MERINO WIND FARM

Northern Cape Province

Scoping Report

November 2021

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PROJECT DETAILS

Title	:	Environmental Impact Assessment Process: Scoping Report for the Merino Wind Farm and Associated Infrastructure, Northern Cape Province
Authors	:	Savannah Environmental (Pty) Ltd Mmakoena Mmola Jo-Anne Thomas
Client	:	Great Karoo Renewable Energy (Pty) Ltd
Report Revision	:	Revision 0 – Draft for Public Review
Date	:	November 2021

When used as a reference this report should be cited as: Savannah Environmental (2021) Scoping Report for the Merino Wind Farm and Associated Infrastructure, Northern Cape Province.

PURPOSE OF THE SCOPING REPORT AND INVITATION TO COMMENT

Great Karoo Renewable Energy (Pty) Ltd has appointed Savannah Environmental as the independent environmental consultant to undertake the Scoping and Environmental Impact Assessment (S&EIA) process for the Merino Wind Farm, Northern Cape Province. The EIA process is being undertaken in accordance with the requirements of the 2014 EIA Regulations promulgated in terms of the National Environmental Management Act (No. 107 of 1998) (NEMA).

This Scoping Report represents the findings of the Scoping Phase of the EIA process and contains the following chapters:

- **Chapter 1** provides background to the Merino Wind Farm and the EIA process.
- **Chapter 2** provides a description of the wind farm and infrastructure associated with the facility.
- **Chapter 3** provides the site selection information and identified project alternatives.
- **Chapter 4** describes wind energy as a power generation option and provides insight to technologies for wind energy.
- **Chapter 5** outlines the strategic regulatory and legal context for energy planning in South Africa, and specifically for the proposed facility.
- **Chapter 6** describes the need and desirability of the Merino Wind Farm within the project site.
- **Chapter 7** outlines the process which was followed during the Scoping Phase of the EIA process.
- **Chapter 8** describes the existing biophysical and socio-economic environment affected by the proposed facility.
- **Chapter 9** provides an identification and evaluation of the potential issues associated with the proposed Merino Wind Farm and associated infrastructure.
- **Chapter 10** presents the conclusions of the Scoping Report.
- **Chapter 11** describes the Plan of Study for EIA Phase.
- **Chapter 12** provides references used in the compilation of the Scoping Report.

The Scoping Report is available for review from **Friday, 12 November 2021 – Monday, 13 December 2021** on the Savannah Environmental website (https://savannahsa.com/public-documents/energy-generation/the-great-karoo-cluster-of-renewable-energy-facilities/).

Please submit your comments by **13 December 2021** to:
Nicolene Venter of **Savannah Environmental** PO Box 148, Sunninghill, 2157 Tel: 011-656-3237 Mobile: 060 978 8396 Fax: 086-684-0547 Email: publicprocess@savannahsa.com

Comments can be made as written submission via fax, post or email.

EXECUTIVE SUMMARY

Great Karoo Renewable Energy (Pty) Ltd is proposing the development of a commercial wind farm and associated infrastructure on a site 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 (refer to **Figure 1**). The facility will have a contracted capacity of up to 140MW and will be known as the Merino Wind Farm. The project is planned as part of a larger cluster of renewable energy projects, which include three (3) 100MW PV facilities (known as the Moriri Solar PV, Kwana Solar PV, and Nku Solar PV), an additional 140MW Wind Energy Facility (known as the Angora Wind Farm), as well as grid connection infrastructure connecting the renewable energy facilities to the existing Eskom Gamma Substation (refer to **Figure 2**). These projects are proposed by separate Specialist Purpose Vehicles (SPVs) and are assessed through separate Environmental Impact Assessment (EIA) processes.

A technically feasible 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 ~5 516ha has been identified within the project site by the proponent for the development. The development area consists of four (4) affected properties, which include:

- 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

The full extent of the development area has been considered within this Scoping Report with the aim of determining the suitability from an environmental and social perspective and identifying areas that should be avoided in development planning. Within this identified development area, a development footprint or facility layout will be defined for assessment in the EIA Phase. The development area is larger than the area required for the development footprint of a 140MW wind farm and therefore provides the opportunity for the optimal placement of infrastructure, ensuring avoidance of

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.

Infrastructure associated with the Merino Wind Farm will include:

- Up to 45 wind turbines with a maximum hub height of up to 170m. The tip height of the turbines will be 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 that 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.

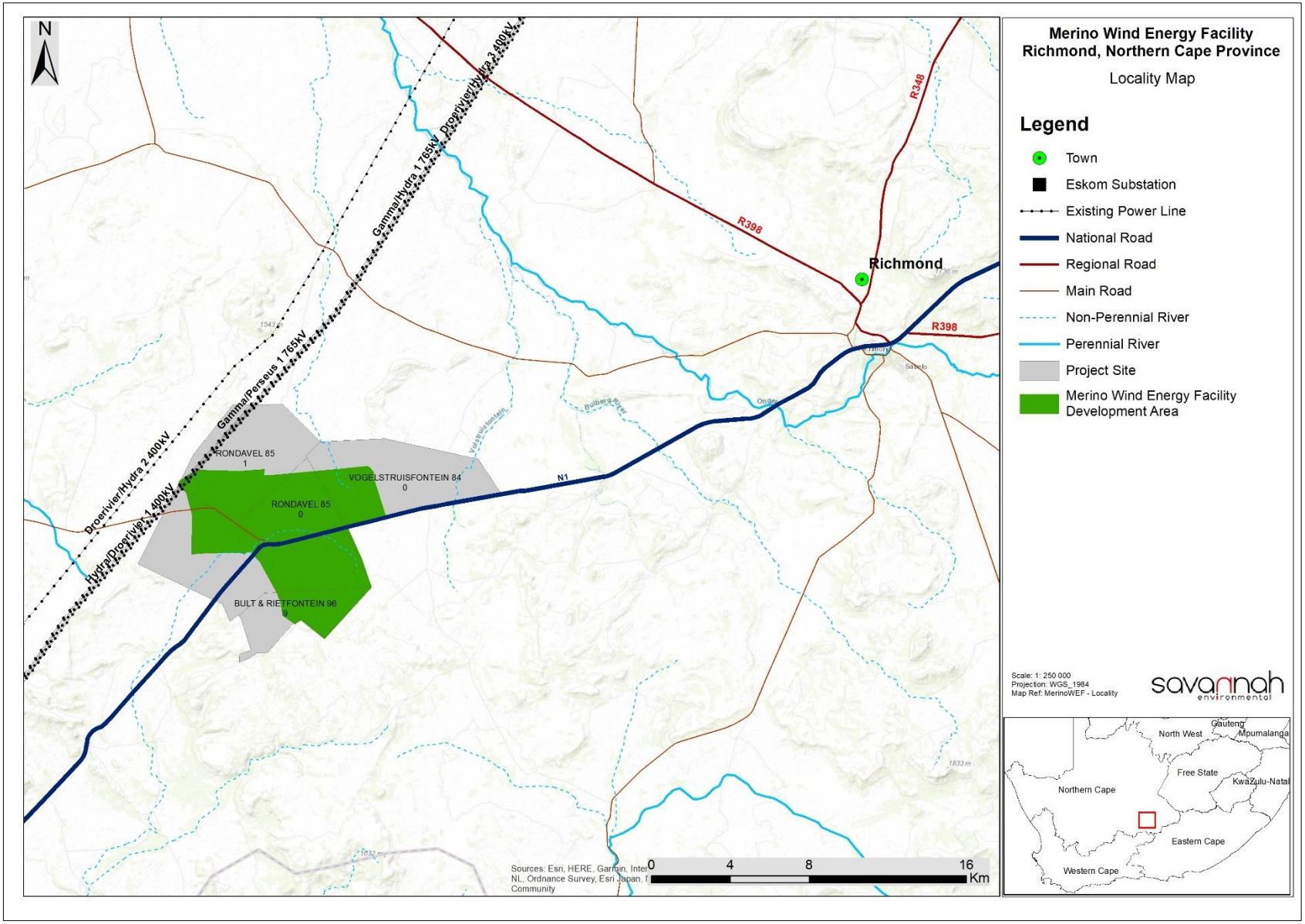

Figure 1: Locality map of the project site within which the Merino Wind Farm is proposed to be developed

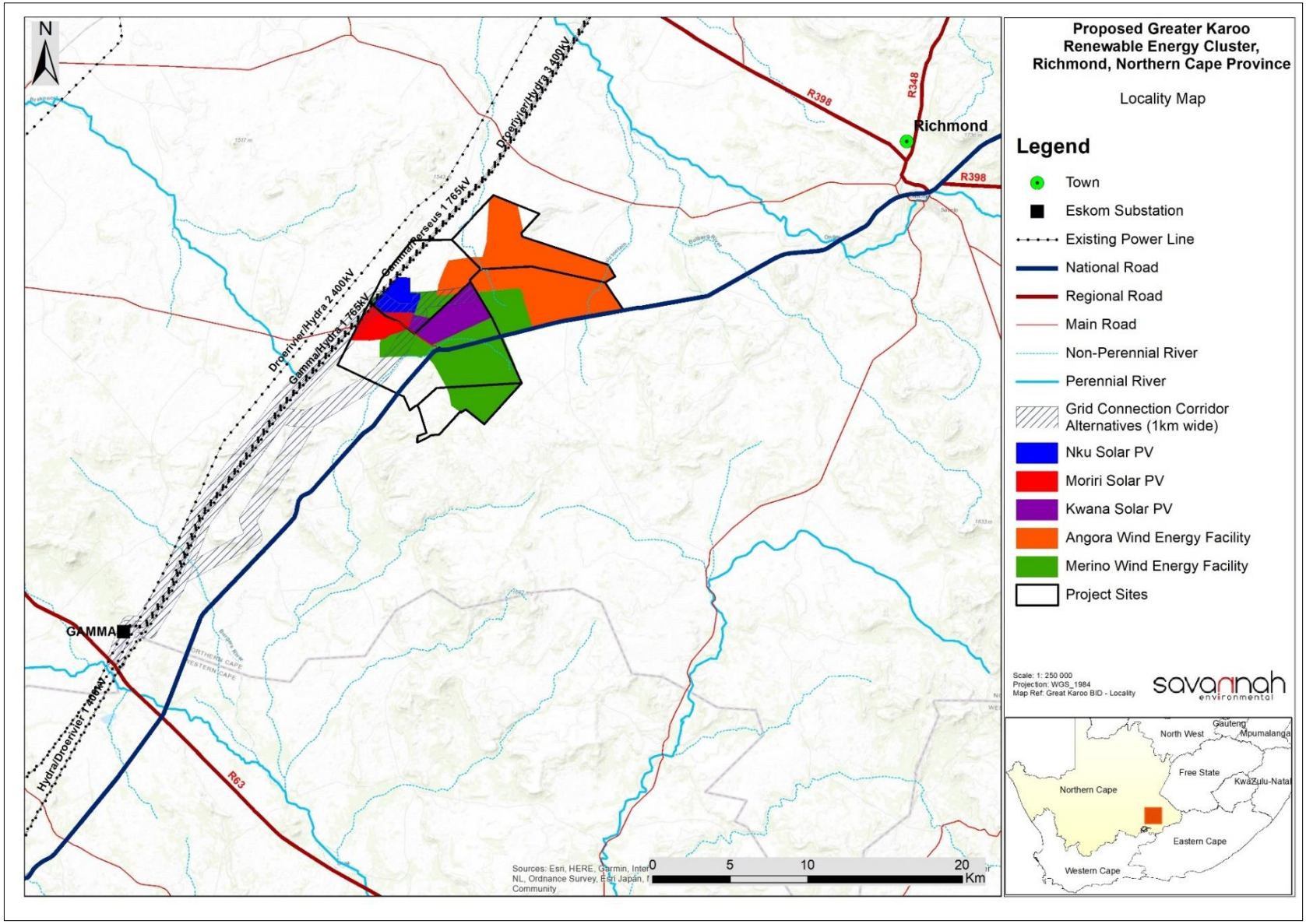

Figure 2: The cluster of proposed renewable energy facilities that the Merino Wind Farm forms part of

1. Environmental Permitting Requirements

The Merino Wind Farm and its associated infrastructure trigger the need for the following environmental permit:

» **An Environmental Authorisation (EA)** from the National Department of Forestry, Fisheries, and the Environment (DFFE), in consultation with the Provincial Northern Cape Department of Agriculture, Environmental Affairs, Rural Development and Land Reform (DAEARD & LR), in accordance with the requirements of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) and Environmental Impact Assessment (EIA) Regulations (GNR 326), 2014, as amended.

Savannah Environmental has been appointed as the Independent Environmental Assessment Practitioner (EAP) in accordance with NEMA and Regulations 21 to 24 of the 2014 EIA Regulations (GNR 326) to undertake the required S&EIA in support of the application for Environmental Authorisation (EA) and the public participation process for the project, in order to identify and assess all potential environmental impacts associated with the proposed wind farm and recommend appropriate mitigation measures in an Environmental Management Programme (EMPr).

An EIA is an effective planning and decision-making tool for the project developer as it allows for the identification and management of potential environmental impacts. It provides the opportunity for the developer to be fore warned of potential environmental issues and allows for the resolution of issues reported on in the Scoping and EIA Reports as well as a dialogue with Interested and Affected Parties (I&APs). Comprehensive, independent environmental specialist studies are required in accordance with the EIA Regulations to provide the competent authority with sufficient information in order to make an informed decision. The EIA process being undertaken for the proposed general waste disposal site comprises two phases – i.e., Scoping and Impact Assessment - and involves the identification and assessment of environmental impacts through specialist studies, as well as public participation. The process followed in these two phases is as follows:

» The **Scoping Phase** includes the identification and description of potential impacts associated with the proposed project through a desktop study and consultation with interested and affected parties and key stakeholders. This phase considers the broader project area in order to identify and delineate any environmental fatal flaws, no-go or sensitive areas, as well as project alternatives in order to determine which should be assessed in more detail in the EIA Phase. Following the public review period of the Scoping Report, this phase culminates in the submission of a final Scoping Report and Plan of Study for the EIA Phase to the competent authority for acceptance and approval to continue with the EIA Phase of the process.

» The **EIA Phase** involves a detailed assessment of potentially significant positive and negative impacts (direct, indirect, and cumulative) identified in the Scoping Phase. This phase considers a proposed development footprint and includes detailed specialist investigations (including field surveys), consideration of feasible alternatives and public consultation. Recommendations of practical and achievable mitigation and management measures are included in an Environmental Management Programme (EMPr) considering all phases of the project. Following the public review period of the EIA Report and EMPr, this phase culminates in the submission of a Final EIA Report and EMPr to the competent authority for review and decision-making.

2. Potential Impacts Identified

Potential impacts associated with the development of the Merino Wind Farm are expected to occur during both the construction and operation phases. The conclusion of the findings of the Scoping Study is that the potential impacts identified to be associated with the construction and operation of the Merino Wind Farm are anticipated to be at a site or localised level, with few impacts extending from a local to national extent which includes both positive and negative impacts. The following provides a summary of the findings of the specialist studies undertaken:

» *Ecology: T*he extent of the ecological impacts identified during the Scoping Phase is local to regional, and the significance of the impacts (at the scoping stage) is considered to be low, medium, or high pre-mitigation. If appropriate mitigation measures are put in place, it is probable that most impacts will have low to medium significance. Impacts identified include disturbance/destruction to and loss of vegetation and fauna, introduction and/or spread of declared weeds and alien invasive plants, as well as increased runoff and erosion.

» *Freshwater Features:* The extent of the impacts on the freshwater features is regional and the significance of the impacts (at the scoping stage) is considered to be low, subject to the avoidance of the highly sensitive features and their associated buffer zones, as well as implementation of mitigation measures. The impacts identified include disturbance / degradation / loss to wetland soils or vegetation due to the construction of the facility and associated infrastructure, such as crossings, and increased erosion and sedimentation, as well as the contamination of surface water resources.

» *Bats:* The extent of the impacts on bats identified during the Scoping Phase is limited to the site and in some cases regional. The significance of the impacts (at the scoping stage) will be from high pre-mitigation but can be reduced to low to medium signifiance subject to the avoidance of the identified no-go areas. The impacts include, foraging habitat destruction, bat roost disturbance/destruction, and increased bat mortality due to light pollution and moving turbine blades.

» *Avifauna:* The extent of the avifaunal impacts identified during the Scoping Phase is local to regional and the significance of the impacts (at the scoping stage) is considered to be low to medium, subject to the avoidance of the identified no-go areas and the implementation of appropriate mitigation. The impacts include the displacement and mortality of priority species due to construction activities, the transformation of habitat, collisions with wind turbines and the medium voltage internal reticulation network, as well as electrocution on the medium voltage internal reticulation network.

» *Soils and Agricultural Potential:* The extent of the soils and agricultural potential impacts identified during the Scoping Phase is regional and the significance of the impacts (at the scoping stage) will be low post-mitigation due to the lack of sensivity (high and very high) and subject to the implentation of appropriate mitigation measures. The impacts include loss of soil and land capability.

» *Heritage (including cultural landscape, archaeology and palaeontology):* Heritage sensitivity relates to archaeological resources, palaeontological resources, heritage resources, and the cultural landscape. The field assessment to be undertaken as part of the EIA Phase will determine the significance of the resources likely to be impacted. Impacts can be minimised through the implementation of appropriate mitigation measures. The impacts on heritage include direct impact

to archaeological and palaeontological heritage of scientific significance, as well as indirect impact to significant cultural landscapes and cultural landscape elements.

» *Visual:* Visual impacts will mainly occur once the wind farm is operational. Due to the nature of a wind farm, the extent of the impact (at the scoping stage) is expected to be local and/or regional, with the highest probability within 0 - 5km from the development footprint. The primary impact from a visual perspective is the negative experience of viewing the infrastructure and activities within a predominantly rural and natural setting. The significance of this impact will be high pre-mitigation.

» *Noise:* The extent of the impacts identified at the Scoping Phase is local (i.e. up to 2km from the development footprint) and the significance of the impacts will be medium to high pre-mitigation, which should be significantly reduced should the 160m and 500m buffer areas be avoided by wind turbines. The impacts include an increase in the noise lelvels at the closest receptors and noise levels exceeding the SANS 10103 rating level due to construction and operation activities.

» *Traffic:* The extent of the impacts identified at the Scoping Phase is local. The significance of the transport impact during the construction phase can be rated as medium. However, considering that this is temporary and short term in nature, the impact can be mitigated to an acceptable level. Traffic will return to normal levels after construction is completed. Noise, dust, and exhaust pollution during the construction phase cannot be completely mitigated but mitigation measures will significantly reduce the impact. Traffic related impacts will be limited to the construction period.

» *Socio-Economic:* The extent of the impacts identified at the Scoping Phase is local to national and the significance of the impacts varies from low to high. Both positive and negative impacts were also identified to be associated with the construction and operation phases of the project. The positive impacts include creation of employment and business opportunities, skills development and training, reduction in reliance on coal, improvement in energy security , and improvement in basic services. The negative impacts include loss of grazing and/or crops, impact on employment opportunities on the affacted farms, damage to local farm roads, security concerns, noise impacts and impacts on quality of life.

3. Overall Conclusion and Fatal Flaw Analysis

The findings of the Scoping Study indicate that no environmental fatal flaws are associated with the proposed project. While some impacts of potential significance do exist, it is anticipated that the implementation of appropriate mitigation measures would assist in reducing the significance of such impacts to acceptable levels. It is however recommended that the development area for the development of the facility be considered outside of the areas identified as no-go areas as far as possible in order to ensure that the development does not have a detrimental impact on the environment. This forms part of the 'funnel-down approach' for the identification of an appropriate development footprint within the development area. Even with the appropriate avoidance of sensitive areas, there is an adequate area on the site which can accommodate the planned 140MW facility with relatively low impacts on the environment. This area is referred to as the development footprint and will be investigated further during the EIA Phase of the process.

Figure 3 provides an environmental sensitivity map of the scoping phase no-go areas. This conclusion must be confirmed through a detailed investigation of the development footprint within the EIA Phase of the process.

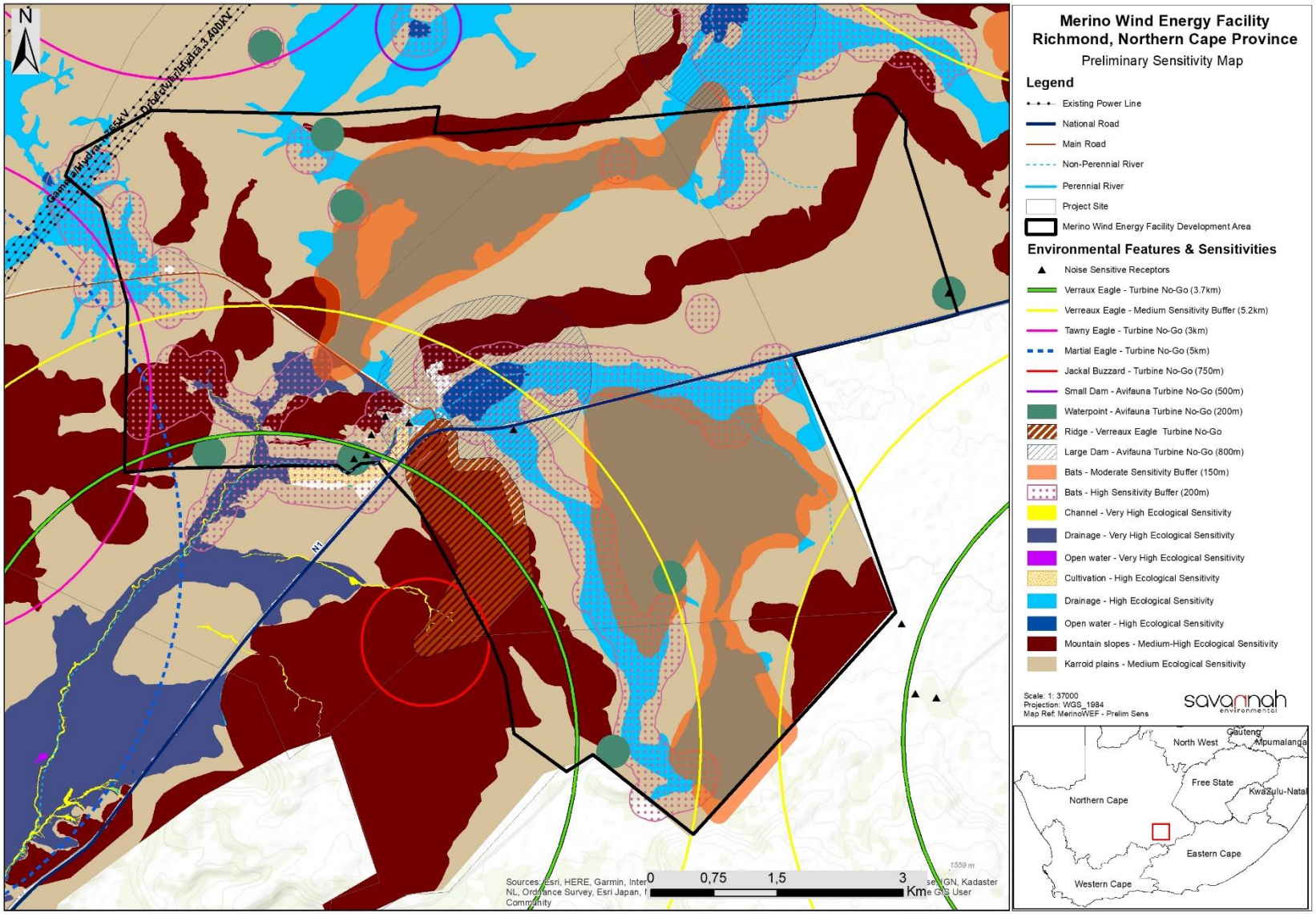

Figure 3: Environmental Sensitivity Map from the results of the scoping evaluation for the Merino Wind Farm and associated infrastructure

DEFINITIONS AND TERMINOLOGY

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.

Betz Limit: It is the flow of air over the blades and through the rotor area that makes a wind turbine function. The wind turbine extracts energy by slowing the wind down. The theoretical maximum amount of energy in the wind that can be collected by a wind turbine's rotor is approximately 59%. This value is known as the Betz Limit.

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.

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

Commissioning: Commissioning commences once construction is completed. Commissioning covers all activities including testing after all components of the wind turbine are installed.

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

Cumulative impacts: Impacts that result from the incremental impact of 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.

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.

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.

Emergency: An undesired/ unplanned event that results in a significant environmental impact and requires the notification of the relevant statutory body, such as a local authority.

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

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

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

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

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

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

Environmental management programme: An operational plan that organises and co-ordinates mitigation, rehabilitation and monitoring measures in order to guide the implementation of a proposal and its ongoing maintenance after implementation.

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

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

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

Indirect impacts: Indirect or induced changes that may occur 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.

Method statement: A written submission to the ECO and the site manager (or engineer) by the EPC Contractor in collaboration with his/her EO.

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.

No-go areas: Areas of environmental sensitivity that should not be impacted on or utilised during the development of a project as identified in any environmental reports.

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

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

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

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

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

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

Tower: The tower, which supports the rotor, is constructed from tubular steel. It is between 80m and 120m 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 wind turbine and to sustain vibration, wind loading and the overall weather elements for the lifetime of the wind turbine.

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

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

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

TABLE OF CONTENTS

APPENDICES LIST

CHAPTER 1: INTRODUCTION

Great Karoo Renewable Energy (Pty) Ltd is proposing the development of a commercial wind farm and associated infrastructure on a site 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 (refer to **Figure 1.1**). The facility will have a contracted capacity of up to 140MW and will be known as the Merino Wind Farm. The project is planned as part of a larger cluster of renewable energy projects, which include three (3) 100MW PV facilities (known as the Moriri Solar PV, Kwana Solar PV, and Nku Solar PV), an additional 140MW Wind Energy Facility (known as the Angora Wind Farm), as well as grid connection infrastructure connecting the renewable energy facilities to the existing Eskom Gamma Substation (refer to **Figure 1.2**). These projects are proposed by separate Specialist Purpose Vehicles (SPVs)[1], and are assessed through separate Environmental Impact Assessment (EIA) processes.

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.

From a regional perspective, the Northern Cape is considered favourable for the development of a commercial wind farm by virtue of prevailing climatic conditions, relief, the extent of the affected properties, the availability of a direct grid connection (i.e., a point of connection of the national grid) and the availability of land on which the development can take place.

1.1. Requirement for an Environmental Impact Assessment Process

Section 24 of South Africa's National Environmental Management Act (No. 107 of 1998) (NEMA) pertains to Environmental Authorisations (EA), and requires that the potential consequences for, or impacts of, listed or specified activities on the environment be considered, investigated, assessed, and reported on to the Competent Authority (CA). The 2014 Environmental Impact Assessment (EIA) Regulations, as amended (GNR 326) published under NEMA prescribe the process to be followed when applying for Environmental Authorisation (EA), while the Listing Notices (Listing Notice 1 (GNR 327), Listing Notice 2 (GNR 325), and Listing Notice 3 (GNR 324)) contain those activities which may not commence without EA from the CA.

As the project has the potential to impact on the environment, an Environmental Authorisation (EA) is required from the National Department of Forestry, Fisheries, and the Environment (DFFE) subject to the completion of a full Scoping and Environmental Impact Assessment (S&EIA) process, as prescribed in Regulations 21 and 24 of the 2014 EIA Regulations (GNR 326), as amended. The requirement for EA

[1]The development of the various projects under separate SPVs is in accordance with the DMRE's requirements under the REIPPPP.

subject to the completion of a full S&EIA process is triggered by the inclusion of, amongst others, Activity 1 of Listing Notice 1 (GNR 325), namely:

"The development of facilities or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20MW or more."

In terms of GNR 779 of 01 July 2016, the DFFE has been determined as the Competent Authority for all projects which relate to the IRP for Electricity 2010 – 2030, and any updates thereto. Through the decision-making process, the DFFE will be supported by the Northern Cape Department of Agriculture, Environmental Affairs, Rural Development and Land Reform as the commenting authority.

1.2. Legal Requirements as per the EIA Regulations, 2014 (as amended) for the undertaking of a Scoping Report

This Scoping Report has been prepared in accordance with the requirements of the EIA Regulations published on 08 December 2014 (and amended on 07 April 2017) promulgated in terms of Chapter 5 of the National Environmental Management Act (Act No 107 of 1998). This chapter of the Scoping Report includes the following information required in terms of Appendix 2: Content of the Scoping Report:

Requirement	Relevant Section
(a)(i) the details of the EAP who prepared the report and (ii) the expertise of the EAP to carry out scoping procedures; including a curriculum vitae	The details of the EAP and the expertise of the EAP have been included in **section 1.5**. The Curriculum vitae of the Savannah Environmental team have been included as **Appendix A**.
(b) the location of the activity, including (i) the 21-digit Surveyor General code of each cadastral land parcel; (ii) where available, the physical address and farm name and (iii) where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties	The location of the project site proposed for the development of the Merino Wind Farm is included as **Figure 1.1**. The details of the affected properties, including the property names and numbers, as well as the SG-codes are included in **Table 1.1**.
(c) a plan which locates the proposed activity or activities applied for at an appropriate scale, or, if it is (i) a linear activity, a description, and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or (ii) on land where the property has not been defined, the coordinates within which the activity is to be undertaken	The locality of the project site is illustrated on a locality map included as **Figure 1.1**. The centre point co-ordinates of the project site are included in **Table 1.1**.

This Scoping Report consists of twelve chapters, as follows:

- **Chapter 1** provides background to the Merino Wind Farm and the EIA process.
- **Chapter 2** provides a description of the wind farm and infrastructure associated with the facility.
- **Chapter 3** provides the site selection information and identified project alternatives.
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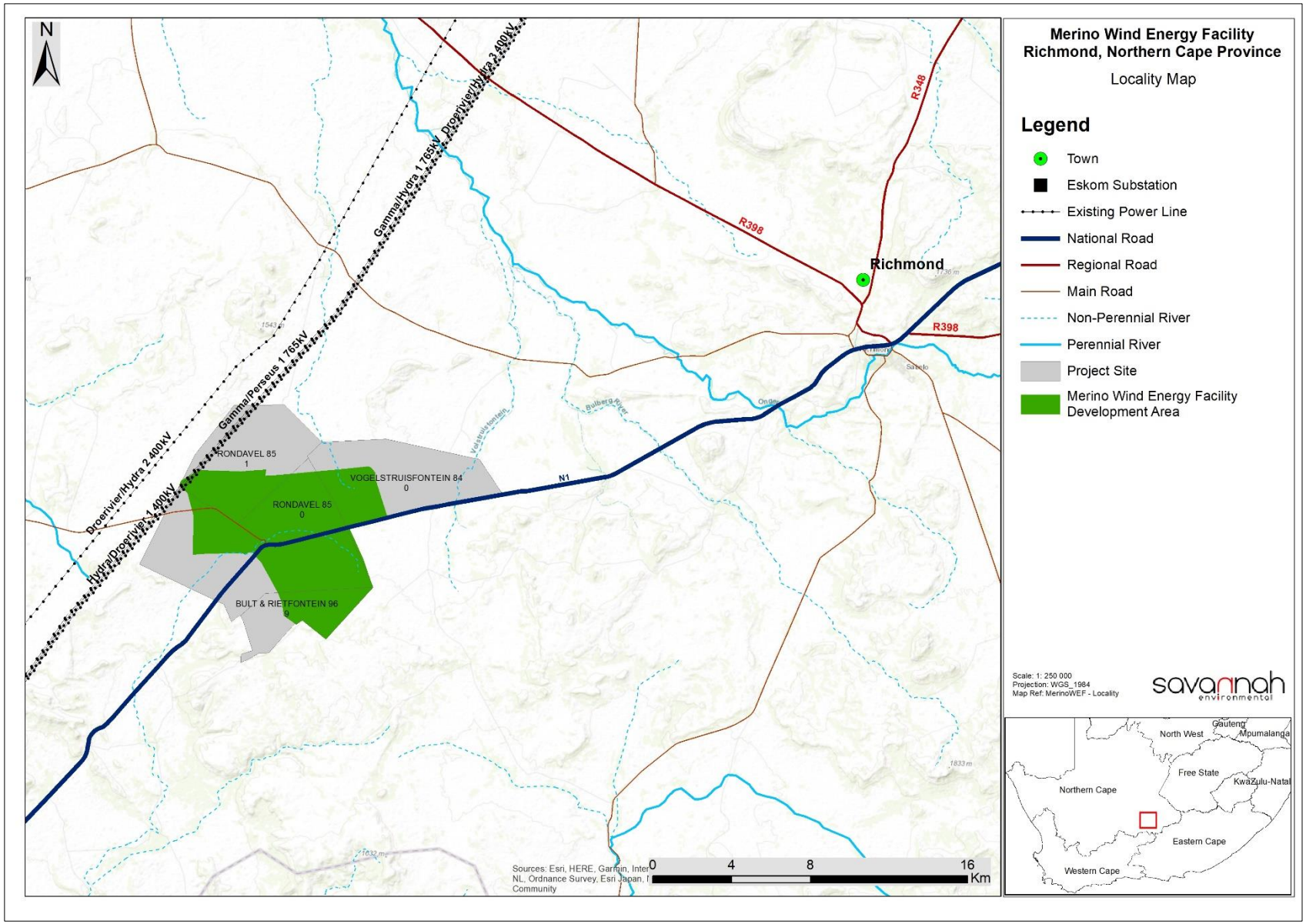

Figure 1.1: Locality map of the project site within which the Merino Wind Farm is proposed to be developed (refer to **Appendix M** for A3 Map).

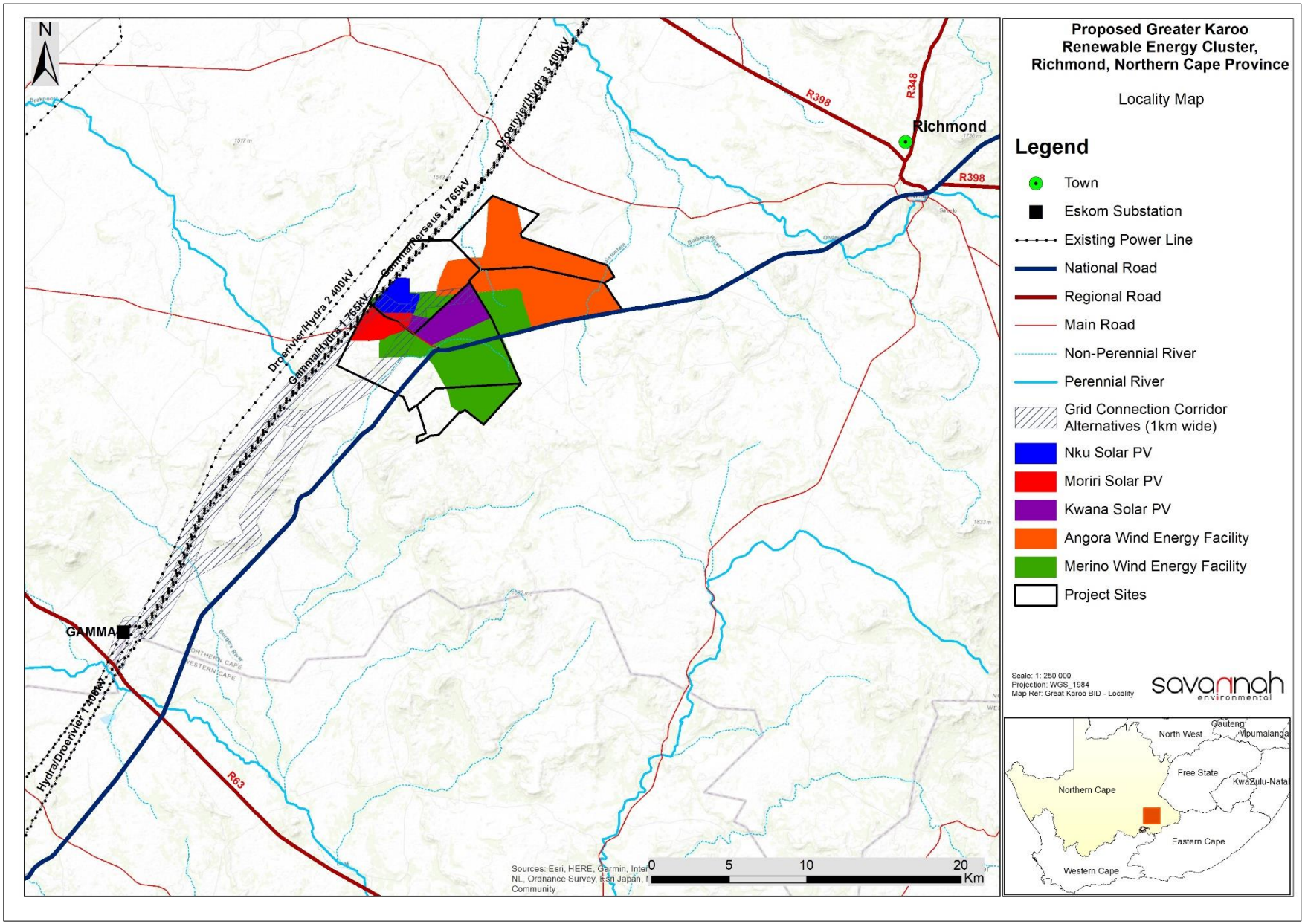

Figure 1.2: The cluster of proposed renewable energy facilities that the Merino Wind Farm forms part of (refer to **Appendix M** for A3 Map).

1.3. Project Overview

A technically feasible project site[2], 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[3] of ~5 516ha has been identified within the project site by the proponent for the development. The development area consists of four (4) affected properties, which include:

- 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

The full extent of the development area has been considered within this Scoping Report with the aim of determining the suitability from an environmental and social perspective and identifying areas that should be avoided in development planning. Within this identified development area, a development footprint[4] or facility layout will be defined for assessment in the EIA Phase. The development area is larger than the area required for the development footprint of a 140MW wind farm and therefore provides the opportunity for the optimal placement of infrastructure, ensuring avoidance of major identified environmental sensitivities or constraints identified through this Scoping and EIA process.

Table 1.1: Detailed description of the Merino Wind Farm project site

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 project site)	31°30'14.35"S; 23°38'7.66"E

Infrastructure associated with the Merino Wind Farm will include:

[2] The project site is the area with an extent of 29 909ha, within which the Merino Wind Farm development footprint will be located.
3 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 ~5 516ha in extent.
4 The development footprint is the defined area (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.

- Up to 45 wind turbines with a maximum hub height of up to 170m. The tip height of the turbines will be 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 that 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.

The key infrastructure components proposed as part of the Merino Wind Farm are described in greater detail in Chapter 2 of this Scoping Report.

The overarching objective for the Merino Wind Farm is to maximise electricity production through exposure to the available wind resource, while minimising infrastructure, operational and maintenance costs, as well as potential social and environmental impacts in accordance with the principles of sustainable development. Local level environmental and planning issues will be assessed through the EIA process with the aid of site-specific specialist studies in order to delineate areas of sensitivity within the identified project site. Once constraining factors have been determined, the layout of the wind turbines and associated infrastructure can be planned to minimise social and environmental impacts.

1.4. Overview of the Environmental Impact Assessment (EIA) Process

An EIA is an effective planning and decision-making tool for the project developer as it allows for the identification and management of potential environmental impacts. It provides the opportunity for the developer to be forewarned of potential environmental issues and allows for the resolution of the issues reported on in the Scoping and EIA reports as well as dialogue with interested and affected parties (I&APs).

The EIA process comprises of two (2) phases (i.e., Scoping and Impact Assessment) and involves the identification and assessment of potential environmental impacts through the undertaking of independent specialist studies, as well as public participation. The processes followed in these two phases is as follows:

- The **Scoping Phase** includes the identification of potential issues associated with the project through a desktop study (considering existing information), limited field work and consultation with interested and affected parties and key stakeholders. This phase considers the broader project site in order to identify and delineate any environmental fatal flaws, no-go and / or sensitive areas. Following a public review period of the Scoping report, this phase culminates in the submission of a final Scoping Report and Plan of Study for the EIA to the Competent Authority for consideration and acceptance.

- The **EIA Phase** involves a detailed assessment of the potentially significant positive and negative impacts (direct, indirect, and cumulative) identified in the Scoping Phase. This phase considers a

proposed development footprint within the project site and includes detailed specialist investigations as well as public consultation. Following a public review period of the EIA Report, this phase culminates in the submission of a final EIA Report and an Environmental Management Programme (EMPr), including recommendations of practical and achievable mitigation and management measures, to the Competent Authority for final review and decision-making.

1.5. Details of Environmental Assessment Practitioner and Expertise to conduct the S&EIA Process

In accordance with Regulation 12 of the 2014 EIA Regulations (GNR 326), Great Karoo Renewable Energy (Pty) Ltd has appointed Savannah Environmental (Pty) Ltd as the independent Environmental Assessment consultant responsible for managing the Application for EA and supporting Scoping and Environmental Impact Assessment (S&EIA) process; inclusive of comprehensive, independent specialist studies. The application for EA and S&EIA process will be managed in accordance with the requirements of NEMA, the 2014 EIA Regulations (GNR 326), and all other relevant applicable legislation.

Neither Savannah Environmental nor any of its specialists are subsidiaries or are affiliated to the applicant. Furthermore, Savannah Environmental does not have any interests in secondary developments that may arise out of the authorisation of the proposed facility.

Savannah Environmental is a specialist environmental consulting company providing a holistic environmental management service, including environmental assessment, and planning to ensure compliance and evaluate the risk of development, and the development and implementation of environmental management tools. Savannah Environmental benefits from the pooled resources, diverse skills and experience in the environmental field held by its team.

The Savannah Environmental team have considerable experience in basic assessments and environmental management, and have been actively involved in undertaking environmental studies, for a wide variety of projects throughout South Africa, including those associated with electricity generation.

» **Mmakoena Mmola**, the principle author of this Scoping Report, holds a BSc Honours in Geochemistry from the University of the Witwatersrand and 3.5 years of experience in the environmental management field. Her key focus is on undertaking environmental impact assessments, environmental permitting and authorisations, compliance auditing, public participation, and environmental management programmes. She is registered as a Candidate Natural Scientist with the South African Council for Natural Scientific Professions (SACNASP), Registration Number: 126748.

» **Jo-Anne Thomas**, the principle EAP on this project, is a registered EAP with the Environmental Assessment Practitioners Association of South Africa (EAPASA - 2019/726). She provides 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. Her key focus is 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.

» **Nicolene Venter**, is a Board Member of IAPSA (International Association for Public Participation South Africa). She holds a Higher Secretarial Diploma and has over 21 years of experience in public participation, stakeholder engagement, awareness creation processes and facilitation of various meetings (focus group, public meetings, workshops, etc.). She is responsible for project management of public participation processes for a wide range of environmental projects across South Africa and neighbouring countries.

In order to adequately identify and assess potential environmental impacts associated with the proposed Merino Wind Farm, the following specialist sub-consultants have provided input into this Scoping Report:

Specialist	Area of Expertise
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

Appendix A includes the curricula vitae for the environmental assessment practitioners from Savannah Environmental and the specialist consultants.

CHAPTER 2: PROJECT DESCRIPTION

This chapter provides an overview of the Merino Wind Farm and details the project scope which includes the planning/design, construction, operation, and decommissioning activities required for the development. It must be noted that the project description presented in this Chapter may change to some extent based on the outcomes and recommendations of detailed engineering and other technical studies, the findings and recommendations of the EIA and supporting specialist studies, and any licencing, permitting, and legislative requirements.

2.1 Legal Requirements as per the EIA Regulations, 2014 (as amended), for the undertaking of a Scoping Report

This chapter of the Scoping Report includes the following information required in terms of the EIA Regulations, 2014, as amended - Appendix 2: Content of the Scoping Report:

Requirement	Relevant Section
3(b) the location of the activity including (i) the 21 digit Surveyor General code of each cadastral land parcel, (ii) where available the physical address and farm name and (iii) where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties.	The location of the proposed project is detailed in Chapter 1, **Table 1.1**, as well as **section 2.2.1** below.
3(d)(ii) a description of the scope of the proposed activity, including a description of the activities to be undertaken including associated structures and infrastructure	A description of the activities to be undertaken with the development of project is included in **Table 2.1** and **Table 2.2**.

2.2 Nature and Extent of the Merino Wind Farm

In responding to the growing electricity demand within South Africa, the need to promote renewable energy and sustainability within the Northern Cape Province, as well as the country's targets for renewable energy, Great Karoo Renewable Energy (Pty) Ltd is proposing the development of a commercial wind farm and associated infrastructure to add new capacity to the national electricity grid. The Merino Wind Farm will be developed in a single phase and will comprise up to 45 wind turbines with a contracted capacity of up to 140MW. The optimum turbine for use at the project site is yet to be determined; however, it is considered that each turbine could have a generating capacity of up to 3.15MW[5], with a hub height of up to 170m. The final turbine capacity and model will be dependent on what is deemed suitable for the site in relation to, among other things, further studies of the wind regime, terrain, and potential environmental constraints.

[5] The 3.15MW capacity of the individual turbines is a predicted maximum per turbine and the final decision regarding the final turbine capacity will be based on the facility layout and technical and environmental considerations.

2.2.1. Overview of the Project Site

The project is to be developed on a site located approximately 35km south-west of Richmond and 80km south-east of Victoria West. The project site falls within Ward 3 of the Ubuntu Local Municipality and within the Pixley Ka Seme District Municipality in the Northern Cape Province. The full extent of the development area (i.e., ~5 516ha), located within the project site (i.e., 29 909ha) has been considered within this Scoping Phase of the EIA process, within which the Merino Wind Farm will be appropriately located from a technical and environmental sensitivity perspective. The development area includes the following four (4) affected properties:

- 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

Access to the project site is ample with the presence of existing roads mainly consisting of national and regional roads. The project site is bisected by the N1 national road, which provides access to the project site and development area (refer to **Figure 2.1**). The R398 and R63 are located to the north-east and south-west of the project site, respectively. The gravel main access road which is bisected by the project site provides direct access to the project site and the development area and will therefore be utilised for accessing the project site and development area (refer to **Figure 2.2**).

Figure 2.1: Location of the N1 national road in relation to the Merino Wind Farm development area (development area in blue).

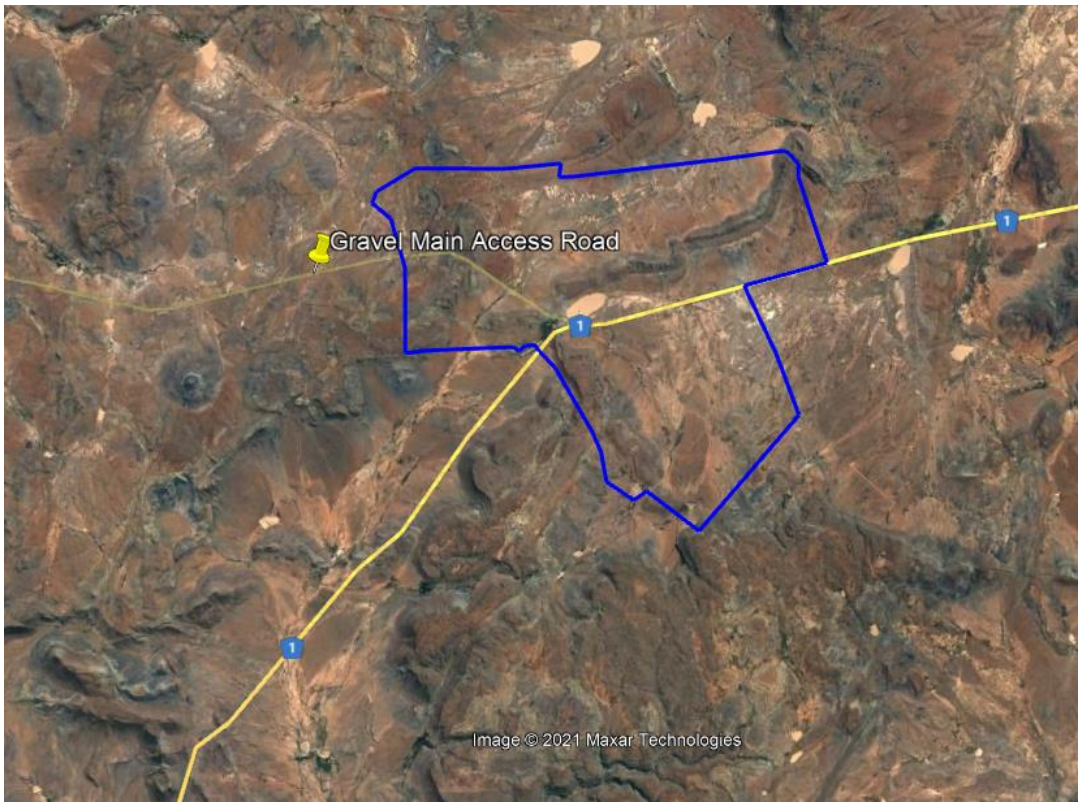

Figure 2.2: Location of the development area (outline in blue) in relation to the gravel main access road located that bisects the project site and provides direct access to the project site and development area.

Once environmentally constraining factors have been identified through the EIA process, the layout of the wind turbines and associated infrastructure will be determined. The optimal position for each turbine will be determined taking into consideration any environmental sensitivity identified through the EIA process, and the turbines will be appropriately spaced to optimise the energy generating potential of the wind resource. A more accurate understanding of the final development footprint will be determined during the EIA Phase with the availability of a facility layout plan.

2.2.2. *Components of the Merino Wind Farm*

The project site is proposed to accommodate both the wind turbines, as well as most of the associated infrastructure, which is required for such a facility, and will include:

- Up to 45 wind turbines with a maximum hub height of up to 170m. The tip height of the turbines will be 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.
- Site offices and maintenance buildings, including workshop areas for maintenance and storage.

A summary of the details and dimensions of the planned infrastructure associated with the project is provided in **Table 2.1.**

Table 2.1: Details or dimensions of typical infrastructure required for the 140MW Merino Wind Farm

Infrastructure	Footprint and dimensions
Number of turbines	Up to 45 turbines
Hub Height	Up to 170m
Tip Height	Up to 250m
Contracted Capacity	Up to 140MW (individual turbines up to 3.15MW in capacity each)
Tower Type	Steel or concrete towers can be utilised at the site. Alternatively, the towers can be of a hybrid nature, comprising concrete towers with top steel sections.
Area occupied by the on-site facility substation	~1000m x 700m
Capacity of on-site facility substation	33kV/132kV
Underground cabling between the turbines	Underground cabling will be installed at a depth of up to 1.5m to connect the turbines to the on-site facility substation. The cabling will have a capacity of up to 33kV.
Cabling from the onsite substation to the 132kV collector substation	Underground cabling will be installed at a depth of up to 1.5m to connect the on-site substation to the 132kV collector substation. The cabling will have a capacity of up to 132kV.
Area occupied by the electrical and auxiliary equipment required at the collector substation	100 x 100m
Area occupied by laydown area	~1000m x 700m
Access and internal roads	Wherever possible, existing access roads will be utilised to access the project site and development area. It is unlikely that access roads will need to be upgraded as part of the proposed development. Internal roads of up to 4.5m in width will be required to access each turbine and the on-site substation.
Turbine hardstand	~80m x 35m
Turbine foundation	Diameter of up to 25m per turbine
Grid connection	The 33/132kV on-site substation will be connected to the proposed 132kV central collector substation via underground cabling with a capacity of up to 132kV. A new 132kV single- or double-circuit power line will run from the central collector substation and tie into the existing Eskom Gamma Substation. The switching station forming part of the 132kV collector substation and the new 132kV single- or double-circuit will be assessed as part of a separate Basic Assessment process in support of an application for Environmental Authorisation.
Temporary infrastructure	Temporary infrastructure, including laydown areas, hardstand areas and a concrete batching plant, will be required during the construction phase. All

Infrastructure	Footprint and dimensions
	temporary infrastructure will be rehabilitated following the completion of the construction phase, where it is not required for the operation phase.

Table 2.2 below provides details regarding the requirements and the activities to be undertaken during the Merino Wind Farm development phases (i.e., construction phase, operation phase and decommissioning phase). **Table 2.3** provides photographs of the construction phase of a wind farm similar to the Merino Wind Farm.

2.2.3 Project Development Phases Associated with the Merino Wind Farm

Table 2.2: Details of the Merino Wind Farm project development phases (i.e., construction, operation, and decommissioning)

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. » 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

Table 2.3: Photographs of the construction phase of a wind farm similar to the Merino Wind Farm (Source: www.alamy.com/stock-photo/wind-turbine-construction.html; www.medianet.com.au/releases/178350/; www.industrycrane.com/blog/wind-turbines-installation-process.html)

CHAPTER 3: CONSIDERATION OF ALTERNATIVES

This Chapter provides an overview of the various alternatives considered for the Merino Wind Farm as part of the Scoping Process.

3.1 Legal Requirements as per the EIA Regulations, 2014 (as amended) for the undertaking of an Impact Assessment Report

This chapter of the Scoping Report includes the following information required in terms of Appendix 2: Content of the Scoping Report:

Requirement	Relevant Section
3(g) a motivation for the preferred site, activity, and technology alternative	The identification and motivation for the preferred project site, the development area within the project site, the proposed activity and the proposed technology is included in **sections 3.3.1, 3.3.3 and 3.3.4**.
3(h)(i) details of the alternative considered	The details of all alternatives considered as part of the Merino Wind Farm are included in **sections 3.3.1 – 3.3.5**.
3(h)(ix) the outcome of the site selection matrix	The site selection process followed by the developer in order to identify the preferred project site and development area is described in **section 3.3.1**.
3(h)(x) if no alternatives, including alternative locations for the activity were investigation, the motivation for not considering such	Where no alternatives have been considered, motivation has been included. This is included in **section 3.3**.

3.2 Alternatives Considered during the Scoping Phase

In accordance with the requirements of Appendix 2 of the 2014 Environmental Impact Assessment (EIA) Regulations (GNR 326), reasonable and feasible alternatives including but not limited to site and technology alternatives, as well as the "do-nothing" alternative should be considered.

The DFFE Guideline for determining alternatives states that the key criteria for consideration when identifying alternatives are that they should be "practicable", "feasible", "relevant", "reasonable" and "viable". Essentially there are two types of alternatives:

» Incrementally different (modifications) alternatives to the project.
» Fundamentally (totally) different alternatives to the project.

In this instance, 'the project' refers to Merino Wind Farm, a wind energy facility with capacity of up to 140MW and associated infrastructure proposed to be developed by an Independent Power Producer (IPP) and intended to form part of the DMRE's REIPPP Programme, or other similar programme.

3.2.1 Consideration of Fundamentally Different Alternatives

Fundamentally different alternatives are usually assessed at a strategic level and, as a result, project specific EIAs are therefore limited in scope and ability to address fundamentally different alternatives. At a

strategic level, electricity generating alternatives have been addressed as part of the DMRE's current Integrated Resource Plan for Electricity 2010 – 2030 (IRP)[6], and will continue to be addressed as part of future revisions. In this regard, the need for renewable energy power generation from wind energy facilities has been identified as part of the technology mix for power generation in the country for the next 20 years.

The fundamental energy generation alternatives were assessed and considered within the development of the IRP and the need for the development of renewable energy projects has been defined. Therefore, fundamentally different alternatives to the proposed project are not considered within this EIA process.

3.2.2 Consideration of Incrementally Different Alternatives

Incrementally different alternatives relate specifically to the project under investigation. "Alternatives", in relation to a proposed activity, means different ways of meeting the general purposes and requirements of the activity, which may include alternatives for:

- The property on which, or location where the activity is proposed to be undertaken.
- The type of activity to be undertaken.
- The design or layout of the activity.
- The technology to be used in the activity.
- The operational aspects of the activity.

In addition, the option of not implementing the activity (i.e., the "do-nothing" alternative) must also be considered.

The sections below describe the incrementally different alternatives being considered as part of the Merino Wind Farm. Where no alternative is being considered, a motivation has been provided as required by the EIA Regulations, 2014.

3.3 Project Alternatives under Consideration for the Merino Wind Farm

Table 3.1 provides an overview of the alternatives being considered as part of the project:

Table 3.1: Summary of the alternatives considered as part of the Merino Wind Farm project.

Nature of Alternatives Considered	Description of the Alternatives relating to the Merino Wind Farm
Site-specific and Layout Alternatives	One preferred project site has been identified for the development of the Merino Wind Farm due to site specific characteristics such as the wind resource, land availability, topographical considerations, proximity to a viable grid connection and environmental features. The project site is ~29 909ha in extent which is considered to be sufficient for the development of a wind farm with a contracted capacity of up to 140MW. A development area of ~5 515ha has been identified by the proponent within the project site for the development. A facility layout within this development area will be provided by the applicant for assessment in the EIA Phase of the process.
Activity Alternatives	Only the development of a renewable energy facility is considered by Great Karoo

[6] The Integrated Resource Plan (IRP) is legislated policy which regulates power generation planning.

Nature of Alternatives Considered	Description of the Alternatives relating to the Merino Wind Farm
	Renewable Energy (Pty) Ltd. Due to the location of the project site and the suitability of the wind resource, only the development of a wind farm is considered feasible considering the natural resources available to the area and the current land-use activities undertaken within the project site (i.e., livestock farming).
Technology Alternatives	Only the development of a wind farm is considered due to the characteristics of the site, including the natural resources available. The use of wind turbines for the generation of electricity is considered to be the most efficient technology for the project site.
'Do-nothing' Alternative	This is the option to not construct and operate the Merino Wind Farm. No impacts (positive or negative) are expected to occur on the social and environmental sensitive features or aspects located within the project site or the surrounds. The opportunities associated with the development of the wind farm for the affected area and other surrounding towns in the area will also not be realised.

These alternatives are described in more detail in the sections which follow.

3.3.1. Property or Location Alternatives

The Merino Wind Farm is located south-east of Victoria West and south-west of Richmond. The preferred project site for the development of the Merino Wind Farm was identified through an investigation of prospective sites and properties in the area within the Northern Cape Province. The investigation involved the consideration of specific characteristics within the province and specifically within the areas near Richmond and Victoria West including:

- Wind resource characteristics (including speed);
- Land availability;
- Land use and geographical and topographical considerations;
- Access to the national grid, including distance and capacity to connect the proposed project to the network;
- Site accessiblity; and
- Environmental and social aspects.

The characteristics considered were identified by the developer as the main aspects that play a role in the opportunities and limitations for the development of a wind farm. The characteristics considered, and the results thereof, are discussed in the sections below. The developer considered that should these characteristics not be favourable for the development of a wind farm, then some limitations and challenges may be expected and potentially hinder such development.

- **Wind resource**: Wind resource is the first main driver of site selection and project viability when considering the development of wind farms. The project site, which is located near the towns of Richmond and Victoria West in the Northern Cape Province has good wind resource potential. Through the consideration of the datasets, involving wind presence and wind speed, as well as meteorological information and geographical factors taken from measurements on site, it was confirmed that the area is suitable for the development of a wind farm.

- **Land Availability:** In order to develop the Merino Wind Farm with a contracted capacity of up to 140MW, sufficient space is required. The preferred project site was identified within the Northern Cape

Province and in the Richmond / Victoria West area following the confirmation of a feasible wind resource from on-site wind measurements taken over a 12-month period. The properties included in the project site are privately-owned parcels available in the area for a development of this nature through agreement with the landowners and are deemed technically feasible by the project developer for such development to take place. The combination of the affected properties has an extent of ~5 516ha, which was considered by the developer as sufficient for the development of the Merino Wind Farm. A preferred development area of ~5 516ha within this larger project site has been identified for the location of the Merino Wind Farm. A development footprint within the development area for the placement of infrastructure will be identified and assessed as part of the EIA Phase considering environmental constraints and sensitivities.

