of 1998) (NEMA)	In terms of the "Duty of Care and Remediation of Environmental Damage" provision in Section 28(1) of NEMA every person who causes, has caused or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring, or, in so far as such harm to the environment is authorised by law or cannot reasonably be avoided or stopped, to minimise and rectify such pollution or degradation of the environment. In terms of NEMA, it is the legal duty of a project proponent to consider a project holistically, and to consider the cumulative effect of a variety of impacts.	DFFE Northern Cape DAEARD&LR	While no permitting or licensing requirements arise directly by virtue of the proposed project, this section finds application through the consideration of potential cumulative, direct, and indirect impacts. It will continue to apply throughout the life cycle of the project.
Environment Conservation Act (No. 73 of 1989) (ECA)	The Noise Control Regulations in terms of Section 25 of the ECA contain regulations applicable for the control of noise in the Provinces of Limpopo, North West, Mpumalanga, Northern Cape, Eastern Cape, and KwaZulu-Natal Provinces. The Noise Control Regulations cover the powers of a local authority, general prohibitions, prohibitions of disturbing noise, prohibitions of noise nuisance, use of measuring instruments, exemptions, attachments, and penalties. In terms of the Noise Control Regulations, no person shall make, produce, or cause a disturbing noise, or allow it to be made, produced or caused by any person, machine, device or apparatus or any combination thereof (Regulation 04).	DFFE Northern Cape DAEARD&LR Ubuntu Local Municipality	Noise impacts are expected to be associated with the construction and operation phases of the project. A Noise Impact Assessment (**Appendix I**) has been undertaken for the Merino Wind Farm which indicates that the impact of the project from a noise perspective will be of low significance.
National Water Act (No. 36 of 1998) (NWA)	A water use listed under Section 21 of the NWA must be licensed with the Regional DWS, unless it is listed in Schedule 1 of the NWA (i.e. is an existing lawful use), is permissible under a GA, or if a responsible authority waives the need for a licence.	Regional Department of Water and Sanitation	Watercourses are present within the development area of the Merino Wind Farm as identified in the Aquatic Impact Assessment (**Appendix G**). As a result, a water use authorisation for the project will

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	Water use is defined broadly, and includes consumptive and non-consumptive water uses, taking and storing water, activities which reduce stream flow, waste discharges and disposals, controlled activities (activities which impact detrimentally on a water resource), altering a watercourse, removing water found underground for certain purposes, and recreation. Consumptive water uses may include taking water from a water resource (Section 21(a)) and storing water (Section 21(b)). Non-consumptive water uses may include impeding or diverting of flow in a water course (Section 21(c)), and altering of bed, banks or characteristics of a watercourse (Section 21(i)).		be required from the DWS; however, the process will only be completed once a positive EA has been received and the project selected as Preferred Bidder by the DMRE or a private offtaker. This is in line with the requirements from the DWS.
Minerals and Petroleum Resources Development Act (No. 28 of 2002) (MPRDA)	In accordance with the provisions of the MPRDA a mining permit is required in accordance with Section 27(6) of the Act where a mineral in question is to be mined, including the mining of materials from a borrow pit.	Department of Mineral Resources and Energy (DMRE)	Any person who wishes to apply for a mining permit in accordance with Section 27(6) must simultaneously apply for an Environmental Authorisation in terms of NEMA. No borrow pits are expected to be required for the construction of the project, and as a result a mining permit or EA in this regard is not required to be obtained.
	Section 53 of the MPRDA states that any person who intends to use the surface of any land in any way which may be contrary to any object of the Act, or which is likely to impede any such object must apply to the Minister for approval in the prescribed manner.		In terms of Section 53 of the MPRDA, approval is required from the Minister of Mineral Resources and Energy to ensure that the proposed development does not sterilise a mineral resource that might occur on site.
National Environmental Management: Air Quality Act (No. 39 of 2004) (NEM:AQA)	The National Dust Control Regulations (GNR 827) published under Section 32 of NEM:AQA prescribe the general measures for the control of dust in all areas, and	Northern Cape DAEARD&LR / Pixley ka Seme District Municipality	In the event that the project results in the generation of excessive levels of dust, the possibility could exist that a dustfall monitoring programme would be