» **Land Use, Geographical and Topographical Considerations**: The character of the greater area surrounding the project site can be described as a rural, Karoo landscape characterised by livestock farming. There are a number of farm dwellings located in the vicinity of the site, including three farm dwellings within the boundary of the site. The land use identified within the greater area surrounding the project site (i.e., livestock farming) is generally preferred for developments of this nature as the livestock farming activities can continue on the affected properties in tandem with the operation of the wind farm.

The project site is located within a 30km of several authorised renewable energy facilities and therefore compliments planned future land use. Development of the Merino Wind Farm presents an opportunity to bring some relief to the area and affected landowners and surrounding communities in terms of socio-economic development, skills development, and upliftment.

The topography in the wider area surrounding the project site is characterised by a largely flat to undulating landscape interspead with areas of high elevation in the form of hills, koppies, ridges and/or mountains. In the wider area, a range of located hilly/mountainous topography with high elevations can be found to the south-east and north of the site, respectively. As such, there are very few physical contraints present which would have an effect on the wind speed, as well as on the construciton of a wind farm.

Based on the location of the project site within an area where supporting tranmission and distribution infrastructure is readily available to enable the evacuation of the generated power and the suitable and prefereble topography present, the site was identified as being technically preferred for the planned development.

» **Access to the National Electricity Grid** – A key factor in the siting of any generation project is a viable grid connection. The anticipated grid connection solution (subject to a separate environmental assessment and authorisation process) is a 132kV central collector substation and a 132kV power line to enable connection to the existing Gamma Substation. The developer consulted with the Eskom network planners to understand the current capacity of the existing grid connection infrastructure and to identify feasible connection points for the wind farm. The existing Gamma Substation, located to the south-west of the site was identified as the preferred grid connection point for the project.

» **Site access**: Access to the project site is ample with the presence of existing roads mainly consisting of national and regional roads. The project site is bisected by the N1 national road, which provides access to the project site and development area. The R398 is located to the north-east of the project

site and the R63 is located to the south-west of the project site. The gravel main access road which also bisects the project site provides direct access to the project site and the development area and will therefore be utilised for accessing the project site and development area.

Based on the above considerations, the Merino Wind Farm project site was identified by the developer as being the most technically feasible and viable project site within the broader area for further investigation in support of an application for authorisation. As a result, no property/location alternatives are proposed as part of this Scoping and EIA process.

3.3.2. Design and Layout Alternatives

The overall aim of the facility layout (i.e., development footprint) is to maximise electricity production through exposure to the wind resource, while minimising infrastructure, operation, and maintenance costs, and social and environmental impacts. Specialist software is available to assist developers in selecting the optimum position for each turbine. This micro-siting information will inform the specialist impact assessments at the EIA Phase. The planning process will also include the positioning of other ancillary infrastructure, including, but not limited to, access roads, and laydown areas.

An overall environmental scoping sensitivity map has been provided in order to illustrate the sensitive environmental features located within the project site which needs to be considered and, in some instances completely avoided by the development footprint (refer to Chapter 8). Once more detailed information is available from an environmental and planning perspective for the broader site, a detailed micro-siting exercise will be undertaken to effectively 'design' the wind farm facility layout and the turbine positions within the project site, which will be known as the development footprint. Through the process of determining constraining factors and environmentally sensitive areas, the layout of the wind turbines footprint and infrastructure will be planned and adjusted if necessary to ensure the avoidance of no-go areas and mitigation of sensitive environmental features. A detailed facility layout will be developed and will be made available as a layout alternative for assessment and ground-truthing by the independent specialists in the EIA phase. Where further conflicts are predicted, a mitigation strategy will be developed to meet the objectives of the mitigation hierarchy (avoid, minimise, mitigate).

3.3.3. Activity Alternatives

Great Karoo Renewable Energy (Pty) Ltd is a renewable energy project developer and as such is only considering renewable energy activities in accordance with the need for such development within the IRP. Considering the available natural energy resources within the area and the current significant restrictions placed on other natural resources such as water, it is considered that wind energy is the preferred option for the development of a renewable energy facility within the preferred project site.

The project site is located near the towns of Richmond and Victoria West in the Northern Cape Province which has above average wind resource potential. Based on the wind data collected from the area over the past 12 months, the available wind resource has been confirmed. Based on available information, it is concluded by the developer that there are a limited number of sites in South Africa with a wind resource considered viable to support the development of a technically and economically feasible wind farm. The project site is therefore considered best suited for the development of a wind farm. The project site is therefore considered best suited for the development of a wind farm. In addition, grid connection

infrastructure to connect the wind farm to the national grid is present in the surrounding area which enables connection.
Considering the suitability of the project site for the development of a wind farm, the current land-use activities being undertaken within the project site which relate to livestock farming and compatibility thereof, the activity (i.e., the development of a wind farm) is considered to be appropriate. Therefore, not activity alternatives are considered within this Scoping Report.

3.3.4. Technology Alternatives

As Great Karoo Renewable Energy (Pty) Ltd is an IPP, only renewable energy technologies are being considered for the generation of up to 140MW (contracted capacity) of electricity. Considering the local resources available (i.e., wind and solar irradiation) for such technologies, the footprint requirements for such developments, the topography of the project site and the current land use of the project site (i.e., livestock farming), the project site is considered most suitable for the establishment of a wind farm. After 12 months of wind measurements and bird and bat monitoring in the area, this area has been identified as a suitable and best location for the proposed wind farm.

Once environmental constraining factors have been determined through the Scoping and EIA process, Great Karoo Renewable Energy (Pty) Ltd will consider various wind turbine options. The preferred option will be informed by efficiency as well as environmental impact and constraints (such as noise associated with the turbine and sensitive biophysical features). The wind turbines being proposed for the Merino Wind Farm will be up to 3.15MW in capacity. The turbines are proposed to have a hub height of up to 170m, with an overall tip height of up to 250m.

There is a limited range of alternative technologies (turbines) available for commercial-scale wind energy facilities. In addition, the technology is constantly evolving. **Table 3.2** summarises the types of variables associated with existing wind turbine technologies.

Table 3.2: Variables associated with existing wind turbine technologies.

Variables	Description
Type	The horizontal axis wind turbine completely dominates the commercial scale wind turbine market.
Size	Typical land-based utility scale wind turbines are currently in the 600 kW to 6MW range internationally.
Foundation	The foundation is usually poured reinforced concrete. Its size and shape are dictated by the size of the wind turbine and local geotechnical considerations. The foundation for the Merino Wind Farm is estimated a diameter of up to 25m per turbine.
Tower	Towers are typically constructed from steel and/or concrete and can be hybrid. The towers used for the Merino Wind Farm will be up to 170m in height.
Rotor	3- Bladed rotor is standard.
Rotor Speed Control	Fixed or variable speed rotors.
Gears	Geared and gearless.
Generator	Standard high-speed generator (geared) or custom low-speed ring generator (gearless).
Other variables	Yaw gears, brakes, control systems, lubrication systems and all other turbine components are similar on modern wind turbines.

Great Karoo Renewable Energy (Pty) Ltd therefore confirms wind energy technology as the preferred technology alternative for the development of the Merino Wind Farm. No further technology alternatives will be considered.

3.3.5. The 'Do-Nothing' Alternative

The 'do-nothing' alternative is the option of not constructing and operating the Merino Wind Farm. Should this alternative be selected, there would be no environmental impacts or benefits as a result of construction and operation activities associated with a wind energy facility. The 'do-nothing' alternative will therefore likely result in minimising the cumulative impact on the land, although it is expected that pressure to develop the site for renewable energy purposes will be actively pursued due to the same factors which make the site a viable option for renewable energy development. This alternative is evaluated in this Scoping Report (refer to Chapter 9) and will be assessed within the EIA Phase of the process.

» CHAPTER 4: WIND AS A POWER GENERATION TECHNOLOGY

Environmental pollution and the emission of CO_2 from the combustion of fossil fuels through the implementation of conventional power plants constitute a threat to the environment. The use of fossil fuels is reportedly responsible for ~70% of greenhouse gas emissions worldwide. The approach to addressing climate change needs to include a shift in the way that energy is generated and consumed. Worldwide, many solutions and approaches are being developed to reduce emissions. However, it is important to acknowledge that the most cost-effective solution in the short-term is not necessarily the least expensive long-term solution. This holds true not only for direct project costs, but also indirect project costs such as impacts on the environment. Renewable energy is considered a 'clean source of energy' with the potential to contribute greatly to a more ecologically, socially, and economically sustainable future. The challenge however is to ensure that wind energy projects are able to meet all economic, social and environmental sustainability criteria through the appropriate placement of these facilities.

Compared with other renewable energy sources such as solar and bio-energy, wind energy generates the highest energy yield while affecting the smallest physical land space. Wind technologies convert the energy of moving air masses at the earth's surface to mechanical power that can be used directly for mechanical needs (e.g., milling or water pumping) or converted to electric power in a generator (i.e., a wind turbine). The use of wind for electricity generation is essentially a non-consumptive use of a natural resource and produces an insignificant quantity of greenhouse gases in its life cycle. A wind farm also qualifies as a Clean Development Mechanism (CDM) project (i.e., a financial mechanism developed to encourage the development of low carbon generating technologies) as it meets all international requirements in this regard.

This chapter explores the use of wind energy as a means of power generation.

4.1. Wind Resource as a Power Generation Technology

Using the wind resource for energy generation has the attractive attribute in that the fuel is free. The economics of a wind energy project crucially depend on the wind resource at the project site. Detailed and reliable information about the speed, strength, direction, and frequency of the wind resource is vital when considering the installation of a wind farm, as the wind resource is a critical factor to the success of the installation.

- **Wind power** is the conversion of wind energy into a useful form, such as electricity, using wind turbines.
- **Wind speed** is the rate at which air flows past a point above the earth's surface. Average annual wind speed is a critical siting criterion, since this determines the cost of generating electricity. The doubling of the wind speed increases the wind power by a factor of 8, so even small changes in wind speed can produce large changes in the economic performance of a wind farm. Wind turbines can start generating electricity at wind speeds of between ~3 m/s to 4 m/s (this is also known as the cut-in wind speed), with wind speeds greater than 6 m/s currently required for a wind farm to be economically viable. Wind speed can be highly variable and is also affected by a number of factors, including surface roughness of the terrain. The effect of height variation/relief in the terrain is seen as a speeding-up/slowing-down effect of the wind due to the topography of the landscape.

Elevation in the topography influences the flow of air, and results in turbulence within the air stream, which has to be considered in the placement of turbines.

» **Wind direction** at a site is important to understand as it influences the turbulence over the site, and therefore the potential energy output. However, wind turbines can extract energy from any wind direction as the nacelle automatically turns to face the blades into the predominant wind direction at any point in time.

A wind resource measurement campaign and analysis programme must be conducted for the site proposed for development, as only measured data will provide a robust prediction of the wind farm's expected energy production over its lifetime. This is being undertaken for the project site through the on-site monitoring of the wind resource via wind masts installed in 2011.

The placement of the individual turbines within a wind farm must consider the following technical factors:

» Predominant wind direction, wind strength and frequency.
» Topographical features or relief affecting the flow of the wind (e.g., causing shading effects and turbulence of air flow).
» Effects of adjacent turbines on wind flow and speed – specific spacing is required between turbines in order to reduce the effects of wake turbulence.

Wind turbines typically need to be spaced approximately 3 to 5 times the rotor diameter apart in order to minimise the induced wake effect that the turbines might have on each other (refer to **Figure 4.1**). Once a viable footprint for the establishment of the wind farm has been determined (through the consideration of both technical and environmental criteria) the spacing requirements will be considered through the process of micro-siting the turbines on the site.

4.1.1. How do wind turbines function and what are the associated infrastructure?

Wind turbines are mounted on a tower at height to capture the most energy. The kinetic energy of wind is used to turn a wind turbine to generate electricity. At an increased height above ground, they can take advantage of the faster and less turbulent wind. Turbines catch the wind's energy with their propeller-like blades. Generally, a wind turbine consists of three rotor blades and a nacelle mounted at the top of a tapered steel or concrete tower. The mechanical power generated by the rotation of the blades is transmitted to the generator within the nacelle.

Turbines are able to operate at varying speeds. The amount of energy a turbine can harness depends on both the wind velocity and the length of the rotor blades. It is anticipated that the turbines utilised for the Merino Wind Farm will have a hub height of up to 170m, and a tip height of up to 250m. The capacity of the wind farm will depend on the wind turbine selected by Great Karoo Renewable Energy (Pty) Ltd (turbine capacity and model that will be deemed most suitable for the site). A maximum of 45 turbines are proposed for the project site.

Other infrastructure associated with the facility includes internal access roads, facility substation, Battery Energy Storage System (BESS), electrical and auxiliary equipment required at the collector substation that serves the wind energy facility (including switchyard/bay, control building, fences, etc.), and operation and maintenance buildings. The construction phase of the wind energy facility is dependent on the number of turbines erected and is estimated at a maximum of approximately 15-18 months (including all infrastructure). The lifespan of the facility (i.e., operation phase) is approximated at 20 to 25 years.

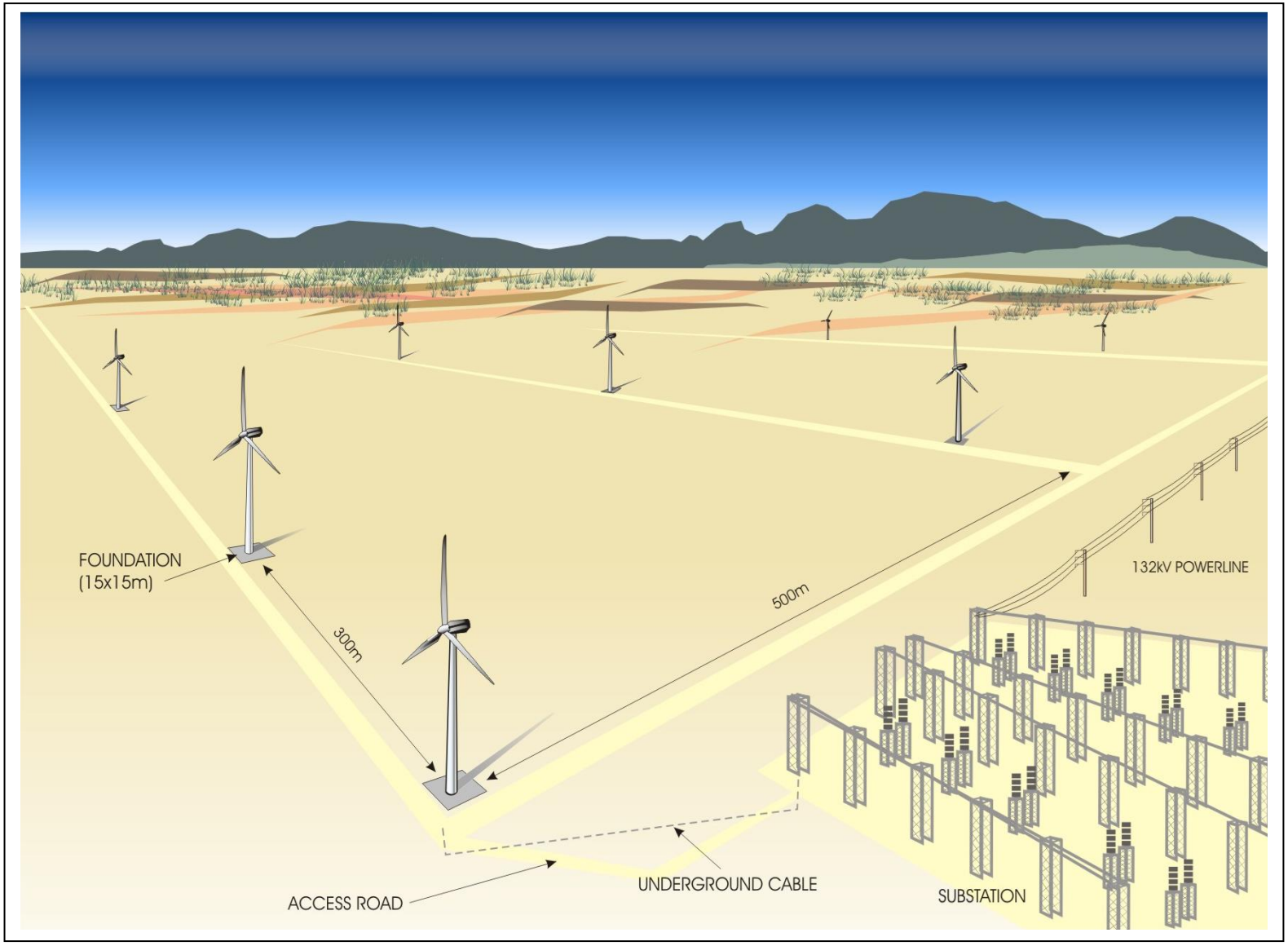

Figure 4.1: Artist's impression of a portion of a typical wind energy facility, illustrating the various components and associated infrastructure. Note that distances and measurements shown are indicative and for illustrative purposes only.

4.1.2. Main Components of a Wind Turbine

The turbine consists of the following major components (as shown in **Figure 4.2**):

» The foundation unit
» The tower
» The rotor
» The nacelle

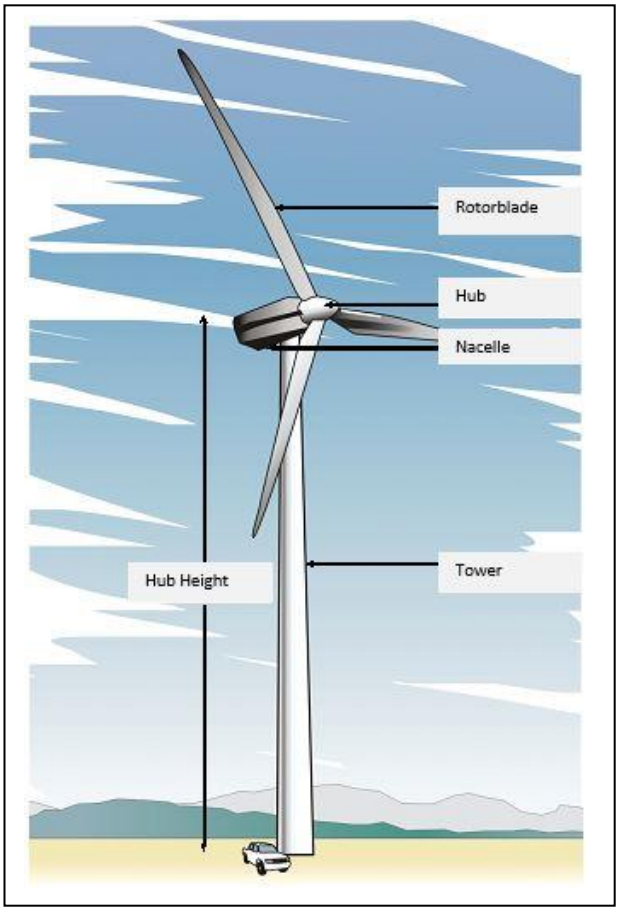

Figure 4.2: Illustration of the main components of a wind turbine

The foundation
The foundation is used to secure each wind turbine to the ground. These structures are commonly made of reinforced concrete and are designed to withstand the vertical loads (weight) and lateral loads (wind).

The tower
The tower is a hollow structure (steel or concrete or a combination of the two materials, known as hybrid) allowing access to the nacelle (up to 170m in height). The height of the tower is a key factor in determining the amount of electricity a turbine can generate as the wind speed varies with height. Towers are typically delivered to site in sections and then erected and joined together on site. Most towers are made of steel however some are made of reinforced post-stressed concrete.

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 wind turbine and to sustain vibration, wind loading and the overall weather elements for the lifetime of the wind turbine.

Figure 4.3: Example of a tower on which the rotor is mounted

The Rotor

The portion of the wind turbine that collects energy from the wind is called the rotor. The rotor comprises of three rotor blades. The rotor blades use the latest advances in aeronautical engineering materials science to maximise efficiency. The greater the number of turns of the rotor the more electricity is produced. The rotor converts the energy in the wind into rotational energy to turn the generator. The rotor has three blades that rotate at about 15 to 28 revolutions per minute (rpm). The speed of rotation of the blades is controlled by turning the blades to face into the wind ('yaw control') and changing the angle of the blades ('pitch control') to make the most use of the available wind.

The rotor blades function in a similar way to the wing of an aircraft, utilising the principles of lift**.** When air flows past the blade, a wind speed and pressure differential is created between the upper and lower blade surfaces. The pressure at the lower surface is greater and therefore acts to "lift" the blade. When blades are attached to a central axis, like a wind turbine rotor, the lift is translated into rotational motion. Lift-powered wind turbines are well suited for electricity generation.

The nacelle

The nacelle at the top of the tower accommodates the gears, the generator, anemometer for monitoring the wind speed and direction, cooling and electronic control devices, and yaw mechanism. Geared nacelles generally have a longer form/ structure than gearless turbines.

The generator is what converts the turning motion of a wind turbine's blades into electricity. Inside this component, coils of wire are rotated in a magnetic field to produce electricity. The generator's rating, or size, is partly dependent on the length of the wind turbine's blades because more energy is captured by longer blades.

Other infrastructure associated with the facility includes internal access roads, a power line, an on-site collector substation and operation and maintenance buildings. The construction phase of the wind farm is dependent on the number of turbines erected and is estimated at a maximum of approximately 30 months (including all infrastructure). The lifespan of the facility (i.e., operation phase) is approximated at 20 to 25 years.

4.1.3. Operating Characteristics of a Wind Turbine

A turbine is designed to operate continuously, unattended and with low maintenance for more than 20 years or >120 000 hours of operation. Once operating, a wind farm can be monitored and controlled remotely, with a mobile team for maintenance, when required.

The cut-in speed is the minimum wind speed at which the wind turbine will generate usable power and is usually between ~3 m/s and 4 m/s. This wind speed is typically between 10 and 15 km/hr (i.e., ~3 m/s and 4 m/s).

At very high wind speeds, typically over 90 km/hr (25 m/s), the wind turbine will cease power generation and shut down. The wind speed at which shut down occurs is called the cut-out speed. Having a cut-out speed is a safety feature which protects the wind turbine from damage. Normal wind turbine operation usually resumes when the wind drops back to a safe level.

It is the flow of air over the blades and through the rotor area that makes a wind turbine function. The wind turbine extracts energy by slowing the wind down. The theoretical maximum amount of energy in the wind that can be collected by a wind turbine's rotor is approximately 59%. This value is known as the Betz Limit. Therefore, if a blade were 100% efficient then it would extract 59% of the energy as this is the maximum (due to Betz law). In practice, the typical collection efficiency of a rotor is 35% to 45%. A complete wind energy system incurs losses through friction and modern systems end up converting between 20-25% of the energy in the air into electricity which equates to 34 - 42% of the maximum (due to Betz Law).

However, because the energy in the air is free, describing how efficiently the energy is converted is only useful for system improvement and monitoring purposes. A more useful measurement is the Capacity Factor, which is also represented as a percentage. The Capacity Factor percentage is calculated from the actual MWh output of electricity from the entire wind farm over 1 year divided by the nameplate maximum theoretical output for the same period. It therefore also takes wind resource, wind variability and system availability (downtime, maintenance and breakdowns) into account.

Wind turbines can be used as stand-alone applications, or they can be connected to a utility power grid. For utility-scale sources of wind energy, a large number of wind turbines are usually erected close together (suitably spaced so as to minimise wake losses and wake induced turbulence) and then connected to an on-site substation where all power is transformed to the correct voltage and then exported via a linkage to the utility power grid. This is termed a wind farm.

CHAPTER 5: POLICY AND LEGISLATIVE CONTEXT

This Chapter provides an overview of the policy and legislative context within which the development of a wind farm, such as the Merino Wind Farm, is proposed. It identifies environmental legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process which may be applicable to or have bearing on the proposed project.

5.1 Legal Requirements as per the EIA Regulations, 2014 (as amended) for the undertaking of a Scoping Report

This chapter of the Scoping Report includes the following information required in terms of the EIA Regulations, 2014 - Appendix 2: Content of the Scoping Report:

Requirement	Relevant Section
(e) a description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process.	**Chapter 5** as a whole provides an overview of the policy and legislative context which is considered to be associated with the development of the Merino Wind Farm. The regulatory and planning context has been considered at national, provincial and local levels.

5.2. Strategic Electricity Planning in South Africa

The need to expand electricity generation capacity in South Africa is based on national policy and informed by on-going strategic planning undertaken by the Department of Mineral Resources and Energy (DMRE). The hierarchy of policy and planning documentation that support the development of renewable energy projects such as the Merino Wind Farm is illustrated in **Figure 5.1**. These policies are discussed in more detail in the following sections, along with the provincial and local policies or plans that have relevance to the development of proposed project.

The South African energy industry is evolving rapidly, with regular changes to legislation and industry role-players. The regulatory hierarchy for an energy generation project of this nature consists of three tiers of authority who exercise control through both statutory and non-statutory instruments – that is National, Provincial and Local levels. As wind farm developments are a multi-sectoral issue (encompassing economic, spatial, biophysical, and cultural dimensions) various statutory bodies are likely to be involved in the approval process of a wind farm project and the related statutory environmental assessment process.

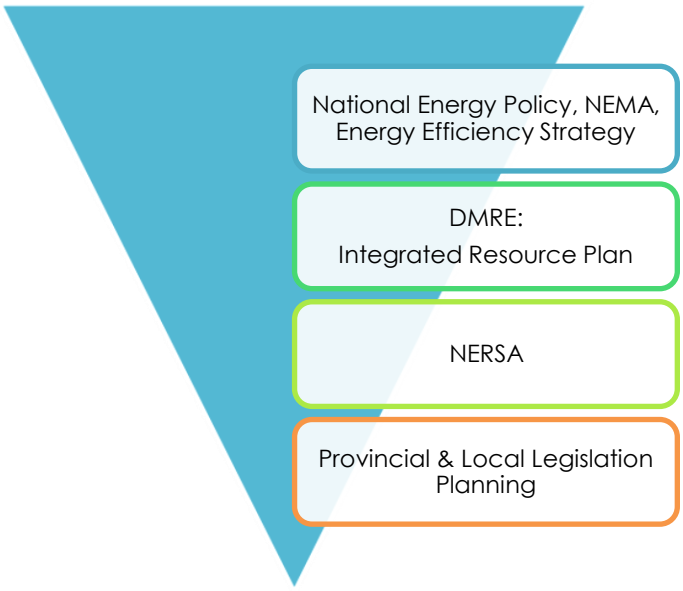

Figure 5.1: Hierarchy of electricity and planning documents

At **National Level**, the main regulatory agencies are:

- **Department of Mineral Resources and Energy (DMRE):** This Department is responsible for policy relating to all energy forms and for compiling and approving the Integrated Resource Plan (IRP) for electricity. Furthermore, the Department is also responsible for granting approvals for the use of land which is contrary to the objects of the Mineral and Petroleum Resource Development Act (Act No. 28 of 2002) (MPRDA) in terms of Section 53 of the Act. Therefore, in terms of the Act, approval from the Minister is required to ensure that the proposed activities do not sterilise mineral resources that may occur within the project site and development area.
- **National Energy Regulator of South Africa (NERSA):** NERSA is responsible for regulating all aspects of the electricity sector and will ultimately issue licenses for IPP projects to generate electricity.
- **Department of Forestry, Fisheries and the Environment (DFFE):** This Department is responsible for environmental policy and is the controlling authority in terms of NEMA and the EIA Regulations, 2014 (GN R326) as amended. DFFE is the Competent Authority for this project (as per GN R779 of 01 July 2016), and is charged with granting the EA for the project under consideration.
- **The South African Heritage Resources Agency (SAHRA):** SAHRA is a statutory organisation established under the National Heritage Resources Act (No. 25 of 1999) (NHRA), as the national administrative body responsible for the protection of South Africa's cultural heritage.
- **South African National Roads Agency Limited (SANRAL):** This Agency is responsible for the regulation and maintenance of all national road routes.
- **Department of Human Settlements, Water and Sanitation (DHSWS):** This Department is responsible for effective and efficient water resource management to ensure sustainable economic and social development. This Department is also responsible for evaluating and issuing licenses pertaining to water use (i.e., Water Use License (WUL) and General Authorisation).
- **The Department of Agriculture, Rural Development and Land Reform (DARDLR):** This Department is the custodian of South Africa's agricultural resources and is primarily responsible for the formulation and implementation of policies governing the agriculture sector. Furthermore, the Department is also responsible for issuing permits for the disturbance or destruction of protected tree species listed under Section 15 (1) of the National Forest Act (No. 84 of 1998) (NFA).

At **Provincial Level**, the main regulatory agencies are:

- **Provincial Government of the Northern Cape – Northern Cape Department of Agriculture, Environmental Affairs, Rural Development and Land Reform (DAEARD&LR):** This Department is the commenting authority for the EIA process for the project and is responsible for issuing of biodiversity and conservation-related permits.
- **Northern Cape Department of Transport, Safety and Liaison:** This Department provides effective co-ordination of crime prevention initiatives, provincial police oversight, traffic management and road safety towards a more secure environment.
- **Ngwao-Boswa Ya Kapa Bokone (NBKB):** This Department identifies, conserves and manages heritage resources throughout the Northern Cape Province.

At the **Local Level,** the local and district municipal authorities are the principal regulatory authorities responsible for planning, land use and the environment. In the Northern Cape Province, both the local and district municipalities play a role. The local municipality includes the **Ubuntu Local Municipality** which forms part of the **Pixley Ka Seme District Municipality**. In terms of the Municipal Systems Act (No. 32 of 2000), it is compulsory for all municipalities to go through an Integrated Development Planning (IDP) process to prepare a five-year strategic development plan for the area under their control.

5.3. International Policy and Planning Context

A brief review of the most relevant international policies relevant to the establishment of the Merino Wind Farm are provided below in **Table 5.1**. The Merino Wind Farm is considered to be aligned with the aims of these policies, even if contributions to achieving the goals therein are only minor.

Table 5.1: International policies relevant to the Merino Wind Farm

Relevant policy	Relevance to the Merino Wind Farm
United Nations Framework Convention on Climate Change (UNFCCC) and Conference of the Party (COP)	The Conference of the Parties (COP), established by Article 7 of the UNFCCC, is the supreme body and highest decision-making organ of the Convention. It reviews the implementation of the Convention and any related legal instruments and takes decisions to promote the effective implementation of the Convention. The Conference of the Parties (COP) 21 was held in Paris from 30 November to 12 December 2015. From this conference, an agreement to tackle global warming was reached between 195 countries. South Africa signed the Agreement in April 2016 and ratified the agreement on 01 November 2016. The Agreement was assented to by the National Council of Provinces on 27 October 2016, and the National Assembly on 1 November 2016. South Africa's National Climate Change Response Policy (NCCRP) establishes South Africa's approach to addressing climate change, including adaptation and mitigation responses. The NCCRP formalises Government's vision for a transition to a low carbon economy, through

Relevant policy	Relevance to the Merino Wind Farm
	the adoption of the 'Peak, Plateau and Decline' (PPD) GHG emissions trajectory whereby South Africa's emissions should peak between 2020 and 2025, plateau for approximately a decade, and then decline in absolute terms thereafter, and based on this the country has pledged to reduce emissions by 34% and 42% below Business As Usual (BAU) emissions in 2020 and 2025, respectively. The policy provides support for the Merino Wind Farm which will contribute to managing climate change impacts, supporting the emergency response capacity, as well as assist in reducing GHG emissions in a sustainable manner.
The Equator Principles IV (October 2020)	The Equator Principles (EPs) IV constitute a financial industry benchmark used for determining, assessing, and managing project's environmental and social risks. The EPs are primarily intended to provide a minimum standard for due diligence to support responsible risk decision-making. The EPs are applicable to large infrastructure projects (such as the Merino Wind Farm) and apply globally to all industry sectors. Such an assessment should propose measures to minimise, mitigate, and offset adverse impacts in a manner relevant and appropriate to the nature and scale of the Merino Wind Farm. In terms of the EPs, South Africa is a non-designated country, and as such the assessment process for projects located in South Africa evaluates compliance with the applicable IFC Performance Standards on Environmental and Social Sustainability, and Environmental Health and Safety (EHS) Guidelines. The Merino Wind Farm is currently being assessed in accordance with the requirements of the 2014 EIA Regulations, as amended (GN R326), published in terms of Section 24(5) of the National Environmental Management Act (No. 107 of 1998) (NEMA), which is South Africa's national legislation providing for the authorisation of certain controlled activities. Through this assessment, all potential social and environmental risks are identified and assessed, and appropriate mitigation measures proposed.
International Finance Corporation (IFC) Performance Standards and Environmental and Social Sustainability (January 2012)	The International Finance Corporation's (IFC) Performance Standards (PSs) on Environmental and Social Sustainability were developed by the IFC and were last updated on 1 January 2012. Performance Standard 1 requires that a process of environmental and social assessment be conducted, and an Environmental and Social Management System (ESMS) appropriate to the nature and scale of the project, and commensurate with the level of its environmental and

Relevant policy	Relevance to the Merino Wind Farm
	social risks and impacts, be established and maintained. The above-mentioned standard is the overarching standard to which all the other standards relate. Performance Standards 2 through to 8 establish specific requirements to avoid, reduce, mitigate, or compensate for impacts on people and the environment, and to improve conditions where appropriate. While all relevant social and environmental risks and potential impacts should be considered as part of the assessment, the standards 2 and 8 describe potential social and environmental impacts that require particular attention specifically within emerging markets. Where social or environmental impacts are anticipated, the developer is required to manage them through its ESMS consistent with Performance Standard 1. Given the nature of the Merino Wind Farm, it is anticipated (at this stage of the process) that Performance Standards 1, 2, 3, 4, 6, and 8 may be applicable to the project.

5.4. National Policy and Planning Context

Further to the South African government's commitment in August 2011 to support the development of renewable energy capacity, the DMRE initiated the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) to procure renewable energy from the private sector in a series of rounds. To date, the Department has procured 6 422MW of renewable energy capacity from 112 independent power producers (IPPs), with 4 949MW operational and made available to the grid[7]. National policies have to be considered for the construction and operation of the solar PV facility to ensure that the development is in line with the planning of the country.

A brief review of the most relevant national policies is provided below in **Table 5.2**. The development of Merino Wind Farm is considered to align with the aims of these policies, even where contributions to achieving the goals therein are only minor.

Table 5.2: Relevant national legislation and policies for Merino Wind Farm

Relevant legislation or policy	Relevance to Merino Wind Farm
Constitution of the Republic of South Africa, 1996	Section 24 of the Constitution pertains specifically to the environment. It 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. The Constitution outlines the need to promote social and economic development. Section 24 of the Constitution therefore requires that development be conducted in such a manner that it does not infringe on an individual's environmental rights, health,

[7]https://www.ipp-projects.co.za/

Relevant legislation or policy	Relevance to Merino Wind Farm
	or well-being. This is especially significant for previously disadvantaged individuals who are most at risk to environmental impacts. The undertaking of an EIA process for the proposed project in terms of the requirements of the EIA Regulations, 2014 (as amended) aims to minimise any impacts on the natural and social environment.
National Environmental Management Act (No. 107 of 1998) (NEMA)	The NEMA is South Africa's key piece of environmental legislation and sets the framework for environmental management in South Africa. The NEMA is founded on the principle that everyone has the right to an environment that is not harmful to their health or well-being as contained within the Bill of Rights. The national environmental management principles state that the social, economic, and environmental impacts of activities, including disadvantages and benefits, must be considered, assessed, and evaluated, and decisions must be appropriate in the light of such consideration and assessment. The need for responsible and informed decision-making by government on the acceptability of environmental impacts is therefore enshrined within the NEMA.
National Energy Act (No. 34 of 2008)	The purpose of the National Energy Act (No. 34 of 2008) is to ensure that diverse energy resources are available, in sustainable quantities and at affordable prices, to the South African economy in support of economic growth and poverty alleviation, while taking into account environmental management requirements and interactions amongst economic sectors, as well as matters relating to renewable energy. The National Energy Act also provides for energy planning, increased generation and consumption of renewable energies, contingency energy supply, holding of strategic energy feedstocks and carriers, adequate investment in, appropriate upkeep and access to energy infrastructure. The Act provides measures for the furnishing of certain data and information regarding energy demand, supply, and generation, and for establishing an institution to be responsible for promotion of efficient generation and consumption of energy and energy research. The Act provides the legal framework which supports the development of power generation facilities. The Act also provides for licences and registration as the manner in which generation, transmission, distribution, trading and the import and export of electricity are regulated. The development of the Merino Wind Farm will have to ensure compliance with this Act as a license for the generation of electricity will be required.
White Paper on the Energy Policy of the Republic of South Africa (1998)	The White Paper on Energy Policy places emphasis on the expansion of energy supply options to enhance South Africa's energy security. This can be achieved through increased use of renewable energy and encouraging new entries into the generation market. The policy states that the advantages of renewable energy include, minimal environmental impacts during operation in comparison with traditional supply technologies, generally lower running costs, and high labour intensities. Disadvantages include higher capital costs in some cases, lower energy densities, and lower levels of availability, depending on specific conditions, especially with sun and wind-based systems. Nonetheless, renewable resources generally operate from an unlimited resource base and, as such, can increasingly contribute towards a long-term sustainable energy future.
White Paper on the Renewable Energy Policy of the Republic of South Africa	The White Paper on Renewable Energy Policy supplements Government's predominant policy on energy as set out in the White Paper on the Energy Policy of the Republic of South Africa (DME, 1998). The policy recognises the potential of renewable

Relevant legislation or policy	Relevance to Merino Wind Farm
(2003)	energy and aims to create the necessary conditions for the development and commercial implementation of renewable energy technologies. The White Paper on Renewable Energy sets out Government's vision, policy principles, strategic goals, and objectives for promoting and implementing renewable energy in South Africa. The country relies heavily on coal to meet its energy needs due to its abundant, and fairly accessible and affordable coal resources. However, massive renewable energy resources that can be sustainable alternatives to fossil fuels, have so far remained largely untapped. The development of additional renewable energy projects will promote the use of the abundant South African renewable energy resources and contribute to long-term energy security and diversification of the energy mix.
The Electricity Regulation Act (No. of 2006)	The Electricity Regulation Act of 2006 replaced the Electricity Act (No. 41 of 1987), as amended, with the exception of Section 5B, which provides funds for the energy regulator for the purpose of regulating the electricity industry. The Act establishes a national regulatory framework for the electricity supply industry and introduces the National Energy Regulator (NERSA) as the custodian and enforcer of the National Electricity Regulatory Framework. The Act also provides for licences and registration as the manner in which the generation, transmission, distribution, trading, and import and export of electricity are regulated.
National Development Plan 2030	The National Development Plan (NDP) 2030 is a plan prepared by the National Planning Commission in consultation with the South African public which is aimed at eliminating poverty and reducing inequality by 2030. In terms of the Energy Sector's role in empowering South Africa, the NDP envisages that, by 2030, South Africa will have an energy sector that promotes: » Economic growth and development through adequate investment in energy infrastructure. The sector should provide reliable and efficient energy service at competitive rates, while supporting economic growth through job creation. » Social equity through expanded access to energy at affordable tariffs and through targeted, sustainable subsidies for needy households. » Environmental sustainability through efforts to reduce pollution and mitigate the effects of climate change. In formulating its vision for the energy sector, the NDP took the IRP 2010 as its point of departure. Therefore, although electricity generation from coal is still seen as part of the energy mix within the NDP, the plan sets out steps that aim to ensure that, by 2030, South Africa's energy system will look very different to the current situation: coal will contribute proportionately less to primary-energy needs, while gas and renewable energy resources – especially wind, solar, and imported hydroelectricity – will play a much larger role. The NDP aims to provide a supportive environment for growth and development, while promoting a more labour-absorbing economy. The development of Merino Wind Farm supports the NDP through the development of energy-generating infrastructure which will not lead to the generation of GHGs and will result in economic development and growth of the area surrounding the development area.
Integrated Energy Plan (IEP), November 2016	The purpose and objectives of the Integrated Energy Plan (IEP) are derived from the National Energy Act (No. 34 of 2008). The IEP takes into consideration the crucial role that energy plays in the entire economy of the country and is informed by the output

Relevant legislation or policy	Relevance to Merino Wind Farm
	of analyses founded on a solid fact base. It is a multi-faceted, long-term energy framework which has multiple aims, some of which include: » To guide the development of energy policies and, where relevant, set the framework for regulations in the energy sector. » To guide the selection of appropriate technologies to meet energy demand (i.e., the types and sizes of new power plants and refineries to be built and the prices that should be charged for fuels). » To guide investment in and the development of energy infrastructure in South Africa. » To propose alternative energy strategies which are informed by testing the potential impacts of various factors such as proposed policies, introduction of new technologies, and effects of exogenous macro-economic factors. A draft version of the IEP was released for comment on 25 November 2016. The purpose of the IEP is to provide a roadmap of the future energy landscape for South Africa which guides future energy infrastructure investments and policy development. The development of the IEP is an ongoing continuous process. It is reviewed periodically to take into account changes in the macroeconomic environment, developments in new technologies and changes in national priorities and imperatives, amongst others. The 8 key objectives of the integrated energy planning process are as follows: » Objective 1: Ensure security of supply. » Objective 2: Minimise the cost of energy. » Objective 3: Promote the creation of jobs and localisation. » Objective 4: Minimise negative environmental impacts from the energy sector. » Objective 5: Promote the conservation of water. » Objective 6: Diversify supply sources and primary sources of energy. » Objective 7: Promote energy efficiency in the economy. » Objective 8: Increase access to modern energy.
Integrated Resource Plan for Electricity (IRP) 2010-2030	The Integrated Resource Plan (IRP) for Electricity 2010 – 2030 is a subset of the IEP and constitutes South Africa's National electricity plan. The primary objective of the IRP is to determine the long-term electricity demand and detail how this demand should be met in terms of generating capacity, type, timing, and cost. The IRP also serves as input to other planning functions, including amongst others, economic development and funding, and environmental and social policy formulation. On 27 August 2018, the then Minister of Energy published a draft IRP which was issued for public comment. The lengthy public participation and consultation process has culminated in the issue of the overdue IRP 2019 which updates the energy forecast from the current period to the year 2030. Since the promulgated IRP 2010, the following capacity developments have taken place: » A total of 6 422MW has been procured thus far under the REIPPP Programme, with 4 949MW being currently operational and made available to the grid. In addition, IPPs have commissioned 1005MW from two (2) Open Cycle Gas Turbines (OCGT) peaking plants. » Under the Eskom Build Programme, 1 332MW has been procured from the Ingula Pumped Storage Project, 1 588MW and 800MW from the Medupi and Kusile power stations and 100MW from the Sere Wind Farm.

Relevant legislation or policy	Relevance to Merino Wind Farm
	Provision has been made for the following new capacity by 2030: » 1 500MW of coal » 2 500MW of hydro » 6 000MW of solar PV » 14 400MW of wind » 1 860MW of nuclear » 2 088MW of storage » 3 000MW of gas/diesel » 4 000MW from other distributed generation, co-generation, biomass and landfill technologies To date, 2 372MW[8] has been installed for solar PV facilities, whereas 1000MW[9] has already been procured. Based on the IRP 2019, 1 000MW has been allocated for solar PV facilities from 2022 to 2030. This will bring the total installed capacity of solar PV facilities by 2030 to 8 288MW. Therefore, the development of the Merino Wind Farm is supported by the IRP 2019.
New Growth Path (NGP) Framework, 23 November 2010	The purpose of the New Growth Path (NGP) Framework is to provide effective strategies towards accelerated job-creation through the development of an equitable economy and sustained growth. The target of the NGP is to create 5 million jobs by 2020; with economic growth and employment creation as the key indicators identified in the NGP. The framework seeks to identify key structural changes in the economy that can improve performance in terms of labour absorption and the composition and rate of growth. To achieve this, government will seek to, amongst other things, identify key areas for large-scale employment creation, as a result of changes in conditions in South Africa and globally, and to develop a policy package to facilitate employment creation in these areas.
National Climate Change Bill, 2018	On 08 June 2018, the Minister of Environmental Affairs published the National Climate Change Bill ("the Bill") for public comment. The Bill provides a framework for climate change regulation in South Africa aimed at governing South Africa's sustainable transition to a climate resilient, low carbon economy and society. The Bill provides a procedural outline that will be developed through the creation of frameworks and plans. Merino Wind Farm is a renewable energy generation facility and would not result in the generation or release of emissions during its operation.
National Climate Change Response Policy, 2011	South Africa's National Climate Change Response Policy (NCCRP) establishes South Africa's approach to addressing climate change, including adaptation and mitigation responses. The NCCRP formalises Government's vision for a transition to a low carbon economy, through the adoption of the 'Peak, Plateau and Decline' (PPD) GHG emissions trajectory whereby South Africa's emissions should peak between 2020 and 2025, plateau for approximately a decade, and then decline in absolute terms thereafter, and based on this, the country has pledged to reduce emissions by 34% and 42% below Business As Usual (BAU) emissions in 2020 and 2025, respectively.

[8] https://www.pv-magazine.com/2021/07/21/south-africa-installed-1-3-gw-of-pv-last-year/
[9] https://www.ipp-projects.co.za/

Relevant legislation or policy	Relevance to Merino Wind Farm
	As an integral part of the policy, a set of near-term priority flagship programmes will be implemented to address the challenges of climate change, one of which includes the Renewable Energy Flagship Programme. This flagship programme includes a scaled-up renewable energy programme, based on the current programme specified in the IRP 2010, and using the evolving South African Renewables Initiative led by the Department of Public Enterprise and Department of Trade and Industry (DTI), as a driver for the deployment of renewable energy technologies. The programme will be informed by enhanced domestic manufacturing potential and the implementation of energy efficiency and renewable energy plans by local government. The development of the Merino Wind Farm is aligned with the Renewable Energy Flagship Programme identified under South Africa's NCCRP and could therefore be argued to be aligned with the country's approach to addressing climate change.
National Climate Change Response Strategy for South Africa, 2004	The need for a national climate change policy for South Africa was identified as an urgent requirement during the preparations for the ratification of the UNFCCC in 1997. A process to develop such a policy was thus instituted under the auspices of the National Committee for Climate Change (NCCC), a non-statutory stakeholder body set up in 1994 to advise the Minister on climate change issues and chaired by the then Department of Environmental Affairs and Tourism (DEAT). It was determined that a national climate change response strategy will promote integration between the programmes of the various government departments involved to maximise the benefits to the country as a whole, while minimising negative impacts. Further, as climate change response actions can potentially act as a significant factor in boosting sustainable economic and social development, a national strategy specifically designed to bring this about is clearly in the national interest, supporting the major objectives of the government, including poverty alleviation and the creation of jobs. A number of principles and factors guided the conception of the strategy and are required to be implemented. These are: » Ensuring that the strategy is consistent with national priorities, including poverty alleviation, access to basic amenities including infrastructure development, job creation, rural development, foreign investment, human resource development and improved health, leading to sustainable economic growth. » Ensuring alignment with the need to consistently use locally available resources. » Ensuring compliance with international obligations. » Recognizing that climate change is a cross cutting issue that demands integration across the work programmes of other departments and stakeholders, and across many sectors of industry, business, and the community. » Focussing on those areas that promote sustainable development. » Promoting programmes that will build capacity, raise awareness, and improve education in climate change issues. » Encouraging programmes that will harness existing national technological competencies. » Reviewing the strategy constantly in the light of national priorities and international trends. » Recognizing that South Africa's emissions will continue to increase as development is realised. The strategy was devised through an integrated approach and considers policies and programmes of other government departments and the fact that South Africa is a

Relevant legislation or policy	Relevance to Merino Wind Farm
	developing country. This will ensure that the principles of sustainable development are adequately served and do not conflict with existing development policies.
Strategic Integrated Projects (SIPs)	The Presidential Infrastructure Coordinating Committee (PICC) is integrating and phasing investment plans across 18 Strategic Infrastructure Projects (SIPs) which have five core functions: to unlock opportunity, transform the economic landscape, create new jobs, strengthen the delivery of basic services, and support the integration of African economies. A balanced approach is being fostered through greening of the economy, boosting energy security, promoting integrated municipal infrastructure investment, facilitating integrated urban development, accelerating skills development, investing in rural development, and enabling regional integration. SIP 8 and 9 of the energy SIPs supports the development of the wind energy facility: » SIP 8: Green energy in support of the South African economy: Support sustainable green energy initiatives on a national scale through a diverse range of clean energy options as envisaged in the Integrated Resource Plan (IRP 2010 – 2030) and supports bio-fuel production facilities. » SIP 9: Electricity generation to support socio-economic development: The proposed Merino Wind Farm is a potential SIP 9 Project as electricity will be generated and social and economic upliftment, development and growth will take place within the surrounding communities. It would become a SIP 9 project if selected as a Preferred Bidder project by the Department Mineral Resources and Energy. SIP 9 supports the acceleration of the construction of new electricity generation capacity in accordance with the IRP 2010 to meet the needs of the economy and address historical imbalances. The Merino Wind Farm could be registered as a SIP project once it is under development. The project would then contribute to the above-mentioned SIPs.

5.5. Provincial Policy and Planning Context

A brief review of the most relevant provincial policies is provided below in **Table 5.3**. The proposed development is considered to align with the aims of these policies, even if contributions to achieving the goals therein are only minor.

Table 5.3: Relevant provincial legislation and policies for Merino Wind Farm

Relevant policy	Relevance to Merino Wind Farm
Northern Cape Provincial Spatial Development Framework (PSDF) 2012	The Northern Cape Provincial Spatial Development Framework (PSDF) 2012 states that the overarching goal for the province is to enable sustainability through sustainable development. The province considers social and economic development as imperative in order to address the most significant challenge facing the Northern Cape, which is poverty. The PSDF identifies key sectoral strategies and plans which are considered to be the key components of the PSDF. Sectoral Strategy 19 refers to a provincial renewable energy strategy. Within the PSDF, a policy has been included which states that renewable energy sources (including the utilisation of solar energy) are to comprise 25% of the province's energy generation capacity by 2020. The overall energy objective for the province also includes promoting the development of renewable energy supply schemes which are considered to be strategically important for increasing the diversity of domestic energy supply and

Relevant policy	Relevance to Merino Wind Farm
	avoiding energy imports, while also minimising the detrimental environmental impacts. The implementation of sustainable renewable energy is also to be promoted within the province through appropriate financial and fiscal instruments. The development of Merino Wind Farm supports the overall energy objective of the province to have 25% of its electricity from renewable energy sources.
Northern Cape Provincial Spatial Development Framework (PSDF) 2018 Review - Executive Summary	The review of the Northern Cape PSDF (2018) refers to infrastructure investment and that a balance must be maintained between investments aimed at meeting the social needs of communities and investments aimed at promoting economic development and job creation. The Spatial Development Strategy identified in the PSDF for basic infrastructure includes achieving the provision of green infrastructure which includes renewable energy. As part of the Vision 2040 of the PSDF, key opportunities are identified for the province. The strengthening of the development triangle that is formed by the linking of Kimberley, Vryburg, Upington and De Aar. The development triangle sustains a diverse economy with strong mining, agricultural and renewable energy sectors. It is stated in the PSDF that a sustainable and viable economic network must be driven within the development triangle to improve the return of public investment in the province. The development of the Merino Wind Farm will contribute to the economic network of the province specifically in terms of the renewable sector, albeit it does not fall within the development triangle.
Northern Cape Provincial Growth and Development Strategy	The Northern Cape Provincial Growth and Development Strategy (NCPGDS) identifies poverty reduction as the most significant challenge facing the government and its partners. All other societal challenges that the province faces emanate predominantly from the effects of poverty. The NCPGDS notes that the only effective way to reduce poverty is through long-term sustainable economic growth and development. The sectors where economic growth and development can be promoted include: » Agriculture and Agro-processing. » Fishing and Mariculture. » Mining and mineral processing. » Transport. » Manufacturing. » Tourism. However, the NCPGDS also notes that economic development in these sectors also requires: » Creating opportunities for lifelong learning. » Improving the skills of the labour force to increase productivity. » Increasing accessibility to knowledge and information. The achievement of these primary development objectives depends on the achievement of a number of related objectives that, at a macro-level, describe necessary conditions for growth and development. These are: » Developing requisite levels of human and social capital. » Improving the efficiency and effectiveness of governance and other development institutions. » Enhancing infrastructure for economic growth and social development.

Relevant policy	Relevance to Merino Wind Farm
	The NCPGDS makes reference to the need to ensure the availability of inexpensive energy. The section notes that in order to promote economic growth in the Northern Cape, the availability of electricity to key industrial users at critical localities at rates that enhance the competitiveness of their industries must be ensured. At the same time, the development of new sources of energy through the promotion of the adoption of energy applications that display a synergy with the province's natural resource endowments must be encouraged. In this regard the NCPGDS notes "the development of energy sources such as solar energy, the natural gas fields, bio-fuels, etc., could be some of the means by which new economic opportunity and activity is generated in the Northern Cape". The NCPGDS also highlights the importance of close co-operation between the public and private sectors in order for the economic development potential of the Northern Cape to be realised. The NCPGDS also highlights the importance of enterprise development and notes that the current level of private sector development and investment in the Northern Cape are low. In addition, the province also lags in the key policy priority areas of SMME Development and Black Economic Empowerment. The development of the Merino Wind Farm therefore has the potential to create employment opportunities, promote skills development, create opportunities to promote private sector investment and the development of SMMEs in the Northern Cape Province.
The Northern Cape Climate Change Response Strategy	The key aspects of the Northern Cape Climate Change Response Strategy (NCCCRS) Report are summarised in the MEC's (NCPG: Environment and Nature Conservation) 2011 budget speech: "*The Provincial Climate Change Response Strategy will be underpinned by specific critical sector climate change adaptation and mitigation strategies that include the Water, Agriculture and Human Health sectors as the 3 key Adaptation Sectors, the Industry and Transport alongside the Energy sector as the 3 key Mitigation Sectors with the Disaster Management, Natural Resources and Human Society, livelihoods and Services sectors as 3 remaining key. Sectors to ensure proactive long-term responses to the frequency and intensity of extreme weather events such as flooding and wildfire, with heightened requirements for effective disaster management*". Key points from the MEC address include the NCPG's commitment to develop and implement policy in accordance with the National Green Paper for the National Climate Change Response Strategy (2010), and an acknowledgement of the Northern Cape Province's extreme vulnerability to climate-change driven desertification. The development and promotion of a provincial green economy, including green jobs, and environmental learnership is regarded as an important provincial intervention in addressing climate change. The renewable energy sector, including solar and wind energy (but also biofuels and energy from waste), is explicitly indicated as an important element of the Provincial Climate Change Response Strategy. The development of the Merino Wind Farm will assist in achieving (although only to a limited extent) the promotion of the provincial green economy of the Northern Cape.
Northern Cape Province Green Document	The NCP Green Document (2017-2018) was prepared by the Northern Cape Department of Economic Development and Tourism and provides an impact assessment of IPPs on the communities in the province located within a 50km radius from existing facilities. The document notes that the NCP is nationally a leader in commercial-scale renewable energy projects. By 2018, a total of 23 IPP projects in the

Relevant policy	Relevance to Merino Wind Farm
	province had been integrated into the national grid. These projects include Solar PV, Concentrated Solar, and Wind Energy Facilities. The document notes that through their economic development obligations, these projects have already made a significant positive contribution to affected communities. Much of the effort has been directed at supporting local education. The document also notes that, as these projects are committed to 20-year minimum lifespans, they collectively hold a tremendous potential for socio-economic upliftment. The development of the Merino Wind Farm will contribute towards further socio-economic upliftment in the Northern Cape Province.
Northern Cape Critical Biodiversity Area (CBA) Map (2016)	The Northern Cape Critical Biodiversity Area (CBA) Map was published in 2016 and updates, revises and replaces all older systematic biodiversity plans and associated products for the province. The Northern Cape CBA map classifies the natural vegetation of the province according to conservation value in decreasing value, as follows: » Protected » Critical Biodiversity Area One (Irreplaceable Areas) » Critical Biodiversity Area Two (Important Areas) » Ecological Support Area » Other Natural Area At a regional level, the Critical Biodiversity Area (CBA) map for the Northern Cape indicates the northern part of the broader project site as being important for conservation. There are also two drainage lines (the two main ones on site) that are designated as being CBA1 areas. The remaining drainage lines of the broader project site are indicated as being Ecological Support Areas (ESAs). The development area for the Merino Wind Farm overlaps with a CBA One (CBA 1), Other Natural Areas (ONA), and an ESA.

5.6. Local Policy and Planning Context

The local tiers of government relevant to the Merino Wind Farm are the Ubuntu Local Municipality and the Pixley Ka Seme District Municipality. Instruments and/or policies at both the district and local level contain objectives which align with the development of Merino Wind Farm. These include, economic growth, job creation, community upliftment and poverty alleviation.

Relevant policy	Relevance to Merino Wind Farm
Pixley Ka Seme District Municipality Integrated Development Plan (IDP) (2019-2020)	The vision for the PKSDM is "Developed and Sustainable District for Future Generations" The mission statement that underpins the vision is: » Supporting our local municipalities to create a home for all in our towns, settlements, and rural areas to render dedicated services. » Providing political and administrative leadership and direction in the development planning process. » Promoting economic growth that is shared across and within communities. » Promoting and enhancing integrated development planning in the operations of our municipalities. » Aligning development initiatives in the district to the National Development Plan.

Relevant policy	Relevance to Merino Wind Farm
	The Strategic Objectives to address the vision that are relevant to the project include the promotion of economic growth in the district and enhancement of service delivery. Chapter 4 of the IDP, Development of Strategies, highlights the key strategies of the PKSDM. The IDP also notes that the growth and development context in the district has also changed radically since 2013 (after it had been stagnant for decades) owing mainly to private and public investments in the area as a hub for renewable energy generation and astronomy. The IDP notes that the economy in the Pixley Ka Seme municipal area is characterised by: » High levels of poverty and low levels of education. » Low levels of development despite the strategic location in terms of the national transport corridors. » High rate of unemployment, poverty, and social grant dependence. » Prone to significant environmental changes owing to long-term structural changes (such as climate change, energy crises and other shifts). Of specific relevance, the IDP highlights the potential for renewable energy to help address some of these challenges. The development of the Merino Wind Farm will promote economic development in the Pixley Ka Seme municipal area, thereby assisting in addressing some the challenges faced by the district municipality as detailed in the IDP.
Pixley Ka Seme District Municipality Spatial Development Framework (SDF) (2017)	The SDF notes that the vision for the PKSDM is "Pixley Ka Seme District Municipality, pioneers of development, a home and future for all". The Mission Statement that underpins the vision refers to: » Effective and efficient service delivery. » Optimal human and natural resource development. » Local economic growth and development, job creation and poverty alleviation. » A vibrant tourism industry. » To participate in the fight to reduce the infection rate and lessen the impact of HIV/AIDS and other communicable diseases. » A safe, secure and community friendly environment. The SDF identifies the opportunities and constraints associated with the district. An opportunity of relevance to the Merino Wind Farm is renewable energy and the development of a renewable energy hub in the region.
Ubuntu Local Municipality Integrated Development Plan (IDP) (2019 – 2020)	The vision of ULM is "By 2030, Ubuntu Municipality shall be the best rural municipality through relentless pursuit of excellence through focused governance, efficient administration, and effective service delivery for inclusive targeted social and economic development against all odds". The mission is to: » Maximize the utility of the municipal resources in a sustainable, developmental, and economic manner to better the life of all. » Improve institutional effectiveness and efficiency. » Optimally develop our human, financial and natural resources. » Create an enabling environment for local economic growth in order to create employment opportunities and alleviate poverty. » Work with all our existing and prospective partners to establish a vibrant tourism industry. » Participate in the fight to reduce the HIV/AIDS infection rate and lessen the

Relevant policy	Relevance to Merino Wind Farm
	impact thereof. » Focus on youth development, women empowerment and enabling the disabled to play a meaningful role in unlocking human potential. » Ensure a safe, secure and community friendly environment. » Maintain sound and sustainable management of financial and fiscal affairs. The IDP identifies a number of challenges facing the area in terms of economic development and growth. Of relevance to the project these include: » Unemployment and poverty. » Shortage of critical skills » Needs of vulnerable groups, including women, disabled and youth. » Access to basic services such as water, sanitation, electricity and housing. » Improved access to services in education, health and social services. » Reduction in the rate of crime. These issues can be addressed by supplier and enterprise development and enterprise development spend linked to the Merino Wind Farm.

CHAPTER 6: NEED AND DESIRABILITY

Appendix 2 of the 2014 EIA Regulations (GNR 326) requires that a Scoping Report includes a motivation for the need and desirability of the proposed development, including the need and desirability of the activity in the context of the preferred location. The need and desirability of the development needs to consider whether it is the right time and the right place for locating the type of land-use/activity being proposed. The need and desirability of a proposed development is, therefore, associated with the wise use of land, and should be able to respond to questions such as, but not limited to, what the most sustainable use of the land may be.

This Chapter provides an overview of the need and desirability, and perceived benefits of the project specifically.

6.1. Legal Requirements as per the EIA Regulations, 2014 (as amended), for the undertaking of a Scoping Report

This chapter includes the following information required in terms of Appendix 2: Content of a Scoping Report:

Requirement	Relevant Section
(f) a motivation for the need and desirability for the proposed development including the need and desirability of the activity in the context of the preferred location.	The need and desirability for the development of the Merino Wind Farm is included and discussed as a whole within this chapter. The need and desirability for the development of the wind farm has been considered from an international, national, regional, and site-specific perspective.

6.2. Need and Desirability from an International Perspective

The need and desirability of Merino Wind Farm, from an international perspective, can be described through the project's alignment with internationally recognised and adopted agreements, protocols, and conventions. South Africa is a signatory to a number of international treaties and initiatives, including the United Nation's Development Programme's (UNDP's) Sustainable Development Goals (SDGs). The SDGs address global socio-economic challenges such as poverty, hunger, health, education, climate change, gender equality, water, sanitation, energy, urbanisation, environment, and social justice. The SDGs consist of 17 global goals set by the United Nations. The 17 SDGs are characterised by 169 targets, and 304 indicators.

Goal 7 of the SDGs relates to "Affordable and Clean Energy", with the aim of the goal being to ensure access to affordable, reliable, sustainable, and modern energy for all. The following targets and indicators have been set for Goal 7:

Targets	Indicators
7.1 By 2030, ensure universal access to affordable, reliable and modern energy services.	7.1.1 Proportion of population with access to electricity. 7.1.2 Proportion of population with primary reliance on clean fuels and technology.
7.2 By 2030, increase substantially the share of	7.2.1 Renewable energy share in the total final energy

Targets		Indicators	
	renewable energy in the global energy mix.		consumption.
7.3	By 2030, double the global rate of improvement in energy efficiency.	7.3.1	Energy intensity measured in terms of primary energy and GDP.
7.A	By 2030, enhance international cooperation to facilitate access to clean energy research and technology, including renewable energy, energy efficiency and advanced and cleaner fossil-fuel technology, and promote investment in energy infrastructure and clean energy technology.	7.A.1	Mobilised amount of United States dollars per year starting in 2020 accountable towards the $100 billion commitment.
7.B	By 2030, expand infrastructure and upgrade technology for supplying modern and sustainable energy services for all in developing countries, in particular least developed countries, small island developing States, and land-locked developing countries, in accordance with their respective programmes of support.	7.B.1	Investments in energy efficiency as a percentage of GDP and the amount of foreign direct investment in financial transfer for infrastructure and technology to sustainable development services.

The development of the Merino Wind Farm would contribute positively towards Goal 7 (and specifically 7.2.1) of the SDGs through the following means:

- By generating up to 140MW (contracted capacity) of affordable and clean energy.
  - A study published by the CSIR on 14 October 2016 ("Cost of new power generators in South Africa Comparative analysis based on recent Independent Power Producer (IPP) announcements", Dr Tobias Bischof-Niemz and Ruan Fourie) which took into consideration the results of the cost prices bid successfully under the Department of Mineral Resources and Energy's Renewable Energy (RE) IPP and Coal Baseload IPP Procurement Programmes, found that solar PV and wind were 40% cheaper than new baseload coal (i.e. R0.62/kWh for PV and wind vs R1.03 for coal).
  - Wind power technology is one of the cleanest electricity generation technologies, as it does not result in the release of emissions during its operation.
- By contributing towards South Africa's total generation capacity, specifically through the utilisation of renewable energy resources.

The Kyoto Protocol (1997) is also relevant to the need for the development of the Merino Wind Farm from an international perspective. The protocol calls for the reduction of South Africa's greenhouse gas emissions through actively cutting down on using fossil fuels, or by utilising more renewable resources. The development of the Merino Wind Farm will add capacity to the renewable energy sector of the country and strengthen the commitment and action plan to achieve the requirements, as set out in the protocol, through the generation of energy without the emission of greenhouse gasses.

6.3. Need and Desirability from a National Perspective

The National Development Plan (NDP) envisages that, by 2030, South Africa will have an energy sector that provides reliable and efficient energy service at competitive rates; that is socially equitable through expanded access to energy at affordable tariffs; and that is environmentally sustainable through reduced emissions and pollution. Historically, coal has provided the primary fuel resource for baseload electricity generation in South Africa. Consequently, Eskom, who is the main electricity generating company in the country, generates approximately 85% of the country's electricity from coal resources (Stats SA, 2016), resulting in a large carbon footprint. Taking into consideration the need to ensure adequate supply of

electricity and meet international obligations in terms of addressing climate change, Government has identified the need to diversify the energy mix within the country.

The Merino Wind Farm is proposed in specific response to a National Government initiative, the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) or a similar programme. This programme was initiated in order to give effect to the requirements of the IRP with regards to renewable energy targets. As a result, the need and desirability of the Merino Wind from a national perspective can largely be linked from the project's alignment with national government policies, plans, and programmes which have relevance to energy planning and production (as discussed in detail in **Chapter 5**). The following key plans have been developed by National Government to consider South Africa's current energy production, projected future demands, and provides the necessary framework within which energy generation projects can be developed:

» Integrated Energy Plan (IEP)
» Integrated Resource Plan (IRP)

The above-mentioned energy plans have been extensively researched and are updated on an on-going basis to take into consideration changing scenarios, new information, developments in new technologies, and to reflect updated demands and requirements for energy production within the South African context. These plans form the basis of South Africa's energy generation sector and dictate national priorities for energy production.

The IEP is intended to provide a roadmap of South Africa's future energy landscape and guide future energy infrastructure investments and policy development. The Plan considered the three pillars of sustainable development, and list the following as the eight key energy planning objectives:

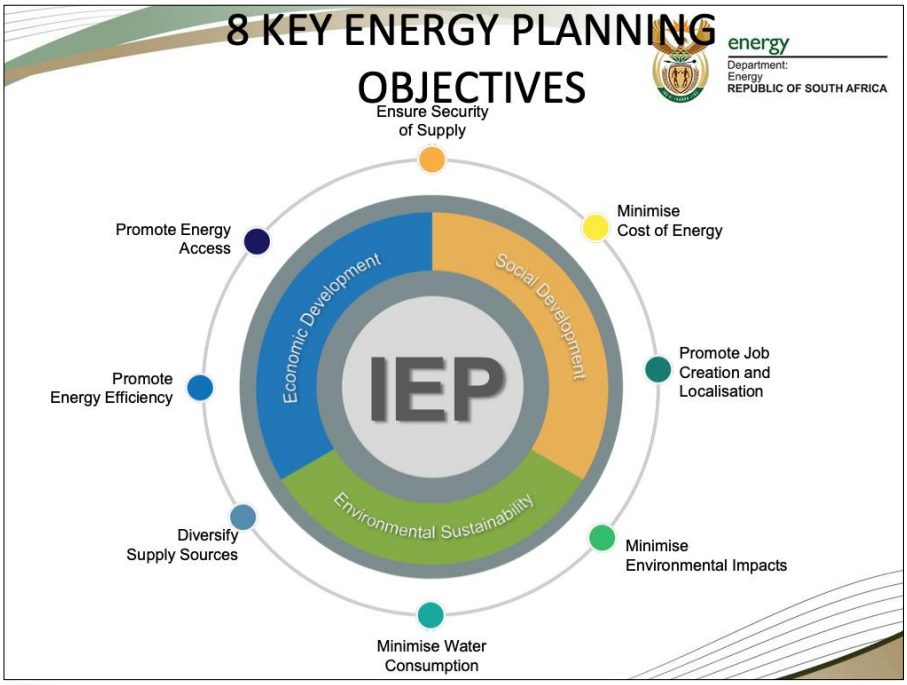

Figure 6.1: Eight key energy objectives as listed in the IEP, 2016 (extract from DOE presentation, December 2016)

In terms of electricity generation, the IEP states that South Africa should continue to pursue a diversified energy mix which reduces reliance on a single or a few primary energy sources, and includes the following statement regarding wind energy's contribution to the diversified energy mix:

» *Wind energy should continue to play a role in the generation of electricity. Allocations to ensure the development of wind energy projects aligned with the IRP should continue to be pursued.*

The IRP for Electricity 2010 – 2030 (gazetted in 2019) is a subset of the IEP and constitutes South Africa's current gazetted energy plan. The purpose of the plan is to ensure sustainable electricity development which takes into consideration technical, economic, and social constraints, and identifies investments in the electricity sector which are required to meet the country's forecasted electricity demands at minimum costs. This plan provides for the development of 17 743MW of capacity from large scale wind energy facilities by 2030, with an annual contribution of 1600MW from 2022.

A number of IPP Procurement Programmes have been initiated to secure electricity generated from a range of resources from the private sector (i.e., from Independent Power Producers, or IPPs). Under these Programmes, IPPs are invited to submit proposals for the finance, construction, operation, and maintenance of electricity generation facilities for the purpose of entering into an Implementation Agreement with the DMRE and a Power Purchase Agreement (PPA) with Eskom as the buyer. Provision has been made for new additional capacities in the IRP 2019 (refer to **Table 6.1**).

Table 6.1: Overview of the total installed capacity expected by 2030

IPP Procurement Programme	Technology	MW	Total
Renewables	Wind	17 742MW	31 320MW
	Solar CSP	600MW	
	Solar Photovoltaic	8 288MW	
	Hydro	4 600MW	
Coal	Coal	33 364MW	33 364MW
Nuclear	Nuclear	1 860MW	1 860MW
Gas & Diesel	Gas & Diesel	3 000MW	3 000MW
Other (Distributed Generation, CoGen, Biomass, Landfill)	Other (Distributed Generation, CoGen, Biomass, Landfill)	4 000MW	4 000MW

Renewable resources are valuable in contributing towards electricity generation and diversifying South Africa's electricity mix, while contributing towards South Africa's response to Climate Change. Under the REIPPPP, the DMRE intends to secure 14 725MW of electricity from renewable energy generation facilities utilising either onshore wind, concentrated solar thermal, solar photovoltaic (PV), biomass, biogas, landfill gas, or hydro across a number of bidding windows, while simultaneously contributing towards socio-economic development. A total of 1 980MW[10] of wind generated electricity has been awarded to preferred bidders across four (4) rounds of bidding to date, with 1 362MW still remaining to be allocated in subsequent bidding rounds. Preferred bidders identified under any IPP Procurement Programme, including the REIPPPP, are required to satisfy a number of economic development requirements, including amongst others, job creation, local content, skills development, enterprise and supplier development, and socio-

[10] https://www.cliffedekkerhofmeyr.com/en/news/publications/2019/Corporate/energy-alert-22-october-The-Integrated-Resource-Plan-2019-A-promising-future-roadmap-for-generation-capacity-in-South-Africa.html

economic development. In addition to electricity generation and supply, IPP Procurement Programmes also contribute positively towards socio-economic development of a region, over and above job creation.

The need for new power generation from wind energy facilities has been identified and assessed by government at a national scale considering the national energy requirements as well as international commitments under the Paris Agreement; therefore, provision has been made for the inclusion of new wind power generation capacity in South Africa's energy mix. The implementation of the Merino Wind Farm has the potential to contribute positively towards the identified need, while simultaneously contributing to job creation and socio-economic development, identified as a need for the country within the National Development Plan (NDP).

Merino Wind Farm will make use of renewable energy technology and would contribute positively towards reducing South Africa's GHG emissions and ensure compliance with all applicable legislation and permitting requirements. In addition, by making use of wind technology, Merino Wind Farm would have reduced water requirements when compared with some other generation technologies in alignment with one of the vision 2030 themes of the then-Department of Water and Sanitation's (now the Department of Human Settlements, Water and Sanitation) National Water Resource Strategy 2 (2013) (i.e., transitioning to a low carbon economy through stimulating renewable energy and retrofitting buildings).

6.4. Need and Desirability of the project from a Regional Perspective

South Africa's electricity generation mix has historically been dominated by coal. However, up to 2030, a new capacity demand will be driven by the decommissioning of existing coal-fired power stations. A further 24 100MW (**Figure 5.2**) of coal power is expected to be decommissioned in the period 2030 to 2050. Therefore, additional capacity will be required from renewable energy sources, particularly wind with 14 400MW being allocated for the period up to 2030.

	Coal	Cost (Decommissioning)	Nuclear	Hydro	Storage	PV	Wind	CSP	GAS/ Diesel	Other (Distributed Generation, Cogeri, Biomass, Landfill
Current	31715		1860	2100	2912	1474	1980	300	3830	499
2019	2155	-2372	-	-	-	-	244	300	-	Allocation to the intent of the short term capacity and energy gap
2020	1433	-557	-	-	-	114	300	-	-	
2021	1433	-1403	-	-	-	300	818	-	-	
2022	755	-344	-	-	513	400 1000	1600	-	-	
2023	750	-555	-	-	-	1000	1600	-	-	500
2024	1 000	-	1660	-	-	-	1600	-	1000	500
2025	7 000	-	-	-	-	1000	1600	-	-	500
2026	-	-1734	-	-	-	-	1600	-	-	500
2027	750	-547	-	-	-	-	1600	-	2000	500
2028	-	-475	-	-	-	1000	1600	-	-	500
2029	-	-1654	-	-	1575	1000	1600	-	-	500
2030	-	-1656	-	1500	-	1000	1600	-	-	500
Total Installed Capacity by 2030 (MW)	33164		1660	4600	5000	8288	17742	600	6380	-
% Total Installed Capacity (% of MW)	43		2.36	5.84	6.35	10.52	22.53	0.76	8.1	-
% Annual Energy Contribution (% of MWh)	58.3		4.5	0.3	1.2	6.3	17.8	0.6	1.3	-

Figure 6.2: A snapshot of the updated Energy Mix as per the IRP 2019

Although the majority of South Africa's electricity generation infrastructure (coal-fired power stations) is currently located within Mpumalanga due to the location of coal resources within this province, the Northern Cape Province has been identified as an area where electricity generation from wind energy facilities is highly feasible and a viable option. The location of the study area and project site within the Northern Cape is therefore considered to support the Province/Region's generation targets.

The overarching objective for the Merino Wind Farm is to maximise electricity production through exposure to the wind resource, while minimising infrastructure, operational and maintenance costs, as well as social and environmental impacts. From a regional site selection perspective, this region is considered to be preferred for wind energy development by virtue of its abundant wind resource. The wind speed for the area derived from the Wind Atlas for South Africa (WASA) High Resolution Wind Resource Map is within the range of 6.5m.s^{-1} to 8m.s^{-1}, which is considered favourable for the development of a wind farm (refer to **Figure 6.3**).

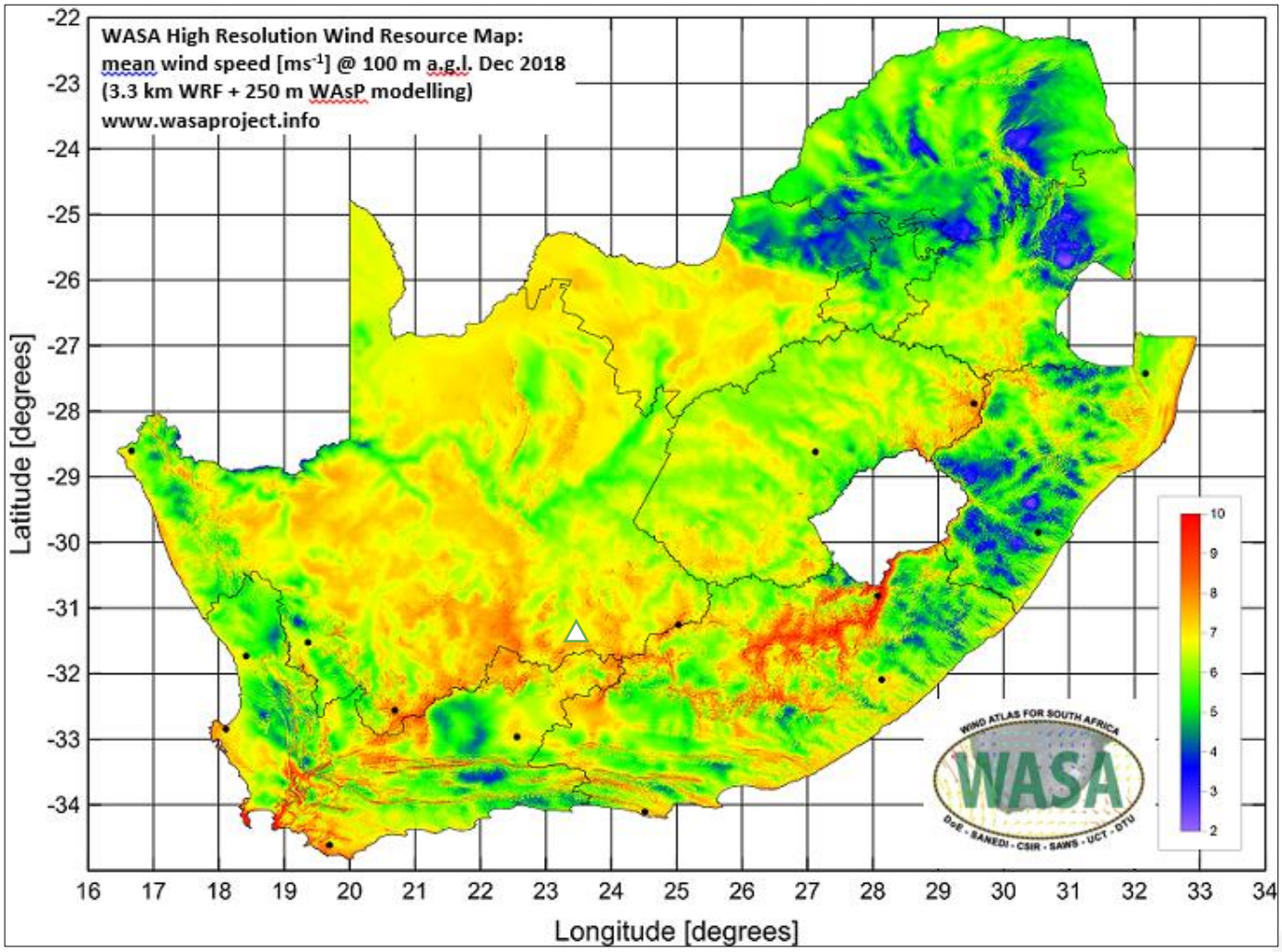

Figure 6.3: Wind resource map for South Africa, with the position of Merino Wind Farm shown by the white triangle (Source: wasaproject.info)

6.5. Receptiveness of and desirability of the project site to develop the Merino Wind Farm

The placement of a wind farm is strongly dependent on several factors including climatic conditions (wind speed), topography, the location of the site, availability of grid connection, the extent of the site and the

need and desirability for the project. From a local level perspective, the project site and development area have specifically been identified by the proponent as being highly desirable from a technical perspective for the development of a wind farm due to the following site characteristics:

» **Wind resource**: The economic viability of a Wind Energy Facility is directly dependent on the wind speed. The wind speed for the area derived from the Wind Atlas for South Africa (WASA) High Resolution Wind Resource Map is within the range of 6.5m.s^{-1} to 8m.s^{-1}, which is considered favourable for the development of a wind farm.

» **Land Availability**: Availability of relatively level land of sufficient extent can be a restraining factor to wind farm development. The project site is ~29 909ha in extent, which is sufficient to the development of a wind farm with a contracted capacity of up to 140MW, while allowing for the avoidance of environmental sensitivities. A development area of ~5 516ha has been identified within the project site within which the wind farm will be sited. The development footprint within which the footprint of the Merino Wind Farm and associated infrastructure will be placed will be defined during the EIA Phase. The extent of land available for the construction and operation of Merino Wind Farm and the opportunity provided for the avoidance of environmental sensitivities contributes to the need and desirability of the development in the proposed location.

» **Land Use**: The current land use of the development area is an important consideration in site selection in terms of limiting disruption to existing land use practices. The project site is currently used for agricultural purposes, specifically livestock farming, which is generally preferred for developments of this nature as the livestock farming can continue on the project site in tandem with the operation of the wind farm. The development area is not optimal for agricultural land use activities due to the arid climate and shallow soils, limiting the overall potential of the site to very low and rendering a low carrying capacity for livestock. Other land uses present within the vicinity of the development area include power line servitudes and the future development of other renewable energy facilities which have received EAs from the DFFE. The proposed development is compatible with the surrounding land uses and does not present a conflicting land use.

» **Topographical Considerations**: Sites that facilitate easy construction conditions, (i.e., relatively flat topography, lack of major rock outcrops, limited watercourse crossings, etc.) are favoured by developers during the site selection process. As a result, the development area for the Merino Wind Farm consists of a largely flat to undulating landscape interspersed with area of high elevation in the form if localised hills, koppies, ridges and/or mountains. These characteristics are preferred for the construction and operation of a wind energy facility such as the Merino Wind Farm.

» **Access to Road Infrastructure and Site access**: **Site access**: Access to the project site is ample with the presence of existing roads mainly consisting of national and regional roads. The project site is bisected by the N1 national road, which provides access to the project site and development area. The R398 is located to the north-east of the project site and the R63 is located to the south-west of the project site. The gravel main access road which also bisects the project site provides direct access to the project site and the development area (refer to **Figure 6.4**). As material and components would need to be transported to the development area during the construction phase, accessibility to the project site is a key factor in determining the viability of the Merino Wind Farm, particularly taking transportation costs (direct and indirect) into consideration and the impact of this on the project economics and the ability to submit a competitive bid under the DMRE's REIPPP Programme or a similar programme.

Figure 6.4: Location of the development area (outline in blue) in relation to the gravel main access road that bisects the project site and provides direct access to the project site and development area and the N1 national road. This infrastructure will primarily be used to gain access to the development area.

» **Grid access:** A key factor in the sitting of any generation project is a viable grid connection. The anticipated grid connection solution (subject to a separate environmental assessment and authorisation process) is a 132kV central collector substation and a 132kV power line to enable connection to the Existing Gamma Substation.

» **Landowner Support:** The selection of a site where the landowner is supportive of the development of renewable energy is essential for ensuring the success of the project. The three landowners affected by the proposed Merino Wind Farm do not view the development as a conflict with their current land use practices. The support from the landowners for the development to be undertaken on the affected properties has been solidified by the provision of consent for the project to proceed on the property through the signing of consent forms.

» **Proximity *to Towns with a Need for Socio-Economic Upliftment:*** The official unemployment rate in the Ubuntu Local municipality in 2011 was 18.1%, while 44.2% were employed, and 33.2% were regarded as not economically active. The figures for Ward 3 (i.e., the affected ward) in 2011 were 6.8% unemployed, 62.5% employed and 28.4% not economically active. With the development of the Merino Wind Farm, secondary social benefits can be expected in terms of additional spend in the nearby towns due to the increased demand for goods and services.

Considering the above, it is clear that a need for employment opportunities and skills development is present within the area.

Taking into consideration the wind resource, grid access, land availability, landowner support, access to road infrastructure, the current land use of the project site and development area, the development of

the Merino Wind Farm is considered to be desirable and will ultimately contribute to, and further develop the successful power generation activities already being undertaken within the Northern Cape.

6.6. Benefits of Renewable Energy and the Need and Desirability in the South African Environment

The generation of electricity from renewable energy resources offers a range of potential socio-economic and environmental benefits for South Africa. These benefits include:

Socio-economic upliftment of local communities: The Merino Wind Farm has the potential to create much needed employment for unskilled locals during the construction phase. Training opportunities will also be afforded to qualified local people who can be upskilled to undertake certain roles during the construction and operation phases. Some of the challenges facing the Local and District municipalities, as detailed in the IDPs include High rates of unemployment, high levels of poverty, and low levels of development despite the strategic local in terms of the national transport corridors. The Local and District municipalities are therefore in need to economic development, sustainable employment opportunities and growth in personal income levels. A study undertaken by the DMRE, National Treasury and the Development Bank of Southern Africa (DBSA) in June 2017 found that employment opportunities created during the construction phase of renewable energy projects implemented to date had created 40% more jobs for South African citizens than anticipated. The study also found that significantly more people from local communities were employed during construction than was initially planned, confirming the potential benefits for local communities associated with the implementation of renewable energy projects.

Merino Wind Farm also has the potential to make a positive contribution towards the identified community needs. In terms of the economic development requirements of the REIPPPP, the project will commit benefits to the local community in the form of job creation, localisation, and community ownership. In accordance with the DMRE's bidding requirements of the REIPPPP, a percentage of the revenue generated per annum during operation will be made available to local communities through a social beneficiation scheme. Therefore, the potential for creation of employment and business opportunities, and the opportunity for skills development for local communities is significant. Secondary social benefits can be expected in terms of additional spend in nearby towns due to the increased demand for goods and services. These socio-economic benefits would include an increase in the standard of living for local residents within the area as well as overall financial and economic upliftment.

Increased energy security: Given that renewables can often be deployed in a short timeframe and in a decentralised manner close to consumers, they offer the opportunity for improving grid strength and supply quality in the short-term, while reducing expensive distribution losses. As a result of the power constraints in the first half of 2015, power generators meant to be the "barely-ever-used" safety net for the system (diesel-fired gas turbines) were running at >30% average load factor in the first half of 2015. Load shedding occurred during 82 days in the first half of 2015 (out of 181 days). Results of a CSIR Energy Centre study for the period January to June 2015 (CSIR, August 2015), concluded that the already implemented renewable projects (wind and solar) within the country avoided 203 hours of so-called 'unserved energy'. During these hours, the supply situation was such that some customers' energy supply would have had to be curtailed ('unserved') had it not been for the renewables. The avoidance of unserved energy cumulated into the effect that for 15 days, from January to June 2015, load shedding was avoided entirely, delayed, or a higher stage of load shedding prevented due to the contribution of renewable wind

and PV projects[11]. More recently, power generated from renewable energy sources has assisted Eskom in alleviating the need for rolling blackouts when aging power stations have been offline for maintenance.

Resource saving: It is estimated that the achievement of the targets in the Renewable Energy White Paper will result in water savings of approximately 16.5 million kilolitres per annum. As an already water-stressed nation, it is critical that South Africa engages in a variety of water conservation measures, particularly due to the detrimental effects of climate change on water availability. Renewable energy also translates into revenue savings, as fuel for renewable energy facilities is free, while compared to the continual purchase of fuel for conventional power stations. Results of a CSIR Energy Centre study for January – June 2015 (CSIR, August 2015) have quantified the contribution from renewable energy to the national power system and the economy over the first 6 months of 2015 compared to the 12 months of 2014:

2015 (6 months)	2014 (12 months)
R3.60 billion saving in diesel and coal fuel costs	R3.64 billion saving in diesel and coal fuel costs
200 hours of unserved energy avoided, saving at least an additional R1.20 billion–R4.60 billion for the economy	120 hours of unserved energy avoided, saving at least an additional R1.67 billion for the economy
Generated R4.0 billion more financial benefits than cost	Generated R0.8 billion more financial benefits than cost

Exploitation of significant renewable energy resource: At present, valuable renewable resources, including biomass by-products, solar irradiation and wind power remain largely unexploited. The use of these energy flows will strengthen energy security through the development of a diverse energy portfolio in South Africa.

By the end of March 2019, the REIPPPP had made the following significant impacts in terms of energy supply:

* 6 422MW of electricity had been procured from 112 Renewable Energy Independent Power Producers (IPPs) in seven bid rounds.
* 3 976 MW of electricity generation capacity from 64 IPP projects has been connected to the national grid.
* 35 669 GWh6 of energy has been generated by renewable energy sources procured under the REIPPPP since the first project became operational. Renewable energy IPPs have proved to be very reliable. Of the 64 projects that have reached COD, 62 projects have been operational for longer than a year. The energy generated over the past 12-month period for these 62 projects is 10 648 GWh, which is 96% of their annual energy contribution projections of 11 146 GWh over a 12-month delivery period. Twenty-eight (28) of the 62 projects (45%) have individually exceeded their projections.

Economics: As a result of the excellent resource and competitive procurement processes, both wind power and solar PV power are now proven in South Africa as cheaper forms of energy generation than coal power. They offer excellent value for money to the economy and citizens of South Africa while benefitting society as a whole through the development of clean energy.

The following has been achieved by the IPP programme (March 2019) in terms of investment and economics:

* Investment (equity and debt) to the value of R209.7 billion10, of which R41.8 billion (20%) is foreign investment, was attracted.

[11] (http://ntww1.csir.co.za/plsql/ptl0002/PTL0002_PGE157_MEDIA_REL?MEDIA_RELEASE_NO=7526896)

- Socio-economic development contributions of R860.1 million to date, of which R81.1 million was spent in this 2019 reporting quarter.
- Enterprise development contributions of R276.7 million to date, of which R26.5 million was spent in this 2019 reporting quarter.

Pollution reduction: The release of by-products through the burning of fossil fuels for electricity generation has a particularly hazardous impact on human health and contributes to ecosystem degradation. The use of solar irradiation or wind for power generation is a non-consumptive use of a natural resource which produces zero emissions during its operation.

The overview of the Independent Power Producers Procurement Report (March 2019) indicates that a carbon emission reduction of 36.2 Mton CO_2 has been realised by the IPP programme from inception to date, of which 2.91 Mton is in the 2019 reporting quarter.

Climate friendly development: The uptake of renewable energy offers the opportunity to address energy needs in an environmentally responsible manner and thereby allows South Africa to contribute towards mitigating climate change through the reduction of GHG emissions. South Africa is estimated to currently be responsible for approximately 1% of global GHG emissions (and circa half of those for which Africa is responsible) and is currently ranked 9th worldwide in terms of per capita carbon dioxide emissions. Since its inception, the REIPPPP has achieved carbon emission reductions[12] of 25.3 million tonnes of CO_2 (IPP Office, March 2018). The development of Merino Wind Farm, and the associated electricity generated as a result of the facility, will result in considerable savings on tons of CO_2 emissions.

Support for international agreements: The effective deployment of renewable energy provides a tangible means for South Africa to demonstrate its commitment to its international agreements under the Kyoto Protocol and the Paris Agreement, and for cementing its status as a leading player within the international community.

Employment creation: The development, procurement, installation, maintenance and management of renewable energy facilities have significant potential for job creation and skills development in South Africa. The construction phase will create temporary employment opportunities and the operation phase will create limited full-time employment opportunities.

Acceptability to society: Renewable energy offers a number of tangible benefits to society, including reduced pollution concerns, improved human and ecosystem health and climate friendly development.

Support to a new industry sector: The development of renewable energy offers the opportunity to establish a new industry within the South African economy, which will create jobs and skill local communities which have potential for further renewable energy projects.

Protecting the natural foundations of life for future generations: Actions to reduce our disproportionate carbon footprint can play an important part in ensuring our role in preventing dangerous anthropogenic climate change, thereby securing the natural foundations of life for generations to come; this is the basis of sustainable development.

[12] Carbon emission reduction is calculated based on a displacement of power, from largely coal-based to more environmentally friendly electrical energy generation, using a gross Eskom equivalent emissions factor of 1.015 tons CO_2/MWh.

CHAPTER 7: APPROACH TO UNDERTAKING THE SCOPING PHASE

In terms of the EIA Regulations of December 2014 (as amended) published in terms of the NEMA (Act No. 107 of 1998) as amended, the construction and operation of Merino Wind Farm is a listed activity requiring Environmental Authorisation (EA). The application for EA is required to be supported by an Environmental Impact Assessment (EIA) process based on the contracted capacity of the facility being 140MW and Activity 1 of Listing Notice 2 (GNR 325) being triggered.

An EIA process refers to the process undertaken in accordance with the requirements of the 2014 EIA Regulations (GNR 326), as amended, which involves the identification and assessment of direct, indirect, and cumulative environmental impacts associated with a proposed project or activity. The EIA process comprises two main phases: i.e., **Scoping** and **EIA Phase**, and is illustrated in **Figure 7.1**. Public participation forms an important component of the process and is undertaken throughout both phases.

Figure 7.1: The Phases of an Environmental Impact Assessment (EIA) Process

7.1 Legal Requirements as per the EIA Regulations, 2014 (as amended), for the undertaking of an Impact Assessment Report

This chapter includes the following information required in terms of Appendix 2: Content of a Scoping report:

Requirement	Relevant Section
(d)(i) a description of the scope of the proposed activity, including all listed and specified activities triggered and being applied for and (ii) a description of the activities to be undertaken, including associated structures and infrastructure.	All listed activities triggered and applied for are included in s**ection 7.2**.
(g)(ii) details of the public participation process undertaken in terms of Regulation 41 of the Regulations, including copies of the supporting documents and inputs.	The public participation process followed throughout the EIA process for the Merino Wind Farm is included in s**ection 7.5.2** and copies of the supporting documents and inputs are included in **Appendix C**.

Requirement	Relevant Section
(g)(iii) a summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them.	The main issues raised through the undertaking of the public participation process, including consultation with I&APs are included in the Comments and Responses Report in **Appendix C8**.
(g)(vi) the methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives;	The methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives are included in **section 7.5.3**.
(o) a description of any assumptions, uncertainties, and gaps in knowledge which relate to the assessment and mitigation measures proposed.	The assumptions and limitations of the EIA process being undertaken for the Merino Wind Farm is included in s**ection 7.6**.

7.2 Relevant legislative permitting requirements

The legislative permitting requirements applicable to Merino Wind Farm, as identified at this stage in the process and considered within this EIA process, are described in more detail under the respective sub-headings.

7.2.1 National Environmental Management Act (No. 107 of 1998) (NEMA)

The NEMA is South Africa's key piece of national environmental legislation that provides for the authorisation of certain controlled activities known as "listed activities". In terms of Section 24(1) of the NEMA, the potential impact on the environment associated with listed activities must be considered, investigated, assessed, and reported on to the Competent Authority (the decision-maker) charged by NEMA with granting of the relevant Environmental Authorisation (EA). Since the A Merino Wind Farm is a power generation project and therefore relates to the IRP for Electricity 2010 – 2030, the National Department of Forestry, Fisheries, and the Environment (DFFE) has been determined as the Competent Authority (CA) in terms of GNR 779 of 01 July 2016. The Provincial Northern Cape Department of Agriculture, Environmental Affairs, Rural Development and Land Reform (DAEARD & LR) is the Commenting Authority on the project.

The need to comply with the requirements of the EIA Regulations published under NEMA ensures that developers are provided the opportunity to consider the potential environmental impacts of their activities early in the project development process, and also allows for an assessment to be made as to whether environmental impacts can be avoided, minimised or mitigated to acceptable levels. Comprehensive, independent environmental studies are required to be undertaken in accordance with the EIA Regulations to provide the Competent Authority with sufficient information in order for an informed decision to be taken regarding the Application for EA.

The EIA process being conducted for the Merino Wind Farm is undertaken in accordance with Section 24(5) of the NEMA, which defines the procedure to be followed in applying for EA, and requires that the potential consequences for, or impacts of, listed or specified activities on the environment be considered, investigated, assessed, and reported on to the competent authority. Listed Activities are activities identified in terms of Section 24 of the NEMA which are likely to have a detrimental effect on the environment, and which may not commence without an EA from the competent authority subject to the completion of an environmental assessment process (either a Basic Assessment (BA) or full Scoping and EIA).

Table 7.1 details the listed activities in terms of the EIA Regulations, 2014 (as amended) that apply to the Merino Wind Farm, and for which an application for Environmental Authorisation has been submitted to the DFFE. The table also includes a description of the specific project activities that relate to the applicable listed activities.

Table 7.2: Listed activities as per the EIA Regulations that are triggered by the Merino Wind Farm

Notice Number	Activity Number	Description of listed activity
Listing Notice 1 (GNR 327) 08 December 2014 (as amended on 07 April 2017)	11(i)	The development of facilities or infrastructure for the transmission and distribution of electricity – (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275kV. ***Internal electrical infrastructure required to connect the Merino Wind Farm to the grid connection infrastructure will consist of a 132kV onsite substation and 132kV cabling (buried or overhead) and will collectively exceed 2km outside an urban area.***
Listing Notice 1 (GNR 327) 08 December 2014 (as amended on 07 April 2017)	12(ii)(a)(c)	The development of – (ii) Infrastructure or structures with a physical footprint of 100 square metres or more Where such development occurs- (a) within a watercourse; or (c) within 32 metres of a watercourse. ***The construction and operation of the Merino Wind Farm and associated infrastructure will include the development of some infrastructure within seepage wetlands, rivers, and floodplains, as well as within 32m of these watercourses. The infrastructure will have a physical footprint of more than 100 square metres.***
Listing Notice 1 (GNR 327) 08 December 2014 (as amended on 07 April 2017)	14	The development and related operation of facilities and infrastructure, for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 cubic metres or more but not exceeding 500 cubic metres. ***The development of the Merino Wind Farm will require the construction and operation of facilities and infrastructure for the storage and handling of dangerous goods (combustible and flammable liquids, such as oils, lubricants, solvents) associated with the on-site substations, where such storage will occur inside containers with a combined capacity exceeding 80 cubic meters but not exceeding 500 cubic meters.***
Listing Notice 1 (GNR 327) 08 December 2014 (as amended on 07 April 2017)	19(i)	***The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a (i) Watercourse.*** ***Parts of the development area for the Merino Wind Farm are located within watercourses. Therefore, during the construction phase, 10 cubic metres or more of rock will be removed from the watercourses.***
Listing Notice 1 (GNR 327) 08 December 2014 (as	24(ii)	The development of a road – (ii) with a reserve wider than 13.5m, or where no reserve exists where the road is wider than 8m.

Notice Number	Activity Number	Description of listed activity
amended on 07 April 2017)		***The construction of the Merino Wind Farm will require the construction of new access roads in areas where no road reserve exists to provide access to the facility. These will exceed 8m in width.***
Listing Notice 1 (GNR 327) 08 December 2014 (as amended on 07 April 2017)	28(ii)	Residential, mixed, retail, commercial, industrial, or institutional developments where such land was used for agriculture, game farming, equestrian purposes or afforestation on or after 01 April 1998 and where such development: (ii) will occur outside an urban area, where the total land to be developed is bigger than 1ha. ***The total area to be development (i.e., the development footprint) for the Merino Wind Farm is greater than 1ha and occurs outside an urban area in an area currently zoned for agriculture.***
Listing Notice 1 (GNR 327) 08 December 2014 (as amended on 07 April 2017)	56(ii)	The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre (ii) where no reserve exists, where the existing road is wider than 8 metres. ***Existing farm roads within the project site may require widening, and access roads will be widened by more than 6 metres.***
Listing Notice 2 (GNR 325) 08 December 2014 (as amended on 07 April 2017)	1	The development of facilities or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20MW or more. ***The project comprises a renewable energy generation facility, which will utilise wind power technology and will have a generation capacity of up to 140MW.***
Listing Notice 2 (GNR 325) 08 December 2014 (as amended on 07 April 2017)	15	The clearance of an area of 20ha or more of indigenous vegetation[13]. ***The facility is located on agricultural land where the predominant land use is livestock grazing and is therefore likely to comprise indigenous vegetation. The project would therefore result in the clearance of indigenous vegetation within an area in excess of 20ha for the development of infrastructure.***
Listing Notice 3 (GNR 325) 08 December 2014 (as amended on 07 April 2017)	4(g)(ii)(ee)	The development of a road wider than 4 metres with a reserve less than 13,5 metres. g. Northern Cape ii. Outside urban areas: (ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans. ***The development of the Merino Wind Farm and associated infrastructure will require the development of roads wider than 4m within a CBA, specifically CBA 1, outside urban areas within the Northern Cape Province.***

[13] "Indigenous vegetation" as defined by the 2014 EIA Regulations (GNR 326) refers to vegetation consisting of indigenous plant species occurring naturally in an area, regardless of the level of alien infestation and where the topsoil has not been lawfully disturbed during the preceding ten years.

Notice Number	Activity Number	Description of listed activity
Listing Notice 3 (GNR 325) 08 December 2014 (as amended on 07 April 2017)	10(g)(ii)(iii)(ee)	The development and related operation of facilities or infrastructure for the storage, or storage and handling of a dangerous good where such storage occurs in containers with a combined capacity of 30 but not exceeding 80 cubic metres g. Northern Cape ii. Areas within a watercourse or wetland; or within 100 metres from the edge of a watercourse or wetland. iii. Outside urban areas: (ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans. ***The development of the Merino Wind Farm will require the construction and operation of facilities for the storage and handling of a dangerous goods (combustible and flammable liquids, such as oils, lubricants, solvents) associated with the on-site substations, where such storage will include insider containers with a capacity of 80 cubic meters within CBA areas. There are watercourses located within parts of the development area for the Merino Wind Farm, namely seepage and channelled valley bottom wetlands and rivers. The development area also falls within a CBA1, outside an urban area and within the Northern Cape Province.***
Listing Notice 3 (GNR 325) 08 December 2014 (as amended on 07 April 2017)	12(g)(ii)	The clearance of an area of 300 square metres or more of indigenous vegetation g. Northern cape ii. Within critical biodiversity areas identified in bioregional plans. ***The development of the Merino Wind Farm will require the clearance of more than 300 square meters of indigenous vegetation within a CBA1 in the Northern Cape Province.***
Listing Notice 3 (GNR 325) 08 December 2014 (as amended on 07 April 2017)	14(ii)(a)(c)(g)(ii)(ff)	The development of— (ii) infrastructure or structures with a physical footprint of 10 square metres or more; where such development occurs— (a) within a watercourse; or (c) within 32 metres of a watercourse, measured from the edge of a watercourse. g. Northern Cape ii. Outside urban areas: (ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans. ***The development of the Merino Wind Farm will require the establishment of infrastructure with a physical footprint exceeding 10m² within seepage wetlands, rivers, and floodplains, as well as within 32m of these watercourses. The project site comprises areas classified as CBA1 and Ecological Support Areas and falls outside of an urban area.***

Notice Number	Activity Number	Description of listed activity
Listing Notice 3 (GNR 325) 08 December 2014 (as amended on 07 April 2017)	18(g)(ii)(ee)(ii)	The widening of a road by more than 4 metres, or the lengthening of a road by more than 1 kilometre. g. Northern Cape ii. Outside urban areas: (ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans. (ii) Areas within a watercourse or wetland; or within 100 metres from the edge of a watercourse or wetland. ***The development of the Merino Wind Farm will require the widening of roads by more than 4m, outside urban areas, within areas classified as CBA1, and within a watercourse or wetland and within 100m from the edge of a watercourse or wetland (i.e., seepage and channelled valley bottom wetlands and rivers) in the Northern Cape Province.***

7.2.2 National Water Act (No. 36 of 1998) (NWA)

In accordance with the provisions of the National Water Act (No. 36 of 1998) (NWA), all water uses must be licensed with the Competent Authority (i.e., the Regional Department of Water and Sanitation (DWS) or the relevant Catchment Management Agency (CMA)). Water use is defined broadly, and includes 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.

Table 7.2 contains Water Uses associated with the proposed project and identified in terms of the NWA which require licensing either in the form of a General Authorisation (GA), or in the form of a Water Use License (WUL). The table also includes a description of those project activities which relate to the applicable Water Uses.

Table 7.2: List of Water Uses published under Section 21 of NWA, as amended.

Notice No.	Activity No.	Description of Water Use
NWA (No. 36 of 1998)	Section 21 (c)	Impeding or diverting the flow of water in a watercourse ***The development area considered for the establishment of the Merino Wind Farm is associated with the presence of watercourses. Activities pertaining to the establishment of the wind farm might encroach on watercourses which may lead to an impediment and diversion of the flow in the watercourses.***
NWA (No. 36 of 1998)	Section 21 (i)	Altering the bed, banks, course or characteristics of a watercourse. ***The development area considered for the establishment of the Merino Wind Farm is associated with the presence of watercourses. Activities pertaining to the establishment of the wind farm might encroach on watercourses which may lead to the altering of the characteristics of the watercourses.***

In the event that the flow of water in the watercourses is affected and the bed, banks or course characteristics are altered then a water use authorisation would be required. This will need to be in accordance with the requirements of the Regulations Regarding the Procedural Requirements for Water Use License Applications and Appeals (GN R267), or a GA registered in accordance with the requirements of Revision of General Authorisation. The process of applying for a WUL or GA registration will only be completed once a positive EA has been received and the project selected as Preferred Bidder under the REIPPPP or similar programme. Should the developer choose the option This is in line with the requirements of the Department of Water and Sanitation (DWS).

7.2.3 National Heritage Resources Act (No. 25 of 1999) (NHRA)

The National Heritage Resources Act (No. 25 of 1999) (NHRA) provides an integrated system which allows for the management of national heritage resources, and to empower civil society to conserve heritage resources for future generations. Section 38 of NHRA provides a list of activities which potentially require the undertaking of a Heritage Impact Assessment.

Section 38: Heritage Resources Management

1). Subject to the provisions of subsections (7), (8) and (9), any person who intends to undertake a development categorised as –

a. the construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;

b. the construction of a bridge or similar structure exceeding 50m in length;

c. any development or other activity which will change the character of a site –

i). exceeding 5 000m² in extent; or

ii). involving three or more existing erven or subdivisions thereof; or

iii). involving three or more erven or divisions thereof which have been consolidated within the past five years; or

iv). the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority.

Must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development.

In terms of Section 38(8), approval from the heritage authority is not required if an evaluation of the impact of such development on heritage resources is required in terms of any other legislation (such as NEMA), provided that the consenting authority ensures that the evaluation of impacts fulfils the requirements of the relevant heritage resources authority in terms of Section 38(3) and any comments and recommendations of the relevant resources authority with regard to such development have been taken into account prior to the granting of the consent. However, should heritage resources of significance be affected by the proposed development, a permit is required to be obtained prior to disturbing or destroying such resources as per the requirements of Section 48 of the NHRA, and the South African Heritage Resources Agency (SAHRA) Permit Regulations (GNR 668).

7.3 Overview of the Scoping and EIA (S&EIA) Process being undertaken for the Merino Wind Farm

The development of the Merino Wind Farm requires Environmental Authorisation (EA) from the DFFE subject to the completion of a full Scoping and Environmental Impact Assessment (S&EIA), as prescribed in Regulations 21 to 24 of the 2014 EIA Regulations (GNR 326), as amended. The need for a full S&EIA process

to be conducted in support of the application for EA is based on listed activities triggered which are contained within Listing Notice 2 (GNR 325).

The S&EIA process is to be undertaken in two phases as follows:

- The **Scoping Phase** includes the identification and description of potential impacts associated with the project through a desktop study and consultation with I&APs and key stakeholders through a Public Participation Process. The entire development area is evaluated within this process. Through this study, areas of sensitivity within the development area are identified and delineated in order to identify any environmental fatal flaws, and environmentally sensitive, or no-go areas which need to be considered. In accordance with Regulation 21(1) of the 2014 EIA Regulations (GNR 326), as amended, this Scoping Report prepared for the project will be subjected to a 30-day review and comment period during which any Interested and Affected Party (I&AP) or Authority are invited to review and provide comment on the findings (refer to **Figure 7.2**). Following completion of this review period, a Final Scoping Report, which incorporates all comments received during the 30-day public review and comment period, will be prepared and submitted to DFFE for consideration. Following receipt of the Final Scoping Report, the DFFE has 43 days within which to either accept the Scoping Report, and advise the applicant to proceed or continue with the tasks contemplated in the Plan of Study for EIA; or refuse the Application for EA in the event that the proposed activity is in conflict with a prohibition contained in the legislation; or the Scoping Report does not substantially comply with Appendix 2 of the 2014 EIA Regulations (GNR 326), as amended.
- The **EIA Phase** involves a detailed assessment of potentially significant positive and negative direct, indirect, and cumulative impacts identified during the Scoping Phase. This phase includes detailed specialist investigations and a Public Participation Process, and results in the compilation of an EIA Report and Environmental Management Programme (EMPr). In accordance with Regulation 23(1)(a) of the 2014 EIA Regulations (GNR 326), as amended, the EIA Report and EMPr prepared for the project will also be subjected to a 30-day public review and comment period during which members of the public, I&APs, and authorities will be invited to review and provide comment on the EIA Report and EMPr. Following conclusion of this review period, a Final EIA Report and EMPr which incorporates all comments received during the 30-day review and comment period, will be prepared and submitted the DFFE for consideration. Following receipt of the Final EIA Report and EMPr, the DFFE has 107 days within which to either grant or refuse the EA.

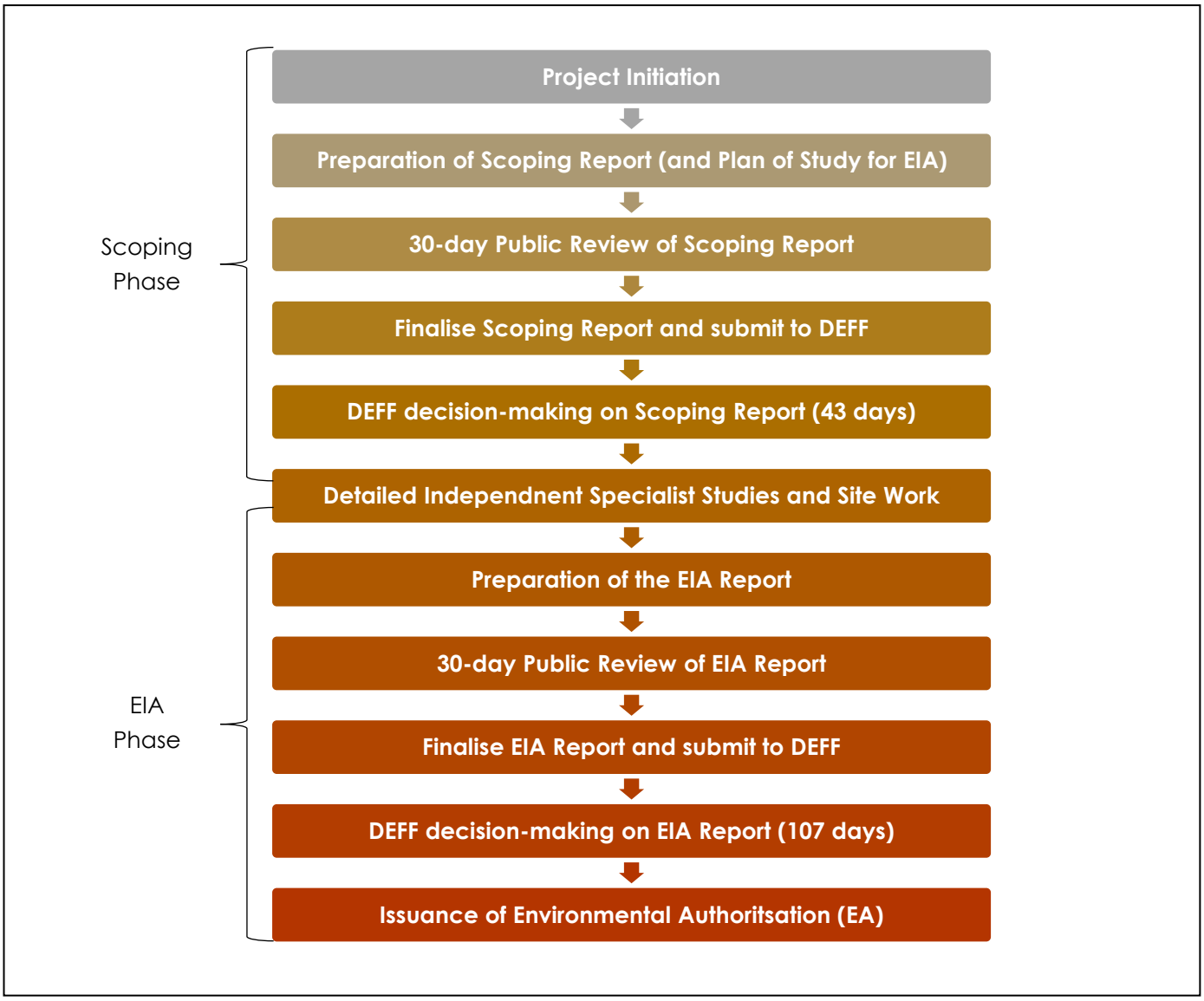

Figure 7.2: Regulated timeframe of an Environmental Impact Assessment (EIA) Process

7.4 Objectives of the Scoping Phase

This Scoping Report documents the evaluation of potential environmental impacts of the Merino Wind Farm and forms part of the EIA process being conducted in support of an Application for EA for the project. The Scoping Phase has been conducted in accordance with the requirements of the 2014 EIA Regulations (GNR 326), as amended, and therefore aims to:

- Identify and evaluate potential environmental (biophysical and social) impacts and benefits of all phases of the proposed development (including design, construction, operation, and decommissioning) within the broader project site and development area through a review of existing baseline data, including specialist studies which were undertaken within the project area.
- Identify potentially sensitive environmental features and areas within the broader project site and development area in order to inform the preliminary design process of the facility.
- Define the scope of studies to be undertaken during the EIA process.
- Provide the authorities with sufficient information in order to make a decision regarding the scope of issues to be addressed in the EIA Phase, as well as regarding the scope and extent of specialist studies that will be required to be undertaken.

The following objectives of the Scoping Phase (in accordance with Appendix 2 of the 2014 EIA Regulations (GNR 326)), as amended, have been met, through the undertaking of a consultative process.

- The policies and legislation relevant the project have been identified and considered within this Scoping Report.
- The need and desirability of the proposed project, including the need and desirability of the activity in the context of the preferred project site have been motivated.
- Feasible alternatives for the project have been considered and confirmed.
- Potential impacts associated with the undertaking of the identified activities and proposed technology have been identified and described.
- Areas of high sensitivity to be avoided by the development footprint within the development area have been identified.
- Preferred areas for the development in the form of a development footprint within areas associated with low to medium environmental sensitivity have been identified within the development area through a desktop level scoping process and on-going consultative process. The development footprint and proposed facility layout will be assessed within the EIA Phase.
- Key issues associated with the project to be addressed during the EIA Phase through further detailed study and ground-truthing have been identified and listed within this Scoping Report.
- The level of assessment, including the methodology to be applied, the expertise required, and the extent of further consultation to be undertaken in the EIA Phase of the process, with the aim of determining the extent of impacts associated with the activities through the life cycle of the project (i.e., construction, operation, and decommissioning), have been identified and included within this Scoping Report.
- Suitable measures to avoid, manage or mitigate identified impacts and to determine the extent of the residual risks that need to be managed and monitored have been identified where possible at this stage in the process.

7.5 Overview of the Scoping Phase

Key tasks undertaken within the Scoping Phase include:

- Consultation with relevant decision-making and regulating authorities (at National, Provincial and Local levels).
- Submission of the completed Application for EA to the competent authority (i.e., the DFFE) in terms of Regulations 5 and 16 of the 2014 EIA Regulations (GNR 326), as amended.
- Undertaking a public participation process in accordance with Chapter 6 of GNR326, the approved public participation plan submitted to DEFF, and the Department of Environmental Affairs (2017) Public Participation guidelines in terms of NEMA EIA Regulations(hereinafter referred to as "the Guidelines") in order to obtain comments on and identify issues and concerns associated with the proposed project.
- Undertaking of independent specialist studies in accordance with Appendix 6 of the EIA Regulations, 2014 (GNR326), as amended, and the requirements of the Specialist Protocols published in Regulation GNR 320, issued 20 March 2020 and GNR 1150 of 30 October 2020, where relevant, as well as other relevant guidelines.
- Preparation of a Scoping Report and Plan of Study for the EIA in accordance with the requirements of Appendix 2 of the 2014 EIA Regulations (GNR 326).
- Provision of a 30-day public and authority review period for the Scoping Report.
- Preparation of a Comments and Response (C&R) Report detailing all comments raised by I&APs and responses provided as part of the Scoping Phase.

» Submission of a Final Scoping Report, including a Plan of Study for the EIA, to the DFFE for review and approval.

7.5.1 Authority Consultation and Application for Authorisation in terms of the 2014 EIA Regulations (as amended)

In terms of GNR 779 of 1 July 2016, the National DFFE is the competent authority for all projects which relate to the IRP and any updates thereto. As the project is proposed within Northern Cape Province, the Northern Cape DAEARD & LR is the provincial commenting authority for the project. Consultation with these authorities, as well as other relevant Organs of State will continue throughout the Scoping Phase. To date, this consultation has included the following:

» Submitting a pre-application meeting request form, together with the Public Participation Plan to the DFFE via email for approval on **02 September 2021**. Following submission of the Public Participation Plan, the DFFE provided approval of the submitted plan via email on **15 September 2021** (refer to **Appendix C9**).
» Submission of the application form for Environmental Authorisation to the DFFE via the DFFE Novell Filr System.
» Submission of the Scoping Report for review and comment by:
  * The competent and commenting authorities.
  * State departments that administer laws relating to a matter affecting the environment relevant to an Application for EA.
  * Organs of State which have jurisdiction in respect of the activity to which the application relates.

The submissions, as listed above, were undertaken electronically, as required by the DFFE (in line with the directions for new Applications for Environmental Authorisations provided for in GNR650 of 05 June 2020). A record of all authority correspondence undertaken during the Scoping Phase is included in **Appendix B**.

7.5.2 Public Participation Process

Public participation is an essential and regulatory requirement for an environmental authorisation process and is guided by Regulations 41 to 44 of the EIA Regulations 2014 (GN R326), as amended. The purpose of public participation is clearly outlined in Regulation 40 of the EIA Regulations 2014 (GN R326, as amended, and is being followed for this proposed project.

The Public Participation Process undertaken for the proposed development of the Merino Wind Farm considers the restrictions and limitations imposed by Government through Section 27 (2) of the Disaster Management Act (Act No. 57 of 2002) of 2002 and the Directions issued by the Minister of Forestry Fisheries and the Environment (DFFE) in terms of consultations with I&APs to limit the risks associated with COVID-19. A Public Participation Plan was prepared and submitted to the DFFE in accordance with the DFFE requirements. Approval of the Plan was provided by the DFFE Case Officer via email on **15 September 2021** (refer to **Appendix B**).