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	provide a standard for acceptable dustfall rates for residential and non-residential areas. In accordance with the Regulations (GNR 827) any person who conducts any activity in such a way as to give rise to dust in quantities and concentrations that may exceed the dustfall standard set out in Regulation 03 must, upon receipt of a notice from the air quality officer, implement a dustfall monitoring programme. Any person who has exceeded the dustfall standard set out in Regulation 03 must, within three months after submission of the dustfall monitoring report, develop and submit a dust management plan to the air quality officer for approval.		required for the project, in which case dustfall monitoring results from the dustfall monitoring programme would need to be included in a dust monitoring report, and a dust management plan would need to be developed.
National Heritage Resources Act (No. 25 of 1999) (NHRA)	Section 07 of the NHRA stipulates assessment criteria and categories of heritage resources according to their significance. Section 35 of the NHRA provides for the protection of all archaeological and palaeontological sites, and meteorites. Section 36 of the NHRA provides for the conservation and care of cemeteries and graves by SAHRA where this is not the responsibility of any other authority. Section 38 of the NHRA lists activities which require developers or any person who intends to undertake a listed activity to notify the responsible heritage resources authority and furnish it with details regarding the location, nature, and extent of the proposed development. Section 44 of the NHRA requires the compilation of a Conservation Management Plan as well as a permit from	South African Heritage Resources Agency (SAHRA) Ngwao Boswa Kapa Bokone (NBKB) – provincial heritage authority	A full Heritage Impact Assessment has been undertaken as part of the EIA process (refer to **Appendix I** of this EIA Report). Sites of varying significance have been identified within the development area and specific mitigation measures have been recommended by the specialist with regards to each identified find. Furthermore, the site was found to form part of an intact cultural landscape representative of the Central Plateau of the Great Karoo possessing heritage value for historical, aesthetic, architectural, social and scientific reasons. Sensitive areas identified in this regard have been avoided by the layout. Should a heritage resource be impacted upon, a permit may be required from SAHRA or Ngwao Boswa Kapa Bokone (NBKB) in accordance with Section 48 of

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	SAHRA for the presentation of archaeological sites as part of tourism attraction.		the NHRA, and the SAHRA Permit Regulations (GN R668). This will be determined as part of the final walk-through survey once the final location of the development footprint and its associated infrastructure has been determined.
National Environmental Management: Biodiversity Act (No. 10 of 2004) (NEM:BA)	Section 53 of NEM:BA provides for the MEC / Minister to identify any process or activity in such a listed ecosystem as a threatening process. Three government notices have been published in terms of Section 56(1) of NEM:BA as follows: » Commencement of TOPS Regulations, 2007 (GNR 150). » Lists of critically endangered, vulnerable and protected species (GNR 151). » TOPS Regulations (GNR 152). It provides for listing threatened or protected ecosystems, in one of four categories: critically endangered (CR), endangered (EN), and 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 (NEM:BA: National list of ecosystems that are threatened and in need of protection, (Government Gazette 37596, GNR 324), 29 April 2014).	DFFE Northern Cape DAEARD&LR	Under NEM:BA, a permit would be required for any activity that is of a nature that may negatively impact on the survival of a listed protected species. An Ecological Impact Assessment has been undertaken as part of the EIA process (**Appendix D**). No protected species which require a permit under the NEM:BA were identified within the development area.

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
National Environmental Management: Biodiversity Act (No. 10 of 2004) (NEM:BA)	Chapter 5 of NEM:BA pertains to alien and invasive species, and states that a person may not carry out a restricted activity involving a specimen of an alien species without a permit issued in terms of Chapter 7 of NEM:BA, and that a permit may only be issued after a prescribed assessment of risks and potential impacts on biodiversity is carried out. Applicable, and exempted alien and invasive species are contained within the Alien and Invasive Species List (GNR 864).	DFFE Northern Cape DAEAR&LR	An Ecological Impact Assessment (**Appendix D**) was undertaken as part of the EIA process to identify any alien invasive plants present on site. No alien and invasive species listed under the Alien and Invasive Species List were recorded within the development area.
Conservation of Agricultural Resources Act (No. 43 of 1983) (CARA)	Section 05 of CARA provides for the prohibition of the spreading of weeds. Regulation 15 of GN R1048 published under CARA provides for the classification of categories of weeds and invader plants, and restrictions in terms of where these species may occur. Regulation 15E of GN R1048 published under CARA provides requirement and methods to implement control measures for different categories of alien and invasive plant species.	Department of Agriculture, Land Reform and Rural Development (DALRD)	CARA will find application throughout the life cycle of the project. In this regard, soil erosion prevention and soil conservation strategies need to be developed and implemented. In addition, a weed control and management plan must be implemented. In terms of Regulation 15E (GN R1048), where Category 1, 2 or 3 plants occur, a land user is required to control such plants by means of one or more of the following methods: » Uprooting, felling, cutting or burning. » Treatment with a weed killer that is registered for use in connection with such plants in accordance with the directions for the use of such a weed killer. » Biological control carried out in accordance with the stipulations of the Agricultural Pests Act (No. 36 of 1983), the ECA and any other applicable legislation.