The traditional means and opportunities available for the undertaking of public participation will still be covered and implemented as part of the public participation plan considering the current limitations. Alternative means of undertaking consultation have been designed and implemented by Savannah Environmental to ensure that I&APs are afforded sufficient opportunity to access project information and raise comments on the project through an interactive web-based platform (i.e. online stakeholder

engagement platform) readily available and accessible to any person registering their interest in the project, and ensures that the public participation process is undertaken in line with Regulations 41 to 44 of the EIA Regulations, 2014, as amended. The Public Participation Plan (**Appendix C9**) considers the limitations applied by the Disaster Management Act Regulations prohibiting the gathering of people, as well as limitations which certain I&APs may have in terms of access to computers and internet as well as access to public spaces which may not be open for operation that inhibits access to hard copy documentation. The online stakeholder engagement platform implemented by Savannah Environmental for the project allowed the EAP to visually present details regarding the project as well as consultation documentation, including project maps and plans, presentations, and posters. The platform also contains the Scoping Report available for review. The use of an online tool enables stakeholders and I&APs to explore the project-specific content in their own time, and still enables them to participate in a meaningful way in the consultation process. Where parties do not have access to electronic systems to access the project information, opportunity for them to engage with the project team is facilitated through alternative means, such as consultation with the Ward Councillor, community representatives or one-on-one engagement, where the relevant Regulations to minimise risks associated with COVID-19 can be adhered to.

The sharing of information forms the basis of the public participation process and offers the opportunity for I&APs to become actively involved in the EIA process from the outset. The public participation process is designed to provide sufficient and accessible information to I&APs in an objective manner. The public participation process affords I&APs opportunities to provide input into and receive information regarding the EIA process in the following ways:

During the **Scoping Phase**:
- Provide an opportunity to submit comments regarding the project.
- Assist in identifying reasonable and feasible alternatives, where required.
- Contribute relevant local information and knowledge to the environmental assessment.
- Allow registered I&APs to verify that their comments have been recorded, considered and addressed, where applicable, in the environmental investigations.
- Foster trust and co-operation.
- Generate a sense of joint responsibility and ownership of the environment.
- Comment on the findings of the Scoping Phase results.
- Identify issues of concern and suggestions for enhanced benefits.

During the **EIA Phase**:
- Contribute relevant local information and knowledge to the environmental assessment.
- Verify that issues have been considered in the environmental investigations as far as possible as identified within the Scoping Phase.
- Comment on the findings of the environmental assessments.
- Attend a Focus Group Meeting to be conducted for the project.

During the **decision-making phase**:
- To advise I&APs of the outcome of the competent authority's decision, and how and by when the decision can be appealed.

The Public Participation process therefore aims to ensure that:
- Information containing all relevant facts in respect of the application is made available to potential stakeholders and I&APs for their review.

- The information presented during the public participation process is presented in such a manner, i.e., local language and technical issues, that it avoids the possible alienation of the public and prevents them from participating.
- Public participation is facilitated in such a manner that I&APs are provided with a reasonable opportunity to comment on the project.
- A variety of mechanisms are provided to I&APs to correspond and submit their comments i.e. fax, post, email, telephone, text message (SMS and WhatsApp).
- An adequate review period is provided for I&APs to comment on the findings of the Scoping and EIA Reports.

In terms of the requirement of Chapter 6 of the EIA Regulations of December 2014, as amended, the following key public participation tasks are required to be undertaken:

- Fix a notice board at a place conspicuous to the public at the boundary or on the fence of—
  - (i) the site where the activity to which the application relates is or is to be undertaken; and
  - (ii) any alternative site mentioned in the application.
- Give written notice to:
  - (i) the owner or person in control of that land if the applicant is not the owner or person in control of the land;
  - (ii) the occupiers of the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken;
  - (iii) owners and occupiers of land adjacent to the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken;
  - (iv) the municipal councillor of the ward in which the site or alternative site is situated and any organisation of ratepayers that represent the community in the area;
  - (v) the municipality which has jurisdiction in the area;
  - (vi) any organ of state having jurisdiction in respect of any aspect of the activity; and
  - (vii) any other party as required by the competent authority.
- Place an advertisement in one local newspaper.
- Open and maintain a register of I&APs and Organs of State.
- Release of a Scoping Report for a 30-day review and comment period.
- Prepare a Comments and Responses (C&R) report which documents the comments received on the EIA process and during the 30-day review and comment period of the Scoping Report and the responses provided by the project team.

In compliance with the requirements of Chapter 6: Public Participation of the EIA Regulations, 2014, as amended, and the approved Public Participation Plan, the following summarises the key public participation activities implemented. The schematic overliaf provides an overview of the tools that are available to I&APs and stakeholders to access project information and interact with the public participation team to obtain project information and resolve any queries that may arise, and to meet the requirements for public participation.

i. Stakeholder identification and register of I&APs	•Register as an I&AP on the online platfrom via completion of a form and provison of contact information, by responding to an advert, or sending a 'please call me' which will be responded to •State interest in the project •Receive all project related information via email
ii. Advertisments and notifications	•Advertisements, site notices and/or radio live reads and notifications provide information and details on where to access project information •Notifications regarding the EIA proceses and availability of project reports for public review to be sent via email, post or SMS notifications
iii. Public Involvement and consultation	•Distribution of a BID providing details on the project and how I&APs can become involved in the process •Submission of comments or queries via the online platform to the PP team •Virtual presentations (both English and Afrikaans) available via the online platform •Availability of project information via the online platform •An opportunity for I&APs and stakeholders to request virtual meetings with the project team. •Direct in-person consultation will only take place in limited numbers and where sanitary conditions can be maintained at all times.
iv. Comment on the Scoping and EIA Reports	•Availability of the project reports via the online platform for 30-day comment period •Submission of comments via the online platform, email or post to the PP team •Comments recorded and responded to, as part of the process
v. Identification and recording of comments	•Comments and Responses Report, including all comments received, and included within the final Report for decision-making

i. Stakeholder identification and Register of Interested and Affected Parties

42. A proponent or applicant must ensure the opening and maintenance of a register of I&APs and submit such a register to the competent authority, which register must contain the names, contact details and addresses of –
    (a) All persons who, as a consequence of the public participation process conducted in respect of that application, have submitted written comments or attended meetings with the proponent, applicant or EAP;
    (b) All persons who have requested the proponent or applicant, in writing, for their names to be placed on the register; and
    (c) All organs of state which have jurisdiction in respect of the activity to which the application relates.

I&APs have been identified through a process of networking and referral, obtaining information from Savannah Environmental's existing stakeholder database, liaison with potentially affected parties in the greater surrounding area and a registration process involving the completion of a reply form. Key

stakeholders and affected and surrounding landowners have been identified and registered on the project database. Other stakeholders are required to formally register their interest in the project through either directly contacting the Savannah Environmental Public Participation team via phone, text message (SMS and WhatsApp), email or fax, or registering their interest via the online stakeholder engagement platform. An initial list of key stakeholders identified and registered is included in **Table 7.3**.

Table 7.3: Initial list of Stakeholders identified for the inclusion in the project database during the public participation process for the Merino Wind Farm

Organs of State
National Government Departments
Department of Forestry, Fisheries and the Environment (DFFE)
Department of Mineral Resources and Energy (DMRE)
Department of Agriculture, Land Reform and Rural Development (DALRRD)
Department of Water and Sanitation (DWS)
Government Bodies and State-Owned Companies
Air Traffic Navigation Services (ATNS)
Eskom Holdings SOC Limited
National Energy Regulator of South Africa (NERSA)
South African Civil Aviation Authority (CAA)
South African Heritage Resources Agency (SAHRA)
South African National Roads Agency Limited (SANRAL)
South African Radio Astronomy Observatory (SARAO)
Telkom SA SOC Limited
Transnet SA SOC Limited
Provincial Government Departments
Northern Cape Department of Agriculture, Environmental Affairs, Rural Development and Land Reform (DAEARD&LR)
Northern Cape Department of Economic Development and Tourism
Northern Cape Department of Roads and Public Works
Ngwao Boswa Kapa Bokone (NBKB) – provincial Heritage Authority
Local Government Departments
Pixley Ka Seme District Municipality
Ubuntu Local Municipality – including the Ward Councillor, ward committee members, community representative or local community forum members
Commenting Stakeholders
BirdLife South Africa
Endangered Wildlife Trust (EWT)
SENTECH
Landowners
Affected landowners, tenants and occupiers
Neighbouring landowners, tenants and occupiers

As per Regulation 42 of the EIA Regulations, 2014, as amended, all relevant stakeholder and I&AP information has been recorded within a register of I&APs (refer to **Appendix C1** for a listing of the recorded

parties). In addition to the above-mentioned EIA Regulations, point 4.1 of the Public Participation Guidelines has also been followed. The register of I&APs contains the names[14] of:

- all persons who requested to be registered on the database through the use of the online stakeholder engagement platform or in writing and disclosed their interest in the project;
- all Organs of State which hold jurisdiction in respect of the activity to which the application relates; and
- all persons who submitted written comments or attended virtual meetings (or in-person consultation where sanitary conditions can be maintained) and viewed the narrated presentations on the Savannah Environmental online platform during the public participation process.

I&APs have been encouraged to register their interest in the EIA process from the onset of the project, and the identification and registration of I&APs will be on-going for the duration of the EIA process. The database of I&APs will be updated throughout the EIA process and will act as a record of all I&APs involved in the public participation process.

ii. Advertisements and Notifications

40.(2)(a)	Fixing a notice board at a place conspicuous to and accessible by the public at the boundary, on the fence or along the corridor of –
	(i) The site where the activity to which the application or proposed application relates is or is to be undertaken; and
	(ii) Any alternative site.
40.(2)(b)	Giving written notice, in any of the manners provided for in section 47Dof the Act, to –
	(i) The occupiers of the site and, if the proponent or applicant is not the owner or person in control of the site on which the activity is to be undertaken, the owner or person in control of the site where the activity is or is to be undertaken and to any alternative site where the activity is to be undertaken;
	(ii) Owners, persons in control of, and occupiers of land adjacent to the site where the activity is or is to be undertaken and to any alternative site where the activity is to be undertaken;
	(iii) The municipal councillor of the ward in which the site and alternative site is situated and any organisation of ratepayers that represent the community in the area;
	(iv) The municipality which has jurisdiction in the area;
	(v) Any organ of state having jurisdiction in respect of any aspect of the activity; and
	(vi) Any other party as required by the competent authority.
40.(2)(c)	Placing an advertisement in –
	(i) One local newspaper; or
	(ii) Any official Gazette that is published specifically for the purpose of providing public notice of applications or other submissions made in terms of these Regulations;
40.(2)(d)	Placing an advertisement in at least one provincial newspaper or national newspaper, if the activity has or may have an impact that extends beyond the boundaries of the metropolitan or district municipality in which it is or will be undertaken: Provided that this paragraph need not be complied with if an advertisement has been placed in an official Gazette referred to in paragraph (c)(ii); and
40.(2)(e)	Using reasonable alternative methods, as agreed to by the competent authority, in those instances where a person is desirous of but unable to participate in the process due to –
	(i) Illiteracy;
	(ii) Disability; or
	(iii) Any other disadvantage.

[14] Contact details and addresses have not been included in the I&AP database as this information is protected by the Protection of Personal Information Act (No 4 of 2013).

The EIA process was announced with an invitation to the Organs of State, potentially affected and adjacent landowners, tenants and occupiers, and general public to register as I&APs and to actively participate in the process. This was achieved via the following:

- Compilation of a background information document (BID) (refer to **Appendix C3**) providing technical and environmental details on the project and how to become involved in the EIA process. The BID and the process notification letter announcing the EIA process, notifying Organs of State, potentially affected and neighbouring landowners, as well as registered stakeholders/IAPs of the proposed Merino Wind Farm, and providing background information of the project and inviting I&APs to register on the project's database were distributed via email on **21 October 2021**. Evidence of distribution is contained in **Appendix C** of the Scoping Report. The BID is also available electronically on the Savannah Environmental website (https://savannahsa.com/public-documents/energy-generation/the-great-karoo-cluster-of-renewable-energy-facilities/).
- Placement of site notices announcing the EIA process at visible points along the boundary of the development area (i.e., the boundaries of the affected properties), in accordance with the requirements of the EIA Regulations on **28 – 30 September 2021**. Photographs of the site notices and the GPS co-ordinates of the locations where the site notices were placed are contained within **Appendix C2** of the Scoping Report.
- Placement of an advertisement in the De Aar Echo Newspaper (in English) on **23 September 2021** at the commencement of the EIA process. This advert:
  - Announced the project and the associated EIA process.
  - Provided details of how I&APs can become involved in the EIA process, including details of the public participation consultant.
  - Provided all relevant details to access the Savannah Environmental online stakeholder engagement platform.

  A copy of the newspaper advert as sent to the newspaper and the advert tear sheet are included in **Appendix C2** of the Scoping Report.
- Placement of an advertisement in the De Aar Echo Newspaper (in English) on **12 November 2021**at the commencement of the 30-day review and comment period. This advert:
  - Announced the availability of the Scoping report, the review period, and where it is accessible for review.
  - Invited comment on the Scoping Report.
  - Provided all relevant details to access the Savannah Environmental online stakeholder engagement platform.
  - Provided details of the meetings to be held during the 30-day review and comment period of the Scoping Report.

  A copy of the newspaper advert as sent to the newspaper is included in **Appendix C2** of the Scoping Report. The advert tear sheet will be included in **Appendix C2** of the final Scoping Report.
- A Live Read on RSG on **12 November 2021** at the commencement of the 30-day review and comment period (**Appendix C2**). A further radio live read segment will also broadcasted on RSG as a reminder of the availability of the Scoping Report for review and comment on **06 December 2021**. RSG is one of the local radio stations accessible in the study area.
- The Scoping Report has been made available for review by I&APs for a 30-day review and comment period from **Friday, 12 November 2021** to **Monday**, **13 December 2021**. The Scoping Report has been made available on the Savannah Environmental website and all registered I&APs have been notified of the availability on **10 November 2021** via email which included the link to

access the report on the Savannah Environmental website. The evidence of distribution of the Scoping Report will be included in the Final Scoping Report, which will be submitted to the DFFE.

- Focus group meetings will be held with key stakeholders on **Tuesday, 23 November 2021 at 09h00 – 11h00, 11h30 – 13h00, 13h30 – 15h00, and 17h30 – 19h00** via a virtual platform, where relevant.
- An information session will be held at the Richmond Show Ground in the Northern Cape Province on **Thursday, 2 December 2021 from 14h00** (this will take the format of a poster display).

iii. Public Involvement and Consultation

In order to accommodate the varying needs of stakeholders and I&APs within the surrounding area, as well as capture their views, comments, issues and concerns regarding the project, various opportunities have been and will continue to be provided to I&APs to note their comments and issues. I&APs are being consulted through the following means:

Table 7.4: Public involvement for the Merino Wind Farm

Activity	Date
Announcement of the EIA process in one local newspaper: » De Aar Echo Newspaper (English advertisement)	23 September 2021
Distribution of the BID, process notification letters and stakeholder reply form announcing the EIA process and inviting I&APs to register on the project database. The BID and electronic reply form was also made available on the online stakeholder engagement platform.	21 October 2021
Placement of site notices at the project site, including placement of further notices in the town of Richmond.	28 – 30 September 2021
Announcement of the availability of the Scoping Report for a 30-day review and comment period, including details on how to access the Scoping Report via the online stakeholder engagement platform, in one local newspaper: » De Aar Echo Newspaper (English advertisement)	12 November 2021
Radio Live Read by RSG regarding the Scoping Report comment period, and the details on how to get involved and how contact with Savannah Environmental can be made. A further radio live read segment will also broadcasted on RSG as a reminder of the availability of the Scoping Report for review and comment.	12 November 2021
Distribution of notification letters announcing the availability of the Scoping Report for a 30-day review and comment period. These letters were distributed to Organs of State, Government Departments, Ward Councillors, landowners within the surrounding area (including neighbouring landowners), registered I&APs and key stakeholder groups.	10 November 2021
30-day review and comment period of the Scoping Report.	Friday, 12 November 2021 to Monday, 13 December 2021
Virtual meetings through the use of virtual platforms as determined through discussions with the relevant stakeholder group: » Landowners » Authorities and key stakeholders (including Organs of State, local municipality and official representatives of community-based organisations). » Where an I&AP does not have access to a computer and/or	» Focus group meetings will be held with key stakeholders on **Tuesday, 23 November 2021 at 09h00 – 11h00, 11h30 – 13h00, 13h30 – 15h00, and 17h30 – 19h00** via a virtual platform, where relevant. » An information session will be held at

internet to participate in a virtual meeting telephonic discussions (including WhatsApp video call) will be set-up and minuted for inclusion. The preferred language of the I&AP has been considered when setting up these discussions. Direct in-person consultation will only take place in limited numbers and where sanitary conditions can be maintained at all times.	the Richmond Show Ground in the Northern Cape Province on **Thursday, 2 December 2021 from 14h00** (this will take the format of a poster display).
On-going consultation (i.e., telephone liaison; e-mail communication) with all I&APs.	Throughout the EIA process

iv. Registered I&APs entitled to Comment on the Scoping Report

43.(1) A registered I&AP is entitled to comment, in writing, on all reports or plans submitted to such party during the public participation process contemplated in these Regulations and to bring to the attention of the proponent or applicant any issues which that party believes may be of significance to the consideration of the application, provided that the interested and affected party discloses any direct business, financial, personal or other interest which that party may have in the approval or refusal of the application.

(2) In order to give effect to section 24O of the Act, any State department that administers a law relating to a matter affecting the environment must be requested, subject to regulation 7(2), to comment within 30 days.

44.(1) The applicant must ensure that the comments of interested and affected parties are recorded in reports and plans and that such written comments, including responses to such comments and records of meetings, are attached to the reports and plans that are submitted to the competent authority in terms of these Regulations.

(2) Where a person desires but is unable to access written comments as contemplated in subregulation (1) due to –

(a) A lack of skills to read or write;
(b) Disability; or
(c) Any other disadvantage;

Reasonable alternative methods of recording comments must be provided for.

I&APs registered on the database have been notified by means of a notification letter of the release of the Scoping Report for a 30-day review and comment period, invited to provide comment on the Scoping Report, and informed of the manner in which, and timeframe within which such comment must be made. The report has been made available in soft copies to I&APs due to restrictions and limitations on public spaces and limitations in ensuring sanitary conditions of hard copy documents during the national state of disaster related to COVID-19. No hard copies of the report have been made available for review and comment in accordance with the approved public participation plan. Hard copies can however be made available on request where sanitary conditions can be maintained.

The Scoping Report has been made available on the Savannah Environmental website (i.e., online stakeholder engagement platform) (https://savannahsa.com/public-documents/energy-generation/the-great-karoo-cluster-of-renewable-energy-facilities/). A notification letter to all registered parties was distributed prior to commencement of the 30-day review and comment period, on **10 November 2021**. Where I&APs are not able to provide written comments (including SMS and WhatsApp), other means of consultation, such as telephonic discussions are used to provide the I&APs with a platform to verbally raise their concerns and comments on the proposed development.

All comments raised as part of the discussions and written comments submitted during the 30-day review and comment period will be recorded and included in **Appendix C6** and **Appendix C7** of the Scoping Report.

v. Identification and Recording of Comments

Comments raised by I&APs to date have been included into a Comments and Responses (C&R) Report, which is included in **Appendix C8** of this Scoping Report. The C&R Report includes detailed responses from members of the EIA project team and/or the project proponent to the issues and comments raised. The C&R Report will be updated with all comments received during the 30-day review and comment period and will be included as **Appendix C8** in the Final Scoping Report that will be submitted to the DEFF for approval.

Meeting notes of all the telephonic discussions and virtual meetings conducted during the 30-day review and comment period of the Scoping Report will be included in **Appendix C7**.

7.6. Outcomes of the DFFE Web-Based Screening Tool

In terms of GN R960 (promulgated on 5 July 2019) and Regulation 16(1)(b)(v) of the 2014 EIA Regulations (as amended), the submission of a Screening Report generated from the national web based environmental screening tool is compulsory for the submission of applications in terms of Regulations 19 and 21 of the EIA Regulations.

The requirement for the submission of a Screening Report (included as **Appendix O** of the Scoping Report) for the Merino Wind Farm is applicable as it triggers Regulation 19 of the EIA Regulations, 2014, as amended. **Table 7.5** provides a summary of the specialist assessments identified in terms of the screening tool and responses to each assessment from the project team considering the development area under consideration.

Table 7.5: Sensitivity ratings from the DFFE's web-based online Screening Tool associated with the development of the Merino Wind Farm

Specialist Assessment	Sensitivity Rating as per the Screening Tool (relating to the need for the study)	Project Team Response
Agricultural Scoping Assessment	Very high	The Soils, Land Use and Agriculture Scoping Assessment is included in this Scoping Report as **Appendix G**.
Landscape/Visual Scoping Assessment	Very high	A Visual Scoping Assessment has been undertaken for the wind farm and is included in this Scoping Report as **Appendix J.**
Archaeological and Cultural Heritage Scoping Assessment	Low	A Heritage Screener has been undertaken for the wind farm and is included in this Scoping Report as **Appendix H**. A full Heritage Impact Assessment (including an assessment of archaeological resources and the cultural landscape) will be undertaken during the EIA Phase and included as an Appendix in the EIA Report.
Palaeontology Scoping Assessment	Very high	A Heritage Screener has been undertaken for the wind farm and is included in this Scoping Report as **Appendix H**. A full Heritage Impact Assessment (including an assessment of palaeontological resources) will be undertaken during the EIA Phase and included as an Appendix in the EIA Report.
Terrestrial Biodiversity	High	An Ecological Scoping Assessment (including flora and

Specialist Assessment	Sensitivity Rating as per the Screening Tool (relating to the need for the study)	Project Team Response
Scoping Assessment		fauna) has been undertaken for the wind farm and is included as **Appendix D** of the Scoping Report.
Aquatic Biodiversity Scoping Assessment	Very high	An Aquatic Scoping Assessment has been undertaken for the wind farm and is included as **Appendix G** of the Scoping Report.
Avian Scoping Assessment	Low	An Avifauna Scoping Assessment Report (including 12-months monitoring as per the BirdLife SA Best Practice Guidelines) has been undertaken for the wind farm and included as **Appendix E** of the Scoping Report.
Civil Aviation Assessment	Medium	The Civil Aviation Authority will be consulted throughout the EIA process to obtain input.
Defence Assessment	Low	The project site is not located within close proximity of any military base.
RFI Assessment	Medium	The project site under consideration for the development of the Merino Wind Farm is located within an area that as classified as having low sensitivity for telecommunication; between 26 and 48km of an SKA receptor; and more than 60km from a weather radar installation. The South African Radio Astronomy Observatory (SARAO) will however be consulted during the 30-day review and comment period of the Scoping Report to provide written comment on the proposed development.
Noise Scoping Assessment	Very high	A Noise Scoping Assessment has been undertaken for the wind farm and is included as **Appendix I** of the Scoping Report.
Flicker Assessment	Very high	A Visual Scoping Assessment has been undertaken for the wind farm and is included in this Scoping Report as **Appendix J.** The impact of flicker associated with the development will be considered in detail in the Visual Impact Assessment to be undertaken during the EIA Phase.
Traffic Scoping Assessment	The screening report does not indicate a rating for this theme.	A Traffic Scoping Assessment has been undertaken for the wind farm and is included as **Appendix L** of the Scoping Report.
Social Assessment	The screening report does not indicate a rating for this theme.	A Social Scoping Assessment has been undertaken and is included in the Scoping Report as **Appendix K**.
Plant Species Assessment	Medium	An Ecological Scoping Assessment (including flora and fauna) has been undertaken for the Merino Wind Farm and is included as **Appendix D** of the Scoping Report.

7.7. Evaluation of Issues Identified through the Scoping Process

Direct, indirect, and cumulative environmental impacts associated with the project identified during the Scoping Phase have been evaluated through consideration of existing information available for the Merino Wind Farm development area.

In order to evaluate issues and assign an order of priority, the following methodology was used to identify the characteristics of each potential issue/impact:

- The ***nature***, which includes a description of what causes the impact, what will be affected and how it will be affected.
- The ***extent***, wherein it is indicated whether the impact will be local (limited to the immediate area or site of development), regional or national.
- Identify ***sensitive receptors*** that may be impacted on by the proposed development and the types of impacts that are most likely to occur.
- The ***significance*** of potential impacts in terms of the requirements of the 2014 EIA Regulations (including (nature, significance, consequence, extent, duration and probability of the impacts, the degree to which these impacts:
  (a) Can be reversed;
  (b) May cause irreplaceable loss of resources; and
  (c) Can be avoided, managed or mitigated.
- Identify the potential impacts that will be considered further in the EIA Phase through detailed investigations.

The evaluation of the proposed project resulted in a description of the nature, significance, consequence, extent, duration, and probability of the identified issues, as well as recommendations regarding further studies required within the EIA Phase.

7.8. Finalisation of the Scoping Report

The final stage of the Scoping Phase entails the recording and capturing of comments received from stakeholders and I&APs on the Scoping Report in order to finalise the Scoping Report for submission to the DFFE for decision-making. All written comments received will be addressed within the C&R Report (refer to **Appendix C8**).

7.9. Assumptions and Limitations of the EIA Process

The following assumptions and limitations are applicable to the EIA process for the Merino Wind Farm:

- All information provided by the developer and I&APs to the environmental team was correct and valid at the time it was provided.
- The development area identified by the developer represents a technically suitable site for the establishment of the Merino Wind Farm, which is based on the design undertaken by technical consultants for the project.
- The development footprint (the area that will be affected during the operation phase) will include the footprint for the wind farm and associated infrastructure (i.e., internal access roads, BESS, and grid connection infrastructure).
- The Scoping Phase evaluation of impacts has been largely based on desktop studies. This information has been used to inform this Scoping Report and will be verified by specialists in the EIA Phase to assess the project development footprint for the Merino Wind Farm.

7.10. Legislation and Guidelines that have informed the preparation of this Scoping Report

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

- National Environmental Management Act (Act No. 107 of 1998).
- EIA Regulations of December 2014, published under Chapter 5 of NEMA (as amended).
- Department of Environmental Affairs (2017), Public Participation guidelines in terms of NEMA EIA Regulations.
- Department of Environmental Affairs (2017), Integrated Environmental Management Guideline: Guideline on Need and Desirability.
- Procedures for the assessment and minimum criteria for reporting on identified environmental themes in terms of sections 24(5)(a) and (h) and 44 of the National Environmental Management Act, 1998, when applying for environmental authorisation; and
- International guidelines – the Equator Principles, the IFC Performance Standards, the Sustainable Development Goals, World Bank Environmental and Social Framework, and the and World Bank Group Environmental, Health, and Safety Guidelines (EHS Guidelines).

Several other Acts, standards or guidelines have also informed the project process and the scope of issues addressed and assessed in this Scoping Report. A review of legislative requirements applicable to the proposed project as identified at this stage in the process is provided in **Table 7.5**.

Table 7.5: Relevant legislative permitting requirements applicable to the Merino Wind Farm

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 developments 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	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 Scoping Report and a Plan of Study for the EIA to the DFFE for approval.

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	Activity 1 of Listing Notice 2 (GNR 325), a full Scoping and EIA process is required in support of the Application for EA.		
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 will be undertaken during the EIA Phase to determine the impact significance that the project will have from a noise perspective.
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	Regional Department of Water and Sanitation	Watercourses are present within the development area of the Merino Wind Farm as identified in the Aquatic Scoping

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	a GA, or if a responsible authority waives the need for a licence. 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)).		Assessment (**Appendix G**). As a result, a water use authorisation for the project will 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.

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
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 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.	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 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	South African Heritage Resources Agency (SAHRA) Ngwao Boswa Kapa Bokone (NBKB) – provincial heritage authority	A Heritage Impact Assessment will be undertaken for the project as per the requirements Section 38 of the NHRA. The Heritage Impact Assessment will be made available in the EIA Phase. 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 the NHRA, and the SAHRA Permit Regulations (GN R668).

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	extent of the proposed development. Section 44 of the NHRA requires the compilation of a Conservation Management Plan as well as a permit from SAHRA for the presentation of archaeological sites as part of tourism attraction.		
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 will be undertaken as part of the EIA Phase to identify the presence of any listed protected species present on site which will require a permit.
National Environmental Management: Biodiversity Act (No.	Chapter 5 of NEM:BA pertains to alien and invasive species, and states that a person may not carry out a restricted	DFFE	An Ecological Impact Assessment will be undertaken as part of the EIA Phase to identify

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
10 of 2004) (NEM:BA)	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).	Northern Cape DAEAR&LR	the presence of any alien and invasive species present on site.
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. » Any other method of treatment recognised by the executive officer that has as its object the control of plants

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
			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 will be undertaken as part of the EIA Phase to identify the presence of any protected trees present on site which will require a permit.
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.	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.

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	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.		
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. » 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	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
	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. » 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.	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.
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	South African National Roads Agency (SANRAL) – national roads	An abnormal load / vehicle permit may be required to transport the various components to site for construction. These include route

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	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.	Northern Cape Department of Transport, Safety and Liaison	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 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	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. Should these species be confirmed within the development footprint during any phase of the project, permits will be required. An Ecological Impact Assessment will be undertaken as part of the EIA Phase to identify the presence of any listed species present on site which will require a permit.

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	found (plant or animal) must take the necessary steps to eradicate or destroy such species; The Act provides lists of protected species for the Province.		

7.10.1 Best Practice Guidelines Birds & Wind Energy (2015)

The Best Practice Guidelines for Birds and Wind Energy (2015) proposed by the Birds and Renewable Energy Specialist Group (BARESG) (convened by BirdLife South Africa and the Endangered Wildlife Trust) contain guidelines for assessing and monitoring the impact of wind energy facilities on birds in Southern Africa. These guidelines recognise the impact that wind energy facilities may have on birds, through for example, creating a barrier to movement, displacing sensitive species, affecting breeding success and/or altering habitat. The guidelines were developed to ensure that negative impacts on threatened, or potentially threatened bird species are identified and mitigated using structured, methodical and scientific methods.

The guidelines are aimed at Environmental Assessment Practitioners (EAPs), avifaunal specialists, developers and regulators and propose a tiered assessment process as listed below:

(i) Scoping – a brief site visit informs a desktop assessment of likely avifauna present, possible impacts, and the design of a site-specific survey and monitoring protocols.
(ii) Pre-construction monitoring and impact assessment – a full assessment of the significance of likely impacts and available mitigation options, based on the results of systematic and quantified monitoring over at least 4 seasons.
(iii) Construction phase monitoring – not always necessary but can assist in determining whether the proposed mitigation measures are implemented and are effective and identify triggers of any observed changes.
(iv) Post-construction monitoring – repetition of the pre-construction monitoring, plus the collection of mortality data, to develop a complete before and after picture of impacts and refine mitigation measures.
(v) If warranted, more detailed and intensive research on affected threatened or potentially threatened species.

The following species-specific guidelines are also of relevance to consider during the pre-construction monitoring phase:

» Verreauxs' Eagle and Wind Farms: Guidelines for impact assessment, monitoring, and mitigation (March 2017)
» Cape Vulture and Wind Farms: Guidelines for impact assessment, monitoring and mitigation (July 2018)

For the Merino Wind Farm, the scoping assessment and the 12-month pre-construction bird monitoring as required by the guidelines have been completed at the project site. The results from the monitoring will be used to inform both the development footprint as well as the Avifauna Impact Assessment report to be completed during the EIA Phase.

7.10.2 South African Best Practice Guidelines for Pre-Construction Monitoring of Bats at Wind Energy Facilities (2020)

The South African Best Practice Guidelines for Pre-Construction Monitoring of Bats at Wind Energy Facilities prepared by Inkululeko Wildlife Services (Pty) Ltd, Bats without Borders and Arcus Consultancy Services South Africa (Pty) Ltd seek to provide technical guidance for consultants charged with carrying out impact assessments for proposed Wind Energy Facilities, to ensure that pre-construction monitoring surveys

produce the required level of detail and answers for authorities evaluating applications for Wind Energy Facility developments. These guidelines outline basic requirements of best practice and highlight specific considerations relating to the pre-construction monitoring of proposed Wind Energy Facility sites for bats.

The results from pre-construction bat monitoring are required to inform the final layout, the BA or Scoping and EIA assessments and to provide adequate information to the competent authority for them to make an informed decision.

Bat activity is monitored using active and passive bat monitoring techniques. Active monitoring is carried out on site visits by the means of driven transects. A bat detector mounted on a vehicle is used, and transect routes are chosen based on road accessibility. Sampling effort and prevalent weather conditions are considered for each transect.

For the Merino Wind Farm, a passive bat monitoring technique is being utilised. To date, 6 months of pre-construction bat monitoring has been completed and as such, monitoring activities are still ongoing and will continue until 12 months of passive bat activity data has been gathered, which will provide comparative bat activity and species assemblages across all seasons as well as various habitats, terrain and/or areas of the site.

7.10.3 South African Good Practice Guidelines for Operational Monitoring for Bats at Wind Energy Facilities (2019)

The South African Good Practice Guidelines for Operational Monitoring for Bats at Wind Energy Facilities are used as a guideline in developing protocols for operational monitoring of bat activity and fatalities at operating Wind Energy Facilities in South Africa. The objective of these guidelines is to provide practitioners with a standard protocol to monitor and estimate bat mortality, facilitating comparison between fatality rates across different Wind Energy Facilities.

According to these guidelines, the first two years of a Wind Energy Facility's operation are the most important period in which to collect post-construction information as this is when any change in bat activity and mortalities are likely to occur. Where more severe impacts have been identified or predicted, an extended period of data collection might be required to assess the effectiveness of any mitigation proposed. Examples of operational bat monitoring protocols include acoustic monitoring and carcass searches.

For the Merino Wind Farm, the bat specialist has recommended that a minimum of 2 years of operational bat mortality monitoring should be conducted from the commencement of operation of the facility. These guidelines will be used to develop the protocols for operational monitoring of bat activity and fatalities at the Merino Wind Farm.

7.10.4 The IFC Environmental Health and Safety (EHS) Guidelines

The IFC EHS Guidelines are technical reference documents with general and industry specific examples of Good International Industry Practice (GIIP). The following IFC EHS Guidelines have relevance to the proposed project:

» IFC EHS General Guidelines

» IFC EHS Guidelines for Electric Power Transmission and Distribution

The General EHS Guidelines are designed to be used together with the relevant Industry Sector EHS Guidelines. The application of the General EHS Guidelines should be tailored to the hazards and risks associated with a project and should take into consideration site-specific variables which may be applicable, such as host country context, assimilative capacity of the environment, and other project factors. In instances where host country regulations differ from the standards presented in the EHS Guidelines, whichever is the more stringent of the two in this regard should be applied.

The General EHS Guidelines include consideration of the following:

» Environmental:
  * Air Emissions and Ambient Air Quality
  * Energy Conservation
  * Wastewater and Ambient Water Quality
  * Water Conservation
  * Hazardous Materials Management
  * Waste Management
  * Noise
  * Contaminated Land
» Occupational Health and Safety:
  * General Facility Design and Operation
  * Communication and Training
  * Physical Hazards
  * Chemical Hazards
  * Biological Hazards
  * Radiological Hazards
  * Personal Protective Equipment (PPE)
  * Special Hazard Environments
  * Monitoring
» Community Health and Safety:
  * Water Quality and Availability
  * Structural Safety of Project Infrastructure
  * Life and Fire Safety (L&FS)
  * Traffic Safety
  * Transport of Hazardous Materials
  * Disease Prevention
  * Emergency Preparedness and Response
» Construction and Decommissioning:
  * Environment
  * Occupational Health & Safety
  * Community Health & Safety

7.10.2 IFC Environmental, Health and Safety Guidelines for Wind Energy (August 2015)

The EHS Guidelines for wind energy include information relevant to environmental, health, and safety aspects of onshore and offshore wind energy facilities. It should be applied to wind energy facilities from

the earliest feasibility assessments, as well as the environmental impact assessment, and continue to be applied throughout the construction and operation phases.

The guidelines list issues associated with wind energy facilities which need to be considered. These include:

- Environmental impacts associated with the construction, operation, and decommissioning of wind energy facilities activities may include, among others, impacts on the physical environment (such as noise or visual impact) and biodiversity (affecting birds and bats, for instance).
- Due to the typically remote location of wind energy facilities, the transport of equipment and materials during construction and decommissioning may present logistical challenges (e.g., transportation of long, rigid structures such as blades, and heavy tower sections).
- Environmental issues specific to the construction, operation, and decommissioning of wind energy projects and facilities include the following:
  - Landscape, Seascape, and Visual impacts
  - Noise
  - Biodiversity
  - Shadow Flicker
  - Water Quality

CHAPTER 8: DESCRIPTION OF THE AFFECTED ENVIRONMENT

This section of the Scoping Report provides a description of the local environment. This information is provided in order to assist the reader in understanding the possible effects of the proposed project on the environment within which it is proposed to be development. Aspects of the biophysical, social, and economic environment that could be directly or indirectly affected by, or could affect, the proposed development have been described. This information has been sourced from both existing information available for the area as well as collected field data undertaken by specialist consultants and aims to provide the context within which this EIA process is being conducted.

8.1 Legal Requirements as per the EIA Regulations, 2014 (as amended), for the undertaking of a Scoping Report

This chapter includes the following information required in terms of the EIA Regulations, 2014 - Appendix 2: Content of the Scoping Report:

Requirement	Relevant Section
(g)(iv) the environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects	The environmental attributes associated with the development of the Merino Wind Farm are included as a whole within this chapter. The environmental attributes that are assessed within this chapter include the following: » The regional setting of the broader study area and the project site indicates the geographical aspects associated with the Merino Wind Farm. This is included in s**ection 8.2**. » The climatic conditions present within Richmond have been included in s**ection 8.3**. » The biophysical characteristics of the project site and the surrounding areas are included in s**ection 8.4**. The characteristics considered are topography and terrain, geology, soils and agricultural potential and the ecological profile which includes the vegetation patterns, listed plant species, critical biodiversity areas and broad-scale processes, freshwater resources, terrestrial fauna, bats, and avifauna. » The heritage and cultural aspects (including archaeology and palaeontology) have been included in s**ection 8.5**. » The visual quality of the surrounding area and the project site has been considered in s**ection 8.6**. » The ambient noise levels and quality of the surrounding area and the project site has been considered in s**ection 8.7**. » The traffic conditions within the broader study area and the project site have been considered in s**ection 8.8**. » The social and socio-economic characteristics associated with the broader study area and the project site have been included in s**ection 8.9**.

A more detailed description of each aspect of the affected environment is included within the specialist Scoping Reports contained within **Appendices D - L**.

8.2. Regional Setting

The Merino Wind Farm development area 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 Northern Cape Province is the largest province in South Africa, taking up nearly a third of the country's land area. It covers an area of ~ 372 889km² and has a population of 1 193 780, the least populous of South Africa's provinces. The Northern Cape Province is bordered by Namibia and Botswana to the north, and south-east, Free State, and North West provinces to the east, Botswana, and Namibia, to the north, and the Atlantic Ocean to the west. The Northern Cape is the only South African province which borders Namibia and plays an important role in terms of providing linkages between Namibia and the rest of South Africa. The Orange River, which is South Africa's largest river, is a significant feature and is also the main source of water in the province, while also constituting the international border between South Africa and Namibia.

The Northern Cape is rich in minerals including alluvial diamonds, iron ore, asbestos, manganese, fluorspar, semi-precious stones and marble. The mining sector in the province is the largest contributor of the provincial Gross Domestic Product (GDP) and of a great importance to South Africa as it produces ~37% of the country's diamonds, 44% of its zinc, 70% of its silver, 84% of its iron ore, 93% of its lead and 99% of its manganese.

The province has fertile agricultural land in the Orange River Valley, especially at Upington, Kakamas and Keimoes, where grapes and fruit are cultivated intensively. The interior Karoo relies on sheep farming, while the karakul-pelt industry is one of the most important in the Gordonia District of Upington. Wheat, fruit, peanuts, maize, and cotton are produced at the Vaalharts Irrigation Scheme near Warrenton. The agricultural sector employs approximately 19.5% of the total formally employed individuals. The sector is also experiencing significant growth in value-added activities, including game-farming, while food production and processing for the local and export markets is also growing significantly (PGDS, July 2011). Furthermore, approximately 96% of the land in the province is used for livestock and game farming, while only approximately 2% is used for crop farming, mainly under irrigation in the Orange River Valley and the Vaalharts Irrigation Scheme.

The Northern Cape offers unique tourism opportunities including wildlife conservation destinations, natural features, historic sites, festivals, cultural sites, star gazing, adventure tourism, agricultural tourism, ecotourism, game farms, and hunting areas, etc. The province is home to the Richtersveld Botanical and Landscape World Heritage Site, which comprises a United Nations Educational, Scientific and Cultural Organisation (UNESCO) World Heritage Site under the World Heritage Convention. The province also includes to two (2) Transfrontier National Parks, namely the Kgalagadi Transfrontier Park, and the Richtersveld /Ai-Ais Transfrontier Park, as well as five (5) national parks and six (6) provincial reserves. In addition, the province plays a significant role in South Africa's science and technology sector, as it is home to the Square Kilometre Array (SKA), the Southern African Large Telescope (SALT), and the Karoo Array Telescope (MeerKAT). In addition, the Augrabies National Park, a major tourist destination in the province is located 120km east of Upington near the town of Kakamas.

The capital city of the Northern Cape Province is Kimberley. Other important towns include Upington, Springbok, Kuruman and De Aar. The province is rich in minerals and has fertile agricultural land in the Orange River Valley. The interior Karoo relies on sheep farming, while the karakul-pelt industry is one of the most important in the Gordonia District of Upington. The Northern Cape Province comprises five district municipalities, namely, Francis Baard, John Taolo Gaetsewe, Namakwa, Pixley ka Seme, and ZF Mgcawu, which contain twenty-six local municipalities collectively(refer to **Figure 8.1**).

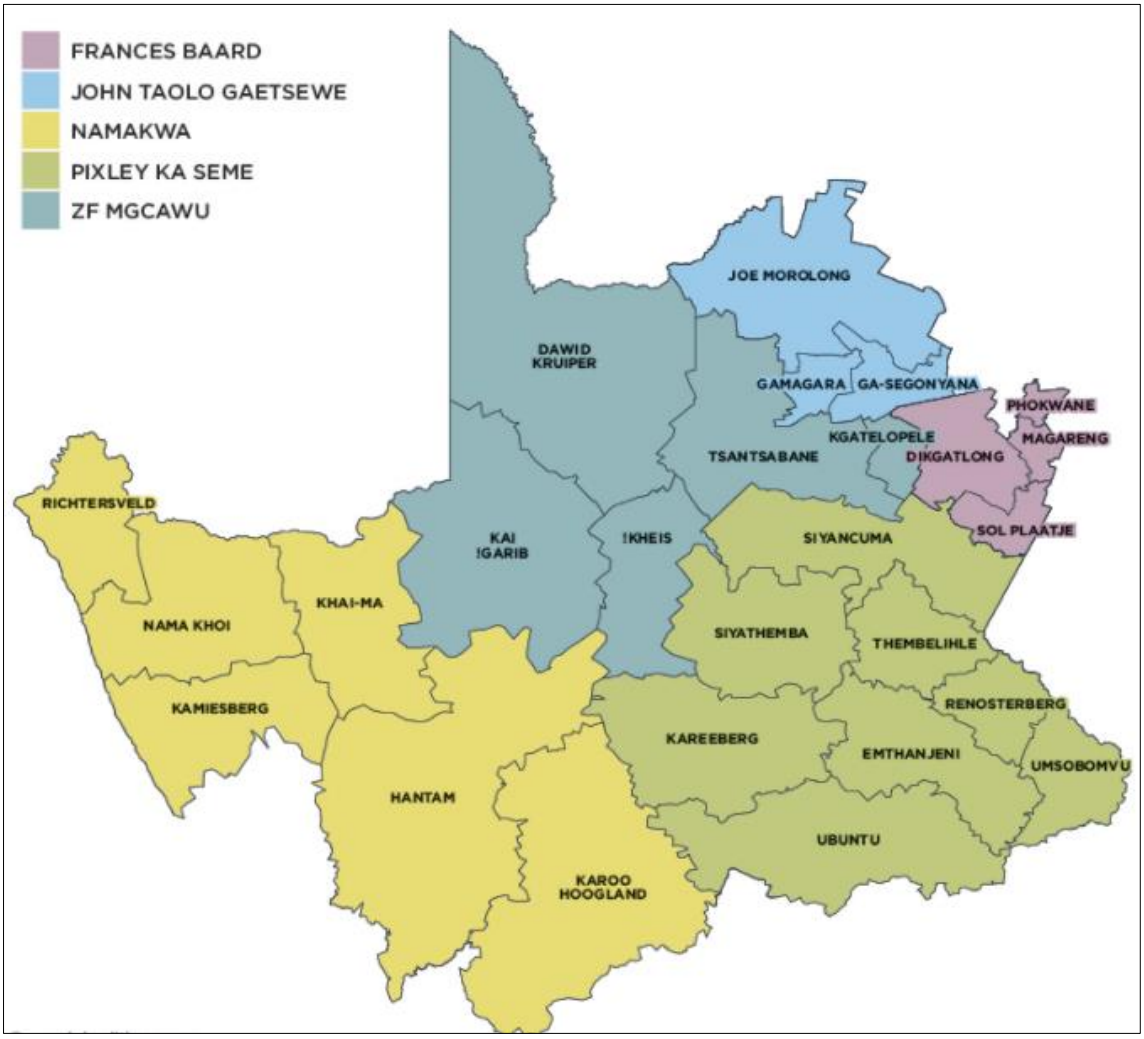

Figure 8.1: District municipalities of the Northern Cape Province (Source: Municipalities of South Africa).

The Pixley ka Seme District Municipality is a Category C municipality situated in the south-east of the Northern Cape Province. It shares it border with three other provinces, namely, the Free State to the east, the Eastern Cape to the south-east, and the Western Cape to the south-west. The Pixley ka Seme District Municipality covers an area of ~ 103 411km², making it the second-largest district of the five in the province. Two of the major dams in South Africa, the Vanderkloof and Gariep Dams, are situated on the borders of the district municipality. The Pixley ka Seme District Municipality comprises eight local municipalities, namely, Ubuntu, Umsobomvu, Emthanjeni, Kareeberg, Renosterberg, Thembelihle, Siyathemba and Siyancum (refer to **Figure 8.2**). Its main town is De Aar. According to StatsSA 2011 and the Community Survey 2016, the Pixley ka Seme District Municipality's population sits at 195 595. The main economic sectors in the Pixley ka Seme District Municipality are community services (26.6%), agriculture (16.6%), transport (15.1%), trade (12.9%), finance (12.8%), electricity (7.0%), construction (3.3%), manufacturing (3.2%), and mining (2.6%).

Figure 8.2: Local Municipalities of the Pixley Ka Seme District Municipality (Source: Municipalities of South Africa)

The broader project site for the establishment of the Merino Wind Farm and associated infrastructure is located within the Ubuntu Local Municipality. The Ubuntu Local Municipality is a Category B municipality within the Pixley Ka Seme District in the Northern Cape Province. It is bordered by Kareeberg and Emthanjeni in the north, the Western Cape and Eastern Cape Provinces in the south, the Eastern Cape in the east, and the Namakwa District in the west. The Ubuntu Local Municipality covers an area of ~ 20 393km², making it the largest of the eight local municipalities that make up the district. Cities and/or towns within the municipality include Hutchinson, Loxton, Richmond and Victoria West. The agricultural sector is the main economic sector in the Ubuntu Local Municipality. According to census 2011, the population of the Ubuntu Local Municipality grew from 16 375 in 2001 to 18 601 in 2001, indicating an annual population growth rate of 1.6%.

Areas surrounding the project site are generally sparsely populated, with the highest concentration of people living in the town of Richmond (5 122). The project site and the areas surrounding the site consist of a landscape that can be described as remote due to its considerable distance from any major metropolitan centres or populated areas. The scarcity of water and other natural resources has

influenced settlement within this region, keeping numbers low, and distribution limited to the availability of water. Settlements, where they occur, are usually rural homesteads or farm dwellings.

The project site is situated directly adjacent to the N1 national road. The R398 and R63 are located to the north-east and south-west of the project site, respectively. The gravel main access road located to the north-east of the project site provides direct access to the project site and the development area and will used to access the project site and development area during the project lifecycle.

8.3. Climatic Conditions

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 (also see **Figure 8.3** for more information).

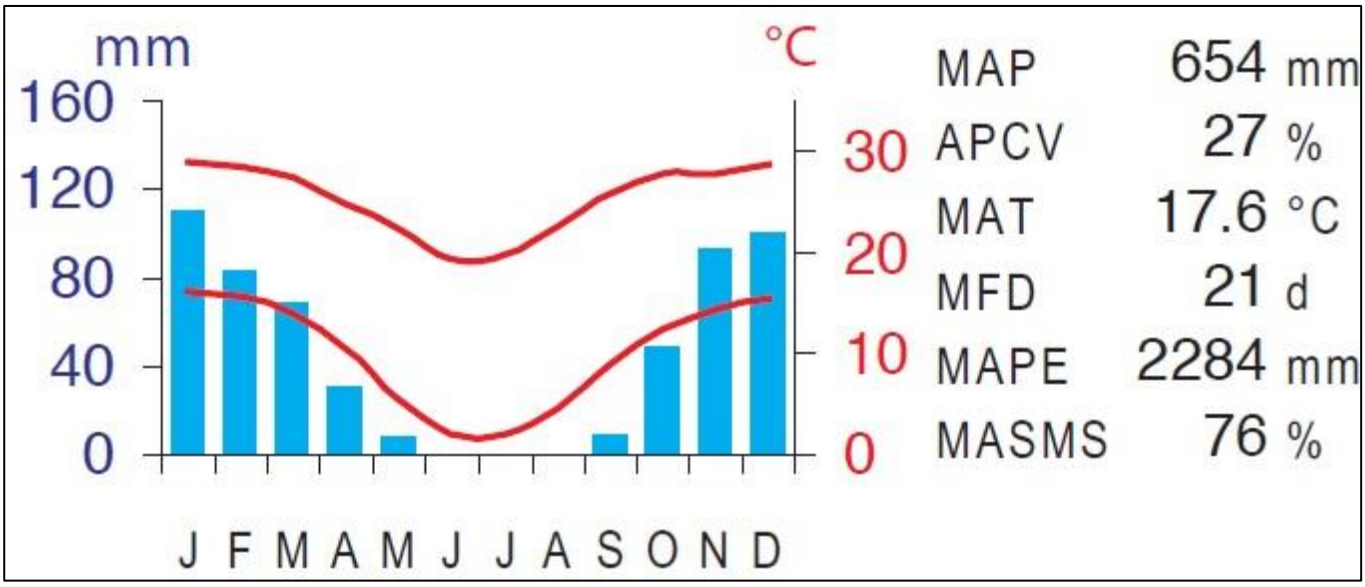

Figure 8.3: Climatic graph for Richmond area, Northern Cape within which the proposed project site is located

8.4. Biophysical Characteristics of the Project Site

The following section provides an overview and description of the biophysical characteristics of the study area and has been informed by specialist studies (**Appendix D-L**) undertaken for this Scoping Report.

8.4.1. Topographical profile

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% (refer to **Figure 8.4**).

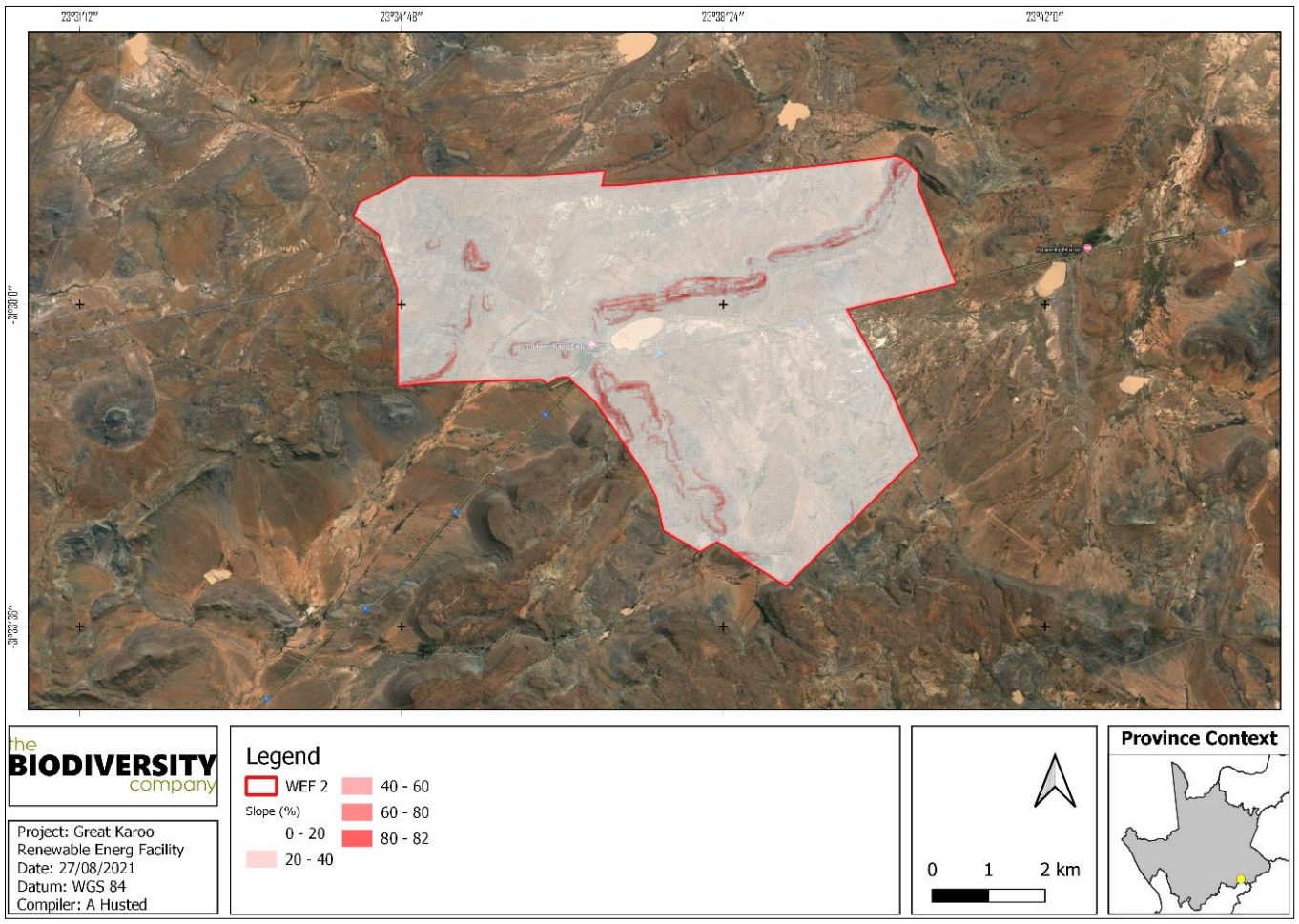

Figure 8.4: Slope percentage calculated for the development area within which the Merino Wind Farm is proposed

8.4.2. Geology, Soils and Agricultural Potential

Geological Setting of the Project Site

The geology of the project site is characterised by sandstones and mudstones from the Beaufort Group (including the Tarkastad and Adelaide Subgroups), which supports pedocutanic and prismacutanic diagnostic horizons. The geology of the proposed Merino Wind Farm is indicated in **Figure 8.5** below.

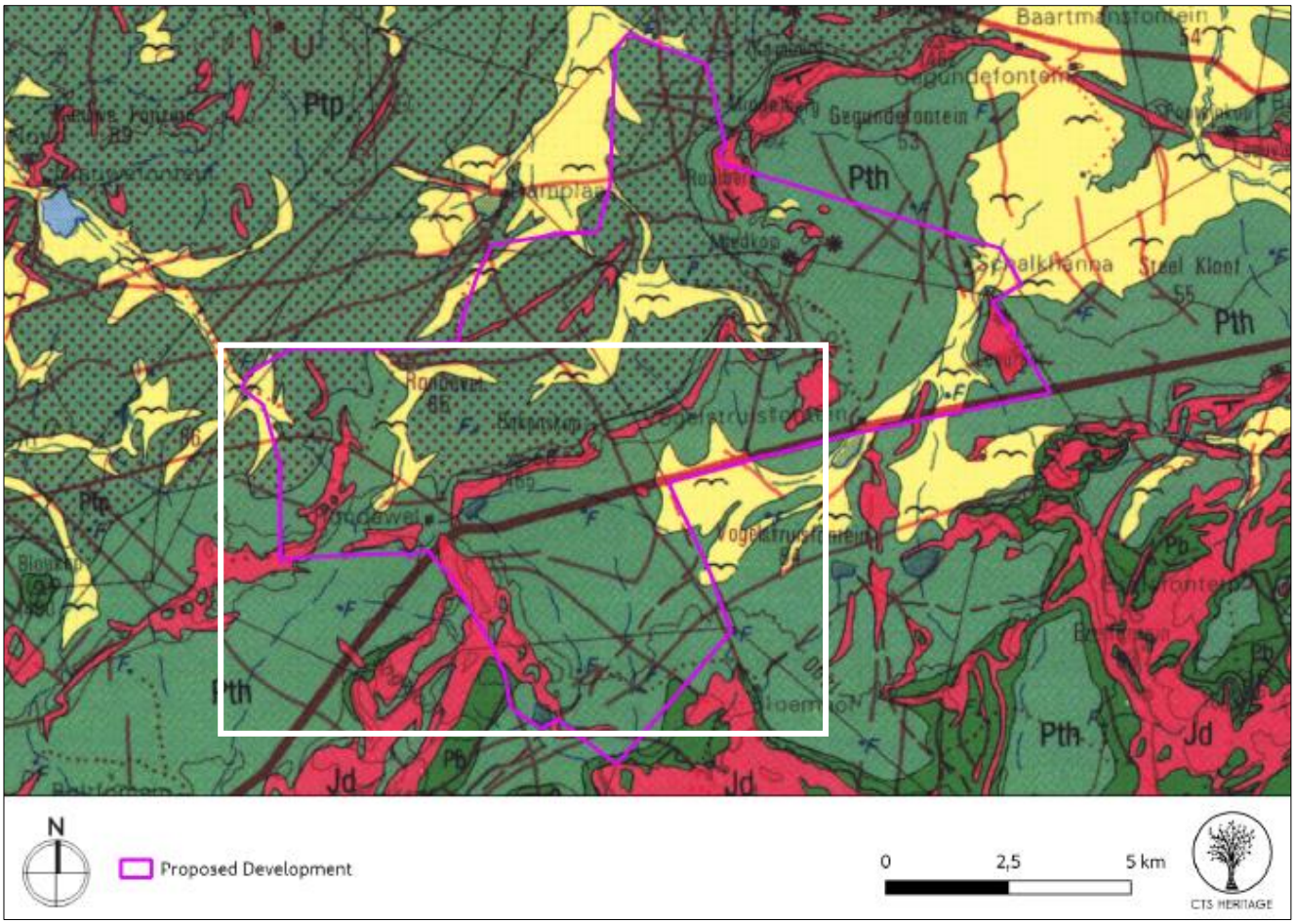

Figure 8.5: Extract from the CGS 3122 Victoria West Map indicating that the development area for the Merino Wind Farm (indicated on the map with the white block) is underlain by sediments of Ptp: Poortjie Member and Pth: Hoedemaker Member of the Teekloof Formation of the Adelaide Subgroup and Jd: Jurassic Dolerite as well as Quaternary Sands

Soil Forms, Land Type, Land Capability and Agricultural Potential of the Project Site

According to the land type database (Land Type Survey Staff, 1972 - 2006), the project site is characterised by the Da 76, Da 147, Fc 131, Fb 488, Ib 125, Fb 126 and Fb 397 land types (refer to **Figure 8.6**). The Da land type is characterised by prismacutanic and/or pedocutanic horizons with the possibility of red apedal B-horizons occurring.