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
			» Any other method of treatment recognised by the executive officer that has as its object the control of plants concerned, subject to the provisions of sub-regulation 4. » A combination of one or more of the methods prescribed, save that biological control reserves and areas where biological control agents are effective shall not be disturbed by other control methods to the extent that the agents are destroyed or become ineffective.
National Forests Act (No. 84 of 1998) (NFA)	According to this Act, the Minister may declare a tree, group of trees, woodland or a species of trees as protected. Notice of the List of Protected Tree Species under the National Forests Act (No. 84 of 1998) was published in GNR 734. 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".	Department of Agriculture, Land Reform and Rural Development (DALRD)	A licence is required for the removal of protected trees. It is therefore necessary to conduct a survey that will determine the number and relevant details pertaining to protected tree species present in the development footprint for the submission of relevant permits to authorities prior to the disturbance of these individuals. An Ecological Impact Assessment undertaken as part of the EIA included the identification of any protected tree species which may require a license in terms of the NFA (No. 84 of 1998) within the development area (refer to **Appendix D** of this EIA Report). There is a single species protected under the National Forest Act that is known to have a geographical distribution in the area, namely *Boscia albitrunca*.

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
National Veld and Forest Fire Act (No. 101 of 1998) (NVFFA)	Chapter 4 of the NVFFA places a duty on owners to prepare and maintain firebreaks, the procedure in this regard, and the role of adjoining owners and the fire protection association. Provision is also made for the making of firebreaks on the international boundary of the Republic of South Africa. The applicant must ensure that firebreaks are wide and long enough to have a reasonable chance of preventing a veldfire from spreading to or from neighbouring land, it does not cause soil erosion, and it is reasonably free of inflammable material capable of carrying a veldfire across it. Chapter 5 of the Act places a duty on all owners to acquire equipment and have available personnel to fight fires. Every owner on whose land a veldfire may start or burn or from whose land it may spread must have such equipment, protective clothing and trained personnel for extinguishing fires, and ensure that in his or her absence responsible persons are present on or near his or her land who, in the event of fire, will extinguish the fire or assist in doing so, and take all reasonable steps to alert the owners of adjoining land and the relevant fire protection association, if any.	DFFE	While no permitting or licensing requirements arise from this legislation, this Act will be applicable during the construction and operation of the Merino Wind Farm, in terms of the preparation and maintenance of firebreaks, and the need to provide appropriate equipment and trained personnel for firefighting purposes.
Hazardous Substances Act (No. 15 of 1973) (HAS)	This Act regulates the control of substances that may cause injury, or ill health, or death due to their toxic, corrosive, irritant, strongly sensitising or inflammable nature or the generation of pressure thereby in certain instances and for the control of certain electronic products. To provide for the rating of such substances or products in relation to the degree of danger, to provide for the prohibition and control of the importation, manufacture, sale, use, operation, modification, disposal or dumping of such substances and products.	Department of Health (DoH)	It is necessary to identify and list all Group I, II, III, and IV hazardous substances that may be on site and in what operational context they are used, stored or handled. If applicable, a license would be required to be obtained from the DoH.

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	» 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 as Group I or Group II substance » Group IV: any electronic product, and » Group V: any radioactive material. The use, conveyance, or storage of any hazardous substance (such as distillate fuel) is prohibited without an appropriate license being in force.		
National Environmental Management: Waste Act (No. 59 of 2008) (NEM:WA)	The Minister may by notice in the Gazette publish a list of waste management activities that have, or are likely to have, a detrimental effect on the environment. The Minister may amend the list by – » Adding other waste management activities to the list. » Removing waste management activities from the list. » Making other changes to the particulars on the list. In terms of the Regulations published in terms of NEM:WA (GNR 912), a BA or EIA is required to be undertaken for identified listed activities. Any person who stores waste must at least take steps, unless otherwise provided by this Act, to ensure that: » The containers in which any waste is stored, are intact and not corroded or in » Any other way rendered unlit for the safe storage of waste.	DFFE – Hazardous Waste Northern Cape DAEARD&LR – General Waste	No waste listed activities are triggered by the Merino Wind Farm, therefore, no Waste Management License is required to be obtained. General and hazardous waste handling, storage and disposal will be required during construction and operation. The National Norms and Standards for the Storage of Waste (GNR 926) published under Section 7(1)(c) of NEM:WA will need to be considered in this regard.