The Fb land type consists of Glenrosa and/or Mispah soil forms with the possibility of other soils occurring throughout. Lime is generally present within the entire landscape. The Ib land type consists of miscellaneous land classes including rocky areas with miscellaneous soils. The Fc land type consists of Glenrosa and/or Mispah soil forms with the possibility of other soils occurring throughout. Lime is rare or absent within this land type in upland soils but generally present in low-lying areas.

Even though the soil depth, texture and permeability of various soil forms expected throughout the development area ensure high land capability, the climatic capability of the area often reduces the land potential considerably. Therefore, very few areas characterised by "High" land potential are expected.

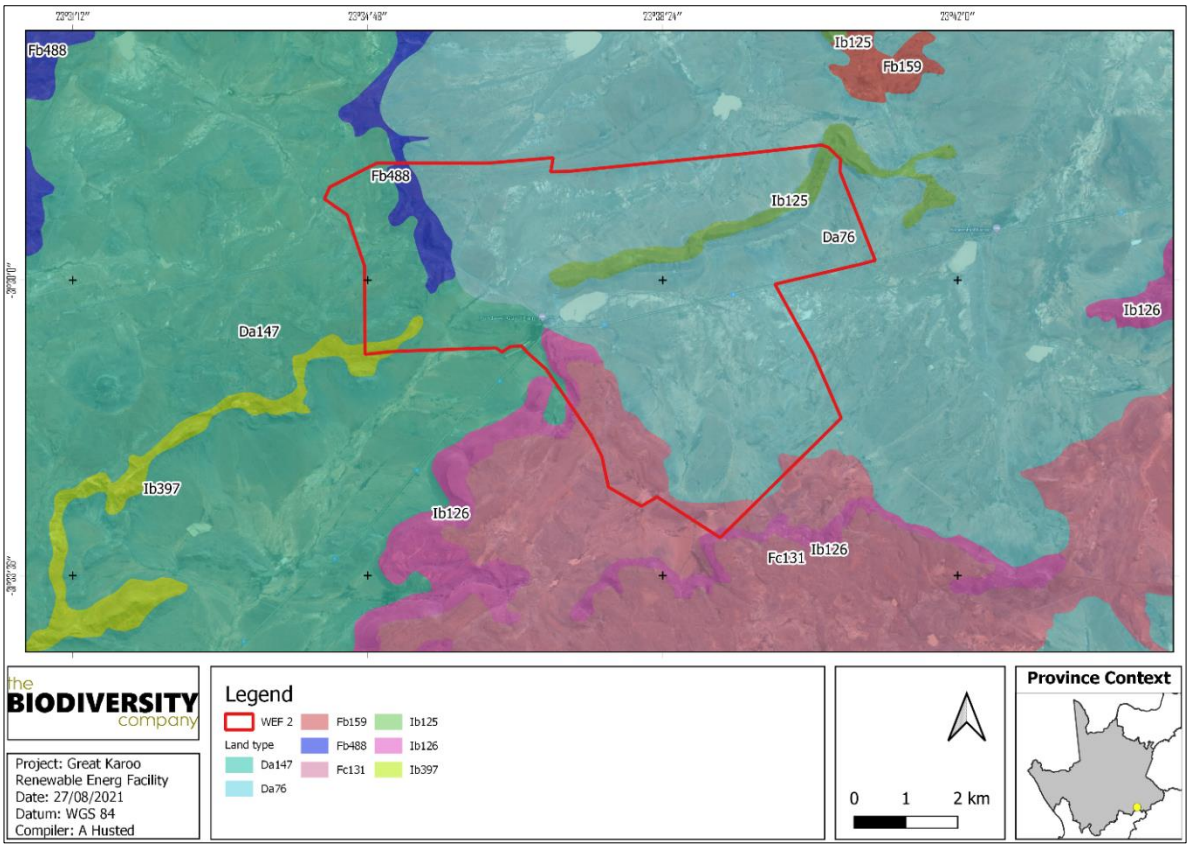

Figure 8.6: Land types present within the development area for the Merino Wind Farm

8.4.3. Land Use

The predominant land use in the area is stock farming (predominantly sheep, game, or goat farming). Since rainfall is low and water is scarce, crop farming accounts for only a small portion of the land use and is largely confined to the more fertile floodplain valleys. Due to the low carrying capacity, farms are large and usually at least about 5km apart.

There are no designated protected areas within the region and no major tourist attractions, or destinations were identified within the project site. There are however two overnight facilities, namely the Bloemhof Karoo Farmstay and the Rondawel Guest Farm. The latter facility appears to be located on the farm identified for the Merino Wind Farm.

In spite of the rural and natural character of the area within which the project site is proposed, there are a large number of overhead power lines, all congregating at either the Gamma or Victoria Cap Substations. These include, Droërivier/Hydra 1, 2 & 3 400kV; Gamma/Hydra 1 765kV; and Gamma/Perseus 1 765kV. These power lines traverse the north-western boundary of the proposed development area. Additional power lines to the north-west of the study area (at the Brakpoort Substation) include the Brakpoort/Hutchinson 1 132kV and Brakpoort/Laken 1 132kV lines.

8.4.4. Ecological Profile of the Broader Study Area and the Project Site

i. Broad-Scale Vegetation Patterns

The national vegetation map for the project site is depicted in **Figure 8.7**. The Merino Wind Farm is mapped as falling within two vegetation types, namely, the Eastern Upper Karoo, which occurs across most of the

site, and the Upper Karoo Hardeveld, which is associated with low mountains. Another vegetation type, i.e., the Southern Karoo Riviere, is shown as occurring nearby. There is a possibility that this may occur within drainage areas, although it is not mapped at a regional scale as occur within these areas. The vegetation types that occur on site are briefly described below.

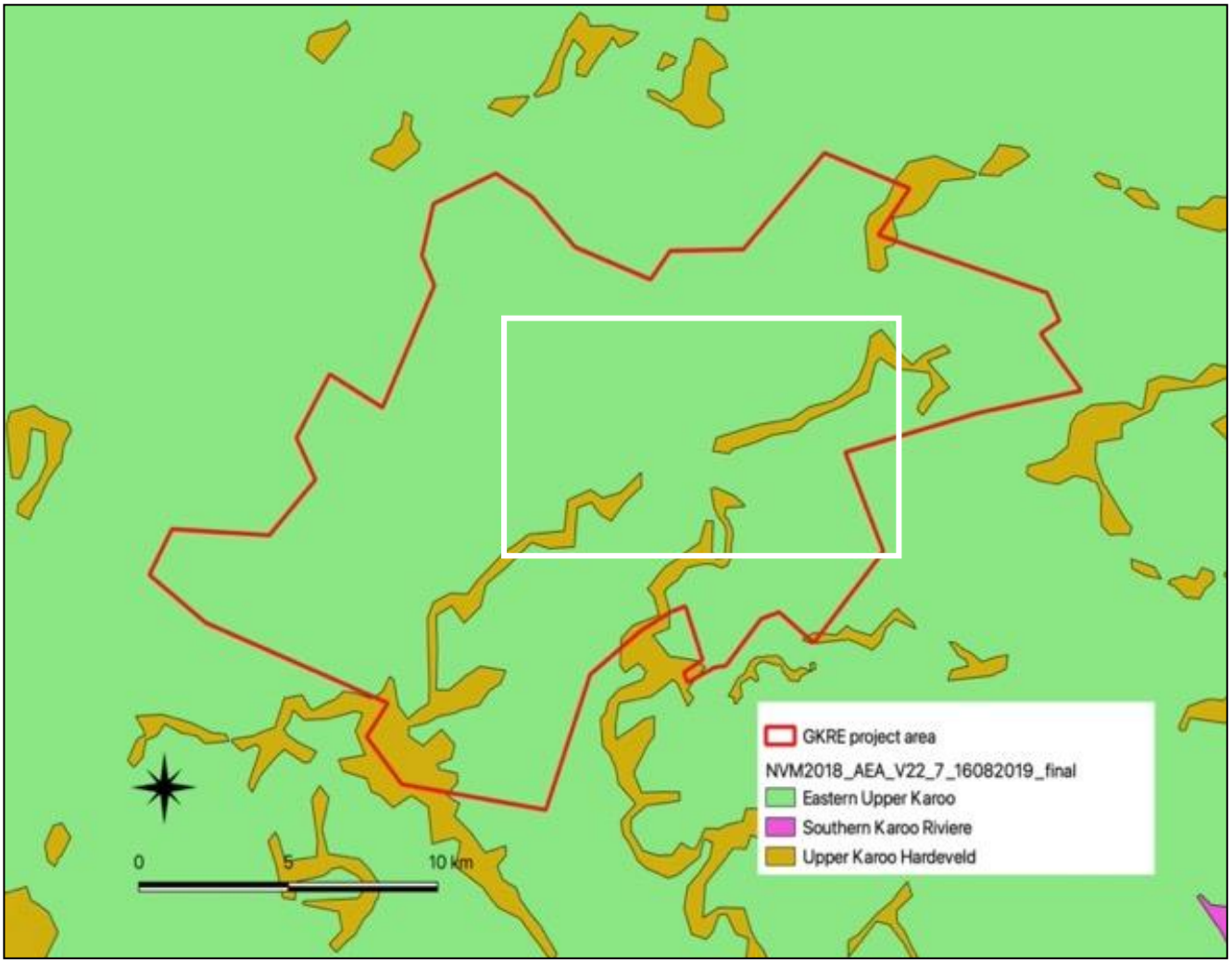

Figure 8.8: National vegetation map of the project site showing that the Merino Wind Farm (indicated with a white block) falls within the Eastern Upper Karoo and the Upper Karoo Hardeveld vegetation types.

Eastern Upper Karoo (NKu2)

Distribution:
Northern, Western and Eastern Cape Provinces: Discrete areas of slopes and ridges including dolerite dykes and sills in the region spanning Middelpos in the west and Strydenburg, Richmond and Nieu-Bethesda in the east. Most crest areas and steep slopes of the Great Escarpment facing south between Teekloofpas (connecting Leeu-Gamka and Fraserburg) and eastwards to Graaff-Reinet. Altitude varies mostly from 1 000–1 900m.
Vegetation and Landscape Features:
Steep slopes of koppies, butts, mesas and parts of the Great Escarpment covered with large boulders and stones supporting sparse dwarf Karoo scrub with drought-tolerant grasses of genera such as *Aristida, Eragrostis* and *Stipagrostis*.
Important Taxa:

- **Tall Shrubs:** *Lycium cinereum* (d), *Rhigozum obovatum* (d), *Cadaba aphylla*, *Diospyros austro-africana*, *Ehretia rigida* subsp. *rigida*, *Lycium oxycarpum*, *Melianthus comosus*, *Rhus burchellii*.
- **Low Shrubs**: *Chrysocoma ciliata* (d), *Eriocephalus ericoides* subsp. *ericoides* (d), *Euryops lateriflorus* (d), *Felicia muricata* (d), *Limeum aethiopicum* (d), *Pteronia glauca* (d), *Amphiglossa triflora*, *Aptosimum elongatum*, *A. spinescens*, *Asparagus mucronatus*, *A. retrofractus*, *A. striatus*, *A. suaveolens*, *Eriocephalus spinescens*, *Euryops annae*, *E. candollei, E. empetrifolium, E. nodosus, Felicia filifolia* subsp. *filifolia*, *Garuleum latifolium*, *Helichrysum lucilioides*, *H. zeyheri*, *Hermannia filifolia* var. *filifolia*, *H. multiflora*, *H. pulchella*, *H. vestita*, *Indigofera sessilifolia*, *Jamesbrittenia atropurpurea*, *Lessertia frutescens*, *Melolobium candicans*, *M. microphyllum*, *Microloma armatum*, *Monechma incanum*, *Nenax microphylla*, *Pegolettia retrofracta*, *Pelargonium abrotanifolium*, *P. ramosissimum*, *Pentzia globosa*, *P. spinescens*, *Plinthus karooicus*, *Polygala seminuda*, *Pteronia adenocarpa*, *P. sordida*, *Rosenia humilis*, *Selago albida*, *Solanum capense*, *Sutera halimifolia*, *Tetragonia arbuscula*, *Wahlenbergia tenella*.
- **Succulent Shrubs:** *Aloe broomii*, *Drosanthemum lique*, *Faucaria bosscheana*, *Kleinia longiflora*, *Pachypodium succulentum*, *Trichodiadema barbatum*, *Zygophyllum flexuosum*.
- **Semiparasitic Shrub**: *Thesium lineatum* (d). Herbs: *Troglophyton capillaceum* subsp. *capillaceum*, *Dianthus caespitosus* subsp. *caespitosus*, *Gazania krebsiana*, *Lepidium africanum* subsp. *africanum*, *Leysera tenella*, *Pelargonium minimum*, *Sutera pinnatifida*, *Tribulus terrestris*.
- **Geophytic Herbs:** *Albuca setosa*, *Androcymbium albomarginatum*, *Asplenium cordatum*, *Boophone disticha*, *Cheilanthes bergiana*, *Drimia intricata*, *Oxalis depressa*, Graminoids: *Aristida adscensionis* (d), *A. congesta* (d), *A. diffusa* (d), *Cenchrus ciliaris* (d), *Enneapogon desvauxii* (d), *Eragrostis lehmanniana* (d), *E. obtusa* (d), *Sporobolus fimbriatus* (d), *Stipagrostis obtusa* (d), *Cynodon incompletus*, *Digitaria eriantha*, *Ehrharta calycina*, *Enneapogon scaber*, *E. scoparius*, *Eragrostis curvula*, *E. nindensis, E. procumbens*, *Fingerhuthia africana*, *Heteropogon contortus*, *Merxmuellera disticha*, *Stipagrostis ciliata*, *Themeda triandra*, *Tragus berteronianus*, *T. koelerioides*.

Endemic Taxa:

- **Succulent Shrubs**: *Aloe chlorantha*, *Crassula barbata* subsp. *broomii*, *Delosperma robustum, Sceletium expansum*, *Stomatium suaveolens*.
- **Low Shrubs**: *Cineraria polycephala*, *Euryops petraeus*, *Lotononis azureoides*, *Selago magnakarooica*.
- **Tall Shrub**: *Anisodontea malvastroides*.
- **Herbs**: *Cineraria arctotidea*, *Vellereophyton niveum*. **Succulent Herbs**: *Adromischus fallax*, *A. humilis*.
- **Geophytic Herbs**: *Gethyllis longistyla*, *Lachenalia auriolae, Ornithogalum paucifolium* subsp. *karooparkense*.

Eastern Upper Karoo (NKu4)

Distribution:

Northern Cape, Eastern Cape and Western Cape Provinces: Between Carnarvon and Loxton in the west, De Aar, Petrusville and Venterstad in the north, Burgersdorp, Hofmeyr and Cradock in the east and the Great Escarpment and the Sneeuberge-Coetzeesberge mountain chain in the south. Altitude varies between mostly 1 000–1 700 m.

Vegetation and Landscape Features:

Flats and gently sloping plains (interspersed with hills and rocky areas of Upper Karoo Hardeveld in the west, Besemkaree Koppies Shrubland in the northeast and Tarkastad Montane Shrubland in the southeast), dominated by dwarf microphyllous shrubs, with 'white' grasses of the genera *Aristida* and *Eragrostis* (these

become prominent especially in the early autumn months after good summer rains). The grass cover increases along a gradient from southwest to northeast.

Important Taxa:

- **Tall Shrubs**: *Lycium cinereum* (d), *L. horridum*, *L. oxycarpum*.
- **Low Shrubs**: *Chrysocoma ciliata* (d), *Eriocephalus ericoides* subsp. *ericoides* (d), *E. spinescens* (d), *Pentzia globosa* (d), *P. incana* (d), *Phymaspermum parvifolium* (d), *Salsola calluna* (d), *Aptosimum procumbens*, *Felicia muricata*, *Gnidia polycephala*, *Helichrysum dregeanum*, *H. lucilioides*, *Limeum aethiopicum*, *Nenax microphylla*, *Osteospermum leptolobum*, *Plinthus karooicus*, *Pteronia glauca*, *Rosenia humilis*, *Selago geniculata*, *S. saxatilis*.
- **Succulent Shrubs**: *Euphorbia hypogaea*, *Ruschia intricata*.
- **Herbs**: *Indigofera alternans*, *Pelargonium minimum*, *Tribulus terrestris*.
- **Geophytic Herbs**: *Moraea pallida* (d), *Moraea polystachya*, *Syringodea bifucata*, *S. concolor*.
- **Succulent Herbs**: *Psilocaulon coriarium*, *Tridentea jucunda, T. virescens.*
- **Graminoids**: *Aristida congesta* (d), *A. diffusa* (d), *Cynodon incompletus* (d), *Eragrostis bergiana* (d), *E. bicolor* (d), *E. lehmanniana* (d), *E. obtusa* (d), *Sporobolus fimbriatus* (d), *Stipagrostis ciliata* (d), *Tragus koelerioides* (d), *Aristida adscensionis*, *Chloris virgata*, *Cyperus usitatus*, *Digitaria eriantha*, *Enneapogon desvauxii*, *E. scoparius*, *Eragrostis curvula*, *Fingerhuthia africana*, *Heteropogon contortus*, *Sporobolus ludwigii*, *S. tenellus*, *Stipagrostis obtusa*, *Themeda triandra*, *Tragus berteronianus*.

Endemic Taxa:

- **Succulent Shrubs:** *Chasmatophyllum rouxii*, *Hertia cluytiifolia*, *Rabiea albinota*, *Salsola tetrandra*.
- **Tall Shrub:** *Phymaspermum scoparium*.
- **Low Shrubs:** *Aspalathus acicularis* subsp. *planifolia*, *Selago persimilis*, *S. walpersii*.

ii. Conservation Status of Broad Vegetation Types

On the basis of a scientific approach used at national level by the South African National Biodiversity Institute (SANBI), vegetation types can be categorised according to their conservation status which is, in turn, assessed according to the degree of transformation relative to the expected extent of each vegetation type. The status of a habitat or vegetation type is based on how much of its original area still remains intact relative to various thresholds. On a national scale the thresholds are as depicted in **Table 8.1** below, as determined by best available scientific approaches. The level at which an ecosystem becomes Critically Endangered differs from one ecosystem to another and varies from 16% to 36%.

Table 8.1: Conservation status of different vegetation types occurring in the project site

Vegetation Type	**Target (%)**	**Conserved (%)**	**Transformed (%)**	**Conservation status**	
				Driver *et al*. 2005; Mucina *et al*., 2006	**National Ecosystem List (NEM:BA)**
Eastern Upper Karoo	21	0.7	2	Least Threatened	Not listed
Upper Karoo Hardeveld	21	2.9	<1	Least Threatened	Not listed

Determining ecosystem status (Driver *et al.*, 2005). *BT = biodiversity target (the minimum conservation requirement).

Habitat remaining (%)		
80–100	least threatened	LT
60–80	vulnerable	VU
*BT–60	endangered	EN
0–*BT	critically endangered	CR

According to scientific literature (Driver *et al*., 2005; Mucina *et al*., 2006), as shown in **Table 8.1**, both vegetation types are listed as Least Threatened.

The National List of Ecosystems that are Threatened and in need of protection (GN1002 of 2011), published under the National Environmental Management: Biodiversity Act (Act No. 10, 2004), lists national vegetation types that are afforded protection on the basis of rates of transformation. The thresholds for listing in this legislation are higher than in the scientific literature, which means there are fewer ecosystems listed in the National Ecosystem List versus in scientific literature.

Neither vegetation types are listed in the National List of Ecosystems that are Threatened and in need of protection (GN1002 of 2011).

iii. Habitats on Site

Six habitat types were identified within the project site for the Merino Wind Farm (refer to **Figure 8.9**), namely, karroid plains, mountain slopes, drainage areas, drainage scrub, open water and no natural habitat. These are discussed in detail below.

Karroid Plains
The plains on the lowlands have gently undulating topography. They are found between the hills throughout the site. The vegetation in these areas is mostly a dwarf karroid shrubland. These areas have been moderately to heavily grazed throughout the study area.

Mountain Slopes
The site is characterised by the presence of a range of hills that form a mini-escarpment parallel to the national road. The topography within these areas is relatively steep and rugged. There are also various low hills and the free-standing Bloukop inland of the mini escarpment. The vegetation in these areas is a grassy dwarf karroid shrubland.

Drainage Areas
In the lowest parts of the plains, often in wide bands, are areas that are shaped by fluvial processes and are either channelled in places or eroded from water movement. The soils are mostly deep sands where they have not been eroded away. The vegetation is a karroid dwarf shrubland or a sparse weedy community in eroded areas.

Drainage Scrub
This forms part of the drainage areas but has been mapped as a separate unit due to the clearly different vegetation structure and composition. The vegetation is a scrub or shrubland with shrubs up to 3m high in places. The vegetation is relatively dense, and the soils are deep and sandy. It constitutes and important refuge for wildlife, both in terms of the dense vegetation cover as well as the deep sands which are ideal

for burrowing animals. Although considered unlikely that it would occur on site, this is the habitat that most closely matches the habitat requirements of the Critically Endangered Riverine Rabbit.

Open Water

There are a number of farm dams on site. These are all man-made, but they nevertheless constitute an important water resource for wildlife. There is a possibility that the Protected Giant Bullfrog occurs in the general area, in which case these areas of open water may constitute important habitat for them.

No natural habitat

All areas where natural habitat has been lost have been included in this map unit. This includes farmhouses, roads, cultivated areas, previously cultivated areas, quarries, and other disturbed areas.

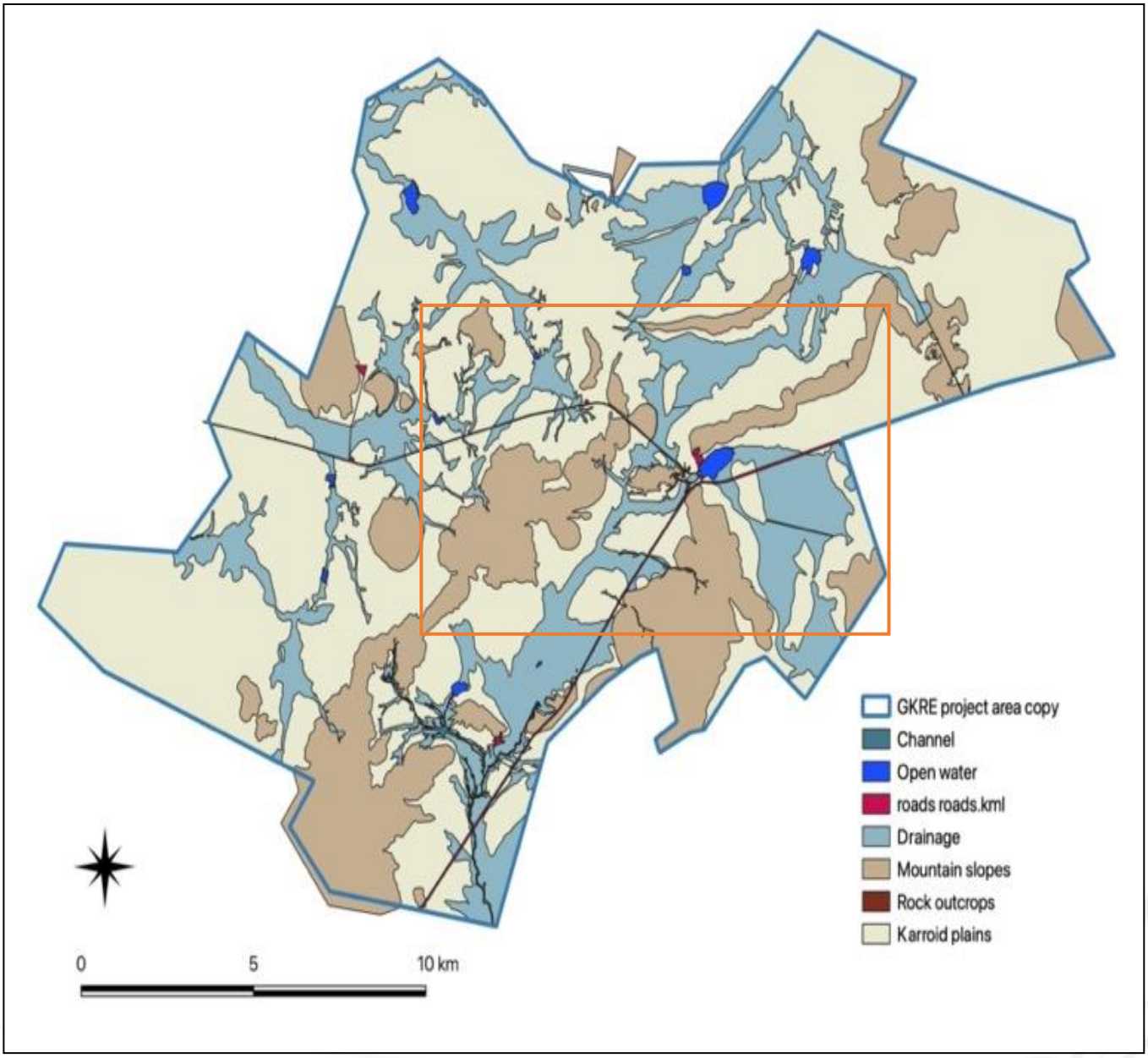

Figure 8.9: Habitats of the study area, including the project site for the Merino Wind Farm (indicated with the orange block)

iii. Protected Areas within the Broader Project Site

According to the National Parks Area Expansion Strategy (NPAES), there are no areas within the project site that have been identified as priority areas for inclusion in future protected areas. The project site is therefore outside the NPAES focus area. There are many areas outside of the project site, to the north, south, east and west that are included as being part of future protected areas, but not within or adjacent to the site itself.

iv. Listed Plant Species

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 8.2**). 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 8.2: 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**

v. Plants Protected in terms of the National Environmental Management: Biodiversity Act and the Northern Cape Conservation Act

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.

vi. Trees Protected in Terms of the National Forests Act

There is a single tree species protected under the National Forests Act (No. 84 of 1998) that is known to have a geographical distribution within the project site, namely, *Boscia albitrunca* (Shepherd's Tree / Witgatboom), which occurs in semi-desert areas and bushveld, often on termitaria, but is common on sandy to loamy soils and calcrete soils.

vii. Critical Biodiversity Areas

An extract of the 2016 Northern Cape Critical Biodiversity Area Map for the study area is illustrated below (**Figure 8.10**). This biodiversity assessment identifies Critical Biodiversity Areas (CBAs) which represent biodiversity priority areas which should be maintained in a natural to near natural state. The CBA maps indicate the most efficient selection and classification of land portions requiring safeguarding in order to maintain ecosystem functioning and meet national biodiversity objectives.

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

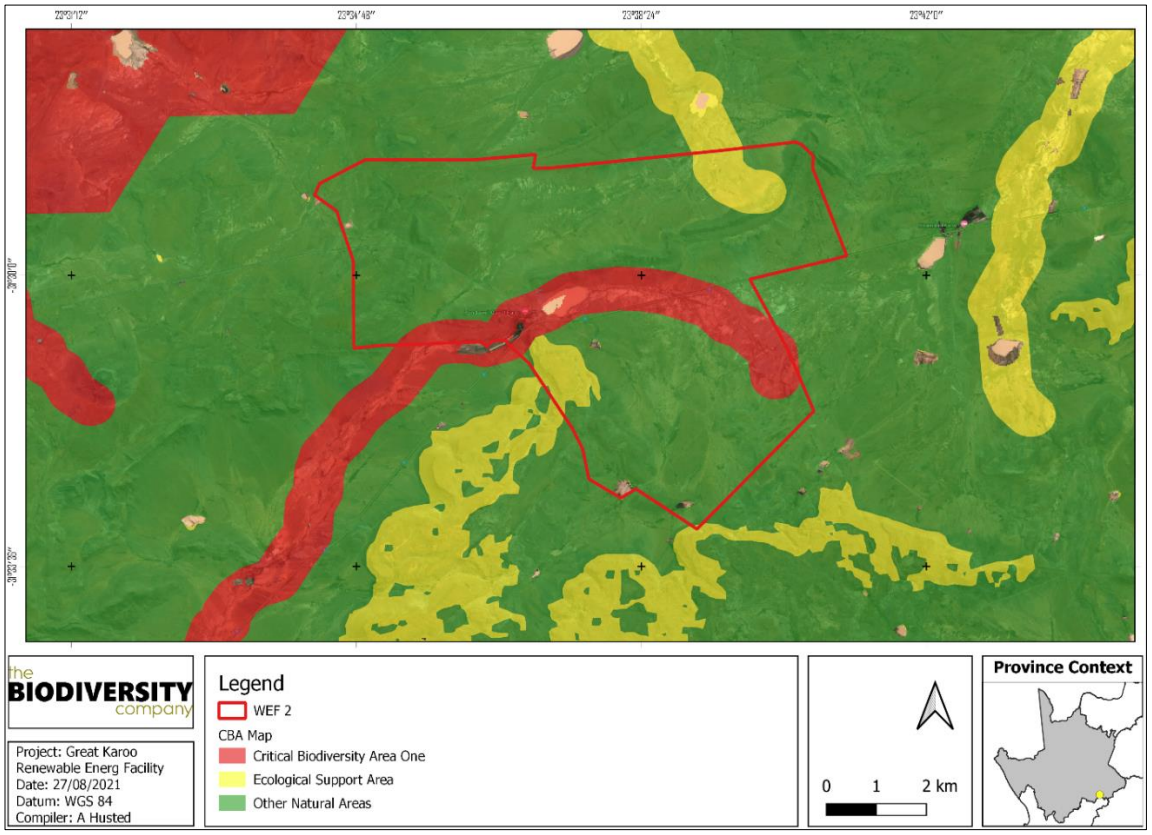

Figure 8.10: Critical Biodiversity Areas (CBAs), as per the 2016 Northern Cape Critical Biodiversity Area Map, located within the Merino Wind Farm project site

viii. Wetlands and Freshwater Resources

Catchment

The project site extends into two Water Management Areas (WMA), namely the Lower Orange WMA (WMA 6) and the Mzimvubu-Tsitsikamma WMA (WMA 7). The locally affected quaternary catchments include D61A, D61D and L21B.

National Freshwater Ecosystem Priority Area Status

In an attempt to better conserve aquatic ecosystems, South Africa has categorised its river systems according to set ecological criteria (i.e., ecosystem representation, water yield, connectivity, unique features, and threatened taxa) to identify Freshwater Ecosystem Priority Areas (FEPAs). The FEPAs are intended to be conservation support tools and envisioned to guide the effective implementation of measures to achieve the National Environment Management Biodiversity Act's (NEM:BA) biodiversity goals.

Figure 8.11 shows the location of the project site in relation to wetland FEPAs. Based on this information, non-priority systems are located within the extent of the development area.

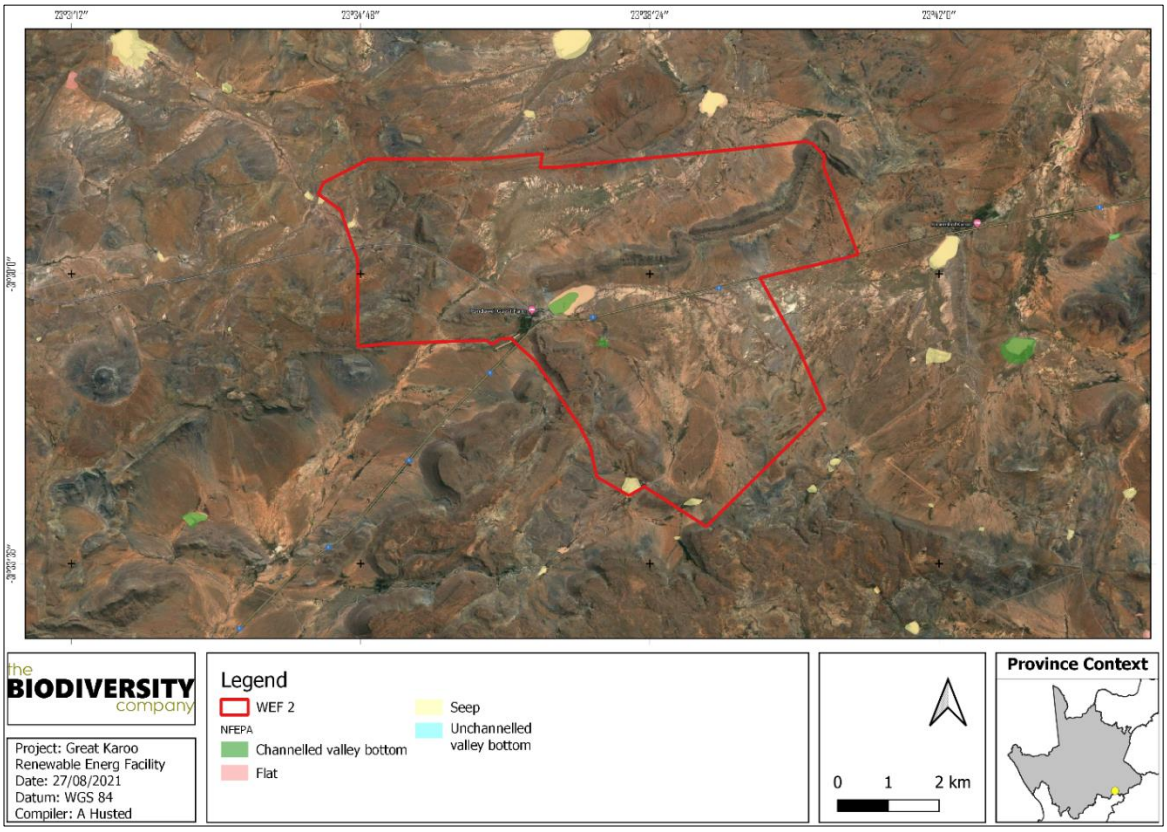

Figure 8.11: The location of NFEPA wetlands in relation to the development area

National Wetland Map 5

The National Wetland Map 5 (NWM5) spatial data was published in October 2019, in collaboration with the South African National Biodiversity Institute (SANBI), with the specific aim of spatially representing the location, type and extent of wetlands in South Africa. The data represents a synthesis of a wide number of official watercourse data, including rivers, inland wetlands, and estuaries. This database does not recognise the presence of any wetlands within the extent of the development area. However, areas classified as "rivers" are extensive throughout the development area (**Figure 8.12**).

Aquatic Ecosystems

The South African Inventory of Inland Aquatic Ecosystems (SAIIAE) was released with the NBA 2018. Ecosystem threat status (ETS) of river and wetland ecosystem types are based on the extent to which each river ecosystem type had been altered from its natural condition. Ecosystem types are categorised as Critically Endangered (CR), Endangered (EN), Vulnerable (VU) or Least Threatened (LT), with CR, EN and VU ecosystem types collectively referred to as 'threatened'. No wetlands are present within the extent of the project area (refer to **Figure 8.13**).

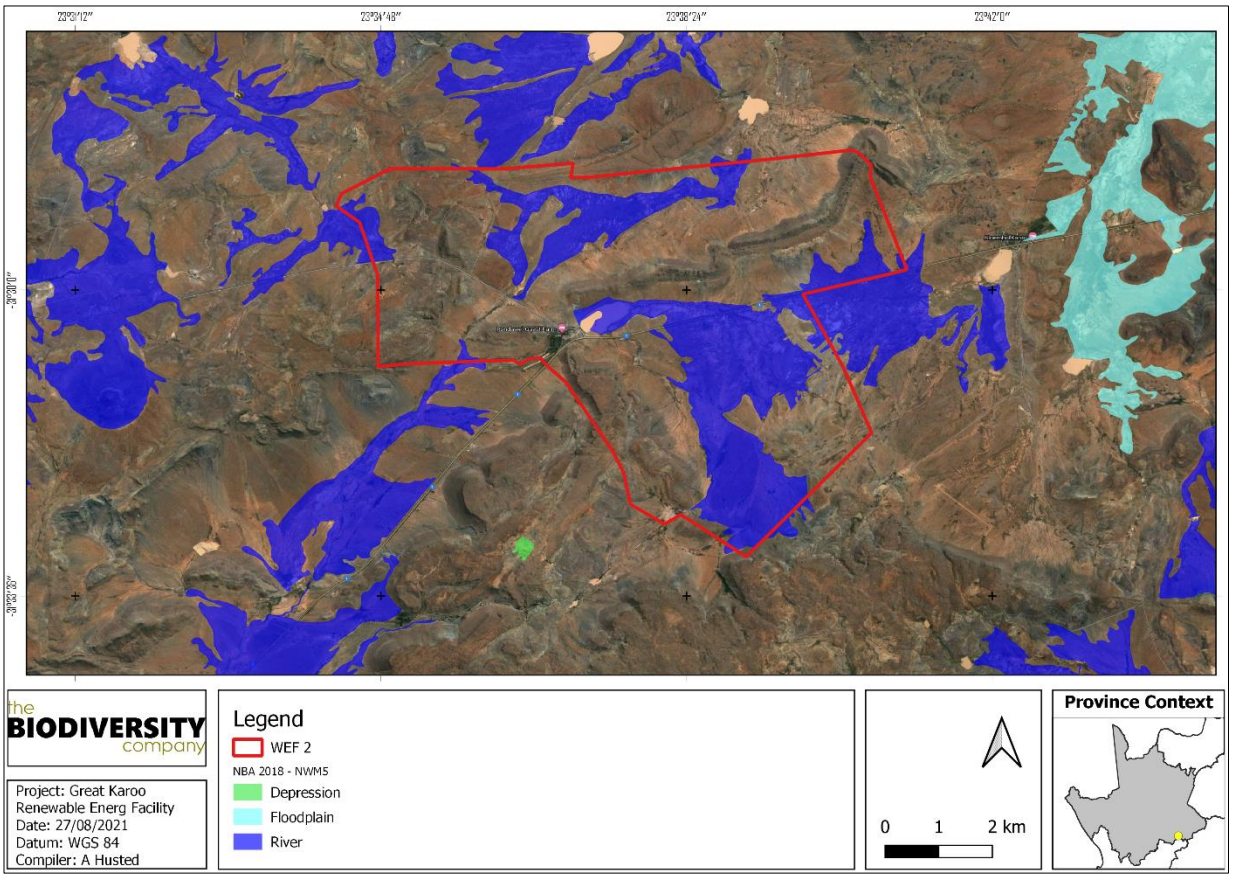

Figure 8.12: Map illustrating the NWM5 for the project area

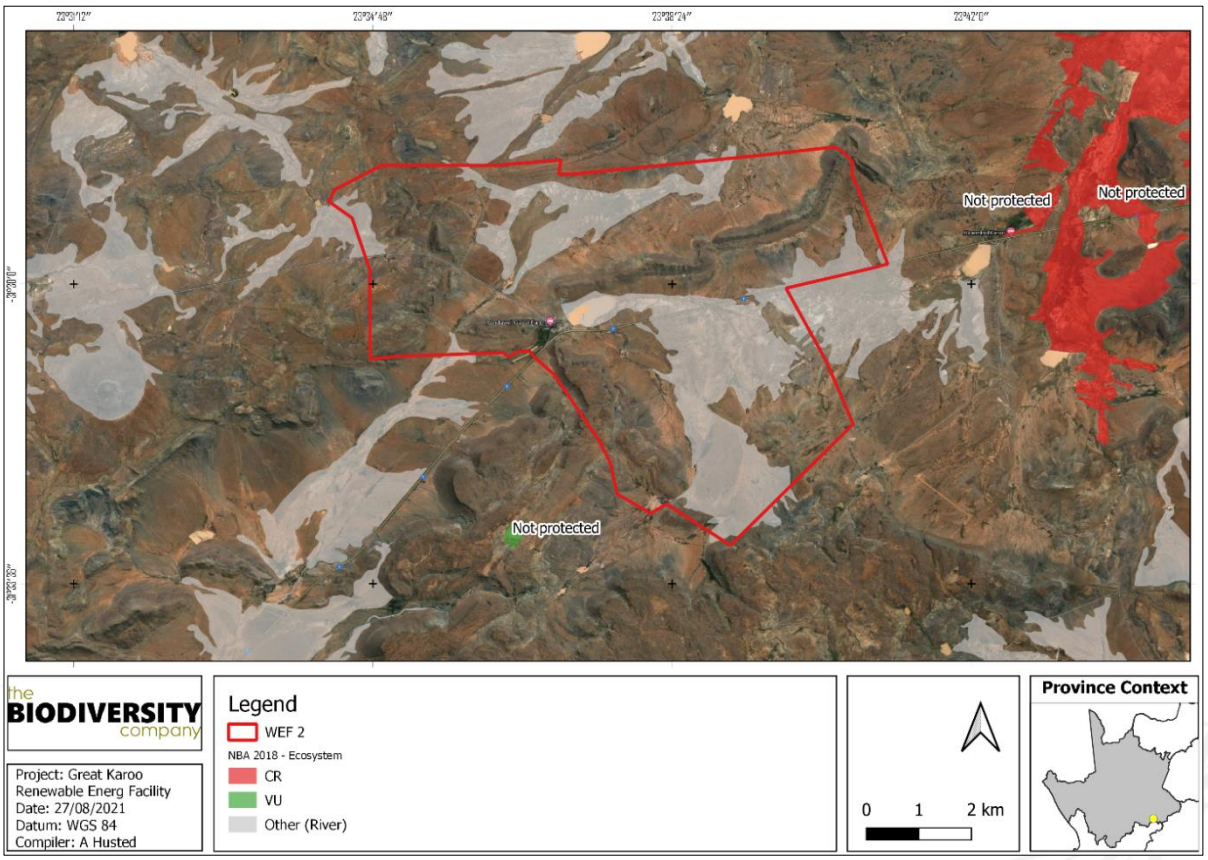

Figure 8.13: Map illustrating ecosystem threat status of wetland ecosystems

ix. Terrestrial Fauna Communities in the Study Area

Mammals

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) (**Table 8.3**). There was some rodent activity (active burrows and tracks) observed, but the species were not identified during the survey.

The endangered *Bunolagus monticularis* is not expected in the area (known distribution range further south), but a survey is currently being conducted to confirm its absence/presence in the study area.

Table 8.3: Summary of expected mammals associated with the QDS 3123DA (shaded species represent either observation or signs of activity)

Family	*Genus and species name*	Common name	Conservation status
Bathyergidae	*Cryptomys hottentotus*	African Mole-rat	Least Concern
Bovidae	*Raphicerus campestris*	Steenbok	Least Concern
Bovidae	*Antidorcas marsupialis*	Springbok	Least Concern
Bovidae	*Pelea capreolus*	Grey Rhebok	Least Concern
Canidae	*Otocyon megalotis*	Bat-eared Fox	Least Concern
Cercopithecidae	*Papio ursinus*	Cape Baboon	Least Concern
Felidae	*Felis nigripes*	Black-footed Cat	Vulnerable
Herpestidae	*Suricata suricatta*	Meerkat	Least Concern
Herpestidae	*Herpestes pulverulentus*	Cape Grey Mongoose	Least Concern
Leporidae	*Lepus saxatilis*	Scrub Hare	Least Concern
Leporidae	*Lepus capensis*	Cape Hare	Least Concern
Muridae	*Rhabdomys pumilio*	Four-striped Grass Mouse	Least Concern
Mustelidae	*Ictonyx striatus*	Striped polecat	Least Concern
Orycteropodidae	*Orycteropus afer*	Aardvark	Least Concern
Pedetidae	*Pedetes capensis*	Springhare	Least Concern
Procaviidae	*Procavia capensis*	Rock hyrax	Least concern
Sciuridae	*Geosciurus inauris*	Cape Ground Squirrel	Least Concern
Viverridae	*Genetta genetta*	Small-spotted Genet	Least Concern

Amphibians

According to the records (FitzPatrick Institute of African Ornithology – Virtual Museum, Frog Records, 2021), only two (2) amphibian species (**Table 8.4**) 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.

Table 8.4: List of Amphibians associated with the QDS (3123DA) of the study area

Family	*Genus and species name*	Common name	Conservation status
Pyxicephalidae	*Cacosternum boettgeri*	Common Caco	Least Concern

Family	*Genus and species name*	Common name	Conservation status
Pyxicephalidae	*Tomopterna tandyi*	Tandy's Sand Frog	Least Concern

Reptiles

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 (**Table 8.5**). 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.

Table 8.5: List of expected reptiles on the area of the proposed development (FitzPatrick Institute of African Ornithology – Virtual Museum, Reptile Records, 2021 and i-Naturalist, 2021)

Family	*Genus and species name*	Common name	Conservation status
Agamidae	*Agama atra*	Southern Rock Agama	Least Concern
Agamidae	*Agama aculeata*	Ground Agama	Least Concern
Colubridae	*Lamprophis aurora*	Aurora House Snake	Least Concern
Cordylidae	*Karusasaurus polyzonus*	Karoo Girdled Lizard	Least Concern
Cordylidae	*Cordylus cordylus*	Cape Girdled Lizard	Least Concern
Gekkonidae	*Afroedura karroica*	Karoo Flat Gecko	Least Concern
Lacertidae	*Meroles suborbitalis*	Spotted Sand Lizard	Least Concern
Lacertidae	*Pedioplanis namaquensis*	Namaqua Sand Lizard	Least Concern
Scincidae	*Trachylepis sulcata*	Western Rock Skink	Least Concern
Scincidae	*Plestiodon gilberti*	Gilbert's Skink	Least Concern
Testudinidae	*Stigmochelys pardalis*	Leopard Tortoise	Least Concern
Varanidae	*Varanus albigularis*	Rock Monitor	Least Concern

Arachnida

A number of scorpions (**Table 8.6**) 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.

Table 8.6: List of possible Scorpions that can occur on the study site, as these are listed in the larger area surrounding Richmond)

Family	*Genus and species name*	Common name	Conservation status
Buthidae	*Parabuthus granulatus*	Rough Thicktail Scorpion	Least Concern
Buthidae	*Parabuthus mossambicensis*	Mozambique Thicktail Scorpion	Least Concern
Buthidae	*Uroplectes carinatus*	Common Lesser-Thicktail Scorpion	Least Concern
Buthidae	*Uroplectes triangulifer*	Highveld Lesser-Thicktail Scorpion	Least Concern
Scorpionidae	*Opistophthalmus carinatus*	Radiant Burrower	Least Concern
Scorpionidae	*Opistophthalmus karrooensis*	Karroo Burrower	Least Concern

From the surveys conducted, it is clear that the animal diversity is low, and it can be linked to the current drought conditions and the semi-arid conditions associated with the region, as well as the history of habitat management associated with livestock production.

x. Bats

Bats play a critical role in many ecosystems and are important indicators of biodiversity and ecosystem health. They provide many essential ecosystem services which increase human well-being such as pollination, seed dispersal and the consumption of important agricultural pests.

Bat Species

There are several bat species in the vicinity of the site that occur commonly in the area. Some of these species are of special importance based on their likelihood of being impacted by the proposed wind farm, due to high abundances and certain behavioural traits. They have also been dominating records of fatalities at wind farms in South Africa. The relevant species are discussed below.

Tadarida aegyptiaca

The Egyptian Free-tailed Bat, *Tadarida aegyptiaca*, is a Least Concern species (IUCN Red List 2016) as it has a wide distribution and high abundance throughout South Africa and is part of the Free-tailed bat family (Molossidae). It occurs from the Western Cape of South Africa, north through to Namibia and southern Angola; and through Zimbabwe to central and northern Mozambique (Monadjem *et al*. 2020). This species is protected by national legislation in South Africa (ACR 2020).

They roost communally in small (dozens) to medium-sized (hundreds) groups in caves, rock crevices, under exfoliating rocks, in hollow trees and behind the bark of dead trees. *Tadarida aegyptiaca* has also adapted to roosting in buildings, in particular roofs of houses. Thus, man-made structures and large trees on the site would be important roosts for this species.

Tadarida aegyptiaca forages over a wide range of habitats, flying above the vegetation canopy. It appears that the vegetation has little influence on foraging behaviour as the species forages over desert, semi-arid scrub, savannah, grassland, and agricultural lands. Its presence is strongly associated with permanent water bodies due to concentrated densities of insect prey.

The Egyptian Free-tailed bat is considered to have a high likelihood of risk of fatality due to wind turbines. Due to the high abundance and widespread distribution of this species, high mortality rates due to wind turbines would be a cause for concern as these species have more significant ecological roles than the rarer bat species and are displaying moderate to high numbers of mortalities at nearby operating wind farms.

Neoromicia capensis

Neoromicia capensis is commonly called the Cape serotine and has a conservation status of Least Concern (IUCN Red List 2016) as it is found in high numbers and is widespread over much of Sub-Saharan Africa.

High mortality rates of this species due to wind turbines would be a cause for concern as *N. capensis* is abundant and widespread and as such has a more significant role to play within the local ecosystem than the rarer bat species. *N. capensis* does not undertake migrations and is thus considered a resident of the site.

It roosts individually or in small groups of two to three bats in a variety of shelters, such as under the bark of trees, at the base of aloe leaves, and under the roofs of houses. It will use most man-made structures as day roosts which can be found throughout the site and surrounding areas (Monadjem *et al*. 2020).

N. capensis is tolerant to a wide range of environmental conditions as it survives and prospers across arid and semi-arid areas to montane grasslands, forests, and savannas; indicating that it may occupy several

habitat types across the site and is amenable towards habitat changes. It is however a clutter-edge forager, meaning it prefers to hunt on the edge of vegetation clutter mostly, but can occasionally forage in open spaces. It is thought to have a Medium-High likelihood of risk of fatality due to wind turbines and is currently displaying moderate to high numbers of mortalities at operational wind farms in South Africa.

Miniopterus natalensis

Miniopterus natalensis, commonly referred to as the Natal long-fingered bat, occurs widely across the country but mostly within the southern and eastern regions and is listed as Least Concern. This bat is a cave-dependent species and identification of suitable roosting sites may be more important in determining its presence in an area than the presence of surrounding vegetation. It occurs in large numbers when roosting in caves with approximately 260 000 bats observed making seasonal use of the De Hoop Guano Cave in the Western Cape, South Africa. Culverts and mines have also been observed as roosting sites for either single bats or small colonies. Separate roosting sites are used for winter hibernation activities and summer maternity behaviour, with the winter hibernacula generally occurring at higher altitudes in more temperate areas and the summer hibernacula occurring at lower altitudes in warmer areas of the country.

The Natal long-fingered bat undertakes short migratory journeys between hibernaculum and maternity roosts. Due to this migratory behaviour, it is considered to be at high risk of fatality from wind turbines if a wind farm is placed within a migratory path. The mass movement of bats during migratory periods could result in mass casualties if wind turbines are positioned over a mass migratory route and such turbines are not effectively mitigated. Very little is known about the migratory behaviour and paths of *M. natalensis* in South Africa, with migration distances exceeding 150km.

M. natalensis faces a medium to high risk of fatality due to wind turbines. The species is currently displaying low to moderate numbers of mortalities at operational wind farms in South Africa.

xi. Avifauna

Important Bird and Biodiversity Areas (IBA)

There are no Important Bird Areas (IBA) within a 50km radius of the proposed Merino wind Farm. The closest IBA to the project site is the Platberg-Karoo Conservancy IBA SA037, which is just over 50km away. It is therefore highly unlikely that the proposed development will have a negative impact on any IBA due to the distance from the project site.

Avifauna Micro-habitats

The project site within which the development area is located falls within the Nama Karoo biome. It consists of a flat plain with a number of inselbergs containing steep, boulder-strewn slopes, exposed rocky ridges and low cliffs. Two vegetation types are found in the development site, the dominant one being Eastern Upper Karoo, which is found on the plains and Upper Karoo Hardeveld occurring on the ridges.

Whilst the distribution and abundance of the bird species in the development area are typical of the broad vegetation type, it is also necessary to examine bird habitats in more detail as they may influence the distribution and behaviour of priority species. These are discussed in more detail below.

Nama Karoo: The vegetation at the development area consists of Karoo shrub.

Surface Water: The development area contains one source of permanent surface water, namely boreholes with water troughs. There are also two large dams on the western and southern border of the site, and one large dam on the development area itself. The dams contain water periodically. When they did contain water, flocks of Blue Cranes were observed roosting in them at night, as well as a number of Greater Flamingos.

High voltage lines: There are a number of high voltage lines that run to the north-west of the development area. Transmission lines are an important breeding substrate for raptors in the Karoo, due to the lack of large trees. There is a Tawny Eagle nest (FPTE1) situated approximately 6.3km from the development area border on the Droërivier – Hydra 2 400kV transmission line. The nest was last inspected in July 2021, when an adult bird was recorded on the nest.

Rocky ridges: The development area contains two ridges with steep, boulder-strewn slopes and exposed rock faces. One of the ridges extend beyond the development area in an easterly direction and contains a Verreaux's Eagle nest (FPVE3) (-31.425449° 23.702398°) approximately 2.5km from the closest border of the development area. There is also a Jackal Buzzard nest (-31.453311° 23.679073°) on a rocky outcrop.

Agricultural lands: Cultivation in the development area is limited to a few irrigated lands in the south of the development area where lucerne is cultivated.

Alien trees: The development area is largely devoid of trees, except for alien trees which have been planted in rows between the lucerne fields and at the homestead.

Bird Community within the Surrounding Area and the Project Site

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. **Table 8.7** below lists all the priority species that are likely to occur regularly and the possible impact on the respective species by the proposed wind farm.

Table 8.7: Priority species potentially occurring at the development area (Red List species are shaded) (where **NT = Near threatened, VU = Vulnerable** and **EN = Endangered**

Species	Taxonomic name	SABAP2 reporting rate		Conservation status		Recorded during surveys	Likelihood of regular occurrence	Habitat feature						Potential impact				
		Full protocol reporting rate	ad hoc protocol reporting rate	Global status	Regional status			Nama Karoo	Surface water	Agriculture	Ridges	Alien trees	HV lines	Collisions with turbines	Displacement: Disturbance associated with construction	Displacement: Habitat transformation	Electrocution: MV lines	Collisions: MV OHL
African Fish Eagle	*Haliaeetus vocifer*	2.08	0.00				L		x			x		x			x	
African Harrier-Hawk	*Polyboroides typus*	6.25	3.03			x	M	x	x			x		x			x	
Black Harrier	*Circus maurus*	2.08	0.00	EN	EN		L	x	x					x				
Black Stork	*Ciconia nigra*	4.17	0.00	LC	VU	x	M		x		x			x			x	x
Black-winged Kite	*Elanus caeruleus*	2.08	0.00				L	x		x		x		x			x	
Blue Crane	*Grus paradisea*	62.50	18.18	VU	NT	x	H	x	x	x				x	x	x		x
Booted Eagle	*Hieraaetus pennatus*	6.25	0.00			x	M	x	x			x		x			x	
Common Buzzard	*Buteo buteo*	2.08	7.58			x	M	x	x	x		x	x	x			x	
Greater Flamingo	*Phoenicopterus roseus*	4.17	1.52	LC	NT	x	M		x					x				x
Greater Kestrel	*Falco rupicoloides*	31.25	3.03			x	H	x				x	x	x			x	
Jackal Buzzard	*Buteo rufofuscus*	43.75	16.67			x	H	x	x		x	x	x	x			x	
Karoo Korhaan	*Eupodotis vigorsii*	52.08	7.58	LC	NT	x	H	x						x	x	x		x
Lanner Falcon	*Falco biarmicus*	2.08	3.03	LC	VU	x	M	x	x	x	x	x	x	x			x	
Lesser Kestrel	*Falco naumanni*	2.08	1.52			x	L	x		x		x	x	x			x	
Ludwig's Bustard	*Neotis ludwigii*	45.83	7.58	EN	EN	x	H	x		x				x	x	x		x
Martial Eagle	*Polemaetus bellicosus*	10.42	1.52	VU	EN	x	H	x	x			x	x	x			x	
Northern Black Korhaan	*Afrotis afraoides*	72.92	21.21			x	H	x						x	x	x		x
Pale Chanting Goshawk	*Melierax canorus*	45.83	13.64			x	H	x	x			x	x	x			x	
Secretarybird	*Sagittarius serpentarius*	12.50	6.06	VU	VU		L	x	x					x				x
Spotted Eagle-Owl	*Bubo africanus*	8.33	0.00				M	x				x		x	x		x	

Tawny Eagle	*Aquila rapax*	12.50	3.03	VU	EN	x	H	x	x			x	x	x			x	
Verreaux's Eagle	*Aquila verreauxii*	18.75	1.52	LC	VU	x	H		x		x		x	x			x	
Western Barn Owl	*Tyto alba*	2.08	0.00				L			x		x		x			x	
Cape Vulture	*Gyps coprotheres*	0.00	0.00	EN	EN	x	L	x			x		x	x			x	

8.5. Integrated Heritage including Archaeology, Palaeontology, and the Cultural Landscape

The area proposed for the Merino Wind Farm is located approximately 35km south-west of Richmond and 80km south-east of Victoria West outside of the identified Beaufort West REDZ, along the N1. The town of Richmond was established in 1843 to service the needs of the growing farming community. It was renowned as a resort town in the 1800s for European aristocrats suffering lung disease due to its clean air and mineral-rich waters.

8.5.1 Cultural Landscape

The name 'Karoo' has its roots in the Khoisan word meaning 'place of great dryness'. It once supported large grassy flatlands and the San and Khoekhoen migrated across the region for hunting and grazing purposes. Less than two hundred years ago large, herds of antelope still roamed the grass plains. With the occupation of the area by stock farmers, the sheep gradually replaced the game and the grass receded along with changing grazing and weather patterns. By the late 17th century, the Khoenhoen had moved from the region into the more water rich southern Karoo and the coastal plains. During the early colonial period, the harshness of the Karoo region formed an almost impenetrable barrier from the Cape to the interior for colonial explorers, hunters and travellers.

The 18th century was characterized by a marked increase in the rate of expansion of the boundaries of the settlement at the Cape. This was associated with the emergence of the migrant stock farmer (trekboer). Early routes into the interior largely followed the tracks initially used by migrating herds of game or the cattle herds and sheep flocks of the Khoekhoen on their seasonal route between coastal and inland grazing grounds. These routes were later reinforced by generations of trek farmers moving between the markets at the Cape and their farms.

Permanent settlement of the region only really occurred in the 19th century with towns being established near permanent water sources. It was during this period that Beaufort West was established as a drostdy in 1818 on the farm Hooyvlakte. In the same year, a mission station was established at Kookfontein, just outside Beaufort West. Beaufort West became the first municipality in South Africa on 3 February 1837 and had the country's first town hall. When the railroad reached the town in 1880 it became a marshalling yard and locomotive depot and today it is the largest town in the Karoo.

A number of the significant heritage resources located in close proximity to the proposed development area are located within Beaufort West and are associated with the early colonial history of the town. The area proposed for development has limited topography that could screen the proposed development. It is therefore very likely that the proposed development will have a negative impact on the cultural and scenic value of the landscape.

8.5.2. Archaeology

Very few heritage assessments have been completed within close proximity to the area proposed for development. The Karoo has a long and rich archaeological record dating from the earliest stages of Stone Age technology that are over a million years old, to the historic period that consists of the last few hundred years of human occupation. Archaeological sites include caves and rock shelters, open air artefact scatters, rock engravings and historic structures with their associated cultural materials. Because of the scarcity of caves and shelters, more than 90% of Karoo archaeological sites are open sites of stone artefacts, ostrich eggshell fragments and occasionally, pottery. Bone remains are rarely preserved.