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	» Adequate measures are taken to prevent accidental spillage or leaking. » The waste cannot be blown away. » Nuisances such as odour, visual impacts and breeding of vectors do not arise, and » Pollution of the environment and harm to health are prevented.		
National Road Traffic Act (No. 93 of 1996) (NRTA)	The technical recommendations for highways (TRH 11): "Draft Guidelines for Granting of Exemption Permits for the Conveyance of Abnormal Loads and for other Events on Public Roads" outline the rules and conditions which apply to the transport of abnormal loads and vehicles on public roads and the detailed procedures to be followed in applying for exemption permits are described and discussed. 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. 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.	South African National Roads Agency (SANRAL) – national roads Northern Cape Department of Transport, Safety and Liaison	An abnormal load / vehicle permit may be required to transport the various components to site for construction. These include route clearances and permits required for vehicles carrying abnormally heavy or abnormally dimensioned loads and transport vehicles exceeding the dimensional limitations (length) of 22m. Depending on the trailer configuration and height when loaded, some of the on-site substation and BESS components may not meet specified dimensional limitations (height and width) which will require a permit.
Provincial Policies / Legislation			
Northern Cape Nature Conservation Act (Act No. 9 of 2009)	This Act provides for the sustainable utilisation of wild animals, aquatic biota and plants; provides for the implementation of the Convention on International Trade in Endangered Species of Wild Fauna and Flora; provides for offences and penalties for contravention of	Northern Cape DAEARD&LR	A collection/destruction permit must be obtained from Northern Cape DAEARD&LR for the removal of any protected plant or animal species found on site.

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	the Act; provides for the appointment of nature conservators to implement the provisions of the Act; and provides for the issuing of permits and other authorisations. Amongst other regulations, the following may apply to the current project: » Boundary fences may not be altered in such a way as to prevent wild animals from freely moving onto or off of a property; » Aquatic habitats may not be destroyed or damaged; » The owner of land upon which an invasive species is found (plant or animal) must take the necessary steps to eradicate or destroy such species; The Act provides lists of protected flora and fauna species for the Province.		An Ecological Impact Assessment has been undertaken as part of the EIA process (refer to **Appendix D**). Plant species protected under this Act were found on site. From the field surveys, this includes the following: Chasmatophyllum musculinum (Aizoaceae), Delosperma lootsbergense (Aizoaceae), Delosperma multiflorum (Aizoaceae), Drosanthemum hispidum (Aizoaceae), Drosanthemum lique (Aizoaceae), Galenia africana (Aizoaceae), Galenia glandulifera (Aizoaceae), Galenia procumbens (Aizoaceae), Galenia pubescens (Aizoaceae), Galenia secunda (Aizoaceae), Hereroa incurva (Aizoaceae), Mesembryanthemum coriarium (Aizoaceae), Mesembryanthemum crystallinum(Aizoaceae), Mesembryanthemum nodiflorum (Aizoaceae), Pleiospilos compactus (Aizoaceae), Ruschia cradockensis(Aizoaceae), Ruschia intricata (Aizoaceae), Ruschia spinosa (Aizoaceae), Trichodiadema attonsum (Aizoaceae), Trichodiadema rogersiae (Aizoaceae), Trichodiadema setuliferum (Aizoaceae), Bulbine abyssinica (Asphodelaceae), ,Haworthia bolusii var. blackbeardiana (Asphodelaceae) Haworthia bolusii var. bolusii (Asphodelaceae), Haworthia marumiana var. marumiana (Asphodelaceae), Haworthiopsis

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
			tessellata (Asphodelaceae) ,Kniphofia stricta (Asphodelaceae) Trachyandra acocksii (Asphodelaceae), Trachyandra karrooica (Asphodelaceae), Aloe broomii (Asphodolaceae), Aloe claviflora (Asphodolaceae), Euphorbia caterviflora (Euphorbiaceae), Euphorbia clavarioides (Euphorbiaceae), Euphorbia decepta (Euphorbiaceae), Euphorbia mauritanica (Euphorbiaceae), Euphorbia rhombifolia (Euphorbiaceae), Euphorbia stellispina (Euphorbiaceae), Pelargonium abrotanifolium (Geraniaceae), Pelargonium alchemilloides (Geraniaceae), Pelargonium aridum (Geraniaceae), Pelargonium karooicum (Geraniaceae), Pelargonium minimum (Geraniaceae), Pelargonium proliferu (Geraniaceae), Pelargonium tragacanthoides (Geraniaceae), Babiana bainesii (Iridaceae), Babiana hypogaea (Iridaceae), Babiana sambucina subsp. sambucina (Iridaceae), Dierama pendulum (Iridaceae), Gethyllis longistyla (Iridaceae), Hesperantha longituba (Iridaceae), Lapeirousia plicata subsp. plicata (Iridaceae), Moraea polystachya(Iridaceae), Romulea macowanii var. alticola (Iridaceae), Syringodea concolor (Iridaceae), Tritonia karooica (Iridaceae), Tritonia laxifolia (Iridaceae).