Artefacts of both the Early and Middle Stone Age are widespread and may generally be described as an ancient litter that occurs at a low frequency across the landscape. Where definable scatters of Early and Middle Stone Age material occur, they are considered to be significant heritage sites. More intensive occupation of the Karoo started around 13 000 years ago during the Later Stone Age, which is essentially the heritage of Khoisan groups who lived throughout the region.

The legacy of the San includes numerous open sites while traces of their presence can also be found in most large rock shelters, often in the form of rock art. They frequently settled a short distance from permanent water sources (springs or waterholes) and made use of natural shelters such as rock outcrops or large boulders or even large bushes. In the Great Karoo, natural elevated features such as dolerite dykes and ridges played a significant role in San settlement patterns. It is likely that similar archaeological heritage exists within the area proposed for development. **Figure 8.14** shows the heritage resources previously identified within the study area.

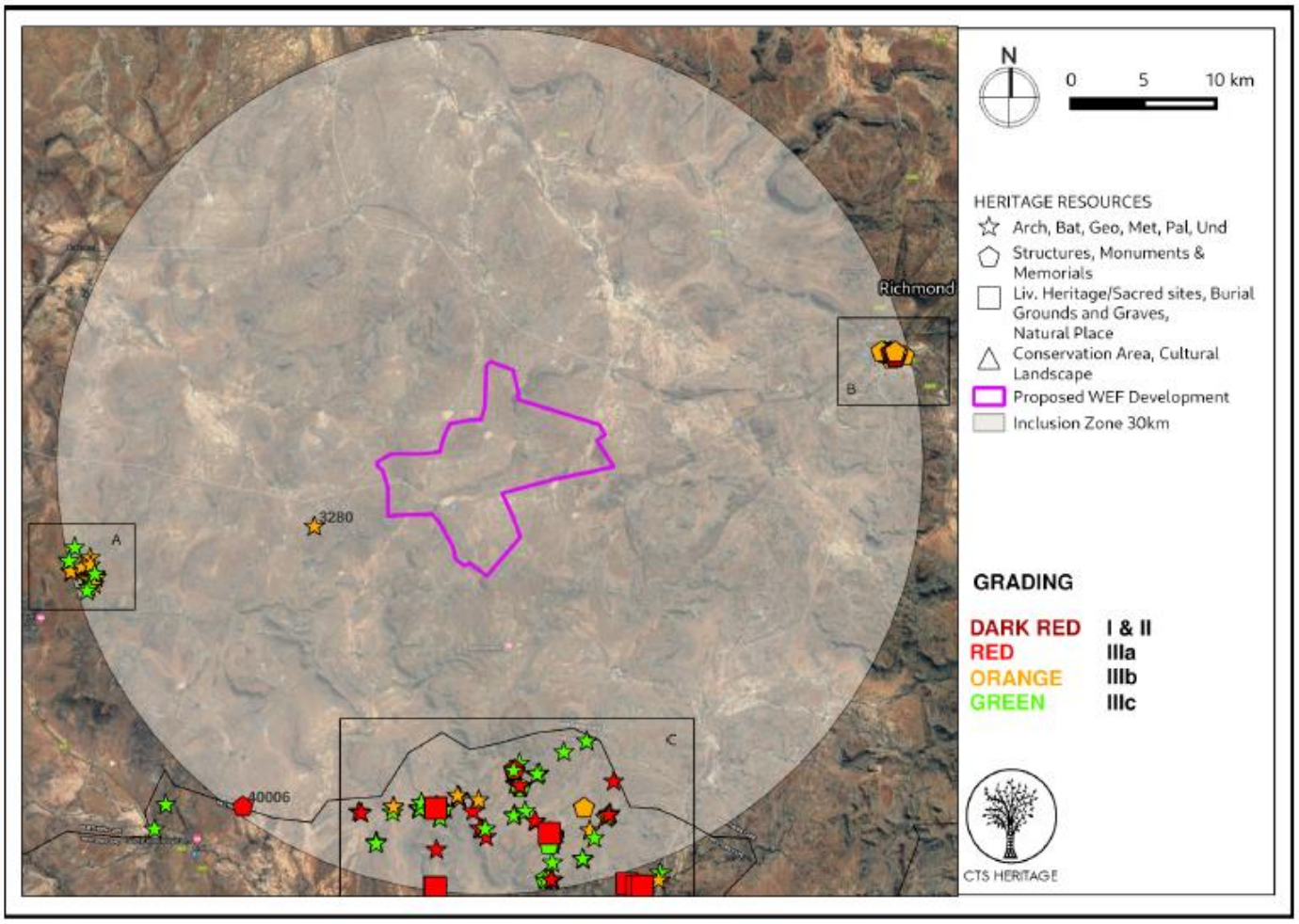

Figure 8.14: Heritage resources previously identified within the study area.

8.5.3. Palaeontology

According to the SAHRIS Palaeosensitivity Map (**Figure 8.15**), the area proposed for development is underlain by sediments of very high paleontological sensitivity. According to the extract from the Council for GeoSciences Map 3122 for Victoria West, the development area is underlain by the Abrahamskraal and Teekloof Formations, both of the Adelaide Subgroup of the Beaufort Group of sediments. According to the SAHRIS Fossil Heritage Browser and the Palaeotechnic Report for the Western Cape (Almond and

Pether, 2008), the Beaufort Group sediments are known to preserve diverse terrestrial and freshwater tetrapods of *Tapinocephalus* to *Lystrosaurus* Biozones (amphibians, true reptiles, synapsids – especially therapsids), palaeoniscoid fish, freshwater bivalves, trace fossils (including tetrapod trackways) and sparse vascular plants (*Glossopteris* Flora, including petrified wood).

Based on the known paleontological sensitivity of this area, it is very likely that activities associated with the development of the proposed Merino Wind Farm will negatively impact on significant fossil heritage.

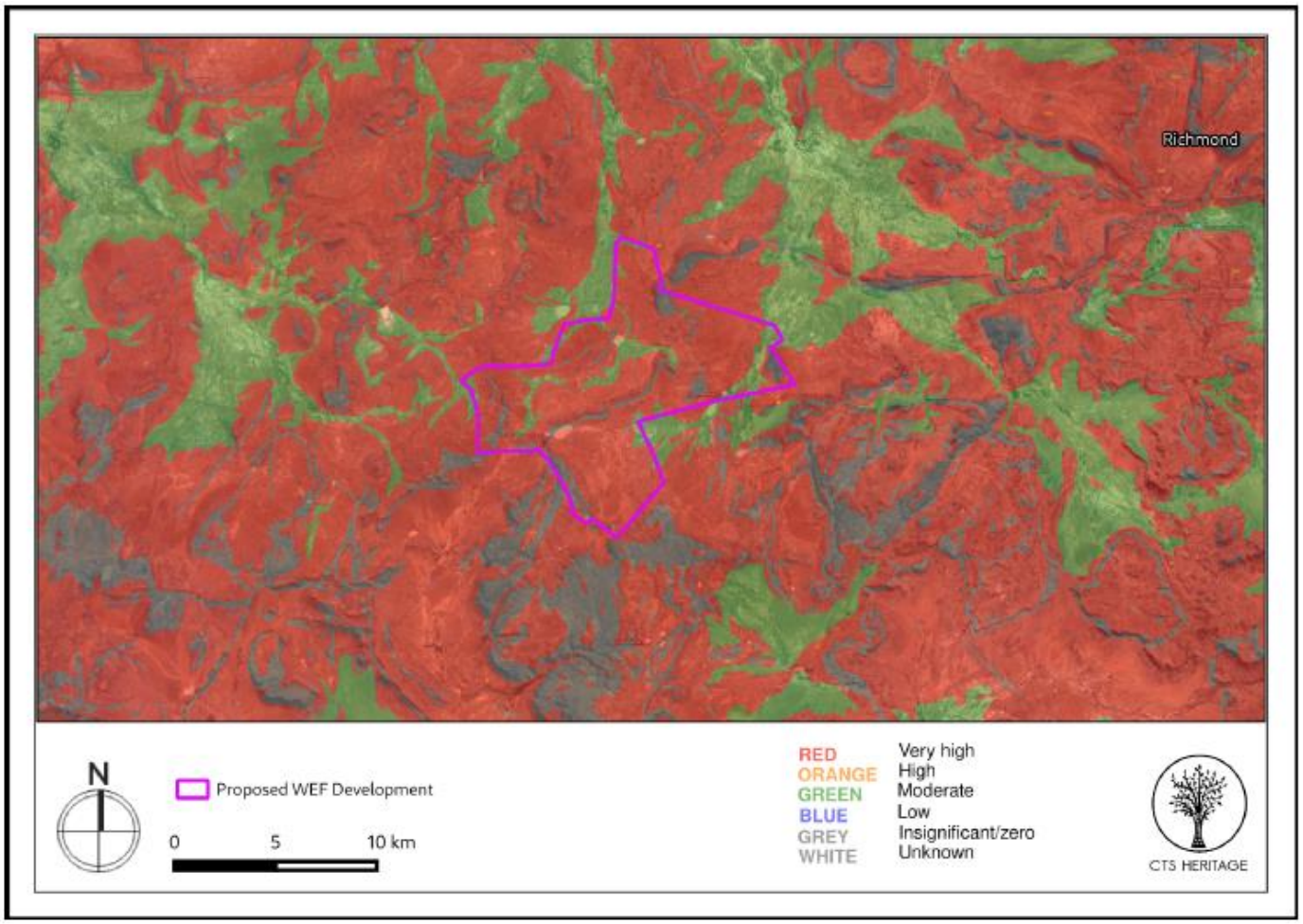

Figure 8.15: Palaeosensitivity map indicating fossil sensitivity underlying the study area.

8.6. Visual Quality

The study area 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 the south, with a ridge traversing the centre of the site from the east to the west.

The proposed development site itself is located at an average elevation of 1 389m above sea level. The overall terrain morphological description of the study area is described as *undulating plains* (lowlands), with *ridges*, *hills,* and *mountains*.

The majority of the study area is sparsely populated (less than 1 person per km^2). The study area consists of a landscape that can be described as remote due to its considerable distance from any major

metropolitan centres or populated areas. Settlements, where they occur, are usually rural homesteads or farm dwellings.

The photographs below aid in describing the general environment within the study area and surrounding the proposed project infrastructure.

The N1 national road traversing the study site

Ridges near the proposed development area

Typical Karoo homestead

Typical Karoo Scene

Figure 8.16: Photographs showing the general environment within the area.

8.6.1 Visual Exposure/Visibility

A preliminary viewshed analyses for the proposed Merino Wind Farm was undertaken in order to determine the general visual exposure of the area under investigation, the results of which are shown in **Figure 8.17**.

The viewshed analyses was undertaken from preliminary vantage points (with a maximum of 45) within the proposed development area at offsets of 170m above average ground level (i.e., the approximate hub height of the proposed wind turbines).

The following is evident from the viewshed analyses:

» The proposed Merino Wind Farm would have a large 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 relatively flat topography. This core area includes a number of homesteads, namely, Rondawel (on the development site), Rietfontein Wes, Bloemhof, and Vogelstruisfontein. The turbine structures are also expected to be clearly visible from the N1 national road traversing the proposed development site, and from one secondary road west of the site.

- Visual exposure will remain high in the medium distance (i.e., between 5 and 10km), especially to the north-east and south-west. Exposure to the south is hampered (reduced) by the undulating nature of the topography. Additional visual exposure within this zone also includes a section of the N1 national road and two secondary roads.
- In the medium to longer distance (i.e., between 10 and 20km), visual exposure will be somewhat reduced, especially towards the south-east and the north-west. This is due to the presence of hills and ridges at these locations. A section of the R398 arterial road may also be exposed within this zone.
- Visual exposure beyond a 20km radius is significantly reduced, especially in to the south and east. The town of Richmond also falls within this zone. However, it is not visually exposed to the proposed wind turbine structures.

It is envisaged that the wind farm structures would be easily and comfortably visible to observers (i.e., people travelling along roads and residing at homesteads or visiting the region), especially within a 5-10km radius of the wind farm, and would constitute a high visual prominence, potentially resulting in a high visual impact.

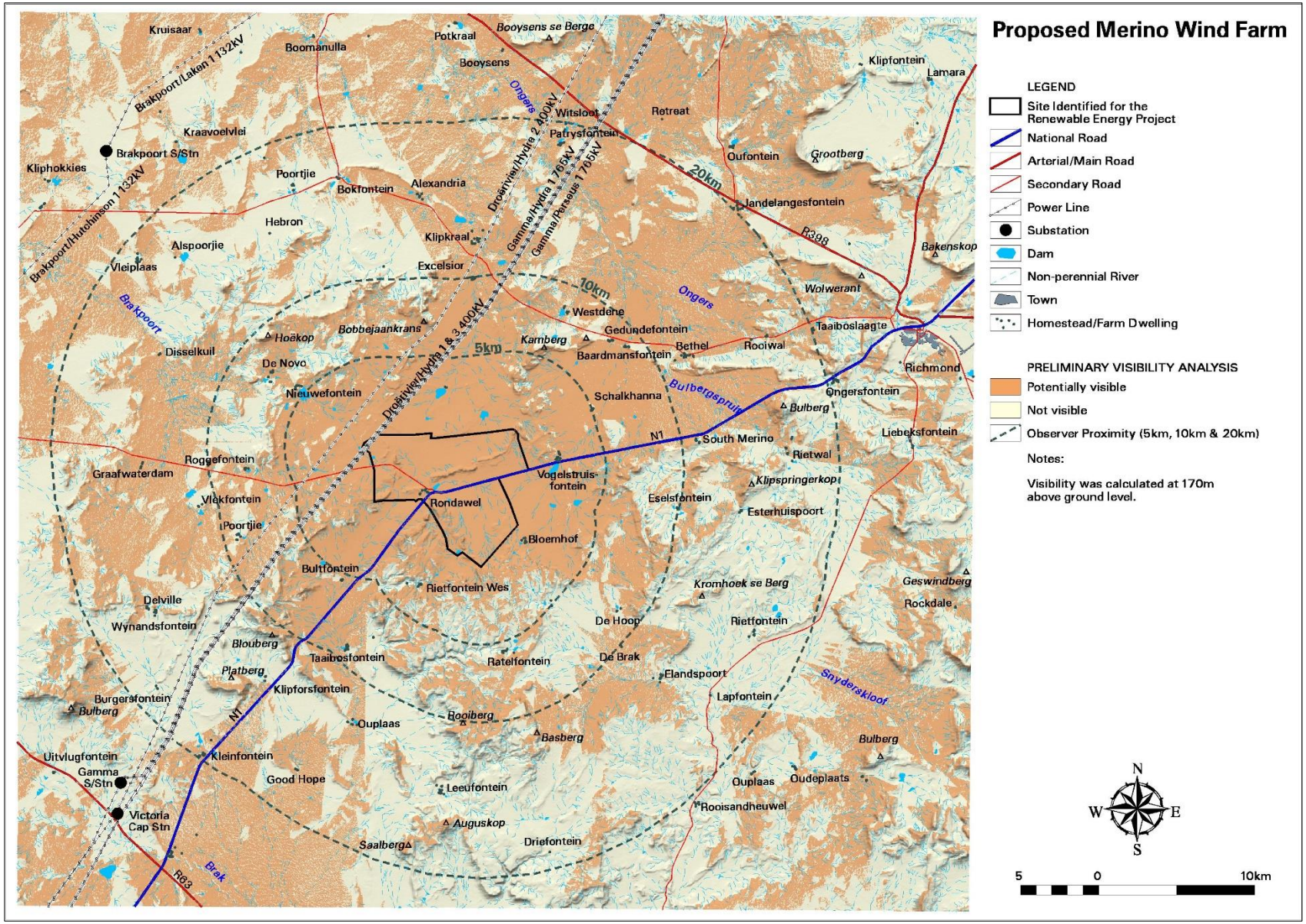

Figure 8.17: Map indicating the preliminary visual exposure of the proposed Merinp Wind Farm

8.7. Ambient Noise Levels and Sensitive Noise Developments

Existing Ambient Sound Levels

Ambient sound levels were measured previously in this area over a three-night period (approximately two days) from the 25th to 28th April 2016. The data indicates that road traffic noises on the N1 significantly influence ambient sound levels up to 500m from the road, likely influencing ambient sound levels as far as 2 000m. Areas further than 2 000m from the road would be quiet (naturally quiet, as faunal noises may be high at times), with ambient sound levels typical of a rural noise district.

Potential Noise Sources

Increased noise levels are directly linked with the various activities associated with the construction of the proposed Merino Wind Farm and related infrastructure, as well as the operation phase of the activity.

During the construction, activities such as the use of construction equipment, the use of a concrete batching plant and borrow pits (if required), blasting and construction traffic will result in increased noise levels. For the construction phase, increased noise levels will result from routine servicing (access road and traffic light) and unscheduled maintenance. The primary source of noise during the operation phase will come from the rotation of the wind turbines.

Noise-Sensitive Developments

Potential noise-sensitive developments in the area were initially identified using aerial images as well as the Online Environmental Screening Tool, with the noise-sensitive developments confirmed during the site visit. The noise-sensitive developments as identified are highlighted in **Figure 8.18**, with the same figure also illustrating areas with a high noise sensitivity in terms of the National Web-based Environmental Screening Tool.

Also indicated on this figure are generalized 500m, 1 000m and 2 000m buffer zones. Generally, noises from wind turbines:

- Could be significant within 500m, with receptors staying within 500m from operational wind turbines subject to noises at a potentially sufficient level to be considered disturbing.
- Are normally limited to a distance of approximately 1 000m from operational wind turbines. Night-time ambient sound levels are elevated, and the potential noise impact might be measurable. Cumulative noises from multiple WTG surrounding an NSD may be high and exceed 45dBA.
- May be audible up to a distance of 2 000m at night.
- Are of a low concern at distances greater than 2 000m.

It should be noted that each dot may represent a number of different dwellings that are or could be used for residential activities.

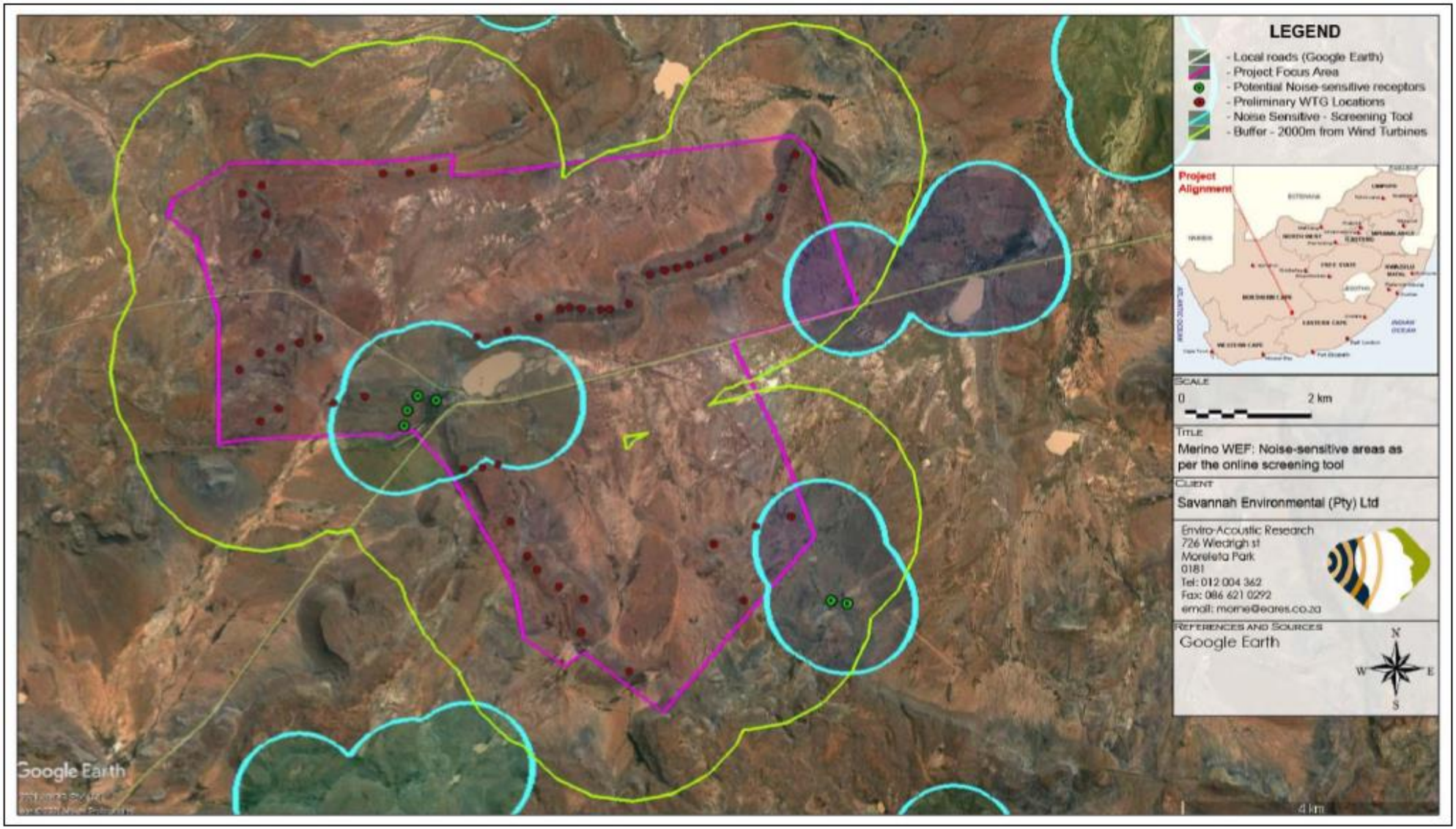

Figure 8.18: Noise-sensitive developments located within the surrounding area and the project site of the Merino Wind Farm

8.8. Traffic Conditions

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 (refer to **Figure 8.19**).

Figure 8.19: Proposed route from the Port of Ngqura to the proposed site.

The proposed access points to the development area are located along the the N1, as shown in **Figure 8.20.** 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.

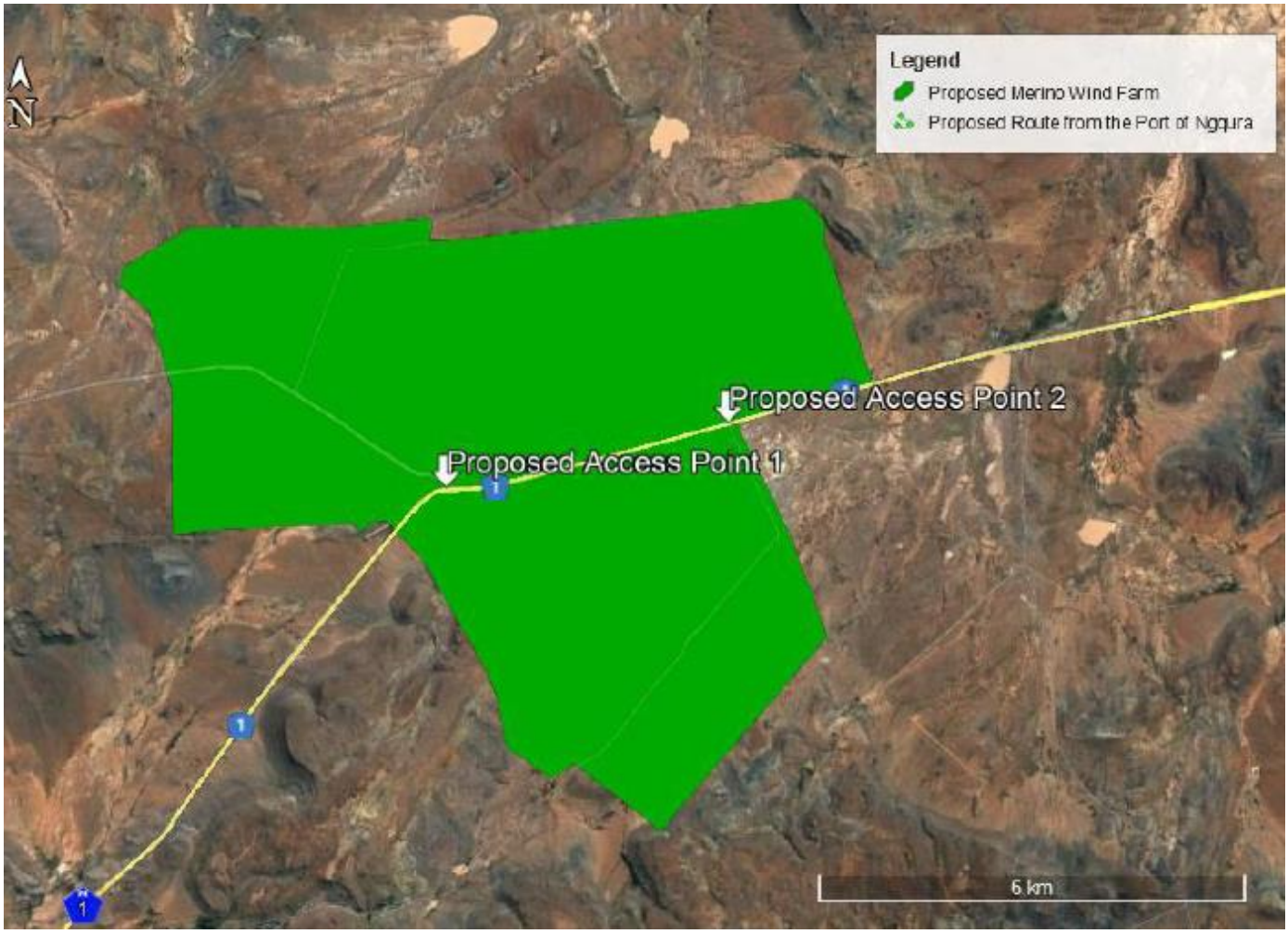

Figure 8.20: Proposed access point to the project site

8.9. Socio-Economic Profile

8.9.1. Profile of the Broader Area

The project site is located within Ward 3 of the Ubuntu Local Municipality, which forms part of the Pixley Ka Seme District Municipality.

Population

According to the Community Household Survey conducted in 2016, the Ubuntu Local Municipality has a population of 19 471. Of this total, 38.6% are under the age of 18, 55.9% between 18 and 64, and the remaining 5.5% are 65 and older. According to the 2011 StatsSA data, the population of Ward 3 is 4 715. Of this total 37% under the age of 18, 58% between 18 and 64, and the remaining 5% are 65 and older. The Ubuntu Local Municipality and the Ward 3 therefore have a high percentage of the population that falls within the economically active group of 18 – 65.

Employment

The official unemployment rate in the Ubuntu Local Municipality in 2011 was 18.1%, while 44.2% were employed, and 33.2% were regarded as not economically active. The figures for Ward 3 in 2011 were

6.8% unemployed, 62.5% employed and 28.4% not economically active. The unemployment rates for the Ubuntu Local Municipality and Ward 3 are lower than the Provincial rate of 14.5% and the District rate of 14.8%. Recent figures released by Stats South Africa also indicate that South Africa's unemployment rate is in the region of 36%, the highest formal unemployment rate in the world.

Education

In terms of education levels, the percentage of the population over 20 years of age in the Ubuntu Local Municipality and Ward 3 with no schooling was 11.8% (2016) and 20.7% (2011), respectively, compared to 7.9% and 11.1% for the Northern Cape Province in 2016 and 2011, respectively. The percentage of the population over the age of 20 with matric was 23.2% and 15.6%, respectively, compared to 29.1% (2016) and 25.2% (2011) for the Northern Cape. The lower education levels are linked to the rural, isolated nature of the area.

8.9.2. Profile of the Immediate Affected Area

The Great Karoo Cluster of Renewable Energy Facilities is located to the north of the N1, between Three Sisters and Richmond. The closest towns to the site are Richmond, which is located approximately 35km south-west of the site, and Victoria West, which is located approximately 80km south-east the site. The bulk of the site is located to the north of the N1 with a small portion located to the south.

The town of Richmond was established in 1843 when a new congregation was formed for the area. The town was named after the Duke of Richmond from Kent, who was the father-in-law of the Governor of the Cape at that time, Sir Peregrine Maitland. Historically the town served as resort town for European aristocratic tuberculosis patients in the 1800s due to its clean air and mineral rich waters. The Pixley Ka Seme District Municipality Spatial Development Framework identifies Richmond as an Urban Satellite Town. These are towns that already have some services and infrastructure and have the potential to grow. The economy of the town is linked to providing services to the surrounding farming areas and through traffic associated with the N1.

The town of Victoria West was named after Queen Victoria of England and established in 1843. Victoria West forms the starting point of the Diamond Way and lies on the main route from Cape Town to Kimberley. Diamond fever was sparked in 1866 with the discovery at Hopetown and then at Kimberley. The Pixley Ka Seme District Municipality Spatial Development Framework identifies Victoria West as an Urban Centre. These towns are administrative centres within the respective eight municipalities in the district. These centres' administrative functions should be further enhanced, and it is recommended that programs for urban rehabilitation of these centres should focus on the stimulation of economic growth in these areas. The economy of the town is linked to providing services to the surrounding farming areas and through traffic associated with the N12 and R63.

The landscape associated with the site is a typical Karoo landscape consisting of dolerite koppies and ridges separated by valley bottoms. The land uses are linked to livestock farming. The character of the area can be described as a rural, Karoo landscape. There are a number of farm dwellings located in the vicinity of the site, including three farm dwellings within the boundary of the site. Most of the farm dwellings are located in the area to the west and north of the site. The Rondavel Guest Farm is located adjacent to the N1, within the boundary of the site.

CHAPTER 9: SCOPING OF POTENTIAL ISSUES

This chapter serves to describe environmental issues and potential impacts (direct, indirect, and cumulative impacts) that have been identified to be associated with the development of the Merino Wind Farm and associated infrastructure, and to make recommendations for further studies required to be undertaken in the EIA Phase. The scoping process has involved the review of existing information (including previous detailed studies undertaken), limited field work, input from the project proponent and specialist consultants.

Environmental issues associated with construction and decommissioning activities of the project may include, among others, impacts on biodiversity (fauna, flora, and ecological integrity), loss of habitat, soil erosion, and impacts on, and/or benefits to the social environment and current land use. Environmental issues specific to the operation of a wind farm could include visual impact; change to ambient noise levels; avian mortality resulting from collisions with blades; and mortality, injury, and disturbance to faunal species (e.g., bat mortality due to barotrauma). Benefits during both the construction and operation phases include the creation of employment and business opportunities, and the opportunity for skills development and on-site training, improvement in energy security and support towards the renewable sector, benefits for local landowners, and benefits associated with socio-economic contributions to community development.

The development area considered for the proposed Merino Wind Farm includes Portion 9 of Farm Bult & Rietfontein 96, Portion 0 of Farm Vogelstruisfontein 84, Portion 1 of Farm Rondavel 85, and Portion 0 of Farm Rondavel 85 that comprises an area of approximately 5 516ha in extent, which has been investigated during this Scoping Phase to determine the environmental suitability of the site. This will provide an indication of the areas of sensitivity that the developer would need to take into considering in the planning of the located of the proposed Merino Wind Farm within the development footprint.

Section 9.3 provides a summary of the findings of the desktop scoping study undertaken for the construction, operation, and decommissioning phases of the Merino Wind Farm. Those impacts associated with construction can also be expected to be associated with the decommissioning phase (however, to a lesser extent as the development footprint would have previously undergone transformation and disturbance during construction). More detail regarding potential impacts is included in the specialist scoping reports included in **Appendix D - L**.

A summary of the potential cumulative impacts that may be associated with the project is provided in **Section 9.4**. These impacts are associated with the scale of the project when considered together with other similar developments within the region and will be confirmed and assessed within the EIA Phase of the project.

9.1. Legal Requirements as per the EIA Regulations, 2014 (as amended) for the undertaking of a Scoping Report

This chapter serves to identify the potential environmental impacts associated with the development of the Merino Wind Farm from a desktop level. It includes the following information required in terms of the EIA Regulations, 2014 - Appendix 2: Content of the Scoping Report:

Requirement	Relevant Section
(g)(v) the impacts and risks which have informed the identification of each alternative, including the nature, significance, consequence, extent, duration and probability of such identified impacts, including the degree to which these impacts (aa) can be reversed (bb) may cause irreplaceable loss of resources and (cc) can be avoided, managed or mitigated.	The impacts and risks identified to be associated with the construction and operation phases of the Merino Wind Farm have been included in **sections 9.3 and 9.4**. Impact tables have been included for each field of study which considers the nature, significance, consequence, extent duration and probability of the impacts, as well the reversibility of the impacts, the loss of resources and avoidance or mitigation.
(g)(vii) positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects	The positive and negative impacts associated with the Merino Wind Farm have been included in **sections 9.3 and 9.4.**
(g)(viii) the possible mitigation measures that could be applied and level of residual risk	Possible mitigation (i.e., avoidance of sensitive areas) has been included in **sections 9.3 and 9.4.**

9.2. Assumptions made for the Scoping Evaluation

While evaluating potential impacts associated with the proposed project, the Scoping evaluation assumed the following:

- All information provided by the developer and I&APs to the environmental team was correct and valid at the time it was provided.
- It is assumed that the development area identified by the developer represents a technically suitable site for the establishment of Merino Wind Farm which is based on the design undertaken by technical consultants for the project.
- The development footprint (i.e., the area that will be affected during the operation phase) will include the footprint for the wind farm and associated infrastructure (i.e., internal access roads, BESS, etc.).
- The Scoping Phase evaluation of impacts has been largely based on specialist scoping assessments completed for this specific site. This information has been used to inform the Scoping Report and will be verified by specialists in the EIA Phase to assess the project development footprint.

9.3. Evaluation of potential impacts associated with the Construction, Operation and Decommissioning Phases

» *9.3.1. Impacts on Ecology (including flora and fauna)*

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.

Impacts associated with the construction, operation and decommissioning phases of the proposed wind farm and associated infrastructure on ecology include the following:

- Direct loss of vegetation. The main impact on terrestrial ecosystems is due to road construction and not to the turbines themselves. The placement of roads is therefore critical in limiting impacts.
- Loss, fragmentation, or degradation of faunal habitat.
- Displacement of populations of mobile species.
- Mortality of populations of sedentary species during construction.
- Loss of indigenous natural vegetation during construction.
- Loss of protected plants during construction.
- Introduction and/or spread of declared weeds and alien invasive plants in terrestrial habitats.

Sensitivity Analysis of the Site

To determine sensitivity within the project site, local and regional factors were considered. There are some habitats within the project site that have been described as sensitive in their own right, irrespective of regional assessments. This includes primarily the dry stream beds and associated riparian zones. Rocky outcrops and steep slopes are more sensitive than surrounding areas, mainly due to higher floristic diversity and the likelihood of plant species with low local abundance occurring there.

At a regional level, the Critical Biodiversity Area (CBA) map for the Northern Cape indicates the northern part of the broader project site as being important for conservation. There are also two drainage lines (the two main ones on site) that are designated as being CBA1 areas. The remaining drainage lines of the broader project site are indicated as being Ecological Support Areas (ESAs).

In terms of other species of concern and overall biological diversity, including both plants and animals, the low hills and mountain ranges are the areas with the most species as well as being most likely to contain any species of concern. However, the southern main drainage line is the most likely habitat for the Critically Endangered Riverine Rabbit, if it occurs on site, which is unknown but possible.

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:

- Habitat suitable for the Riverine Rabbit.
- Dry stream beds, including their associated riparian habitats and adjacent floodplains.
- Ridges, outcrops, hills, and mountain slopes.
- Plains vegetation.
- Critical Biodiversity Areas (CBA1).

Based on this information, a map of habitat sensitivity on site is provided in **Figure 9.1,** with the development area for the Merino Wind Farm indicated with an orange block. This shows main habitat sensitivity classes on site, namely VERY HIGH for habitat suitable for Riverine Rabbit, HIGH for other CBA1 areas and riparian habitats, MEDIUM-HIGH for ridges, outcrops, hills and mountain slopes, and MEDIUM for plains vegetation.

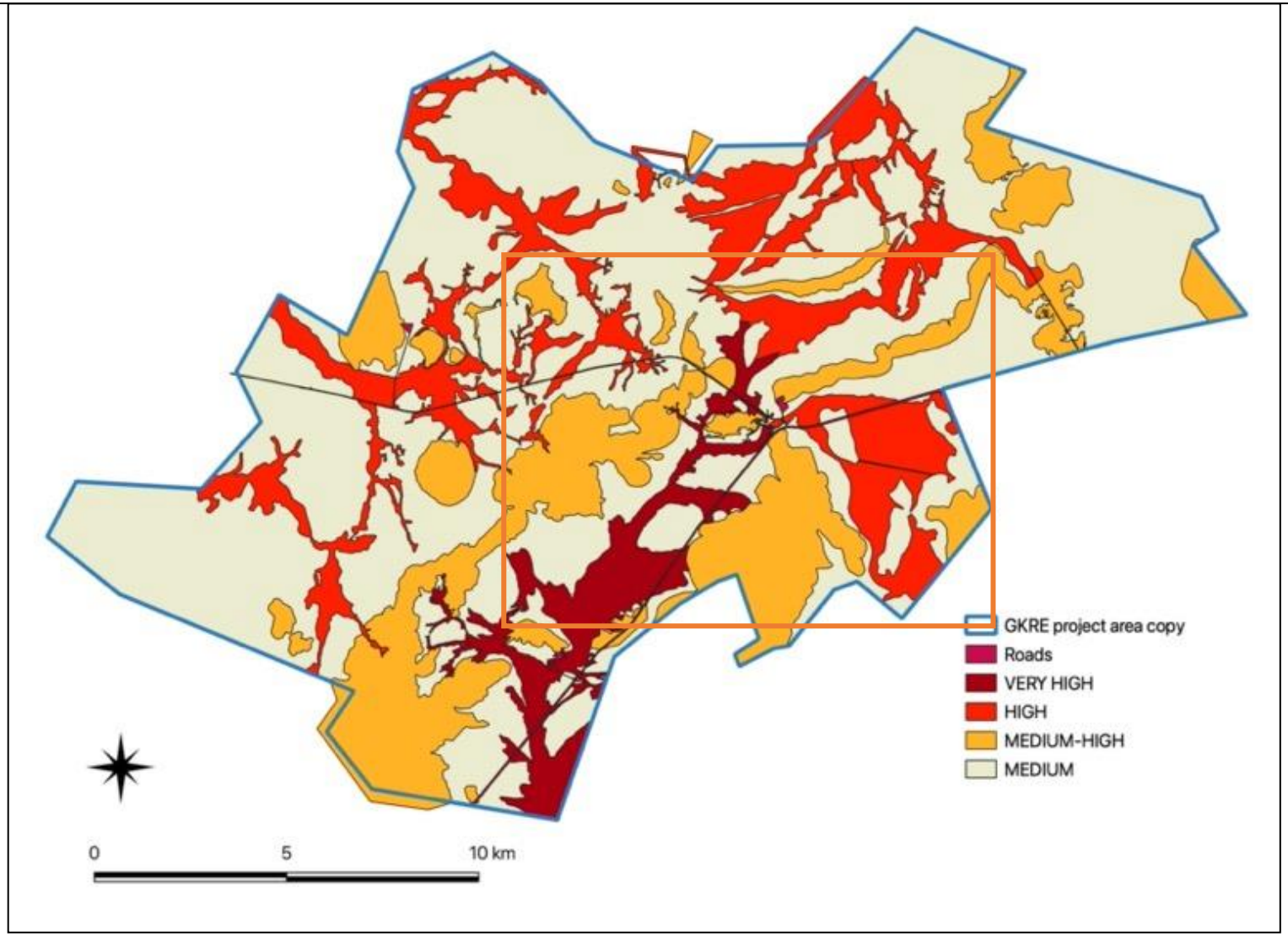

Figure 9.1: Preliminary ecological sensitivity map of broader project site with Merino Wind Farm shown by the orange block

Issue	Nature of Impact	Extent of Impact	No-Go Areas
Disturbance/destruction to and loss of vegetation and fauna, introduction and/or spread of declared weeds and alien invasive plants, as well as increased runoff and erosion	**Construction Phase Impacts** <u>Direct impacts:</u> » Loss and/or fragmentation of indigenous natural vegetation due to clearing. » Loss of individuals of protected plants. » Loss of faunal habitat and refugia. » Direct mortality of fauna due to machinery, construction and increased traffic. » Displacement and/or disturbance of fauna due to increased activity and noise levels. » Increased poaching and/or illegal collecting due to increased access to the area. <u>Indirect impacts:</u> » Establishment and spread of alien invasive plants due to the clearing and disturbance of indigenous vegetation. » Increased runoff and erosion due to clearing of vegetation, construction of hard surfaces and compaction of surfaces, leading to changes in downslope areas. **Operation Phase Impacts** <u>Direct impacts:</u> » Continued disturbance to natural habitats due to general operational activities and maintenance. » Direct mortality of fauna through traffic, illegal collecting, poaching and collisions and/or entanglement with infrastructure. <u>Indirect impacts:</u> » Continued establishment and spread of alien invasive plant species due to the presence of migration corridors and disturbance vectors. » Continued runoff and erosion due to the presence of hard surfaces that change the infiltration and runoff properties of the landscape. » Changes to behavioural patterns of animals, including possible migration away or	Local to regional	The areas designated as Very High sensitivity (which occur within the project site, as well as the development area for the Merino Wind Farm) were designated as such on the basis of the valley being identified as a possible habitat for the Riverine Rabbit. The occurrence of the Riverine Rabbit within the project site, as well as confirmation as to whether the valley should be treated as a no-go area will be confirmed during the EIA Phase. The drainage lines, which are designated as being of high sensitivity should be treated as restricted. No buffer zones are recommended around the identified sensitive features from an ecological perspective.

	towards the project area. » Positive potential impact on climate change due to generation of electricity without the need for coal mining or burning of coal, currently the main form of power generation in South Africa. **Decommissioning Phase Impacts** <u>Direct impacts:</u> » Loss and disturbance of natural vegetation due to the removal of infrastructure and need for working sites. » Direct mortality of fauna due to machinery, construction, and increased traffic. » Displacement and/or disturbance of fauna due to increased activity and noise levels. <u>Indirect impacts:</u> » Continued establishment and spread of alien invasive plant species due to the presence of migration corridors and disturbance vectors. » Continued runoff and erosion due to the presence of hard surfaces that change the infiltration and runoff properties of the landscape. » Changes to behavioural patterns of animals, including possible migration away or towards the project area.		
Description of expected significance of impact A risk assessment was undertaken which identified seven potential negative impacts on flora and fauna due to the construction and operation of the proposed wind farm and associated infrastructure. The preliminary assessment indicates that these potential impacts will have a significance of low, medium, or high. If appropriate mitigation measures are put in place, it is probable that most impacts will have low to medium significance. This, in combination with the limited amount of biodiversity of significance likely to be affected, indicates that the project is unlikely to have significant biodiversity impacts, in terms of those issues investigated.			
Gaps in knowledge & recommendations for further study » Detailed camera-trap survey of potential Riverine Rabbit habitat, as per recommended protocols. This survey will provide incidental information on the occurrence of other mobile flora on site. » More detailed floristic surveys of main footprint areas in order to document composition, especially of protected species. Ideally, this should be undertaken after an appropriate time-period after rainfall to allow emergence of any species of potential interest.			

» 9.3.2. *Impacts on Freshwater Features*

Limited natural wetland areas are expected for the development area. The available data suggests the presence of drainage features, dams, and extensive Section A river networks. The dams are artificial and regarded as man-made features. These dams are not expected to be characterised by hydromorphic properties or hydrophytic vegetation. These systems, considering their artificial nature, are assigned an overall low sensitivity.

A network of drainage features, comprising channels and networks, are expected for the area. These systems are characterised by terrestrial soils with hydromorphic properties completely being absent. The overall sensitivity of these systems is also expected to be low. Nevertheless, these systems should be granted some level of protection considering the roles that these systems play in ensuring the functionality of the Section A river systems.

Areas indicated as river systems at a desktop level have been classified as Section A river systems due to the expected dominance of alluvial soils and riparian vegetation within and surrounding the direct channel. Section A river systems are characterised by zero-baseflow conditions given the fact that the zone of saturation is not in contact with the base of the stream channel. A Section A system is the least sensitive of the three (section A, B and C) systems in regard to water yield from catchments and is often also referred to as a non-perennial system. The overall sensitivity of these systems is moderate to moderately high.

The potential impacts to freshwater features include the following:

» Disturbance / degradation / loss to wetland soils or vegetation due to the construction of the facility and associated infrastructure, such as crossings.
» Increased erosion and sedimentation, as well as the contamination of surface water resources.

Sensitivity Analysis for the Site
The aquatic biodiversity theme sensitivity indicates predominantly "Very High" sensitivity, with isolated areas of "Low" sensitivity (**Figure 9.1**). These "Very High" sensitivities are attributed to the presence of wetlands, rivers, and priority area quinary catchments. The watercourses in the area are classified as Critically Endangered (CR) and Endangered (EN). Further to this, also considering the presence of areas indicated as CBA1, a buffer width of 45m is recommended for construction and operation activities.

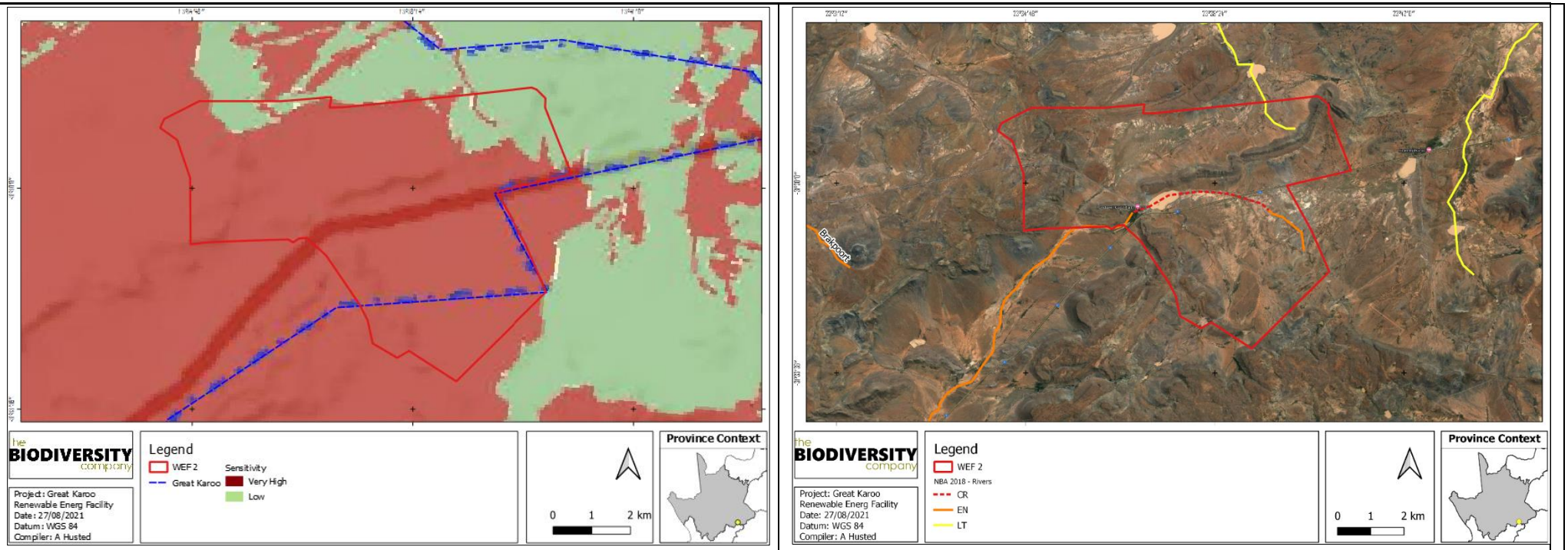

Figure 9.2: The aquatic biodiversity theme sensitivity classification and the threat status for local river systems within the development area for the Merino Wind Farm

Issue	Nature of Impact	Extent	No-Go Areas
Disturbance / degradation / loss to wetland soils or vegetation due to the construction of the facility and associated infrastructure, such as crossings	<u>Direct impacts:</u> » Disturbance / degradation / loss to wetland soils or vegetation <u>Indirect impacts:</u> » Loss of ecosystem services	Regional	Water resources and buffer area
Increased erosion and sedimentation & contamination of resources	<u>Direct impacts:</u> » Erosion and structural changes to the systems <u>Indirect impacts:</u>	Regional	None identified at this stage

	» Sedimentation & contamination of downstream reaches		

Description of expected significance of impact

The development of the area could result in the encroachment into water resources and result in the loss or degradation of these systems, most of which are functional and provide ecological services. Water resources are also likely to be traversed by roads and other linear infrastructure which might create a barrier to flow and biotic movement across the systems. These disturbances could also result in the infestation and establishment of alien vegetation would affect the functioning of the systems. Earthworks will expose and mobilise earth materials which could result in sedimentation of the receiving systems. A number of machines, vehicles and equipment will be required, aided by chemicals and concrete mixes for the project. Leaks, spillages, or breakages from any of these could result in contamination of the receiving water resources. Contaminated water resources are likely to have an effect on the associated biota. It is anticipated to increase stormwater runoff due to the hardened surfaces and the crossings will result in an increase in run-off volume and velocities, resulting in altered flow regimes. The changes could result in physical changes to the receiving systems caused by erosion, run-off and also sedimentation, and the functional changes could result in changes to the vegetative structure of the systems. The reporting of surface run-off to the systems could also result in the contamination of the systems, transporting (in addition to sediment) diesel, hydrocarbons, and soil from the operational areas.

Gaps in knowledge & recommendations for further study

» Identification, delineation, and characterisation of water resources.
» Undertake a functional assessment of systems where applicable.
» Determine a suitable buffer width for the resources.

Recommendations with regards to general field surveys

» Field surveys to prioritise the development areas, but also consider the 500m regulation area. Beneficial to undertake fieldwork during the wet season period.

» 9.3.3 *Impacts on Bats*

Bats play a critical role in many ecosystems and are important indicators of biodiversity and ecosystem health. They provide many essential ecosystem services which increase human well-being such as pollination, seed dispersal and the consumption of important agricultural pests.

There are several bat species in the vicinity of the site that occur commonly in the area. Some of these species are of special importance based on their likelihood of being impacted by the proposed wind farm, due to high abundances and certain behavioural traits. They have also been dominating records of fatalities at wind farms in South Africa. The relevant species are *Tadarida aegyptiaca, Neoromicia capensis and Miniopterus natalensis.*

The potential impacts to bats as a result of construction and operation activities include the following:

- Foraging habitat destruction.
- Bat roost disturbance/destruction.
- Increased bat mortality due to light pollution and moving turbine blades.

Sensitivity Analysis for the Site

Sensitivities have been classified as high or medium, where high sensitivities and their buffers are no-go zones for turbines and turbine blade overhang (**Table 9.1**). In other words, no turbine blades may intrude into high sensitivity buffers. Medium sensitivities indicate areas of probable increased risk due to seasonal fluctuations, but turbines are allowed to be constructed in medium sensitivity areas.

Table 9.1: Sensitive features identified within the development area for the Merino Wind Farm

High sensitivities and 200m buffers	Valley bottom wetlands.
	Pans and depressions.
	Dams.
	Rocky boulder koppies (tors).
	Exposed rocky cliff edges.
	Drainage lines capable of supporting riparian vegetation.
	Other water bodies and other sensitivities such as manmade structures, buildings, houses, barns and sheds.
Moderate sensitivities and 150m buffers	Alluvial plains and washes.
	Seasonal drainage lines.

Table 9.2: Description of sensitivity categories and their significance in the sensitivity map.

Sensitivity	Description
High Sensitivity and its buffers	Areas that are deemed critical for resident bat populations, capable of elevated levels of bat activity and support greater bat diversity/activity than the rest of the site. These areas are 'no-go' zones and turbines may not be placed in these areas and their buffers. Turbine blades (rotor swept diameter) also may not intrude into high sensitivity buffers.
Medium Sensitivity and its buffers	Areas of foraging habitat or roosting sites considered to have significant roles for bat ecology. Turbines are allowed within these areas and their buffers but may require priority (not excluding all other turbines) during post-construction studies, and in some instances, there is a higher likelihood that mitigation measures may need to be applied to them due to seasonal bat activity fluctuations.

Figure 9.3 depicts the sensitive areas of the site, based on features identified to be important for foraging and roosting of the bat species that are most probable to occur on site. Thus, the sensitivity map is based on species ecology, habitat preferences and bat activity recorded by the passive bat detection systems during the pre-construction monitoring programme currently underway on the site.

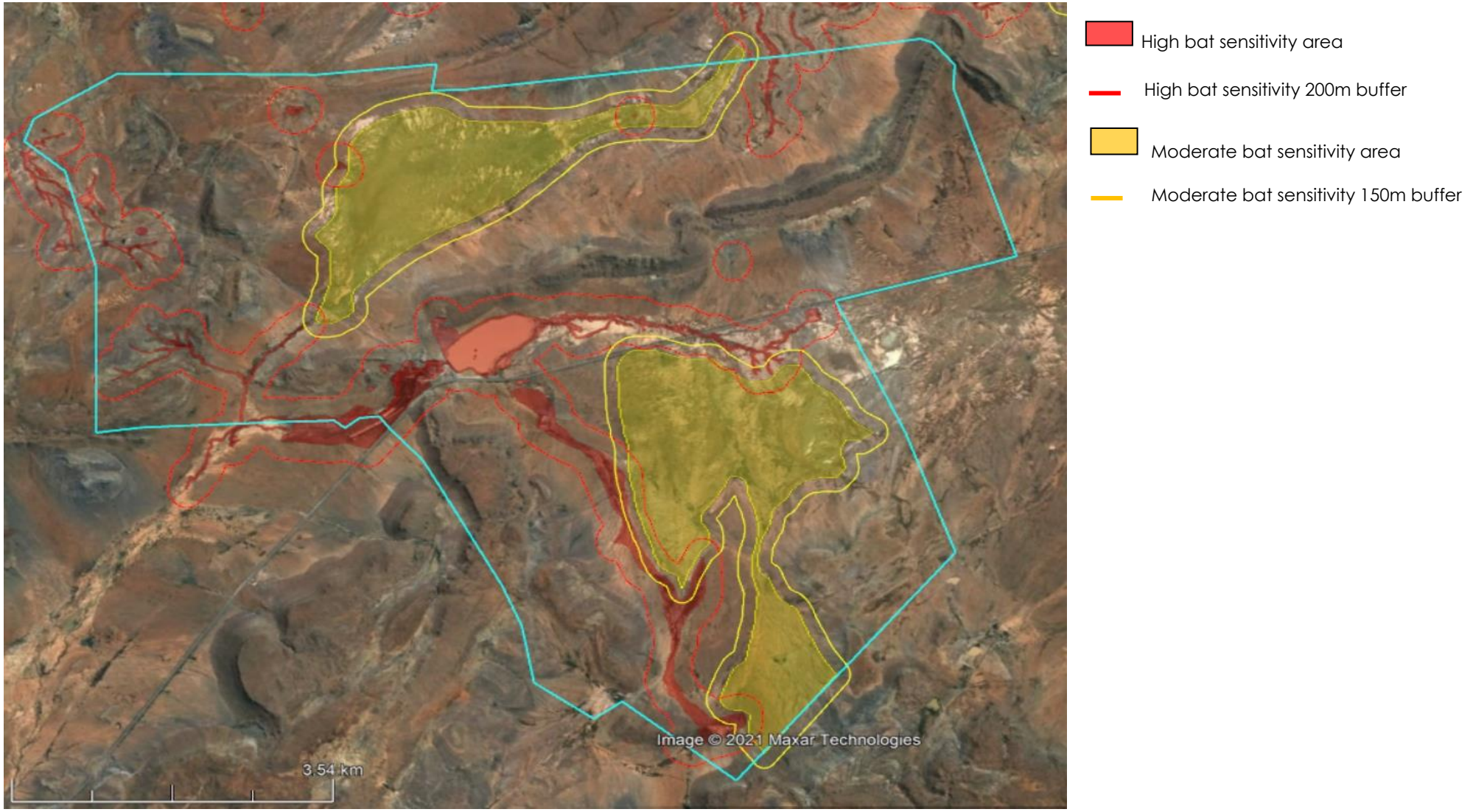

Figure 9.3: Bat sensitivities identified within the development area for the Merino Wind Farm

Issue	Nature of Impact	Extent	No-Go Areas
Potential loss of bat foraging habitat	Direct impacts: » Loss of habitat will potentially lead to a reduction in bat insect prey numbers. Indirect impacts: » A reduction of insect prey numbers may lead to increased competition for food resources and lowered carrying capacity of the general area.	Site	As per the sensitivity map
Description of expected significance of impact Considering the relatively low area footprint of the proposed wind farm, the destruction of foraging habitat is not expected to be of a high significance.			
Gaps in knowledge & recommendations for further study No specific gaps in knowledge exists for a specific impact, that can be filled by the EIA Phase bat study. The EIA Phase will simply improve confidence on the current identified impacts and allow for impact assessment ratings of each impact.			

Issue	Nature of Impact	Extent	No-Go Areas
Potential disturbance/destruction of bat roosts	Direct impacts: » Loss of bat roosts can lead to direct mortalities of bats utilising the roost. Indirect impacts: » A reduction of available roosting space may lead to increased competition for roosting areas and lowered carrying capacity of the general area.	Site	As per the sensitivity map
Description of expected significance of impact Bat roost destruction can result in direct mortalities of bats utilising the roost, thereby potentially causing an impact of high significance. However, mitigation is achievable.			
Gaps in knowledge & recommendations for further study No specific gaps in knowledge exists for a specific impact, that can be filled by the EIA Phase bat study. The EIA Phase will simply improve confidence on the current identified impacts and allow for impact assessment ratings of each impact			

Issue	Nature of Impact	Extent	No-Go Areas
Increased bat mortality due to light pollution	Direct impacts: » Increased lights at turbine or buildings near turbines can cause increased bat mortalities. Indirect impacts: » Increased mortalities of only certain species that readily forage around lights, can alter species composition dynamics in a population.	Site	As per the sensitivity map
Description of expected significance of impact Increased bat mortality due to light pollution can be of high significance if lights are placed on turbines or near turbines. Artificial lighting can attract insects and thereby bats foraging on the insects, that will increase the probability of these bats to be killed by moving turbine blades.			
Gaps in knowledge & recommendations for further study No specific gaps in knowledge exists for a specific impact, that can be filled by the EIA Phase bat study. The EIA Phase will simply improve confidence on the current identified impacts and allow for impact assessment ratings of each impact			

Issue	Nature of Impact	Extent	No-Go Areas
Bat mortality due to moving turbine blades.	Direct impacts: » Bats can be killed by moving turbine blades. Indirect impacts: » Prolonged bat mortalities in a population can lead to lowered breeding rates and loss of genetic diversity.	Regional	As per the sensitivity map
Description of expected significance of impact In terms of bat mortality due to moving turbine blades, the impact significance can be high, causing direct mortalities over a prolonged period for the lifetime of the facility.			
Gaps in knowledge & recommendations for further study No specific gaps in knowledge exists for a specific impact, that can be filled by the EIA Phase bat study. The EIA Phase will simply improve confidence on the current identified impacts and allow for impact assessment ratings of each impact			

» *9.3.4. Impacts on Avifauna*

The effects of a wind farm on birds are highly variable and depend on a wide range of factors, including the specification of the development, the topography of the surrounding land, the habitats affected, and the number and species of birds present. With so many variables involved, the impacts of each wind farm must be assessed individually, supported by site-specific data collected through a pre-construction monitoring programme. The principal areas of concern with regard to effects on birds are listed below. Each of these potential effects can interact with each other, either increasing the overall impact on birds or, in some cases, reducing a particular impact (for example where habitat loss or displacement causes a reduction in birds using an area which might then reduce the risk of collision):

- Mortality due to collisions with the wind turbines.
- Displacement due to disturbance during construction and operation of the wind farm.
- Displacement due to habitat change and loss at the wind farm.
- Mortality due to electrocution on the medium voltage overhead lines.
- Mortality due to collisions with the medium voltage overhead lines.

Sensitivity Analysis for the Site

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 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.

See **Figure 9.4** for the avifaunal sensitivities identified from a wind energy perspective.

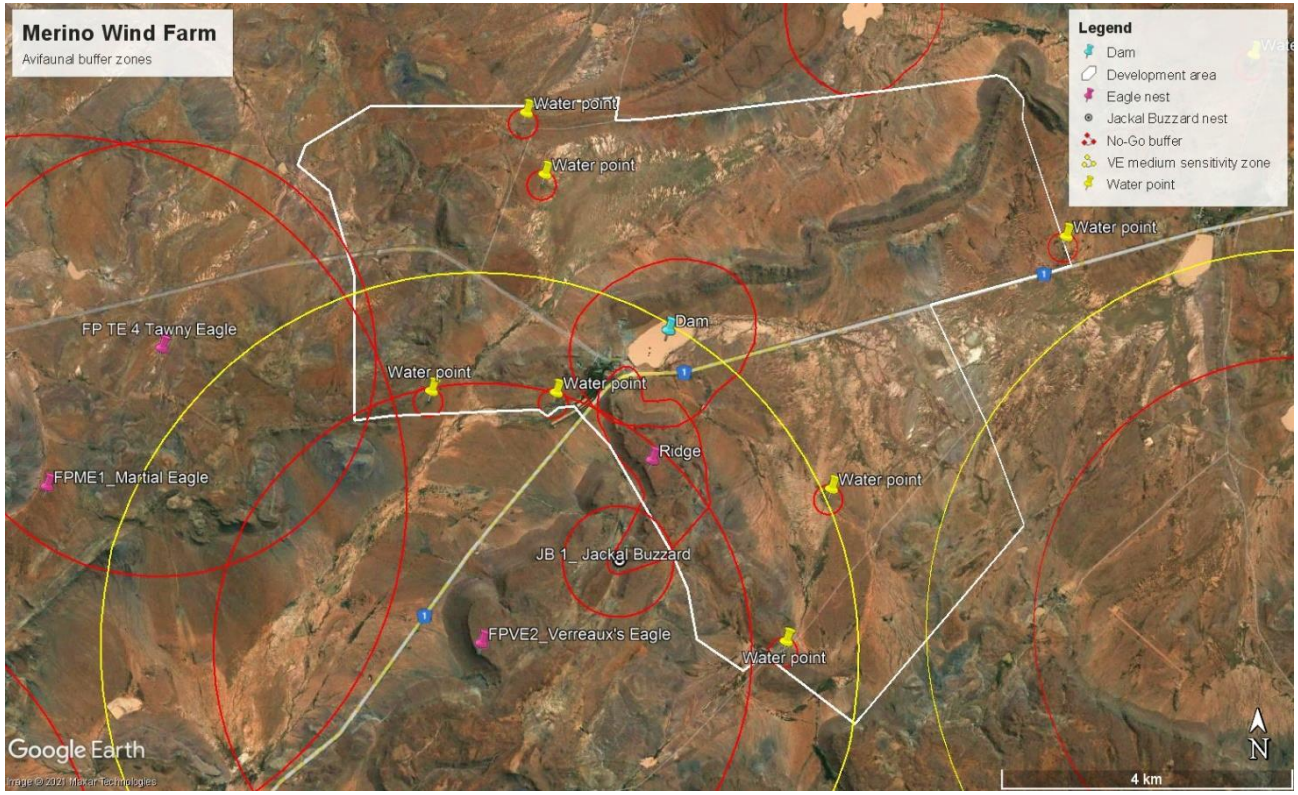

Figure 9.4: Avifaunal sensitivities identified as the Merino Wind Farm

Issue	Nature of Impact	Extent	No-Go Areas
During construction: Displacement due to disturbance associated with the construction of the wind turbines and associated infrastructure.	It is inevitable that a measure of displacement will take place for all priority species during the construction phase due to the disturbance factor associated with the construction activities. This is likely to affect ground nesting species the most, as this could temporarily disrupt their reproductive cycle. Species which fall in this category are Ludwig's Bustard, Blue Crane, Karoo Korhaan, Northern Black Korhaan and Spotted Eagle-Owl. Some raptors might also be affected, e.g, Greater Kestrel which often breeds on crow nests which have been constructed on wind pumps. Some species might be able to recolonise the area after the completion of the construction phase, but for some species this might only be partially the case, resulting in lower densities than before once the wind farm is operational, due to the disturbance factor of the operational turbines. In summary, the following species could be impacted by disturbance during the construction phase: Blue Crane, Karoo Korhaan, Ludwig's Bustard, Northern Black Korhaan, Spotted Eagle-Owl and Greater Kestrel.	Local	No avifaunal no-go areas were determined necessary for the mitigation of this anticipated impact.
During construction: Displacement of priority species due to habitat transformation associated with construction of the wind turbines and associated infrastructure.	The network of roads is likely to result in significant habitat fragmentation, and it could have an effect on the density of several species, particularly larger terrestrial species such as Ludwig's Bustard, Blue Crane, Northern Black Korhaan and Karoo Korhaan. Given the expected density of the proposed turbine layout and associated road infrastructure, it is not expected that any priority species will be permanently displaced from the development site. The building infrastructure and substations will all be situated in the same habitat, i.e., Karoo scrub. The habitat is not particularly sensitive, as far as avifauna is concerned. Therefore, the impact of the habitat transformation will be low given the extent of available habitat and the small size of the footprint. In summary, the following species are likely to be affected by	Local	No avifaunal no-go areas were determined necessary for the mitigation of this anticipated impact.

Issue	Nature of Impact	Extent	No-Go Areas
	habitat transformation: Blue Crane, Karoo Korhaan, Northern Black Korhaan, Ludwig's Bustard.		
During operation: Mortality of priority species due to collisions with wind turbines.	The proposed development will pose a collision risk to several priority species which could occur regularly at the site. Species exposed to this risk are large terrestrial species i.e., mostly bustards such as Karoo Korhaan, Northern Black Korhaan, Ludwig's Bustard, and Blue Crane; although bustards and cranes generally seem to be not as vulnerable to turbine collisions as was originally anticipated (Ralston-Paton & Camagu 2019). Soaring priority species, i.e., species such as Tawny Eagle, Cape Vulture, Martial Eagle, Pale Chanting Goshawk, Lanner Falcon, Booted Eagle, Verreaux's Eagle, Greater Kestrel and Black Stork are most at risk of all the priority species likely to occur at the project site. In summary, the following priority species could be at risk of collisions with the turbines: African Fish Eagle, African Harrier-Hawk, Black Harrier, Black Stork, Black-winged Kite, Blue Crane, Booted Eagle, Common Buzzard, Greater Flamingo, Greater Kestrel, Jackal Buzzard, Karoo Korhaan, Lanner Falcon, Lesser Kestrel, Ludwig's Bustard, Martial Eagle, Northern Black Korhaan, Pale Chanting Goshawk, Secretarybird, Spotted Eagle-Owl, Tawny Eagle, Verreaux's Eagle, Western Barn Owl and Cape Vulture.	Local	» A 3.7km No-Go zone should be implemented around the Verreaux's nest (FPVE2) (-31.543776°, 23.597448°). » A 3.7km No-Go zone should be implemented around the Verreaux's nest (FPVE4) (-31.540635°, 23.716886°). » A 3km No-Go zone should be implemented around the Tawny Eagle nest (FPTE1) (-31.445988° ,23.583921°). » A 3km No-Go zone should be implemented around the Tawny Eagle nest (FPTE4) (-31.507460°, 23.550963°). » A 5km No-Go zone should be implemented around the Martial Eagle nest (FPME1) (-31.524550°, 23.534279°). » An 800m turbine exclusion zone should be implemented at the large dams situated at -31.463982°, 23.653370° and at -31.505297°, 23.624400°. » A 500m turbine exclusion zone should be implemented at the medium-sized dam situated at -31.468068°, 23.613909°. » A 200m turbine exclusion zone should be implemented around the following boreholes: o -31.543646°, 23.641418° o -31.524881°, 23.648011° o -31.512977°, 23.608149° o -31.512790°, 23.590034° o -31.485982°, 23.606518° o -31.478371°, 23.603843°
During operation: Mortality of priority species due to	While the intention is to place the medium voltage reticulation network underground where possible, there are areas where	Regional	No reticulation lines should be constructed within 300m of the large dam at -31.463982°,

Issue	Nature of Impact	Extent	No-Go Areas
electrocution on the medium voltage internal reticulation network	the lines might have to run above ground, for technical reasons. In these instances, the poles could potentially pose an electrocution risk to raptors. In summary, the following priority species are expected to be vulnerable to electrocution: Spotted Eagle-Owl, Greater Kestrel, Pale Chanting Goshawk, Jackal Buzzard, Martial Eagle, Tawny Eagle, Verreaux's Eagle, African Fish Eagle, African Harrier-Hawk, Black Stork, Black-winged Kite, Booted Eagle, Common Buzzard, Lanner Falcon, Lesser Kestrel, Western Barn Owl and Cape Vulture.		23.653370°.
During operation: Mortality of priority species due to collisions with the medium voltage internal reticulation network	While the intention is to place the majority of the medium voltage reticulation network underground at the wind farm, there are areas where the lines will run above ground. Priority species which most at risk of collisions with the medium voltage powerlines are the following: Black Stork, Blue Crane, Karoo Korhaan, Northern Black Korhaan, Ludwig's Bustard, Greater Flamingo, Secretary Bird.	Regional	No reticulation lines should be constructed within 300m of the large dam at -31.463982°, 23.653370°.
Description of expected significance of impact The proposed 140 MW Merino Wind Farm will have an anticipated high and low pre-mitigation negative impact on priority avifauna, which is expected to be reduced to medium and low with appropriate mitigation.			
Gaps in knowledge & recommendations for further study » Implement six avifaunal surveys, utilising transects, vantage point watches, focal points and incidental counts, to inform the assessment of the potential impacts of the planned infrastructure within the development footprint. » Undertake an avifauna impact assessment during the EIA Phase.			

» 9.3.5. *Impacts on Agricultural Potential and Soils*

Considering the occurrence of various soil forms that are commonly associated with high land capabilities, it is likely that areas with high land capability sensitivity do occur within the project area. However, due to the poor climatic capability, the ultimate land potential is more likely to be low.

Sensitivity Analysis for the Site

The agriculture theme sensitivity indicates predominantly a combination of "Low" and "Medium" sensitivities, with isolated areas of "High" sensitivity (refer to **Figure 9.5**). It is worth noting that no "High" sensitivity areas were identified within the development area.

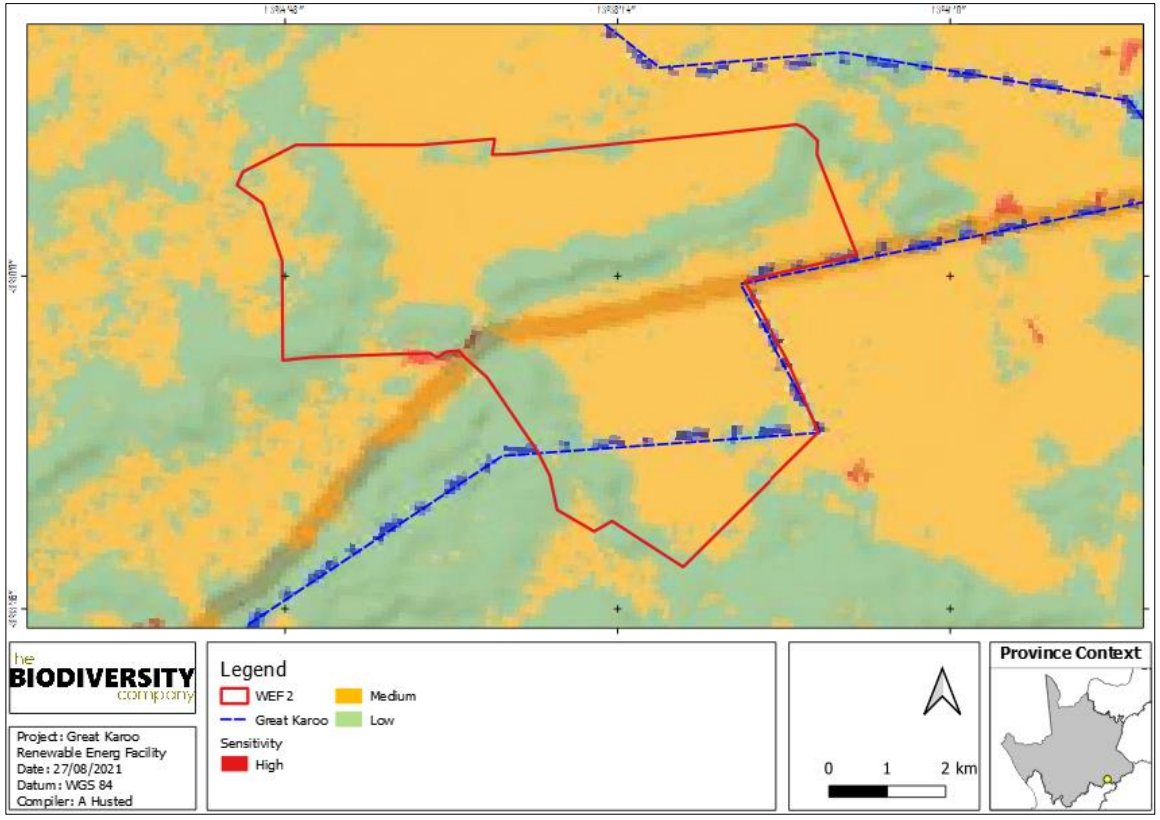

Figure 9.5: Agriculture theme sensitivity for the development area for the Merino Wind Farm

Issue	Nature of Impact	Extent	No-Go Areas
Compaction/soil stripping/transformation of land use which leads to loss of land capability	Direct impacts: » Loss of soil / land capability Indirect impacts: » Loss of land capability	Regional	None identified at this stage
Description of expected significance of impact The development of the area could result in the encroachment into areas characterised by high land potential properties, which can ultimately result in the loss of land capability. These disturbances could also result in the infestation and establishment of alien vegetation, which in turn can have a detrimental impact on soil resources. Earthworks will expose and mobilise earth materials which could result in compaction and/or erosion. A number of machines, vehicles and equipment will be required, aided by chemicals and concrete mixes for the project. Leaks, spillages or breakages from any of these could result in contamination of soil resources, which could affect the salinity or pH of the soil, which can render the fertility of the soil unable to provide nutrition to plants. During the operational phase, the impacts associated with the substation and collector sub will be easily managed by best "housekeeping" practices.			
Gaps in knowledge & recommendations for further study » This study is completed at a desktop level only. » Identification and delineation of soil forms. » Determine of soil sensitivity. **Recommendations with regards to general field surveys** » Field surveys to prioritise the development areas.			

» 9.3.6. *Impacts on Heritage (Cultural Landscape, Archaeology and Palaeontology)*

Cultural Landscape

A number of the significant heritage resources located in close proximity to the proposed development area are located within Beaufort West and are associated with the early colonial history of the town. The area proposed for development has limited topography that could screen the proposed development. It is therefore very likely that the proposed development will have a negative impact on the cultural and scenic value of the landscape.

Archaeology

The Karoo houses a long and rich archaeological record dating from the earliest stages of Stone Age technology that are over a million years old, to the historic period that consists of the last few hundred years of human occupation. Archaeological sites include caves and rock shelters, open air artefact scatters, rock engravings and historic structures with their associated cultural materials. It is likely that similar archaeological heritage exists within the area proposed for development.

Palaeontology

According to the extract from the Council for GeoSciences Map 3122 for Victoria West, the development area is underlain by the Abrahamskraal and Teekloof Formations, both of the Adelaide Subgroup of the Beaufort Group of sediments. According to the SAHRIS Fossil Heritage Browser and the Palaeotechnic Report for the Western Cape (Almond and Pether, 2008), the Beaufort Group sediments are known to preserve diverse terrestrial and freshwater tetrapods of *Tapinocephalus* to *Lystrosaurus* Biozones (amphibians, true reptiles, synapsids – especially therapsids), palaeoniscoid fish, freshwater bivalves, trace fossils (including tetrapod trackways) and sparse vascular plants (*Glossopteris* Flora, including petrified wood).

Sensitivity Analysis for the Site

According to the SAHRIS Palaeosensitivity Map (**Figure 9.6**), the area proposed for development is underlain by sediments of very high paleontological sensitivity. Based on the known paleontological sensitivity of this area, it is very likely that activities associated with the development of the proposed Merino Wind Farm could negatively impact on significant fossil heritage.

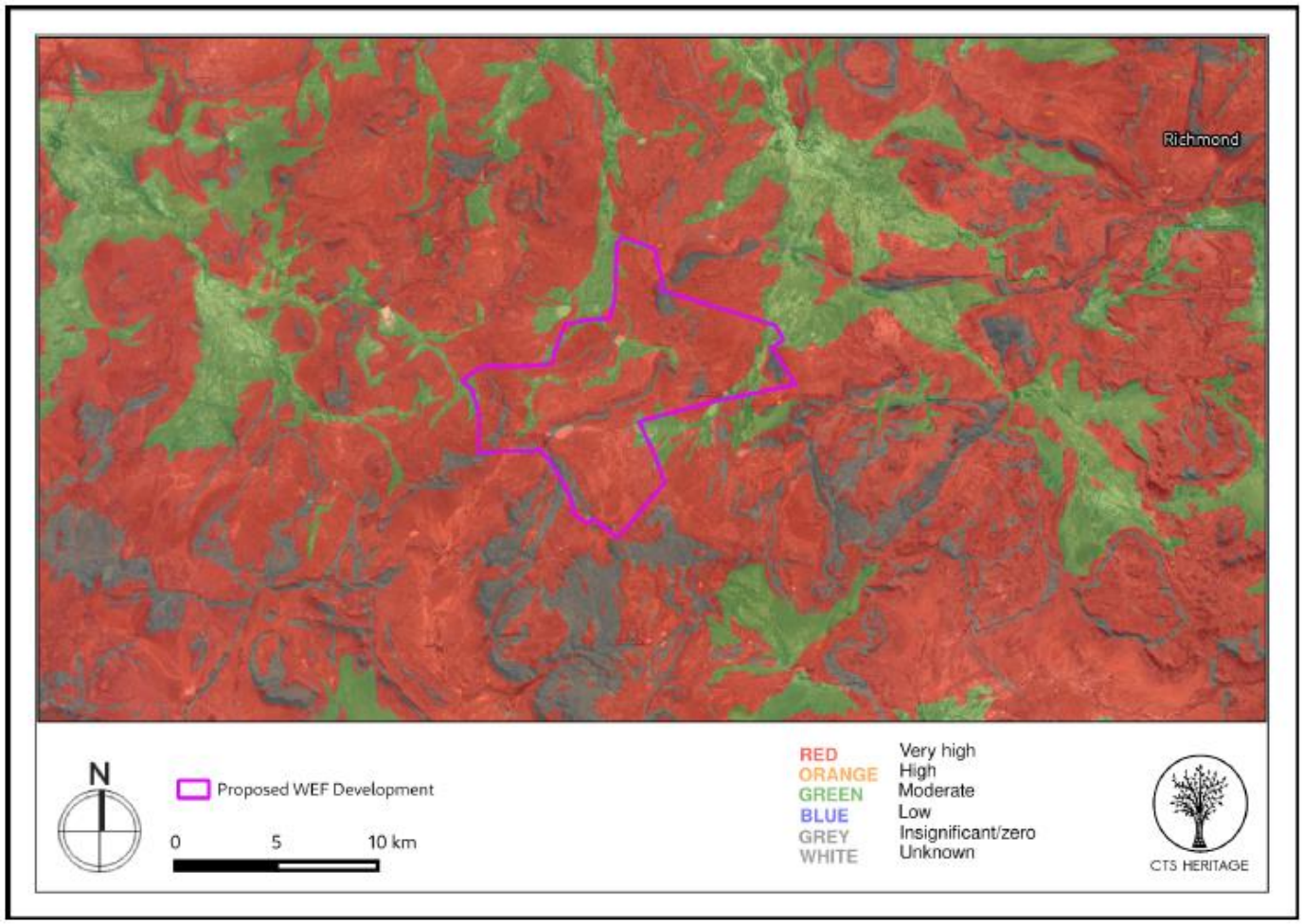

Figure 9.6: Palaeosensitivity map indicating fossil sensitivity underlying the study area

Issue	Nature of Impact	Extent	No-Go Areas
Destruction of archaeological heritage	» Direct impact to archaeological heritage of scientific significance	Within project boundary	None identified at this stage
Destruction of	» Direct impact to palaeontological heritage of scientific	Within project boundary	None identified at this stage

palaeontological heritage	significance		
Negative impact to significance cultural landscapes	» Indirect impact to significant cultural landscapes and cultural landscape elements	Regional	None identified at this stage
Description of expected significance of impact Field assessment will determine the significance of the resources likely to be impacted. Impacts can be minimised through the implementation of appropriate mitigation measures.			
Gaps in knowledge & recommendations for further study » The project area and the area more broadly have not been subjected to many heritage impact assessments and therefore substantial gaps in knowledge exist. Field assessment will fill these gaps. **Recommendations with regards to general field surveys** » Archaeological field surveys must provide sufficient ground-coverage of the areas to be developed to be able to determine the nature of the resources likely to be impacted. » Palaeontological and cultural landscape field surveys will target sensitive geological and cultural landscape features.			

» *9.3.7. Impacts on the Visual Quality of the Area*

The area potentially affected by the proposed development is generally seen as having a high scenic value based on the aesthetic quality of the receiving environment brought about by the vast open landscape, predominantly natural character and topographical features. The construction and operation of the proposed Merino Wind Farm may have a visual impact on a number of potentially sensitive visual receptors, especially within (but not restricted to) a 5 - 10km radius of the facility. Visual receptors include people travelling along roads and residing at homesteads, and tourists visiting the region.

Sensitivity Analysis for the Site

A preliminary viewshed analyses for the proposed Merino Wind Farm was undertaken in order to determine the general visual exposure of the area under investigation, the results of which are shown in **Figure 9.7**.

The viewshed analyses was undertaken from preliminary vantage points (with a maximum of 45) within the proposed development area at offsets of 170m above average ground level (i.e., the approximate hub height of the proposed wind turbines).

The following is evident from the viewshed analyses:

- The proposed Merino Wind Farm would have a large 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 relatively flat topography. This core area includes a number of homesteads, namely, Rondawel (on the development site), Rietfontein Wes, Bloemhof, and Vogelstruisfontein. The turbine structures are also expected to be clearly visible from the N1 national road traversing the proposed development site, and from one secondary road west of the site.
- Visual exposure will remain high in the medium distance (i.e., between 5 and 10km), especially to the north-east and south-west. Exposure to the south is hampered (reduced) by the undulating nature of the topography. Additional visual exposure within this zone also includes a section of the N1 national road and two secondary roads.
- In the medium to longer distance (i.e., between 10 and 20km), visual exposure will be somewhat reduced, especially towards the south-east and the north-west. This is due to the presence of hills and ridges at these locations. A section of the R398 arterial road may also be exposed within this zone.
- Visual exposure beyond a 20km radius is significantly reduced, especially in to the south and east. The town of Richmond also falls within this zone. However, it is not visually exposed to the proposed wind turbine structures.

It is envisaged that the wind farm structures would be easily and comfortably visible to observers (i.e., people travelling along roads and residing at homesteads or visiting the region), especially within a 5-10km radius of the wind farm, and would constitute a high visual prominence, potentially resulting in a high visual impact.

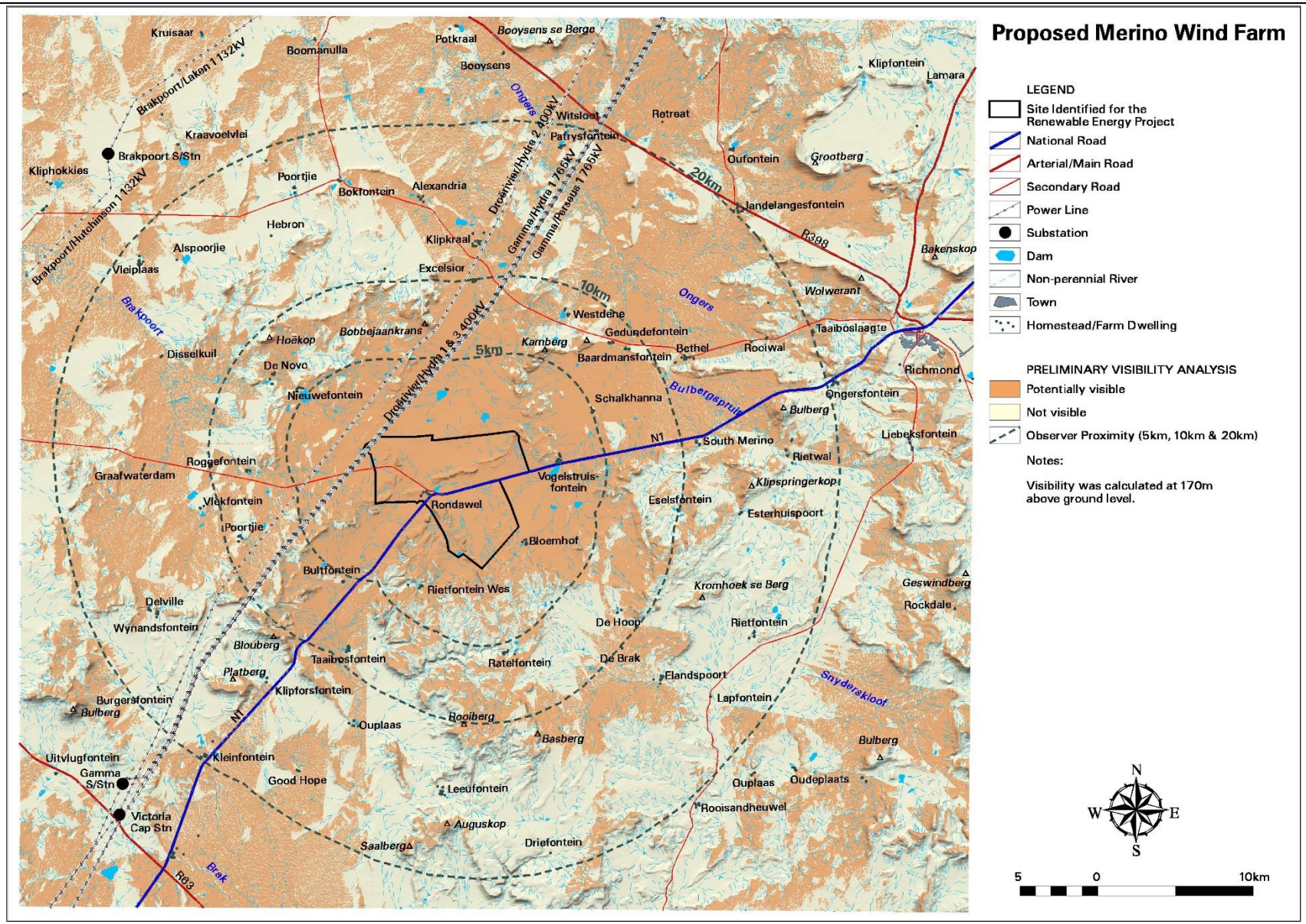

Figure 9.7: Map indicating the preliminary visual exposure of the proposed Merino Wind Farm

Issue	Nature of Impact	Extent	No-Go Areas
The viewing of the wind energy facility infrastructure and activities	» The potential negative experience of viewing the infrastructure and activities within a predominantly rural and natural setting	Primarily observers situated within a 5 - 10km (but potentially up to 20km) radius of the facility	Wind turbines should ideally not be placed on ridges, hills, or other elevated topographical units

Description of expected significance of impact

Extent: Local and/or regional
Duration: Long term
Magnitude: High to very high
Probability: Probable
Significance: High
Status (positive, neutral, or negative): Negative
Reversibility: Recoverable
Irreplaceable loss of resources: No
Can impacts be mitigated: Yes and no (some impacts may be mitigated)

Gaps in knowledge & recommendations for further study

A finalised layout of the wind energy facility and ancillary infrastructure are required for further analysis. This includes the provision of the dimensions of the proposed structures and ancillary equipment.

Additional spatial analyses are required in order to create a visual impact index that will include the following criteria:

» Visual exposure.
» Visual distance/observer proximity to the structures/activities.
» Viewer incidence/viewer perception (identify potentially affected sensitive visual receptors).
» Determine the visual absorption capacity of the environment surrounding the infrastructure and activities.

Additional activities:

» Identify potential cumulative visual impacts.
» Undertake a site visit.
» Recommend mitigation measures and/or infrastructure placement alternatives.

» *9.3.8. Impacts on Sensitive Noise Receptors*

Increased noise levels are directly linked with the various activities associated with the construction of the proposed Merino Wind Farm and related infrastructure, as well as the operation phase of the activity.

During construction, activities such as the use of construction equipment, the use of a concrete batching plant and borrow pits (if required), blasting and construction traffic will result in increased noise levels. For the construction phase, increased noise levels will result from routine servicing (access road and traffic light) and unscheduled maintenance. The primary source of noise during the operation phase will come from the rotation of the wind turbines.

One of the issues of concern with regard to noise is the impact that it has on animals. A great deal of research was conducted in the 1960's and 1970's on the effects of aircraft noise on animals.

From these studies, the following can be concluded:

- Animals respond to impulsive (sudden) noises (higher than 90 dBA) by running away. If the noises continue, animals will try to relocate. This is not relevant to wind energy facilities because the turbines do not generate any impulsive noises close to these sound levels.
- Animals of most species exhibit adaptation with noise, including aircraft noise and sonic booms (far worse than noises associated with Wind Turbines).
- More sensitive species would relocate to a quieter area, especially species that depend on hearing to hunt or evade prey, or species that makes use of sound/hearing to locate a suitable mate.
- Noises associated with helicopters, motor- and quad bikes significantly impact on animals.

The impact of noise from the rotation of wind turbines on animals will be investigated further during the EIA Phase.

Sensitivity Analysis for the Site

Potential noise-sensitive developments in the area were initially identified using aerial images as well as the Online Environmental Screening Tool, with the noise-sensitive developments confirmed during the site visit. The noise-sensitive developments as identified are highlighted in **Figure 9.8**, with the same figure also illustrating areas with a high noise sensitivity in terms of the National Web-based Environmental Screening Tool.

Also indicated on this figure are generalized 500m, 1 000m and 2 000m buffer zones. Generally, noises from wind turbines:

- Could be significant within 500m, with receptors staying within 500m from operational wind turbines subject to noises at a potentially sufficient level to be considered disturbing.
- Are normally limited to a distance of approximately 1 000m from operational wind turbines. Night-time ambient sound levels are elevated, and the potential noise

impact might be measurable. Cumulative noises from multiple WTG surrounding an NSD may be high and exceed 45dBA.

» May be audible up to a distance of 2 000m at night.

» Are of a low concern at distances greater than 2 000m.

It should be noted that each dot may represent a number of different dwellings that are or could be used for residential activities.

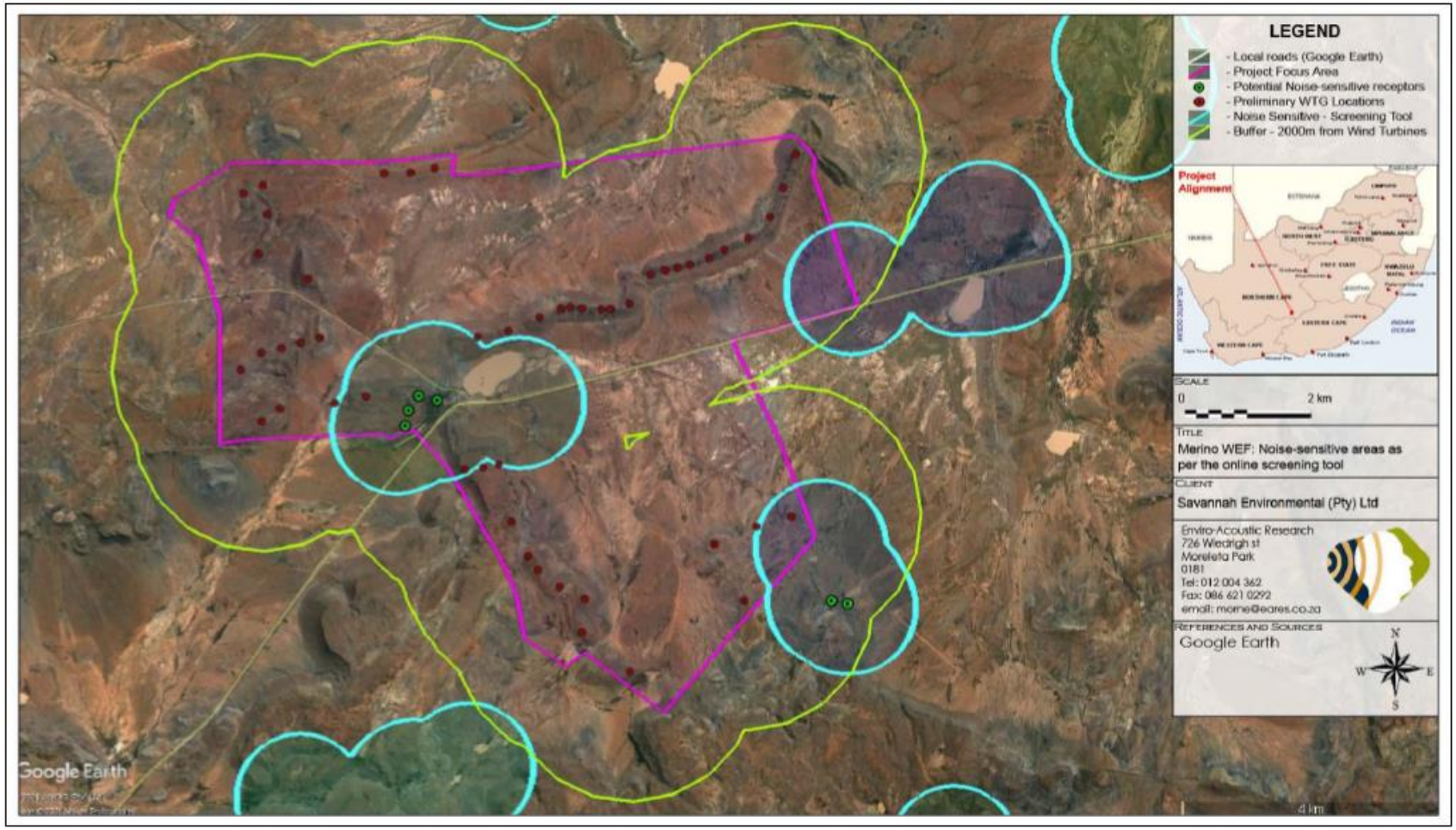

Figure 9.8: Noise-sensitive developments located within the surrounding area and the project site of the Merino Wind Farm

Issue	Nature of Impact	Extent	No-Go Areas
Construction Phase: Increase in noise level at receptors. Disturbing noises. Noises exceeding rating level.	Increased noises or disturbing noises may increase annoyance levels with project. Noise levels could exceed 45 dBA during construction.	Multiple construction activities taking place simultaneously may impact an area up to 2 000m from the activities at night.	No wind turbines to be developed within 160 m and 500 m from identified NSD considering day- and night-time noise limits respectively (considering only construction noises).
Description of expected significance of impact Without noise propagation modelling where cumulative effects are included, it is difficult to assess the potential significance of the noise impact, though considering the projected noise levels, the significance may be medium to high. Construction noise impacts however: » are highly reversible; » will not result in the irreplaceable loss of resources; and » potential noise impacts can be managed, mitigated or even avoided.			
Gaps in knowledge & recommendations for further study Insufficient information is available to consider the potential noise impact. Scoping level assessment is insufficient, and a full Environmental Noise Impact Assessment is required.			

Issue	Nature of Impact	Extent	No-Go Areas
Operational Phase: Increase in noise level at receptors. Noises exceeding rating level.	Increased noises may increase annoyance levels with project.	Multiple wind turbines operating at night could impact on an area up to 2 000m from the turbines.	As the noise level depends on the layout (that would determine the cumulative effect from all WTG located within 2 000m from an NSD), no-go areas cannot be confirmed during the scoping phase.
Description of expected significance of impact Based on the preliminary layout available, the wind farm is located approximately 160m from potential noise-sensitive developments and the noise level may be high. The significance of the noise impact may be high and will be investigated in detail during the EIA phase.			
Gaps in knowledge & recommendations for further study Insufficient information is available to consider the potential noise impact. A final wind farm layout is required as well as the status of the identified noise-sensitive developments. Scoping level assessment is insufficient, and a full Environmental Noise Impact Assessment is recommended.			

» 9.3.9. *Impacts on Traffic*

Impacts on traffic are expected in the construction and decommissioning phases. No impacts on traffic are expected during the operation phase.

Impact – Construction Phase
Traffic congestion due to an increase in traffic caused by the transportation of equipment, material, and staff to site.

Desktop Sensitivity Analysis of the Site
Traffic congestion possible along the N1 during construction.

Issue	Nature of Impact	Extent	No-Go Areas
Traffic congestion	Potential traffic congestion and delays on the surrounding road network. The associated noise, dust, and exhaust pollution due to the increase in traffic.	Local	None identified.

Description of expected significance of impact
The significance of the transport impact during the construction phase can be rated as medium. However, considering that this is temporary and short term in nature, the impact can be mitigated to an acceptable level. Traffic will return to normal levels after construction is completed. Noise, dust, and exhaust pollution during the construction phase cannot be completely mitigated but mitigation measures will significantly reduce the impact. These potential impacts will be limited to the construction period.

Gaps in knowledge & recommendations for further study
Gaps:
The following items need to be clarified:
» Existing traffic volumes along the N1.
» Local or imported components.
» Water source to be clarified – borehole or transported to site.
» Number of components.
» Number of abnormal loads.
» Dimensions and weight of components.
» Size of water bowser to be used.
» Construction period.
» Number of site staff.
» Fleet size.

Recommendations:
» To clarify the items above, an additional site visit during the EIA phase is recommended.
» Transport Specialist requires the above information when it becomes available.

» *9.3.10. Impacts on Socio-Economic Environment*

Construction Phase Impacts

Impact: Creation of employment and business opportunities during the construction phase			
Issue	**Nature of Impact**	**Extent of Impact**	**No-Go Areas**
Creation of employment and business opportunities during the construction phase	Direct impacts: » Creation of temporary employment opportunities » Creation of business and procurement opportunities Indirect impacts: » Support for local economy » Creation of training and skills development opportunities	Local-Regional	N/A
Description of expected significance of impact Evidence from other renewable energy projects indicates that the construction phase of 140 MW wind farm will extend over a period of approximately 18-24 months and create in the region of 350 employment opportunities. Members from the local communities in the area, specifically Victoria West and Richmond, would be in a position to qualify for most of the low skilled and semi-skilled opportunities. The business-related opportunities will be linked to the hospitality (accommodation) and services sector (catering, security, transport etc.).			
Gaps in knowledge & recommendations for further study » Collection of information on local skills and education levels. » Collection of information on local hospitality and services sector. **Recommendations with regards to general field surveys** » Site visit and interviews with representatives from local municipality, and the hospitality and services sector. » Site visit and interviews with local chamber of commerce.			

Impact: Potential impacts on family structures and social networks associated with the presence of construction workers			
Issue	**Nature of Impact**	**Extent of Impact**	**No-Go Areas**
Potential impacts on family structures and social networks associated with the presence of construction workers	Direct impacts: » Disruption of existing family structures and social networks	Local-Regional	N/A

	» Anti-social behaviour of construction workers » Increase in substance abuse, crime, sexually transmitted diseases. » Unplanned pregnancies <u>Indirect impacts:</u> » Impact on psychological well-being of local communities » Resentment of outsiders and tension within local communities		
Description of expected significance of impact Evidence from other renewable energy projects indicates that presence and behaviour of construction workers can impact negatively on local communities. Members from the local communities in the area, specifically Victoria West and Richmond, would be at potential risk depending on where non-local construction workers are accommodated during the construction phase.			
Gaps in knowledge & recommendations for further study » Collection of information on local skills and education levels. Employing local community members reduces the potential risks » Collection of information on accommodation options and capacity. » Collection of information on existing community challenges and needs. **Recommendations with regards to general field surveys** » Site visit and interviews with representatives from local municipality and community representatives. » Site visit and interviews with representatives from hospitality sector with regard to accommodation options.			

Impact: Potential impacts on family structures, social networks and community services associated with the influx of job seekers			
Issue	**Nature of Impact**	**Extent of Impact**	**No-Go Areas**
Potential impacts on family structures, social networks and community services associated with the influx of job seekers	<u>Direct impacts:</u> » Disruption of existing family structures and social networks » Anti-social behaviour of construction workers » Increase in substance abuse, crime, sexually transmitted diseases. » Unplanned pregnancies	Local-Regional	N/A

	» Pressure on local services Indirect impacts: » Impact on psychological well-being of local communities » Resentment of outsiders and tension within local communities		
Description of expected significance of impact Evidence from other renewable energy projects indicates that the construction phase can result in the influx of jobseekers to the area and that this has the potential to impact negatively on local communities. However, the potential for the influx of jobseekers is also influenced by the location of the project. Projects located in relatively remote, rural areas are less likely to attract jobseekers			
Gaps in knowledge & recommendations for further study » Collection of information on existing community challenges and needs. **Recommendations with regards to general field surveys** » Site visit and interviews with representatives from local municipality and community representatives.			

Impact: Potential risk to farmers and farm workers, livestock and damage to farm infrastructure associated with the presence and activities of construction workers on site			
Issue	**Nature of Impact**	**Extent of Impact**	**No-Go Areas**
Potential risk to safety of scholars, farmers and farm workers, livestock and damage to farm infrastructure associated with the presence of construction workers on site	Direct impacts: » Damage of gates, fences, etc. » Injuries to and loss of livestock » Break-ins, and theft of from local farms. » Damage of local farm roads. Indirect impacts: » Exposure to outside people of farming operations and risk to farming operations. » Increased risk of stock-theft.	Local	N/A
Description of expected significance of impact Evidence from other renewable energy projects indicates that the movement and activities of construction workers can impact on farming operations. The impacts include			

damage to fences and gates, gates being left open resulting in loss of livestock, increased risk of petty theft and stock theft etc.
Gaps in knowledge & recommendations for further study » Collection of information on existing farming operations and activities. **Recommendations with regards to general field surveys** » Site visit and interviews with local farmers and representatives from local farming associations etc.

Impact: Potential loss of livestock, crops and houses, damage to farm infrastructure and threat to human life associated with increased incidence of grass fires			
Issue	**Nature of Impact**	**Extent of Impact**	**No-Go Areas**
Potential loss of livestock, crops and houses, damage to farm infrastructure and threat to human life associated with increased incidence of grass fires	Direct impacts: » Damage of structures, grazing, gates, fences, etc. » Injuries to and loss of livestock Indirect impacts: » Impact on stocking levels and future farming operations » Increased risk of stock losses and theft	Local	N/A
Description of expected significance of impact Evidence from other renewable energy projects indicates that the activities associated with the construction phase can increase the risk of grass fires, which in turn can impact on farming operations. The impacts include loss of grazing, damage to structures, fences, and gates, etc. These impacts impact on the livelihood of farmers.			
Gaps in knowledge & recommendations for further study » Collection of information on existing farming operations and activities, and risk of grass fires in the area. **Recommendations with regards to general field surveys** » Site visit and interviews with local farmers and representatives from local farming associations etc.			

Impact: Potential noise, dust and safety impacts associated with construction related activities			
Issue	**Nature of Impact**	**Extent of Impact**	**No-Go Areas**
Potential noise, dust and safety impacts associated with construction related activities	Direct impacts: » Dust impacts, and impact on quality of life and also crops and grazing » Noise impacts, and impact on quality of life	Local	N/A

	» Safety of farmers due to movement of construction vehicles » Damage of local farm roads <u>Indirect impacts:</u> » Limited indirect impacts		
Description of expected significance of impact Evidence from other renewable energy projects indicates that the activities associated with the construction phase do result in dust, noise and safety impacts that can impact on local farmers and farm workers.			
Gaps in knowledge & recommendations for further study » Collection of information on existing farming operations and activities. **Recommendations with regards to general field surveys** » Site visit and interviews with local farmers and representatives from local farming associations etc.			

Impact: The activities associated with the construction phase, such as establishment of access roads and the construction camp, movement of heavy vehicles and preparation of foundations for the project etc. will damage farmlands and result in a loss of farmlands for grazing.			
Issue	**Nature of Impact**	**Extent of Impact**	**No-Go Areas**
Damage to farmland and loss of grazing and or crops	<u>Direct impacts:</u> » Loss of grazing and/or crops <u>Indirect impacts:</u> » Impact on future farming operations » Impact on employment opportunities on the farm	Local	N/A
Description of expected significance of impact Evidence from other renewable energy projects indicates that the activities associated with the construction phase will result in the loss of farmland, including grazing and or crops depending on the location. These impacts impact on the livelihood of farmers. However, loss of land and crops can be addressed by minimising the disturbance footprint and compensation for losses.			
Gaps in knowledge & recommendations for further study » Collection of information on existing farming operations and activities.			

Recommendations with regards to general field surveys
» Site visit and interviews with local farmers and representatives from local farming associations etc.

Operation Phase Impacts

Nature: Development of infrastructure to improve energy security and support renewable sector			
Issue	**Nature of Impact**	**Extent of Impact**	**No-Go Areas**
Improve SAs energy security and reduce reliance on coal	Direct impacts: » Improve energy security » Reduce reliance on coal » Support renewable energy Indirect impacts: » Address climate change impacts	Local-International	N/A
Description of expected significance of impact South Africa's energy crisis, which started in 2007 and is ongoing, has resulted in widespread rolling blackouts (referred to as load shedding) due to supply shortfalls. The load shedding has had a significant impact on all sectors of the economy and on investor confidence. A review of the REIPPPP and establishment of renewable energy facilities not only addresses environmental issues associated with climate change and consumption of scarce water resources, but also create significant socio-economic opportunities and benefits, specifically for historically disadvantaged, rural communities.			
Gaps in knowledge & recommendations for further study » Collection and review of information on REIPPPP. **Recommendations with regards to general field surveys** » N/A. Desktop review of REIPPPP.			

Nature: Creation of employment and business opportunities associated with the operational phase			
Issue	**Nature of Impact**	**Extent of Impact**	**No-Go Areas**
Creation of employment and business opportunities associated with the operational phase	Direct impacts: » Creation of employment opportunities » Creation of business and procurement opportunities	Local-Regional	N/A

	Indirect impacts: » Support for local economy. » Creation of training and skills development opportunities		
Description of expected significance of impact The direct employment opportunities associated with the operational phase of renewable energy projects are relatively limited. However, a review of the REIPPPP indicates that the benefits associated with the operation of renewable energy projects are significant and extend beyond direct employment opportunities.			
Gaps in knowledge & recommendations for further study » Collection and review of information on REIPPPP. **Recommendations with regards to general field surveys** » N/A. Desktop review of REIPPPP.			

Impact: The generation of additional income represents a significant benefit for the local affected farmer(s) and reduces the risks to their livelihoods posed by droughts and fluctuating market prices for sheep and farming inputs, such as feed etc.			
Issue	**Nature of Impact**	**Extent of Impact**	**No-Go Areas**
Generation of additional income for affected landowners	Direct impacts: » Additional income to support farming Indirect impacts: » Opportunity to invest and expand farming operations and create more employment opportunities on the farm.	Local	N/A
Description of expected significance of impact Evidence from other renewable energy projects indicates that the generation of additional income represents a significant benefit for the local affected farmer(s) and reduces the risks to their livelihoods posed by droughts and fluctuating market prices for sheep and farming inputs, such as feed etc.			
Gaps in knowledge & recommendations for further study » Collection of information on existing farming operations and activities. **Recommendations with regards to general field surveys** » Site visit and interviews with local farmers and representatives from local farming associations etc.			

Impact: Benefits associated with support for local community's form SED contributions			
Issue	**Nature of Impact**	**Extent of Impact**	**No-Go Areas**
Support for local economic development and investment	Direct impacts: » Support local economic development » Create employment opportunities » Create skills development and training opportunities » Improve basic services Indirect impacts: » Up-grade local municipalities and improve quality of life of local communities	Local-Regional	N/A
Description of expected significance of impact The revenue from the proposed wind farm can be used to support a number of social and economic initiatives in the area, including: » Creation of jobs. » Education. » Support for and provision of basic services. » School feeding schemes. » Training and skills development. » Support for SMMEs.			
Gaps in knowledge & recommendations for further study » Collection and review of information on REIPPPP. **Recommendations with regards to general field surveys** » N/A. Desktop review of REIPPPP.			

Impact: Visual impact associated with the proposed facility and associated infrastructure and the potential impact on the area's rural sense of place.			
Issue	**Nature of Impact**	**Extent of Impact**	**No-Go Areas**
Impact on rural sense of place	Direct impacts: » Change in rural sense of place Indirect impacts:	Local	N/A

	» Potential impact on property values and hospitality operations.		
Description of expected significance of impact Renewable energy projects do have the potential to impact on an area's sense of place. In some instances, this can impact on existing or proposed tourist facilities and also on property values. In other cases, local landowners have indicated that the potential visual impacts are not regarded as an issue.			
Gaps in knowledge & recommendations for further study » Collection of information on location of existing farming and hospitality operations and activities. **Recommendations with regards to general field surveys** » Site visit and interviews with local farmers and representatives from local municipality and farming and hospitality associations etc.			

Impact: Potential impact of the WEF on property values. This is usually linked to the visual impact associated with the proposed facility and associated infrastructure and the potential impact on the areas rural sense of place.

Issue	Nature of Impact	Extent of Impact	No-Go Areas
Impact on rural sense of place and associated impact on property values.	Direct impacts: » Change in rural sense of place and impact on property values Indirect impacts: » Potential impact on hospitality operations.	Local	N/A
Description of expected significance of impact Renewable energy projects do have the potential to impact on an areas sense of place. In some instances, this can impact on property values. In other cases, local landowners have indicated that the potential visual impacts and impact on property values are not regarded as an issue.			
Gaps in knowledge & recommendations for further study » Collection of information on location of existing farming and hospitality operations and activities. **Recommendations with regards to general field surveys** » Site visit and interviews with local farmers and representatives from local municipality and farming and hospitality associations etc.			

Impact: Potential impact of the wind farm on local tourism. This is usually linked to the visual impact associated with the proposed facility and associated infrastructure and the potential impact on the area's rural sense of place.

Issue	Nature of Impact	Extent of Impact	No-Go Areas
Impact on existing and future tourism operations.	Direct impacts: » Change in rural sense of place and impact on tourism activities. Indirect impacts: » Potential impact on future development of hospitality operations.	Local	N/A

Description of expected significance of impact

Renewable energy projects do have the potential to impact on an area's sense of place. In some instances, this can impact on tourism activities. In other cases, local landowners have indicated that the potential visual impacts and impact on tourism activities are not regarded as an issue.

Gaps in knowledge & recommendations for further study

» Collection of information on location of existing farming and hospitality operations and activities.

Recommendations with regards to general field surveys

» Site visit and interviews with local farmers and representatives from local municipality and farming and hospitality associations etc.

9.4 Evaluation of Potential Cumulative Impacts Associated with the Merino Wind Farm and Other Approved Wind Energy Developments

Impacts of a cumulative nature place the direct and indirect impacts of the proposed project into a regional and national context, particularly in view of similar or resultant developments and activities in the region. Potential cumulative impacts associated with the Merino Wind Farm are described below and will be assessed in detail as part of the subsequent EIA phase to be conducted for the project.

Cumulative impacts, in relation to an activity, refer to the impact of an activity that in itself may not be significant but may become significant when added to the existing and potential impacts eventuating from similar or diverse activities or undertakings in the area. For cumulative effects analysis to help the decision-maker and inform interested parties, it must be limited to effects that can be evaluated meaningfully (DEAT, 2004). It is important to explore the potential for cumulative impacts as this will lead to a better understanding of these impacts and the potential for mitigation that may be required. The scale at which the cumulative impacts are assessed is important. For example, the significance of the cumulative impact on the regional or national economy will be influenced by wind farm developments throughout South Africa, while the significance of the cumulative impact on the visual amenity may only be influenced by wind farm developments that are in closer proximity to each other. For practical purposes a sub-regional scale of 30km is considered for the evaluation of cumulative impact of wind farms.

The cumulative impacts associated with the Merino Wind Farm have been viewed from two perspectives within this Scoping Report:

- Cumulative impacts associated with the scale of the project (one 140MW wind farm on the project site); and
- Cumulative impacts associated with other relevant planned, approved, or existing similar developments within a 30km radius of the project site (multiple renewable facilities and the associated grid connection infrastructure in the proximity of the site).

Cumulative effects are commonly understood as the impacts which combine from different projects, and which result in significant change, which is larger than the sum of all the impacts (DEAT, 2004). The complicating factor is that the projects that need to be considered are from past, present, and reasonably foreseeable future development. Cumulative effects can be characterised according to the pathway they follow. One pathway could be the persistent additions from one process. Another pathway could be the compounding effect from one or more processes. Cumulative effects can therefore occur when impacts are:

- Additive (incremental).
- Interactive.
- Sequential.
- Synergistic.

Canter and Sadler (1997) describe the following process for addressing cumulative effects in an EIA:

- Delineating potential sources of cumulative change (i.e., GIS to map the relevant renewable energy facilities in close proximity to one another).
- Identifying the pathways of possible change (direct impacts).

» Indirect, non-linear or synergistic processes.
» Classification of resultant cumulative changes.

The site for the proposed development is located within 30km from several other authorised renewable energy facilities. These projects include the following (refer to **Figure 9.9**)[22]:

Project Name	Project Status
Brakpoort Solar PV Facility	Authorised
Umsinde Emoyeni Wind Energy Facility	Authorised
Aurora Solar PV Facility	Authorised
Mainstream Renewable Energy Cluster	Authorised
Ishwati Emoyeni Wind Energy Facility	Authorised
Trouberg Wind Energy Facility	Authorised
Modderfontein Wind Energy Facility	Authorised
Nobelsfontein Wind Energy Facility	Authorised
Bietjiesfontein Solar Energy Facility	Authorised
Karoo Renewable Energy Facility	Authorised

In addition to the renewable energy facilities listed above, four new renewable energy facilities (three solar PV facilities and one wind farm are proposed adjacent to the Merino Wind Farm, namely:

Project Name	Affected property	Contracted Capacity
Kwana Solar PV Facility	Portion 0 of Farm Rondavel 85	100MW
Moriri Solar PV Facility	Portion 0 of Farm Rondavel 85	100MW
Nku Solar PV Facility	Portion 1 of Farm Rondavel 85	100MW
Angora Wind Farm	Portion 11 of Farm Gegundefontein 53 Portion 0 of Farm Vogelstruisfontein 84 Portion 1 of Farm Rondavel 85 Portion 0 of Farm Rondavel 85	140MW

[22] None of the authorised renewable energy facilities located within a 30km radius of the Merino Wind Farm were selected as preferred bidder in the latest Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) Round (i.e., Round 5).

The cumulative impacts that have the potential to be compounded through the development of the Merino Wind Farm and its associated infrastructure in proximity to other similar developments include impacts such as those listed below. The role of the cumulative assessment is to test if such impacts are relevant to the Merino Wind Farm within the development area being considered for the development:

- Unacceptable loss of threatened or protected vegetation types, habitat, or species through clearing, resulting in an impact on the conservation status of such flora, fauna, or ecological functioning.
- Unacceptable risk to freshwater features through disturbance associated with construction activities and increased runoff and erosion during the operation phase.
- Unacceptable risk to avifauna through habitat loss, displacement, and collision with wind turbines.
- Unacceptable loss of high agricultural potential areas presenting a risk to food security and increased soil erosion.
- Unacceptable loss of heritage resources (including palaeontological and archaeological resources).
- Unacceptable increase in ambient noise conditions.
- Complete or whole-scale change in the sense of place and character of an area and unacceptable visual intrusion.
- Unacceptable impact on traffic and road conditions.
- Unacceptable impact to socio-economic factors and components.

Summary of the nature, significance, consequence, extent, duration, and probability of the impacts

- The above-mentioned impacts are considered probable, although it is anticipated that the extent, duration, and magnitude of these impacts can be minimised to levels where this impact can be regarded as having low significance through the implementation of appropriate mitigation measures.
- The operational lifespan of the project and other renewable energy facilities within the surrounding areas is expected to be long-term (i.e., a minimum of 20 years) and subsequently the impact is also expected to be long-term.
- The impact associated with the proposed development is expected to be local, affecting mainly the immediate environment and surrounding areas, as well as other renewable energy facilities within the vicinity.

Gaps in knowledge & recommendations for further study:

- Each specialist study will consider and assess the cumulative impacts of proposed, approved and authorised renewable projects in the area.
- Cumulative impacts will be fully assessed and considered in the EIA phase.

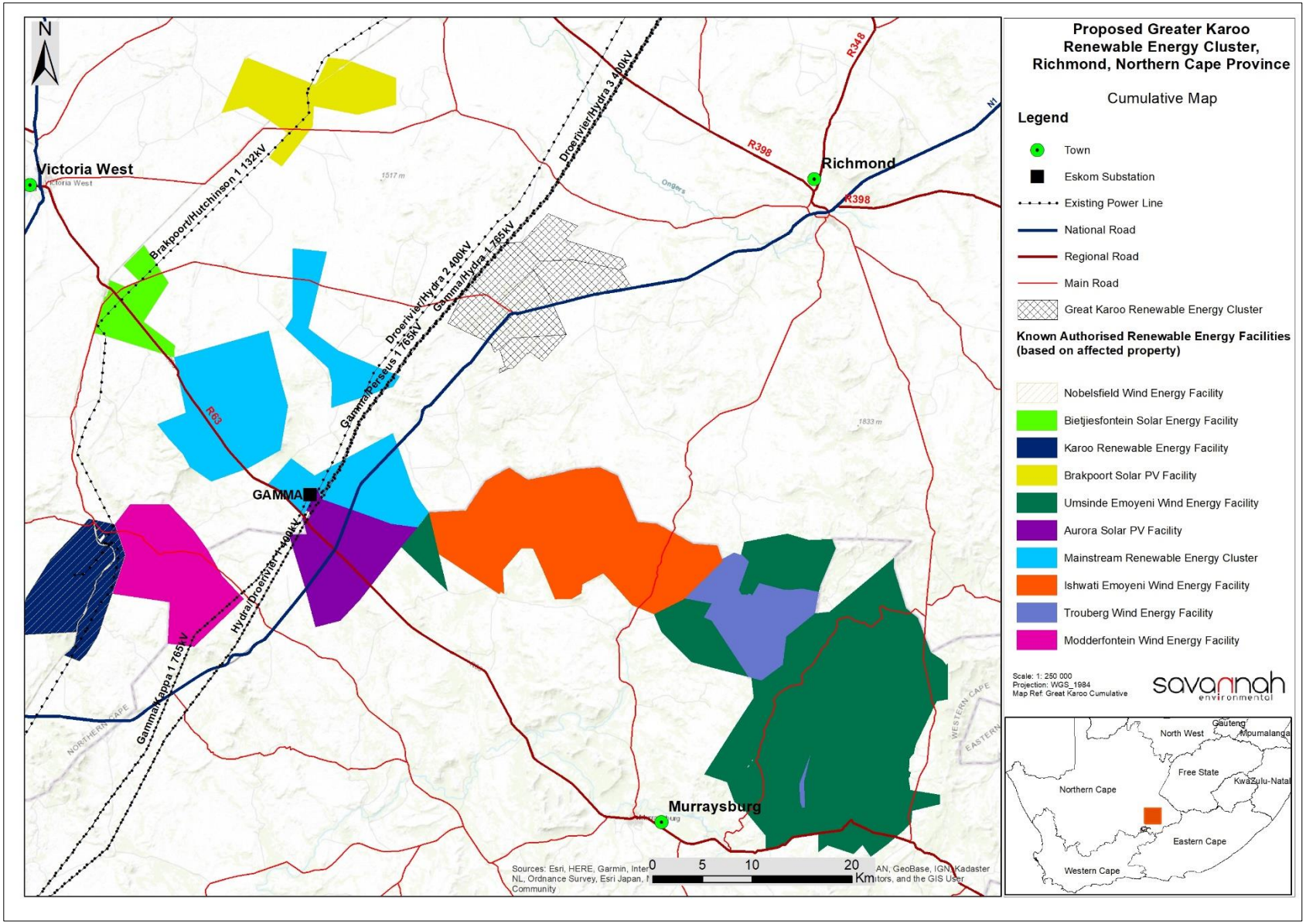

Figure 9.9: Cumulative map illustrating other approved and/or constructed renewable energy facilities located within a 30km radius of the Merino Wind Far

CHAPTER 10: CONCLUSIONS

This Scoping Report is aimed at detailing the nature and extent of the proposed development, identifying and describing potential issues associated with developing the Merino Wind Farm and associated infrastructure on the identified site, potential environmental fatal flaws and/or areas of sensitivity, and defining the extent of studies required to be undertaken as part of the detailed EIA phase. This was achieved through an evaluation of the proposed project, involving the project proponent, and specialist consultants. This Scoping Report has been compiled in terms of the 2014 EIA Regulations (GNR 326) published in terms of Section 24(5) of NEMA.

A summary of the conclusions of the evaluation of the potential impacts identified to be associated with the project is provided in **Section 10.2**. Recommendations regarding investigations required to be undertaken within the detailed EIA phase are provided within the Plan of Study for EIA (**Chapter 11**).

10.1 Legal Requirements as per the EIA Regulations, 2014 (as amended) for the undertaking of a Scoping Report

This chapter of the Scoping Report includes the following information required in terms of Appendix 2: Content of the Scoping Report:

Requirement	Relevant Section
(h)(xi) a concluding statement indicating the preferred alternatives, including the preferred location of the activity.	An overall conclusion and fatal flaw analysis regarding the Merino Wind Farm is included within this chapter as a whole.

10.2. Overview of the Merino Wind Farm

This Scoping Report documents the procedure for determining the extent of, and approach to, the Environmental Impact Assessment (EIA) Phase. The Scoping Phase included the following key tasks:

- Involvement of relevant authorities and Interested and Affected Parties (I&APs) through the Public Involvement Process.
- Consideration of feasible alternatives to be assessed during the EIA Phase.
- Identification of potential impacts (positive and negative) associated with feasible project alternatives to be assessed during the EIA Phase.
- Defining Terms of Reference for any specialist studies required to inform the EIA Phase (Plan of Study (PoS) for the Environmental Impact Assessment Report.

The Merino Wind Farm is proposed on a site located approximately 35km south-west of Richmond and 80km south-east of Victoria West. The project site falls within Ward 3 of the Ubuntu Local Municipality and within the Pixley Ka Seme District Municipality in the Northern Cape Province on the following four (4) affected properties:

- 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

The Merino Wind Farm project site is proposed to accommodate the following infrastructure which will enable the wind farm to supply a contracted capacity of up to 140MW:

» Up to 45 wind turbines with a maximum hub height of up to 170m. The tip height of the turbines will be 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.
» Site offices and maintenance buildings, including workshop areas for maintenance and storage.

The Scoping study included the identification of potential impacts associated with the project through specialist inputs and consultation with affected parties and key stakeholders. A preliminary evaluation of the extent and expected significance of potential impacts associated with the development of the Merino Wind Farm have been detailed in Chapter 9. These will be assessed in detail through the EIA Phase assessment, which will include independent specialist assessments.

This scoping study has identified sensitive areas within the development area to assist in focussing the location of the development footprint for the Merino Wind Farm to minimise the potential for environmental impact. The extent of the project site is ~29 909ha and has been considered in this Scoping Report. A development area of ~5 516ha was demarcated within this project site and allows an adequate footprint for the installation of a wind energy facility with a contracted capacity of up to 140MW, while allowing for the avoidance of environmental site sensitivities. The size of the development footprint within the development area will be confirmed in the EIA Phase once the facility layout is available for assessment.

The majority of potential impacts identified to be associated with the construction of the Merino Wind Farm and associated infrastructure are anticipated to be localised and restricted to the development area itself, while operation phase impacts/benefits range from local to regional. No environmental fatal flaws were identified to be associated with the development area. Areas of high and very high sensitivity were identified to be avoided by the development footprint.

The potentially significant issues related to the construction and operation of the Merino Wind Farm include:

» Disturbance/destruction to and loss of vegetation and fauna and associated habitats
» Introduction and/or spread of declared weeds and alien invasive plants.
» Disturbance / degradation / loss of wetland soils and vegetation.

- Increased erosion and sedimentation & contamination of soil and water resources.
- Potential loss of bat foraging habitat.
- Potential disturbance/destruction of bat roosts.
- Increased bat mortality due to light pollution and collision with moving turbine blades.
- Mortality of priority bird species due to collision with moving turbine blades and electrocution and collisions with medium voltage power lines within the facility.
- Displacement of priority bird species.
- Loss of land with agricultural capability.
- Destruction of archaeological and palaeontological heritage.
- Negative impact to significant cultural landscapes.
- Visual impacts on the landscape and sense of place.
- Increase in noise level at sensitive receptors.
- Traffic congestion during construction.
- Social impacts, both positive and negative (job creation and business opportunities, impacts associated with construction workers in the area, and economic benefits).

10.3. Site Sensitivity Analysis for the Aurora Wind Farm

This section considers the sensitive features located within the development area, as identified by the independent specialists within each respective field, and also indicates the locations of the sensitive features within the development area.

The potentially sensitive areas which have been identified through the scoping study are illustrated in **Figure 10.1**. The detail is based on the desktop review of available baseline information for the project site, as well as sensitivity data from specialist studies undertaken during the scoping phase, which included field surveys. During the site and desktop surveys, the affected area was investigated in sufficient detail in order to provide definitive insight into the potential for constraining factors on the site. The sensitivity map must be used as a tool by the developer to avoid any areas flagged to be of higher risk or sensitivity and inform the location/layout of the development footprint for the facility and associated infrastructure. The development footprint is the area which will be assessed further in detail in the EIA Phase, in order to provide an assessment of environmental acceptability and suitability of the facility layout of the Merino Wind Farm.

10.3.1 Ecological Sensitive Features

To determine sensitivity within the project site, local and regional factors were considered. There are some habitats within the project site that have been described as sensitive in their own right, irrespective of regional assessments. This includes primarily the dry stream beds and associated riparian zones. Rocky outcrops and steep slopes are more sensitive than surrounding areas, mainly due to higher floristic diversity and the likelihood of plant species with low local abundance occurring there.

At a regional level, the Critical Biodiversity Area (CBA) map for Northern Cape indicates the northern part of the broader project site as being important for conservation. There are also two drainage lines (the two main ones on site) that are designated as being CBA1 areas. The remaining drainage lines of the broader project site are indicated as being Ecological Support Areas (ESAs).

In terms of species of concern and overall biological diversity, including both plants and animals, the low hills and mountain ranges are the areas with the most species recorded as well as being most likely to contain any species of concern. However, the southern main drainage line is the most likely habitat for the Critically Endangered Riverine Rabbit, if it occurs on site, which is unknown but possible.

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:

Very high ecological sensitivity:
» Habitat suitable for Riverine Rabbit

High ecological sensitivity:
» CBA 1 and dry stream beds, including the associated riparian habitats and adjacent floodplains

Medium – high ecological sensitivity:
» Ridges, outcrops, hills, and mountain slopes

Medium ecological sensitivity:
» Plains vegetation

The areas designated as Very High sensitivity were designated as such on the basis of the valley being identified as a possible habitat for the Riverine Rabbit. The occurrence of the Riverine Rabbit within the project site, as well as confirmation as to whether the valley should be treated as a no-go area will be confirmed during the EIA Phase. The drainage lines, which are designated as being of high sensitivity should be treated as restricted. No buffer zones are recommended around the identified sensitive features from an ecological perspective.

10.3.2 Freshwater Sensitive Features

The aquatic biodiversity theme sensitivity indicates predominantly "Very High" sensitivity, with isolated areas of "Low" sensitivity. These "Very High" sensitivities are attributed to the presence of wetlands, rivers, and priority area quinary catchments. The watercourses in the area are classified as Critically Endangered (CR) and Endangered (EN). Further to this, also considering the presence of areas indicated as CBA1, a buffer width of 45m is recommended for construction and operation activities.

The identified water resources (which are rated as being of very high sensitivity) and their associated buffer zones are regarded as no-go areas and turbines may not be placed within these features and their buffers. The construction of road crossings across these features is however acceptable.

10.3.3 Bat Sensitive Features

Within the Merino Wind Farm project site, sensitive bat features have been identified which need to be considered by the development footprint. The high sensitive features are considered to be mainly no-go areas, with some moderate sensitivity features also present. The following sensitive features have been identified:

High bat sensitivity (a 200m buffer has been recommended around these features):

- Valley bottom wetlands.
- Pans and depressions.
- Dams.
- Rocky boulder koppies (tors).
- Exposed rocky cliff edges.
- Drainage lines capable of supporting riparian vegetation.
- Other water bodies and other sensitivities such as manmade structures, buildings, houses, barns, and sheds.

Medium bat sensitivity (a 150m buffer has been recommended around these features):

- Alluvial plains and washes.
- Seasonal drainage lines.

The high bat sensitivity areas, together with their associated buffer zones, are regarded as no-go areas and turbines may not be placed in these areas and their buffers. The construction of road crossings across the drainage lines is however acceptable. Turbines are allowed within the medium bat sensitivity areas and their buffers.

10.3.4 Avifaunal Sensitive Features

A number of habitat units comprising potential sensitive avifauna features have been observed within the development area for the Merino Wind Farm. The following preliminary avifauna sensitivities have been identified:

- **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 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.
»

10.3.5 Soils and Agricultural Potential Sensitive Features

The agriculture theme sensitivity indicates predominantly a combination of "Low" and "Medium" sensitivities, with isolated areas of "High" sensitivity. It is worth noting that no "High" sensitivity areas were identified within the development area.

There are no areas identified which are required to be excluded from the proposed development footprint at this stage. This will be confirmed during the EIA Phase.

10.3.6 Heritage Sensitive Features, the Cultural Landscape (incl. Archaeology, Palaeontology, and Cultural Landscape)

Heritage sensitivity relates to archaeological resources, palaeontological resources, heritage resources, and the cultural landscape. According to the SAHRIS Palaeosensitivity Map, the area proposed for development is underlain by sediments of very high paleontological sensitivity. According to the extract from the Council for GeoSciences Map 3122 for Victoria West, the development area is underlain by the Abrahamskraal and Teekloof Formations, both of the Adelaide Subgroup of the Beaufort Group of sediments. According to the SAHRIS Fossil Heritage Browser and the Palaeotechnic Report for the Western Cape (Almond and Pether, 2008), the Beaufort Group sediments are known to preserve diverse terrestrial and freshwater tetrapods of *Tapinocephalus* to *Lystrosaurus* Biozones (amphibians, true reptiles, synapsids – especially therapsids), palaeoniscoid fish, freshwater bivalves, trace fossils (including tetrapod trackways) and sparse vascular plants (*Glossopteris* Flora, including petrified wood).

There are no areas identified which are required to be excluded from the proposed development footprint at this stage. This will be confirmed during the EIA Phase.

10.3.7 Noise Sensitive Features

Potential noise-sensitive developments in the area were initially identified using aerial images as well as the Online Environmental Screening Tool, with the noise-sensitive developments confirmed during the site visit. To minimise impacts on the identified potential noise-sensitive developments, 500m, 1 000m and 2 000m buffer zones have been recommended. Generally, noises from wind turbines:

» Could be significant within 500m, with receptors staying within 500m from operational wind turbines subject to noises at a potentially sufficient level to be considered disturbing.
» Are normally limited to a distance of approximately 1 000m from operational wind turbines. Night-time ambient sound levels are elevated, and the potential noise impact might be measurable.

Cumulative noises from multiple wind farms surrounding potential noise-sensitive developments may be high and exceed 45dBA.
» May be audible up to a distance of 2 000m at night.
» Are of a low concern at distances greater than 2 000m.

No wind turbines are to be developed within 160m and 500m from identified noise-sensitive developments considering day and night-time noise limits (considering only construction noises). As the noise level depends on the layout (that would determine the cumulative effect from all wind energy developments located within 2 000m from noise-sensitive developments), no-go areas cannot be confirmed during the scoping phase.

10.3.8 Visual Sensitive Features

A preliminary viewshed analysis for the proposed Merino Wind Farm was undertaken in order to determine the general visual exposure of the area under investigation. The viewshed analyses was undertaken from preliminary vantage points (with a maximum of 45) within the proposed development area at offsets of 170m above average ground level (i.e., the approximate hub height of the proposed wind turbines).

The following is evident from the viewshed analysis:

» The proposed Merino Wind Farm would have a large 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 relatively flat topography. This core area includes a number of homesteads, namely, Rondawel (on the development site), Rietfontein Wes, Bloemhof, and Vogelstruisfontein. The turbine structures are also expected to be clearly visible from the N1 national road traversing the proposed development site, and from one secondary road west of the site.
» Visual exposure will remain high in the medium distance (i.e., between 5 and 10km), especially to the north-east and south-west. Exposure to the south is hampered (reduced) by the undulating nature of the topography. Additional visual exposure within this zone also includes a section of the N1 national road and two secondary roads.
» In the medium to longer distance (i.e., between 10 and 20km), visual exposure will be somewhat reduced, especially towards the south-east and the north-west. This is due to the presence of hills and ridges at these locations. A section of the R398 arterial road may also be exposed within this zone.
» Visual exposure beyond a 20km radius is significantly reduced, especially in to the south and east. The town of Richmond also falls within this zone. However, it is not visually exposed to the proposed wind turbine structures.

It is envisaged that the wind farm structures would be easily and comfortably visible to observers (i.e., people travelling along roads and residing at homesteads or visiting the region), especially within a 5-10km radius of the wind farm, and would constitute a high visual prominence, potentially resulting in a high visual impact. Wind turbines should ideally not be placed on ridges, hills, or other elevated topographical units.

10.4 Overall Conclusion and Fatal Flaw Analysis

The development area for the Merino Wind Farm is outlined in black in **Figure 10.1.** The findings of the Scoping Study indicate that no environmental fatal flaws are associated with the proposed project. While some impacts of potential significance do exist, it is anticipated that the implementation of appropriate mitigation measures would assist in reducing the significance of such impacts to acceptable levels. It is however recommended, that the development area for the development of the facility be considered outside of the areas identified as no-go areas as far as possible in order to ensure that the development does not have a detrimental impact on the environment. This forms part of the 'funnel-down approach' for the identification of an appropriate development footprint within the development area. Even with the appropriate avoidance of sensitive areas, there is an adequate area on the site which can accommodate the planned 140MW facility with relatively low impacts on the environment. This area is referred to as the development footprint.

With an understanding of which areas within the development area are considered sensitive to the development of the proposed facility, the developer can prepare a detailed facility layout for consideration within the EIA Phase. During the EIA Phase, more detailed environmental studies will be conducted in line with the Plan of Study for EIA contained in **Chapter 11** of this Scoping Report. These studies will consider the detailed facility layout produced by the developer and make recommendations for the implementation of avoidance strategies (if required), and mitigation and management measures to ensure that the final assessed layout retains an environmental impact within acceptable limits. The sensitivity map will be further refined in the EIA phase on the basis of these specialist studies, in order to provide an assessment of environmental acceptability of the final design of the facility.

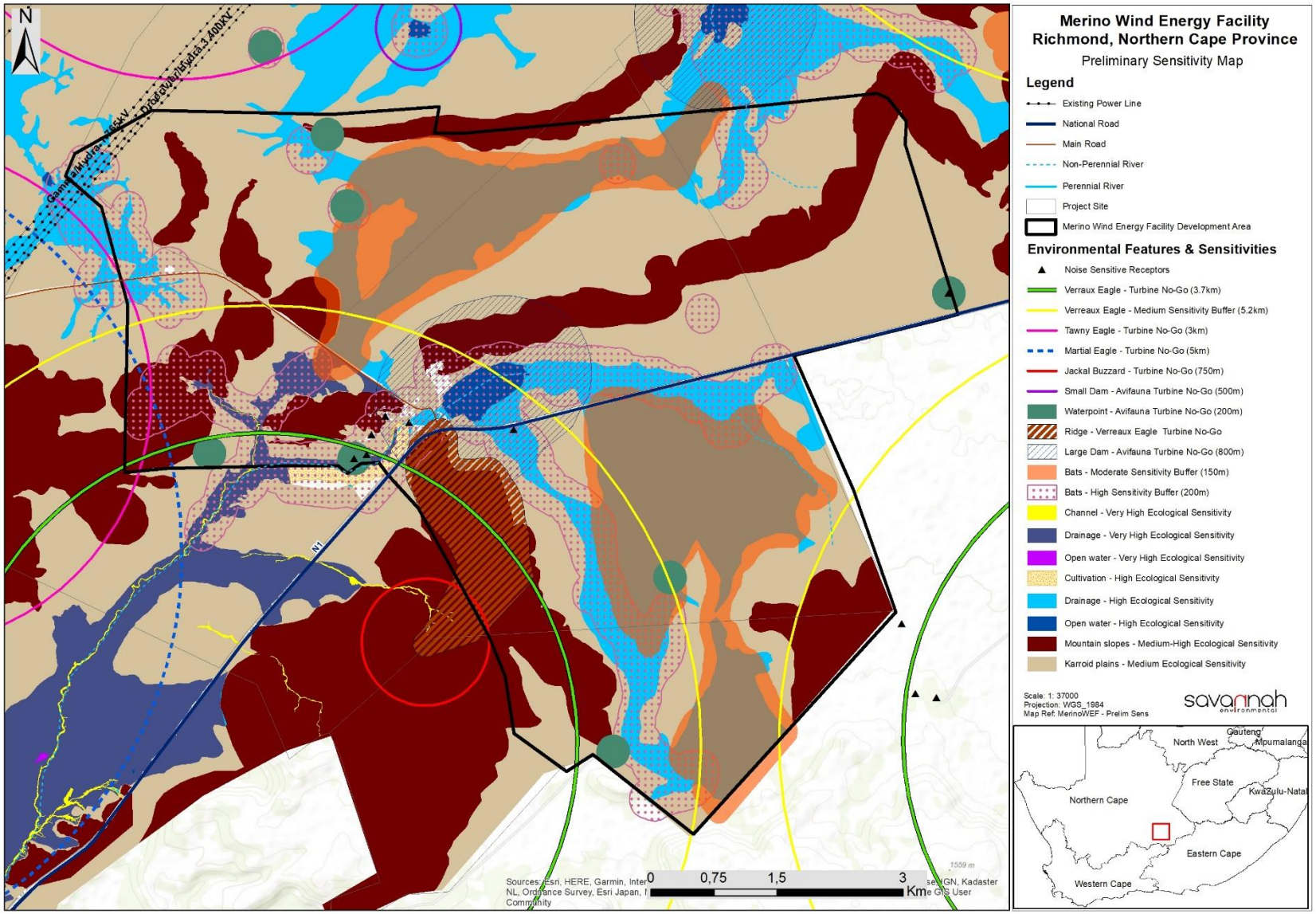

Figure 10.1: Environmental Sensitivity Map from the results of the scoping evaluation for the Merino Wind Farm and associated infrastructure

CHAPTER 11: PLAN OF STUDY FOR THE ENVIRONMENTAL IMPACT ASSESSMENT

One of the key objectives of the Scoping Phase is to determine the level of assessment to be undertaken within the EIA Phase of the process. This will include the methodology to be applied, the expertise required as well as the extent of further consultation to be undertaken. This is to determine the impacts and risks a particular activity will impose on a preferred site through the life of the activity (including the nature, significance, consequence, extent, duration and probability of the impacts) to inform the location of the development footprint within the preferred site.

This Chapter contains the Plan of Study for the EIA for the Merino Wind Farm, which describes how the EIA Phase will proceed, and includes details of the independent specialist studies required to be undertaken to assess the significance of those impacts identified within the Scoping Study to be of potential significance.

11.1 Legal Requirements as per the EIA Regulations, 2014 (as amended) for the Undertaking of a Scoping Report

This chapter of the scoping report includes the following information required in terms of Appendix 2: Content of the Scoping Report:

Requirement	Relevant Section
(h) a plan of study for undertaking the environmental impact assessment process to be undertaken, including - (i) a description of the alternatives to be considered and assessed within the preferred site, including the option of not proceeding with the activity; (ii) a description of the aspects to be assessed as part of the environmental impact assessment process; (iii) aspects to be assessed by specialists; (iv) a description of the proposed method of assessing the environmental aspects, including aspects to be assessed by specialists; (v) a description of the proposed method of assessing duration and significance: (vi) an indication of the stages at which the competent authority will be consulted; (vii) particulars of the public participation process that will be conducted during the environmental impact assessment process; and (viii) a description of the tasks that will be undertaken as part of the environmental impact assessment process; (ix) identify suitable measures to avoid, reverse, mitigate or manage identified impacts and to determine the extent of the residual risks that need to be managed and monitored.	A plan of study for the undertaking of the EIA Phase for the Merino Wind Farm is included within this chapter as a whole.

11.2 Objectives of the EIA Phase

The EIA Phase to be undertaken for the Merino Wind Farm and associated infrastructure will aim to achieve the following:

- Provide an overall description and detailed assessment of the social and biophysical environment affected by the development of the wind farm and associated infrastructure.
- Assess potentially significant impacts (direct, indirect, and cumulative, where required) associated with the wind farm.
- Identify and recommend appropriate avoidance strategies and mitigation measures for potentially significant environmental impacts.
- Undertake a fully inclusive public involvement process to ensure that I&APs are afforded the opportunity to participate, and that their comments are recorded.

The EIA will assess potential environmental impacts and benefits (direct, indirect, and cumulative impacts) associated with each phase of the development including design, construction, operation and decommissioning; and will aim to provide the Competent Authority with sufficient information to make an informed decision regarding the proposed development. The site layout being proposed for the Merino Wind Farm will be assessed through detailed independent specialist studies. As required in terms of the 2014 EIA Regulations (GNR 326), as amended, the assessment will include consideration of the 'do nothing' alternative.

11.3 Consideration of Alternatives

The following project alternatives will be investigated in the EIA:

Nature of Alternatives Considered	Description of the Alternatives relating to the Merino Wind Farm
Site-specific and Layout Alternatives	One preferred project site has been identified for the development of the Merino Wind Farm due to site specific characteristics such as the wind resource, land availability, topographical considerations, proximity to a viable grid connection and environmental features. The project site is ~29 909ha in extent which is considered to be sufficient for the development of a wind farm with a contracted capacity of up to 140MW. A development area of ~5 516ha has been identified by the proponent within the project site for the development. A facility layout within this development area will be provided by the applicant for assessment in the EIA Phase of the process.
Activity Alternatives	Only the development of a renewable energy facility is considered by Great Karoo Renewable Energy (Pty) Ltd. Due to the location of the project site and the suitability of the wind resource, only the development of a wind farm is considered feasible considering the natural resources available to the area and the current land-use activities undertaken within the project site (i.e., livestock farming).
Technology Alternatives	Only the development of a wind farm is considered due to the characteristics of the site, including the natural resources available. The use of wind turbines for the generation of electricity is considered to be the most efficient technology for the project site.
'Do-nothing' Alternative	This is the option to not construct and operate the Merino Wind Farm. No impacts (positive or negative) are expected to occur on the social and environmental sensitive features or aspects located within the project site or the surrounds. The opportunities associated with the development of the wind farm for the affected area and other surrounding towns in

Nature of Alternatives Considered	Description of the Alternatives relating to the Merino Wind Farm
	the area will also not be realised.

11.4 Description of project to be assessed during the EIA Phase

» *11.4.1 Project description*

The aspects or nature and extent of the project to be assessed as part of the EIA are detailed in **Table 11.1** below. A more detailed description of the activities associated with the construction and operation of the project is included in Chapter 2 of this Scoping Report and will be further refined in the EIA.

Table 11.1: Activities and associated infrastructure to be assessed in the EIA

Infrastructure	Footprint and dimensions
Number of turbines	Up to 45 turbines
Hub Height	Up to 170m
Tip Height	Up to 250m
Contracted Capacity	Up to 140MW (individual turbines up to 3.15MW in capacity each)
Tower Type	Steel or concrete towers can be utilised at the site. Alternatively, the towers can be of a hybrid nature, comprising concrete towers with top steel sections.
Area occupied by the on-site facility substation	~1000m x 700m
Capacity of on-site facility substation	33kV/132kV
Underground cabling between the turbines	Underground cabling will be installed at a depth of up to 1.5m to connect the turbines to the on-site facility substation. The cabling will have a capacity of up to 33kV.
Cabling from the onsite substation to the 132kV collector substation	Underground cabling will be installed at a depth of up to 1.5m to connect the on-site substation to the 132kV collector substation. The cabling will have a capacity of up to 132kV.
Area occupied by the electrical and auxiliary equipment required at the collector substation	100m x 100m
Area occupied by laydown area	~1000m x 700m
Access and internal roads	Wherever possible, existing access roads will be utilised to access the project site and development area. It is unlikely that access roads will need to be upgraded as part of the proposed development. Internal roads of up to 4.5m in width will be required to access each turbine and the on-site substation.
Turbine hardstand	~80m x 35m
Turbine foundation	Diameter of up to 25m per turbine
Grid connection	The 33/132kV on-site substation will be connected to the proposed 132kV central collector substation via underground cabling with a capacity of up to 132kV. A new 132kV single- or double-circuit power line will run from the central collector substation and tie into the existing Eskom Gamma Substation. The switching station forming part of the 132kV collector substation and the new 132kV single- or double-circuit will be assessed as part of a separate Basic Assessment process

Infrastructure	Footprint and dimensions
	in support of an application for Environmental Authorisation.
Temporary infrastructure	Temporary infrastructure, including laydown areas, hardstand areas and a concrete batching plant, will be required during the construction phase. All temporary infrastructure will be rehabilitated following the completion of the construction phase, where it is not required for the operation phase.

» *11.4.2. Scope of the EIA phase and EIA report*

The EIA Report will be compiled in terms of the requirements of the EIA Regulations and include the information as required in Appendix 3 of GNR 326. The results of the specialist studies and other available information will be integrated, synthesised, and presented in the EIA Report by the Savannah Environmental project team. The EIA report will assess the overall environmental impacts associated with the development, consider mitigation measures as may be required, and make recommendations regarding the best development alternative. The EIA Report will also identify mitigation measures and provide management recommendations to minimise negative impacts and enhance benefits. The EIA Report will include:

- The details and expertise of the **EAP** who prepared the report.
- The **location** of the development footprint of the activity and a locality map illustrating the location of the proposed activity.
- A **description** of the scope of the proposed activity including all listed activities triggered and a description of associated structures and infrastructure.
- The **policy and legislative** context within which the development is located and an explanation of how the development complies and responds to the legislation and policy context.
- The **need and desirability** of the proposed development of the activity in the context of the preferred location.
- A motivation for the **preferred development footprint** within the approved site as contemplated in the accepted scoping report.
- A description of the **process** followed to reach the proposed development footprint within the approved site, including:
  - details of the development footprint considered;
  - details of the public participation process undertaken in terms of Regulation 41 of the 2014 EIA Regulations, including copies of supporting documents;
  - a summary of issues raised by interested and affected parties and the manner in which the issues were incorporated;
  - the environmental attributes associated with the development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;
  - the impacts and risks identified including the nature, significance, consequence extent, duration and probability of the impacts, including the degree to which these impacts can be reversed, may cause irreplaceable loss of resources and can be avoided, managed or mitigated;
  - the methodology used for determining and ranking the nature, significance, consequence, extent, duration and probability of potential environmental impacts and risks;
  - positive and negative impacts that the activity and alternatives will have on the environment and the community;

- possible mitigation measures to be applied and the level of residual risk;
- a motivation for not considering alternative development locations;
- a concluding statement indicating the location of the preferred alternative development location; and
- a full description of the process followed to identify, assess and rank impacts of the activity and associated infrastructure on the preferred location including all environmental issues and risks that have been identified and an assessment of the significance of each issue and risk and the extent to which the issue/risk can be avoided or mitigated.

» An **assessment** of the identified potentially significant impacts and risks.
» A summary of the **findings and recommendations** of any specialist report and an indication as to how these findings and recommendations have been included.
» An **environmental impact assessment** containing a summary of key findings, an environmental sensitivity map and a summary of the positive and negative impacts and risks of the proposed activity.
» An **Environmental Management Programme** (EMPr), as per Appendix 4 of GNR326, containing the recommendations from specialists, the impact management **objectives,** and the impact management **outcomes**.
» The final **alternatives** which respond to the impact management measures, avoidance and mitigation measures identified.
» Any aspects which were **conditional** to the findings of the assessment.
» Description of the assumptions, uncertainties and gaps in knowledge relating to the assessment and mitigation measures proposed.
» An **opinion** as to whether the proposed activity should or should not be authorised and the conditions thereof.
» An undertaking under **affirmation** by the EAP in relation to the correctness of the information, the inclusion of comments and inputs from stakeholders and Interested and affected parties, the inclusion of inputs and recommendations from the specialists and any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested or affected parties.

The EIA Report will be released to the public and relevant stakeholders, Organs of State and Authorities for a 30-day review and comment period. Comments received from I&APs will be captured within a Comments and Response Report, which will be included within the Final EIA Report, for submission to the authorities for decision-making.

» 11.5 Specialist Assessments to be undertaken during the EIA Phase

A summary of the aspects which require further investigation within the EIA Phase through specialist studies, the terms of reference for each specialist study, as well as the proposed activities to be undertaken in order to assess and ground-truth the significance of the potential impacts is provided within **Table 11.2**. The specialists proposed to undertake detailed studies in the EIA Phase are also reflected within this table. These specialist studies will consider the development footprint proposed for the wind farm and all associated infrastructure, as well as feasible and reasonable alternatives identified for the project.

Table 11.2: Aspects requiring further investigation by specialists during the EIA Phase and terms of reference to assess the significance of the potential impacts relevant to the Merino Wind Farm

Aspect	Activities to be undertaken in order to assess significance of impacts	Specialist
Ecology (Fauna and Flora)	The following site-specific assessments are recommended for the EIA Phase: » Detailed camera-trap survey of potential Riverine Rabbit habitat, as per recommended protocols. This survey will provide incidental information on the occurrence of other mobile flora on site. » More detailed floristic surveys of main footprint areas in order to document composition, especially of protected species. Ideally, this should be undertaken after an appropriate time-period after rainfall to allow emergence of any species of potential interest. Assessment of Impacts for the EIA The methodology described in **Section 11.6** assists in the evaluation of the overall effect of a proposed activity on the environment. It includes an assessment of the significant direct, indirect, and cumulative impacts. The significance of environmental impacts is to be assessed by means of criteria including extent (scale), duration, magnitude (severity), probability (certainty) and direction (negative, neutral or positive). The nature of the impact will be defined and described. It will refer to the causes of the effect, what will be affected, and how it will be affected. For each anticipated impact, recommendations will be made for desirable mitigation measures. Environmental Management Programme For each overarching anticipated impact, management recommendations for the design, construction, and operational phase (where appropriate) will be drafted for inclusion in the project EMPr.	David Hoare of David Hoare Consulting (Pty) Ltd
Freshwater resources (including all waterbodies and wetlands)	The EIA Phase will include the following activities: Freshwater resources located within the development area will be further assessed during the EIA Phase. The following activities will be undertaken: » Identify, delineate, and characterise water resources. » Undertake a functional assessment of systems, where applicable. » Determine a suitable buffer width for the resources. » Undertake a field survey during the wet season period that prioritises the development areas, but also considers the 500m regulated area. Assessment of Impacts for the EIA:	Andrew Husted and Ivan Baker of the Biodiversity Company

Aspect	Activities to be undertaken in order to assess significance of impacts	Specialist
	The methodology described in **Section 11.6** assists in the evaluation of the overall effect of a proposed activity on the environment. It includes an assessment of the significant direct, indirect, and cumulative impacts. The significance of environmental impacts is to be assessed by means of criteria including extent (scale), duration, magnitude (severity), probability (certainty) and direction (negative, neutral or positive). The nature of the impact will be defined and described. It will refer to the causes of the effect, what will be affected, and how it will be affected. For each anticipated impact, recommendations will be made for desirable mitigation measures. <u>Environmental Management Programme:</u> For each overarching anticipated impact, management recommendations for the design, construction, and operational phase (where appropriate) will be drafted for inclusion in the project EMPr.	
Bats	<u>The EIA Phase will include the following activities:</u> A bat impact assessment report will be compiled and be informed by the results of 12-month pre-construction monitoring programme. The data to be gathered in the remainder of the 12-month assessment forms part of the EIA study, and therefore the EIA plan of study requires the completion of the 12-month pre-construction study. <u>Assessment of Impacts for the EIA:</u> The methodology described in **Section 11.6** assists in the evaluation of the overall effect of a proposed activity on the environment. It includes an assessment of the significant direct, indirect, and cumulative impacts. The significance of environmental impacts is to be assessed by means of criteria including extent (scale), duration, magnitude (severity), probability (certainty) and direction (negative, neutral or positive). The nature of the impact will be defined and described. It will refer to the causes of the effect, what will be affected, and how it will be affected. For each anticipated impact, recommendations will be made for desirable mitigation measures. <u>Environmental Management Programme:</u> For each overarching anticipated impact, management recommendations for the design, construction, and operational phase (where appropriate) will be drafted for inclusion in the project EMPr.	Werner Marais of Animalia
Avifauna	<u>The EIA Phase will include the following activities:</u> An avifauna impact assessment report will be compiled and be informed by the results of 12-month pre-construction monitoring programme. The following activities will be undertaken during the EIA Phase: » The implementation of six avifaunal surveys, utilising transects, vantage point watches, focal points and incidental	Chris van Rooyen of Chris van Rooyen Consulting

Aspect	Activities to be undertaken in order to assess significance of impacts	Specialist
	counts, to inform the assessment of the potential impacts of the planned infrastructure within the development footprint.The monitoring protocol is guided by the following: o Procedures for the Assessment and Minimum criteria for reporting on identified environmental themes in terms of sections 24(5)(a) and (h) and 44 of NEMA when applying for Environmental Authorisation (Gazetted October 2020) o Protocol for the specialist assessment and minimum report content requirements for environmental impacts on avifaunal species by onshore wind energy generation facilities where the electricity output is 20MW or more (Government Gazette No. 43110 – 20 March 2020). o Verreaux's Eagle Best Practice Guidelines (Ralston-Patton S. 2017. Verreaux's Eagles and Wind Farms. Guidelines for impact assessment, monitoring and mitigation. BirdLife South Africa, March 2017). » The avifaunal specialists report will be structured around the following terms of reference: o Description of the affected environment from an avifaunal perspective. o Discussion of gaps in baseline data and other limitations. o Description of the methodology that was used for the field surveys. o Comparison of the site sensitivity recorded in the field with the sensitivity classification in the DFFE National Screening Tool and adjustment if necessary. o Provision of an overview of all applicable legislation. o Provision of an overview of assessment methodology. o Identification and assessment of the potential impacts of the proposed development on avifauna including cumulative impacts. o Provision of sufficient mitigation measures to include in the Environmental Management Programme (EMPr). o Conclusion with an impact statement whether the PV facility is fatally flawed or may be authorised. <u>Assessment of Impacts for the EIA:</u> The methodology described in **Section 11.6** assists in the evaluation of the overall effect of a proposed activity on the environment. It includes an assessment of the significant direct, indirect, and cumulative impacts. The significance of environmental impacts is to be assessed by means of criteria including extent (scale), duration, magnitude (severity), probability (certainty) and direction (negative, neutral or positive). The nature of the impact will be defined and described. It will refer to the causes of the effect, what will be affected, and how it will be affected. For each anticipated impact, recommendations will be made for desirable mitigation measures.	

Aspect	Activities to be undertaken in order to assess significance of impacts	Specialist
	Environmental Management Programme: For each overarching anticipated impact, management recommendations for the design, construction, and operational phase (where appropriate) will be drafted for inclusion in the project EMPr.	
Soils and Agricultural Potential	The EIA Phase will include the following activities: The soils impact assessment will include the consideration of aspects related to agricultural aspects in accordance with the protocols and procedures of GN 320 of 2020. The assessment will also include: » Identification and delineation of soils forms. » Determination of soil sensitivity. » Undertake a field survey that will prioritise the development areas. Assessment of Impacts for the EIA: The methodology described in **Section 11.6** assists in the evaluation of the overall effect of a proposed activity on the environment. It includes an assessment of the significant direct, indirect, and cumulative impacts. The significance of environmental impacts is to be assessed by means of criteria including extent (scale), duration, magnitude (severity), probability (certainty) and direction (negative, neutral or positive). The nature of the impact will be defined and described. It will refer to the causes of the effect, what will be affected, and how it will be affected. For each anticipated impact, recommendations will be made for desirable mitigation measures. Environmental Management Programme: For each overarching anticipated impact, management recommendations for the design, construction, and operational phase (where appropriate) will be drafted for inclusion in the project EMPr.	Ivan Baker of the Biodiversity Company
Heritage (including Cultural Landscape, Archaeology and Palaeontology)	The EIA Phase will include the following activities: As part of the EIA, it is necessary to undertake a Heritage and Archaeological Study to fulfil the SAHRA requirements in accordance with the National Heritage Resources Act (No. 25 of 1999). A Heritage and Archaeological Impact Assessment (including cultural landscape and palaeontology) will therefore be conducted, the primary objective of which is to determine the heritage and archaeological significance of features on the site as well as the significance of the cultural landscape. The following activities will be undertaken during the EIA Phase: » Undertake field assessments in order to fill the identified gaps in knowledge. The archaeological field surveys will provide sufficient ground-coverage of the areas to be developed to be able to determine the nature of the resources likely to be impacted. The palaeontological and cultural landscape field surveys will target sensitive geological and cultural landscape features.	Jenna Lavin of CTS Heritage

Aspect	Activities to be undertaken in order to assess significance of impacts	Specialist
	» Draft a report in accordance with the requirements for Heritage Impact Assessments. Assessment of Impacts for the EIA: The methodology described in **Section 11.6** assists in the evaluation of the overall effect of a proposed activity on the environment. It includes an assessment of the significant direct, indirect, and cumulative impacts. The significance of environmental impacts is to be assessed by means of criteria including extent (scale), duration, magnitude (severity), probability (certainty) and direction (negative, neutral or positive). The nature of the impact will be defined and described. It will refer to the causes of the effect, what will be affected, and how it will be affected. For each anticipated impact, recommendations will be made for desirable mitigation measures. Environmental Management Programme: For each overarching anticipated impact, management recommendations for the design, construction, and operational phase (where appropriate) will be drafted for inclusion in the project EMPr.	
Visual	The EIA Phase will include the following activities: » A visual impact assessment will be undertaken during the EIA Phase. The report will include an assessment of potential visual impacts according to the nature, extent, duration, intensity or magnitude, probability and significance of the potential visual impacts, and will propose management actions and/or monitoring programs and may include recommendations related to the wind energy facility layout. The visual impact will be determined for the highest impact-operating scenario (worst-case scenario) and varying climatic conditions (i.e., different seasons, weather conditions, etc.) will not be considered. The visual impact assessment will also consider potential cumulative visual impacts, or alternatively the potential to concentrate visual exposure/impact within the region. The following via specific tasks must be undertaken: o Determine potential visual exposure. o Determine visual distance/observer proximity to the facility. o Determine viewer incidence/viewer perception (sensitive visual receptors). o Determine the visual absorption capacity (VAC) of the landscape. o Calculate the visual impact index. o Determine impact significance. o Propose mitigation measures. o Reporting and map display.	Lourens du Plessis of LoGIS

Aspect	Activities to be undertaken in order to assess significance of impacts	Specialist
	o Site visit. o Photo simulations from selected vantage points. <u>Assessment of Impacts for the EIA:</u> The methodology described in **Section 11.6** assists in the evaluation of the overall effect of a proposed activity on the environment. It includes an assessment of the significant direct, indirect, and cumulative impacts. The significance of environmental impacts is to be assessed by means of criteria including extent (scale), duration, magnitude (severity), probability (certainty) and direction (negative, neutral or positive). The nature of the impact will be defined and described. It will refer to the causes of the effect, what will be affected, and how it will be affected. For each anticipated impact, recommendations will be made for desirable mitigation measures. <u>Environmental Management Programme:</u> For each overarching anticipated impact, management recommendations for the design, construction, and operational phase (where appropriate) will be drafted for inclusion in the project EMPr.	
Noise	<u>The EIA Phase will include the following activities:</u> The identification and assessment of noise impacts is based on the SANS 10328:2008 standard. The following activities will be undertaken during the EIA Phase: » A site visit to confirm the status of the identified receptors and areas identified to have a "very high" sensitivity to noise (as identified by the online screening tool). » The semi-continuous measurement of ambient sound levels over a minimum period of 2-nights, in compliance with the requirements of GNR 320. The data will be analysed to motivate appropriate noise limits. » Data as received from the developer will be used to model the potential noise impact. The following information will be considered o The Sound Power Emission details of a WTG that may be used at this WEF; o The latest WEF layout to be assessed; o The surface contours of the project focus area; and o Surface and meteorological constants. » The potential impact will be evaluated (where possible) in terms of the nature (description of what causes the effect, what/who might be affected and how it/they might be affected) as well as the extent of the impact. » The potential significance of the identified issues will be calculated based on the evaluation of the issues/impacts.	Morné de Jager of Enviro-Acoustic Research

Aspect	Activities to be undertaken in order to assess significance of impacts	Specialist
	» The development of an Environmental Management Plan and a proposal of potential mitigation measures (if required). » Recommendations. Assessment of Impacts for the EIA: The methodology described in **Section 11.6** assists in the evaluation of the overall effect of a proposed activity on the environment. It includes an assessment of the significant direct, indirect, and cumulative impacts. The significance of environmental impacts is to be assessed by means of criteria including extent (scale), duration, magnitude (severity), probability (certainty) and direction (negative, neutral or positive). The nature of the impact will be defined and described. It will refer to the causes of the effect, what will be affected, and how it will be affected. For each anticipated impact, recommendations will be made for desirable mitigation measures. Environmental Management Programme: For each overarching anticipated impact, management recommendations for the design, construction, and operational phase (where appropriate) will be drafted for inclusion in the project EMPr.	
Traffic	The EIA Phase will include the following activities: » Undertake additional site visit. » Confirmation of trip generation based on the activities related to traffic movement for the construction and operation (maintenance) phases of the facility. » Access assessment based on the preferred access point. » Impact assessment and mitigation measure. » Cumulative impact assessment. Assessment of Impacts for the EIA: The methodology described in **Section 11.6** assists in the evaluation of the overall effect of a proposed activity on the environment. It includes an assessment of the significant direct, indirect, and cumulative impacts. The significance of environmental impacts is to be assessed by means of criteria including extent (scale), duration, magnitude (severity), probability (certainty) and direction (negative, neutral or positive). The nature of the impact will be defined and described. It will refer to the causes of the effect, what will be affected, and how it will be affected. For each anticipated impact, recommendations will be made for desirable mitigation measures.	Iris Wink of JG Afrika

Aspect	Activities to be undertaken in order to assess significance of impacts	Specialist
	Environmental Management Programme: For each overarching anticipated impact, management recommendations for the design, construction, and operational phase (where appropriate) will be drafted for inclusion in the project EMPr.	
Social	The EIA Phase will include the following activities: The proposed approach to the Social Impact Assessment (SIA) is based on the Guidelines for SIA endorsed by Western Cape Provincial Environmental Authorities (DEA&DP) in 2007. The Guidelines are based on accepted international best practice guidelines, including the Guidelines and Principles for Social Impact Assessment (Inter-organizational Committee on Guidelines and Principles for Social Impact Assessment, 1994) and IAIA Guidance for Assessing and Managing Social Impacts (2015). The approach to the study will involve: » Collection and review of reports and baseline socio-economic data on the area. This includes socio-economic characteristics of the affected areas, current and future land uses, and land uses planning documents relating to the study area and surrounds. » Identification of the components associated with the construction and operational phase of the proposed project, including estimate of total capital expenditure, number of employment opportunities created and breakdown of the employment opportunities in terms of skill levels (low, medium and high skilled), breakdown of wages per skill level, assessment procurement policies etc. » Site visit and interviews with key affected parties, including local communities, local landowners, key government officials (local and regional), the client, local farmers associations, tourism and conservation officials, chamber of commerce etc. » Review of key findings of the key specialist studies that have a bearing on the SIA, such as the Visual Impact Assessment (VIA). This information will also be used to inform the engagement with the affected landowners. » Identification and assessment of key social issues and assessment of potential impacts (negative and positive) associated with the construction, operational and decommissioning phase of the project. » Identification and assessment of cumulative impacts (positive and negative). » Identification of appropriate measures to avoid, mitigate, enhance, and compensate for potential social impacts. » Preparation of Social Impact Assessment (SIA) Report. Assessment of Impacts for the EIA: The methodology described in **Section 11.6** assists in the evaluation of the overall effect of a proposed activity on the	Tony Barbour of Environmental Consulting and Research

Aspect	Activities to be undertaken in order to assess significance of impacts	Specialist
	environment. It includes an assessment of the significant direct, indirect, and cumulative impacts. The significance of environmental impacts is to be assessed by means of criteria including extent (scale), duration, magnitude (severity), probability (certainty) and direction (negative, neutral or positive). The nature of the impact will be defined and described. It will refer to the causes of the effect, what will be affected, and how it will be affected. For each anticipated impact, recommendations will be made for desirable mitigation measures. Environmental Management Programme: For each overarching anticipated impact, management recommendations for the design, construction, and operational phase (where appropriate) will be drafted for inclusion in the project EMPr.	
Cumulative Assessment	Assess the cumulative impacts associated with the construction and operation of more than one development (i.e., renewable energy developments) within the immediate surrounding areas of the project site and within a 30km radius of the site on the ecological, heritage, soil and agricultural potential, bats, avifaunal, social, traffic, visual and noise impacts of the area. The objective is to identify and focus on potentially significant cumulative impacts so these may be taken into consideration in the decision-making process. The following will be considered: » Unacceptable loss of threatened or protected vegetation types, habitat, or species through clearing, resulting in an impact on the conservation status of such flora, fauna or ecological functioning. » Unacceptable risk to freshwater features through disturbance associated with construction activities and increased runoff and erosion during the operation phase. » Unacceptable risk to bats through habitat loss, roost destruction, and collision with wind turbines » Unacceptable risk to avifauna through habitat loss, displacement, and collision with wind turbines and/or medium voltage power lines. » Unacceptable loss of high agricultural potential areas presenting a risk to food security and increased soil erosion. » Unacceptable loss of heritage resources (including palaeontological and archaeological resources, and cultural landscape). » Unacceptable increase in ambient noise conditions. » Complete or whole-scale change in the sense of place and character of an area and unacceptable visual intrusion.	Savannah Environmental

Aspect	Activities to be undertaken in order to assess significance of impacts	Specialist
	» Unacceptable impact on traffic and road conditions. » Unacceptable impact to social factors and components.	

» 11.6 Methodology for the Assessment of Potential Impacts

Direct, indirect, and cumulative impacts of the above issues identified through this Scoping Study will be assessed in terms of the following criteria:

- The **nature**, which shall include a description of what causes the effect, what will be affected and how it will be affected.
- The **extent**, wherein it will be indicated whether the impact will be local (limited to the immediate area or site of development) or regional:
  - local extending only as far as the development site area – assigned a score of 1;
  - limited to the site and its immediate surroundings (up to 10 km) – assigned a score of 2;
  - will have an impact on the region – assigned a score of 3;
  - will have an impact on a national scale – assigned a score of 4; or
  - will have an impact across international borders – assigned a score of 5.
- The **duration**, wherein it will be indicated whether:
  - the lifetime of the impact will be of a very short duration (0–1 years) – assigned a score of 1;
  - the lifetime of the impact will be of a short duration (2-5 years) - assigned a score of 2;
  - medium-term (5–15 years) – assigned a score of 3;
  - long term (> 15 years) - assigned a score of 4; or
  - permanent - assigned a score of 5.
- The **magnitude**, quantified on a scale from 0-10, where a score is assigned:
  - 0 is small and will have no effect on the environment;
  - 2 is minor and will not result in an impact on processes;
  - 4 is low and will cause a slight impact on processes;
  - 6 is moderate and will result in processes continuing but in a modified way;
  - 8 is high (processes are altered to the extent that they temporarily cease); and
  - 10 is very high and results in complete destruction of patterns and permanent cessation of processes.
- The **probability** *of occurrence*, which shall describe the likelihood of the impact actually occurring. Probability will be estimated on a scale, and a score assigned:
  - Assigned a score of 1–5, where 1 is very improbable (probably will not happen);
  - Assigned a score of 2 is improbable (some possibility, but low likelihood);
  - Assigned a score of 3 is probable (distinct possibility);
  - Assigned a score of 4 is highly probable (most likely); and
  - Assigned a score of 5 is definite (impact will occur regardless of any prevention measures).
- the **significance**, which shall be determined through a synthesis of the characteristics described above (refer formula below) and can be assessed as low, medium or high.
- the **status**, which will be described as either positive, negative or neutral.
- the degree to which the impact can be reversed.
- the degree to which the impact may cause irreplaceable loss of resources.
- the *degree* to which the impact can be *mitigated.*

The **significance** is determined by combining the criteria in the following formula:

S= (E+D+M) P; where

S = Significance weighting
E = Extent
D = Duration
M = Magnitude
P = Probability

The **significance weightings** for each potential impact are as follows:

- < 30 points: Low (i.e., where this impact would not have a direct influence on the decision to develop in the area),
- 30-60 points: Medium (i.e., where the impact could influence the decision to develop in the area unless it is effectively mitigated),
- > 60 points: High (i.e., where the impact must have an influence on the decision process to develop in the area).

Other aspects to be taken into consideration in the specialist studies and EIA report are:

- Impacts should be described in terms of before and after the proposed mitigation and management measures have been implemented.
- All impacts should be evaluated for the full lifecycle of the proposed development, including construction, operation, and decommissioning.
- The impact assessment should take into consideration the cumulative effects associated with this and other similar developments which are either developed or in the process of being developed in the region. The purpose of the cumulative assessment is to test if such impacts are relevant to the proposed project in the proposed location (i.e., whether the addition of the proposed project in the area will increase the impact). In this regard, specialist studies will consider whether the construction of the proposed development will result in:
  - Unacceptable risk
  - Unacceptable loss
  - Complete or whole-scale changes to the environment or sense of place
  - Unacceptable increase in impact
- A conclusion regarding whether the proposed development will result in any unacceptable loss or impact considering all the projects proposed in the area is included in the respective specialist reports.

As Great Karoo Renewable Energy (Pty) Ltd has the responsibility to avoid and/or minimise impacts as well as plan for their management (in terms of the EIA Regulations), the mitigation of significant impacts will be discussed. Assessment of mitigated impacts will demonstrate the effectiveness of the proposed mitigation measures.

11.7 Authority Consultation

Consultation with the regulating authorities (i.e., DFFE and Northern Cape DAEARD&LR) has been undertaken in the Scoping Phase and will continue throughout the EIA process. On-going consultation will include the following:

- Submission of a Final Scoping Report following a 30-day review period which will include all comments and issues raised during the review period as well as appropriate responses to the comments.
- Submission of an EIA Report and EMPr for a 30-day review and comment period.

- Submission of a Final EIA Report and EMPr following a 30-day review period which will include all comments and issues raised during the review period as well as appropriate responses to the comments received.
- Consultation and an authority site visit (if required) in order to discuss the findings and conclusions of the EIA Report.

11.8 Public Participation Process

A public participation process will be undertaken by Savannah Environmental during the EIA phase. The Public Participation will be undertaken in line with the approved Public Participation Plan as per the correspondence from DFFE (**Appendix B** and **Appendix C9**). Consultation with key stakeholders and I&APs will be on-going throughout the EIA Phase. Through this consultation process, stakeholders and I&APs will be encouraged to verify that their issues were recorded in the Scoping Phase, identify additional issues of concern or highlight positive aspects of the proposed project, and comment on the findings of the EIA Phase. In order to accommodate the varying needs of stakeholders and I&APs within the study area, as well as capture their inputs, various opportunities will be provided for stakeholders and I&APs to be involved in the EIA Phase of the process, as follows:

- Focus group meetings (pre-arranged and I&APs invited to attend) via the use of virtual platforms (Zoom or MS Teams).
- One-on-one consultation meetings (for example with directly affected and surrounding landowners) via telephone or virtual platforms.
- Telephonic consultation sessions (consultation with various parties from the EIA project team, including the public participation consultant, lead EIA consultant, as well as specialist consultants).
- Written, faxed or e-mail correspondence.

The public participation process will include the following activities:

- Placement of an advertisement in one local newspaper (De Aar Echo Newspaper)).
- Maintenance and finalisation of the I&AP database.
- Release of the EIA Report and EMPr for a 30-day review and comment period.
- Ongoing consultation with all registered I&APs regarding the progress of the EIA process and the outcomes or findings of the EIA Report through stakeholder consultation via notification letters, telephone calls and virtual focus group meetings.
- Compile a Comments and Responses Report and evidence of the public participation process undertaken to be included in the final EIA Report for decision-making.

11.9 Key Milestones of the Programme for the EIA

The envisaged key milestones of the programme for the EIA Phase are outlined in the following table (and include indicative dates):

Key Milestone Activities	Proposed timeframe
Make the Scoping Report available to the public, stakeholders, and authorities for 30 days	12 November 2021 – 13 December 2021
Finalisation of Scoping Report, and submission of the Final Scoping Report to DFFE	07 January 2021

Key Milestone Activities	Proposed timeframe
Authority acceptance of the Final Scoping Report and Plan of Study to undertake the EIA	43 days from submission of the Final Scoping Report
Undertake specialist studies and public participation process	December 2021 – February 2022
Make Draft EIA Report and EMPr available to the public, stakeholders, and authorities for 30 days	February 2022 – March 2022
Finalisation of EIA Report, and submission of the Final EIA Report to DFFE	April 2022
Authority review period and decision-making (107 calendar days)	April 2022 – August 2022

CHAPTER 12: REFERENCES

Ecology Scoping Report

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Nid	Report Type	Author/s	Date	Title
120317	HIA Phase 1	Celeste Booth, Sholeen Shanker	01/12/2012	An archaeological ground-truthing walk-through for the proposed substation and associated overhead power line for the Nobelsfontein Wind Energy Facility situated on a site south of Victoria West on the Farm Nobelsfontein 227, Northern Cape Province
120325	HIA Phase 1	Celeste Booth, Sholeen	01/12/2012	An archaeological ground-truthing walk-through for the proposed substation and associated overhead power line for the

		Shanker		Nobelsfontein Wind Energy Facility situated on a site south of Victoria West on the Farm Nobelsfontein 227, Northern Cape Province
120325	HIA Phase 1	Celeste Booth, Sholeen Shanker	01/12/2012	An archaeological ground-truthing walk-through for the proposed substation and associated overhead power line for the Nobelsfontein Wind Energy Facility situated on a site south of Victoria West on the Farm Nobelsfontein 227, Northern Cape Province
120820	HIA Phase 1	Celeste Booth	01/12/2012	An Archaeological Ground-Truthing Walk-Through for The Nobelsfontein Wind Energy Facility Situated on A Site South of Victoria West On The Farms Nobelsfontein 227, Annex Nobelsfontein 234, Ezelsfontein 235, And Rietkloofplaaten 239, Northern Cape Province
251290	PIA Desktop	Lloyd Rossouw	01/01/2014	Combined Environmental Environmental Impact Assessment for the proposed Ishwati Emoyeni Wind Energy Facility and Supporting Eskom Transmission and Eskom Distribution Grid Connection Infrastructure near Murraysburg, Western Cape. Chapter 13: Palaeontology Impact Assessment.
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356942	AIA Phase 1	Johan Binneman, CelesteBooth, Natasha Higgitt	01/05/2010	A PHASE 1 ARCHAEOLOGICAL IMPACT ASSESSMENT (AIA) FOR THE PROPOSED SKIETKUIL QUARRIES 1 AND 2 ON THE FARM SKIETKUIL No. 3, VICTORIA WEST, CENTRAL KAROO DISTRICT, WESTERN CAPE PROVINCE
356942	AIA Phase 1	Johan Binneman, Celeste	01/05/2010	A PHASE 1 ARCHAEOLOGICAL IMPACT ASSESSMENT (AIA) FOR THE PROPOSED
		Booth, Natasha Higgitt		Skietkuil Quarries 1 and 2 On the Farm Skietkuil No. 3, Victoria West, Central Karoo

				District, Western Cape Province
357137	Heritage Impact Assessment Specialist Reports	Timothy Hart	13/10/2015	Heritage Impact Assessment for the proposed Umsinde Emoyeni Wind Energy Facility
360840	Non-Impact Assessment Related Reports	Wouter Fourie	05/03/2016	Environmental Impact Assessment of the proposed amendments to the Environmental Authorisation for the Mainstream Renewable Power South Africa Wind Energy Project near Victoria West in the Northern Cape: Specialist Heritage Opinion
360850	HIA Phase 1	Wouter Fourie	04/03/2016	Basic assessment process for Proposed development of supporting infrastructure to the Victoria West Wind Energy Facility, Victoria West
6805	AIA Phase 1	Len van Schalkwyk, Elizabeth Wahl	01/09/2007	Heritage Impact Assessment of GammaGrassridge Power Line Corridors and Substation, Eastern, Western and Northern Cape Provinces, South Africa
7035	AIA Phase 1	Johan Binneman, CelesteBooth, Natasha Higgitt	05/03/2011	A Phase 1 Archaeological Impact Assessment (AIA) for the proposed Karoo Renewable Energy Facility on asite south of Victoria West, Northern and Western Cape Province on the farms Phaisantkraal 1, Modderfontein 228, Nobelsfontein 227, Annex Nobelsfontein
7036	AIA Desktop	Celeste Booth, Natasha Higgitt	19/11/2010	An Archaeological Desktop Study for the proposed Karoo Renewable Energy Facility on a site south of Victoria West, Northern and Western Cape
8943	PIA Phase 1	Lloyd Rossouw	24/03/2011	Palaeontological desktop assessment of a commercial renewable energy facility site located approximately 34km south of Victoria West in the Western Cape Province (and Northern Cape)

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